REPORT

Draft EIA / EMP Report: Environmental Authorisation Application for the Proposed iMpunzi South Pit Coarse Discard Dump and Venture Co-disposal Facility Project, Mpumalanga Province

Glencore Operations South Africa (Pty) Ltd

DMRE Ref. Number: (MP) 30/5/1/1/3/2/1 (375) EM

Submitted to:

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mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: Glencore Operations South Africa (Pty) Ltd: iMpunzi Mine Complex

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FILE REFERENCE NUMBER: (MP) 30/5/1/1/3/2/1 (375) EM

SAMRAD: N/A

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the EIA process is to, through a consultative process -

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

PURPOSE OF THIS DOCUMENT

Glencore Operations South Africa (GOSA) proposes to develop a discard facility at the previously mined-out South Pit and develop a Co-disposal Facility at the existing Venture coarse discard dump at their iMpunzi Mine Complex on the farms Kromfontein 30 IS, and Klipplaat 14 IS respectively, located in the Magisterial District of eMalahleni in the Mpumalanga Province. A new return water dam (RWD) will be constructed as part of the development of the Venture Co-disposal Facility., and an existing haul road from the ATCOM discard dumps to the ATC Plant will be widened. The proposed activities requires the submission of an application for a Waste Management Licence (WML) and Environmental Authorisation (EA), supported by an environmental impact assessment (EIA) in terms of the 2014 EIA Regulations, as amended April 2017, to the competent authority, the Department of Mineral Resources and Energy (DMRE).

Golder Associates Africa (Pty) Ltd (GAA), an independent environmental assessment practitioner, has been appointed by GOSA to conduct the EIA and associated authorisation processes.

The first phase of an EIA is the Scoping Phase, during which interested and affected parties (I&APs) are given the opportunity to comment on the proposed activities and the proposed scope of the EIA specialist studies. The Draft Scoping Report (DSR) was made available for public comment from 8 November 2019 until 9 December 2019. Comments received from I&APs thus far have been recorded in a Comment and Response Report (CRR) (see APPENDIX G). The Final Scoping (FSR) report was submitted to the DMRE on 8 January 2020. The acceptance of the Final Scoping report was received from DMRE on 01 July 2020.

This Draft EIA and Environmental Management Programme Report (EMPr), which describe the environmental impacts of the proposed development and how they will be managed and mitigated, is presented to registered I&APs so that they may comment on and/or raise issues of concern regarding the proposed project. The due date for comment on the Draft EIA/EMPr report is **2 October 2020**. Comments received during the public review period will be acknowledged and recorded in the final version of the EIA/EMP report, which will be submitted to the DMRE for decision making.

Summary of what the Environmental Impact Assessment report contains

This report contains:

- A description of the proposed expansion activities;
- An overview of the EIA process, including public participation;
- A description of the existing environment in the proposed project area;
- The assessed environmental impacts and recommended mitigation measures;
- A draft environmental management programme; and
- A list of interested and affected parties involved during the EIA process and their comments.

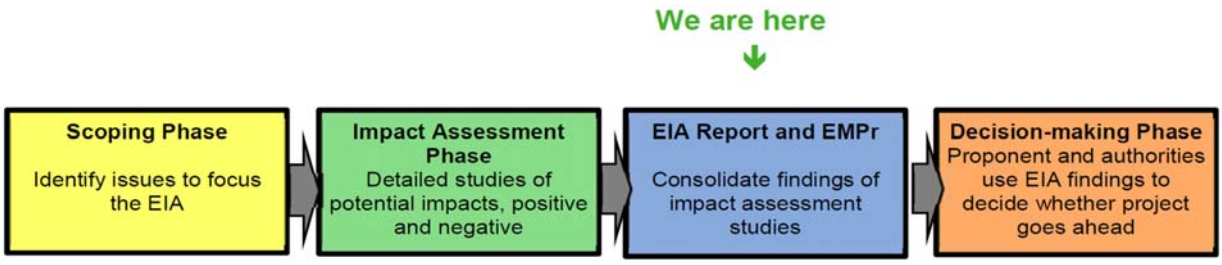

Figure 1: Various phases of an Environmental Impact Assessment (EIA) Process

PUBLIC REVIEW OF THE DRAFT EIA/EMPr REPORT

The Draft EIA/EMP Report is available for comment for a period of **30 days** from **1 September 2020** until **2 October 2020**. See Section 5.5 for the details of the Public Participation process followed during the Impact Assessment (IA) phase (this phase of the project).

OPPORTUNITIES FOR PUBLIC REVIEW

Stakeholders who wish to comment on the Draft EIA/EMP Report may do so in any of the following ways:

- Completing the comment sheet enclosed with this report or on-line via the Golder website (www.golder.com/public);
- Additional written submissions; and
- Comment by e-mail or telephone.

DUE DATE FOR COMMENT ON THIS EIA/EMP REPORT IS 2 October 2020

Please submit comments to the Public Participation Office:

Mabel Qinisile / Brian Magongoa

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Executive Summary

Glencore Operations South Africa's (GOSA) iMpunzi Mine Complex is located 27 km south-east of eMalahleni in the Mpumalanga Province, near the towns of Ogies and Kriel. The complex consists of four (4) sections, namely: Arthur Taylor Colliery (ATC), Phoenix (decommissioned), Arthur Taylor Colliery Opencast Mine (ATCOM), and ATCOM East.

GOSA has appointed Golder Associates Africa (Pty) Ltd (Golder) as an independent environmental assessment practitioner (EAP) to undertake the regulatory application process for the proposed development of a discard facility at the South Pit, develop a Co-disposal Facility at the existing Venture coarse discard dump, and the widening of the existing haul road from the ATCOM discard dumps to the ATC Coal Processing Plant, all located at their iMpunzi Mine Complex.

Project description

a) Proposed Venture Co-disposal Facility and Return Water Dam:

The existing Venture coarse discard dump footprint will be expanded, and the facility will be modified into a Co-disposal Facility to accommodate both coarse and fine (slurry) discard. The fine discard (slurry), currently disposed of underground, will be piped from the ATC Plant to the facility via pipeline. The current Pollution Control Dam (PCD) located here lies within the planned footprint of the new Co-disposal Facility. This PCD will be decommissioned and removed prior to the start of construction of the Co-disposal Facility, to be replaced by a new RWD. The new RWD will be constructed to the north of the Co-disposal Facility footprint, adjacent to the north-western corner of the planned footprint. This new RWD will serve to collect and store contaminated water from the surface water management channels to be constructed around the Co-disposal Facility as well as decant water pumped from the basin area of the facility (Golder Associates Africa (Pty) Ltd (r), February 2020).

The facility will have a lifespan of approximately nine years (in line with the remaining LoM of the ATC section and discard dump reprocessing project) and will store totals of 2.16 Mm^3 of coal fines material and 5.81 Mm^3 of coarse coal discards. The coarse discard will continue to be transported via conveyor belts to the facility from the ATC Plant. Constructed will be phased to allow for accommodation of the full volumes of both coal fines and coarse discard material, at the planned rate of production. There are five main development phases, the starter embankment walls will be constructed with coarse discard material, and deposition of fines will commence when the starter wall reaches a sufficient height to retain the fine material (1 533 mamsl). The facility will then be developed to extend to the south and then to the east.

b) Proposed South Pit Discard Dump:

The proposed South Pit Discard Dump will receive coarse discard from the Phoenix Plant. The South Pit is a previously mined-out area and has been partially rehabilitated. he proposed South Pit Discard Dump will accommodate approximately 29 Mm^3 of coarse discard. The maximum height of the dump will not exceed 30 m from the immediate surrounding ground elevations. The facility will be developed in a phased construction approach (Phases 1 to 3) to minimise the need for clean and dirty water separation measures as well as to allow for the timeous construction of blanket layers on hot areas.

All coals in contact with the atmosphere sooner or later show signs of oxidation and weathering, with resultant decreases in calorific content, volatile matter, and swelling capacities. The oxidation of coal is a strongly exothermic reaction. Thus, if the heat produced is not dissipated by a flow of air or by the conductive properties of the coal, it increases rapidly, finally reaching the temperature at which the coal ignites and burns, and creating a 'hot spot' in the seam or stockpile (Falcon, July 1986).

The Proposed South Pit Discard Dump should reach full capacity in 2035.

c) Haul road expansion:

GOSA plans to reprocess some of the ATCOM discard dumps. In order to enable the transportation of the discard from the dumps to the ATC Plant (via Articulated Dump Trucks (ADTs)), the existing haul road needs to be widened to a maximum of 16 m to accommodate the ADTs to transport the coarse discard to the ATC beneficiation plant. The expansion will also include the upgrading on an existing wetland crossing.

Environmental Impact Assessment and Public Participation Process

Announcement of the project

The proposed project and availability of the Draft Scoping Report (DSR) were announced on **Friday, 08 November 2019** and the due date for public comment was **Monday, 09 December 2019**. Stakeholders were invited to participate in the EIA process and associated public participation process and to pass on the information to friends, colleagues, and neighbours who might be interested, and to register as an interested and affected parties(I&APs).

The proposed project was announced as follows:

- Distribution of an announcement letter, locality map and registration and comment sheet to all identified I&APs with email and postal address. A bulk SMS was sent to identified I&APs with mobile phone numbers;
- The abovementioned documents were made available at the public places and posted to the Golder website;
- A mandatory advertisement was published in the local newspaper, the Middelburg Observer, on **Friday 08 November 2019**; and
- Site notices were placed along the access road to the Glencore (iMpunzi South Pit) operations.

Draft scoping report

The draft scoping report was made available for public review for a period of 30 days from ***Friday 08 November to Monday 09 December 2019*.**

Final scoping report

The DSR was updated and reflected the comments received from I&APs. The Final Scoping Report was submitted to the DMRE, on **8 January 2020**, for consideration on whether the Environmental Assessment Practitioner may proceed with the impact assessment phase. Subsequent acceptance of the EA application was received from DMRE on 1 July 2020.

Issues raised by I&APs

The comments received during the 30-day comment period, both in writing and telephonically, were captured in a Comment and Response Report (CRR) (see APPENDIX G). The Comment and Response Report will be updated throughout the environmental authorisation process.

Public participation process during the impact assessment phase

This phase will entail a review of the findings of the EIA, that will be presented in the EIA Report and Environmental Management Programme (EMPr), and the volume of specialist studies. These reports will be made available to all registered Interested and Affected Parties (I&APs) and key stakeholders for a period of 30 days from **Tuesday, 01 September 2020** until **Friday, 02 October 2020**.

The availability of the Draft EIA/EMP report for public comment will be announced as follows:

- Registered I&APs will receive a letter notifying them of the commencement of the impact assessment phase and an invitation to contribute comments, questions, or suggestions for enhanced benefits on the findings of the specialist studies and EMPr. In view of the COVID-19 restrictions and to protect the safety of stakeholders, Golder will distribute the letter by email, and a short notice via bulk SMS;
- The report, executive summary and its appendices will be available on Golder's website;
- The executive summary of the report also will be available as a separate document for those I&APs who do not have the time nor data to download the entire report. The executive summary will accompany the letter to be electronically distributed; and
- Detailed A3 notices regarding the proposed project (not copies of the actual documents) will be erected at publicly accessible places for potential I&APs to familiarize themselves with the project details.

After completion of the 30-day public comment period, all the issues, comments and suggestions raised on the Draft EIA/EMPr will be added to the Comment and Response Report that will accompany the Final EIA/EMPr. The Final EIA/EMPr will be submitted to the DMRE for decision making.

On submission of the Final EIA/EMPr to the DMRE, a personal letter will be sent to registered I&APs to notify them of the submission and the opportunity to download an electronic copy of the Final EIA/EMPr from the Golder website. The letter will be sent via email and a notification by bulk SMS.

Announcement of lead authority's decision

Once the Mpumalanga DMRE has taken a decision about the proposed project, the Public Participation Office will immediately notify I&APs of the decision and opportunity to appeal. This notification will be provided by distributing a letter, accompanied by a copy of the authority's decision, to all registered I&APs. The letter will provide guidance to I&APs on how to lodge an appeal should they wish to.

An advertisement to announce the Lead Authority's decision will be published in the Middleburg Observer newspaper, if so, required by the authorities.

Summary of key findings of the environmental impact assessment

The following potential impacts were identified and assessed:

Air quality

The project area is located within close proximity of several opencast coal mines and coal-fired power plants, region, thus the ambient particulate matter is already elevated and even small contributions to these can have a detrimental cumulative impact on the receiving environment. Dust emissions are expected as part of the footprint preparations for the proposed activities, due to entrainment of dust particles by the movement and operation of the construction equipment, which may also potentially lead to increased greenhouse gas releases. The area has numerous mines that contributes to air quality deterioration and the risk assessment was based on the fact the air is already exposed to polluting sources. The significance of the impact is anticipated to be Moderate and by implementing mitigation measures such as dust suppression and keeping the cleared footprint to a minimum will reduce the impact significance to Low.

During the operational phase, increased dust emissions can be expected as discard is being transported to the discard facilities and disposed of onto the dumps. The significance of the dust emissions resulting from the transport of the discard and the placement of the discard onto the discard dump is Moderate but can be reduced to Low by implementing the recommended mitigation measures. The possibility of combustion emissions associated with spontaneous combustion were not quantitatively assessed as no suitable site-specific emission factors for the mine are available. However, spontaneous combustion is possible and was identified as a

potential risk with a significance of Moderate and after implementation of mitigation measures the significance remains Moderate. The recommended mitigation measures include compaction of discard to create anoxic conditions which could reduce the probability of spontaneous combustion, and implementation of concurrent rehabilitation.

During decommissioning, dust and fine particulate emissions associated with shaping the final dumps prior to revegetation is anticipated. These impacts are anticipated to be restricted to the site and will cease once the activity ceases. It is anticipated that the significance of the unmitigated impact is Moderate and if the recommended mitigation measures are implemented the significance of the impact is Low.

Groundwater

Seepage from the fine (slurry) and coarse discard is considered to have a High magnitude because of the acid-generating nature of the discard and the elevated concentrations of calcium, aluminium and sulphate in the leachate. The impact is regional due to close proximity to rivers and is long term due to the normal duration of acid-generation of Highveld coal discards, although future kinetic testing of iMpunzi discard could determine the likely duration more accurately. This results in a High significance without mitigation.

Abstraction boreholes in the historic Venture and ATCOM South Pits would need to be installed during the development of the discard facilities to keep water levels within pit level and therefore preventing decant during operations and post-closure. This will reduce the environmental impact of mine affected water (to Moderate) and protect future uses of water resources in the area by preventing decant to surface water systems during the polluting period of the source, and address water use efficiency requirements as the mine-affected water is abstracted for treatment and reuse, rather than leaving it as wasted dirty water.

The following additional mitigation measures are recommended:

- Developing and implementing a standard operating procedure to correctly load vehicles to prevent overloading and associated spillages;
- Regular maintenance of vehicles and the usage of drip trays;
- Implement a minimum 300 mm cover on the discard dump to decrease recharge into the groundwater resource;
- Instillation of interceptor boreholes downgradient of facilities to capture the contaminant plume from reaching river channels (Steenkoolspruit);
- Continuous abstraction of contaminated pit water to prevent decant;
- Boreholes downgradient of backfilled or rehabilitated pits should be monitored for rising water levels, and potential decant of these pits;
- Groundwater levels should continue to be monitored monthly. Should it be identified that groundwater dependent/private users within the vicinity are impacted, it may be necessary to conduct a water supply options analysis and develop a supply strategy to meet the deficits;
- Implement concurrent rehabilitation as far as practically possible;
- Kinetic testing of the discard dump and fine discard material should be done to confirm predicted post closure groundwater quality; and
- Additional assessment should be conducted to confirm that the additional contaminant load from the discard facilities can be accommodated at the existing Tweefontein water treatment plant (WTP).

During decommissioning, seepage from the coarse discard and dried fine discard at the South Pit Discard Dump and the Venture Co-disposal Facility is anticipated to have an impact on the groundwater with a High significance and with the implementation of mitigation measures it can be reduced to a significance of Moderate. The reduction in baseflow to the Steenkoolspruit and the Saaiwaterspruit is another anticipated impact associated with the abstraction of water from the pits not only during the operational phase but during the closure phase and the risk significance is estimated to be Moderate and with mitigation measures it reduces to Low. The following mitigation measures are recommended:

- Implement a min. 300mm cover on the discard dumps to decrease recharge into the groundwater resource; and
- Continuously abstract contaminated pit water to prevent decant, in line with the minimum required as to not result in decreased baseflow.

Surface water

During the construction phase it is anticipated that the site preparation associated with the construction phase will lead to increased sediment loads reporting to the surface water resources. The identified impact has a Low significance if not mitigated and if the recommended mitigation measures, such as implementation of drainage control berms to limit erosion and sedimentation, are implemented it can be reduced further.

Numerous impacts have been identified during the operational phase of the proposed project. The unmitigated impacts with Low significance include increased sedimentation and potential contaminated runoff reporting to the receiving environment, as well as potential discharge from the dirty water sump into the receiving environment. Impacts with Moderate significance were also identified and relates to hydrocarbon spills during the transportation of the discard, inadequate clean and dirty water separation and increased seepage and higher decant volumes that could lead to the contamination of the surface water resources. If the following mitigation measures are implemented the significance of the impacts can be reduced to Low:

- Protect spoils area from erosion by utilising applicable erosion procedures;
- Ensure adequate compaction of discard material and concurrent rehabilitation as far as practically possible;
- Clean up spillages immediately and dispose of contaminated materials at permitted waste sites;
- Ensure regular maintenance of the diversion channels. Channels that have been eroded during storms should be maintained, including excavation of sediments, reinstatement of channels, removal of washed down vegetation and litter;
- Provide erosion protection for the clean water conveyance trench;
- Erosion protection in the form of scour aprons with energy dissipation must be implemented at the discharge points of each channel and scour aprons with stilling basins are required at the outlet of pipe chutes;
- Disturbed areas should be revegetated as quickly as possible to limit erosion and sedimentation in downstream water resources;
- Implement the required min. 300mm cover design option to ensure optimal recharge rates;
- Ensure adequate overburden and topsoil material as required to meet the optimal capping make-up to limit seepage to groundwater resources;
- Comply to rehabilitation and closure plan;
- Utilising applicable erosion procedures;

- Ensure adequate compaction of discard material and ensure that concurrent rehabilitation takes place;
- Design storm water management facilities for the discard facility is to comply with regulation GN 704 so that clean water is diverted away from the mining operations to the water resources;
- Revegetate placed cover material as quickly as possible;
- Manage the use of earth moving machinery in accordance with the mine's standard operating procedures;
- Develop the discard facilities in accordance with the design slopes; and
- Implement corrective measures identified in ongoing rehabilitation performance monitoring and assessment.

Decant of Acid Mine Drainage (AMD) reporting to the surface resources and increased erosion and the mobilisation of sediments have both been identified as impacts with a High unmitigated significance and can be reduces to Low if the recommended mitigation measures are implemented. The imprecise predicted quantification of the post closure decant volumes can lead to ineffective water treatment which has an unmitigated significance of Moderate and a mitigated significance of Low.

Inadequate storm water control measures during decommissioning can result in the restriction of runoff emanating from clean areas to report to the receiving environment and can be reduced from Moderate to Low if the recommended mitigation measures are implemented. Inadequate financial provision for long term water treatment and has a Moderate significance and the uncertainty of the treatment method prior to regulatory approval has a High significance and can be reduced to Low respectively, if the following mitigation measures are implemented:

- Ensure adequate overburden and topsoil material as required to meet the optimal capping make-up to limit seepage to groundwater resources;
- Implementation of water management options to pump and treat water to the required specifications to achieve desired discharge water qualities as per the recommendation made in Section 9.3.3;
- Finalise the integrated water balance for the entire iMpunzi MRA to determine excess water required to be managed;
- Continue with level measurements and metering in order to improve calibration of models;
- Monitor the performance of the treatment plant on an ongoing basis. Maintenance activities to be scheduled during dry seasons;
- Conduct ongoing rehabilitation performance monitoring and assessment;
- Implement the optimal cover design option and depth to ensure lower recharge rates are achieved;
- Ensure that the storm water controls are in compliance with GN704 or the necessary GN 704 exemption has been applied for, and that clean water is separated enabling runoff into catchment;
- A monitoring programme should be implemented to regular monitor water quality or more frequently during the rainy season to get an understanding of the potential contaminants of concern and adequacy of control measures;
- The required treatment for the quality and quantity of water should be clearly investigated. Adequate provisions of funding must be set aside to ensure the correct treatment option is implemented.

Biodiversity

Discard facilities

Considering the transformed nature of the footprints of the proposed discard facilities, it is considered highly unlikely that the proposed project will contribute to any existing impacts on terrestrial ecology as the facilities will be placed on historic mined-out pits. No wetlands were found to occur within the direct footprint of the proposed South Pit study area. The existing Venture coarse discard dump, as well as the footprint of the proposed expansion, will be located on rehabilitated mining land, with mining of the area having been completed before 2003. However, several wetland features, called “rehab wet areas”, were found to occur within the expansion footprint, while a number of natural wetland systems occur within the 500m buffer around the proposed expansion footprint. The “rehab wet areas” can be considered man-made or artificial wetlands in the sense that they have reformed on rehabilitated mining land, and the largest of which currently receives overflow from the existing PCD, which will be decommissioned during this project.

The construction and site preparation phase of the proposed Venture Co-disposal Facility footprint extension and the expansion of the haul road can lead to loss and disturbance of artificial wetland habitat, which formed as a result of rehabilitation in wet areas. By implementing the mitigation measures the significance of the impact can be reduced from Moderate, to a less Moderate rating. During the construction phase increased turbidity and deterioration in terms of quality of the wetlands adjacent to the Venture Co-disposal Facility extension can be expected. Increased sedimentation due to sediment rich runoff from the construction / preparation site to the adjacent wetlands as a result of site clearance, will have result in a Moderate environmental impact and can be reduced to Low, by implementing appropriate storm water management related mitigation measures.

Key focus should be on mitigating the impact of water quality deterioration which was identified as the impact of highest significance from a wetland perspective. Decreased flows within adjacent wetlands due to catchment exclusion as a consequence of the storm water management infrastructure associated with the dumps has been identified as an impact with a Moderate significance.

It is expected that seepage from the discard facilities will enter the underlying rehabilitated opencast pits and if the pits are allowed to fill with water and decant, the acidic seepage will enter the Tweefonteinspruit (Venture Co-disposal Facility) or Steenkoolspruit (South Pit Discard Dump), resulting in a High impact on the receiving wetlands. Should the mitigation measures related to groundwater and surface water be implemented, impacts on wetland should be reduced to Moderate.

During decommissioning of the proposed discard facilities, the sediment movement into wetlands, emanating from the rehabilitation practices which involves cover establishment on the side slopes, has a Moderate significance and by implementing the recommended mitigation measures the significance can be reduced to Low.

Haul road expansion

Currently, an unchanneled valley bottom wetland system with adjacent hillslope seepages occurs within the haul road expansion route. Previous mining and rehabilitation activities have caused significant habitat disturbance and fragmentation of the landscape surrounding the proposed road expansion route. Thus, it is expected that the faunal abundance and diversity in the area is low. During the construction phase of the haul road expansion, the disturbance of vegetation may also result in other/secondary impacts, such as soil erosion and the establishment of alien invasive plants. Implementation of the following mitigation measures are recommended:

- As far as practical, vehicle access tracks and lay-down areas should be located in already disturbed areas. Where this is not possible, the disturbance footprints should also be kept to a minimum;

- The approved area for construction should be demarcated to prevent construction vehicles entering areas of the wetland that will not be affected by the proposed road expansion, enabling construction contractors to avoid these areas; and
- Construction activities should be undertaken during the dry season insofar as possible.

During operation, the hardened surfaces associated with the compaction of soil will result in surface runoff and decreased infiltration into soils. This could result in decreased interflow recharge and decreased flow into the wetlands, while increased surface runoff could result in erosion of the adjacent wetlands. The significance of this impact can be reduced from Moderate to Low, by implementing the below recommended mitigation measures:

- Driving within the wetland areas should be kept to an absolute minimum. Clearly defined access routes should be used only; and
- Appropriately engineered designs for the wetland crossing must be implemented to ensure that diffused flow regime is maintained upstream and downstream of the road crossing, and no impoundment upstream or erosion downstream of the road occurs.

Visual

The expected visual impacts from the proposed discard facilities and expanded haul road may contribute to the negative effect of existing mine infrastructure and facilities on the general visual aesthetics of the local area. Over time, various infrastructure and facilities associated with the GOSA operations and adjacent mines will be removed during decommissioning, closure and rehabilitation of these operations. There will however be a permanent visual impact on the landscape, as the discard facilities will remain post-closure, although they will be shaped, rehabilitated and revegetated.

The potential movement of earth moving vehicles and personnel along the local roads and construction activities on the site could be visible to local residents. The significance of the visual impact might increase if the activities give rise to visible dust plumes. The visual impact during site preparation and construction has a Moderate significance. Implementation of mitigation measures such as dust suppression and planting indigenous trees along the parimeter embankment of the Venture discard dump should reduce the impact to a Low significance.

The significance of the visibility of the discard facilities, especially the Venture Co-disposal Facility expansion and increase in height during operational phase is Moderate and will reduce slightly with the implementation of the recommended mitigation measures. Dust plumes are often one of the more socially objectionable impacts associated with the disposal of discard onto the dumps, due to the associated potential health risks, nuisance factor and degradation of the visual comfort value of the surrounding landscape. The significance of the dust impacts can be reduced from Moderate to Low by implementing mitigation measures such as dust suppression and implementing concurrent rehabilitation to reduce the visual impact of the bare side slopes of the dumps.

The only identified impact during the decommissioning and closure phase is the presence of the discard facilities, especially the Venture Co-disposal Facility which is situated close to a local road. At final closure, the discard facilities will remain in place, but it will be shaped and revegetated.

Noise

The existing mining operations associated with iMpunzi and surrounding mines have long impacted on the ambient noise levels of the area. These include, but are not limited to, opencast mining activities and the coal processing facilities in the area. No residential areas are situated close to the project sites, and the impacts were assessed in terms of the noise impacts on site and along the local roads.

During the site preparation and construction phase it is anticipated that the use of heavy machinery, the hauling of topsoil away from the footprint area and hauling of haul road material will have a Low impact on the current

noise levels in the vicinity of the mine and if mitigated, the impact will reduce further. The following mitigation measures are recommended:

- The most appropriate equipment should be used for the particular purpose of site clearance and construction;
- The haul road must be levelled and compacted on a regular basis to reduce friction on the road leading to noise arising from the road / tyre interaction;
- All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and
- Vehicles should not be allowed to idle when not in use.

During the operational phase the same impacts have been identified as with the construction phase. The significance of the elevated noise levels associated with the hauling and placement of discard materials on the dumps has been identified as Low and with the implementation of the recommended mitigation measures, it can be reduced further.

During the replacement of topsoil and seeding, associated with the rehabilitation phase it is anticipated that the use of heavy machinery and the hauling of topsoil will have a Low impact on the current noise levels in the vicinity of the discard facilities and by implementing mitigation measures similar to those recommended to be implemented during construction and operations, the impact will reduce further.

Socio-economic

The proposed activities will not create any new jobs nor require extraordinary expenditure on local goods and services, but it would prolong the life of the iMpunzi mining operations, which would result in a positive impact of Moderate significance. Communities in the receiving environment are exposed to high rates of unemployment and generally do not have access to adequate social services and infrastructure. During the initial site preparation and construction phase, some temporary employment opportunities will arise for general workers and the positive impact can be increased if the following measures are implemented:

- General workers should be sourced locally as far as possible as they will be the most affected by the proposed project;
- A local skills database must be developed and updated regularly. The skills database should be used for recruitment purposes; and
- A monitoring system should be put in place to ensure that iMpunzi's recruitment policy is adhered to.

During the operational phase, impacts relating to the loss of employment for contractors after construction phase and prolonged job security for the current employees were identified. The expansion of the dumps and associated activities will ensure that iMpunzi remains operational and consequently, this will ensure local economic growth and the transfer of technical skills.

Opinion on whether the activity should be authorised

It is expected that the proposed discard facility establishment at South Pit, modification of the current Venture Co-disposal Facility, and haul road expansion project will not result in any environmental impacts that cannot be mitigated to acceptable levels, provided that all the environmental management measures described in the environmental management programme report (EMPr) and recommended conditions that must be included in the authorisation are applied diligently.

By not granting this authorisation, the benefits (i.e. continued production and job security) of the project to GOSA (iMpunzi), as well as local residents will not be realised. Therefore, it is the opinion of the environmental assessment practitioner (EAP) that the application for Environmental Authorisation (EA), and Waste Management Licence (WML) be granted, to enable GOSA to undertake the activities described in this EIA/EMPr.

Conditions that Must be included in the environmental authorisation

General conditions

- Implement all aspects of the EMPr in sections Part B of this document;
- Comply with all relevant legislation at all times;
- Undertake annual internal auditing of environmental performance and annual reporting to the DMRE; and
- Undertake biennial external auditing of environmental performance and provide the DMRE with a copy of the audit report.

Design conditions - South Pit Discard Dump

GOSA – iMpunzi must:

- Undertake detailed design of the South Pit Discard Dump;
- Update the conceptual landform designs for the overall ATCOM mining areas;
- Undertake detailed design and efficacy studies of the final dump cover thickness, as the 300 mm thick soil cover was determined for managing infiltration for pollution control (decreasing mass loads to the groundwater system) and water use efficiency (decreasing the volume of dirty water generated). Additional soil might be required for a growth medium, depending upon the final determined land use;
- Investigate the use of the proposed borehole as drainage conduit to a suitable level of detail;
- Include differential settlement and low wall stability analysis in the next design phase;
- Apply a 1m blanket layer as a cooling mechanism prior to the placement of discard on hot areas; and
- Conduct hydrological modelling to determine how run-off from the upper surface of the facility can best be drained with a dedicated engineered channel on the western side.

Design conditions - Venture Co-disposal Facility

GOSA – iMpunzi must:

- Conduct hydrological modelling to determine how runoff from the upper surface of the Venture Co-disposal Facility and the South Pit Discard Dump can best be drained with a dedicated engineered channel on the western side; and
- Undertake detailed design and efficacy studies of the final dump cover thickness, as the 300 mm thick soil cover was determined for managing infiltration for pollution control (decreasing mass loads to the groundwater system) and water use efficiency (decreasing the volume of dirty water generated). Additional soil might be required for a growth medium, depending upon the final determined land use.

- Conduct additional geotechnical investigations to update the stability analysis and to complete the design of the facility (e.g. founding conditions for structures, embankment construction, etc) and must include:

- Foundation assessment of the material used to backfill the historic Venture opencast pit. This must include *in-situ* investigations and laboratory testing of sampled materials to conceptualize the type and condition of the backfill material; and

- Laboratory testing of the discard material.

- Install a barge pump (with a maximum pumping capacity of 250 m^3/day) to route runoff and operational slurry return water from the slurry pool to the perimeter channels; the channels must route the water to the new RWD; and

- A new RWD with minimum capacity of 56 000 m^3 must be constructed to receive runoff from the discard dump side slopes as well as the slurry return water and runoff from the dump top (embankment crest, dry beach, wet beach and slurry pool) must be routed through the barge pump system and diverted to the new RWD through the trapezoidal stormwater channel.

Site Specific conditions

- Conduct kinetic testing of the discard dump and fine discard material to confirm predicted post closure groundwater quality;

- Conduct the following assessments relating to the existing Tweefontein WTP (design):
  - Develop a predicted 95th percentile concentration scenario, to indicate potential variability in feed concentrations to even higher levels than currently indicated in the average scenarios (as completed in the Groundwater impact assessment report APPENDIX K);
  - Run reverse osmosis (RO) simulations to ascertain the impact of the higher ionic concentrations in the feed on the % water recovery that can be achieved. Some components associated with scale formation, e.g. Calcium still seems to be within range, but the overall TDS increase impact on recovery needs to be quantified;
  - Since the treatment plant was designed for modular expansion, some expansions may need to be assessed; and
  - Verify revised flow rates from Glencore Goedgevonden and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded.

- Compile a site-wide topsoil balance for all areas of the iMpunzi complex and related mine residue facilities indicating the topsoil volume (and quality) requirements for rehabilitation and closure, topsoil volumes available and their location (in-situ ahead of mining and stockpiled) and the shortfall or surplus;

- Identify and quantify potential topsoil sources to address any shortfalls;

- Update the proposed land preparation, soil amelioration and hydroseeding rates based on site specific soil sampling and analysis;

- Incorporate the Venture Co-disposal Facility and the South Pit Discard Dump into the mine wide closure planning and costing to ensure the alignment of end land use planning and closure objectives;

- Investigate and implement alternative water management solution to manage potential decant if dewatering boreholes are deemed to be ineffective to manage potential decant;
- Continue investigations in support of the development of the post-closure water management strategy for the mine;
- Take appropriate remedial actions if deviations from expected environmental performance occurs; and
- Amend the EMPr as and when necessary to maintain acceptable environmental performance.

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Storm Water Management of the Venture Co-disposal Facility

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TABLE OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AEL	Atmospheric Emission Licence
AMD	Acid Mine Drainage
AP	Acid Potential
ATC	Arthur Taylor Colliery
ATCOM	Arthur Taylor Colliery Opencast Mine
BA	Basic Assessments
BEE	Black Economic Empowerment
BPG	Best Practise Guidelines
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
CMU	Catchment Management Units
CRR	Comments and response report
CV	Curricula Vitae
DMRE	Department of Mineral Resources and Energy
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EIS	Ecological Importance and Sensitivity
ELM	Emalahleni Local Municipality
EMP	Environmental Management Programme
EMPr	Environmental Management Programme reports
FSR	Final Scoping Report

Acronym	Definition
GA	General Authorisation
GAA	Golder Associates Africa
GN	General Notice
GNR	General Notice Regulation
GOSA	Glencore Operations South Africa (Pty) Ltd
IDP	Integrated Development Plan
I&AP	Interested and affected party
IWULA	Integrated Water use Licence
IWWMP	Integrated Water and Waste management Plan
LoM	Life of Mine
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MPRDA	Mineral and Petroleum Resources Development Act No. 28 of 2002
MR	Mining Right
MRA	Mining Right Area
NAAQS	National Ambient Air Quality Standards;
NEMA	National Environmental Management Act No. 107 of 1998
NEMA:QA	National Environmental Management: Air Quality Act No. 39 of 2004
NEM:WA	National Environmental Management: Waste Act No. 59 of 2008.
NWA	National Water Act No. 36 of 1998
PAG	Potentially acid generating
PCD	Pollution control dam
PCSWMM	Personal Computer Storm Water Management Model
PES	Present ecological status
RE	Remaining Extent
ROM	Run of Mine
RWD	Return Water Dam

Acronym	Definition
RWQO	Resource Water Quality Objectives
SANBI	South African National Biodiversity Institute
SAWQG	South African Water Quality Guidelines
SANS	South African National Standards (previously SABS)
SAWS	South African Weather Services
SLP	Social and Labour Plan
SP	Significance points
SWMP	Surface Water Management Plan
VDD	Vandyksdrift
WMA	Water Management Area
WML	Waste Management Licence
WTP	Water Treatment Plant

Units of Measure	
ºC	Degrees Celsius
cm	Centimetre
EC	Electrical conductivity
ha	Hectares
kg	Kilogram
km	Kilometres
km^2	Kilometres squared
kPa	Kilopascal
L/a	Litre per annum
l/d	Litre per day
ℓ/s	Litre per second
m	Metre
mm	Millimetre

Mm^3	Million cubic metres
m^2	Square metre
m^3	Cubic metre
m/s	Metres per second
m^3/d	Cubic metre per day
m^3/year	Cubic metre per year
mamsl	Metres above mean sea level
mbgl	Meters below ground level
mg/ℓ	Milligram per litre
Mℓ	Megalitre
ML	Million litres
Mm	Million metres
mm	Millimetre
Mt	Million tons
mS/m	Milli Siemens per metre
ppm	Parts per million
T	Total
TDS	Total dissolved solids
v/c	Volume/capacity
µg/ℓ	Microgram per litre

PART A
SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1.0 INTRODUCTION AND BACKGROUND

Glencore Operations South Africa's (GOSA) iMpunzi Mine Complex is located 27 km south-east of eMalahleni in the Mpumalanga Province, near the towns of Ogies and Kriel. The complex consists of four (4) sections, namely: Arthur Taylor Colliery (ATC), Phoenix (decommissioned), Arthur Taylor Colliery Opencast Mine (ATCOM), and ATCOM East (Figure 2).

GOSA has appointed Golder Associates Africa (Pty) Ltd (GAA) as an independent environmental assessment practitioner (EAP) to undertake the regulatory application process for the proposed development of a discard facility at the South Pit and modify the existing Venture coarse discard dump into a Co-disposal Facility at their iMpunzi Mine Complex. The proposed South Pit Discard Dump will receive coarse discard from the Phoenix Plant. The South Pit is a previously mined-out area and has been partially rehabilitated. The existing Venture coarse discard dump footprint will be expanded, and the facility will be modified into a Co-disposal Facility to accommodate both coarse and fine (slurry) discard. A new return water dam (RWD) will be constructed as part of the development of the Venture Co-disposal Facility. The Co-disposal Facility will receive coarse and fine discard from the ATC Coal Processing Plant, which sources coal from opencast workings and from discard dump reprocessing. As part of the project, an existing haul road from the ATCOM discard dumps to the ATC Plant will be widened to accommodate re-mining of the discard dumps in this section.

Coarse coal discard

The coarse discard is composed of coal particles greater than 2 mm in size; and is transported and placed within the disposal area by haul truck or conveyor belt.

Fine coal discard (Slurry)

The fine discard is composed of coal particles 2 mm in size or smaller; and is hydraulically transported and placed via pipelines within the disposal area.

The above activities require authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended), the National Water Act, 1998 (Act 36 of 1998) (NWA), and the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEMWA) (as amended). The application process must be supported by an environmental impact assessment (EIA) in terms of the 2014 EIA Regulations, as amended in April 2017, to be submitted to the competent authority, the Department of Mineral Resources and Energy (DMRE).

The main purpose of this EIA/EMPr report is to provide a description of the current baseline environmental conditions within the proposed project area, and to describe the assessed environmental impacts and mitigation measures for the proposed activities.

1.1 Contents of this report

This document has been structured as follows to meet the requirements of the 2014 EIA Regulations, as amended in April 2017:

- **Introduction and overview** – Introduce the project, project proponent provides an overview of the Project, provides the details of the environmental practitioner, and explains the EIA process;
- **Project Motivation** – Motivates the need for and desirability of the project;
- **EIA Process** – Summarises the process being undertaken with respect to the EIA for the project, inclusive of the methodology utilised for scoping;

- **Description of the Proposed Project** - Provides a summary of the key project components, the project location, scale, nature and design, main inputs and outputs, schedule and activities during different phases of the project, inclusive of a description of the project location and the properties on which the project will take place;
- **Project Alternatives** – Summarises alternatives considered by the project proponent;
- **Policy, Legal and Administrative Framework** – Discusses the environmental policy, legal, and administrative framework applicable to the proposed project. This framework includes a summary of relevant South African regulations, the applicable administrative framework, and the environmental permitting process;
- **Description of the Environment that may be affected** – Describes the current pre-project biophysical, socio-economic, and cultural status of the area, key characteristics (sensitive or vulnerable areas), important heritage resources, current land use and livelihoods;
- **Environmental Issues and Potential Impacts of the Project -** Describes the identified impacts and recommended mitigation measures;
- **Public Consultation** – This section provides a summary of the public consultation activities proposed and carried out as part of the EIA/EMPr processes;
- **Opinion of the Environmental Assessment Practitioner (EAP)** and **Recommended Conditions of this Environmental Authorisation Application**;
- **Next Steps in the Process** – Stakeholder review of the findings of the Environmental Impact Assessment (EIA) presented in the Draft EIA Report and Environmental Management Programme report (EMPr), and the volume of specialist studies;
- **References** – References to literature consulted; and
- **Appendices** – Technical material supporting the EIA report, including the Curricula Vitae (CV) of the EAP, stakeholder comments and supporting information, Preliminary design reports, Specialist impact assessment reports, and document limitations.

2.0 PROPONENT AND PRACTITIONER DETAILS

2.1 Details of the proponent

For this EIA, the following person may be contacted at Glencore:

Table 1: Proponents contact details

Contact person	Tebogo Chauke
Address	Glencore Operations South Africa (Pty) Ltd: iMpunzi Mine Complex Private Bag x7265, Witbank, 1035
Telephone number	013 687 8299
Cell Phone number	073 765 0999
E-mail	Tebogo.Chauke@glencore.co.za

2.2 Details of environmental assessment practitioner

GOSA has appointed Golder Associates Africa (Pty) Ltd as an independent environmental assessment practitioner (EAP) to undertake the EIA that is required to support the EA application for the proposed extension of the existing Venture discard facility, establishment of a new RWD, the establishment of the South Pit Discard

Dump, and the widening of the existing haul road from the ATCOM discard dumps to the ATC Coal Processing Plant.

Golder Associates Africa is a member of the world-wide Golder Associates group of companies, offering a variety of specialised engineering and environmental services. Employee owned since its formation in 1960, the Golder Associates group employs more than 7 500 people who operate from more than 155 offices located throughout Africa, Asia, Australasia, Europe, North America and South America. Golder Associates Africa (GAA) has offices in Midrand, Pretoria, Florida, Democratic Republic of the Congo (DRC), Ghana, Mozambique, and Zambia. GAA has more than 200 skilled employees and can source additional professional skills and inputs from other Golder offices around the world.

GAA has no vested interest in the proposed project and hereby declares its independence as required by the South African EIA Regulations.

For purposes of this EIA, the following persons may be contacted at GAA:

Table 2: Details of Golder Associates

Name	Golder Associates Africa (Pty) Ltd
Address	Building 1, Magwa Crescent West, Maxwell Office Park, Waterfall City, Midrand P.O. Box 6001, Halfway House, 1685, South Africa Telephone: (011) 254 4800 **Fax: (086) 582 1561**
Environmental Assessment Practitioner (EAP)	**Mariëtte Weideman** (Environmental Consultant) Email: mweideman@golder.co.za *Full CV is provided APPENDIX B.*
Public Participation Specialist	**Antionette Pietersen** (Public Participation Specialist) Email: Apietersen@golder.co.za

2.2.1 Expertise of environmental assessment practitioner

2.2.1.1 Qualifications of EAP

Education

- B.Sc. Biological Sciences in Botany and Biochemistry - North West University (Potchefstroom Campus);
- B.Sc. (Hons) Environmental Sciences and Development - North West University (Potchefstroom Campus);
- B.Sc. (Hons) Environmental Management - University of South Africa (UNISA); and
- AVCASA Crop Protection Diploma - Tshwane University of Technology.

Professional Affiliations

- Professional Natural Scientist (Pr.Sci.Nat) (Reg. No.400107/17) - South African Council for Natural Scientific Professions.

2.2.1.2 Summary of experience

Mariëtte Weideman has worked in environmental consultancy for over eight years. She joined Golder in 2011, gaining work experience in Environmental Management, specialising in Environmental Performance and Legal Compliance auditing, Environmental and Social Impact Assessments, Basic Assessments (BAs), Environmental

Management Programme reports (EMPrs) for mining and industry, Section 24G applications, the Public Participation Processes, and Mine Closure Planning.

Mariëtte has experience with Southern African legislation as well as International Finance Corporation Performance Standards and Equator Principles. Mariëtte has completed the SAATCA approved EMA Lead Auditors examination through the completion of the ISO 14001:2015 Environmental Management Systems Auditing course (a copy of the EAP's CV is attached in APPENDIX B).

2.3 Description of the property

The extent of the iMpunzi Complex mining right area (MRA) is 6 835 ha (Figure 2). The proposed activities will be located over sections of various farm portions within the MRA, as summarised in Table 3 and Table 4 and illustrated in Figure 3 below.

Table 3: Details of the properties associated with the Proposed South Pit Discard Dump and Haul road expansion (also see **Figure 3**)

Farm names:	Kromfontein 30 IS Portions 1, 2, 3, 5,12, 14, 20, 22, 23, and 28; Klipplaat 462 IS Portion 0.	
Magisterial district:	eMalahleni Local Municipality of the larger Nkangala District Municipality	
Distance and direction from nearest town:	110 km east of Johannesburg and 27 km south of the town of eMalahleni	
SG codes:	■ T0IS00000000003000001 ■ T0IS00000000003000002 ■ T0IS00000000003000003 ■ T0IS00000000003000005 ■ T0IS00000000003000012	■ T0IS00000000003000014 ■ T0IS00000000003000020 ■ T0IS00000000003000022 ■ T0IS00000000003000023 ■ T0IS00000000003000028

Table 4: Details of the properties associated with the Proposed Venture Co-disposal Facility (also see **Figure 3**)

Farm names:	Klipplaat 14 IS Portions 0, 1 and 14; Blesbokfontein 31 IS Portion 0, and 2
Magisterial district:	eMalahleni Local Municipality of the larger Nkangala District Municipality
Distance and direction from nearest town:	110 km east of Johannesburg and 27 km south of the town of eMalahleni
SG codes:	■ T0IS00000000001400001 ■ T0IS00000000001400014 ■ T0IS00000000003100000 ■ T0IS00000000003100002

2.4 Locality map

The iMpunzi Complex is located 27 km south-east of eMalahleni in the Mpumalanga Province, near Ogies and Kriel towns and forms part of the eMalahleni Local Municipality of the Nkangala District Municipality. The Nkangala District around eMalahleni is known as a diversified mining region; the dominant activity within the region are mining and manufacturing (Nkangala District Municipality (NDM), 2018/2019).

Figure 2 below illustrates the locality of the proposed Venture Co-disposal Facility, the new RWD, widened haul road and the proposed South Pit Discard Dump in relation to the surrounding towns, roads and regional watercourses.

The proposed facilities are located in the B11E and B11F quaternary catchments (Figure 30) of the Olifants River Water Management Area (WMA), which are located within Catchment Management Units (CMU) 5, 7 and 9a of the Witbank Dam catchment.

2.4.1 Landowners and use of immediately adjacent land

The surface right owners of the various farm portions in the vicinity of the project area are listed in Table 5 and illustrated in Figure 3.

Table 5: List of landowners

Farm Name and Portion	Surface Right Owner	Title Deed
Klipplaat 14 IS Portion 1	Glencore Operations (Pty) Ltd.	T2547/2014
Klipplaat 14 IS Portion 14	Glencore Operations (Pty) Ltd.	T5872/2014
Kromfontein 30 IS Portion 2	Glencore Operations (Pty) Ltd.	T4429/2014
Kromfontein 30 IS Portion 3	Glencore Operations (Pty) Ltd.	T4429/2014
Kromfontein 30 IS Portion 12	Glencore Operations (Pty) Ltd.	T2547/2014
Kromfontein 30 IS Portion 14	Glencore Operations (Pty) Ltd.	T2547/2014
Kromfontein 30 IS Portion 20	Glencore Operations (Pty) Ltd.	T2547/2014
Kromfontein 30 IS Portion 22	Glencore Operations (Pty) Ltd.	T2547/2014
Kromfontein 30 IS Portion 23	Glencore Operations (Pty) Ltd.	T2547/2014
Kromfontein 30 IS Portion 28	Glencore Operations (Pty) Ltd.	T4429/2014
Blesbokfontein 31 IS Portion 2	Glencore Operations (Pty) Ltd.	T14199/2014
Klipplaat 462 IS Portion 0	Ingwe Surface Holdings (Pty) Ltd.	T76567/1999

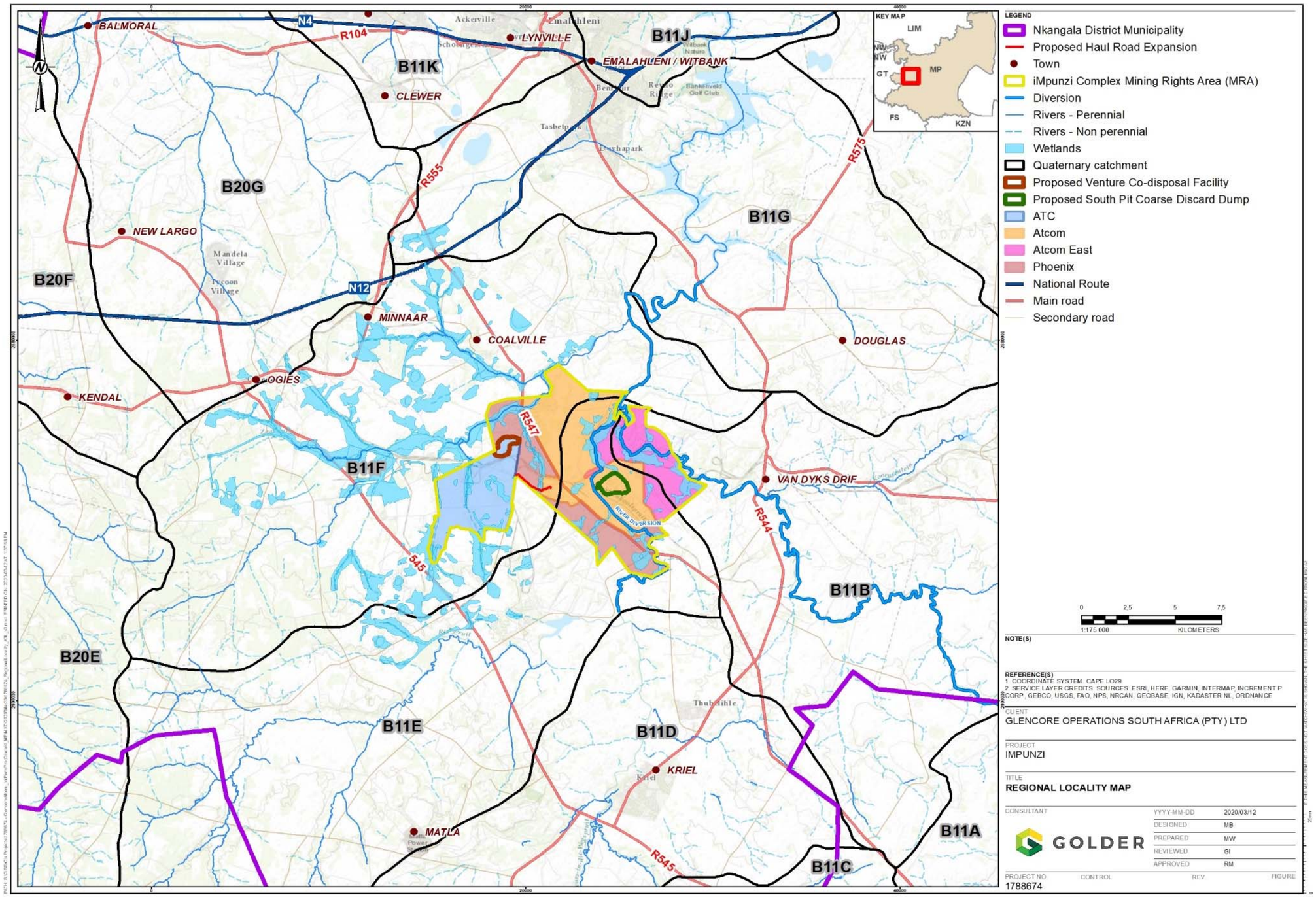
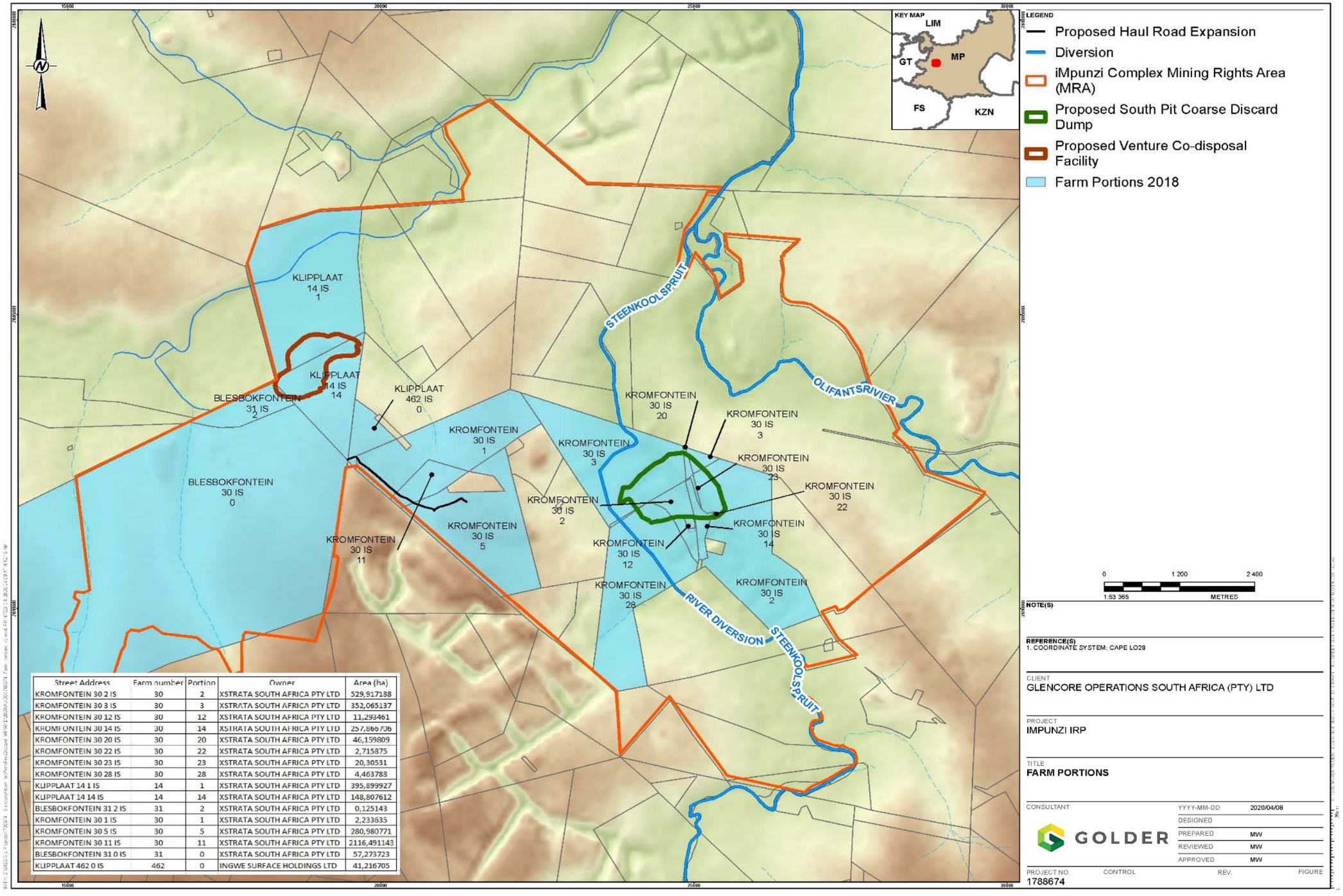


Figure 2: Regional locality of the iMpunzi Complex and the proposed disposal facilities and haul road expansion



Street Address	Farm number	Portion	Owner	Area (ha)
KROMFONTEIN 30 2 IS	30	2	XSTRATA SOUTH AFRICA PTY LTD	529,917188
KROMFONTEIN 30 3 IS	30	3	XSTRATA SOUTH AFRICA PTY LTD	352,065137
KROMFONTEIN 30 12 IS	30	12	XSTRATA SOUTH AFRICA PTY LTD	11,293461
KROMFONTEIN 30 14 IS	30	14	XSTRATA SOUTH AFRICA PTY LTD	257,866706
KROMFONTEIN 30 20 IS	30	20	XSTRATA SOUTH AFRICA PTY LTD	46,159809
KROMFONTEIN 30 22 IS	30	22	XSTRATA SOUTH AFRICA PTY LTD	2,715875
KROMFONTEIN 30 23 IS	30	23	XSTRATA SOUTH AFRICA PTY LTD	20,30531
KROMFONTEIN 30 28 IS	30	28	XSTRATA SOUTH AFRICA PTY LTD	4,463788
KLIPPLAAT 14 1 IS	14	1	XSTRATA SOUTH AFRICA PTY LTD	395,899927
KLIPPLAAT 14 14 IS	14	14	XSTRATA SOUTH AFRICA PTY LTD	148,807612
BLESBOKFONTEIN 31 2 IS	31	2	XSTRATA SOUTH AFRICA PTY LTD	0,125143
KROMFONTEIN 30 1 IS	30	1	XSTRATA SOUTH AFRICA PTY LTD	2,233635
KROMFONTEIN 30 5 IS	30	5	XSTRATA SOUTH AFRICA PTY LTD	280,980771
KROMFONTEIN 30 11 IS	30	11	XSTRATA SOUTH AFRICA PTY LTD	2116,491143
BLESBOKFONTEIN 31 0 IS	31	0	XSTRATA SOUTH AFRICA PTY LTD	57,273723
KLIPPLAAT 462 0 IS	462	0	INGWE SURFACE HOLDINGS LTD	41,216705

Figure 3: Affected farm portions linked to the proposed disposal facilities and haul road expansion

2.5 DESCRIPTION AND SCOPE OF THE PROPOSED OVERALL ACTIVITY

2.5.1 Current iMpunzi mining operations

The iMpunzi Complex consists of four collieries or sub-sections, namely: ATC, Phoenix Colliery, ATCOM, and ATCOM East. Coal mining within the complex was initiated at the Phoenix Colliery in 1936 (Figure 4). Operations at all four collieries have historically been underground. However, all underground operations ceased in 2008, and all remaining operations are opencast.

All opencast mining is undertaken using the strip-mining method using draglines, and truck and shovel at the smaller open pits. All hard overburden (shale/sandstone) and coal are blasted using bulk explosives (heavy ammonium nitrate and fuel oil emulsion). The coal is transported by a fleet of trucks to the crushing and pillar screening plant (Digby Wells (Pty) Ltd, April 2014).

The physical extent of the entire iMpunzi Complex for which there is a mining right extends over approximately 6 835 ha.

The existing infrastructure at the iMpunzi Complex includes the following:

- Primary river / stream diversion;
- Secondary water management in the form of canals;
- Various in-pit channels;
- Stockpiles (ROM and product);
- Tipping and crushing facilities;
- Discard and co-disposal facilities;
- Coal processing plants;
- Water treatment plant (potable water);
- Sewage treatment plants;
- Offices;
- Workshop areas;
- Stores;
- Water management canals and pipeline systems;
- Pollution control dams (PCDs);
- Settling dam facilities;
- Stores;
- On site roads (tar and gravel which also allow access to the neighbouring farms);
- Power lines that pass from east to west through the mine lease area;
- Roads which include the R547, local road to Onverwacht which links the R547 and R545 north / south, a local road to Frischgewaagd which links the R547 and R545 east/ west, and local road between Klipplaat and Leslie;
- The main Richards Bay coal transporting railway line; and
- Eskom 132, 88, 33, 21 and 11 kV power lines with substations.

2.5.1.1 Arthur Taylor Colliery

Operations at ATC traditionally consisted of underground workings but also included an opencast operation called the Butterfly Pit. The operation has its own coal processing plant and has rail load-out facilities for coal transportation, via the adjacent Transnet railway. Underground mining of the No. 2 and No. 4 seams at ATC ceased in 2008. Opencast strip-mining operations at Butterfly Pit commenced in 2009 but have since concluded and now has been rehabilitated.

Additional opencast strip mining is currently taking place the ATC Office and Phoenix Pits. Coal is mined from these pits utilising the truck and shovel method. The coal mined at the ATC Office and Phoenix Pits are being processed at the ATC and ATCOM Central Plant.

2.5.1.2 Arthur Taylor Colliery Opencast Mine

The ATCOM area consists of both opencast and underground coal mining operations. Operations at the ATCOM area commenced in 1991, and the extent of the South Pit covered the original course of the Steenkoolspruit. A permanent river diversion was constructed to divert the Steenkoolspruit around the South Pit (Digby Wells (Pty) Ltd, April 2014).

Current mining activities at ATCOM comprise of opencast mining of the North Pit (pillar extraction from old underground workings). Mining at ATCOM is expected to cease in 2025. The coal mined at ATCOM is transported to the ATCOM Central Plant where it is washed and conveyed to the linear stockpile at ATC. From there, it is conveyed to a rapid load-out silo situated at ATC, from where it is transported via rail to Richards Bay for export (Digby Wells (Pty) Ltd, April 2014).

2.5.1.3 Phoenix Colliery

The Phoenix area is situated to the south-west of ATCOM and east of the ATC, and coal has been mined here since 1936. The Phoenix area consists of the fine discard lagoon area, discard facility (extension of the ATCOM/Phoenix dump located on the old Phoenix Plant area) and underground areas. Mining activities at the Phoenix Colliery ceased in 2008 (Digby Wells (Pty) Ltd, April 2014). All the facilities at the Phoenix Colliery are inactive except for the Phoenix 1 seam, where mine affected water is stored.

2.5.1.4 Arthur Taylor Colliery Opencast Mine East

The mining operation includes opencast mining of historical underground bord and pillar operations, previously owned by BHP Billiton Energy Coal South Africa (Digby Wells (Pty) Ltd, April 2014). The new mining operations are situated near Vandyksdrift (VDD) and are known as ATCOM East. Mining at ATCOM East makes use of truck and shovel as well as dragline operations. The ATCOM East mining operations are divided into five areas, namely:

- **Steenkoolspruit Pit:** Mining by GOSA commenced at the Steenkoolspruit Pit in January 2009. The current LoM plan indicates that mining will resume in 2025 and end in 2029. This pit will be mined by dragline;
- **River shaft South Pit:** It is proposed to commence mining at river shaft South Pit in 2021 and mining will continue until 2031. Due to the restricted area of this pit, it will most likely be mined using the truck and shovel method;
- **VDD South Pit:** This is the largest pit and will be mined concurrently with the River South Pit. Mining is anticipated to continue until 2035. The pit will be mined by dragline;
- **River shaft West Pit:** Mining of this pit commenced in 2014 and will continue until 2024; and
- **VDD West Pit:** This pit will be mined using the truck and shovel method from 2024 until around 2033.

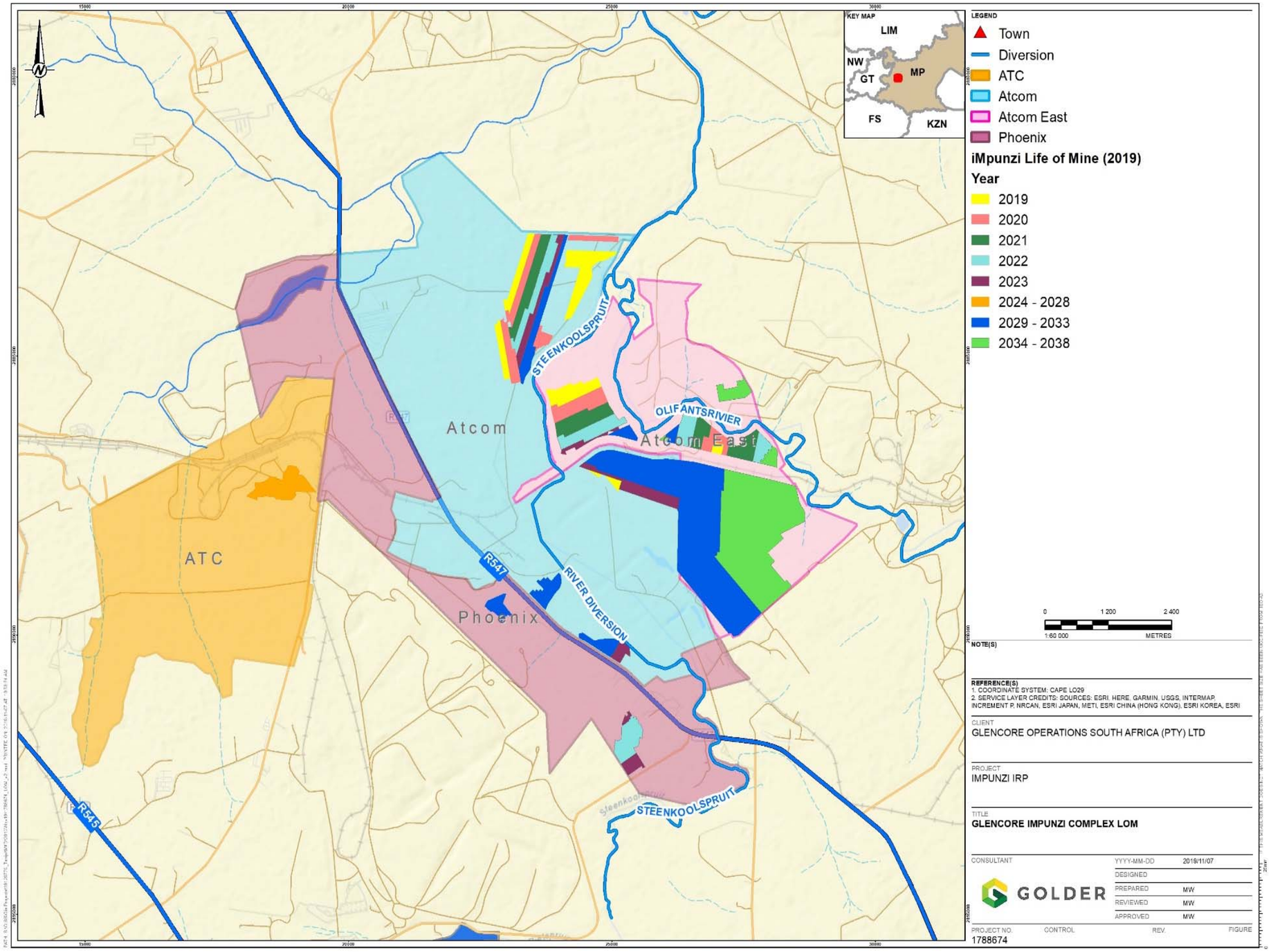


Figure 4: iMpunzi Complex: Subsections and Life of Mine Plan

2.5.1.5 Life description of the existing operations

The remaining life of mine (LoM) for the entire iMpunzi is approximately 18 years. Production is anticipated to cease in 2038 (Figure 4). The LoM schedule is governed by qualitative and quantitative requirements in the market, and future amendments to the overall mining schedule may be included in the LoM plan.

2.5.1.6 Approved Environmental Management Programme reports (EMPrs) and other authorisations

- Environmental Authorisation for the proposed ATCOM infrastructure expansion project and dewatering pipeline on portions 1 and 6 of the farm Steenkoolspruit 18 IS, remainder of portion 1, portion 3,4,11, and 18 of the Farm Kromfontein 30 IS, Portion 3 of the Farm Klipplaat 14 IS, and portions 1 and 6 of the Farm van Dyksdrift 19 IS, eMalahleni, Mpumalanga Province. Ref. No.: 17/2/3/ N-37;
- Amendment of the Environmental Authorisation for the proposed ATCOM infrastructure expansion project and dewatering pipeline on portions 1 and 6 of the farm Steenkoolspruit 18 IS, remainder of portion 1, portion 3,4,11, and 18 of the Farm Kromfontein 30 IS, Portion 3 of the Farm Klipplaat 14 IS, and portions 1 and 6 of the Farm van Dyksdrift 19 IS, eMalahleni , Mpumalanga Province. Ref. No.: 17/2/3 NK-37;
- Environmental Authorisation for the proposed construction of three (3) fuel and oil storage facilities at each of the identified mining reserves located at the ATCOM East Mining Area, Kromfontein 30 IS, Steenkoolspruit 18 IS, and van Dyksdrift 19 IS, Middelburg, Mpumalanga. Ref. No.: 17/2/1/7 NK-3;
- Proposed amendment of the record of decision of the construction of three fuel and oil storage facilities at ATCOM East Mining Area on portions of the Farm Kromfontein 30 IS, Steenkoolspruit 18 IS, and van Dyksdrift 19 IS, eMalahleni , Mpumalanga;
- Environmental Authorisation for the proposed diversion of Rietspruit River on a portion of the Farm Blesbokspruit 31 IS, Ogies, Mpumalanga. Ref. No.: 17/2/1/1(M)MP-08;
- Environmental Authorisation for the proposed rehabilitation of ATCOM South Open Pit and BEATH Dump on portions of the Farm Kromfontein 30 IS, eMalahleni, Mpumalanga province. Ref. No.: 17/2/2/1(e) NK-7;
- Environmental Authorisation for the Phoenix and Office Pit and Associated Infrastructure in respect of the Farm Kromfontein 30 IS, Middledrift 43 IS and Blesbokfontein 31 IS, eMalahleni, Mpumalanga province. Ref. No: (MP) 30/5/1/2/2 (375) EA;
- Consolidated Tavistock EIA and EMPr Amendment, Xstrata South Africa (Pty) Ltd, incl. the existing Venture coarse discard dump. Approved 21 May 2015. DMRE Ref. No. 375 MR; and
- Approved water use licenses for the current operations:
  - Water Use Licence No: 04/BA11E/CI/3732 (Dragline Walkway Crossings);
  - Water Use Licence No:04/B11EIACFGIJ/2387 (ATCOM East Infrastructure);
  - Water Use Licence No: 04/B11E/CFGJI/735 (iMpunzi Integrated WUL);
  - Water Use Licence No: 04/B11E/ACGI/3699 (ATCOM South Pit and BEATH Dump Rehab);
  - Water Use Licence No: 24089451 (Steenkoolspruit / Olifants River Crossings);

- Water Use Licence No: 24007995 (Butterfly River Diversion);
- Water Use Licence No: 03/B11F/CI/4842 (Mining through Pans in the North Pit);
- Water Use Licence No: 03/B11B/CI/4841 (East Wetlands Mining); and
- Water Use Licence No: 06/B11F/IACGJ/7911(Phoenix and Office Pit).

2.5.2 Listed and specific activities

Based upon the currently available information, the proposed project will trigger the following listed activities tabulated in Table 6, and Table 7, as outlined in the relevant EA application.

Table 6: Possible listed activities requiring environmental authorisation in terms of GN R. 327 and GN R. 325

Listing Notice	Activity No	Activity No. Description	Proposed Activity Description
GN R.327, 4 December 2014 (as amended 7 April 2017) Basic Assessment	**27**	"*The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for –* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan*"	Clearance of vegetation over rehabilitated land: - Proposed Venture Co-disposal Facility extension footprint: 82.66 ha Clearance of vegetation over undisturbed land: - Proposed return water dam footprint: 4 ha
	48	*"The expansion of –* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;* *where such expansion occurs-* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse"*	Expansion of existing culverts along proposed haul road expansion from the ATCOM Discard Dump to the ATC Plant will be expanded by 100 m^2
	56	*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres.*	Proposed haul road expansion from ATCOM Discard Dump to the ATC Plant will be 16 m in width.
GN R.325, 4 December 2014 (as amended 7 April 2017) Scoping and Impact Assessment	**6**	"*The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding-* *(i) activities which are identified and included in Listing Notice 1 of 2014;*	Water Use Licence application in terms of the NWA for the proposed RWD specifically will trigger this listed activity.

Listing Notice	Activity No	Activity No. Description	Proposed Activity Description
		(ii) activities which are 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 the National Environmental Management: Waste Act, 2008 applies; *(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or* *(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day*".	
	15	"*The clearance of an area of 20 hectares or more of indigenous vegetation, except where such clearance of indigenous vegetation is required for –* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan*"	Clearance of vegetation **over rehabilitated** land: - Proposed Venture Co-disposal Facility extension footprint: 82.66 ha Clearance of vegetation over undisturbed land: - Proposed return water dam footprint: 4 ha

The proposed fine discard (slurry) pipeline from ATC plant to the Venture Co-disposal Facility has the following dimensions:

- Pipe diameter: 315 mm
- Pipe throughput: 400 m^3/hour
- Pipe length: 1021.6 m

The proposed return water pipeline from the RWD to the underground storage facility has the following dimensions:

- Pipe diameter: 315 mm
- Pipe throughput: 400 m^3/hour
- Pipe length: 2,917.89 m

The proposed Venture Co-disposal Facility and South Pit Discard Dump may trigger the waste management activities listed in Table 7, which require an application for a WML supported by an EIA process, undertaken in accordance with the EIA Regulations GN R.326 of 4 December 2014, as amended.

Table 7: Listed Waste Management Activities associated with the proposed Venture Co-disposal Facility and South Pit Discard Dump in terms GN R 921 as amended by GN R 633

GNR 921 as Amended by GN R 633	Activity No. Description	Proposed Activity Description
Category A 3(13)	The expansion of a waste management activity listed in Category A or B of this schedule which does not trigger an additional waste management activity in terms of this schedule.	Establishment of the proposed Venture Co-disposal Facility will trigger this waste management activity

GNR 921 as Amended by GN R 633	Activity No. Description	Proposed Activity Description
Category B 4(1)	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	Establishment proposed Venture Co-disposal Facility will trigger this waste management activity
Category B 4(10)	The construction of a facility for a waste management facility activity listed in Category B of GN R 921 (as amended) (not in isolation to associated waste management activity).	Establishment of the proposed South Pit Discard Dump and the proposed Venture Co-disposal Facility will trigger this waste management activity
Category B 4(11)	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	Establishment of the proposed South Pit Discard Dump and the proposed Venture Co-disposal Facility will trigger this waste management activity

2.5.3 Description of activities to be undertaken

2.5.3.1 Proposed Venture Co-disposal Facility

The existing Venture coarse discard dump is used for the disposal of coal discard which originates from the processing of coal at the ATC Plant. The facility is located on the historic mined-out ATC Venture Void. The current discard dump is expanding at a notable pace and needs to be expanded upon to accommodate additional volumes of discard and be modified into a Co-disposal Facility to also accommodate fine discard (slurry). The facility will have a lifespan of approximately nine years (in line with the remaining LoM of the ATC section and discard dump reprocessing project) and will store totals of 2.16 Mm^3 of coal fines material and 5.81 Mm^3 of coarse coal discards. The coarse discard will continue to be transported via conveyor belts to the facility from the ATC Plant. The fine discard (slurry), currently disposed of underground, will be piped from the ATC Plant to the facility via pipeline (see Figure 5).

Supernatant water resulting from the slurry deposition of the fines material will be managed in a centralised pool within the basin area of the facility. The pool level will be maintained by decanting of excess water via a pumped barge system. Excess water pumped from the facility will be transported to the proposed RWD located north of the facility from where the water will be piped back to Central Plant for reuse via an underground water storage facility as shown in Figure 6. A pump capacity of 250 m^3/day is required to maintain the operational pool at the Co-disposal Facility at 0.5 m depth (approximately 13 420 m^3) (Golder Associates Africa (Pty) Ltd (r), February 2020).

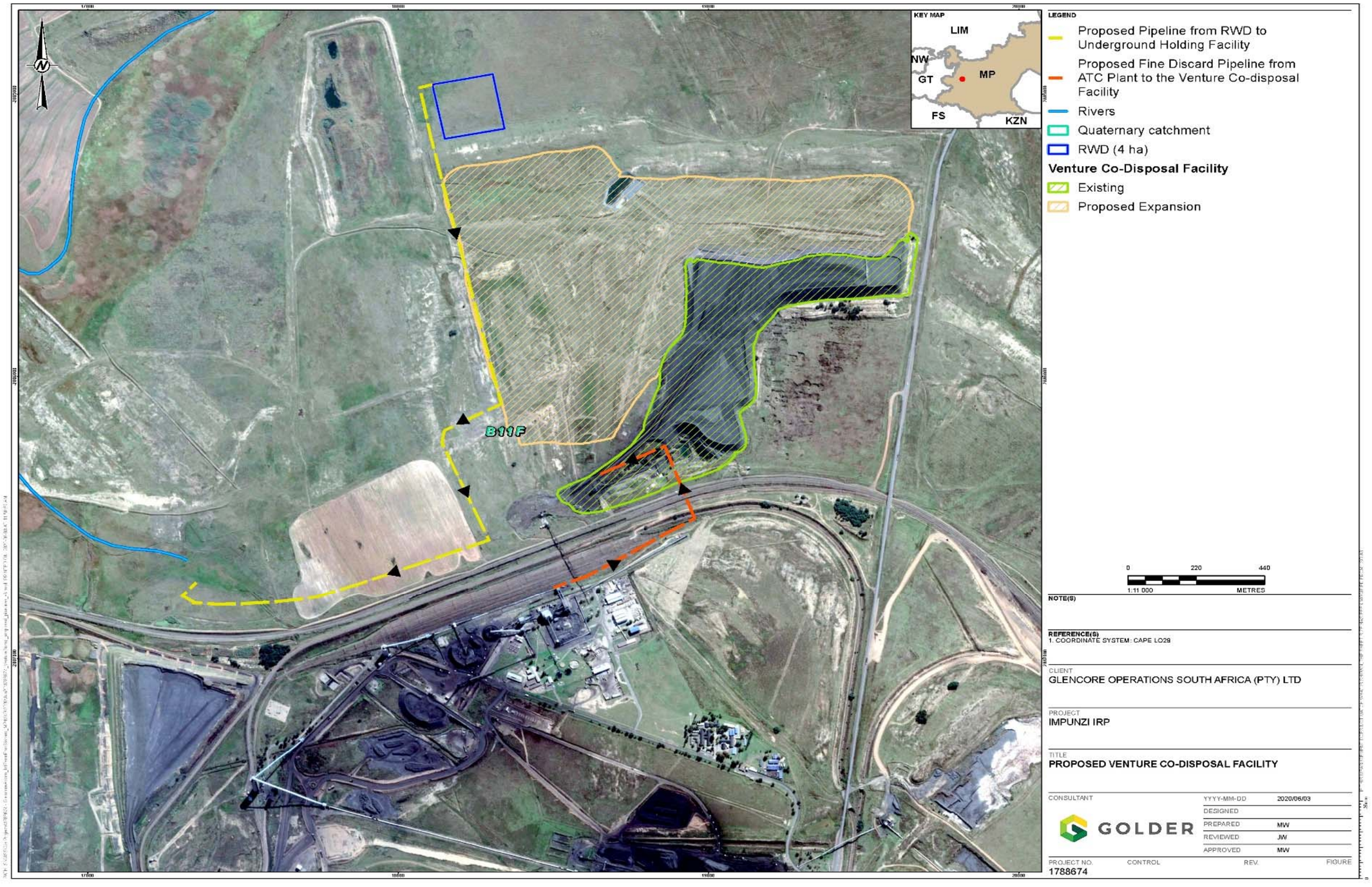


Figure 5: Existing Venture coarse discard dump and the proposed extended Co-disposal Facility footprint and return water dam

Technical design

The planned footprint of the facility lies entirely within the surface limit of the historic opencast pit, which has been backfilled and partially rehabilitated. This includes the planned footprint areas of the retaining embankments of the facility. The technical design report for proposed Venture Co-disposal Facility is appended in APPENDIX I of this report and summarised below.

The Pollution Control Dam (PCD) of the existing Venture coarse discard dump currently lies within the planned footprint of the Co-disposal Facility (see Figure 5). This PCD will be decommissioned and removed prior to the start of construction of the Co-disposal Facility, to be replaced by a new RWD. The new RWD will be constructed to the north of the Co-disposal Facility footprint, adjacent to the north-western corner of the planned footprint. This new RWD will serve to collect and store contaminated water from the surface water management channels to be constructed around the Co-disposal Facility as well as decant water pumped from the basin area of the facility (Golder Associates Africa (Pty) Ltd (r), February 2020).

Discard production

Figure 6 depicts the expected coal fines and coarse discard material production tonnages which are to be stored in the Venture Co-disposal Facility over the life of the facility. The start of the facility is planned for 2021. The tonnages of coal fines and coarse coal discard material are specified as 240 000 tonnes, and 1 032 000 tonnes per annum respectively and is anticipated to remain constant over the nine-year life of the facility. The total volumes stored at the end of the nine-year life would be 2 160 000 m^3 of coal fines and 5 805 000 m^3 of coarse coal discard (Golder Associates Africa (Pty) Ltd (r), February 2020).

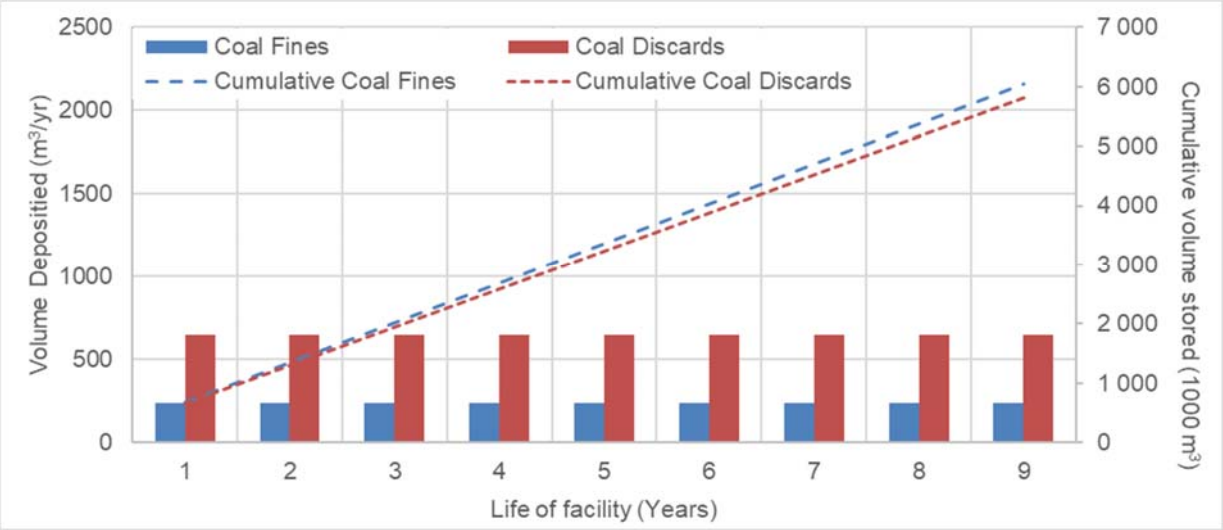


Figure 6: Required Storage Capacities for Venture Co-disposal Facility

Progressive facility / Phased development

The Venture Co-disposal Facility will be constructed in phases to allow for accommodation of the full volumes of both coal fines and coarse discard material, at the planned rate of production. There are five main phases of the facility as detailed in the technical design report appended in APPENDIX I. As described in the design report, the starter embankment walls will be constructed with coarse discard material, and deposition of fines will commence when the starter wall reaches a sufficient height to retain the fine material (1 533 mamsl). The facility will then be developed to extend to the south and then to the east. The Phase 5 final layout is provided in Figure 7.

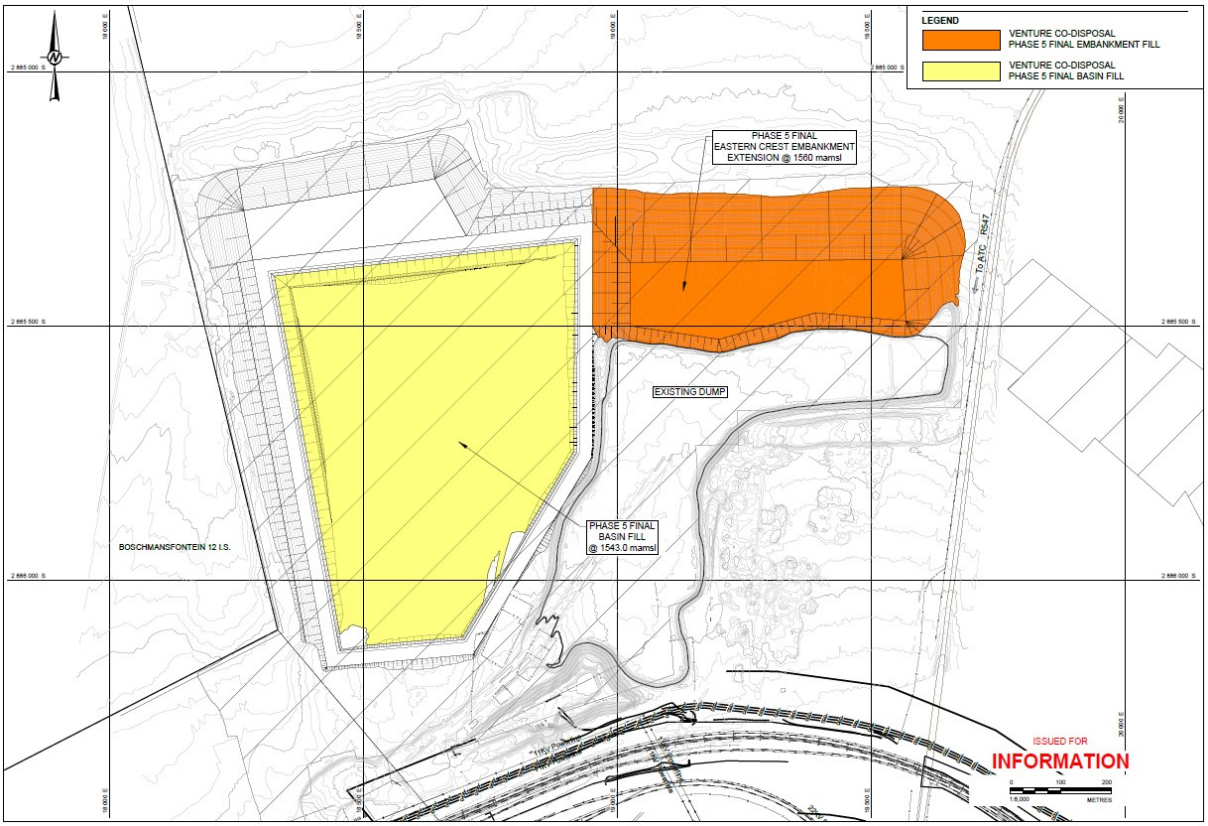


Figure 7: Phase 5 Final Layout - Venture Co-disposal Facility (Golder Associates Africa (Pty) Ltd (r), February 2020)

Storm water management

A storm water management plan (SWMP) was developed for the Venture Co-disposal Facility, to fulfil the requirements of the National Water Act, 1998 (Act 36 of 1998) (NWA) and particularly, Government Notice (GN) 704 contained in Government Gazette 20118 of June 1999 (hereafter referred to as GN 704), which deals with the separation of clean and dirty water (see APPENDIX K).

The clean water runoff generated from the upslope clean water catchments will be diverted away from the area producing dirty water. The dirty water runoff generated from the site infrastructure will be contained for reuse or treatment. The proposed SWMP is detailed below and should be read in conjunction with Figure 8:

- The general gradient of the site is from the southeast to the northwest at an average slope of 0.5 %. To the south of the current discard dump is a railway line with box culverts conveying runoff from the south under the railway towards the proposed Venture Co-disposal Facility footprint area. These areas (sub-catchments S1 and S2) were classified as clean water catchments. The clean surface water runoff generated from these catchments will be collected in unlined trapezoidal clean water cut-off channels (C1 and C2, located adjacent to the railway) and diverted for discharge (OF1) into the environment (located west of the site). North of the railway line an additional clean water catchment was identified (S5); this water will also be collected in the C2 unlined channel for discharge into the environment;
- Clean water catchments (S3 and S4) were identified south east to the existing dump. The clean surface water runoff generated from this catchment will be collected in an unlined trapezoidal clean

water cut-off channel (C3) and diverted for discharge (OF3) into the environment located east of the site;

- Clean water catchment S8 was identified south of the proposed Venture Co-disposal Facility footprint area. The clean surface water runoff generated from this catchment will be collected in an unlined trapezoidal clean water cut-off channel (C4) and diverted for discharge (OF2) into the environment located west of the site;
- The existing dump as well as the proposed Venture Co-disposal Facility footprint area considered dirty water catchments (S7-S14). The surface water runoff generated from these catchments will be captured by concrete lined perimeter channels (C5-C10); the water will be diverted to a proposed new RWD (HDPE lined). The capacity of the existing PCD is not adequate to receive the runoff and operational slurry return water from the proposed Venture Co-disposal Facility and lies within the footprint of the proposed Venture Co-disposal Facility. A new RWD will therefore be constructed, inclusive of a silt trap to the north of the proposed Venture Co-disposal Facility, and the old PCD will decommissioned during construction of the Co-disposal Facility. A silt trap will be required to remove sediment from the water to ensure that the RWD does not fill up with sediment generated from the captured surface water runoff;
- The catchment immediately south of the dump extension was also identified as a dirty water catchment (S6). This catchment drains towards the east where the old adit is located. Currently water pools in this adit as it is the lowest point in the catchment. The catchment is relatively small generating approximately 2360 m^3 of surface runoff during the 1 in 50-year event. It is therefore recommended that the surface water runoff collected in the adit be pumped to the dirty water perimeter channel C5 where it will be diverted to the new RWD. The surface water collected in the adit should be pumped immediately to channel C5 ensure to ensure that no water is being stored in the adit void;
- The fine discard pool level will be regulated using a pumped barge system. The barge system will route all fine discard water inflow and runoff (maintaining the pool level below the pre-defined maximum water level), to the perimeter dirty storm water channels from where it will be routed to the new RWD; and
- The diversion channels have been sized to divert the clean and dirty water runoff for the 50-year return period flood peak, as per GN704. Freeboard was included in the sizing calculations using the Guidelines for the design of canals and related structures (see DWA, 1980 in APPENDIX K). The proposed conceptual clean and dirty water diversion channel layout can be seen in Figure 9.

The results show that channels C5-C10 (co-disposal perimeter channels) have maximum flow velocities greater than 4 m/s. The high velocities are due to the catchment gradients present on the site. The channels will be concrete lined and as such the velocities should not pose any problems with the concrete lining (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

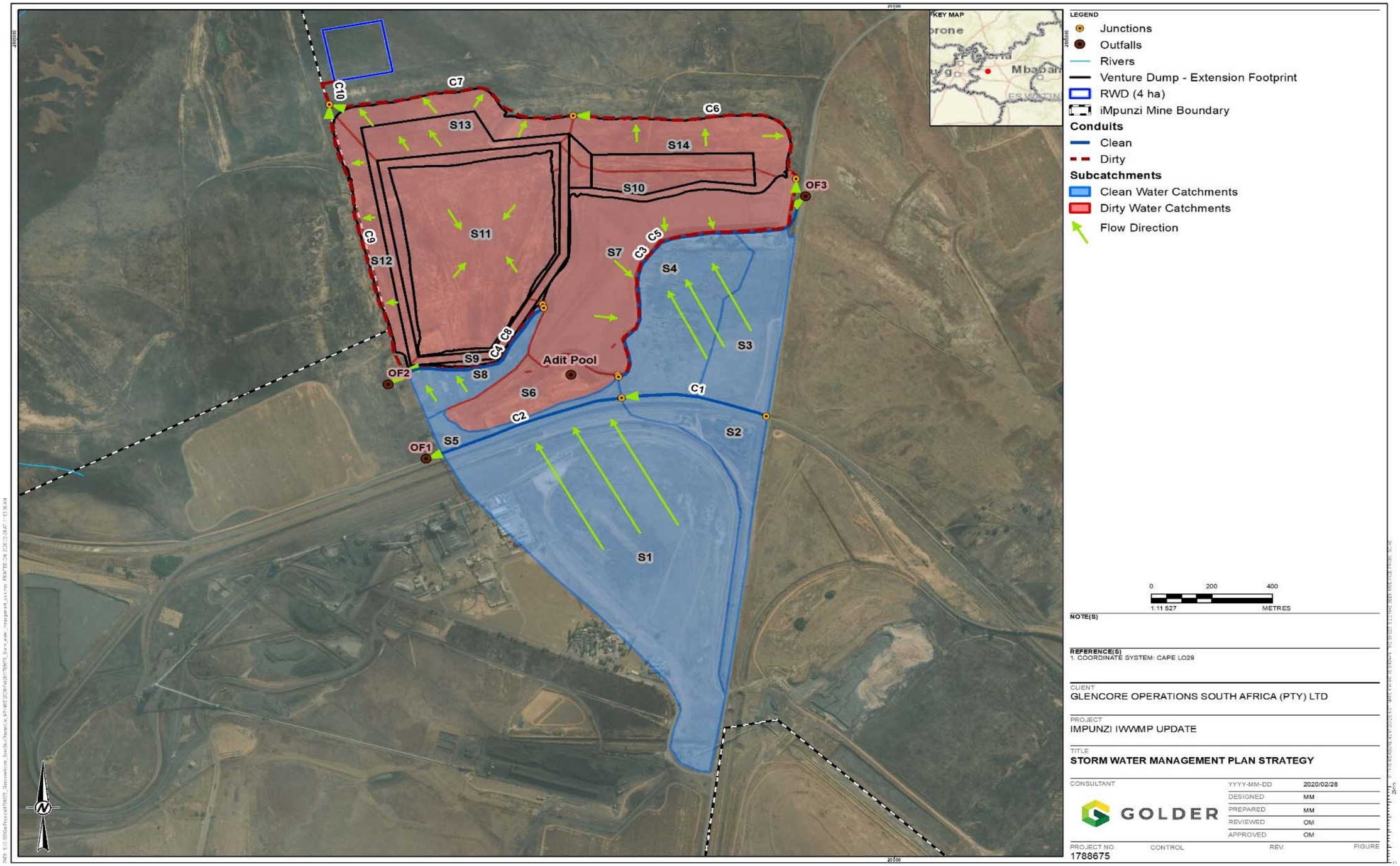


Figure 8: Storm Water Management Plan for the proposed Venture Co-disposal Facility

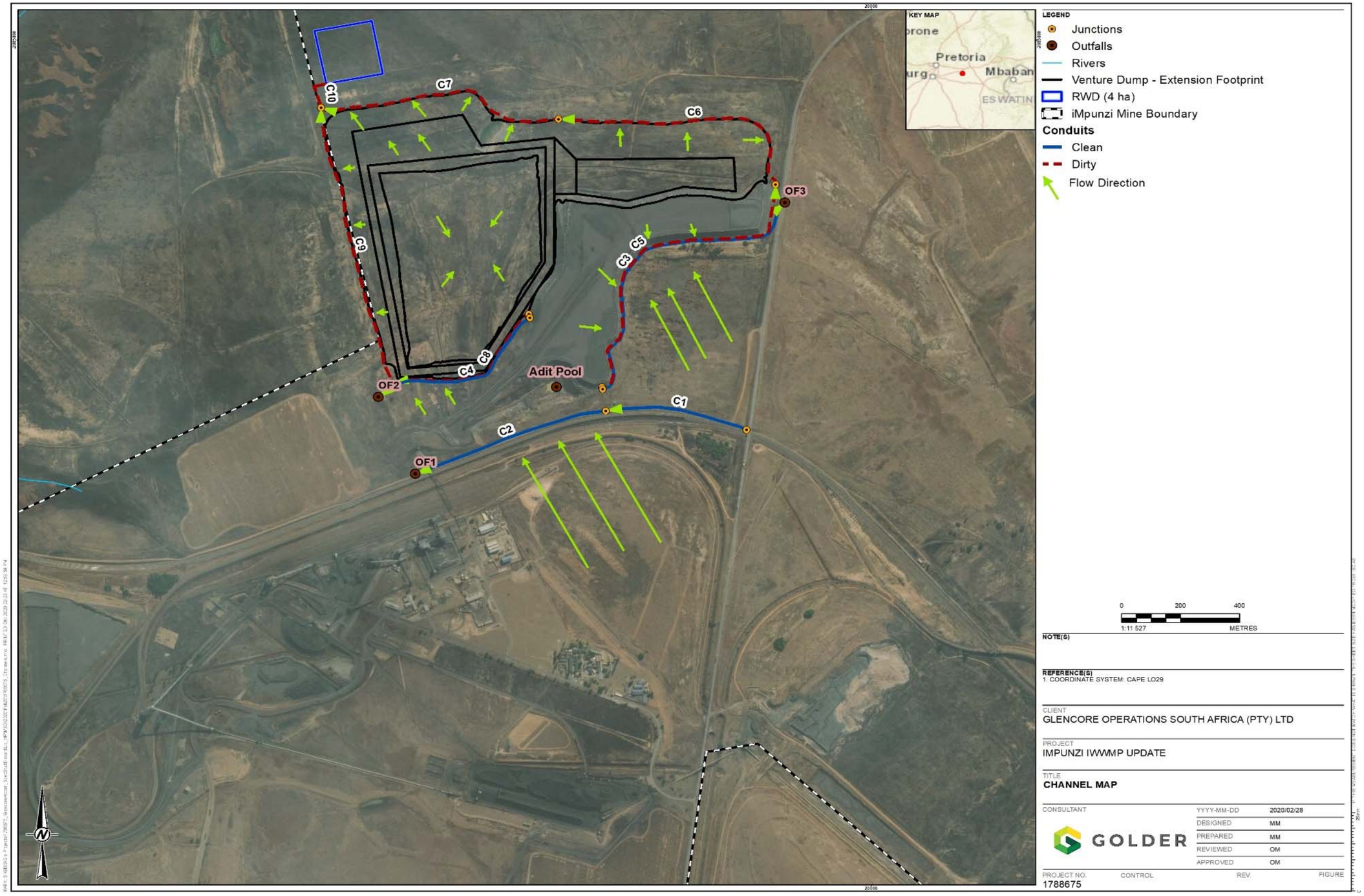


Figure 9: Layout and extent of the clean and dirty water diversion channels for the proposed Venture Co-disposal Facility

Stability analysis

The stability analyses of two selected discard facility sections were undertaken using Slide (2018), a computer software program produced by RocScience. The 'Method of Slices', as proposed by Morgenstern-Price, was used to assess the two-dimensional stability. This method is based on limit equilibrium principles, which satisfy both force and moment equilibrium under either constant or variable ratios of horizontal to vertical inter-slice forces (Golder Associates Africa (Pty) Ltd (r), February 2020).

The resultant safety factors for the static analyses were 3.9 for Section A and 3.4 for Section B. Thus, the factors of safety were consistently greater than the minimum requirement of 1.5. Based on the conditions analysed in this assessment, the stability of the discard dump is considered to be safe (Golder Associates Africa (Pty) Ltd (r), February 2020).

Settlement of Discard Material

The Mohr-Coulomb strength model was used to simulate the shear strength of the discard material and coal fines by defining values for both the friction angle and the apparent cohesion. Drained shear strength parameters were, therefore, applied to the model. Drained conditions were assumed appropriate for the embankment material due to the expected large pore sizes for which undrained conditions would be highly unlikely. Undrained conditions in the discard materials are unlikely, even post a seismic event, hence only a static stability analysis was undertaken (Golder Associates Africa (Pty) Ltd (r), February 2020).

Barrier Design

The management of mine residues (stockpiles and waste deposits) is governed by regulations published under the NEMWA, namely the Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R632 of 2015, as amended), which requires that the pollution control barrier system be driven by a risk assessment based upon the geochemical hazard and toxicology of the waste material and the risk of the water resource and other receptors.

Furthermore, the regulations on use of water for mining and related activities, aimed at the protection of water resources (GN 704 of 1999) provide for the protection of the water resource in the context of mining and related activities, notably:

- Regulation 7(a) which requires the prevention of water containing waste or any substance which is likely to cause pollution from entering a water resource; and
- Regulation 7(e) which requires that residue deposits and stockpiles be designed with suitable barriers that prevent the leaching of materials from the residue into the water resource.

Although a Class C barrier design is required to contain a Type 3 waste in terms of a compliant design, lining of the basin of the Venture Co-disposal Facility is not practical due to the possibility of spontaneous combustion of the discard material and differential settlement across the basin. These factors would place the geomembrane under strain and reduce the geomembrane's life and even result in a total failure of the basal barrier system. It is thus proposed to demonstrate that a similar level of protection of the resource can be achieved with the application of alternative intervention measures and design features. These measures include decreasing the volume of dirty water by use of at least 300 mm soil cover, and interception of dirty water by means of a pressure barrier created in groundwater by pumping wells, which prevents decant from the pit. This approach was based on the premise that the additional waste load from the facility through seepage could be intercepted and managed without unacceptable risk to the environment through the post-closure pit water regime (Golder Associates Africa (Pty) Ltd (r), February 2020).

It is thus recommended that a soil cover consisting of at least 300 mm Bainsvlei and Clovelly soils with established grassland vegetation be implemented to reduce the average net infiltration over the discard facilities. Reduction in net infiltration translates to less mass loads to the groundwater system therefore a reduction in

environmental impact. It is important to note that the performance of the store and release vegetated cover is premised on optimal performance of the vegetation cover which requires that the soil substrate be suitable for deep rooting and that the soils are fertile and uncompacted so that vigorous plant growth will maximise the leaf area for evapotranspiration.

2.5.3.2 Proposed return water dam

As mentioned above, the existing PCD is located to the north of the existing Venture coarse discard dump. The purpose of the PCD is to receive and contain mine affected water from the existing Venture coarse discard dump. However, due to the location and size of the current PCD, it will be necessary to replace this facility with a larger water storage facility, referred to as the RWD, to receive supernatant water and contaminated runoff from the proposed Venture Co-disposal Facility.

The new RWD is proposed to the north west of the existing Venture coarse discard dump. A new pump station will be built to transport return water from the RWD to the ATC 2 seam underground workings (see Figure 5) via a new pipeline and borehole. The water stored here will either be abstracted and sent to the ATC Plant for reuse in the coal processing process or sent to the GOSA Water Treatment Plant (Tweefontein Section) for treatment.

A number of simulations were carried out with various RWD capacities and abstraction rates in order to determine the capacity required to ensure that the RWD will not spill more than once in 50 years. A new RWD with a size of 56 000 m^3 was found to be adequate (Golder Asssociates Africa (Pty) Ltd (q), August 2020). See APPENDIX I for more details.

2.5.3.3 Proposed haul road expansion

iMpunzi proposes to reprocess some of the ATCOM discard dumps. In order to enable the transportation of the discard from the dumps to the ATC Plant (via Articulated Dump Trucks (ADTs), the existing haul road needs to be widened (refer to Figure 3). The haul road will be widened to a maximum of 16 m to accommodate the ADTs that will be utilised to transport the coarse discard to the ATC beneficiation plant. An average of 10 ADTs per day will travel on the expanded haul road.

2.5.3.4 Proposed South Pit Discard Dump

The proposed South Pit Discard Dump will be located on an area which was historically opencast mined (South Pit) and then filled with spoils that have been shaped and levelled to various states towards rehabilitation (see Figure 10). The proposed South Pit Discard Dump will receive coarse discard from the Phoenix Plant.

Technical design

The proposed South Pit Discard Dump will accommodate approximately 29 Mm^3 of coarse discard. The maximum height of the dump will not exceed 30 m from the immediate surrounding ground elevations (Golder Associates (Pty) Ltd (c), April 2018). The technical design report for South Pit Discard Dump is appended in APPENDIX H of this report and summarised below.

Discard production

Based on planned production rates, the dump needs to accommodate 29 Mm^3 of coarse discard (Figure 11). The facility will be developed in a phased construction approach (Phases 1 to 3) to minimise the need for clean and dirty water separation measures as well as to allow for the timeous construction of blanket layers on hot areas. The final footprint of the dump is indicated in Figure 10 below.

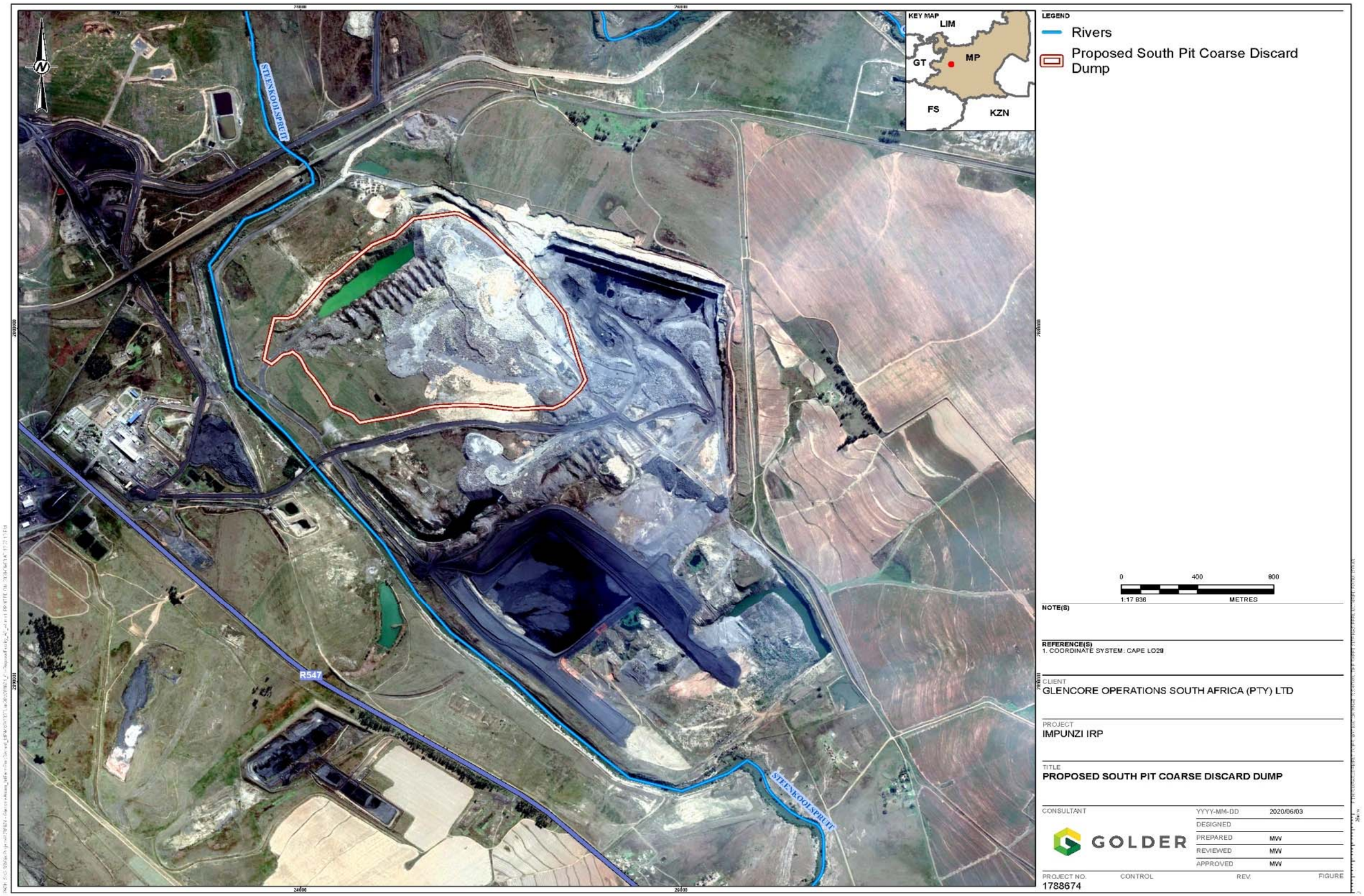


Figure 10: Footprint of the proposed South Pit Discard Dump

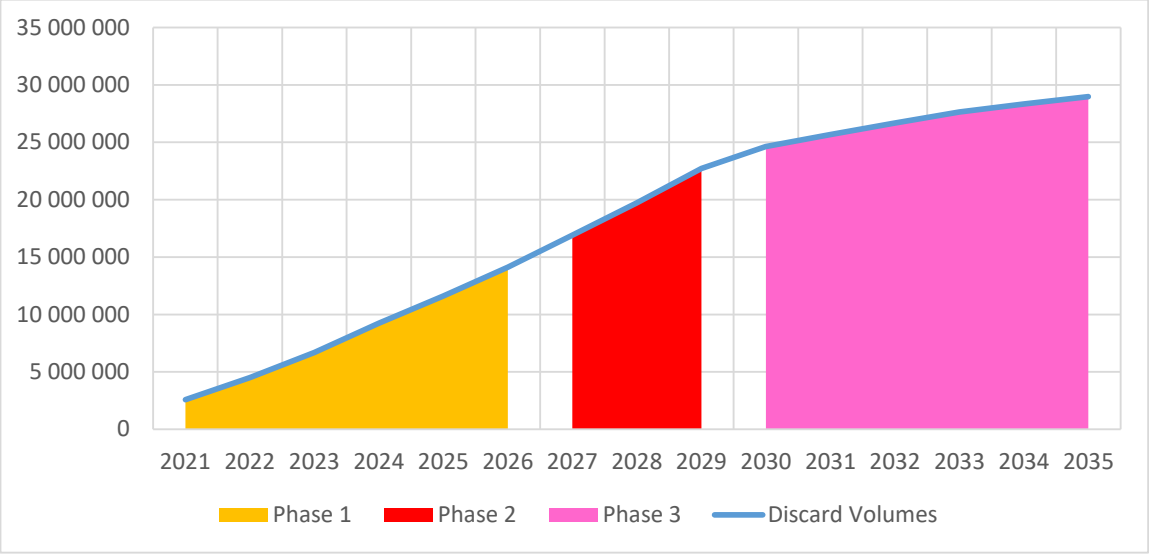


Figure 11: Discard Volumes (m³)

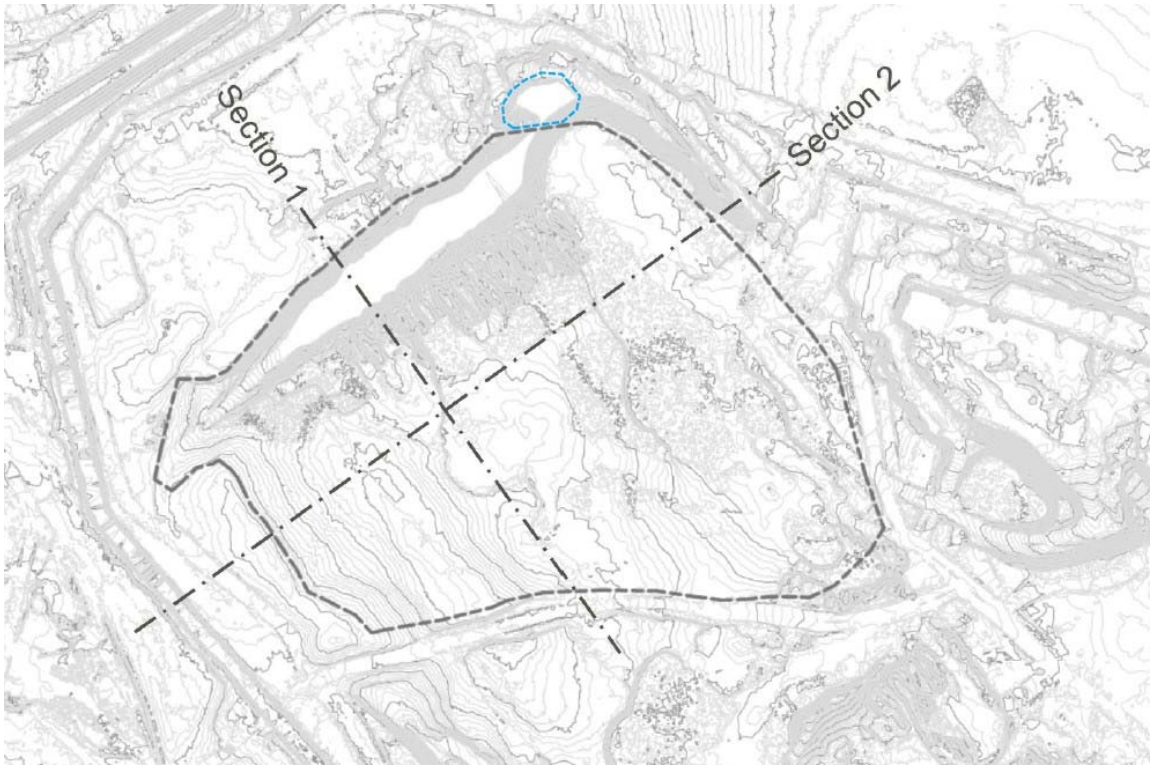


Figure 12: Dump footprint and sections (Golder Associates (Pty) Ltd (c), April 2018)

Figure 13 and Figure 14 shows a section of the combined three phases that forms the final profile of the dump. The blue line shows the elevation of the last conceptual post-mining landform design conducted by Golder. The brown line shows the elevations of the latest topographical survey.

Figure 13: Section 1

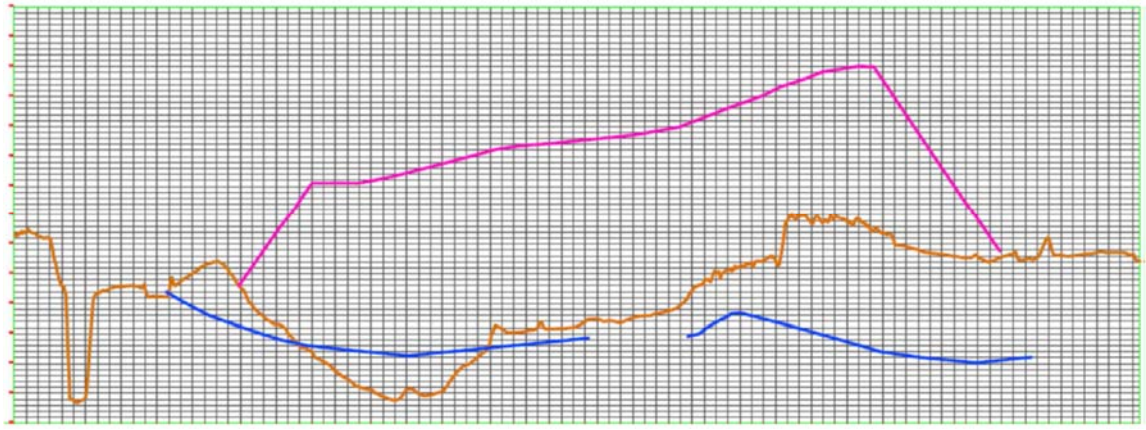


Figure 14: Section 2

The available footprint and height restriction allowed to make use of side slopes of 1V:7H. This was selected for the following reasons:

- The slopes would be flat enough to also function as a stable landform for closure. The dump would therefore not require any further shaping and concurrent topsoil placement and vegetation can take place when the outer slopes of the phases are completed; and
- The flatter outer slopes allowed for easier and safer implementation of the rehabilitation measures.

The discard should be compacted sufficiently directly after placement to avoid oxygen ingress and consequently spontaneous combustion. The side slopes of the advancing face of the dump were therefore designed to a slope of 1V:3H. Discard should not be steeper than a slope of 1V:3H during any stage of discard placement to allow for safe access of construction and compaction vehicles.

South Pit heat flux modelling

Since the South Pit is not a fully rehabilitated pit, and has only been backfilled with spoils, spontaneous combustion of underlying coal needs to be factored into the design of the proposed discard dump in the South Pit.

Heat flux modelling was previously conducted by Golder in 2010 to inform the design of the coarse and fines paddocks still being constructed on the cooler areas of the South Pit (Golder Associates Africa (Pty) Ltd (i), July 2010). Relevant aspects of the report are mentioned as a basis to determine the requirement and suitability of a blanket or isolation layer to reduce temperatures on the surface to such an extent that the discard could be safely placed on this barrier. The report concluded that weather conditions were very important to allow for sufficient cooling. The immediate covering of the isolation layer with discard was hence not recommended as an option.

Figure 15 below shows the modelling results of the surface temperature of the isolation layer for various waste temperatures and wind speeds. The isolation layer considered was a 1 m thick soil layer compacted to a density of 2000 kg/m³.

Given the average wind speed of 4 m/s in the northern parts of South Africa and maximum measured temperatures of 160 ˚C on the South Pit, it is inferred that a similar blanket layer can successfully be applied as a cooling mechanism prior to the placement of discard on hot areas.

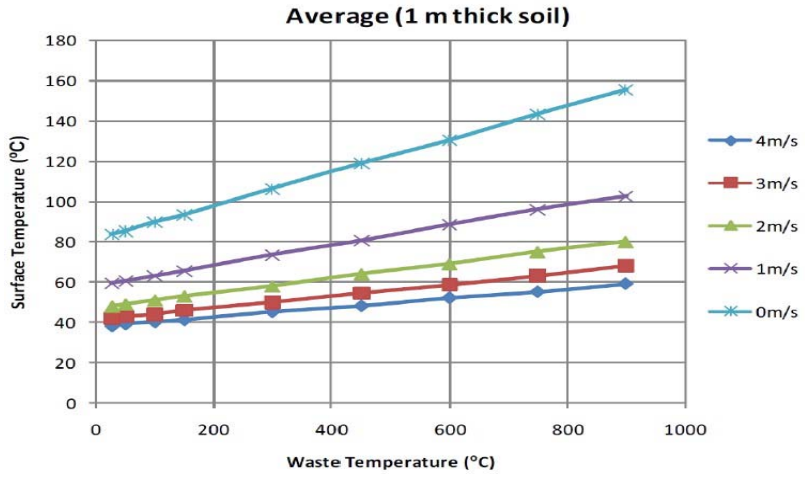


Figure 15: Average surface temperature with varying spoils (waste temperature and wind speed)

Progressive facility / Phased development

The South Pit Discard Dump be constructed in phases to minimize the need for clean and dirty water separation measures as well as to allow for the timeous construction of blanket layers on hot areas. This also assisted to determine the final footprint of the dump indicated in Figure 16.

There are three main phases of the facility as detailed in the technical design report appended in APPENDIX H. As described in the design report. The first phase will be located on the cooler areas with no significant hot spots. Phase 2 will be located on the hot areas that should at time of construction, have cooled off sufficiently with the construction of the blanket layer during the first phase. The third and final phase will be located on and over the ramp/water management facility.

Dump closure and drainage regime

The side slopes and upper surface of the dump was designed to be aligned with a suitable profile for final closure. No additional shaping will be required for rehabilitation or closure purposes. Topsoil placement and vegetation can commence at any time once the outer slope and upper surface elevations have been reached.

Final drainage at closure is shown in Figure 16. Catchment areas on the dump will be considered clean at successful vegetation establishment when after the temporary cut-off berm can be removed. Runoff from the

eastern side slope will drain into a new clean water drainage line that will be established during the rehabilitation of the Triangle pit. The low-lying area to the south of the dump will have to be filled to be to free draining to comply with the general mine closure requirement to ensure that all clean water can be free draining post-mining. This provides for a possible route to the Steenkoolspruit to drain the runoff from the southern side slopes. The borehole can consequently be decommissioned.

The cut-off berm and borehole can be decommissioned and removed after rehabilitation of the dump and low-lying area south of the dump.

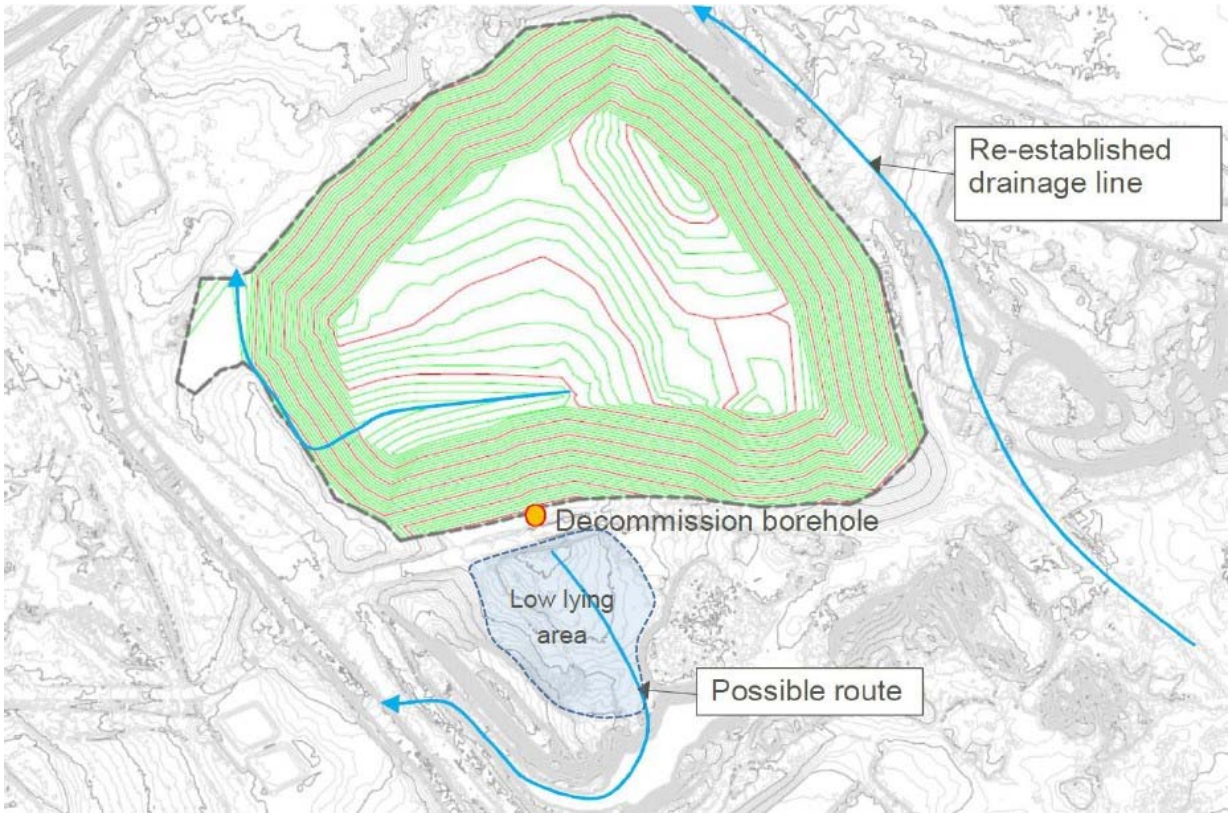


Figure 16: Final closure layout and drainage - South Pit Discard Dump

Storm Water Management Plan

The proposed SWMP for the operational phase of the South Pit Discard Dump was developed in phases (Golder Associates (Pty) Ltd (b), August 2018) and the detailed phase approach can be found in APPENDIX J. The SWMP was developed to fulfil the requirements of the National Water Act, 1998 (Act 36 of 1998) (NWA) and particularly, Government Notice 704 contained in Government Gazette 20118 of June 1999 (hereafter referred to as GN 704), which deals with the separation of clean and dirty water (see APPENDIX J). The Personal Computer Storm Water Management Model (PCSWMM) was used as the flood analysis model to determine the drainage corridor sizing for the South Pit Discard Dump. PCSWMM is a dynamic rainfall-runoff simulation model used for single event or long-term simulation of runoff quantity. The model was set up for the localised South Pit Discard Dump site to predict the relevant flood peaks as well as the associated sizing of the conveyance structures (channels).

During the initial phases' dirty runoff from the southern side slopes will drain towards a low lying area. A new borehole will collect the runoff and act as a conduit to provide temporary drainage to the underground workings during construction of the dump. Clean and dirty water separation measures are limited to the construction of

one cut-off berm on the northern side of the dump and a temporary borehole as a drainage conduit to the underground workings on the southern edge of the dump. No additional clean and dirty water separation measures will be required for Phase 1.

Phase 2 is located on the hot areas that, should have at the time of construction, cooled off sufficiently with the construction of the 1 m soil blanket layer during the first phase. The runoff from the extended northern and eastern side slopes will again drain into the surrounding dirty catchments. No additional clean/dirty water separation measure will be required.

The third phase (Figure 17) will be located on and over the ramp / water management facility. The runoff from the extended northern and eastern side slopes will again drain into the surrounding dirty catchments. During the final stages when discard placement extends past the ramp, a temporary cut-off berm will have to be constructed. Dirty runoff will be separated from the clean area to the north by the berm until the completed side slope has been vegetated (Golder Associates (Pty) Ltd (b), August 2018).

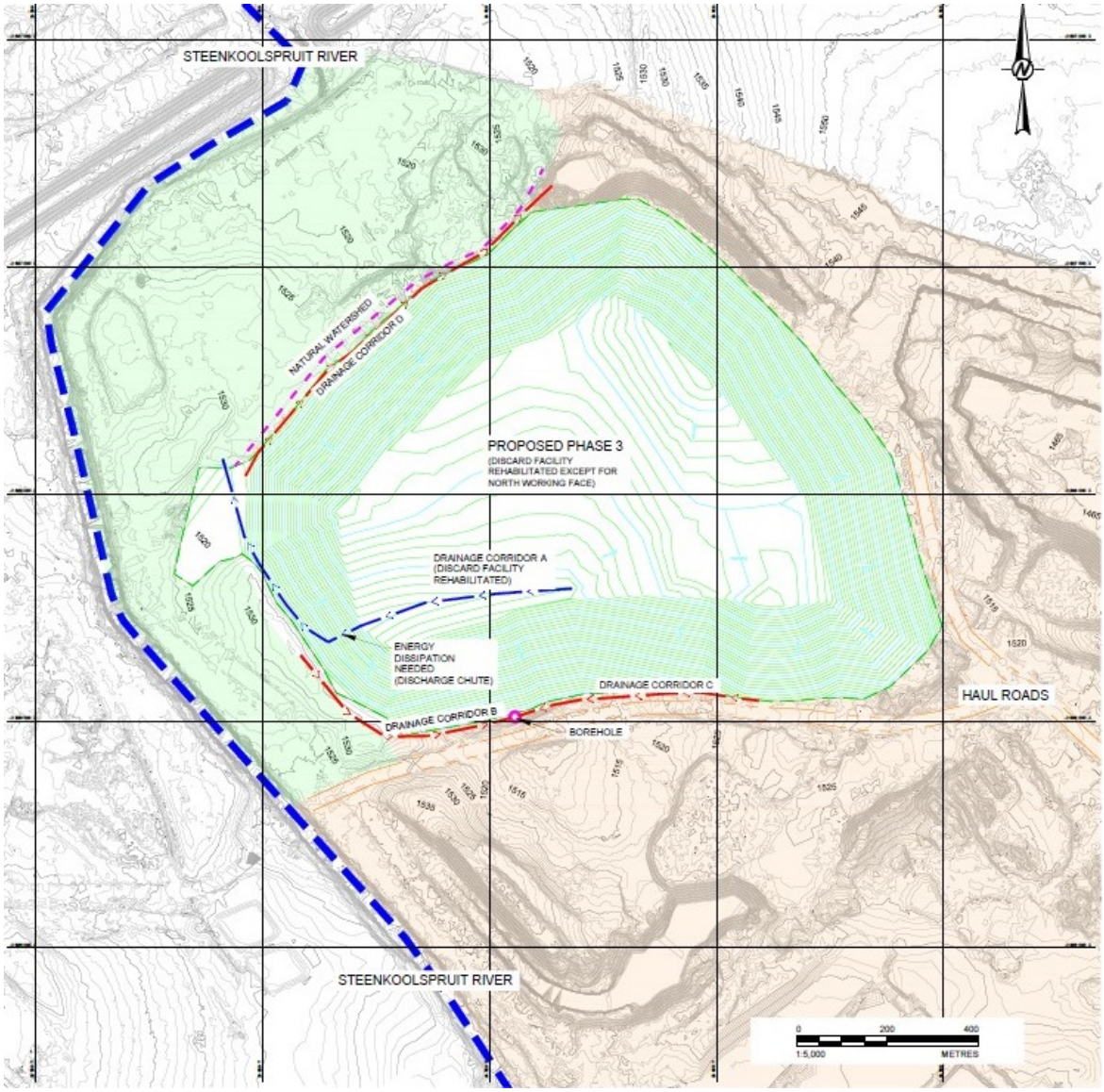


Figure 17: Phase 3 layout – drainage corridors - South Pit Course Discard Dump (Golder Associates (Pty) Ltd (c), April 2018)

Post-closure conceptual Storm Water Management Plan (SWMP)

No additional shaping will be required after the completion of the last phase. Topsoil placement and vegetation can commence at any time once the outer slope and upper surface elevations have been reached.

Final drainage at closure is shown in Figure 18. Catchment areas on the dump will be considered clean at successful vegetation establishment when after the temporary cut-off berm can be removed. Runoff from the eastern side slope will drain into a new clean water drainage line that will be established during the rehabilitation of the Triangle pit. The low-lying area to the south of the dump will have to be filled to be to free draining to comply with the general mine closure requirement to ensure that all clean water can be free draining post-mining. This provides for a possible route to the Steenkoolspruit to drain the runoff from the southern side slopes. The borehole can consequently be decommissioned.

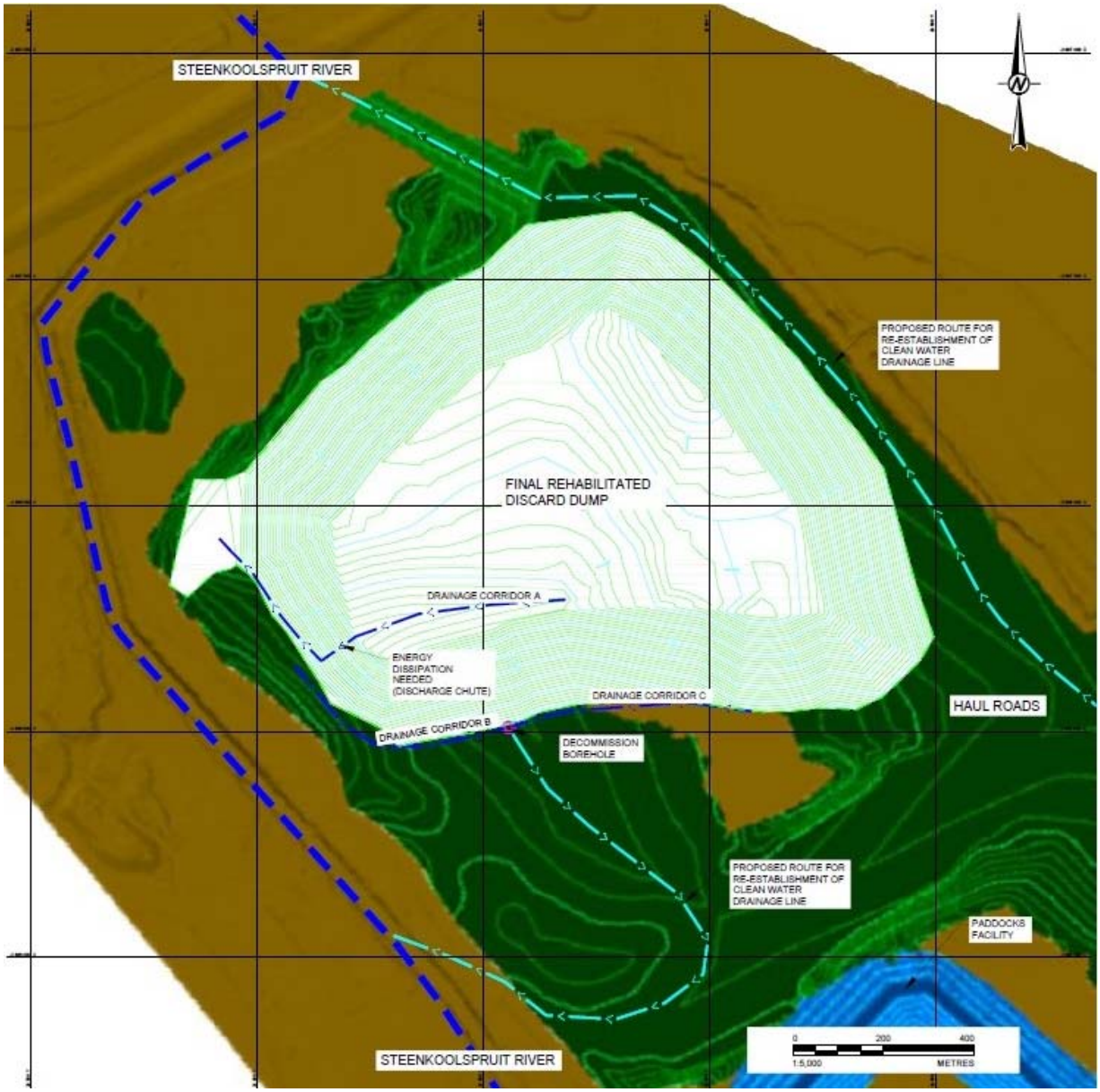


Figure 18: Final closure layout and drainage – South Pit Course Discard Dump (Golder Associates (Pty) Ltd (c), April 2018)

The following recommendations were made in the technical design report for the South Pit Discard Dump as appended in APPENDIX H:

- Update the conceptual landform designs for the overall ATCOM mining areas;
- Investigate the use of the proposed borehole as drainage conduit to a suitable level of detail;
- Include differential settlement and low wall stability analysis in the next design phase; and
- Hydrological modelling should be done to determine how run-off from the upper surface can best be drained with a dedicated engineered channel on the western side.

Stability Analysis

The material proposed for the coarse discard dump is similar to the material being used for the existing Co-disposal Facility within the South Pit area, known as the South Pit Paddocks. These paddocks have adequate factors of safety and so it was not deemed necessary to repeat the stability modelling for the proposed new South Pit Discard Dump as all outer slopes are the same or flatter than the South Pit Paddocks, and the South Pit Paddocks have been proven to be adequately stable.

Barrier Design

As with the Venture Co-disposal Facility, it will be impractical to construct a dedicated liner system at the base of the South Pit Discard Dump. Seepage during operations and post-closure will be abstracted by the groundwater abstraction system and eventually treated. The cover of the dump would therefore serve as the barrier design for the facility, with the key purpose of limiting the infiltration rate of water into the deep and hence report as seepage.

As with the Venture Co-disposal Facility, a layer of at least 300 mm of Bainsvlei and Clovelly soils with established grassland vegetation is recommended for the South Pit Discard Dump, to reduce the average net infiltration over the discard dump. The performance of the store and release vegetated cover is premised on optimal performance of the vegetation cover which requires that the soil substrate be suitable for deep rooting and that the soils are fertile and uncompacted so that vigorous plant growth will maximise the leaf area for evapotranspiration.

Reduction in net infiltration translates to less mass loads to the groundwater system therefore a reduction in environmental impact. The reduction in infiltration is also required in order to decrease the volume of dirty water by reducing infiltration into the waste mass, the cover decreases the volume of dirty water generated from rainfall, which is also a gain in terms of water use efficiency.

3.0 POLICY AND LEGISLATIVE CONTEXT

The following section provides a brief overview of the policy and legislative context within which this EIA process was undertaken. This includes the following key legislation (Table 8):

Table 8: Policy and legislative context

Applicable Legislation and Guidelines used to compile the Report	Reference where applied	How does this Development comply with and respond to the Legislation and Policy Context
2014 EIA Regulations (as amended) (GN R.326 of 2017), published under the NEMA	Section 2.5.2	The EIA Listed Activities triggered by the proposed activities provided in Table 6. This EIA & EMPr has been compiled in accordance with the requirements of the EIA Regulations, to support the application for EA and waste management licence (WML). The screening tool assessment in terms of the 2014 EIA Regulations was conducted to determine environmental sensitivities associated with the proposed activities – See Section 8.1.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) (NEMAQA)	Section 3.4 Section 6.1	The proposed project will not require an atmospheric emission licence (AEL) in terms of Listed Activities and Associated Minimum Emission Standards identified in terms of Section 21 of the NEM:AQA. But proposed dust and fine particulate monitoring should be implemented to monitor compliance with the National Ambient Air Quality Standards (NAAQS).
GN R.921, as amended by GN633, published under the National Environmental Management Waste Act, 2008 (Act 59 of 2008) (as amended) (NEMWA)	Section 2.5.2 Section 3.3	The Waste Management Activities triggered by the proposed activities are provided in Table 7.
National Water Act, 1998 (Act 36 of 1998)	Section 3.2	An application for a water use licence (WUL) in terms of Chapter 4 of NWA is being applied for. The water uses are listed in Table 9.
Regulations GN R. 704 of 04 June 1999, published under the NWA	Section 3.2 Section 2.5.3.1 and Section 2.5.3.4	An application is also being submitted for exemption from the requirements of Regulation 4(a), (b) and (c) of Government Notice 704 of 04 June 1999, for in-pit discard disposal. The conceptual operational and post-closure storm water management plans were also developed to fulfil the requirements of GN 704.
Government Notice (GN. R. 650) published by the Department of Environment, Forestry and Fisheries (DEFF) (Government Gazette No. 43412) on Friday 5 June 2020, in terms of the Disaster Management Act (Act 57 of 2002), outlining directions regarding measures to address, prevent and	Section 5.5	The written Public Participation plan (PP plan), containing the proposed consultation process with registered I&APs during the Impact Assessment phase of his project was presented to the DMRE on Friday 7 August 2020, and the details are included in Section 5.5 of this report. See APPENDIX F for the PP Plan.

Applicable Legislation and Guidelines used to compile the Report	Reference where applied	How does this Development comply with and respond to the Legislation and Policy Context
combat the spread of COVID-19, relating to National Environmental Management Permits and Licences.		

3.1 National Environmental Management Act

In terms of the National Environmental Management Act, Act 107 of 1998 (NEMA), as amended and the EIA Regulations of 2014, an application for EA for certain listed activities must be submitted to the provincial environmental authority or the national authority, the Department of Environmental Affairs, depending on the types of activities.

The current EIA Regulations of 2014, Listing Notice 1 of 2014, Listing Notice 2 of 2014, and Listing Notice 3 of 2014, promulgated in terms of Sections 24(5), 24M and 44 of the NEMA, and subsequent amendments, commenced on 04 December 2014.

Listing Notice 1 and Listing Notice 3 lists those activities for which a Basic Assessment process is required while Listing Notice 2 lists the activities requiring a full scoping and EIA process. The EIA Regulations of 2014 define the processes that must be undertaken to apply for EA.

The activities associated with the proposed project requiring an EA in terms of the NEMA are included in Table 6.

3.2 National Water Act

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is the primary legislation regulating both the use of water and the pollution of water resources. It is applied and enforced by the Department of Water and Sanitation and (DWS).

Section 19 of the National Water Act regulates pollution, which is defined as “the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it:

- Less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- Harmful or potentially harmful to –
  - the welfare, health or safety of human beings;
  - any aquatic or non-aquatic organisms;
  - the resource quality; or
  - property.”

The persons held responsible for taking measures to prevent pollution from occurring, recurring or continuing include persons who own, control, occupy or use the land. This obligation or duty of care is initiated where there is any activity or process performed on the land (either presently or in the past) or any other situation which could lead or has led to the pollution of water.

The following measures are prescribed in Section 19(2) of the NWA to prevent pollution:

- Cease, modify or control any act or process causing the pollution;
- Comply with any prescribed 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 or banks of a watercourse.

The NWA states in Section 22 (1) that a person may only use water:

- Without a licence –
  - if that water use is permissible under Schedule 1;
  - if that water use is permissible as a continuation of an existing lawful use; or
  - if that water use is permissible in terms of a general authorisation issued under Section 39;
- If the water use is authorised by a licence under this Act; or
- If the responsible authority has dispensed with a licence requirement under subsection (3).

Chapter 4 of the NWA stipulates that a water use licence is required for certain water uses, which are listed in Section 21. Those that are most likely to apply to the proposed project are the following:

(c) "Impeding or diverting the flow of water in a watercourse;

(g) Disposing of waste in a manner which may detrimentally impact on a water resource; and

(i) Altering the bed, banks, course or characteristics of a watercourse."

Water use licence application

The water uses that will be applied for, as part of the development of the proposed Venture Co-disposal Facility, and the establishment of the South Pit Discard Dump, are listed in Table 9 below.

Table 9: Water uses to be licensed

Water Use	Description
1. Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource	■ Extension of the Venture Discard Dump (proposed Venture Co-disposal Facility)
2. Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource	■ Establishment of the South Pit Discard Dump
3. Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource	■ Establishment of a new RWD to replace the existing PCD
4. Section 21(c): Impeding or diverting the flow of water in a watercourse; Section 21(i): Altering the bed, banks, course or characteristics of a watercourse	■ Construction of pipelines within 500m of a wetland area; and ■ Extension of culverts along the expanded haul road between the ATC discard dumps and ATC Plant.

An application is also being submitted for exemption from the requirements of Regulation 4(a), (b) and (c) of Government Notice 704 of 04 June 1999, for in-pit discard disposal.

The conceptual operational and post-closure storm water management plans were also developed to fulfil the requirements of GN 704 (see APPENDIX J and APPENDIX K).

3.3 National Environmental Management: Waste Act

The National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEMWA) was implemented on 1 July 2009 and Section 20 of the Environment Conservation Act 73 of 1989, under which waste management was previously governed, was repealed. One of the main objectives of the NEMWA is to reform the law regulating waste management to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development and provide for:

- National norms and standards for regulating the management of waste by all spheres of government;
- Specific waste management measures;
- The licensing and control of waste management activities;
- The remediation of contaminated land; to provide for the national waste information system; and
- Compliance and enforcement.

In terms of the NEMWA, certain waste management activities must be licensed, and in terms of Section 44 of the Act, the licensing procedure must be integrated with an EIA process in accordance with the EIA Regulations promulgated in terms of the NEMA.

Government Notice 921, as amended by GN R 633, lists the waste management activities that require licensing. A distinction is made between Category A waste management activities, which require a Basic Assessment, Category B activities, which require a full EIA (scoping followed by impact assessment) and Category C activities that require compliance with relevant requirements or standards determined by the Minister.

The existing Venture coarse discard dump is authorised in terms of the NEMWA through the approved revised and consolidated EMPr, dated 2014 (Digby Wells (Pty) Ltd, April 2014).

Since the proposed project will entail the expansion of the existing discard dump, the following waste management activity will be triggered:

- Category A, Activity 3(13): The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule;
- Category B, Activity 4(1): The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage;
- Category B, Activity 4(10): The construction of a facility for a waste management facility activity listed in Category B of GN R 921 (as amended) (not in isolation to associated waste management activity);
- Category B, Activity 4(11): The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

These activities require an application for a waste management licence (WML) supported by an environmental impact assessment process, undertaken in accordance with the EIA Regulations GN R.326 of 04 December 2014, as amended.

The management of mine residues (stockpiles and waste deposits) is governed by regulations under the National Environmental Management: Waste Act (Act 59 of 2008): Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R632 of 2015), which allows for the characterisation of mine residues (all forms of mine waste and stockpiles) as the basis for a risk assessment.

When promulgated, GN R632 of 2015 also provided that the pollution control barrier system be driven by the Waste Classification and Management Regulations (GN R634-636 of 2013), based upon the leachable and total concentrations of specified constituents of concern. GN R632 of 2015 was, however, amended on 21 September 2018, removing the reference to the Waste Classification and Management Regulations, and instead, requiring that the pollution control barrier system be driven by a risk assessment based upon the geochemical hazard and toxicology of the waste material and the risk of the water resource and other receptors.

In addition to the waste licence application, the disposal or stockpiling of mining residues typically requires a water use licence (WUL) in terms of Section 21(g) of the National Water Act (Act 36 of 1998). The regulations on use of water for mining and related activities, aimed at the protection of water resources (GN R704 of 1999) provide for the protection of the water resource in the context of mining and related activities, notably:

- Regulation 7(a) which requires the prevention of water containing waste or any substance which is likely to cause pollution from entering a water resource; and
- Regulation 7(e) which requires that residue deposits and stockpiles be designed with suitable barriers that prevent the leaching of materials from the residue into the water resource.

The standard that is applied by the Department of Water and Sanitation (DWS) in considering the acceptability of a pollution control barrier system, in this regulatory context, is either:

- A ‘compliant design’, which the DWS bases on the Waste Classification and Management Regulations (GN R634-636 of 2013), notwithstanding these regulations no longer being applicable in terms of the amended GN R632 of 2015; or
- A ‘risk-based approach’ to pollution control barrier design, per the exchange of memoranda between the DWS and the Minerals Council (ref. WULA/1/2016 and EPC/60/16, respectively).

Waste management licence application

The proposed Venture Co-disposal Facility and South Pit Discard Dump trigger the waste management activities listed in Table 7, which require an application for a WML supported by an EIA process, undertaken in accordance with the EIA Regulations GN R.326 of 04 December 2014.

3.4 National Environmental Management: Air Quality Act

The main objectives of the National Environmental Management: Air Quality Act, Act No. 39 of 2004 (NEMAQA) are to protect the environment by providing reasonable legislative and other measures to:

- Prevent air pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development in alignment with Sections 24a and 24b of the Constitution of the Republic of South Africa.

The NEMAQA has devolved the responsibility for air quality management from the national sphere of government to local spheres of government (district and local municipal authorities), who are tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and development of emissions reduction strategies.

The NEMAQA makes provision for the setting and formulation of national ambient air quality and emission standards. If the need arises, these standards can be set more stringently on a provincial and local level.

The proposed project will not require an atmospheric emission licence in terms of Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the National Environmental Management: Air Quality Act 39 of 2004 (RSA, 2013a). However, the NEM:AQA makes provision for the setting and formulation of national ambient air quality and emission standards upon which the air quality impact assessment for the project was based.

3.5 Need and desirability of the proposed activities

The coal industry employed 92,230 people in 2019 (86,647 in 2018), representing about 19% of total employment in the mining sector 258.9 million tonnes produced in 2019 (253Mt in 2018) with total coal sales of R139.3 billion (R146 billion in 2018). In South Africa, 70 percent of coal volume is consumed domestically, and more than 70 percent of electricity demand is generated from coal power (Minerals Council of South Africa, 2020).

In addition to supplying the local economy, coal from South Africa's production is also being exported. The coal is exported mainly through the Richards Bay Coal Terminal, making South Africa the fourth-largest coal exporting country in the world. At least five large Eskom power stations will still be in operation after 2040. Coal is expected to be the second largest source of primary energy and the largest source for electricity generation in the next 30 years, during which time Eskom will need about four billion tonnes of coal (Minerals Council of South Africa, 2020).

The proposed development of the discard facilities will allow iMpunzi to continue with the current mining activities on site and continue with employment and income generation opportunities in the area. The developments associated with the larger mining operation will further facilitate the development of Black Economic Empowerment (BEE) opportunities during the lifespan of the facilities and the iMpunzi operation itself.

4.0 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE INCLUDING A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO EACH PREFERRED SITE ALTERNATIVE

4.1 Project alternatives

4.1.1 Location and layout of the activity

Alternative sites for the proposed facilities were briefly considered within the mining right area as well as the area surrounding the GOSA mining operations. These sites were all located on either rehabilitated mining areas, or agricultural areas mostly undisturbed by mining activities. The option to locate the discard facilities on previously mined-out spoils was found to be preferable as it will avoid additional water and soil pollution on unmined or rehabilitated areas.

Economically, the location must be as close as possible to the two existing coal processing plants to reduce costs associated with the transportation of discard to these facilities, and maximise the use of existing infrastructure such as haul roads, storm water conveyance infrastructure, etc.

4.1.1.1 Venture Co-disposal Facility

The existing Venture coarse discard dump is used for the disposal of coarse coal discard which originates from the processing of coal at the ATC Plant, and are transferred to the facility via existing conveyor belts. This facility is located on the historic mined-out ATC Venture Void. The current discard dump is expanding at a notable pace and needs to be expanded upon to accommodate additional volumes of discard. The facility will be modified into a Co-disposal Facility to also accommodate fine discard (slurry).

As the facility needs to be expanded, no other alternative locations were identified. The proposed expansion will not extend past the footprint of the historical mined-out pit area, thus reducing the disturbance of any indigenous vegetation.

4.1.1.2 South Pit Discard Dump

The historic mined-out South Pit was selected as the preferred location for the establishment of the proposed South Pit Discard Dump. The old South Pit will be filled with spoils, and then shaped and levelled. The shaping and levelling have currently been completed in various states towards rehabilitation (see Figure 10). As stated above, the preferred location has been selected because of its close proximity to the coal processing plant, and it's footprint being on already disturbed and mined-out land, to reduce the overall cost associated with transport of product to the facility and the minimise the environmental impact.

4.1.1.3 Haul road expansion

No alternative route options were identified as this is an existing haul road that will only need to be upgraded and widened by a maximum of 16 m to accommodate the ADTs that will be utilised to transport the coarse discard to the ATC beneficiation plant.

4.1.2 Water treatment implications

With the proposed development of the new South Pit Discard Dump and the modification of the existing Venture coarse discard dump to a Co-disposal Facility, it is likely that the mine water quality from both pits will change over time. As excess mine affected water from both of these pits is / will be pumped to the Tweefontein Water Treatment Plant (WTP), to keep the water level in the pits low enough to prevent surface or subsurface decant, the principal water quality impact of these developments will be the change in water quality and quantity of the WTP feed[1]. It was therefore necessary to investigate the water treatment implications, the result of which are discussed below (Golder Associates Africa (Pty) Ltd (h), August 2020) (for the full report refer to the Groundwater and Geochemistry Impact Assessment in APPENDIX L). As part of this assessment, recharge rates for a no cover[2] scenario and a 300 mm cover scenario were investigated, to determine the influence a cover would have on the feed water quality (see Section 9.3.3 for the conceptual level seepage modelling conducted for this project).

Predicted Quality of feed from South Pit Discard Dump and Venture Co-disposal Facility

Geochemical code PHREEQC, a computer program for simulating chemical reactions and mass- transfer in natural or contaminated water (Parkhurst and Appelo, 1999) was used to carry out the geochemical modelling of quality of feed from the proposed South Pit Discard Dump and Venture Co-disposal Facility (Golder Associates Africa (Pty) Ltd (h), August 2020). The programme can simulate the appropriate processes occurring in aqueous systems such as mixing of multiple solutions, precipitation/dissolution of selected mineral phases, redox reactions, and adsorption of metals.

[1] All excess mine affected water reporting to the Tweefontein Water Treatment Plant (WTP)

[2] Soil cover/ capping material to be placed on discard facilities during decommissioning and closure

Modelling scenarios

For each facility, annual volumes of recharge from discard, slurry and spoils were estimated from surface areas and recharge rates were provided for a **no cover** scenario and **300 mm cover** scenario. The recharge volumes that were used to calculate mixing ratios for each scenario are presented in Table 10. Post closure mass transport was simulated for 50 years' post closure for Venture Co-disposal Facility and South Pit Coarse discard facility. It is assumed the mining would have ceased and that the slurry facilities at both Venture and Atcom South Pit would have dried out. Figure 29 illustrates the simulated TDS plume for post closure for no cover scenario. The highest TDS concentrations are located within the pits and a portion of the mass load migrates towards the decant locations and then further towards the surface drainages at Saaiwaterspruit for Venture Pit and Steenkoolspruit for Atcom South pit.

Table 10: Annual recharge volumes used to calculate mixing ratios for different scenarios

Source	Total Area (m^2)	No cover scenario	300 mm cover scenario
		Infiltration (L/a)	Infiltration (L/a)
Venture – Slurry area	369 240	5 191 514	1 297 879
Venture – Coarse Discard area	457 360	192 914 448	10 610 295
Venture – Pit Spoils	1 302 047	137 300 856	73 227 123
South Pit Coarse Discard Dump	1 261 039	351 906 250	29 254 844
South Pit – Spoils	3 650 537	384 949 127	205 306 201
South Paddocks – Slurry area	1 250 000	17 575 000	4 393 750
South Paddocks – Coarse Discard area	510 000	215 118 000	11 831 490

Note: recharge from the south paddocks slurry and discard areas were included in the assessment as they report to the same source terms, i.e. South Pit.

The Venture Co-disposal Facility and historic pit area will introduce 67 050 T of TDS into the groundwater system till 50 years post closure (2087) for no cover scenario (Figure 19 and Figure 20) and 8 264 T of TDS for the min. 300mm cover scenario. The South Pit Discard Dump and historic pit area will introduce a cumulative 358 694 T of TDS into the groundwater system till 2087 for no cover scenario and cumulative 38 083 T for the min. 300mm cover scenario (Figure 19 and Figure 20). The highest TDS concentrations are located within the pits and a portion of the mass load migrates towards the decant locations and then further towards the surface drainages at Saaiwaterspruit for Venture footprint and Steenkoolspruit for the South Pit footprint. The TDS contaminant plume is shown with a threshold value of 450 mg/L (Class 0 Drinking Water SANS 241 Standard). There is a smaller footprint of high concentration TDS plume outside the pit boundaries compared to the no cover scenario. TDS concentrations at decant locations are of a lower concentration compared to the no cover scenario (Golder Associates Africa (Pty) Ltd (h), August 2020). Thus, a min. 300mm cover is being recommended to reduce the negative impact on the quality of feed from the proposed facilities in future.

The predicted water chemistry for both facilities is circum-neutral, saline mine drainage, dominated by calcium, magnesium, sodium and sulphate. Gypsum, Calcite, Barite, Hematite, Aragonite, Birnessite, pyrolusite and Diaspore are in equilibrium with the water from both pits, and could precipitate, as could Malachite at the proposed South Pit Discard Dump (Golder Associates Africa (Pty) Ltd (h), August 2020). It is recommended that iMpunzi assess and determine if the existing Tweefontein WTP will be able to effectively treat the expected

feed from the South Pit Discard Dump and Venture Co-disposal Facility. Discussion regarding the suitability of the Tweefontein WTP to receive this feed is discussed in section 4.1.3 below.

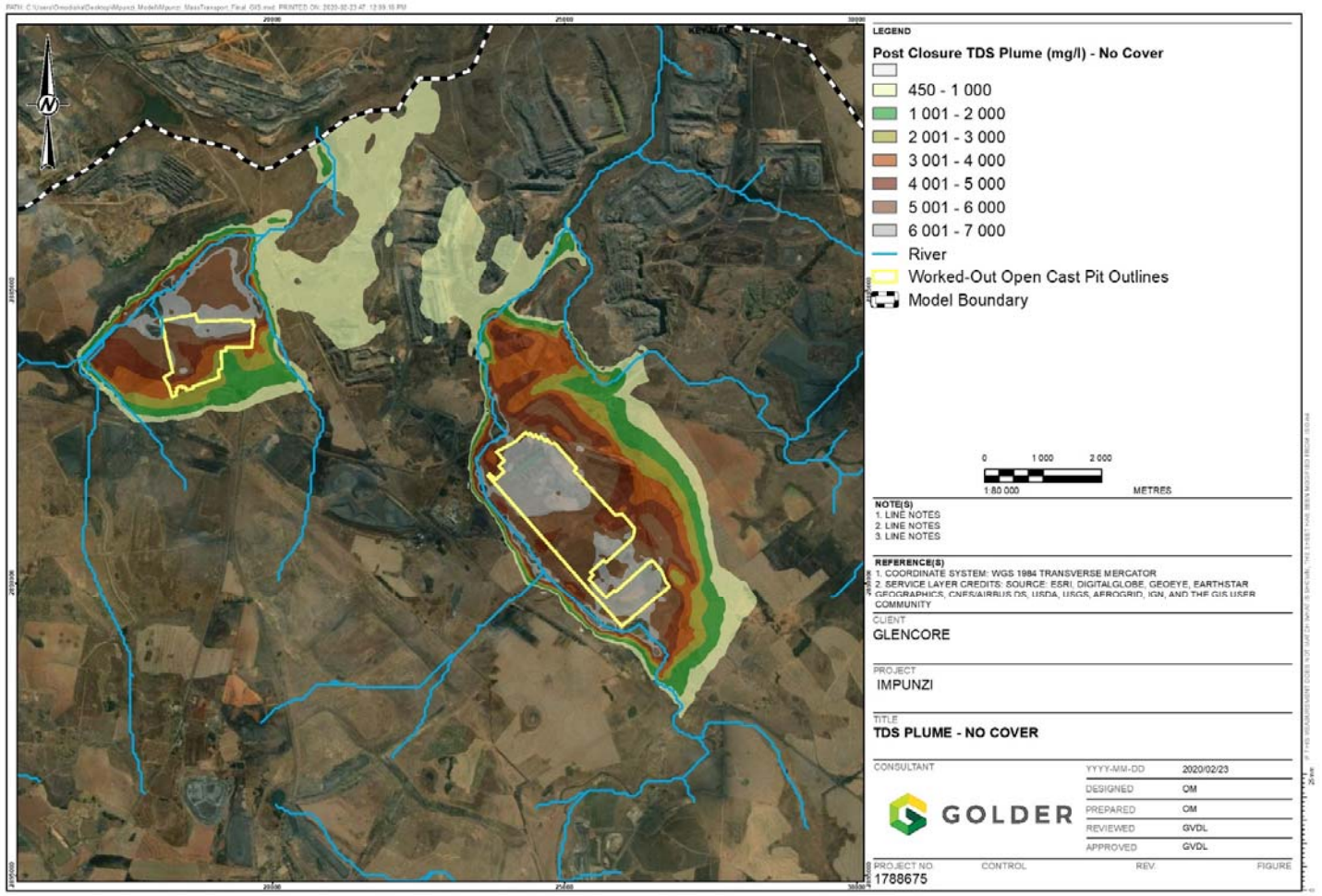


Figure 19: Post closure simulated TDS Plume - with no cover

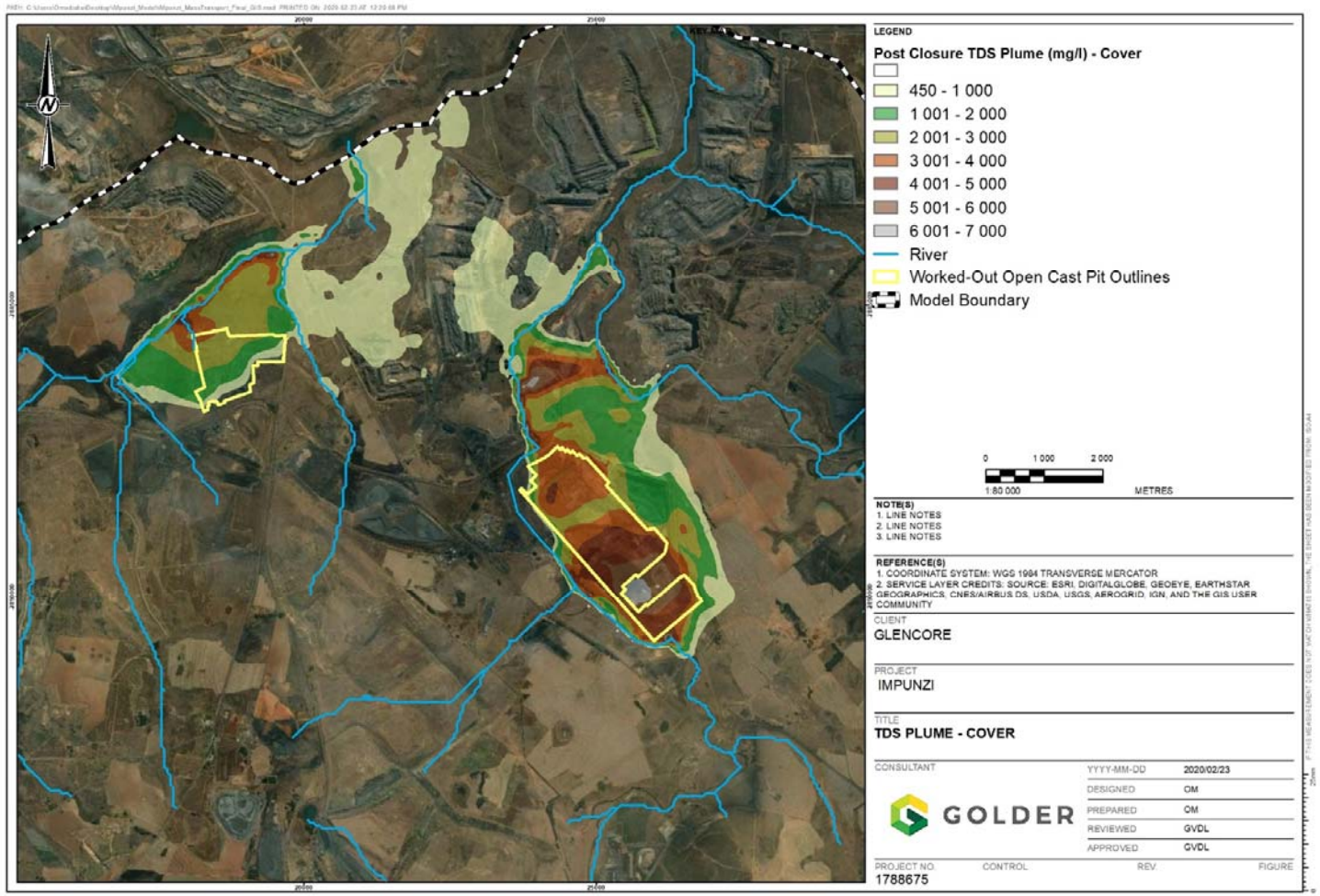


Figure 20: Post closure simulated TDS Plume - with min. 300mm cover

Predicted Quantity of feed from South Pit Discard Dump and Venture Co-disposal Facility

During operations, decant was simulated at South Pit Discard Dump and Venture Co-disposal Facility. The decant locations at South Pit Discard Dump are later affected by mine dewatering at the ATCOM East during operations which draws down the water table and reduces decant slightly at South Pit Discard Dump. Mitigation abstraction is simulated to observe the possible reduction of water levels to within the pit so that there is a possible reduction in impacts to the environment. The positions of the proposed six abstraction boreholes at Venture Co-disposal Facility and eight abstraction boreholes at South Pit Discard Dump are depicted in Figure 21. The boreholes were assigned along the pit outlines were possible decant would occur (Golder Associates Africa (Pty) Ltd (h), August 2020).

The effectiveness of abstraction is a function of the transmissivity of the fill material in the pit. A hydraulic conductivity of 1.728 m/d was assumed in the model. Boreholes at the Venture Co-disposal Facility are each pumped at 4 l/s for a total abstraction of 24 l/s. Boreholes at South Pit Discard Dump are each pumped at 6.9 l/s for a total abstraction of 55 l/s. Actual boreholes yields would need to be verified and confirmed on site upon construction of the proposed abstraction boreholes.

The predicted flow from Venture Co-disposal Facility is 2 ML/day and that from South Pit Discard Dump is 4.7 ML/day. The combined flow rate is 6.7 ML/day during the operation phase. Post closure, the flow from the South Pit Discard Dump in the no cover scenario will increase to 5.4 ML/day resulting in a combined flow rate of 7.4 ML/day. The excess water will be pumped to underground storage lakes on the mine for reuse at the ATC Plant and ATCOM Plant. iMpunzi pumps treats excess water generated at the mine at the Tweefontein WTP. The facility has a capacity of 14.1 ML/day and is currently treating approximately 11 ML/day (Golder Associates Africa (Pty) Ltd (h), August 2020).

The current overall strategy for the management of dirty water generated by the mining activities is storage in mined out underground compartments and ultimately treated for reuse or discharge to the river system. The Tweefontein Water Treatment Plant has been operational 2015. This plant is able to treat approximately 15 Ml/day (Jones & Wagener, July 2020).

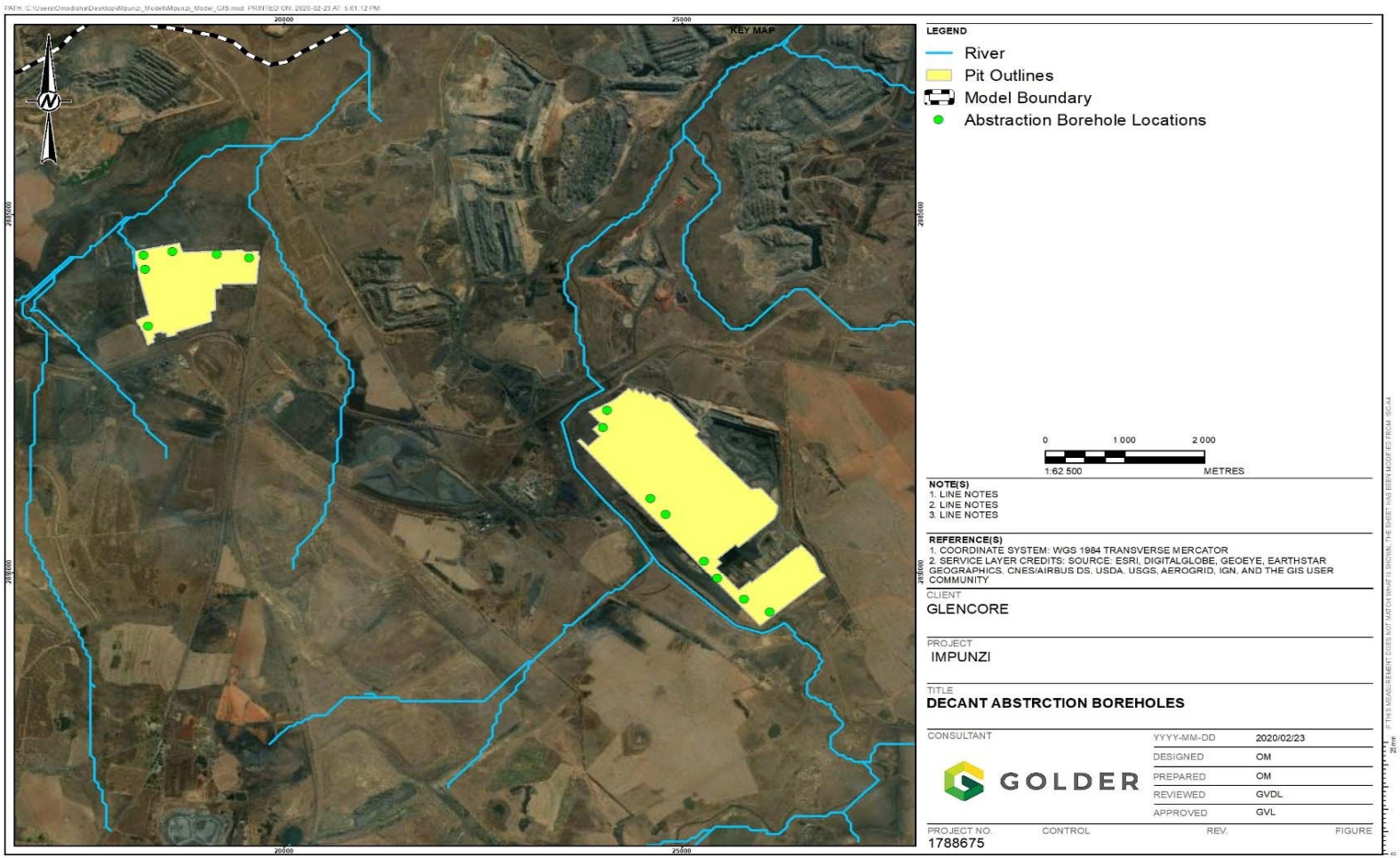


Figure 21: Location of proposed abstraction boreholes

4.1.3 Opinion on suitability of the existing Tweefontein WTP

Original design information was obtained for the facility. The section below, reflects both the original and revised design feed water qualities for three cases, namely:

- 50th percentile;
- 95th percentile and
- Design

The revised design data represent the proposed installed facility final design ranges. A new expected feed water quality was developed as per section 4.1.2 above. The referred data ("predicted feed quality, revised analysis") is however only based on average values and does not consider ranges, e.g. 95th percentile values which are essential in water treatment plant design.

In order to compare the two sets of data, a number of assumptions had to be made to accommodate for these variances between the two sets of data.

The main assumptions are as follows:

- The level of variances between the final design ranges specified and the ranges experienced in the new design will be similar. In other words, if the new average analysis is equal to or less than the revised design average, the 95th percentile will also be within the proposed design range. This assumption could be risky if different mining methodologies used, could result in significantly larger water composition excursions than in the previous evaluation; and
- For metals and semimetals it is assumed that the exceedances can be addressed by the proposed green sands filters prior to downstream treatment processes and hence does not require any downstream expansion of the treatment system. Again, this assumption does pose some risks, since components such as manganese can cause severe damage to downstream membranes if not adequately removed.

Scenarios were developed for both the Venture footprint area as well as the South Pit footprint area, based on a limited number of sample analyses (coarse discard and ATCOM spoils 2 samples each and slurry 1 sample, taken in 2017 (Golder Associates Africa (Pty) Ltd (h), August 2020)). Each pit was again divided in 2 cases, namely no cover and cover. The values for these scenarios were assumed to be average values. The simulations indicated that Iron and Manganese will precipitate prior to entering the treatment plant and should thus be absent from the stream. The values listed in Table 11 are for components where the value for the scenario with the highest predicted concentration, are equal to or less than that of the original design 50th percentile. For purposes of this comparison it was assumed that, for components where the new average concentration is less than the design 50th percentile, the maximum would also be within the original design range.

Table 11: Components with 50th percentile within the original design specification (Golder Associates Africa (Pty) Ltd (h), August 2020)

Water Quality Variable	Units	Revised Analysis	Original Design 50th percentile
Alkalinity as $CaCO_3$	mg/L	30 – 33	240
Chloride	mg/L	24 – 29	42.3
Aluminium	µg/L	0.26 – 0.29	70
Barium	µg/L	3.2 – 3.8	20

Water Quality Variable	Units	Revised Analysis	Original Design 50th percentile
Calcium	mg/L	350 – 491	565
Iron	mg/L	0	0.07
Manganese	mg/L	0	0.57
Silica	mg/L	Not measured	5.95
Strontium	mg/L	0.01 – 1.9	4.67

In the first analyses provided, which were based on different source water ratios, the metals listed on average exceeded the design 50th percentile concentrations. In the revised analyses as received on 24 February 2020 and 06 April 2020, all metals were within the design 50th percentile (Golder Associates Africa (Pty) Ltd (h), August 2020).

Ionic components listed in Table 12 exceed the 50th percentile of the design case. This may result in increased scaling risk to the membranes requiring expansion of the membrane treatment section of the facility.

Table 12: Ionic components that exceed the original 50th percentile concentration (Golder Associates Africa (Pty) Ltd (h), August 2020)

Water Quality Variable	Units	Revised Analysis	Original Design 50th percentile	Original Design Specification	Comment
Sulphate	mg/L	3 165 – 4 343	2 883	3 722	All values for ATCOM South Pit exceed the design 50th percentile value. The Venture Pit Cover scenario is within the design specification value, but all other values exceed it.
Fluoride	mg/L	0.55 – 1.3	0.35	0.90	All values exceed the design 50th percentile value. The Venture Pit Cover scenario is within the design specification value, but all other values exceed it.
Potassium	mg/L	29 – 33	20.4	29.7	All values exceed the design 50th percentile value. The three No Cover cases are within the design specification value, but the Cover cases exceed it.
Magnesium	mg/L	556 - 674	372	517	All values exceed the design 50th percentile value as well as the design specification value.
Nitrate & Nitrite	mg/L	1.3 – 16	0.52	1.53	All values exceed the design 50th percentile value. The Venture Pit Cover scenario is within the design specification value, but all other scenarios exceed it.
Sodium	mg/L	89 - 182	142	222	All values for ATCOM South Pit exceed the design 50th percentile value and the design specification value.
TDS	mg/L	4 241 – 5 749	4 008	5 148	All values exceed the design 50th percentile value. The Venture Pit Cover scenario is within the design specification value, but all other scenarios exceed it.

The impact of blending the two streams and utilizing the lower concentrations from the historic Venture opencast pit to dilute the feed from South Pit was also evaluated. The venture pit contributes approximately 30% of the

blended feed during operation and post-closure it reduces to 27% for the no cover scenario but remains 30% for the cover scenario. Even after blending, the blended stream compositions still exceed the design case 50th percentile and mostly also the design specification value as per Table 13 below.

Table 13: Blended Ionic components that exceed the original 50th percentile concentration (Golder Associates Africa (Pty) Ltd (h), August 2020)

Water Quality Variable	Units	Revised Analysis	Original Design 50th percentile	Original Design Specification	Comment
Sulphate	mg/L	3 985 – 4 025	2 883	3 722	All values still exceed the design 50th percentile value and the design specification value.
Fluoride	mg/L	1.07 – 1.19	0.35	0.90	All values exceed the design 50th percentile and design specification value.
Potassium	mg/L	29 – 32	20.4	29.7	All values exceed the design 50th percentile value. The No Cover scenario is within the design specification value, but not the Cover scenario.
Magnesium	mg/L	608 - 638	372	517	All values exceed the design 50th percentile and design specification value.
Nitrate & Nitrite	mg/L	7.5 – 11.5	0.52	1.53	All values exceed the design 50th percentile and design specification value.
Sodium	mg/L	147 - 171	142	222	All values exceed the design 50th percentile value but are within the design specification value.
TDS	mg/L	5 290 – 5 366	4 008	5 148	All values exceed the design 50th percentile and design specification value.

The predicted flow from the Venture Co-disposal Facility and historic pit is 2 ML/day and that from South Pit Coarse Discard Dump and historic pit is 4.7 ML/day. The combined flow rate is 6.7 ML/day during the operation phase. Post closure, the flow from the South Pit Coarse Discard Dump and historic pit in the no cover scenario will increase to 5.4 ML/day resulting in a combined flow rate of 7.4 ML/day. The excess water will be pumped to underground storage lakes on the mine for reuse at the ATC Plant and ATCOM Plant. IMpunzi pumps excess water generated at the mine at the Tweefontein Water Treatment Plant (WTP). The facility has a capacity of 14.1 ML/day and is currently treating approximately 11 ML/day.

4.1.3.1 Recommendations

The predicted volumetric flow rates provided are within the design ranges of Phase 1 of the Tweefontein WTP design. However, since the treatment plant also receives water from Tweefontein and GGV, the anticipated flows from these units should also be considered before a final conclusion can be made.

In the original analyses provided, some of the metallic ions exceeded the current design criteria, but in the revised composition, metallic ions are within the design ranges and hence the Greensands filters should not be overloaded.

However, a number of ionic species are shown to, at average predicted concentrations, significantly exceed the maximum design range specified for the water treatment works. This could impact the capacity of the RO membranes to achieve the predicted recoveries and these units may need to be re-rated to reflect the impact of higher ionic concentrations.

It is recommended that iMpunzi must complete the following:

- Develop a predicted 95th percentile concentration scenario, to indicate potential variability in feed concentrations to even higher levels than currently indicated in the average scenarios;
- Run RO simulations to ascertain the impact of the higher ionic concentrations in the feed on the % water recovery that can be achieved. Some components associated with scale formation, e.g. Calcium still seems to be within range, but the overall TDS increase impact on recovery needs to be quantified;
- Since the treatment plant was designed for modular expansion, some expansions may need to be considered.
- Verify revised flow rates from GGV and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded; and
- Ensure that the mine's dirty water management system and Tweefontein Water Treatment Plant (WTP) has capacity to handle the excess mine water make from both of the South Pit Coarse Discard Dump and the Venture Co-disposal facility that are and will in future be pumped to the Tweefontein WTP.

4.2 No project option

The current planned LoM for the authorised mining activities at the iMpunzi Mining Complex is 2038.

The no project option for this project is not to expand or extend any of the proposed discard facilities. The option of not going ahead with this project will leave the iMpunzi mine with discard capacity/storage constraints, which would ultimately affect production.

If mining operations at iMpunzi are forced to stop prematurely due to discard facilities exceeding their capacity to store discard waste from the mine, the coal reserves will be left unmined and the economic benefits to Glencore and its employees, as well as the associated socio-economic benefits to the local communities and businesses, and South Africa as a whole would cease.

There are no foreseeable significant environmental effects that could result from implementing the no-go alternative that will outweigh the economic benefits associated with the proposed expansion project.

5.0 PUBLIC PARTICIPATION PROCESS

This section provides an overview of the public participation process undertaken during the scoping phase, and to be undertaken during the impact assessment phase of the EIA.

5.1 Objectives of public participation

The public participation process is designed to provide information to, and receive feedback from interested and affected parties (I&APs) throughout the EIA process, thus providing organisations, individuals and other stakeholders with an opportunity to raise concerns, ask questions and provide comments and suggestions regarding the proposed project.

Opportunities for Comment

Documents are made available at various stages during the EIA process to provide stakeholders with information, further opportunities to identify issues of concern and suggestions for enhanced benefits and to verify that the issues raised have been considered.

The principles that determine communication with society at large are included in the principles of the NEMA and are elaborated upon in General Notice 657, titled *"Guideline 4: Public Participation" (Department of Environmental Affairs and Tourism, 19 May, 2006*) (DEAT, 19 May 2006), which states that: *"Public participation process means a process in which potential I&APs are given an opportunity to comment on, or raise issues relevant to, specific matters."*

Public participation is an essential and regulatory requirement for an environmental authorisation process and has been undertaken in terms of Regulations 39 to 44 of the EIA Regulations GN R.326 (7 April 2017). Public participation is a process that is intended to lead to a joint effort by stakeholders, technical specialists, the authorities and the proponent/developer who work together to produce better decisions than if they had acted independently.

The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner and:

During the scoping phase to enable them to:

- Understand the context of the EIA;
- Become informed and educated about the proposed project and its potential impacts;
- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their comments, issues of concern and suggestions have been recorded;
- Assist in identifying reasonable alternatives; and
- Contribute relevant local information and traditional knowledge to the environmental assessment.

During the impact assessment phase to assist them to:

- Contribute relevant information and local and traditional knowledge to the environmental assessment;
- Verify that their issues and suggestions have been evaluated and considered in the environmental investigations and feedback has been provided;
- Comment on the findings of the EIA; and
- Identify further issues of concern from the findings of the EIA.

During the decision-making phase:

- To advise I&APs of the outcome, i.e. the authority decision, and how the decision can be appealed.

5.2 Identification of I&APs

I&APs were initially identified through a process of networking and referral, obtaining information from iMpunzi's existing stakeholder database (APPENDIX C), liaison with potentially affected parties near the project area,

newspaper advertisements (APPENDIX E) and a registration process requiring I&APs to complete and submit a registration and comment sheet (APPENDIX D).

5.3 Registration of I&APs

The NEMA Regulations distinguish between I&APs and *registered* I&APs.

I&APs, as contemplated in Section 24(4) (d) of the NEMA include: "*(a) any person, group of persons or organisation interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity".*

In terms of the Regulations:

"An EAP managing an application must open and maintain a register which contains the names, contact details and addresses of:

(a) All persons who; have submitted written comments or attended meetings with the applicant or EAP;
(b) All persons who; have requested the applicant or EAP managing the application, in writing, for their names to be placed on the register; and
(c) All organs of state which have jurisdiction in respect of the activity to which the application relates."

The full stakeholder database included 113 stakeholders. As per the EIA Regulations, consultation during the impact assessment phase will be taking place with registered I&APs. Stakeholders who have not yet registered as I&APs are encouraged to register and contribute comments. The I&AP register (APPENDIX C) is updated throughout the EIA process.

5.4 Public participation during Scoping

This section provides a summary of the public participation process followed during the scoping phase.

5.4.1 Announcement of the project

The proposed project and availability of the Draft Scoping Report (DSR) were announced on **Friday, 08 November 2019** and the due date for public comment was **Monday, 09 December 2019**. Stakeholders were invited to participate in the EIA process and associated public participation process and to pass on the information to friends, colleagues, and neighbours who might be interested, and to register as an interested and affected parties(I&APs).

The proposed project was announced as follows:

- Distribution of an announcement letter, locality map and registration and comment sheet to all identified I&APs with email and postal address. A bulk SMS was sent to identified I&APs with mobile phone numbers. The announcement documents provided information about the EIA process, and how to access the draft scoping report. Copies of the announcement documents, evidence of postal delivery, and bulk SMSs are attached as APPENDIX D;
- The abovementioned documents were made available at the public places shown in Table 14 and posted to the Golder website: https://www.golder.com/global-locations/africa/south-africa-public-documents/;
- A mandatory advertisement was published in the local newspaper, the Middelburg Observer, on **Friday 08 November 2019** (see newspaper tear sheet attached as APPENDIX E; and
- Site notices were placed along the access road to the Glencore (iMpunzi South Pit) operations. Photographic evidence and a map showing the locations of the site notices are attached as APPENDIX E.

Table 14: List of public places where the Draft scoping report was displayed

Name of Public Place	Contact Person	Contact Number
Ogies Public Library	Librarian	013 643 1027
eMalahleni Public Library	Ms Maria Rozmiarek	013 690 6232
Ogies Clinic	Sister Choko Motau	013 643 2037
Golder Associates website	Mabel Qinisile / Ursula Papé	(011) 254 4800

5.4.2 Draft scoping report

The draft scoping report was made available for public review for a period of 30 days from ***Friday 08 November to Monday 09 December 2019*.**

5.4.3 Final scoping report

The DSR was updated and reflected the comments received from I&APs. The Final Scoping Report was submitted to the DMRE, on **8 January 2020**, for consideration on whether the Environmental Assessment Practitioner may proceed with the impact assessment phase. Subsequent acceptance of the EA application was received from DMRE on 1 July 2020.

5.4.3.1 Issues raised by I&APs

The comments received during the 30-day comment period, both in writing and telephonically, were captured in a Comment and Response Report (CRR) (see APPENDIX G). The Comment and Response Report will be updated throughout the environmental authorisation process.

5.5 Public participation during the Impact Assessment phase

Government Notice (GN. R. 650) published by the Department of Environment, Forestry and Fisheries (DEFF) (Government Gazette No. 43412) on Friday 5 June 2020, in terms of the Disaster Management Act (Act 57 of 2002), outlining directions regarding measures to address, prevent and combat the spread of COVID-19, relating to National Environmental Management Permits and Licences. A key requirement contained in these Regulations, is the requirements stipulated when conducting public participation; "*Prepare a written public participation plan, containing proposals on how the identification of and consultation with all potential I&APs will be ensured in accordance with regulation 41(2)(a) to (d) of the EIA Regulations or proposed alternative reasonable methods as provided for in regulation 41(2)(e) of the EIA Regulations, for purposes of the application and submit such plan to the competent authority*".

The public participation process for the scoping report (SR) and Plan of Study for Environmental Impact Assessment has been completed and was submitted to the Department of Minerals and Energy (DMRE) on 8 January 2020. The SR was accepted by the DMRE as detailed in Section 5.4.3 above.

The following section describes the proposed public participation plan to be implemented during the Environmental Impact Assessment phase of the proposed iMpunzi project. This proposed plan was telephonically discussed with DMRE on Friday, 07 August 2020, and subsequently submitted for approval by them on Tuesday, 11 August 2020.

Public participation process during the impact assessment phase of the EIA entails a review of the findings of the EIA, that will be presented in the EIA Report and Environmental Management Programme (EMPr), and the volume of specialist studies. These reports will be made available to all registered Interested and Affected

Parties (I&APs) and key stakeholders for a period of 30 days from **Tuesday, 01 September 2020** until **Friday, 02 October 2020**.

The availability of the Draft EIA/EMP report for public comment will be announced as follows:

- Registered I&APs will receive a letter notifying them of the commencement of the impact assessment phase and an invitation to contribute comments, questions, or suggestions for enhanced benefits on the findings of the specialist studies and EMPr. In view of the COVID-19 restrictions and to protect the safety of stakeholders, Golder will distribute the letter by email, and a short notice via bulk SMS.
- The report, executive summary and its appendices will be available on Golder's website (https://www.golder.com/global-locations/africa/south-africa-public-documents/).
- The executive summary of the report also will be available as a separate document for those I&APs who do not have the time nor data to download the entire report. The executive summary will accompany the letter to be electronically distributed.
- Detailed A3 notices regarding the proposed project (not copies of the actual documents) will be erected at the following publicly accessible places for potential I&APs to familiarize themselves with the project details:

Name of publicly accessible place	Address
Glencore iMpunzi South Pit Operations	Glencore Operations South Africa (Pty) Ltd R547 Road, eMalahleni
Ogies Spar	61 Main Street, Ogies, 2230
Ogies Post Office	17 van Riebeeck street, Ogies, 2230
Ogies Police Station	1 Main Road, Ogies, 2230
Golder Associates (Pty) Ltd Office	Building 1, Maxwell Office Park, Magwa Crescent, Waterfall City, Midrand, 1865

After completion of the 30-day public comment period, all the issues, comments and suggestions raised on the Draft EIA/EMPr will be added to the Comment and Response Report that will accompany the Final EIA/EMPr. The Final EIA/EMPr will be submitted to the DMRE for decision making.

On submission of the Final EIA/EMPr to the DMRE, a personal letter will be sent to registered I&APs to notify them of the submission and the opportunity to download an electronic copy of the Final EIA/EMPr from the Golder website. The letter will be sent via email and a notification by bulk SMS.

5.5.1 Announcement of lead authority's decision

Once the Mpumalanga DMRE has taken a decision about the proposed project, the Public Participation Office will immediately notify I&APs of the decision and opportunity to appeal. This notification will be provided by distributing a letter, accompanied by a copy of the authority's decision, to all registered I&APs. The letter will provide guidance to I&APs on how to lodge an appeal should they wish to.

An advertisement to announce the Lead Authority's decision will be published in the Middleburg Observer newspaper, if so required by the authorities.

6.0 ENVIRONMENTAL ATTRIBUTES AND DESCRIPTION OF THE BASELINE RECEIVING ENVIRONMENT

This section of the report provides a description of the receiving environment and existing conditions on and in the vicinity of the proposed discard facilities. Information elaborated upon in this section was partially sourced from the Consolidated Tavistock EIA and EMPR amendment, XST 1364, dated April 2014, (Digby Wells (Pty) Ltd, April 2014), the Integrated Water and Waste Management Plan for iMpunzi Colliery (Jones & Wagener, December 2018), and various specialist studies referenced in the text.

6.1 Climate data

6.1.1 Rainfall

The daily rainfall data for the project baseline was obtained from six rainfall gauges using the proprietary Daily Rainfall Data Extraction (Kunz, 2004, in (Golder Asssociates Africa (Pty) Ltd (q), August 2020)). The details of the rain gauges are given in Table 15. The 24-hour rainfall depths were obtained for the rain gauges by utilizing the Design Rainfall Estimation programme.

Table 15: Rain gauge details and records for the project area

Station Name	SAWS Number	Distance to site (km)	Record (years)	Latitude	Longitude	MAP (mm)
Waterpan	0515270_W	9.7	42	26°0'	29°9'	695
Vandyksdrift	0478546_W	14.5	70	26°6'	29°19'	679
Ogies	0478093_W	14.8	92	26°3'	29°3'	745
Clydesdale	0515266_W	16.6	36	25°56'	29°9'	768
Cologne	0478008_W	18.4	74	26°7'	29°1'	683
Bombardie Estate	0478039_W	18.5	40	26°10'	29°2'	665

Rainfall data was collected from 0478093_W (Ogies) rainfall station. This data is patched data from the Ogies rainfall station. The record runs from January 1920 to December 2000, totalling 80 years of rainfall data (Figure 22) (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

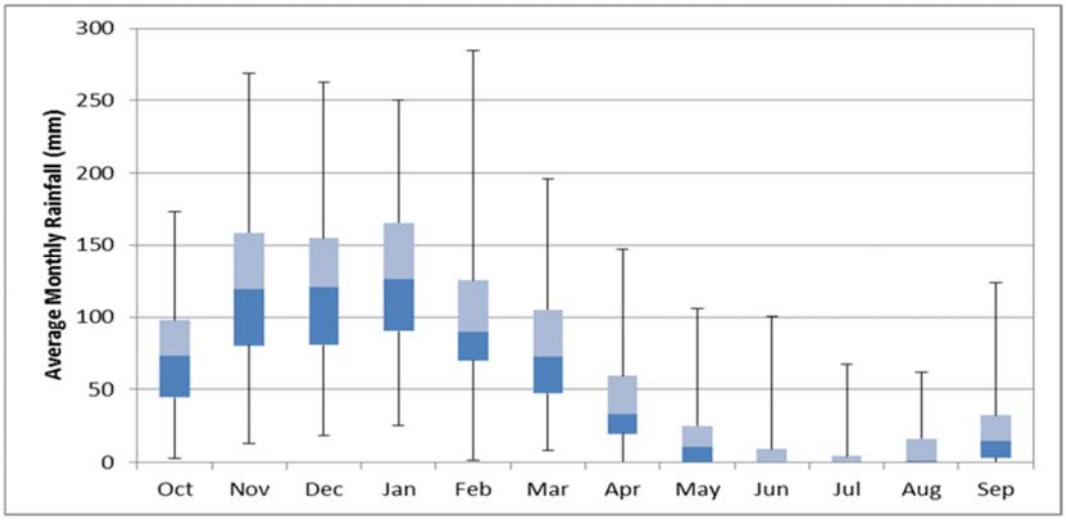


Figure 22: Ogies monthly rainfall statistics (Golder Asssociates Africa (Pty) Ltd (q), August 2020)

6.1.2 Evaporation

The mean annual S-class pan evaporation in the vicinity of the mine is 1 345 mm. Mean monthly evaporation is presented in Figure 23. The mean annual evaporation is higher than the rainfall throughout the year.

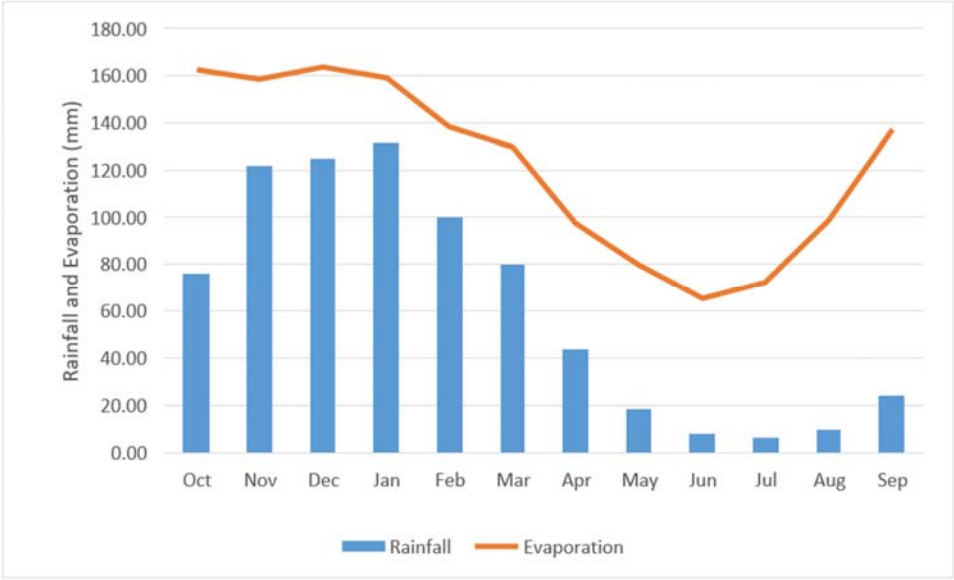


Figure 23: Average monthly evaporation and rainfall measurements for the Ogies weather station (Golder Asssociates Africa (Pty) Ltd (q), August 2020)

6.2 Regional geology

The proposed Venture Co-disposal Facility will include the expansion of the existing Venture coarse discard dump onto previously mined-out footprints. The natural site specific geology has been irreversibly changed. Similarly, the footprint of the proposed South Pit Discard Dump will be on an area which was historically opencast mined.

The regional geology in the study area is underlain by sediments of the Karoo Supergroup. The Karoo Supergroup comprise of the older Dwyka Formation at the base, which is overlain by the Ecca, Beaufort and Lebombo Groups. The local geology in the study area comprises shale, carbonaceous shale, sandstone, and coal layers of the Ecca Group. The Vryheid Formation of the Ecca Subgroup is about 55 m thick and consists of shale and sandstone interbedded with five major coal seams, numbered 1 to 5 from the base, of varying thickness (1.5m - 9.0 m) (refer to Figure 24). The surface geology of the study area is presented in Figure 25.The iMpunzi Complex mines coal in the central-southern part of the Witbank Coalfield from the No. 2 and No. 4 Coal Seams. A simplified geological stratigraphy for the iMpunzi area is presented in Table 16 the underlying geology has an apparent dip angle of 20° towards the south (Golder Associates Africa (Pty) Ltd (h), August 2020).

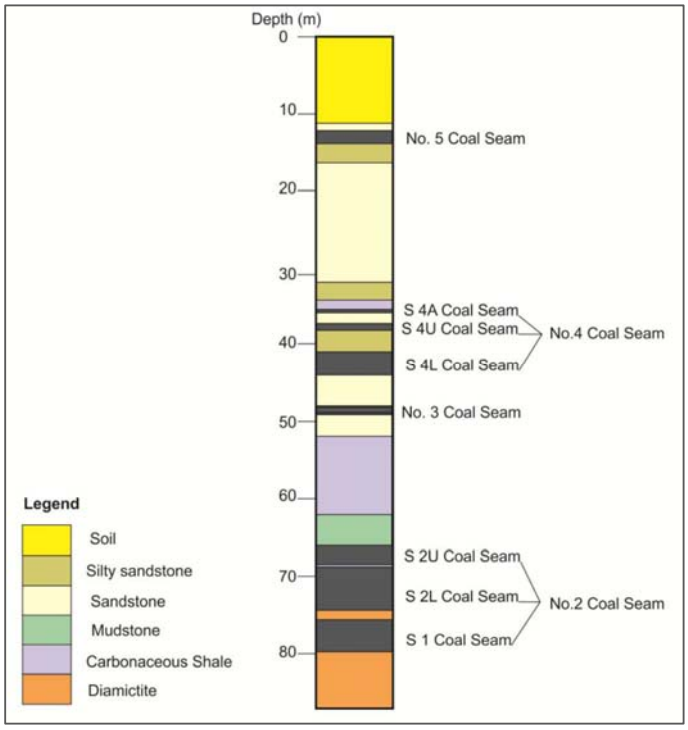


Figure 24: Cross section of the Geological Sequence in the iMpunzi area (Golder Associates Africa (Pty) Ltd (h), August 2020)

Table 16: Simplified Stratigraphy (Golder Associates Africa (Pty) Ltd (h), August 2020)

Period	Supergroup	Group	Formation	Lithology
Quaternary	-	-	-	Alluvium
	-	-	-	Aeolian sand
Jurassic	-	-	-	Dolerite
Permian	Karoo	Ecca	Volkrust	Shale, subordinate sandstone
Carboniferous			Vryheid	Sandstone, Shale, Coal beds
		-	Dwyka	Diamictite, shale

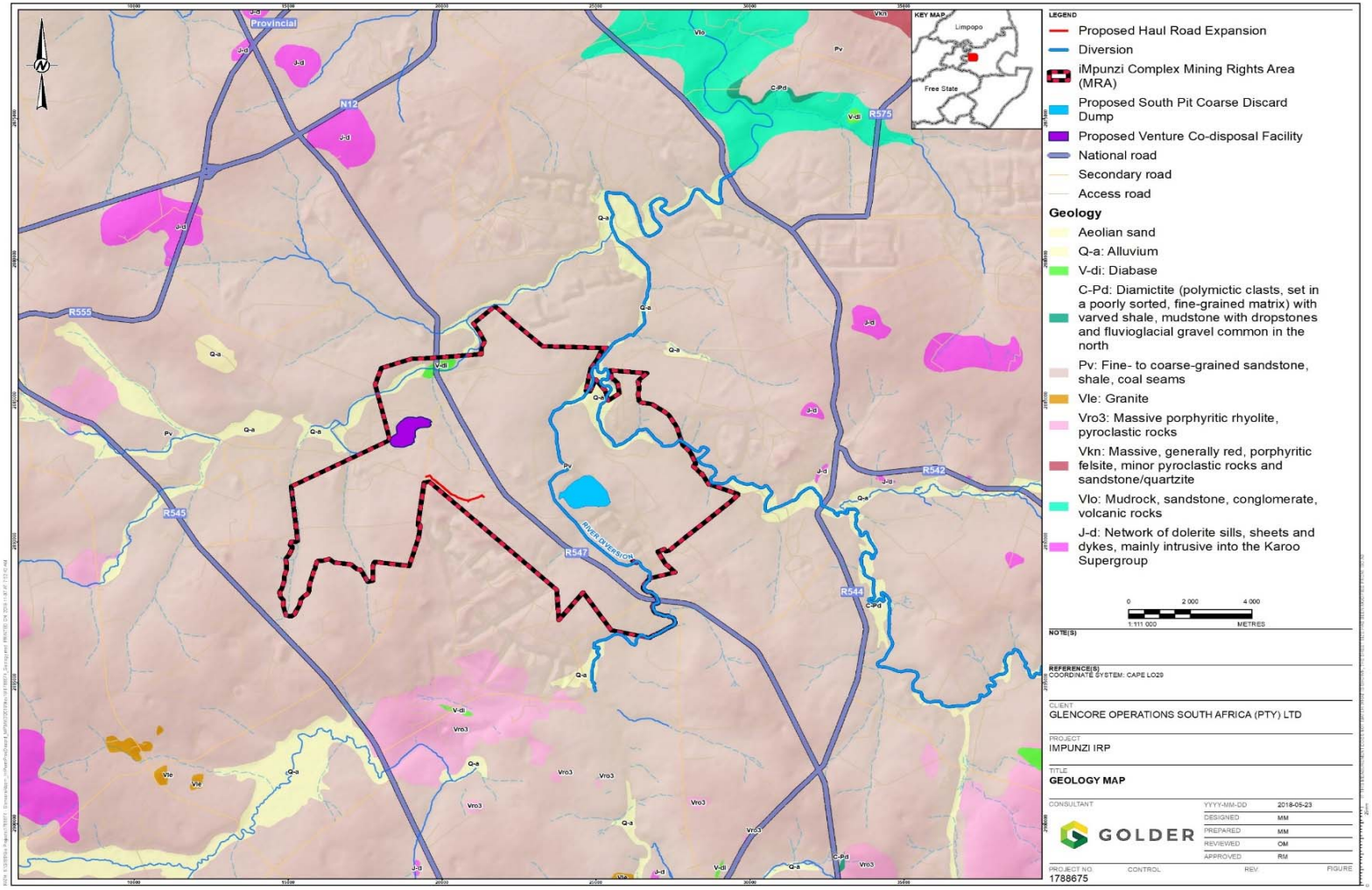


Figure 25: Geology map of the iMpunzi complex MRA

6.1 Topography

The Venture Co-disposal Facility footprint has a general gradient from the southeast to the northwest at an average slope of 0.5% topographic elevations generally ranging from 1520 to 1620 metres above mean sea level (mamsl). To the south of the existing Venture coarse discard dump, is a railway line with box culverts conveying runoff from the south under the railway towards the dump area.

The topography of the larger iMpunzi mining complex area has been significantly altered through past mining activities. Opencast voids, pits, stockpiles, discard facilities and infrastructure complexes have changed the natural topography.

6.2 Air quality

Air pollution in the region arises from the numerous mining operations, farming activities and coal-fired power stations in the area. Sources of dust pollution at the iMpunzi complex and adjacent mines include dust entrainment from haul roads, blasting in opencast sections, discard dumps and soil stockpiles.

iMpunzi has a comprehensive dust fall monitoring network. Dust fall monitoring takes place on a monthly basis as part of the iMpunzi air quality monitoring programme. The locations of air quality monitoring points are in the vicinity to sensitive receptors in the area, and is illustrated below in Figure 26. The ACAP-10 (Amandala Primary school) monitoring point is located at the closest sensitive receptor to the proposed facilities.

Most of the people have been relocated with the structures demolished, though there are a number of small communities south-east of the mining area (Clean Stream, August 2019).

Based upon the findings of the September 2019 monitoring period (see Table 17), the National Dust Control Regulation standards for residential and industrial areas were exceeded at ATAP-1, ACAP-1, and ACAP-12 monitoring point during the July 2019 to October 2019 monitoring months. Exceedances of the daily and annual average National Ambient Air Quality Standards for PM_{10} and $PM_{2.5}$ concentrations were also recorded at iMpunzi.

Table 17: Dust monitoring results – July to September 2019

Locality	Description	Location		Dust Deposition – Insoluble (mg/m²/day)			
		Latitude	Longitude	July 2019	August 2019	September 2019	October 2019
ACAP 16	New Dust Stand iMpunzi Deployment Centre	S26.09304	E29.21934	-	-	980	-
ACAP 17	New Dust Stand iMpunzi	S26.128443	E29.244781	-	-	659	-
ACAP-1	ATC Air Quality Monitoring - Single Directional Dust Bucket	S26.04359	E29.21658	1350	677	629	-
ACAP-10	ATC Air Quality Monitoring - Dust bucket at village (XC-07)	S26.12938	E29.25604	184	382	410	318
ACAP-11	New Dust locality	S26.13993	E29.26974	316	622	531	282
ACAP-12	North-Northeast border of iMpunzi	S26.05675	E29.25326	766	1220	598	-
ACAP-13	Steenkoolspruit Pit - North-eastern border	S26.07637	E29.27116	642	445	641	-
ACAP-14	VDD South Pit Eastern corner of iMpunzi border	S26.10456	E29.29070	342	238	476	278
ACAP-15	South - Albion	S26.12438	E29.27188	345	522	-	287
ACAP-2	ATCOM Air Quality Monitoring - Single Directional Dust Bucket	S26.06730	E29.24719	632	1048	773	-
ACAP-6	ATC Air Quality Monitoring - Single Directional Dust Bucket	S26.11410	E29.23008	217	493	318	291
ACAP-7	ATCOM Air Quality Monitoring - Single Directional Dust Bucket (XC08)	S26.08563	E29.25278	381	356	354	-
ACAP-8	ATCOM Air Quality Monitoring - Single Directional Dust Bucket (XC13)	S26.09827	E29.24063	302	993	402	-
ACAP-9	ATCOM Air Quality Monitoring - Single Directional Dust Bucket (XC09)	S26.08484	E29.26954	173	248	275	-
ATAP-1	ATC Air Quality Monitoring - Single Directional Dust Bucket	S26.09532	E29.18389	-	954	836	2000

Locality	Description	Location		Dust Deposition – Insoluble (mg/m^2/day)			
		Latitude	Longitude	July 2019	August 2019	September 2019	October 2019
ATAP-2	ATC Air Quality Monitoring - Single Directional Dust Bucket	S26.09769	E29.18319	607	346	285	358
ATAP-4	ATC Air Quality Monitoring - Single Directional Dust Bucket	S26.09341	E29.16677	308	180	249	112
ATAP-5	ATC Air Quality Monitoring - Single Directional Dust Bucket	S26.10239	E29.19356	452	635	812	757
ATAP-6	ATC Air Quality Monitoring - Single Directional Dust Bucket (XC12)	S26.10287	E29.17191	422	296	158	115
PHAP-4	Phoenix Air Quality Monitoring - Single Directional Dust Bucket	S26.09515	E29.20656	193	415	270	205
PHAP-5	Phoenix Air Quality Monitoring - Single Directional Dust Bucket	S26.11775	E29.24102	229	307	243	-
PHAP-6	Phoenix Air Quality Monitoring - Single Directional Dust Bucket	S26.09991	E29.19904	172	303	406	195

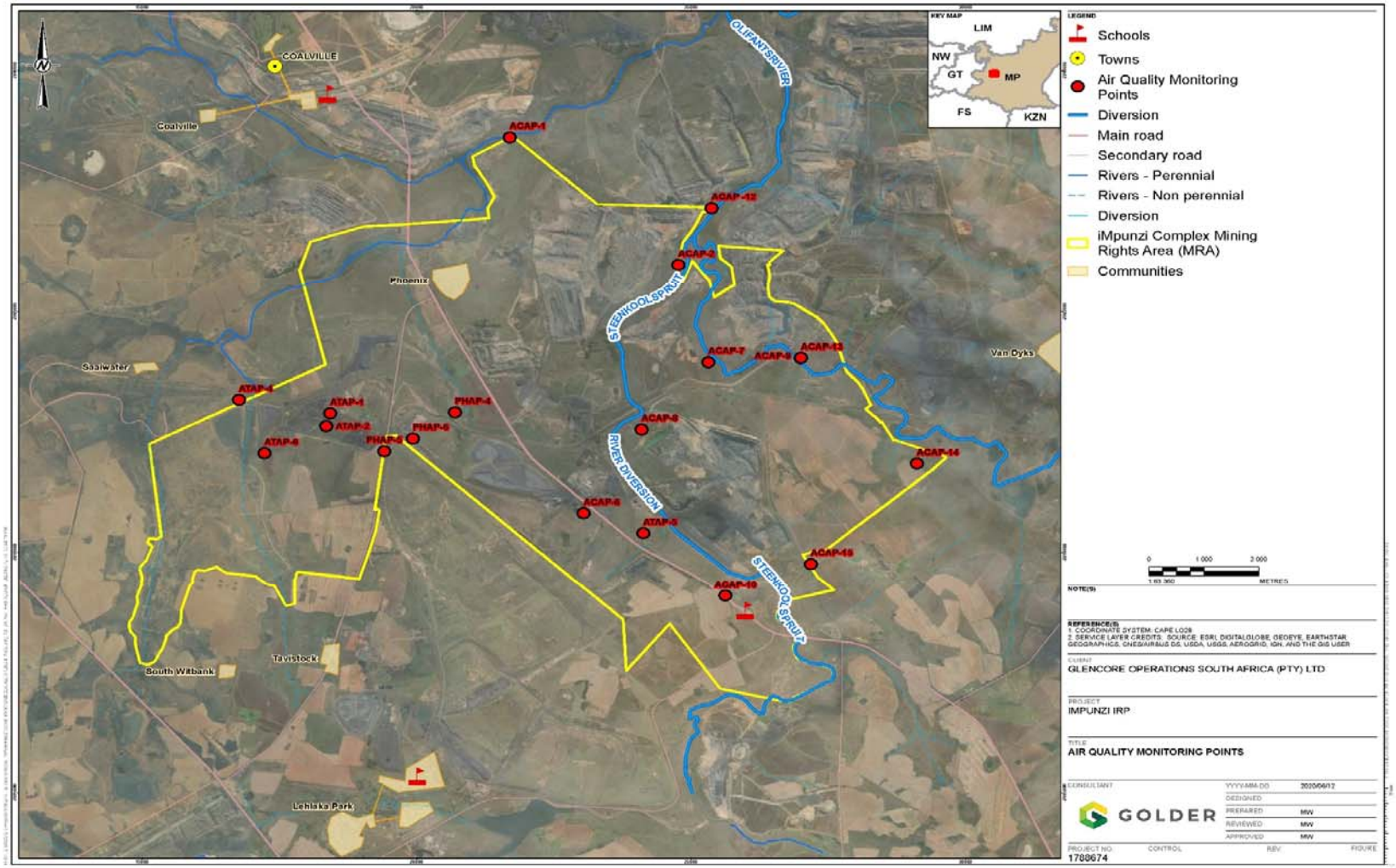


Figure 26: Air Quality Monitoring points at iMpunzi

6.3 Noise

Mining activities in an around iMpunzi all contribute to the existing ambient noise levels. Noise pollution from the mining activities arises from opencast blasting, movements of haul trucks, conveyors, ventilation fans and beneficiation plants. The noise impacts are specific to the various sites throughout the property and do not cause significant public nuisance. Several noise monitoring points have been put in place on site in relation to sensitive receptors in the area (Figure 27). The purpose of the noise monitoring is to ensure compliance with a condition in the existing iMpunzi EMPr. Table 18 detail the existing noise levels in the vicinity of iMpunzi between 14-16 August 2019 (Clean Stream, August 2019).

Table 18: Noise monitoring results (Clean Stream, August 2019)

Location	Day: $L_{Aeq,i}$ level (dBA)	Night: $L_{LAeq,i}$ level (dBA)	Day: $L_{Aeq,f}$ level (dBA)	Night: $L_{Aeq,f}$ level (dBA)	Day: L_{A90} level (dBA)	Night: L_{A90} level (dBA)	Comments
GISLLT01	70	71	69	70	68	68	Plant and conveyor operational during deployment and both were dominant noise sources. Voices of workers. Reverse alarms audible at times. Equipment audible in distance
GISLLT02	58	58	57	57	56	56	Conveyor belt dominant and constant sound. Birds audible. Workers walking on gravel road close by. Trucks audible in distance
GISLLT03	65	67	63	65	61	64	Welding, grinding and coal being dumped audible. Workers talking nearby. Water being sprayed, alarm going off. Trucks on main road audible
GISLLT04	53	48	50	47	46	44	Broadband noise from plant and material handling in distance. Birds (especially doves) dominant noise source. Car passing by on tar road
GISLLT05	56	58	54	57	47	56	Plane passing overhead. Workers talking. Birds and reverse alarms audible. Slurry dam being filled during equipment collection
GISLLT06	57	54	55	53	50	51	Reverse alarms audible, trucks and LDVs moving around. Voices of workers close by

SANS10103:2008 stipulate *"for industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n =70 dBA can be considered as typical and normal*.

Considering the results from the noise measurements it can be concluded that the assessment at GISLLT01 reflected that the noise levels were higher due to plant being operation, and the plant was not fully operational during the 2018 assessment. The Daytime noise levels were typical of an industrial district, and the Night-time noise levels were also typical of an industrial district.

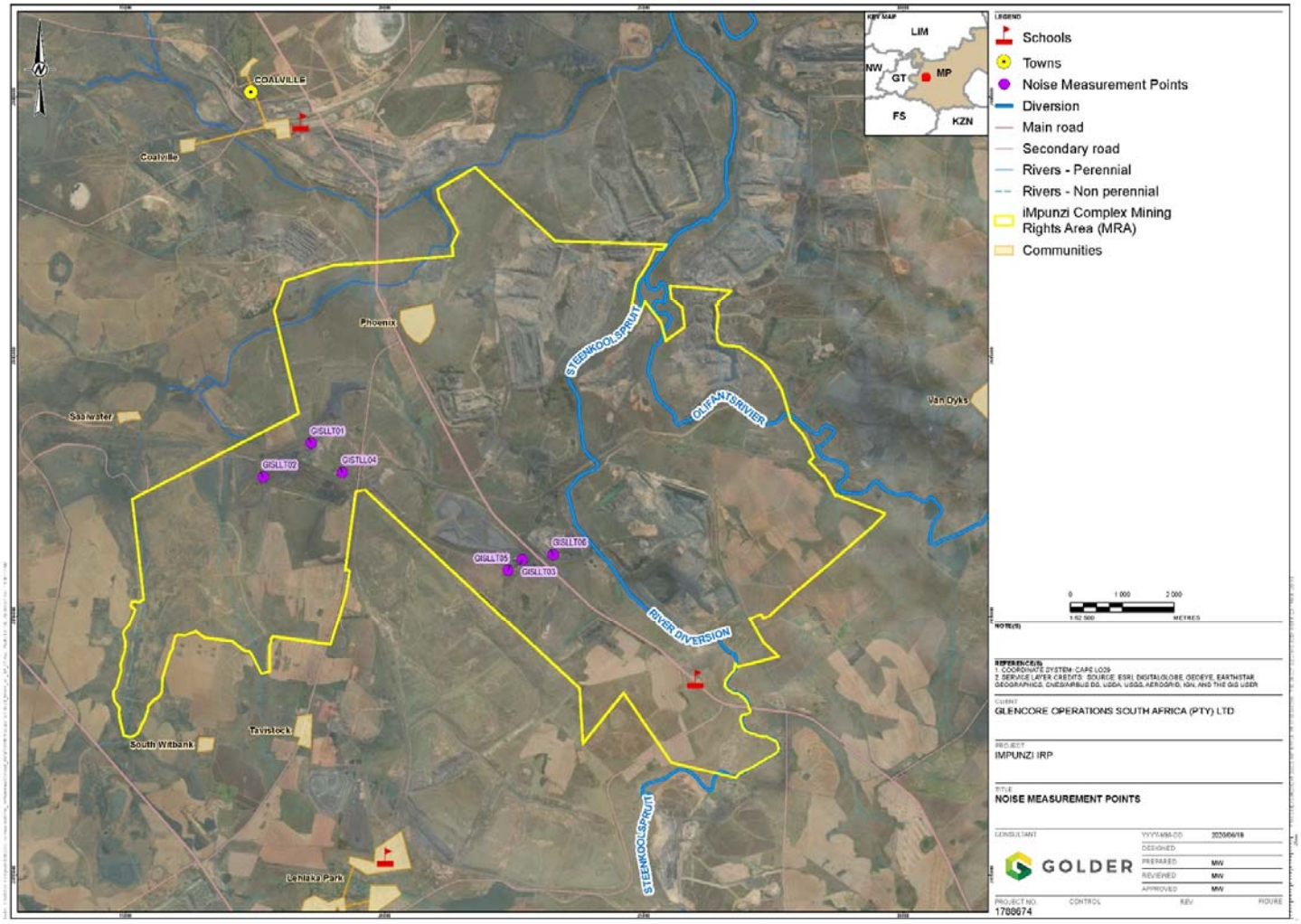


Figure 27: Noise Monitoring points in the iMpunzi area

6.1 Traffic

No existing traffic count data was found for the project area, but the section below describes the location of the proposed activities in relation to the local/district roads.

The existing Venture coarse discard dump is located next to the R547 Bethal and Blackhill intersection. The expansion of this facility into the proposed Venture Co-disposal Facility will be in a North-Westerly direction towards the Saaiwaterspruit. The proposed South Pit Discard Dump will be located on an area which was historically opencast mined (South Pit), approximately 2km North-East of the R547 district road, but within the existing operational mining area. The routes are mostly single lane (alternative directions) continuous traffic paved road.

The proposed haul road expansion involves the widening of the existing haul road that is situated within iMpunzi's MRA adjacent to the ATCOM discard dumps, approximately 1.5km West of the R547 district road. No discard material will be transported via any national or district roads, as described in Section 2.5.3 above.

6.2 Visual

The proposed activities are not situated on any main tourist routes and most of the traffic on surrounding roads is of local origin and is associated with local businesses. Mine infrastructure, such as the conveyor belts, loading bins and discard dumps, are visible from the main roads. However, these do not represent an anomalous view since the whole region is dotted with coal mines and power stations and mining is a long-standing activity in the region. Dust is visible during windy and dry conditions. The visual impact is thus limited to road users and associated routes. The proposed South Pit Discard Dump and haul road extension will not visible from any major freeways or towns.

6.3 Soils and land capability

Both the proposed discard facilities will be developed/established on previously mined-out land. The mined-out footprint of the historic mining activities at the existing Venture coarse discard dump has been backfilled, shaped and partially rehabilitated. The natural site-specific soil type has been irreversibly changed. The proposed footprint of the South Pit Discard Dump is characterised by a backfilled opencast pit of which the western end nearest to the Steenkoolspruit has been rehabilitated and revegetated.

Active mining is still taking place around the South pit opencast mining area. The pit has been filled with spoils that have been shaped and levelled to various states towards rehabilitation.

The land capability of the iMpunzi complex mining area can be classified into four classes; wetland, arable land, grazing land and wilderness. Post mining (end-use) land capability objectives include returning the land, mined by opencast methods to a grazing land capability (Digby Wells (Pty) Ltd, April 2014).

6.4 Biodiversity

Terrestrial ecology

Significant ecological work has been done in the larger iMpunzi area and has collectively led to a comprehensive understanding of the flora and fauna species that occur in the area. The section below outlines the ecological characteristics of the study area; however, it is important to note that the footprints associated with the proposed discard facilities, RWD and haul road extension are already disturbed, and hence are considered brownfields sites. The entire iMpunzi Complex and surrounding area are comprised mainly of highly impacted landscapes, either through mining, agricultural and other anthropogenic activities. The movement of wildlife is certainly impacted by these activities, influencing the habitat connectivity for free range species.

According to the Vegetation Map of South Africa, Lesotho and Swaziland (Mucina and Rutherford, 2006), the study area falls within the Grassland Biome and the Mesic Highveld Grassland Bioregion. The dominant vegetation type found on site is Eastern Highveld Grassland. The Eastern Highveld Grassland vegetation is considered vulnerable under the National List of Ecosystems that are Threatened and in Need of Protection (Wetland Consulting Services (Pty) Ltd, August 2020) (see APPENDIX L).

Historically the entire region has been subject to intensive farming, and as a consequence a large proportion of the area was under maize prior to mining. The remaining viable habitat at the larger iMpunzi is mostly fragmented, with anthropogenic activities (mining, buildings, roads, agricultural fields, train tracks and fences) isolating areas of viable habitat. The relative abundance of mammals observed on site during the various studies conducted is less than may be expected in grassland areas of similar size (Digby Wells (Pty) Ltd, April 2014).

At present the vegetation in the natural pastures (around the pans, rivers, and along slightly undulating slopes) is dominated by weeping lovegrass *(Eragrostis curvula),* couch grasses, predominantly kweekgras *(Cynodon dactylon),* Khaki bush *(Tagetes minuta)* and black jack *(Bidens pilosa).* In the low-lying areas vlei grasses and forbes are common. In disturbed areas such as old maize lands cattail dropseed *(Sporobulus pyrimidalis),* goose grass *(Eleusine indica)* and wild melons are common.

The limited remaining habitat around the pans and drainage lines, the isolation of pans from other natural grasslands by agricultural fields, the lack of refuges, the proximity of human dwellings and human activities are among the reasons for scarcity and influences what species will still occur in the area. It is probable that other rodent species also occur at many of the sites, but this could only be determined by trapping (Golder Associates Africa (Pty) Ltd (f), August 2020).

Wetlands

Wetland Consulting Services (Pty) Ltd, undertook the specialist wetland assessment study required for the proposed establishment of the South Pit Discard Dump and the expansion of the Venture Dump into a Co-disposal Facility (Wetland Consulting Services (Pty) Ltd, August 2020). The key outcomes of the assessment are summarised below. For details, refer to APPENDIX L.

Discard facility expansion activities

No wetlands were found to occur within the direct footprint of the proposed South Pit study area. The existing Venture coarse discard dump, as well as the footprint of the proposed expansion, will be located on rehabilitated mining land, with mining of the area having been completed before 2003. No natural wetland habitat was found to occur within the proposed Venture Co-disposal Facility footprint. However, several wetland features, labelled “rehab wet areas” in Figure 28 below, were found to occur within the expansion footprint, while a number of natural wetland systems occur within the 500m buffer around the proposed expansion footprint. The “rehab wet areas” can be considered man-made or artificial wetlands in the sense that they have reformed on rehabilitated mining land (Wetland Consulting Services (Pty) Ltd, August 2020). The largest of these “rehab wet areas” also receives overflow from the existing Venture coarse discard dump PCD, while the southernmost of the “rehab wet areas” appears to have historically also received flow discharges of an unknown source, evidenced on site by a series of small, low dams to control flow. The main flow driver of these “rehab wet areas” is considered to be direct rainfall and surface runoff from upslope areas accumulating in these low points.

A large seep wetland occurs to the west and north of the existing Venture coarse discard dump (Figure 28). This seep wetland drains into the Tweefonteinspruit. The wetland is comprised of a mosaic of seasonal to temporary wet areas dominated by grass and sedge species and extends up to the edge of historical mining disturbance. To the north-west of the existing Venture coarse discard dump, mining disturbance extends far into the seep wetland in the form of a large rectangular berm that encloses an artificial wetland area dominated by

Phragmites australis. And as a result, the seep wetland present ecological status (PES) is ranked as Category D, largely modified (Wetland Consulting Services (Pty) Ltd, August 2020).

To the east of the Venture coarse discard dump, an Unchanneled Valley Bottom wetland flows from south to north; this system is known as the Gilfillan Stream. A part of this wetland has been mined through in the past, and a stream diversion is in place just upstream of the study area. Downstream towards the confluence with the Tweefonteinspruit some channel incision has occurred within the wetland. The Unchanneled Valley Bottom wetland's PES was also largely modified (Wetland Consulting Services (Pty) Ltd, August 2020).

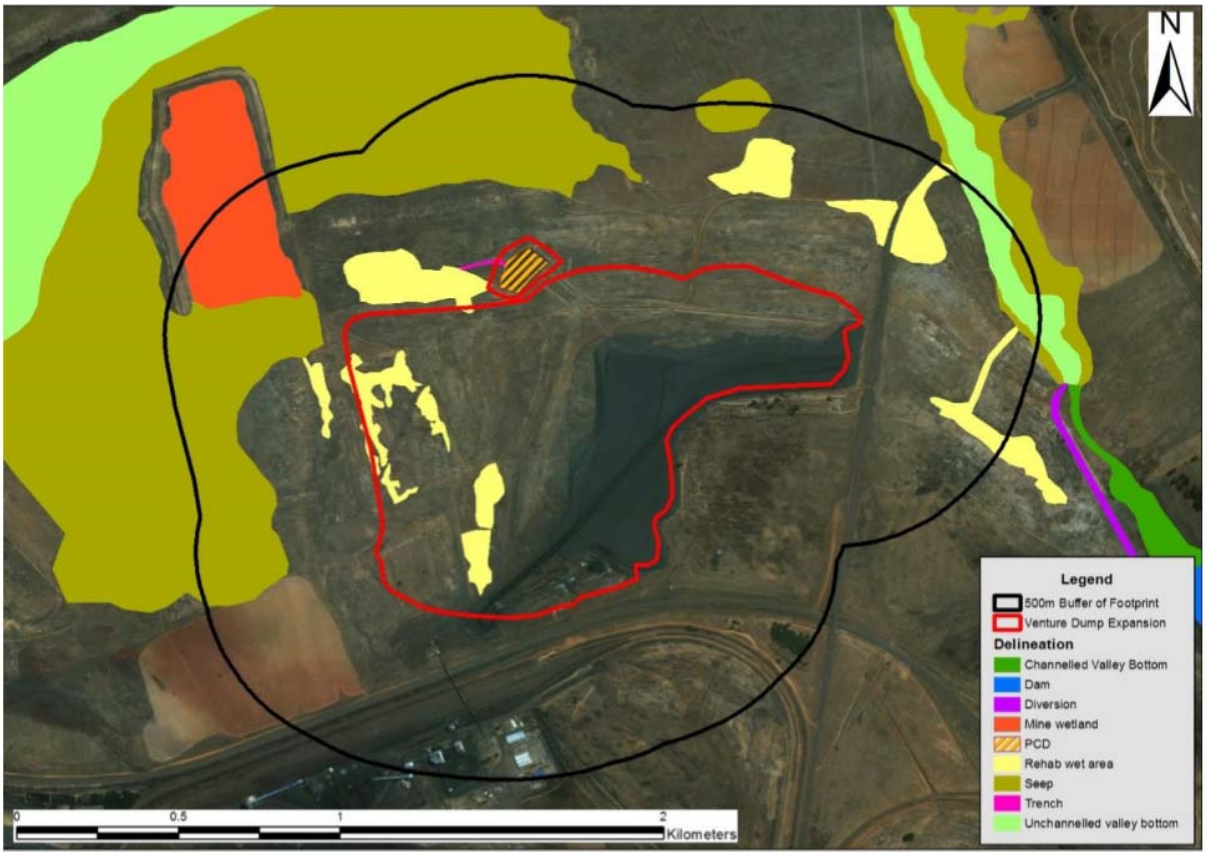


Figure 28: Map of delineated wetland habitat within and adjacent to the proposed Venture Co-disposal Facility footprint (Wetland Consulting Services (Pty) Ltd, August 2020)

Haul road expansion activity

Golder conducted an wetland screening study in March 2020 to assess the potential impact of the expansion of the existing haul road which is required for the transportation of discard from the ATCOM discard dumps to the ATC plant, using haul trucks (Golder Associates Africa (Pty) Ltd (f), August 2020) (see APPENDIX L). The existing haul road crosses a wetland and since the road will be widened, the activity will involve clearance of some vegetation adjacent to the existing road footprint.

The study area for the wetland assessment was defined as the route of the proposed haul road expansion plus a 500 m buffer zone (Figure 29) around the proposed infrastructure to account for potential direct and indirect impacts within the regulated zone of a watercourse, as required by the NWA.

Currently, an unchanneled valley bottom wetland system with adjacent hillslope seepages occurs within the study area. This wetland's health (present ecological status – PES), ecological importance and sensitivity (EIS)

and functionality (ecosystem services provision – WET Ecoservices) was assessed. Both the unchanneled valley bottom and the hillslope seepage wetland have an overall PES category of E which means that the wetland is seriously modified. While the overall EIS for both systems is of low/marginal category meaning the wetland is not ecologically important or sensitive on a local scale. The main ecological services rendered by both wetlands include erosion control, sediment trapping, phosphate trapping, nitrate removal and toxicant removal (Golder Associates Africa (Pty) Ltd (f), August 2020).

The proposed road expansion will not have any significant residual impact on the current environmental setting, provided that the recommended mitigation measures are implemented during construction and operation (Golder Associates Africa (Pty) Ltd (f), August 2020).

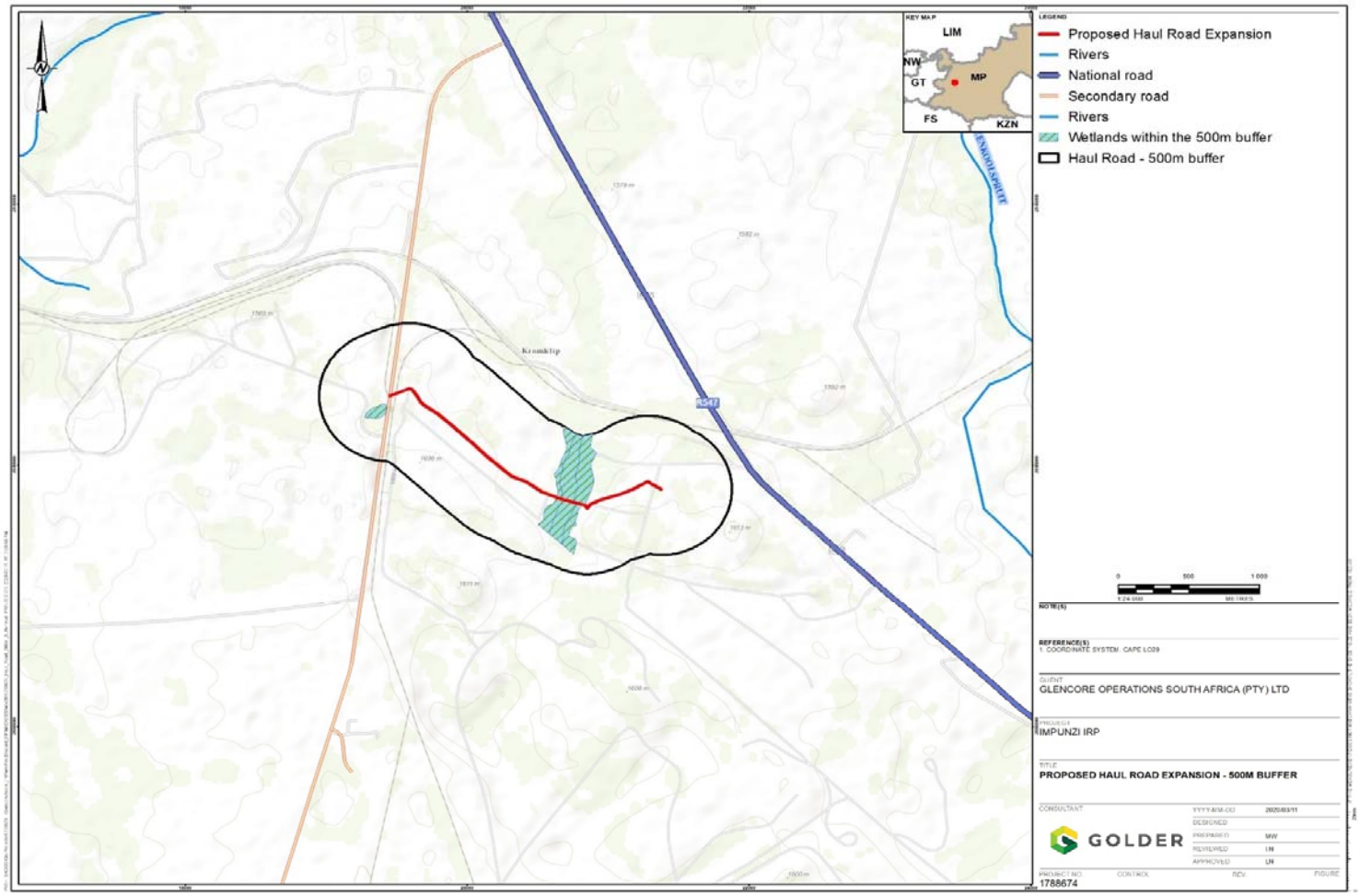


Figure 29: Proposed Haul Road expansion including 500m buffer zone

6.5 Surface water

The iMpunzi Complex is situated within the greater Upper Olifants Water Management Region (B1 catchment) and within quaternary sub-catchment B11E, B11F and B11B of the Limpopo-Olifants primary drainage region (Jones & Wagener, July 2020). The entire mine drains to tributaries of the Olifants River. The watercourses following closely to the proposed South Pit Discard Dump is the Steenkoolspruit which was historically diverted to allow access to coal reserves at the current South Pit area. The Steenkoolspruit predominantly flow in a North-North-Western direction and eventually into the Witbank dam, which supplies municipal and industrial water to eMalahleni and Middelburg. The watercourse to the north of the proposed Venture Co-disposal Facility is called the Saaiwaterspruit, which runs through the Klippoortjie area and upstream of the Phoenix Dam. The location of the water courses, the quaternary catchments and other surface water features is illustrated in Figure 30 (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

Surface water quantity

The majority of the iMpunzi complex surface rights area (ATC, Phoenix, ATCOM and a portion of ATCOM East) are located within the Saaiwaterspruit and Steenkoolspruit catchments (quaternary sub-catchments B11F and B11E respectively). The eastern portion of ATCOM East falls within quaternary sub-catchment B11B of the Olifants River catchment. The mining operations at the iMpunzi Complex could have a significant impact on the runoff generated in quaternary sub-catchments B11F and B11E and B11B, as they occupy 8.5%, 7.4% and 3.3% respectively of these sub-catchments. In addition, the entire iMpunzi Complex contributes approximately 2.3% of the Mean Annual Runoff (MAR) to the Witbank Dam (Jones & Wagener, July 2020). The MARas a percentage of precipitation is shown in Table 19.

Table 19: Mean annual runoff for catchments

Catchment	Catchment area (km^2)	MAR (m^3/year)	iMpunzi Complex runoff (m^3/year)	iMpunzi Complex percentage of catchment MAR
B11F	428	14.7×10^6	1.25×10^6	8.5%
B11E	467	15.1×10^6	1.12×10^6	7.4%
B11B	435	15.7×10^6	0.52×10^6	3.3%
Olifants River at Witbank Dam	3627	125×10^6	2.89×10^6	2.3%

Surface water quality

The intention of the implemented iMpunzi water management activities is to prevent impacts by their mining operations on the surrounding water system. One can simply compare upstream to downstream water qualities to determine whether there is an impact on water quality or not. However, it is known and acknowledged that industrial and mining activities undertaken historically have impacted on water qualities in South Africa, and work has been undertaken to address the target guidelines for various rivers, particularly in the Olifants and Vaal River systems. These guidelines assist in providing focus to water management strategies by indicating levels of constituents that are acceptable, tolerable and unacceptable depending on what the end use is to be (Jones & Wagener, July 2020).

Standards and guidelines for water quality include the Department of Water Sanitation (DWS) Domestic Use Guidelines and the SANS 241 Drinking Water specifications. In some cases, however, there are more specific standards in terms of the catchment itself, as determined by the Catchment Management Agency (CMA).

The water quality of the Saaiwaterspruit as it approaches iMpunzi from the west is already severely affected by mining activities upstream of iMpunzi. Although the SWCM, Alpha and Gilfillan Streams all drain into the Saaiwaterspruit, no deterioration of the water quality in the Saaiwaterspruit is evident along the iMpunzi property. The water quality of the Steenkoolspruit as it enters the iMpunzi Complex is good, and no deterioration in its water quality is evident as it exists the property to the north (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

The Saaiwaterspruit skirts the northern boundary of the iMpunzi Complex, and its water quality as it approaches iMpunzi from the west is already severely affected by mining activities upstream of iMpunzi. Although the SWCM, Alpha and Gilfillan Streams all drain into the Saaiwaterspruit, no deterioration of the water quality in the Saaiwaterspruit is evident along the iMpunzi property. The water quality of the Steenkoolspruit as it enters the iMpunzi Complex is good, and no deterioration in its water quality is evident as it exists the property to the north. The water quality of the Olifants River as it enters the iMpunzi Complex indicates that the river has been affected by mining activities upstream of the iMpunzi Complex. Downstream of the iMpunzi Complex the water quality in the Olifants River improves, however this may be due to the Steenkoolspruit water that enters the Olifants River just north of the iMpunzi boundary (Jones & Wagener, July 2020).

iMpunzi follows a monthly surface water monitoring schedule and samples are collected at the monitoring points, as illustrated in Figure 31.

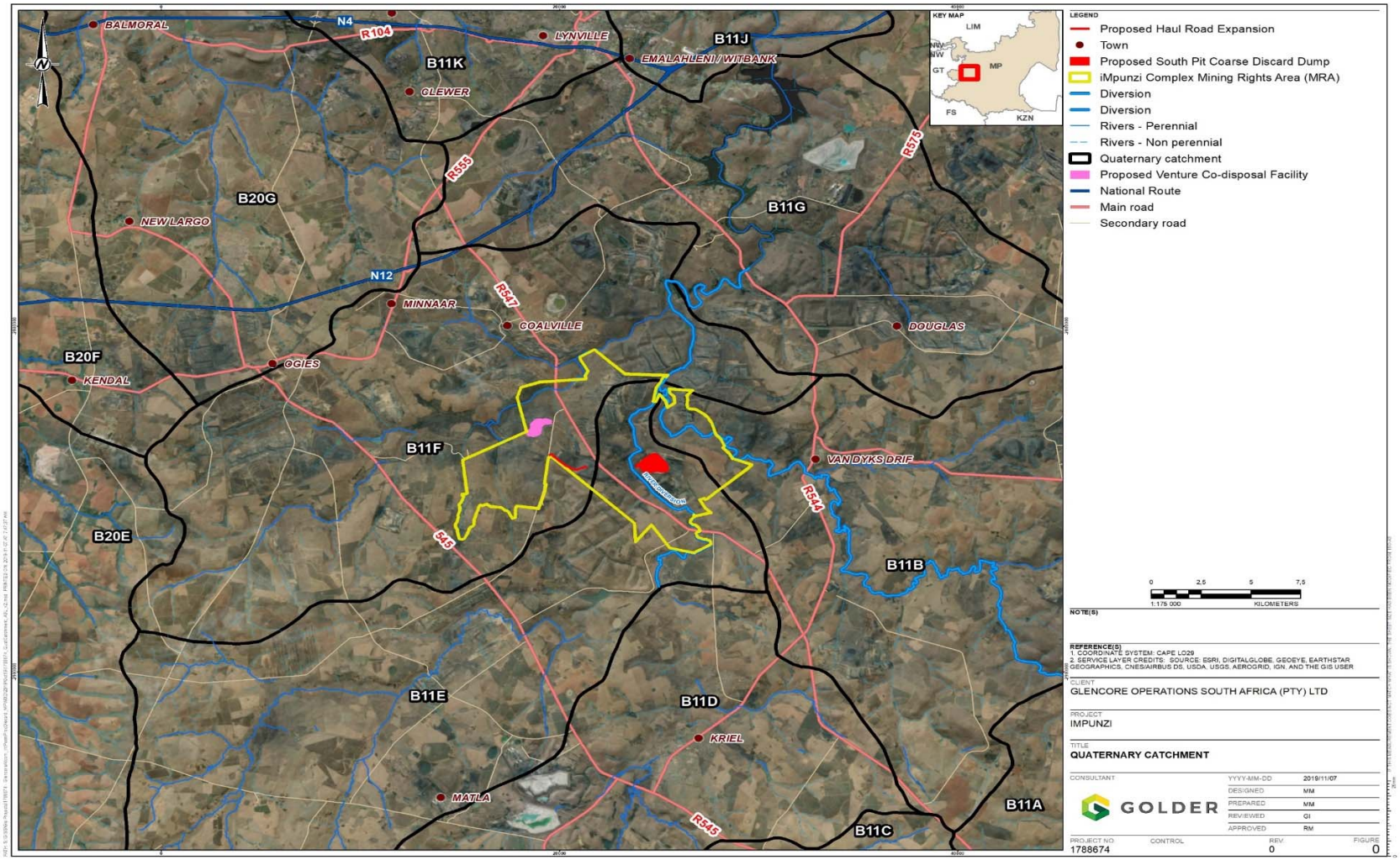


Figure 30: iMpunzi operation in relation to the local quaternary catchments

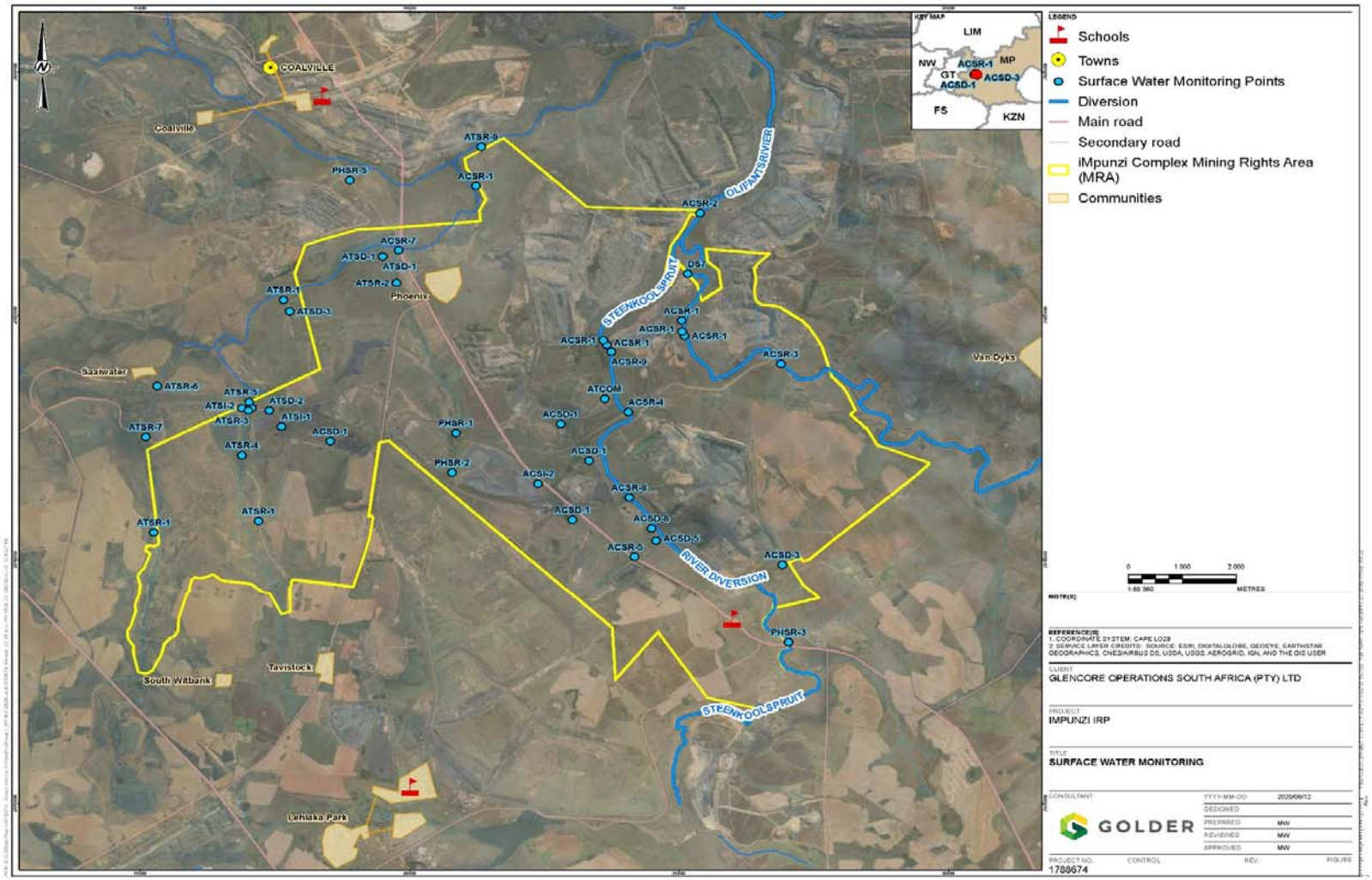


Figure 31: iMpunzi surface water monitoring points

Site-wide water management

The water reticulation at the iMpunzi complex is presented in Figure 32. The reuse of mine impacted water is prioritised, where possible. Potable water is sourced from the Olifants River Pumps Station and treated at the ATC or ATCOM potable water treatment plants. The ATC plant processes discard from historic discard facilities, and the plant sources most of the water used for the process from the ATC 2-seam workings and additional water is sourced from Venture 2-seam workings (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

Additional water is sourced from ATC 2-Seam Underground Storage and ATCOM Underground Lake. Discard is deposited on the existing Venture coarse discard dump and slurry is currently disposed of into the 2-seam underground workings. In future, the modification into the Venture Co-disposal Facility will allow the placement of both slurry and coarse discard Venture. The ATC plant has a backup water line for Olifants River water. The ATCOM plant processes coal received from the open cast mining pits. Water is sourced from the ATCOM Lake underground workings and additional water sourced from the Phoenix Lake underground workings. The lakes receive water from the pits and South Pit Discard Dump. Excess water generated at the mine is treated at the Tweefontein Water Treatment Plant (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

The current overall strategy for the management of dirty water generated by the mining activities is storage in mined out underground compartments and ultimately treated for reuse or discharge to the river system. The Tweefontein Water Treatment Plant has been operational 2015. This plant is able to treat approximately 15 Ml/day (Jones & Wagener, July 2020).

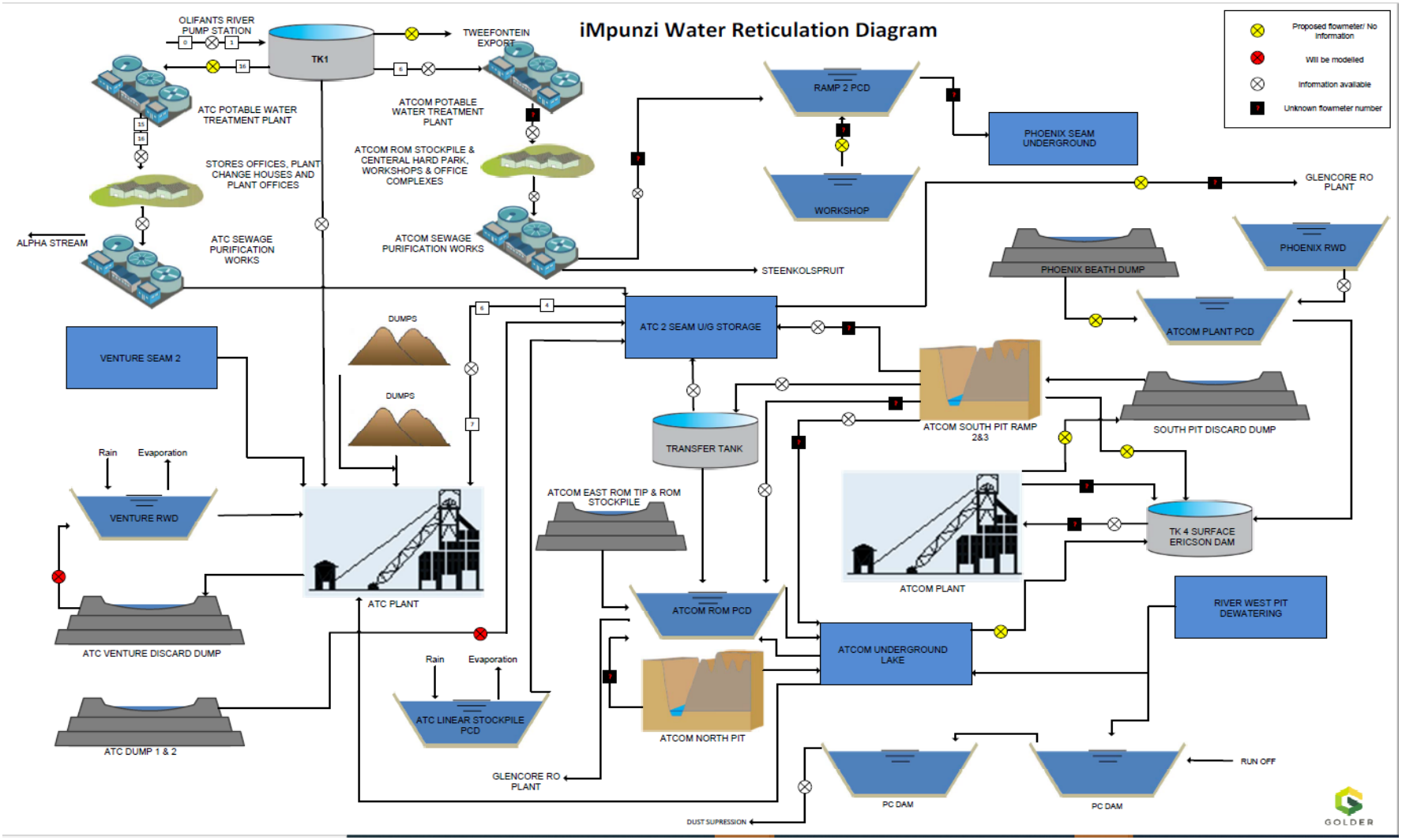


Figure 32: Water reticulation diagram for iMpunzi Mine (Golder Asssociates Africa (Pty) Ltd (q), August 2020)

6.6 Groundwater

The study area is underlain by an aquifer zone comprising of intergranular and fractured aquifer zones. The average borehole yield in the study area is between 0.1 L/s and 0.5 L/s. The aquifer is considered to be unconfined to semi-unconfined. The formation associated with low primary permeability, storage and transmissivity. Secondary processes such as weathering, and fracturing enhance the groundwater potential.

Aquifer types and extent

According to Hodgson and Krantz (1998) in (Golder Associates Africa (Pty) Ltd (h), August 2020), the natural hydrogeological system within the Witbank coal field comprises of two distinct superimposed aquifers, namely, the upper weathered aquifer, and the fractured aquifer. The upper weathered aquifer comprises of in situ weathered material. The depth to weathering is typically between 5 m and 12 m below the surface. Rainfall infiltrating into the weathered rock finds impermeable layers of sediments below the weathered zone. The impermeable layers of sediments are a low yielding aquifer and often not capable of continuous groundwater supply because of its insignificant generally limited thickness. This aquifer is recharged by rainfall and water movement within the aquifer is by porous flow.

The fractured Karoo aquifer is made up of siltstone, sandstone, shale and coal seams. The pores of this unit are generally well cemented and groundwater movement occurs through secondary structures such as faults, bedding plane and fractures. Not all secondary structures within the aquifer are water bearing. Dwyka tillites below the Ecca sediments have poor aquifer properties.

Water quality

Groundwater water quality of iMpunzi have been documented by Golder (2015 and 2018) which covered all the monitoring boreholes within the vicinity of the mine. Figure 33 below illustrates the current groundwater monitoring network at iMpunzi (Golder Associates Africa (Pty) Ltd (h), August 2020). When interpreting groundwater monitoring data, SO_4 concentrations and Total Dissolved Solids (TDS) are used as parameters to identify groundwater contamination. Sulphate is a good indicator of contamination resulting from mining activities whereas TDS refers to the total mass of dissolved constituents in water. The presence of these parameters has been shown to increase steadily with time and excessive concentrations are caused by anthropogenic activities.

The analysed groundwater results from the monitoring borehole network were compared to the South African Water Quality Guidelines (SAWQG). The results in Table 20 reflects the SAWQG limit for SO_4 and TDS during 2018 - 2020 period for the existing Venture coarse discard dump and existing South Pit. Both SO_4 and TDS show a similar trend throughout the various sites, that the existing Venture coarse discard dump footprint and the existing South Pit are impacted by activities in this part of the iMpunzi mine area. Both SO_4 and TDS exceed the maximum allowable limit for Class 2 and Class 3 of the SAWQG limits for four boreholes that are located closest to the footprints of the proposed facilities (Golder Associates Africa (Pty) Ltd (h), August 2020).

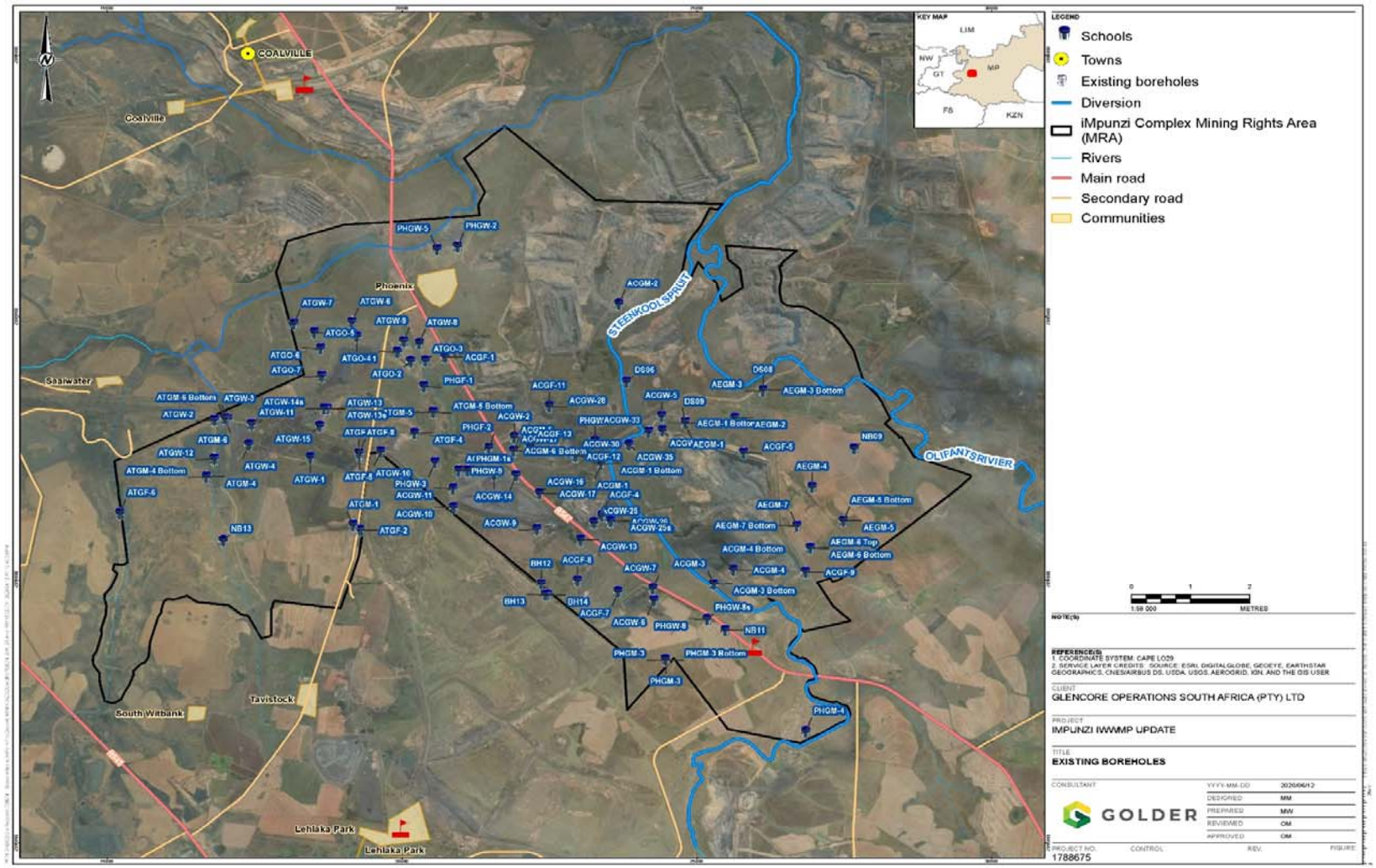


Figure 33: Groundwater monitoring network for the iMpunzi complex

Table 20: Groundwater quality 2018 - 2020

Borehole	Physical Determinants			Chemical Determinants										
Number	pH	EC (mS/m)	TDS (mg/l)	Ca (mg/l)	K (mg/l)	Mg (mg/l)	Na (mg/l)	Cl^- (mg/l)	NO_3^- as N (mg/l)	SO_4^{2-} (mg/l)	Al (mg/l)	F^- (mg/l)	Fe (mg/l)	Mn (mg/l)
ATGO-11	8.4	57	352	25	5.3	31	49	6.4	<0.459	117	<0.005	0.81	<0.009	0.14
ATGO-12	6.7	340	3100	255	26	377	124	11	<0.459	2307	0.009	<0.466	<0.009	0.55
ATGO-8	8.0	22	180	16	2.8	6.0	19	2.0	0.54	19	<0.005	<0.466	<0.009	<0.001
ATGO-2	8.9	95	610	7.53	21	113	42	7.6	4.1	105	0.103	<0.466	<0.009	0.051
ATGO-7	6.1	249	2238	377	17	177	28	35	<0.459	1655	0.015	0.766	6.0	7.4
ACGM-1 Bottom	5.89	309	3052	288	16.7	280	113	21.6	1.53	2241	0.015	<0.466	<0.009	6.31
ACGM-3 Bottom	8.4	50	256	35	4.0	19	29.25	5.9	<0.459	118	<0.005	0.595	<0.009	0.001
ACGM-4 Bottom	7.3	407	3778	472	13	288	214	18	1.8	2377	0.093	<0.466	0.033	1.2
Class 0 Max. Allowable Limit	9.5	<70	<450	<80	<25	<70	<100	<100	<6	<200	-	<0.7	<0.01	<0.1
Class 1 Max. Allowable Limit	10	150	1000	150	50	100	200	200	10	400	-	0.7-1.0	0.01-0.2	0.1-0.4
Class 2 Max. Allowable Limit	10.5	370	2400	300	100	200	400	600	20	600	-	1.0-1.5	0.2-2.0	1.0-4.0
Class 3 Max. Allowable Limit	11	520	3400	>300	500	400	1000	1200	40	1000	-	1.5-3.5	2.0-10.0	4.0-10.0

Geochemistry

Geochemical sampling of mine waste and coal samples was carried out in 2017 by Golder, this included sampling of coarse and fine discard also anticipated to be placed on the proposed discard.

Discrete grab samples were collected with a plastic hand shovel from accessible positions on old and new coarse and fine discard disposal facilities as well as coal stockpiles as listed in Table 21 below.

Table 21: Geochemistry sample list

Sample ID	Site Name	South	East	Comment	Material type
F2-S	Fringe 2	26˚07.626'	029˚14.680'	Fringe 2 stockpile of fine discard being mined from pond. Collected a number of scoops around the positions.	fine discard
		26˚07.537'	029˚14.536'		
F3-S	Fringe 3	26˚05.893'	029˚11.749'	Collected a number of scoops from a pile to the immediate west of Fringe 3.	fine discard
		26˚05.916'	029˚11.761'		
EV-S	E-Void	26˚05.849'	029˚11.829'	Void was not accessible. Collected a number of scoops from piles on Fringe 3 of fine discard mined from the void.	fine discard
		26˚05.853'	029˚11.861'		
A2-D	ATC 2	26˚06.086'	029˚09.975'	Collected fine to gravel sized particles of recently exposed discard on bench that was being mined.	Discard
		26˚06.902'	029˚09.934'		
		26˚05.899'	029˚09.914'		
		26˚05.884'	029˚10.021'		
		26˚05.920'	029˚10.022'		
		26˚05.980'	029˚10.027'		
VV-D	Venture void	26˚05.305'	029˚11.143'	Fine to gravel sized particles of discard.	Discard
		26˚05.181'	029˚11.395'		
		26˚05.152'	029˚11.402'		
		26˚05.110'	029˚11.316'		
		26˚05.128'	029˚11.309'		
		26˚05.116'	029˚11.393'		
AS-S	ATCOM South	26˚07.089'	029˚15.168'	Collected recent fine discard from the southern ATCOM paddock.	fine discard
AS-D	ATCOM	26°06.887'	029°14.789'	Collected fine to gravel sized discard from paddock wall.	Discard
		26°06.886'	029°14.800'		
		26°07.072'	029°15.086'		
		26°07.084'	029°15.073'		
		26°07.091'	029°15.084'		
		26°07.098'	029°15.102'		

Sample ID	Site Name	South	East	Comment	Material type
ND-D	North Dump	26°03.734'	029°12.549'	Collected fine to gravel sized discard	Discard
		26°03.676'	029°12.607'		
		26°03.650'	029°12.629'		

The following are the findings of that geochemistry study, and is included in the groundwater impact assessment report completed for this environmental authorisation process (APPENDIX K):

- Existing Coarse Discard Dumps:

- The discard materials from all the sampled dumps contain pyrite and carbonates in appreciable quantities;
- The materials are enriched in environmentally significant elements sulphur, arsenic, boron, and selenium;
- The discard materials from all dumps are potentially acid generating;
- The discard material from North dump and Venture void are type 3 waste whilst the materials from ATCOM South paddock wall and ATC 2 dump is not Type 4 waste as at least one parameter exceed TCT0, but it does not meet the definition of Type 3 waste due to low risk from leachate (all parameters LC≤LCT0) in the discard materials;
- The discard materials are likely to produce predominantly near-neutral, low-metal drainage upon exposure to rainfall. The levels of calcium, total dissolved solids, electrical conductivity, sulphate, manganese, aluminium and iron are likely to be elevated and exceed at least one DWAF (1996) water quality guideline in drainage from at least one discard dump; and
- The drainage from the ATC discard dumps and North dumps have a significant impact on the quality of Saaiwaterspruit and one of its tributaries, whilst drainage from the ATCOM South Paddock walls do not seem to have a significant impact on the Steenkoolspruit.

- Fine Discard (Slurry) Facilities:

- Pyrite was rare, and carbonates present as accessory to minor phases in the slurry material;
- The materials are enriched in environmentally significant elements sulphur, arsenic, boron, molybdenum, selenium and mercury;
- The slurry materials from all sampled dumps have a very low acid generating potential;
- The slurry material from ATCOM South paddock is type 3 waste whilst slurry material from Fringe 2, Fringe 3 and E-Void is not Type 4 waste as at least one parameter exceeds TCT0, but it does not meet the definition of Type 3 waste due to low risk from leachate (all parameters LC≤LCT0); and
- The slurry materials from all the sampled sources are likely to produce near-neutral, low-metal drainage upon exposure to rainfall. The levels of electrical conductivity, sulphate, calcium, manganese and aluminium are likely to exceed water quality guidelines in drainage from at least one of the sampled slurry facilities.

Acid Base Accounting

The total Sulphur content of discard (1.6%-3.8%) and fine discard (slurry) (0.59%-0.74%) was generally high. The sulphide content was also high in discard (0.62%-3.6%) and fine discard (0.28%-0.47%). Sulphate content was very low (0.05%-0.071%) except for the discard sample from North dump; and the content of other Sulphur species varied from 0.12%-0.51%, with relatively high content being recorded for discard samples from North dump and ATC 2 discard dump.

Bulk neutralization potential (Bulk NP) was generally high in the fine discard (43-54 kg $CaCO_3$ eqv t^{-1}) and discard (39-53 kg $CaCO_3$ eqv t^{-1}), except the sample from North dump, which had nil neutralization potential. The carbonate neutralization potential (CaNP) for all samples (58-1068 kg $CaCO_3$ eqv t^{-1}) was higher than Bulk NP indicating that siderite represented a significant proportion of total carbonates in the samples of all materials. As already noted, siderite have limited neutralising capacity under oxidising field conditions as ferrous iron is an extra source of acidity due to the strong hydrolysis of the ferrous iron in solution (Golder Associates Africa (Pty) Ltd (h), August 2020).

The near-neutral paste pH (6.7-7.6) recorded for all spoils and three discard samples indicates sufficient reactive NP to buffer acidity generated by the initial oxidation of sulphides during the testing procedure in the discard materials from ATCOM South paddock walls, ATC2 dump and Venture void; and fine discard residue facilities. The discard materials from the North dump had an acidic pH (5.0) confirming insufficient reactive NP to buffer acidity generated by the initial oxidation of sulphides during the testing procedure. There is generally excess buffering capacity in the fine discard materials, with Bulk NP exceeding acid potential (AP) in all samples. The discard materials generally have insufficient buffering capacity with AP exceeding Bulk NP in all samples.

Classification of acid rock drainage (ARD) potential show that all the discard samples are potentially acid generating (PAG) per the guidelines of Morin and Hutt and MEND. All fine discard samples classify as not potentially acid generating (Non-PAG) - Figure 34. Classification shows that all discard samples are likely to generate ARD and all fine discard samples have a low ARD generation potential (Figure 35). The fine discard samples have a low risk of acid-generation, whereas coarse discard has moderate to high risk of acid-generation, with the highest risk from North Dump discard. Either sulphide sulphur or total sulphur content can be used to estimate AP and classify ARD potential. The overall classification of samples' AP was based on total sulphur content, since this is conservative[3]. However, there was no major difference in classification of the fine discard and discard samples based on sulphide sulphur and total sulphur-based AP (Table 22).

[3] If the sulphates present in the samples are secondary minerals (ARD products), then using sulphide sulphur content could under-estimate ARD potential. On the other, if substantial amounts of organic sulphur are present, then use of total sulphur content could over-estimate ARD potential.

Table 22: Acid Base Accounting results for coarse discard and fine discard (as sampled in 2017)

Sample ID	Source	Material Type	Paste pH	Total Sulphur	Sulphide Sulphur	Sulphate Sulphur	Sulphur (Other)	Total Carbon	Organic Carbon	Inorganic Carbon	[1]Bulk NP	[1]CaNP	[2]SAP	[2]TAP	[3]SNNP	[3]TNNP	[4]SNPR	[4]TNPR	Classification	
				%							kg $CaCO_3$/T						no units		Based on SNPR	Based on TNPR
F2-S	Fringe 2	Fine Discard	7.6	0.74	0.47	0.046	0.22	51	49	2.3	54	192	15	23	40	31	3.7	2.4	Non-PAG	Non-PAG
F3-S	Fringe 3	Fine Discard	7.4	0.59	0.31	0.007	0.27	58	55	3.3	47	275	10	18	37	28	4.8	2.5	Non-PAG	Non-PAG
EV-S	E-Void	Fine Discard	7.7	0.69	0.28	0.053	0.36	58	56	2.3	47	192	8.6	21	38	25	5.4	2.2	Non-PAG	Non-PAG
AS-S	ATCOM South	Fine Discard	7.6	0.70	0.35	0.065	0.28	59	46	13	43	1068	11	22	32	22	3.9	2.0	Non-PAG	Non-PAG
AS-D		Coarse Discard	6.9	1.8	1.7	0.011	0.09	26	24	2.2	39	183	53	56	-14	-17	0.73	0.69	PAG	PAG
A2-D	ATC 2 Discard Dump	Coarse Discard	7.1	1.9	1.6	0.036	0.30	47	38	8.2	53	684	49	60	3.4	-7.2	1.1	0.88	Uncertain	PAG
VV-D	Venture void	Coarse Discard	6.7	3.8	3.6	0.071	0.18	25	23	1.5	44	125	111	119	-68	-76	0.39	0.37	PAG	PAG

Sample ID	Source	Material Type	Paste pH	Total Sulphur	Sulphide Sulphur	Sulphate Sulphur	Sulphur (Other)	Total Carbon	Organic Carbon	Inorganic Carbon	[1]Bulk NP	[1]CaNP	[2]SAP	[2]TAP	[3]SNNP	[3]TNNP	[4]SNPR	[4]TNPR	Classification	
				%							kg $CaCO_3$/T						no units		Based on SNPR	Based on TNPR
ND-D	North Dump	Coarse Discard	5.0	1.6	0.62	0.511	0.51	54	49	4.4	0	367	19	51	-19	-51	0.01	0.01	PAG	PAG

Notes
[1]Bulk NP is NP measured by Sobek titration. CaNP is NP calculated on the basis of inorganic carbon LECO analysis. Measured NP is used for the NPR calculation
[2]SAP - acid potential based on sulphide sulphur; TAP - acid potential based on the total sulphur content
[3]SNNP - the difference between bulk NP and SAP; TNNP - the difference between bulk NP and TAP
[4]SNPR - Ratio of SAP and bulk NP; TNPR - Ratio of TAP and bulk NP
PAG – Potentially acid generating; Non-PAG – not potentially acid generating

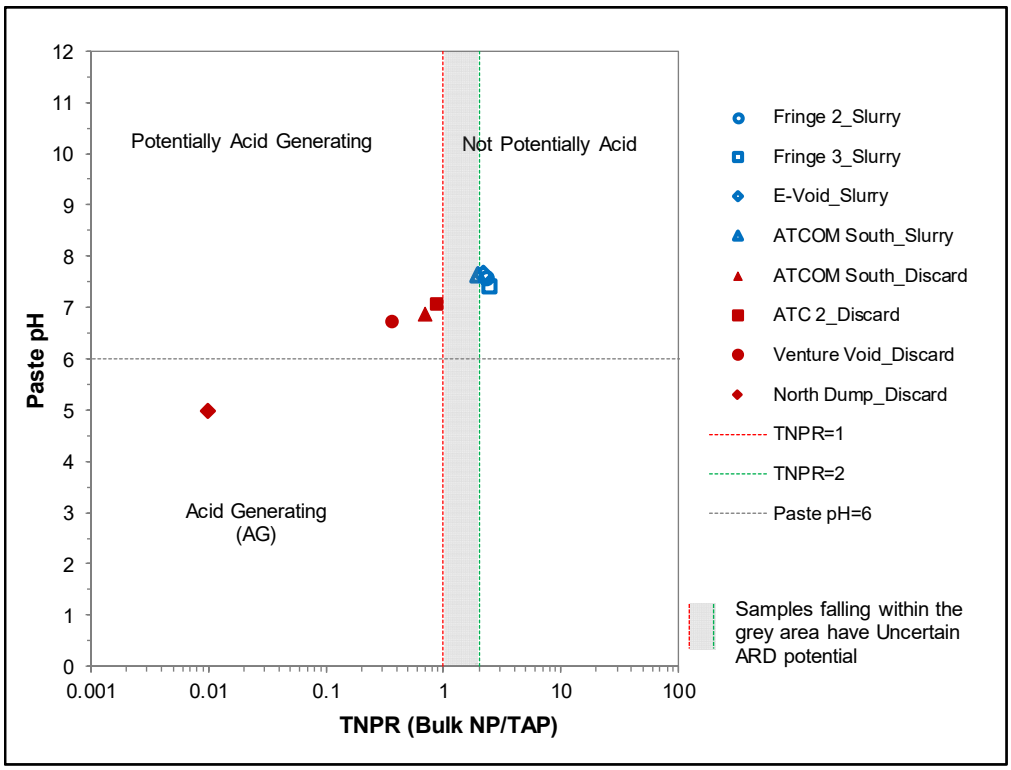


Figure 34: Paste pH versus total sulphur NPR (TNPR) of coarse discard and fine discard samples

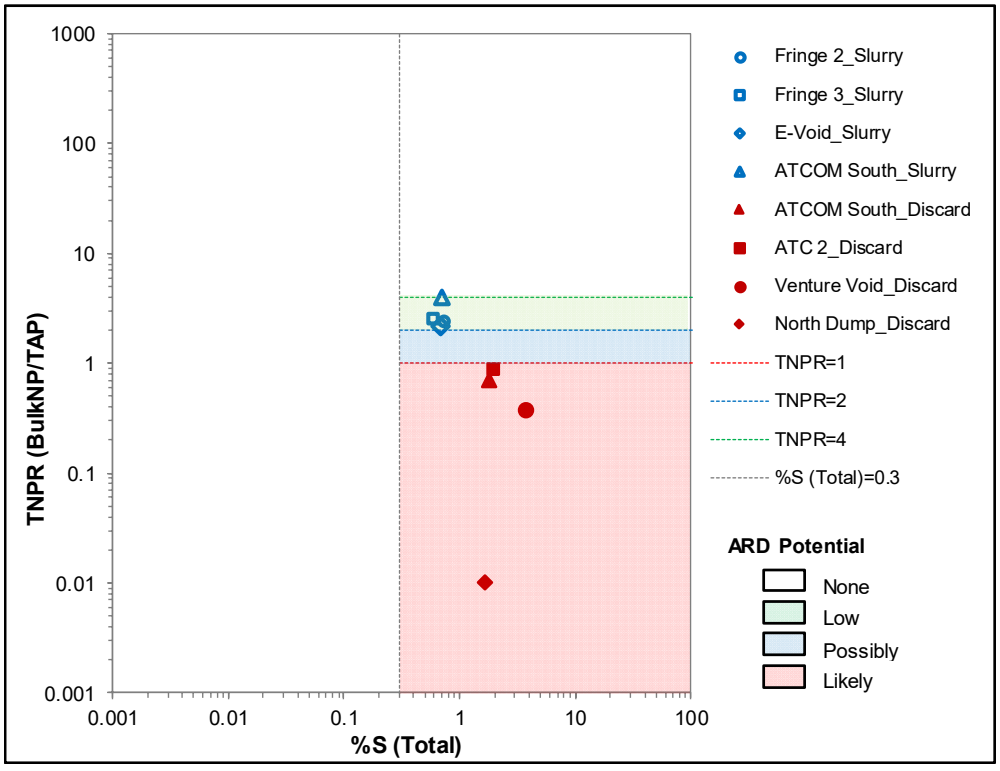


Figure 35: Plot of net potential ratio (TNPR) versus total sulphur content (%S) of coarse discard and fine discard samples

6.7 Socio-economic

The mine is located within the Nkangala District Municipality (NDM), under the jurisdiction of the eMalahleni Local Municipality (ELM). The ELM is one of the six local municipalities in the Nkangala District Municipality (NDM). The below baseline description is for the ELM for the baseline details relating to the larger NDM, refer to the Socio-economic baseline update report (Golder Associates Africa (Pty) Ltd (m), April 2020), appended in APPENDIX L.

6.7.1 Demography

ELM account for the largest population within the NDM, with an estimate of 455 228 people reported in the 2016 community survey. Table 23 shows the population trends of ELM from 2011 to 2016 and the 2030 projected population. From 2011 to 2016, the population of ELM has increased by 3.2%.

Table 23: Population trends of ELM (Emalahleni Local Municipality (ELM), 2017/2018 - 2021/2022)

Area	Population growth rate% (2001 - 2011)		Average annual population growth	Projected
	2011 Census	2016 (community survey)	2011-2016	2030
ELM	395 466	455 228	3.2%	707 530

Gender and age distribution

The age and gender structure of the population is a key determinant of population change and dynamics. The male gender in ELM constitutes approximately 53% of the total population, as indicated in Table 24. This trend can often be observed in mining towns where the mining industry is predominantly male orientated. Most people in ELM (43.1%) are in the 15-34 age group, as shown in Table 25.

Table 24: Gender distribution (Emalahleni Local Municipality (ELM), 2017/2018 - 2021/2022)

Municipality	Males	Females
ELM	52.79%	47.21%

Table 25: Age distribution (Emalahleni Local Municipality (ELM), 2017/2018 - 2021/2022)

Municipality	0-14		15-34		35-64		65+	
	Number	%	Number	%	Number	%	Number	%
ELM	111380	24,5	196255	43,1	133769	29,4	13824	3,0

Ethnicity and language

The population distribution of the ELM composes of all racial groups with the majority of the population belong to the Black African group, and the most spoken language is isiZulu and Southern Ndebele. The dominant home language in the ELM was isiZulu (42.4%), followed by Afrikaans (14.6%), Sepedi (12.5%) and isiNdebele (10%) (Emalahleni Local Municipality (ELM), 2017/2018 - 2021/2022).

Education

According to the 2016 community survey of Stats SA (StatsSA Community survey, 2016), the population in ELM aged 20+ completed grade 12, increased from 117 021 in 2011 to 146 952 (an increase of 29 931) in 2016, an increase of 25.6% in the relevant period.

Employment

From 2006 to 2016, the NDM had an average annual employment growth of 3.05% (Nkangala District Municipality (NDM), 2018/2019). According to Stats SA (2011), ELM was employed either by the formal and informal sector. Figure 36 shows the unemployment rate of ELM and Steve Tshwete Local Municipality (STLM) and according to the 2011 census and 2016 HIS global insight figures. STLM economy is one of the biggest economic areas, and it is therefore expected that a significant number of employment opportunities are being provided in the area. Mining, trade and manufacturing are the major leading employment drivers in STLM.

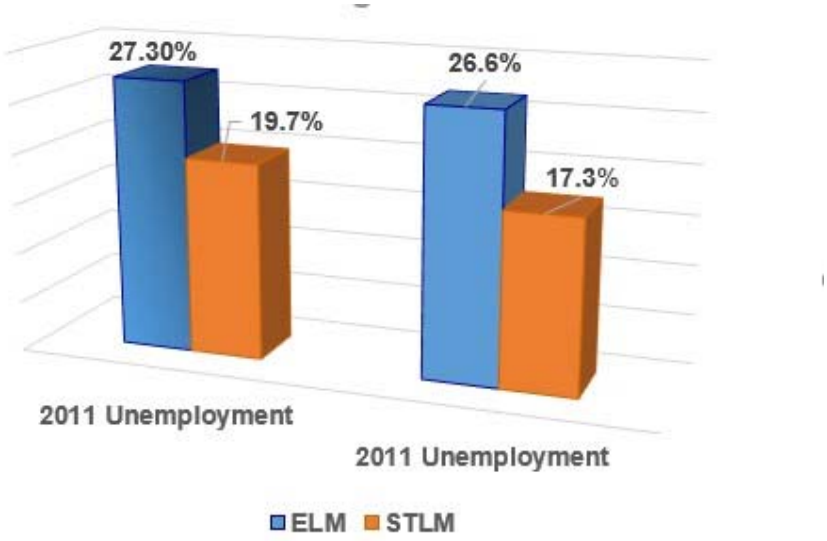


Figure 36: 2011 and 2016 unemployment rate in the municipalities (Nkangala District Municipality (NDM), 2018/2019)

Apart from the formal and informal sector as the channels for sourcing income, other sources of income within the NDM include social services grants. Table 26 shows the grant types received by residents in ELM and STLM.

Table 26: Social services grant types in ELM and STLM (SASSA, 2017/2018)

Grant type	ELM	STLM
Old age	15 967	8 994
War veteran	0	0
Disability	5944	2 595
Foster child	2382	1 675
Care dependency	932	376
Child support	65 968	33 495
Grant in aid	650	56

In a growing economy among which production factors are increasing, most of the household incomes in NDM are spent on purchasing goods and services. Therefore, the measuring of the income and expenditure of households is a major indicator of several economic trends. It was estimated that in 2016 17.42% of all the households in the NDM, were living on R30, 000 or less per annum.

6.7.2 Economic profile

The Nkangala District Municipality (NDM)'s economy is made up of various industries. In 2016, the mining sector was reported to be the largest within NDM accounting for R 41.1 billion (37.3%) of the total Gross Value Added[4] in the district municipality's economy. Figure 37 shows the 2011 and 2016 industry contribution to the GDP at basic prices (Golder Associates Africa (Pty) Ltd (m), April 2020).

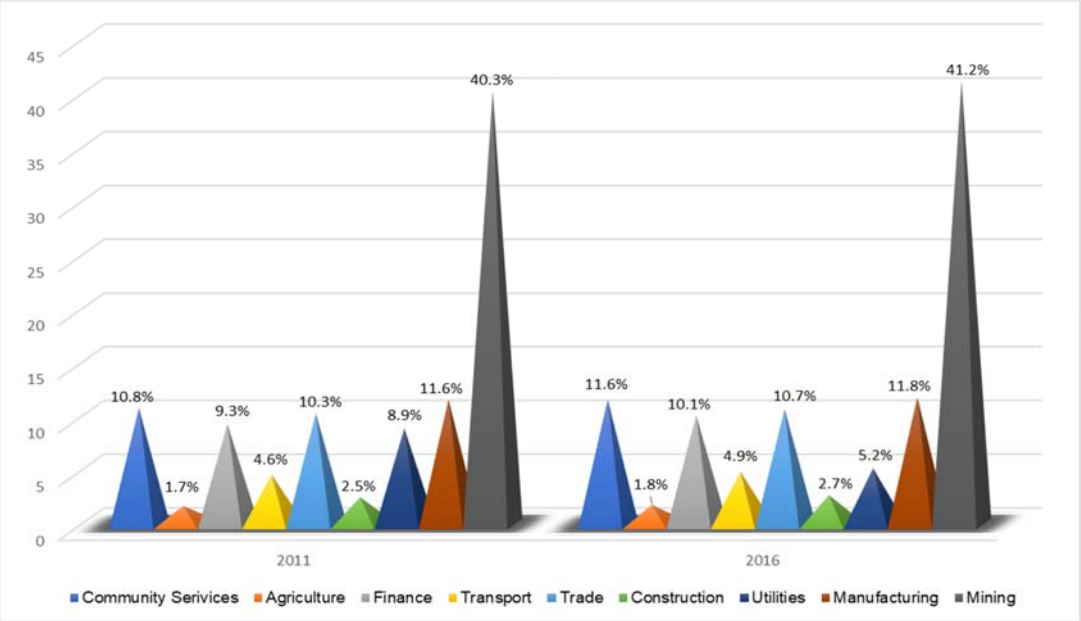


Figure 37: Industry contribution to GDP at basic prices in NDM, 2011 and 2016.

In 2015, the ELM contributed 20.9% to the Mpumalanga Province (MP). From 1996 to 2015, ELM demonstrated an average annual economic growth of 2.4%. The sectors contributing to the economic activities in the ELM contributing to the economy of NDM, are discussed below:

Agriculture

Agriculture in ELM is limited to low-level subsistence farming, producing enough maize for personal use, traditional livestock farming and sorghum production, which is formalised and produced for the market.[5] Wool production is one of the upcoming sources of income in the area for emerging communal farmers (Golder Associates Africa (Pty) Ltd (m), April 2020).

Mining

Mining is a very significant economic sector in the ELM area, but it has also become a major form of development constraint due to shallow undermining - especially in the central, northern and southern portions of Witbank town. This shallow undermining has major implications in terms of correcting the distorted spatial pattern of Witbank town itself. There is a conflict between the mining operations and settlement development, especially in terms of the hazards associated with past mining operations, such as underground fires in old mines, seepage from mines and communities mining coal from remaining coal pillars and old coal dumps. Coal mining has also out-performed agriculture in terms of land-use within the municipal area; thereby causing a major challenge on agriculture development.

[4] The GRA provides a sector breakdown, where each sector is measured in terms of its value added produced in the local economy

[5] Eastern Cape Socio-Economic Consultative Council, 'Emalahleni Local Municipality Socio Economic Review and Outlook, 2017', 2017, 1–102.

Industries

There are various industrial areas in the ELM, most of which are situated within or around Witbank town.

Business activities

The project area is situated more or less between the town of Ogies and eMalahleni . Ogies has developed in a linear pattern along two main roads, namely the P29-1 and adjacent railway line as well as the R545

The general maintenance of the public spaces (road reserves, open spaces, roads etc.) in the town is very poor and requires attention. eMalahleni Central Business District (CBD) represents the largest concentration of business activity in ELM. The urban areas in ELM are mainly residential with supportive services such as business and social facilities.

Tourism

Eco-tourism activities in the form of game farms are primarily consolidated in the mountainous north-western and northern extents of the LM where abundant grazing land and water from the Olifants River are available, while the major tourism destination within the municipal area is the Loskop Dam and surrounds. ELM is the point of entry into Mpumalanga from Gauteng.[6] The province of Mpumalanga has unique scenery. It is also a home to many world-renowned attractions, including the famous Kruger Park and many others. Also, Mpumalanga is the only province of South Africa to border two provinces of Mozambique or to border all four districts of Swaziland. Unfortunately, tourism potential in the two municipalities is not fully exploited.

7.0 POTENTIAL IMPACTS AND RISKS IDENTIFIED

The following potential impacts were identified during the scoping phase:

- Potential negative impact on pit water quality due to the additional acid-generating discard that will be placed on top of old infilled pits;
- Potential spills / dam failure / seepage from the RWD and associated pipelines;
- Potential spills leaks from the fine discard (slurry) pipelines;
- At the proposed Venture Co-disposal Facility, removal of vegetation will lead to recently rehabilitated habitat disturbance and increased sedimentation entering the nearby wetlands;
- Chemical leaks/spills from construction vehicles and machinery during construction may result in water quality deterioration;
- Potential negative impacts on wetlands / watercourses associated with the proposed haul road widening / expansion;
- Potential negative impact on noise levels resulting from site preparation, ground excavation and materials handling activities;
- Potential negative impact on the quality of downstream water resources resulting from potential seepage or spillage of contaminated storm water runoff emanating from the discard facilities;
- Potential increased erosion and runoff volumes from the discard material resulting in increased sedimentation and potential contaminated runoff reporting to surface water environment;
- Potential impact on the volume of contaminated mine affected water requiring management/treatment in the post-closure phase of the mine;

[6] Nkangala District Municipality IDP 2018-2019.

- Potential negative impact on downstream aquatic ecosystems and wetlands resulting from the above-mentioned impacts on water quality;
- Potential negative impact on the water supply of local water users;
- Potential negative impact on ambient air quality as a result of increased nuisance dust and fine particulate levels, likely to occur as a result of materials handling activities (tipping, loading and offloading), vehicle entrainment of dust on unpaved roads, and wind erosion from open/ exposed areas;
- Spontaneous combustion on the South Pit Discard Dump resulting in:
  - Increased levels of fugitive emissions (i.e. air pollution) and non-compliance with the NEMAQA when the ambient air quality standards are exceeded;
  - Increased occupational exposures to the combustion gases;
  - Instability within the discard dump and an increased risk of collapses due to voids being formed as the discard burns within the dump; and
  - Increased risk of occupational injuries and losses of equipment due to burns, smoke inhalation, and collapse.
- Potential negative impact on visual aesthetics of the broader region, particularly since the expanded / established discard dumps will remain a permanent visible feature of the landscape; and
- Potential positive impact on employment safety of permanent employees, continued skills transfer, and local economic development.

8.0 IMPACT ASSESSMENT PROCESS AND METHODOLOGY

The overall process and methodology that was followed for the scoping phase of the EIA was based on the requirements of South African legislation (specifically NEMA) and best practice standards and guidelines.

The approach included the following key stages:

- Gap Analysis of existing information against the project compliance criteria;
- Screening (legal and process review) – review of all applicable compliance criteria inclusive of South African legal and administrative requirements (see Section 3.1 to Section 3.4 above);
- EIA scoping (identification of key issues and development of a plan of study for carrying out the impact assessment). This report is presented to the public for comment and to the government departments dealing with mining and environmental authorisations for a decision on whether the scope proposed for the EIA is appropriate;
- Environmental and Social Baseline Information review – carrying out desktop assessment and review of existing baseline conditions of the environment that could be affected by the proposed project; and
- Stakeholder Engagement – is being undertaken throughout the EIA process to record issues and comments received from the public. These issues and comments are integrated into the process and will be considered in the impact assessment phase of the EIA.

The following activities will be undertaken during the next phase of the EIA:

- Environmental and Social Management Systems Development – the establishment of a system for the management of environmental and social impacts supported by a number of action plans;

- Preparation of an EIA report – documenting all processes and presenting the findings of the impact assessment. The EIA report will be presented to the public for comment and to the relevant South African government departments for a decision on whether the project may proceed, and if so, under what conditions;
- Stakeholder Engagement – will continue throughout the remainder of the EIA process to record issues and comments received from I&APs. All issues and comments will be integrated into the process and considered during the EIA;
- The overarching principles that guide the EIA include:

- Sustainability – development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs; and
- Mitigation hierarchy – The mitigation hierarchy describes a stepwise approach that illustrates the preferred approach to mitigating adverse impacts as follows (the governing principle is to achieve no net loss and preferably a net positive impact on people and the environment as a result of the project):
  - The preferred mitigation measure is **avoidance**;
  - Then **minimisation**;
  - Then **rehabilitation or restoration**; and
  - Finally, **offsetting** residual, unavoidable impacts.
- Duty of care towards the environment and affected people.

The assessment of the impacts of the proposed activities will be conducted within the context provided by these principles and objectives.

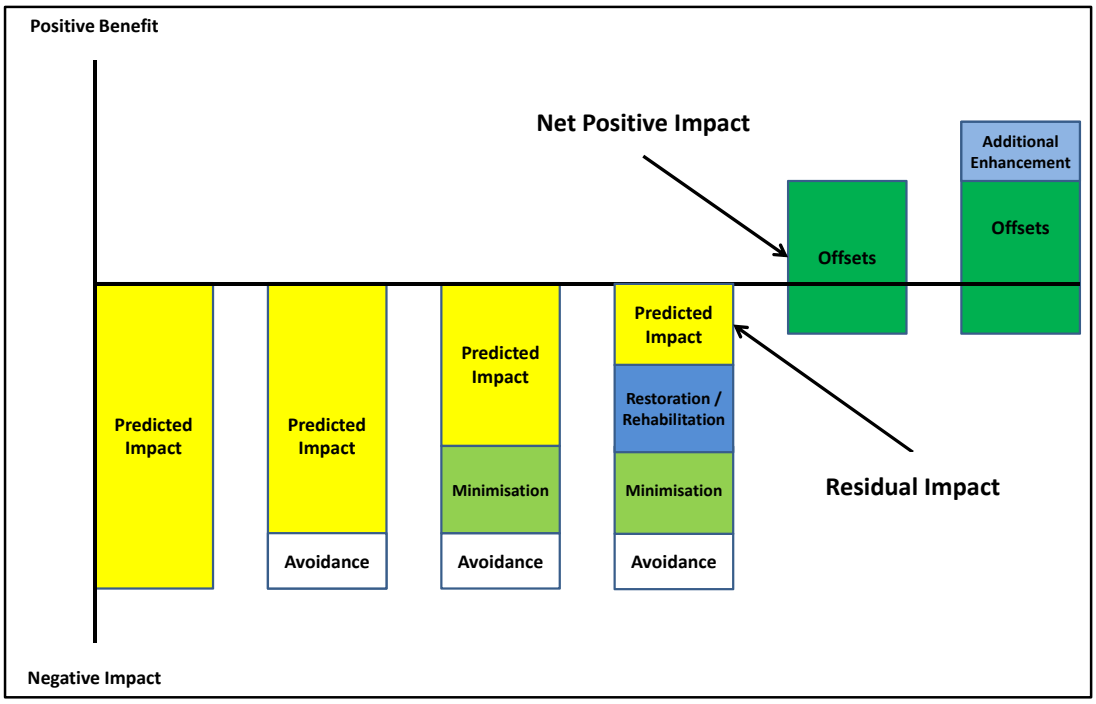


Figure 38: Mitigation Hierarchy Adapted from Biodiversity Offset Design Handbook, 2009

8.1 National environmental screening tool

The Department of Environmental Affairs has developed a web based environmental screening tool that can be accessed at https://screening.environment.gov.za/screeningtool to generate a report that shows environmental features and sensitivities near the proposed project and identifies recommended specialist studies. The use of the tool during the environmental authorisation process became compulsory on 4 October 2019. The Application for Environmental Authorisation form and the Environmental Screening Report generated for this application process are attached as APPENDIX M.

The specialist studies identified in the screening report are listed in Table 27, together with comments on their applicability.

Table 27: Specialist Studies Identified by Environmental Screening Tool

No	Specialist assessment	Comments
1	Agricultural Impact Assessment	This assessment was not undertaken as the footprints of the above-mentioned activities will largely be situated on previously mined-out areas.
2	Landscape / Visual Impact Assessment	This assessment was not conducted, as the proposed activities are expansions to existing discard facilities and existing mining related infrastructure.
3	Archaeological and Cultural Heritage Impact Assessment	This assessment was not undertaken as the footprints of the above-mentioned activities will largely be situated on previously mined-out areas; assessments for the proposed RWD will be based on historical data.
4	Palaeontology Impact Assessment	This assessment was not undertaken as the footprints of the above-mentioned activities will largely be situated on already mined-out areas; assessments for the proposed RWD will be based on historical data.
5	Terrestrial Biodiversity Impact Assessment	This assessment was not undertaken as the footprints of the above-mentioned activities will largely be situated on previously mined-out areas; assessments for the proposed RWD will be based on historical data.
6	Aquatic Biodiversity Impact Assessment	Existing biomonitoring data was used for consideration and integration into the environmental impact assessment report (EIR) (see section 9.3.5 and 9.3.6).
7	Hydrology Assessment	This assessment was conducted and were incorporated into the EIR (see section 9.3.3 and APPENDIX L).
8	Noise Impact Assessment	Existing noise monitoring data was used for consideration and integration into the EIR (see section 9.3.8).
9	Radioactivity Impact Assessment	This assessment was deemed not applicable as no radioactive materials are associated with the colliery or the regional Geology.
10	Traffic Impact Assessment	A traffic assessment was not conducted as existing haul roads on site will be utilised for the proposed activities. No traffic related impacts are envisioned.
11	Geotechnical Assessment	This assessments were undertaken and are attached to the EIR (see APPENDIX H and APPENDIX I).
12	Climate Impact Assessment	This assessment was not conducted as part of this project as the proposed activities are a continuation of current activities.
13	Health Impact Assessment	This assessment was not conducted as the proposed project is a continuation of current activities of the mine, no new impacts on human health are anticipated. Human health impacts were taken into consideration during the assessment of groundwater impacts on water users in the study area (see section 9.3.3).

No	Specialist assessment	Comments
14	Socio-Economic Assessment	This assessment was not conducted as the proposed project is a continuation of current activities of the mine; no new impacts on socio-economic aspects are anticipated. The baseline socio-economic aspects were reviewed and updated (see section 6.7).
15	Ambient Air Quality Impact Assessment	Existing air quality monitoring data were used for consideration and integration into the EIR (see section 9.3.1).
16	Seismicity Assessment	A post-seismic analysis were conducted as part of the technical designs; the findings of which are included in the EIR (see APPENDIX H and APPENDIX I).
17	Plant Species Assessment	This assessment was not undertaken as the footprints of the above-mentioned activities will largely be situated on already mined-out areas; assessments for the proposed RWD were based on historical data.
18	Animal Species Assessment	This assessment was not undertaken as the footprints of the above-mentioned activities will largely be situated on already mined-out areas; assessments for the proposed RWD were based on historical data.

8.2 Scoping methodology

The methodology specifically adopted for the scoping phase includes the following:

- Stakeholder consultation as required in terms of the EIA Regulations;
- Review of existing data;
- Specialists team to identify key impacts and issues and to outline the plan of study; and
- Compiling the scoping report.

8.3 Assumptions and limitations

The EIA is limited to the scope of the assessment outlined in more detail in Section 8.11 of this document.

Although all effort was made by the project team to identify all environmental and social aspects, impacts and mitigation measures, errors and omissions may have occurred. The draft environmental management programme (EMPr) developed as part of the EIA process (Part B of this document), is a live document that must be adapted and updated as additional information, aspects or impacts are identified. An important objective of the EMPr is for the GOSA iMpunzi project team to continually improve environmental and social performance. Besides, according to South African legislation, the EMPr will need to be updated or amended with new information when there are significant changes during the life of the project.

Every effort was made to engage stakeholders to the extent possible, however not every stakeholder may have been consulted, or their comments may have been recorded erroneously. A grievance mechanism has been put in place through which stakeholders can raise grievances and continue to contribute their concerns and issues with the project team. More detail on the assumptions and limitations of this EIA are provided per specialist discipline (see section 9.3).

8.4 Impact assessment methodology

The significance of identified impacts was determined using the approach outlined below (terminology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998). This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further subdivided as follows:

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude of impact

To assess each of these factors for each impact, the following four ranking scales were utilised:

Magnitude	Duration
10 - Very high/unknown	5 - Permanent (>10 years)
8 - High	4 - Long-term (7 - 10 years, impact ceases after site closure has been obtained)
6 - Moderate	3 - Medium-term (3 months- 7 years, impact ceases after the operational life of the activity)
4 - Low	2 - Short-term (0 - 3 months, impact ceases after the construction phase)
2 - Minor	1 - Immediate
Scale	**Probability**
5 - International	5 - Definite/Unknown
4 - National	4 - Highly Probable
3 - Regional	3 - Medium Probability
2 - Local	2 - Low Probability
1 - Site Only	1 - Improbable
0 - None	0 - None

Once these factors are ranked for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

Significance Points= (Magnitude + Duration + Scale) x Probability.

The maximum value is 100 significance points (SP). The impact significance was then rated as follows:

Points	Significance	Description
SP > 60	High environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 - 60	Moderate environmental significance	An impact or benefit which is sufficiently important to require management, and which could have an influence on the decision unless it is mitigated.
SP < 30	Low environmental significance	Impacts with little real effect and which will not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences/effects.

For the methodology outlined above, the following definitions were used:

- Magnitude is a measure of the degree of change in a measurement or analysis (e.g., the area of pasture or the concentration of a metal in water compared to the water quality guideline value for the metal), and is classified as none/negligible, low, moderate or high. The categorisation of the

impact magnitude may be based on a set of criteria (e.g. health risk levels, ecological concepts and professional judgement) pertinent to each of the discipline areas and key questions analysed. The specialist study must attempt to quantify the magnitude and outline the rationale used. Appropriate, widely recognised standards are to be used as a measure of the level of impact;

- Scale/Geographic extent refers to the area that could be affected by the impact and is classified as site, local, regional, national, or international;
- Duration refers to the length of time over which an environmental impact may occur i.e. immediate/transient, short-term (0 to 7 years), medium-term (8 to 15 years), long-term (greater than 15 years with impact ceasing after closure of the project), or permanent; and
- Probability of occurrence is a description of the probability of the impact actually occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definitely occur).

8.5 Assessment of potential impacts and risks

The findings of the specialist studies, which guided the selection of the preferred site layout alternative, are presented in section 8.11 of this EIA/EMPr report. The complete specialist reports are attached as APPENDIX L. The specialists' findings were used to assess the project's impacts and risks during its respective project phases.

8.6 Positive and negative impacts of the initial site layout

The location of all proposed facilities is located within iMpunzi Mining Complex and will be an expansion/extension of the current facilities. The proposed facilities layout, as illustrated in Figure 5 and Figure 10, has been optimised to ensure integration with the iMpunzi Mining Complex and existing access roads.

8.7 Possible mitigation measures and level of risk

Refer to section 9.3 below for mitigation measures identified for each identified environmental impact. The environmental impact assessment process is outlined in section 8.11. Impacts identified during the environmental impact assessment and measures proposed to mitigate these impacts are also summarised in Table 29 to Table 31.

8.8 Site selection matrix and final site layout plan

The footprints associated with the proposed Venture Co-disposal Facility and South Pit Discard Dump are located on previously mined-out land, and hence are brownfields sites. The proposed RWD is located downstream of the proposed of the Venture Co-disposal Facility. The haul road between the ATCOM and ATC Plant will be widened, following the current haul road alignment, until it will tie into the existing railway reserve to the ATC Plant.

8.9 Motivation for not considering alternative sites

Site alternatives are limited by the current location of the coal processing plants, existing discard facilities and existing supporting infrastructure such as haul / access roads, and storm water management facilities. The footprints associated with the proposed Venture Co-disposal Facility and South Pit Discard Dump are located on previously mined-out land, and hence are brownfields sites. The new RWD will be placed in a low lying/flat plain where it will easily receive and trap effluent discharge.

8.10 Statement motivating the preferred site location and site layout

Please refer to Section 4.0 and Section 8.9 of this report.

8.11 Process undertaken to identify, assess and rank impacts and risks imposed on preferred site

The process involved the assessment of impacts in accordance with South African regulatory requirements, best practice and guidelines as described in section 3.0 of this report; public consultation as set out in section 5.0; assessment in accordance with methodologies described in section 8.4 and an analysis of specialist investigations described in section 9.3. Alternative infrastructure site locations and layouts or the preferred site were evaluated on the basis of the criteria set out in section 4.1.

9.0 ENVIRONMENTAL IMPACT ASSESSMENT

The EIA process for this project has been designed to comply with the requirements of the EIA Regulations of 2014 (RSA, 2014e), (See section 3.0). Cognisance has also been taken of the following key principles contained in the National Environmental Management Act (Act 107 of 1998) (NEMA), which is South Africa's framework environmental legislation:

- **Sustainability** – a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs;
- **Mitigation hierarchy** – avoidance of environmental impact, or where this is not possible, minimising the impact and remediating the impact; and
- The **duty of care** of developers towards the environment.

The assessment of the impacts of Glencore's proposed activities on the properties listed in Table 3, above, was conducted in accordance with these principles.

Based on the findings of the EIA (see section 9.3), a comprehensive environmental management programme (EMPr) were developed (see Part B of this report) and will be implemented to control and minimise the impacts during construction, operation, and decommissioning of the proposed operations.

9.1 Project phases and activities

The environmental impacts of the project were assessed for the:

- **Construction phase**;
  - The construction phase marks the beginning, and physical changes to the site. During this phase the following activities will take place:
    - General steps for pre-construction involving site clearance and construction of the storm water management infrastructure, return water dam construction and haul road expansion. It is anticipated that the construction phase will take approximately **six months** to complete.
- **Operational phase**:
  - The operational phase involves the hauling and deposition of discard on the discard dumps until the pre-determined capacity is reached. This will be completed in a phased approach, as described in section 2.5.3 above.
- **Decommissioning and Closure phase**:
  - During the decommissioning and closure phase, the dumps will be shaped, covered and then vegetated with indigenous grass species. The shaping and cover options are discussed in section 2.5.3 and 21.2.

9.2 Summary of specialist reports

Table 28 below reflects a summary of the specialist reports that informed the impact assessment and final preferred site selection process. Copies of these reports are appended to this document as APPENDIX L.

Table 28: Summary of specialist reports

Specialist Studies Undertaken	Specialist recommendations that have been included in the EIA Report	Reference to applicable section of report where specialist recommendations have been included
Biodiversity (Wetland Ecology)	The footprints associated with the proposed discard facilities, RWD and haul road extension are already disturbed, and hence are considered brownfields sites. The most significant potential impacts identified include the disturbance of artificial wetland habitat, potential water quality deterioration, increased sedimentation and turbidity in adjacent wetlands. The recommended mitigation measures provided in the Wetland Specialist study as well as the EIA are included in the EMPr (Part B of this report), to ensure minimal disturbance of the wetlands and water resources adjacent to the study areas. To ensure adequate implementation of mitigation and management measures through all phases of the project from construction onwards, it is essential that these measures be raised and addressed as part of the initial planning and design phase of the project, to allow scope, where necessary, for adaptation of the recommendations to project specific requirements or limitations.	Section 6.4, Section 9.3.6, , Table 34, Table 35, Table 36, and Table 40.
Ecological Screening Study for Proposed Haul Road Expansion	An ecological screening study was conducted to assess the potential impact of the expansion of the existing haul road in order to enable the transportation of discard from the ATCOM discard dumps to the ATC plant, using haul trucks. The proposed road expansion crosses a wetland and will involve clearance of vegetation and as a result. The study area for the wetland and terrestrial ecology assessment was defined as the route of the proposed haul road expansion plus a 500 m buffer zone around the proposed infrastructure to account for potential direct and indirect impacts within the regulated zone of a watercourse. An unchanneled valley bottom wetland system with adjacent hillslope seepages occurs within the study area. This wetland's health, ecological importance and sensitivity and functionality was assessed. Both the unchanneled valley bottom and the hillslope seepage wetland is currently seriously modified. While both systems are not ecologically important or sensitive on a local scale, some recommended mitigation measures would need to be put in place to	Section 6.4, Section 9.3.5, Table 32, Table 34, Table 35, Table 36,and Table 40.

Specialist Studies Undertaken	Specialist recommendations that have been included in the EIA Report	Reference to applicable section of report where specialist recommendations have been included
	reduce the impact on this system namely; erosion control, sediment trapping, phosphate trapping, nitrate removal and toxicant removal. The proposed road expansion will not have any significant residual impact on the current environmental setting, provided that the recommended mitigation measures are implemented during construction and operation. In particular, the development and implementation of a construction method statement for wetland crossings with follow up monitoring will be critical in ensuring that no significant residual impacts on wetlands as a result of construction occur. However, the severity of this impacts on the environment can be mitigated through the implementation of the recommended mitigation measures.	
Soils, Land Use and Land Capability for land cover options	A soil, land use and land capability assessment was conducted to determine if sufficient cover material is available to rehabilitate the dumps. No soil related impact assessment was conducted given the disturbed nature of the footprints associated with the discard facility and haul road expansions.	Section 6.3, Section 9.3.2, Table 32, Table 34, Table 35, Table 36, and Table 40.
Socio-Economic Baseline Update	Based on the desktop update of the Socio-economic baseline, the host communities have high rates of unemployment and generally do not have access to adequate social services and infrastructure. Based on these findings, stakeholder consultation and expert knowledge, both positive and negative socio-economic impacts were identified. Positive impacts include short-term / temporary job opportunities and the security of long-term and full-time employment and skills transfer and development. Other impacts during the construction, operation and decommissioning phases have been rated as positive, low, moderate negative and moderate positive impacts, respectively. If mitigation measures are implemented accordingly, it is anticipated that the consequence and probability of the moderate negative impact will be reduced, while low to moderate positive impacts on average will be enhanced to maximise benefits to the current employees.	Section 0, Table 32, Table 34, Table 35, Table 36, and Table 40.
Surface Water Impact Assessment (incl. Storm water Management plan)	Based on the surface water impact report, which also included a storm water management plan, the catchment in which the site is located is highly developed, with existing impacts. The main impacts from the site during construction would be erosion and increased sediment loads, reporting to surface water resources. Impacts on the surface water resource during the operational phase range from High to Low	Sections 6.5, Section 9.3.4, Table 32, Table 34, Table 35, Table 36, and Table 40.

Specialist Studies Undertaken	Specialist recommendations that have been included in the EIA Report	Reference to applicable section of report where specialist recommendations have been included
	and if the recommended mitigation measures are implemented all the impacts are envisioned to be Low. Mitigation measures include adequate design, operation and maintenance of the storm water system and responsible storage of chemicals in well-designed bunded areas as well as including erosion prevention measures.	
Groundwater and Geochemistry Impact Assessment	The main finding of the groundwater and geochemistry impact assessment is as follows: ▪ Seepage from the coarse and fine discard is considered to have a High significance because of the acid-generating nature of the discard and the elevated concentrations of calcium, aluminium and sulphate in the leachate. The main required interventions are: ▪ Application of a soil cover consisting of a 300 mm silty clay cover with established grassland vegetation over the discard facilities is required in order to reduce infiltration, thereby decreasing mass loads to the groundwater system (by 80 - 90%) and reducing the environmental impact. This reduction in infiltration is also required to decrease the volume of dirty water generated from rainfall, which is a gain in terms of water use efficiency; and ▪ Containment of seepage in the pit and hence prevention of decant of mine affected water through abstraction boreholes in the underlying Venture and ATCOM South Pits during operations and post-closure, which will: – Reduce the environmental impact of mine affected water and protect future uses of water resources in the area by preventing decant to surface water systems during the polluting period of the source; and – Address water use efficiency requirements as the mine-affected water is abstracted for treatment and reuse, rather than leaving it as wasted dirty water. The key recommendations were made in the study: ▪ Conduct kinetic testing of the discard dump and fine discard material to confirm predicted post closure groundwater quality; ▪ Conduct the following assessments relating to the existing Tweefontein WTP (design): – Develop a predicted 95th percentile concentration scenario, to indicate potential variability in feed concentrations to even higher levels than currently indicated in the average scenarios (as completed in the Groundwater impact assessment report APPENDIX K); – Run reverse osmosis (RO) simulations to ascertain the impact of the higher ionic concentrations in the feed on the % water recovery that can be achieved. Some components associated with scale formation, e.g. Calcium still seems to be within range, but the overall TDS increase impact on recovery needs to be quantified; – Since the treatment plant was designed for modular expansion, some expansions may need to be assessed; and	Section 1.1, Section 9.3.3, Table 32, Table 34, Table 35, Table 36, and Table 40.

Specialist Studies Undertaken	Specialist recommendations that have been included in the EIA Report	Reference to applicable section of report where specialist recommendations have been included
	– Verify revised flow rates from Glencore Goedgevonden and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded.	
Closure Plan and Rehabilitation Assessment	A rehabilitation and closure plan was compiled and based on the outcome of the report the following actions are required during the Construction and Operational phases of the project to improve the overall mine closure plan and costing: ■ Compile a site-wide topsoil balance for all areas of the iMpunzi complex and related mine residue facilities indicating the topsoil volume (and quality) requirements for rehabilitation and closure, topsoil volumes available and their location (in-situ ahead of mining and stockpiled) and the shortfall or surplus; ■ Identify and quantify potential topsoil sources to address any shortfalls; ■ Review and update the site wide closure planning and costing to align with GN R. 1147 in the next 12 months and include the specific cover depth for the dump; ■ Update the proposed land preparation, soil amelioration and hydroseeding rates based on site specific soil sampling and analysis; and ■ Incorporate the Venture Co-disposal Facility and the South Pit Discard Dump into the mine wide closure planning and costing to ensure the alignment of end land use planning and closure objectives.	Section 12.0.

9.3 Assessment of impacts and formulation of mitigation measures

9.3.1 Air Quality

9.3.1.1 Construction / Site Preparation Phase

Dust emissions are expected as part of the footprint preparations for the proposed activities, due to entrainment of dust particles by the movement and operation of the construction equipment, which may also potentially lead to increased greenhouse gas releases. The area has numerous mines that contributes to air quality deterioration and the risk assessment was based on the fact the air is already exposed to polluting sources. The significance of the impact was **Moderate (SP = 40)** and by implementing the following mitigation measures the impact significance can be reduces to **Low (SP = 20)**:

- Apply dust suppression on the haul roads and the cleared footprint areas;
- All equipment and vehicles should be maintenance on a regular basis to prevent huge amounts of carbon dioxide emissions associated with poorly maintained vehicles;
- Attempt to keep the cleared footprint to a minimum as far as possible;
- Investigate and implement alternative abatement measures, like wind net stabilizer or the planting of indigenous trees along the dump footprint to act as a windbreak; and
- Dust fallout monitoring is not a mitigation measure, but it is recommended that the existing dust fallout monitoring location programme (Figure 26) be amended to include the installation of dust collection buckets downwind of the Venture Co-disposal Facility, and the South Pit Discard Dump.

9.3.1.2 Operational Phase

During the operational phase, increased dust emissions can be expected as discard is being transported to the discard facilities and disposed of onto the dumps. The significance of the dust emissions resulting from the transport of the discard and the placement of the discard onto the discard dump is **Moderate (SP = 45)** but can be reduced to a **Low (SP = 24)** by implementing the recommended mitigation measures. The implementation of mitigation measures is therefore recommended to reduce particulate mobilisation as far as practically possible.

The possibility of combustion emissions associated with spontaneous combustion were not quantitatively assessed as no suitable site-specific emission factors for the mine are available. However, spontaneous combustion is possible and were identified as a risk with a significance of **Moderate (SP = 45)** and after implementation of mitigation measures the significance remains **Moderate (SP = 32)**.

The recommended mitigation measures include the following:

- Investigate and implement alternative abatement measures, like wind net stabilizer or the planting of indigenous trees along the dump footprint to act as a windbreak;
- Apply dust suppression on the haul roads and areas as necessary;
- Discard should be compacted as frequently as possible to create anoxic conditions which could reduce the probability of spontaneous combustion;
- If spontaneous combustion commonly occurs on site, trace gas monitoring of the fugitive combustion emissions must be undertaken to determine the impact on the ambient air quality and compliance with the National Ambient Air Quality Standards (NAAQS);
- All areas of spontaneous combustion must be extinguished as soon as possible;
- The drop distance from which the discard is tipped should be minimized where possible;
- Avoiding, as far as possible, the disposal of discard onto the dump during windy conditions to reduce dust generation;
- Dust and fine particulate monitoring should be implemented to monitor compliance with NAAQS; and
- Implement concurrent rehabilitation of the discard dumps to reduce the visual intrusion.

9.3.1.3 Decommissioning and Closure Phase

Dust and fine particulate emissions associated with shaping the final dumps prior to revegetation is anticipated. These impacts are anticipated to be restricted to the site and will cease once the activity ceases. It is anticipated that the significance of the unmitigated impact is **Moderate (SP = 40)** and if the recommended mitigation measures are implemented the significance of the impact is **Low (SP = 25)**.

The process and end objectives of revegetation should aim to return the vegetation cover to its pre-development state or acceptable and sustainable alternative land uses. Particulate emissions and dust will typically return to natural levels once the open or exposed acres have been revegetated.

The recommended mitigation measures include the following:

- Dust suppression should be implemented continuously throughout the rehabilitation phase;
- Where practically possible, concurrent rehabilitation should be implemented;
- Speed limits should be enforced to reduce dust emanating from haul roads;

- The placement of topsoil should be conducted during months with low wind speeds; and
- Vegetation should directly follow topsoil placement, if possible, to decrease the exposure time.

9.3.2 Soils, Land use and Land Capability

9.3.2.1 Construction / Site Preparation Phase

During the construction phase, the main impacts have been identified and relates to soil losses, compaction and deterioration of overall soil quality. The significance of soil losses and compaction during soil stripping is anticipated to have a **Moderate (SP = 36)** impact and if the recommended mitigation measures are implemented the significance can be reduces to **Low (SP = 21)**. During the stockpiling of the removed soil further material losses are anticipated along with deterioration in terms of soil quality. The significance of the unmitigated impact is **Moderate (SP = 44)** and the mitigated impact has a **Low** significance **(SP = 14)**.

The following mitigation measures should be implemented to reduce the significance of the impacts:

- Soil stripping should be conducted during the dry season, when the moisture content is as low as possible, to prevent compaction and hard setting of soil;
- A soil handling procedure should be developed and implemented to reduce overhandling which can compromise the soil health and lead to compaction;
- Appropriate equipment should be used to reduce compaction;
- An effective loading and offloading plan should be developed and implemented to ensure no soil losses as a result of soil spillages;
- Removed soil should be placed at the final location in the rehabilitation profile to reduce re-handling;
- Ensure the soils are stockpiled at flat slopes (smaller or equivalent to the soils natural angle of repose) to prevent erosion and soil losses;
- Prevent compaction of the topsoil stockpile by for example end-tipping and restricting the stockpile height;
- Ensure the stockpiles are situated in a free draining location to prevent water logging; and
- Revegetate the stockpile as soon as possible to prevent further soil losses.

9.3.2.2 Operational Phase

An all-inclusive impact has been identified during the operational phase of the proposed project that relates to inadequate topsoil stockpile management resulting in erosion, contamination, soil nutrient losses and ultimately a material deficit during the rehabilitation phase. Inadequate stockpile management is anticipated to have a **Moderate (SP = 36)** impact if unmitigated and can be reduced to a **Low** significance **(SP = 18)** if the following mitigation measures are implemented:

- The bare patches on the stockpile should be revegetated every growing season;
- Fertilizing and seeding should be done by hand as far as practically possible to prevent compaction;
- No waste material / discard material must be placed next to the stockpile to reduce possibility of contamination; and
- A stockpile management / monitoring / awareness raising programme should be developed and implemented to ensure that soil is only used for its intended use.

9.3.2.3 Decommissioning and Closure Phase

During the replacement of the topsoil on the shaped areas it is anticipated that possible impacts involve soil losses and compaction. The unmitigated significance of the impact is **Moderate (SP = 32)** and if the recommended mitigation measures are implemented the significance of the impact will be **Low (SP = 24)**. The following mitigation measures are recommended:

- Appropriate equipment should be used, and soils should be replaced to the greatest possible thickness in single lifts to prevent compaction;
- Soils should be replaced when they are dry to prevent compaction;
- The replaced soils should be smoothed using dozers rather than graders to prevent compaction and surface crusting; and
- Soils should be ripped to effective root-depth and seeded as soon as possible.

9.3.3 Groundwater

A groundwater impact assessment was conducted for the establishment of the South Pit Discard Dump, expansion of the existing Venture coarse discard dump footprint and modification thereof to a Co-disposal Facility to accommodate both coarse and fine (slurry) discard (Golder Associates Africa (Pty) Ltd (h), August 2020). The key outcomes of the assessment are summarised below. For details, refer to APPENDIX L.

Seepage from the fine (slurry) and coarse discard is considered to have a high magnitude because of the acid-generating nature of the discard and the elevated concentrations of calcium, aluminium and sulphate in the leachate. The impact is regional due to close proximity to rivers and is long-term due to the normal duration of acid-generation of Highveld coal discards (although kinetic testing of iMpunzi discard could determine the likely duration more accurately). This results in a high significance without mitigation.

The groundwater modelling shows that prevention of decant results in reduction in baseflow to Steenkoolspruit and Saaiwaterspruit, a decrease in water quantity during Operations and post-closure phases, with a low magnitude, local impact, whose significance is moderate without mitigation. Mitigation of the impact on groundwater is through decreasing the recharge using a cover and abstracting dirty water from the pit to prevent decant. This decreases the magnitude to minor and the scale to site only, resulting in a moderate significance with mitigation.

Cover design – seepage modelling

Conceptual level seepage modelling of a 300 mm thick soil cover for both iMpunzi Venture Co-disposal Facility and South Pit Discard Dump was performed using the one-dimensional soil atmospheric modelling software HYDRUS-1D (Golder Associates Africa (Pty) Ltd (h), August 2020) (see APPENDIX L). The soil cover aims to limit erosion and seepage into the discard facilities and therefore reducing the mass loads to the water treatment facility.

The objective was to evaluate whether a 300 mm soil cover on each of the two discard facilities would reduce seepage. It is assumed that available soils will be used for cover material. Silty clay was not dominant, but present in smaller portions of the surveyed area: around 24 ha was identified in the soil survey. The dominant soil was loamy sand, but this did not yield favourable results to limiting ingress of water (Golder Associates (Pty) Ltd (e), August 2020). The available volume of silty clay topsoil allows for a soil cover thickness of 300 mm for both facilities. For the conceptual level assessment, default silty clay properties in HYDRUS-1D were used. The saturated hydraulic conductivity for normal density (1.3 g/cm^3) silty clay (3.624 cm/day) was applied. Sand texture material properties were used to represent the discard material. Figure 39 presents the simulated average net Infiltration for a 300 mm soil cover made of silty clay at normal density (1.3 g/cm^3). The average

simulated net infiltration is 2.32 cm/yr, which equates to 3.3 % of the Mean Annual Precipitation (Golder Associates Africa (Pty) Ltd (h), August 2020).

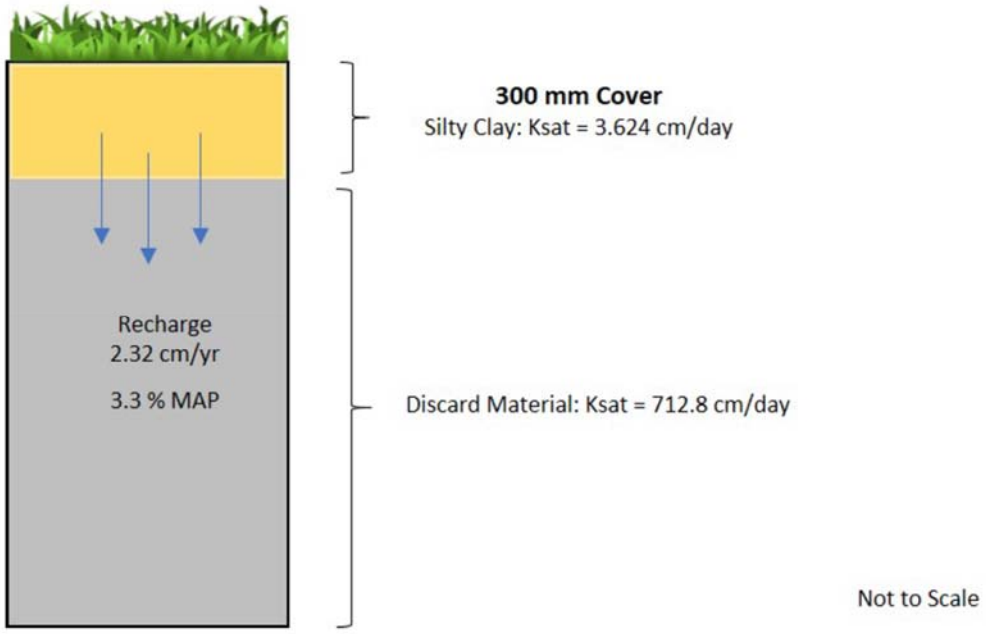


Figure 39: Simulated Conceptual Cover

As this was a desktop assessment, site specific parameters were not used in the model simulations. Site specific data is integral in assessing the recharge assessment through cover material. To progress from conceptual to pre-feasibility (that is from a 30% confidence level to a 60% confidence level), the use of site specific properties such as soil water characteristic curve, in-situ hydraulic conductivity testing, and particle size distribution for the cover borrow material on site as well as the backfill material is recommended. It is important to note that the simulated performance of the store and release vegetated cover is premised on optimal performance of the vegetation cover, which requires that the soil substrate be suitable for deep rooting and that the soils are fertile and uncompacted so that vigorous plant growth will maximise the leaf area for evapotranspiration.

A soil cover consisting of a 300 mm silty clay cover with established grassland vegetation over the discard facilities is required in order to reduce infiltration thereby decreasing mass loads to the groundwater system (by 80 - 90%) and reducing the environmental impact. It should be noted that the purpose of the 300 mm thick soil cover is for managing infiltration for pollution control and water use efficiency. Additional soil might be required for a growth medium, depending upon the final land use (e.g. grass vs shrubs). The final cover thickness would need to be confirmed as part of design. The performance of the store and release vegetated cover is premised on optimal performance of the vegetation cover which requires that the soil substrate be suitable for deep rooting and that the soils are fertile and uncompacted so that vigorous plant growth will maximise the leaf area for evapotranspiration. The reduction in infiltration is also required in order to decrease the volume of dirty water – by reducing infiltration into the waste mass, the cover decreases the volume of dirty water generated from rainfall, which is thus a gain in terms of water use efficiency.

Prevention of decant

Abstraction boreholes in Venture and ATCOM South Pits would need to be installed during mining operations to keep water levels within pit level and therefore preventing decant during operations and post-closure. This will:

- Reduce the environmental impact of mine affected water and protect future uses of water resources in the area by preventing decant to surface water systems during the polluting period of the source; and
- Address water use efficiency requirements as the mine-affected water is abstracted for treatment and reuse, rather than leaving it as wasted dirty water.

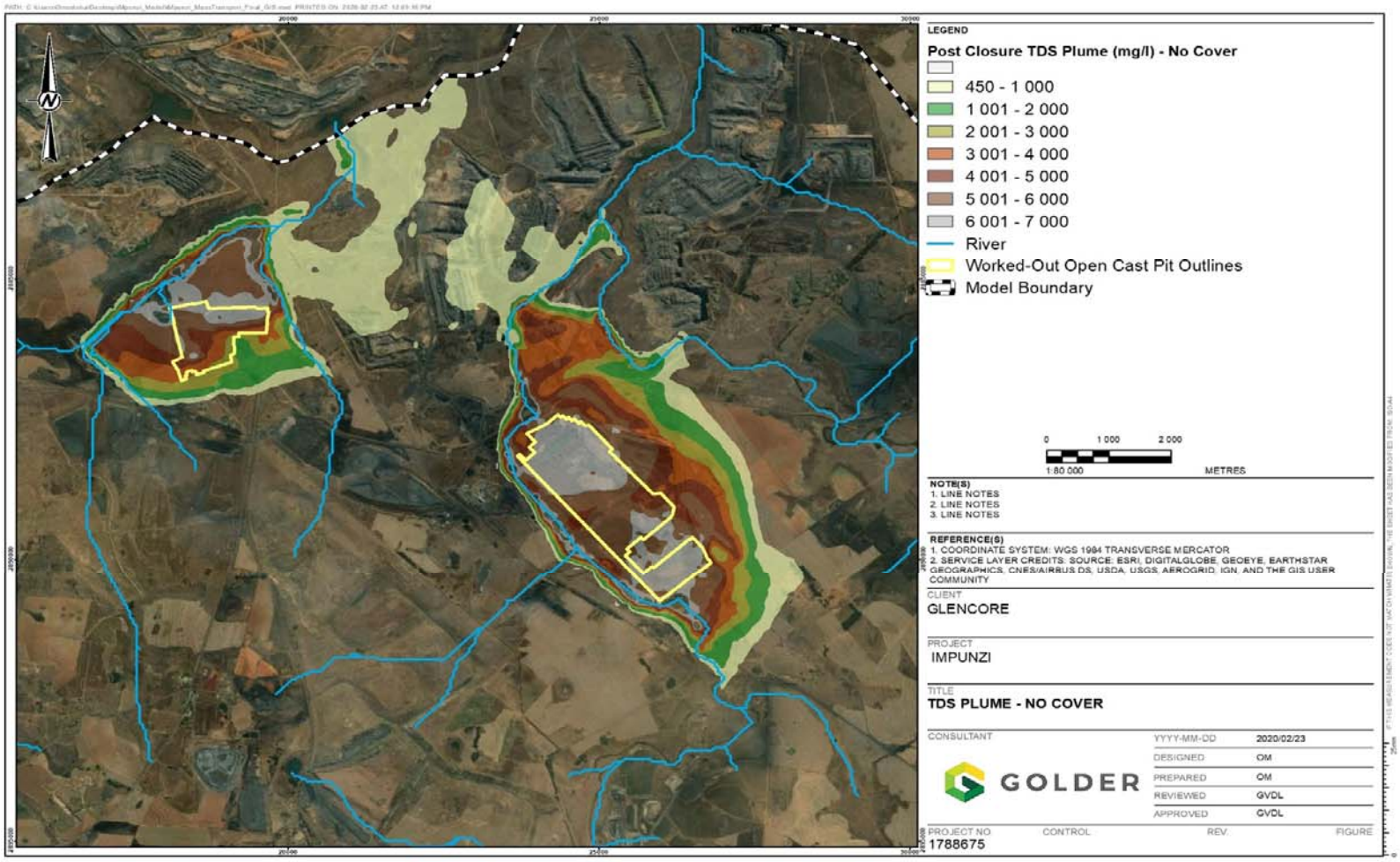


Figure 40: Post Closure Simulated TDS Plume - No Cover

The post closure cover scenarios, it is assumed that the Venture pit and ATCOM South Pit would be rehabilitated and therefore a recharge of 8% MAP is applied to these pits. The Cover recharge rates are provided in Table 29. The cover recharge of 1.34% MAP was taken from a seepage modelling study conducted at BEATH dump by Golder (2019). The soil cover consisted of a 75 cm Bainsvlei and Clovelly soils with established grassland vegetation were assumed for Venture Co-disposal Facility and South Pit coarse discard facility as well as the properties of coarse discard modelled at BEATH Dump (Golder Associates Africa (Pty) Ltd (h), August 2020)

Table 29: Post closure source terms - Cover Scenario

Site	MAP Recharge % No Cover	TDS Concentration (mg/l)	Mass Flux ($g/m^2/d$)
Venture O/C Pit AC4	8%	2 973 – 4074*	0.46
Venture Coarse Discard	1.34%	6 382	0.16
Venture Fine Discard	1.34%	7 154	0.18
ATCOM South O/C Pit AM6	8%	4 869 – 6671*	0.75
ATCOM South Coarse Discard Facility	1.34%	6 382	0.16
Paddocks Coarse Discard	1.34%	6 382	0.16
Paddocks Fine Discard	1.34%	7 154	0.18

** Range due to uncertainty in sulphur content – will be resolved prior to issuing of next draft*

Figure 41 present the simulated TDS plume for post closure cover scenario. The TDS contaminant plume is shown with a threshold value of 450 mg/L. There is a smaller footprint of high concentration TDS plume outside the pit boundaries compared to the no cover scenario. TDS concentrations at decant locations are of a lower concentration compared to the no cover scenario.

Receptors in this instance are identified as Saaiwaterspruit, Steenkoolspruit and Diversion around South Pit. On a cumulative basis 64 028 T(Tonne) of TDS will be released over the period 2037-2087 for no cover and 6 867 T for cover scenarios resulting in a reduction of 57 161 T of TDS to the groundwater at Venture Co-disposal Facility and pit. Similarly, on a cumulative basis some 341 449 T of TDS will be released over the same period at ATCOM South Coarse discard facility and pit for the no cover scenario and 23 668 T for the cover scenario resulting in a reduction of 317 782 T cumulative TDS mass load. These large tonnages reflect the constant source, applied due the absence of kinetics.

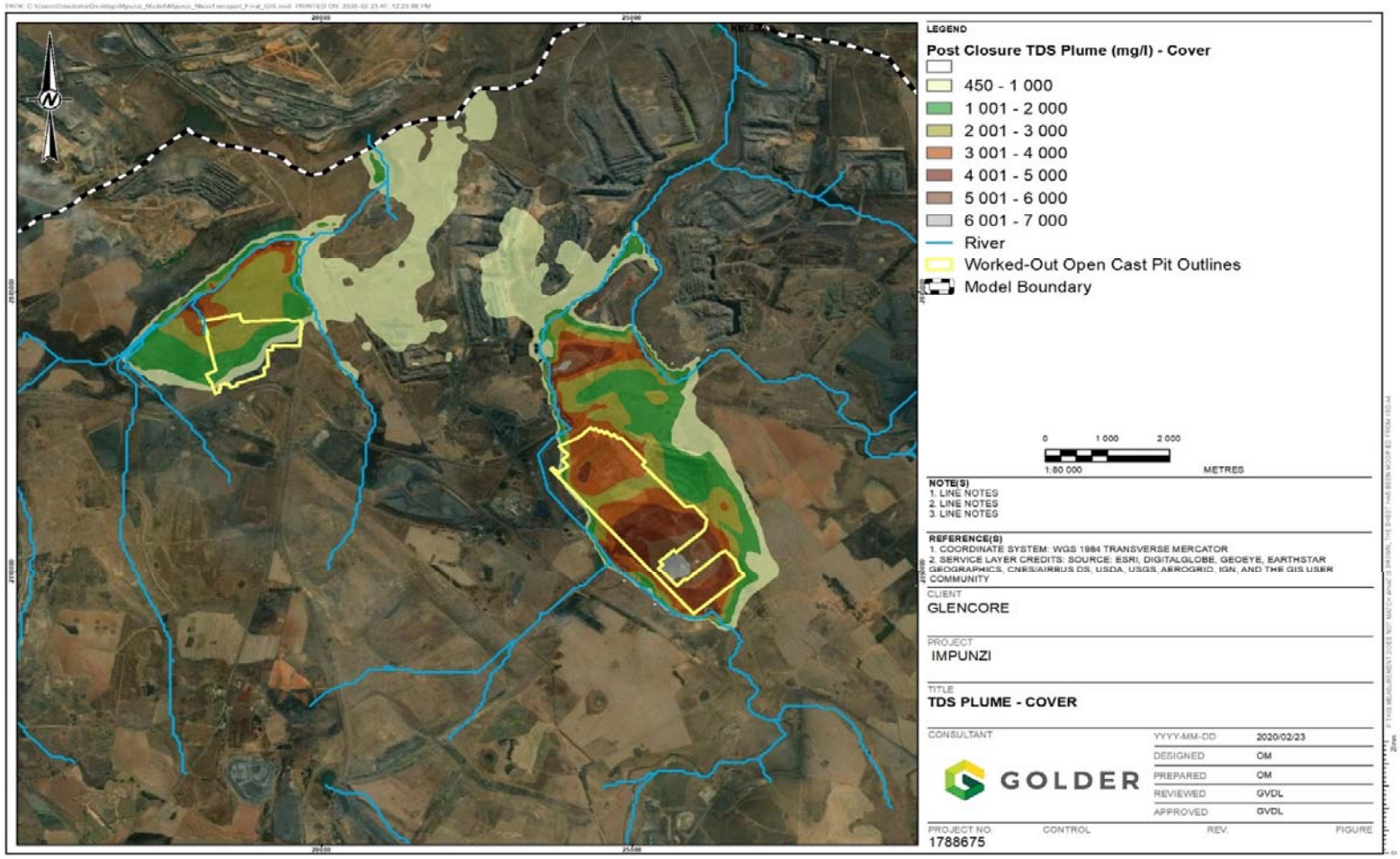


Figure 41: Post Closure Simulated TDS Plume – with Cover applied

A soil cover consisting of a min. 300 mm silty clay cover with established grassland vegetation over the discard facilities is required in order to reduce infiltration thereby decreasing mass loads to the groundwater system (by 80 - 90%) and reducing the environmental impact. It should be noted that the purpose of the 300 mm thick soil cover is for managing infiltration for pollution control and water use efficiency. Additional soil might be required for a growth medium, depending upon the final land use (e.g. grass vs shrubs). The final cover thickness would need to be confirmed as part of design (Golder Associates Africa (Pty) Ltd (h), August 2020).

The performance of the store and release vegetated cover is premised on optimal performance of the vegetation cover which requires that the soil substrate be suitable for deep rooting and that the soils are fertile and uncompacted so that vigorous plant growth will maximise the leaf area for evapotranspiration. The reduction in infiltration is also required in order to decrease the volume of dirty water – by reducing infiltration into the waste mass, the cover decreases the volume of dirty water generated from rainfall, which is thus a gain in terms of water use efficiency (Golder Associates Africa (Pty) Ltd (h), August 2020).

9.3.3.1 Impact Assessment

9.3.3.1.1 Construction / Site Preparation Phase

During the construction phase a single impact was identified that could impact on the groundwater, namely chemical leaks and spills from the construction vehicles. The significance of the identified impact is **Low (SP = 8)** and by regular maintenance of the vehicles and the implementation of drip trays the impact can be reduced further to an **SP = 4**.

9.3.3.1.2 Operational Phase

Discard and chemical / oil spills can have a **Low** impact **(SP = 8)** in terms of groundwater quality and if mitigation measures are implemented it can be further reduced to **SP = 4**.

Seepage of the water emanating from the fine discard has a **High (SP = 80)** significance in terms of groundwater quality and quantity and if effectively mitigated the significance of the impact can reduce to **Moderate (SP = 40)**.

The impact resulting from the seepage from the coarse discard is anticipated to have a **High (SP = 80)** significance, which can be reduced to **Moderate (SP = 40)** with the implementation of the following recommended mitigation measures:

- Developing and implementing a standard operating procedure to correctly load vehicles to prevent overloading and associated spillages;
- Regular maintenance of vehicles and the usage of drip trays;
- Implement a min. 300mm cover on the discard dumps to decrease recharge into the groundwater resource;
- Continuous abstraction of contaminated pit water to prevent decant;
- Existing groundwater level monitoring network for the study area should continue to be utilised;
- Boreholes downgradient of backfilled or rehabilitated pits should be monitored for rising water levels, and potential decant of these pits;
- Groundwater levels should continue to be monitored monthly. Should it be identified that groundwater dependent/private users within the vicinity are impacted, it may be necessary to conduct a water supply options analysis and develop a supply strategy to meet the deficits;
- Kinetic testing of the discard dumps and fine discard material to predict post closure groundwater quality;

- Instillation of interceptor boreholes downgradient of facilities to capture the contaminant plume from reaching river channels (Steenkoolspruit);
- Actual boreholes yields would need to be verified and confirmed on site upon construction of the proposed abstraction boreholes;
- The discard should be compacted sufficiently directly after placement to avoid oxygen ingress and consequently spontaneous combustion;
- The side slopes of the advancing face of the dump were therefore designed to a slope of 1V:3H. Discard should not be steeper than a slope of 1V:3H during any stage of discard placement to allow for safe access of construction and compaction vehicles;
- All areas of spontaneous combustion must be extinguished as soon as possible; The drop distance from which the discard is tipped should be minimized where possible;
- Avoiding, as far as possible, the disposal of discard onto the dump during windy conditions to reduce dust generation; and
- Implement concurrent rehabilitation as far as practically possible.

Assessments relating to the existing Tweefontein WTP (design):

- Develop a predicted 95th percentile concentration scenario, to indicate potential variability in feed concentrations to even higher levels than currently indicated in the average scenarios (as completed in the Groundwater impact assessment report APPENDIX K);
- Run RO simulations to ascertain the impact of the higher ionic concentrations in the feed on the % water recovery that can be achieved. Some components associated with scale formation, e.g. Calcium still seems to be within range, but the overall TDS increase impact on recovery needs to be quantified;
- Since the treatment plant was designed for modular expansion, some expansions may need to be assessed; and
- Verify revised flow rates from Glencore Goedgevonden and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded.

9.3.3.1.3 Decommissioning and Closure Phase

Seepage from the coarse discard and dried fine discard at the South Pit Discard Dump and the Venture Co-disposal Facility is anticipated to have and environmental impact on the groundwater with a **High (SP = 80)** significance and with the implementation of mitigation measures it can be reduced to a significance of **Moderate (SP = 40)**.

The reduction in baseflow to the Steenkoolspruit and the Saaiwaterspruit is another anticipated impact associated with the abstraction of water from the pits not only during the operational phase but during the closure phase and the risk significance is estimated to be **Moderate (SP = 33)** and with mitigation measures it reduces to **Low (SP = 27)**.

The following mitigation measures are recommended:

- Implement a min. 300mm cover on the discard dumps to decrease recharge into the groundwater resource;

- Actual boreholes yields would need to be verified and confirmed on site upon construction of the proposed abstraction boreholes; and
- Continuously abstract contaminated pit water to prevent decant, in line with the minimum required as to not result in decreased baseflow.

9.3.4 Surface water

Surface water impact assessment was conducted for the proposed project (Golder Asssociates Africa (Pty) Ltd (q), August 2020).The key outcomes of the assessment is summarised below. For details, refer to APPENDIX L.

Water Balance

The mine has a site-wide water balance which is updated weekly. For this assessment, a daily timestep dynamic water balance was set up in order to assess the capacity of the return water dam required for the Venture Co-disposal Facility. The existing pollution control dam (PCD) capacity is not adequate to receive the total runoff and slurry return water from the Venture Co-disposal Facility without spilling more than once in a 50-year period. In addition to this, the new proposed expanded footprint, encroaches on the existing PCD. For this reason, it is envisaged that the existing PCD will not form part of the storm water management of the newly proposed Venture Co-disposal Facility.

Based on the hydrological inputs from the storm water runoff model constructed in PCSWWM, the geometrical inputs from the conceptual Venture Co-disposal Facility and the assumptions and calculations made on the slurry pool operation, a daily time step simulation model was set up to determine the required size of the new RWD. A stochastic rainfall generator was coded and calibrated within the simulation model, based on the Ogies historical dataset. This allows the model to generate random sequences of rainfall with similar statistical characteristics as the original data (Boughton, 1999). The monthly mean evaporation measured at the Witbank evaporation station (B1E001) was used in this model. The selection was based on the station being close to the site (approximately 24 km away) with a reasonably long and reliable data set (1963-2008) (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

A number of simulations were carried out by Golder, with various RWD capacities and abstraction rates in order to determine the capacity required to ensure that the RWD will not spill more than once in a 50 year period. A 1,000 different realizations were run and various RWD sizes were tested until a spillage frequency of 1 in 50 years was obtained. A new RWD size of 56 000 m^3 was found to be adequate (Golder Asssociates Africa (Pty) Ltd (q), August 2020).

9.3.4.1 Impact Assessment

9.3.4.1.1 Construction / Site Preparation Phase

During the construction phase it is anticipated that the site preparation associated with the construction phase will lead to increased sediment loads reporting to the surface water resources. The identified impact has a **Low (SP = 24)** significance if not mitigated and if the recommended mitigation measures are implemented it can be reduced to very **Low (SP = 16)**. The recommended mitigation measures for the construction phase are as follows:

- Design and implement drainage control berms to limit erosion and sedimentation; and
- The construction activity should be maintained as small a footprint as possible.

9.3.4.1.2 Operational Phase

Numerous impacts have been identified during the operational phase of the proposed project. The unmitigated impacts with **Low (SP = 24)** significance include, increased sedimentation and potential contaminated runoff

reporting to the receiving environment, as well as potential discharge from the dirty water sump into the receiving environment **(SP = 24)**. If the recommended mitigation measures are implemented it can be reduced further to **SP = 16** and **SP = 20**, respectively. Impacts with **Moderate** significance was also identified and relates to; hydrocarbon spills during the transportation of the discard **(SP = 30)**, inadequate clean and dirty water separation **(SP = 39)** and increased seepage and higher decant volumes that could lead to the contamination of the surface water resources **(SP = 56)**. As the pipeline will be carrying mine affected water, a breakage or leak in the pipe could potentially lead contamination of the environment. While the probability of this happening is low the magnitude could be very high if this does occur. It is therefore important to have some mitigation in place.

If the following mitigation measures are implemented the significance of the impacts can be reduced to **Low (SP = 24)**:

- Protect spoils area from erosion by utilising applicable erosion procedures;
- Ensure adequate compaction of discard material and concurrent rehabilitation as far as practically possible;
- Clean up spillages immediately and dispose of contaminated materials at permitted waste sites;
- Ensure regular maintenance of the diversion channels. Channels that have been eroded during storms should be maintained, including excavation of sediments, reinstatement of channels, removal of washed down vegetation and litter;
- Provide erosion protection for the clean water conveyance trench;
- Erosion protection in the form of scour aprons with energy dissipation must be implemented at the discharge points of each channel and scour aprons with stilling basins are required at the outlet of pipe chutes;
- Disturbed areas should be revegetated as quickly as possible to limit erosion and sedimentation in downstream water resources;
- Implement the required min. 300mm cover design option to ensure optimal recharge rates;
- Ensure adequate overburden and topsoil material as required to meet the optimal capping make-up to limit seepage to groundwater resources;
- Comply to the rehabilitation and closure plan;
- Utilising applicable erosion procedures;
- Ensure adequate compaction of discard material and ensure that concurrent rehabilitation takes place;
- Design storm water management facilities for the discard facility is to comply with regulation GN 704 so that clean water is diverted away from the mining operations to the water resources;
- Revegetate placed cover material as quickly as possible;
- Manage the use of earth moving machinery in accordance with the mine's standard operating procedures;
- Develop the discard facilities in accordance with the design slopes;

- Implement corrective measures identified in ongoing rehabilitation performance monitoring and assessment;
- Inspect the pipeline monthly to assess any weaknesses, and
- Ensure that the pipeline is not accessible to vandals.

9.3.4.1.3 Decommissioning and Closure Phase

Decant of AMD reporting to the surface resources has been identified as an impact with a **High (SP = 85)** unmitigated significance and can be reduces to **Low (SP = 24)** if the recommended mitigation measures are implemented. Increased erosion and the mobilisation of sediments has a **Moderate (SP = 56)** significance if unmitigated and a mitigated significance of **Low (SP = 24)**. The imprecise predicted quantification of the post closure decant volumes can lead to ineffective water treatment which has an unmitigated significance of **SP = 42 (Moderate)** and a mitigated significance of **SP = 24 (Low)**. Inadequate storm water control measures during decommissioning can result in the restriction of runoff emanating from clean areas to report to the receiving environment and can be reduced from **Moderate (SP = 60)** to **Low (SP = 24)** if the recommended mitigation measures are implemented. Inadequate financial provision for long term water treatment and has a **Moderate** significance **(SP = 60)** and the uncertainty of the treatment method prior to regulatory approval has a **High (SP = 85)** significance and can be reduced to **Low (SP = 24)** and **(SP = 20)**, respectively if the following mitigation measures are implemented:

- Ensure adequate overburden and topsoil material as required to meet the optimal capping make-up to limit seepage to groundwater resources;
- Comply to the rehabilitation and closure plan;
- Implementation of water management options to pump and treat water to the required specifications to achieve desired discharge water qualities as per the recommendation made in Section 9.3.3;
- Finalise the integrated water balance for entire iMpunzi MRA to determine excess water required to be managed;
- Continue with level measurements and metering in order to improve calibration of models;
- Monitor the performance of the treatment plant on an ongoing basis. Maintenance activities to be scheduled during dry seasons;
- Conduct ongoing rehabilitation performance monitoring and assessment;
- Implement the optimal cover design option and depth to ensure lower recharge rates are achieved;
- Ensure that the storm water controls are in compliance with GN704 or the necessary GN- 704 exemption has been applied for, and that clean water is separated enabling runoff into catchment;
- A monitoring programme should be implemented to regular monitor water quality or more frequently during the rainy season to get an understanding of the potential contaminants of concern and adequacy of control measures; and
- The required treatment for the quality and quantity of water should be clearly investigated. Adequate provisions of funding must be set aside to ensure the correct treatment option is implemented.

9.3.5 Terrestrial Ecology

As discussed in section 6.4 above, the footprints associated with the proposed discard facilities, RWD and haul road extension are already disturbed, and hence are considered brownfields sites. No ecological impact

assessment studies were undertaken for the footprints of the proposed discard facilities and new RWD. However, Golder completed an ecological screening study for the proposed haul road expansion activities in March 2020 (Golder Associates Africa (Pty) Ltd (f), August 2020). The key outcomes of the assessment are summarised below. For details, refer to APPENDIX L.

As detailed in section 2.5.3.3, the existing haul road will be expanded in order to enable the transportation of discard from the ATCOM discard dumps to the ATC plant, using haul trucks. The proposed road expansion crosses a wetland and will involve clearance of vegetation and as a result.

The site of the proposed road expansion is located in a highly fragmented and modified landscape, dominated by various mine infrastructure. The vegetation of the study area consists of secondary grassland characterised by hardy grass species typically used in mine rehabilitation, and various alien invasive plant species. It was expected that most undeveloped areas would comprise disturbed, secondary habitat. In this context, the terrestrial ecology fieldwork focused on ground-truthing the ecological setting of the road expansion footprint to determine the general character and composition of potentially affected vegetation communities occurring along the proposed road expansion, and identifying any species or sites/habitats of ecological importance or sensitivity (Golder Associates Africa (Pty) Ltd (f), August 2020).

Previous mining and rehabilitation activities have caused significant habitat disturbance and fragmentation of the landscape surrounding the proposed road expansion route. Thus, it is expected that the faunal abundance and diversity in the area is low. 30 species (Mammals, Birds and Herpetofauna) of concern are considered likely to occur within the study area.

An unchanneled valley bottom wetland system with adjacent hillslope seepages occurs within the study area. This wetland's health (present ecological status – PES), ecological importance and sensitivity (EIS) and functionality (ecosystem services provision – WET Ecoservices) was assessed. Both the unchanneled valley bottom and the hillslope seepage wetland have an overall PES category of E which means that the wetland is seriously modified. While the overall EIS for both systems is of low/marginal category meaning the wetland is not ecologically important or sensitive on a local scale. The main ecological services rendered by both wetlands include erosion control, sediment trapping, phosphate trapping, nitrate removal and toxicant removal (Golder Associates Africa (Pty) Ltd (f), August 2020).

The proposed road expansion will not have any significant residual impact on the current environmental setting, provided that the recommended mitigation measures below are implemented during construction, operation and decommissioning of the associated activities.

9.3.5.1 Impact Assessment

Table 30 below details the impacts of the proposed haul road expansion and the recommended mitigation measures to be implemented during all the respective phases of the project.

Table 30: Ecological Impacts and mitigation measures linked to the proposed haul road expansion

Impacts	Phase	Mitigation Measures
Loss and disturbance of rehabilitated/secondary grassland: Disturbance of vegetation may also result in other/secondary impacts, such as soil erosion and the establishment of alien invasive plants.	Construction	**Minimisation** • As far as practical, vehicle access tracks and lay-down areas should be located in already disturbed areas. Where this is not possible, the disturbance footprints should also be kept to a minimum; • The approved area for construction should be demarcated to prevent construction vehicles entering areas of the wetland that will not be affected by the proposed road expansion, enabling construction contractors to avoid these areas;

Impacts	Phase	Mitigation Measures
		• Construction activities should be undertaken during the dry season insofar as possible; and • An Environmental Control Officer (ECO) should oversee the vegetation clearing process. **Rehabilitation** • Any areas cleared of vegetation during construction should be stabilised and revegetated using indigenous grass species
<u>Alien invasive species establishment:</u> Alien invasive plant species are abundant and widespread in the area. Additional disturbances to natural vegetation during construction are likely to facilitate the colonisation and spread of alien invasive plant species. Alien invasive species may continue to colonise the areas disturbed by haul road construction activities during the operational phase. Alien invasive species may establish due to the introduction of foreign material such as soils and vegetation for rehabilitation purposes.	Construction Operation Decommissioning	**Minimisation** • Actively control all alien invasive species (AIS) that colonise areas that have been disturbed during the construction phase. **Control** • Annual treatments along the entire length of the road and all sites disturbed during construction (e.g. vehicle access tracks and lay-down areas); • A combined approach using both chemical and mechanical control methods; • Periodic follow-up treatments, with a regularity informed by annual monitoring. • AIS control should continue through all phases of the proposed project until such a time as monitoring indicates AIS are no longer actively establishing; and • Periodic follow-up treatments, informed by the findings of regular monitoring should be conducted for at least the first three years following decommissioning, or until such a time as monitoring indicates AIS are no longer actively establishing.
<u>Interruption of wetland hydrology:</u> Soil disturbance and vegetation removal during construction could lead to breaches in subsurface soil profiles, altering the subsurface flows, potentially leading to flow concentration and subsequent erosion. Hardened surfaces associated with the compaction of soil will result in surface runoff and decreased infiltration into soils. This could result in decreased interflow recharge and decreased flow into the wetlands, while increased surface runoff could result in erosion of the adjacent wetlands.	Construction Operation	**Minimisation** • Vegetation clearing should be restricted to the footprint area to be disturbed by the road expansion; • The approved area for construction should be demarcated to prevent construction vehicles entering areas of the wetland that will not be affected by the proposed road expansion, enabling construction contractors to avoid these areas; • Driving within the wetland areas should be kept to an absolute minimum. Clearly defined access routes should be used only; • A construction method statement should be developed for road construction across the wetland prior to construction, and provided to the contractor for implementation on site, overseen by the Environmental Control Officer (ECO); and • Appropriately engineered designs for the wetland crossing must be implemented to ensure that diffused flow regime is maintained upstream and downstream of the road crossing, and no impoundment upstream or erosion downstream of the road occurs.
<u>Deterioration in wetland water quality</u>: During the construction phase, the water quality in the wetland may deteriorate as a consequence of vegetation removal and increased risk of	Construction Operation	**Minimisation** • Appropriate erosion protection and sediment control measures should be implemented during both construction and operation to prevent discharge of sediments to the valley bottom wetland;

Impacts	Phase	Mitigation Measures
eroded soils and sediments being transported after rainfall events. Contaminants from machinery and materials (e.g. transported discards) could enter the wetland and contribute to water quality changes during construction and operation.		• Any waste from the construction process should be removed from the construction site; • Keep sufficient quantities of spill clean-up materials on site and/or on the construction vehicles to manage any incidental spills; and • Maintenance of construction vehicles is to be undertaken offsite and all vehicles used on site are to be in good working order without leakage of any oils, greases etc.

9.3.6 Wetland ecology

Wetland Consulting Services (Pty) Ltd, undertook the specialist wetland assessment study required for the proposed establishment of the South Pit Discard Dump and the expansion of the Venture Dump into a Co-disposal Facility in August 2019 ((Wetland Consulting Services (Pty) Ltd, August 2020). The key outcomes of the assessment are summarised below. For details, refer to APPENDIX L.

It is proposed that the existing Venture Dump be extended in a west and northerly direction (Figure 42). The proposed extension will not directly affected any natural wetland systems as the entire extension footprint falls on rehabilitated mine land. The extension will however extend across a number of small artificial wetland areas, termed “rehab wet area” that have formed on the rehabilitated mining land due to accumulation of surface water in shallow depressions and low-lying areas (Wetland Consulting Services (Pty) Ltd, August 2020). The existing Venture Dump, including the extension, will form part of a dirty water area excluded and isolated from the surrounding catchment.

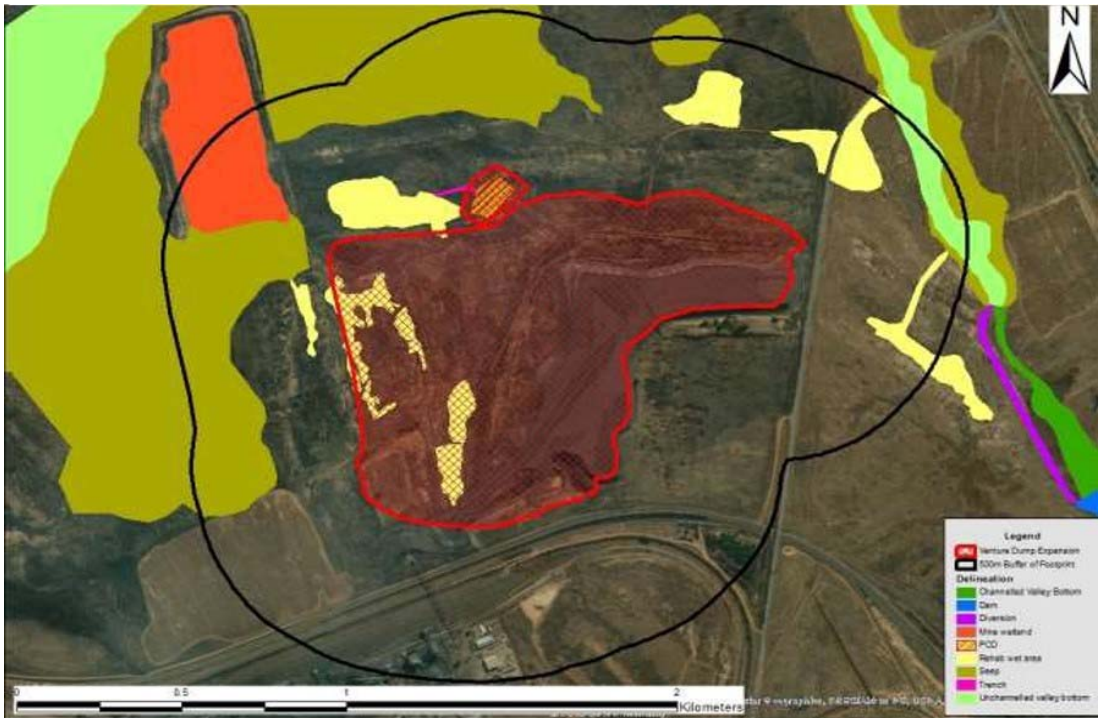


Figure 42: Proposed Venture Co-disposal Facility extension in relation to delineated wetland habitat (Wetland Consulting Services (Pty) Ltd, August 2020)

The proposed South Pit Discard Dump will entail the establishment of a new discard dump within the footprint of the South Pit opencast mining areas (Figure 10). As for the Venture Co-disposal Facility, the establishment of the South Pit Discard Dump will not directly affect any natural wetland systems as the entire extension footprint falls on previously opencast mined land. The South Pit Discard Dump footprint will form part of a dirty water area excluded and isolated from the surrounding catchment (Wetland Consulting Services (Pty) Ltd, August 2020).

9.3.6.1 Impact Assessment

Although the Venture Co-disposal Facility and South Pit Discard Dump are two separate activities, the impacts to wetlands associated with the two proposed dumps are considered to be largely similar:

- No direct impacts to any natural wetlands from either dump;
- Both dumps are located on previously opencast mined land;
- Design and operation of the two dumps is understood to be largely the same; and
- Impacts to adjacent wetlands are likely to result only from indirect impacts (i.e. seepage from the dumps, runoff from the construction footprint etc).

For this reason only a single impact assessment was undertaken. Where difference between the two dumps and associated impacts are likely, such differences are however highlighted (Wetland Consulting Services (Pty) Ltd, August 2020).

9.3.6.1.1 Construction / Site Preparation Phase

The construction and site preparation phase of the proposed Venture Co-disposal Facility footprint extension and the expansion of the haul road can lead to loss and disturbance of artificial wetland habitat, which formed as a result of rehabilitation in wet areas. By implementing the mitigation measures the significance of the impact can be reduced from **SP = 55 (Moderate)** to **SP = 40 (Moderate)**. During the construction phase increased turbidity and deterioration in terms of quality of the wetlands adjacent to the Venture Co-disposal Facility extension can be expected. Increased sedimentation due to sediment rich runoff from the construction / preparation site to the adjacent wetlands as a result of site clearance, will have result in a **Moderate (SP = 44)** environmental impact and if adequately managed the impact can be reduced to **Low (SP = 24)**.

The following mitigation measures should be implemented during the construction phase to reduce the significance of the identified impacts:

- All construction areas should be fenced off/clearly demarcated prior to commencement of vegetation clearing activities;
- All wetland areas should be clearly demarcated;
- All construction staff should be educated on the importance and sensitivity of the wetland systems on site;
- Develop and implement a construction storm water management plan prior to the commencement of site clearing activities; with the aim to minimise the transport of sediment off site;
- Install sediment traps and sediment barriers where necessary;
- Protect storm water discharge points against erosion and incorporate energy dissipaters;
- Ensure that abstracted mine affected water is treated to a standard suitable for discharge to the environment;

- Any changes in the biotic integrity of the Steenkoolspruit should be investigated following the implementation of this proposed project;
- Erosion within the construction site must be minimised through the following:
  - Limit the area of disturbance and vegetation clearing to as small an area as possible;
  - Where possible, undertake construction during the dry season;
  - Phase vegetation clearance activities and limit the exposure time of bare soil;
  - Control of storm water flowing into and through the site. Where required, storm water from upslope should be diverted around the construction site;
  - Revegetate soils, as soon as possible, after disturbance and construction activities; and
  - Slopes should be protected and stabilised using geotextiles or any other suitable product designed for the purpose.
- Sediment transport off the site must be minimised through the following:
  - Establishment of perimeter sediment controls that can be achieved through the installation of sediment fences along downslope verges of the borrow pit site where surface flows leave the site. Where channelled or concentrated flow occurs, reinforced sediment fences or other sediment barriers such as sediment basins can be used;
  - Discharge of storm water from the construction site into adjacent grassland. Discharged flows must be slow and diffused; and
  - Regular inspection and maintenance of sediment controls.
- Ensure that no equipment is washed in the streams and wetlands and washing bays should be placed no closer than 500 m from a wetland or watercourse. No abstraction of water from the wetlands or pans should be allowed unless authorised by a WUL;
- To reduce the potential impacts associated with the introduction of contaminants dissolved or suspended in the runoff from construction sites, where practically possible, no runoff should be introduced into wetlands directly. Introduction into dryland areas is preferred as the vegetation and soils provide an opportunity to limit the movement of contaminants and the environment is conducive for natural degradation;
- Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks. Sufficient spill clean-up material must be kept on site at all times to deal with minor spills. Larger spills should be reported to the Environmental Manager and/or Environmental Control Officer (ECO), coordinator and the relevant authorities (DWS) immediately, with specialists appointed to oversee the clean-up operations.
- Deterioration in wetland water quality as a result of the haul road expansion:
  - Appropriate erosion protection and sediment control measures should be implemented during both construction and operation to prevent discharge of sediments to the valley bottom wetland;
  - Any waste from the construction process should be removed from the construction site;
  - Keep sufficient quantities of spill clean-up materials on site and/or on the construction vehicles to manage any incidental spills; and

- Maintenance of construction vehicles is to be undertaken offsite and all vehicles used on site are to be in good working order without leakage of any oils, greases etc.

9.3.6.1.2 Operational Phase

Key focus should be on mitigating the impact of water quality deterioration which was identified as the impact of highest significance from a wetland perspective. Decreased flows within adjacent wetlands due to catchment exclusion as a consequence of the storm water management infrastructure associated with the dumps has been identified as an impact with a **Moderate (SP = 45)** significance. Water quality deterioration as a result of seepage form the dumps is a **High (SP = 80)** environmental impact and can be reduced to **Moderate (SP = 52)** if the mitigation measures outlined underneath are implemented.

It is expected that seepage from the discard facilities will enter the underlying rehabilitated opencast pits and if the pits are allowed to fill with water and decant, the acidic seepage will enter the Tweefonteinspruit (Venture Co-disposal Facility) or Steenkoolspruit (South Pit Discard Dump), resulting in significant risk to the receiving wetlands.

All the impacts associated with the operational phase can be mitigated by means of the following measures:

- Development and implementation of a mine water management strategy for effective clean and dirty water separation. This strategy must include allowance for the treatment of contaminated water;
- Implementation and maintenance of dirty water infrastructure surrounding the facilities, which also include regular inspections of all water management infrastructures;
- Minimising the extent of dirty water areas as far as practically possible;
- Ensure all clean water is diverted around dirty water areas and allowed to re-enter the environment;
- Construction of clean water diversion canals as vegetated swales rather than cement lined canals wherever possible;
- Implement dust suppression within areas where carbonaceous dust may be generated and areas of heavy vehicle traffic;
- Implementation of a water quality and biomonitoring strategy; and
- Develop and implementing an emergency response procedure for clean-up of any major spillages.

9.3.6.1.3 Decommissioning and Closure Phase

The sediment movement into wetlands, emanating from the rehabilitation practices which involves cover establishment on the side slopes, has a **Moderate (SP = 44)** significance and by implementing the recommended mitigation measures the significance can be reduced to **Low (SP = 24)**. As a result of the sediment and alternatively rehabilitation seed mix transport to the adjacent wetland systems, alien vegetation establishment is a possible impact.

Increased flow velocities within wetlands from surface water runoff emanating from the rehabilitated dump has a **Moderate** significance **(SP = 42)** and by implementing flow dissipaters and maintaining an acceptable slope angle this impact can be reduced to **Low (SP = 24)**.

The impact associated with water quality deterioration is **High (SP = 80)**. This results from the oxidation and leaching of sulphate rich material within the Co-disposal Facility into the underlaying rehabilitated opencast pits and ultimately decanting to the artificial wetlands, Tweefonteinspruit (Venture Co-disposal Facility) or Steenkoolspruit (South Pit Discard Dump). By implementing the recommended mitigation measures listed below the significance of the impact can be reduced to **Moderate (SP = 52)**.

It is recommended that the following mitigation measures be implemented as far as practically possible:

- The discard facilities should be rehabilitated in whaleback fashion with as low slopes as possible;
- Discard facilities to be covered with topsoil and re- vegetated with indigenous grass as soon as possible to reduce the exposure time of the bare soil;
- The discard facilities must be designated clean water areas following completion of rehabilitation;
- Rehabilitation monitoring should be implemented to ensure the successful establishment of vegetation;
- Measures should be implemented to manage storm water runoff from the steep slopes of the rehabilitated dump;
- Implement velocity dissipater structures at the confluence of clean surface runoff from the rehabilitated areas and the receiving environment;
- Sediment traps should be strategically placed to reduce sedimentation of the wetlands; and
- The mitigation measures recommended in the groundwater section of this report should be implemented to ensure that no decant reports to the receiving environment.

9.3.7 Visual

All listed activities associated with this project are not expected to contribute significantly to the existing visual impacts in the area of the iMpunzi operations and neighbouring mines. The existing Venture coarse discard dump is located next to the R547 Bethal and Blackhill intersection. The expansion of this facility into the proposed Venture Co-disposal Facility will be in a North-Westerly direction towards the Saaiwaterspruit. The proposed South Pit Discard Dump will be located on an area which was historically opencast mined (South Pit), approximately 2km North-East of the R547 regional road, but within the existing operational mining area. The proposed haul road expansion involves the widening of the existing haul road that is situated within iMpunzi's MRA adjacent to the ATCOM discard dumps, approximately 1.5km West of the R547 regional road. No discard material will be transported via any national or district roads.

9.3.7.1 Construction / Site Preparation Phase

The potential movement of earth moving vehicles and personnel along the local roads and construction activities on the site could be visible to local residents. The significance of the visual impact might increase if the activities give rise to visible dust plumes. The visual impact during site preparation and construction has a **Moderate (SP = 30)** significance.

Implementation of the following mitigation measures is recommended to reduce the impact to a **Low (SP = 20)** significance:

- Limit the physical extent of cleared areas as much as possible and implement concurrent rehabilitation as far as practically possible;
- Apply sufficient wet suppression to ensure absence of visible dust;
- Enforce a speed limit on-site and haul roads for all construction vehicles;
- Plant indigenous trees along the parimeter embankment of the Venture discard dump;
- Placement of topsoil stockpiles and earth berms, which should be vegetated as soon as possible, along the regional road at the Venture Co-disposal Facility to act as a windbreak; and

- Establish a dust bucket system around the site perimeter to monitor dust fall out, as detailed in section 9.3.1.

9.3.7.2 Operational Phase

The project site and surrounding landscape are currently highly modified and thus already visually complex. The significance of the visibility of the discard facilities, especially the Venture Co-disposal Facility expansion and increase in height is **Moderate (SP = 50)** and will reduce slightly to **SP = 40** with the implementation of the recommended mitigation measures. Dust plumes are often one of the more socially objectionable impacts associated with the disposal of discard onto the dumps, due to the associated potential health risks, nuisance factor and degradation of the visual comfort value of the surrounding landscape. The significance of the dust impacts can be reduced from **Moderate (SP = 40)** to **Low (SP = 28)** by implementing the following mitigation measures:

- Water down haul roads and large bare areas as frequently as is required to minimise airborne dust;
- Maintain a screen of indigenous trees around the perimeter of the Venture Co-disposal Facility;
- Strategic placement of topsoil stockpiles and earth berms along the regional road at the Venture Co-disposal Facility to decrease the visual impact and to act as a wind break;
- Apply chemical dust suppressants if deemed necessary;
- Enforce a speed limit on-site and on haul roads for all vehicles; and
- Implement concurrent rehabilitation to reduce the visual impact of the bare side slopes of the dumps.

9.3.7.3 Decommissioning and Closure Phase

The only identified impact during the decommissioning and closure phase is the presence of the discard facilities, especially the Venture Co-disposal Facility which is situated close to a local road. At final closure, the discard facilities will remain in place, but it will be shaped and revegetated.

The following mitigation measures should be considered to reduce the overall significance of the visual impact from **Moderate (SP = 55)** to **(SP = 45)**:

- A post-closure land use plan for the mine, considering current and proposed future land uses should be developed and implemented, to ensure successful re-integration of the dumps into the visual fabric of the surrounding area at closure;
- Maintain a screen of indigenous trees around the perimeter of the Venture Co-disposal Facility; and
- Effective establishment of indigenous grass species on the dumps and continuous monitoring to ensure effective establishment.

9.3.8 Noise

The existing mining operations associated with iMpunzi and surrounding mines have long impacted on the ambient noise levels of the area. These include, but are not limited to, opencast mining activities and the coal processing facilities in the area. No residential areas are situated close to the project sites (see Figure 5 and Figure 10), and the impacts were assessed in terms of the noise impacts on site and along the local roads.

9.3.8.1 Construction / Site Preparation Phase

During the site preparation and construction phase it is anticipated that the use of heavy machinery, the hauling of topsoil away from the footprint area and hauling of haul road material will have a **Low** impact **(SP = 24)** on

the current noise levels in the vicinity of the mine and if mitigated, the impact will reduce to **SP = 20**. The following mitigation measures are recommended:

- The most appropriate equipment should be used for the particular purpose of site clearance and construction;
- The haul road must be levelled and compacted on a regular basis to reduce friction on the road leading to noise arising from the road / tyre interaction;
- All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and
- Vehicles should not be allowed to idle when not in use.

9.3.8.2 Operational Phase

During the operational phase the same impacts have been identified as with the construction phase. The significance of the elevated noise levels associated with the hauling and placement of discard materials on the dumps has been identified as **Low (SP = 28)** and with the implementation of the recommended mitigation measures, it can be reduced to **SP = 24**.

- Speed limits should be enforced to reduce the noise from vehicle traffic;
- The most appropriate equipment should be used for the particular purpose to haul and deposit the discard material;
- The haul road must be levelled and compacted on a regular basis to reduce friction on the road leading to noise arising from the road/tyre interaction;
- All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and
- Vehicles should not be allowed to idle when not in use.
    - If noise levels associated with material handling activities are deemed as too high, mechanisms to reduce noise levels must be investigated.

9.3.8.3 Decommissioning and Closure Phase

During the replacement of topsoil and seeding, associated with the rehabilitation phase it is anticipated that the use of heavy machinery and the hauling of topsoil will have a **Low** impact **(SP = 24)** on the current noise levels in the vicinity of the discard facilities and by implementing the following mitigation measures the impact will reduce to **SP = 20**:

- The most appropriate equipment should be used for the particular purpose of topsoil placement and vegetation;
- The haul road must be levelled and compacted on a regular basis to reduce friction on the road leading to noise arising from the road/tyre interaction;
- Rigorous speed control measures should be implemented, either speed bumps or speed limits to reduce the noise from vehicle traffic;
- All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and
- Vehicles should not be allowed to idle when not in use.

9.3.9 Cultural and Heritage

9.3.9.1 Construction / Site Preparation Phase

The construction phase as described in section 9.1 will have no **(SP = 0)** impacts on the local heritage resources, but it is always possible that an unknown grave or other buried cultural/archaeological items could be unearthed when excavations are being undertaken.

In such an event the following chance find procedure must be implemented to mitigate the potential impact from one of **High (SP = 80)** to one of **Low (SP = 21)** significance:

- Cease all work in the immediate vicinity of the find;
- Demarcate the area with barrier tape or other highly visible means;
- Notify the South African Heritage Resources Authority (SAHRA) immediately;
- Commission an archaeologist accredited with the Association for Southern African Professional Archaeologists (ASAPA) to assess the find and determine appropriate mitigation measures. These may include obtaining the necessary authorisation from SAHRA to conduct the mitigation measures; and
- Prevent access to the find by unqualified persons until the assessment and mitigation processes have been completed.

9.3.9.2 Operational Phase

The discard moving operations, associated with the operational phase will have no (**SP = 0**) impact, but it is always possible that an unknown grave or other buried cultural/archaeological items could be unearthed while topsoil and subsoil stripping are being undertaken. In such an event the chance find procedure described in section 9.3.9.1 above must be implemented to mitigate the potential impact from one of **High** (**SP = 80**) to one of **Low** (**SP = 21**) significance.

9.3.9.3 Decommissioning and Closure Phase

The closure and rehabilitation phase activities, as described in section 9.1, will have no (**SP = 0**) impact on any identified cultural and heritage resources and no mitigation measures are required.

9.3.10 Palaeontological aspects

9.3.10.1 Construction / Site Preparation Phase

The construction phase activities will have no (**SP = 0**) impacts, but it is always possible that chance find fossils could be unearthed when excavations are being undertaken. In such an event the following procedure must be implemented to mitigate the potential impact from one of **High** (**SP = 80**) to one of **Low** (**SP = 21**) significance:

- iMpunzi needs to clearly stake or peg-out (survey) the areas affected by the operations and dig representative trenches and if possible supply geological borehole data (Fossils likely to occur are for example the fossil plants from the Vryheid Formation, these are present in the grey shale (or any other fossiliferous layer ranked as **VERY HIGH** or **HIGH)** or invertebrates from the Volksrust Formation (or any other fossiliferous layer);
- When clearing topsoil, subsoil or overburden and hard rock (outcrop) is found, the contractor needs to stop all work;
- A Palaeobotanist / palaeontologist must then inspect the affected areas and trenches for fossiliferous outcrops / layers. iMpunzi may be asked to move structures, and put the development on hold;

- If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue;
- After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected;
- When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once a week); and
- At this stage the palaeontologist / palaeobotanist in consultation with iMpunzi must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist.

9.3.10.2 Operational Phase

The discard moving operations, associated with the operational phase will have no (**SP = 0**) impact, but it is always possible that an unknown fossils items could still be unearthed. In such an event the chance find procedure described in section 9.3.10.1 above must be implemented to mitigate the potential impact from one of **High** (**SP = 80**) to one of **Low** (**SP = 21**) significance.

9.3.10.3 Decommissioning and Closure Phase

The closure and rehabilitation phase activities will have no (**SP = 0**) impact on any identified palaeontological resources and no mitigation measures are thus required.

9.3.11 Socio-economic

9.3.11.1 Construction / Site Preparation Phase

All the listed and not listed activities associated with this project will not create any new jobs or require extraordinary expenditure on local goods and services, but it would prolong the life of the iMpunzi mining operations, which would result in a **positive impact** of **Moderate** (SP = 40) significance. Communities in the receiving environment are exposed to high rates of unemployment and generally do not have access to adequate social services and infrastructure. During the initial site preparation and construction phase, some temporary employment opportunities will arise for general workers **(SP = +21)** and the **positive impact** can be increased to **SP = +40** if the following measures are implemented:

- General workers should be sourced locally as far as possible as they will be the most affected by the proposed project;
- A local skills database must be developed and updated regularly. The skills database should be used for recruitment purposes; and
- A monitoring system should be put in place to ensure that iMpunzi's recruitment policy is adhered to.

9.3.11.2 Operational Phase

During the operational phase, impacts relating to the loss of employment for contractors after construction phase and prolonged job security for the current employees were identified. The expansion of the dumps and associated activities will ensure that iMpunzi remains operational and consequently, this will ensure local economic growth and the transfer of technical skills. By implementing the recommended mitigation measures (section 9.3.11.1) the job loss impact can be lowered from **Moderate (SP = 36)** to a **Low** impact **(SP = 28)**. The positive impact associated with job security of current employees increases from **SP = +36** to **SP = +40**.

9.3.11.3 Decommissioning and Closure Phase

Similar to the construction phase, during the decommissioning and closure phase, some temporary employment opportunities will arise for general workers **(SP = +21)**.

9.4 Potential cumulative impacts identified

The following potential cumulative impacts were identified and assessed:

9.4.1 Air Quality

Potential cumulative impact on ambient air quality as a result of spontaneous combustion on the discard dump and increased nuisance dust and fine particulate levels, likely to occur as a result of materials handling activities (tipping, loading and offloading), vehicle entrainment of dust on unpaved haul roads, and wind erosion from open/ exposed areas.

9.4.2 Biodiversity

The proposed South Pit Discard Dump and Venture Co-disposal Facility expansion will not directly affect any natural wetland systems as both footprints fall on a backfilled opencast rehabilitated mine land. The extension will cross a number of small artificial wetland areas, that formed on the rehabilitated areas due to accumulation of surface water in shallow depressions or low-lying areas. The identified impacts and associated mitigation measures are discussed in detail in section 9.3.6.1. Key focus should be on the impact of water quality deterioration which was identified as the impact of highest significance from a wetland perspective.

The proposed road expansion will not have any significant residual impact on the current environmental setting, provided that the recommended mitigation measures, as detailed in section 9.3.5.1 are implemented during all the phases of the project.

It should be noted that the road crosses a wetland and as such constitutes a water use in terms of the National Water Act – requiring a Water Use License. In particular, the development and implementation of a construction method statement for wetland crossings with follow up monitoring will be critical in ensuring that no significant residual impacts on wetlands as a result of construction occur. However, the severity of this impacts on the environment can be mitigated through the implementation of the recommended mitigation measures. Special attention must be given to the wetland that is crossed by the proposed road expansion during construction to ensure that impacts on wetland habitat are avoided and minimised (Golder Associates Africa (Pty) Ltd (f), August 2020).

9.4.3 Surface water

The identified impacts and associated mitigation measures are discussed in detail in section 9.3.4. Potential negative impacts relate to the deterioration in quality of downstream water resources resulting from spillage of contaminated storm water runoff and sediment transport emanating from the discard dump. Other impacts are associated with decant of AMD reporting to the surface resource and ineffective clean and dirty water separation. Post closure impacts involve imprecise volumes of water requiring treatment, preferred treatment options and financial provisions (section 21.3.4) associated with long term treatment.

9.4.4 Groundwater

Potential negative impact on pit water quality due to the additional acid-generating discard that will be placed onto the discard dumps that may lead to seepage. Post closure impacts are associated with decant of mine affected water once mining and operational dewatering ceases impacting on downstream water resources. The identified impacts and associated mitigation measures are discussed in detail in Section 9.3.3.

9.4.5 Noise

Potential cumulative impact on noise levels resulting from site preparation, ground excavation and materials handling activities. Based on the impact assessment of the construction/site preparation, operational phase and closure phase the additional noise impacts associated with the expanded discard dumps will be absorbed by the local elevated baseline noise levels and/or masked by the existing noise levels in the vicinity of the mine.

10.0 ASSESSMENT OF EACH IDENTIFIED POTENTIAL ENVIRONMENTAL IMPACT AND RISK

Table 31 below summarises the potential impacts of various aspects applicable for road developments through the construction, operation, and decommissioning phases of the proposed project.

Table 31: Assessment of each identified potentially significant impact and risk

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Air Quality						
Site preparation and construction	Wind-blown emissions/dust from expansion site open and exposed areas	Air quality	Construction phase	Moderate	Control through impact management	Low
Progression in footprint of discard facilities	Spontaneous combustion	Air quality	Operational phase	Moderate	Control through impact management	Moderate
Progression in footprint of discard facilities	Wind-blown emissions from hauling of discard and expansion of the discard dumps	Air quality	Operational phase	Moderate	Control through impact management	Low
Rehabilitation of discard dumps involving the capping and vegetation	Wind-blown emissions from handling activities associated with Rehabilitation (hauling, loading and offloading)	Air quality	Decommissioning and closure phase	Moderate	Remedy through rehabilitation	Low
Soils						
Site preparation and soil excavation	Soil losses and compaction	Soil Health	Construction phase	Moderate	Control through impact management	Low
Soil stockpiling	Soil losses and deterioration of soil quality	Soil Health	Construction phase	Moderate	Control through impact management	Low
Progression in footprint of discard facilities	Inadequate soil stockpile management	Soil Health	Operational phase	Moderate	Control through impact management	Low
Rehabilitation of discard dumps (Soil replacement	Soil losses and deterioration of soil quality	Soil Health	Decommissioning and closure phase	Moderate	Control through impact management	Low
Biodiversity						
Construction of Venture Co-disposal Facility extension	Loss and disturbance of artificial wetland habitat	Wetland	Construction phase	Moderate	Remedy through rehabilitation	Moderate

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Widening of haul road	Loss and disturbance of rehabilitated / secondary grassland	Wetland	Construction phase	Low	Control through impact management and Remedy through rehabilitation	Low
Widening of haul road	Establishment of alien vegetation	Wetland	Construction phase	Moderate	Control through impact management	Low
Widening of haul road	Interruption of wetland hydrology	Wetland	Construction phase	Moderate	Control through impact management	Low
Site clearance and preparation work for construction	Increased sedimentation within the wetlands due to sediment rich runoff from the construction site	Wetland	Construction phase	Moderate	Remedy through rehabilitation	Low
Construction of Venture Co-disposal Facility extension and the haul road	Increased turbidity and water quality degradation in adjacent wetlands	Wetland	Construction phase	Moderate	Control through impact management	Low
Progression is footprint of discard facilities	Decreased flows within adjacent wetlands due to catchment exclusion	Wetland	Operational phase	Moderate	Control through impact management	Moderate
Progression is footprint of discard facilities	Water quality deterioration due to seepage from the dumps	Wetland	Operational phase	High	Control through impact management	Moderate
Widening of haul road	Establishment of alien vegetation	Wetland	Operational phase	Moderate	Control through impact management	Low
Widening of haul road	Interruption of wetland hydrology	Wetland	Operational phase	Moderate	Control through impact management	Low
Widening of haul road	Deterioration in wetland water quality	Wetland	Operational phase	Moderate	Control through impact management	Low
Rehabilitation of discard dumps involving the capping and vegetation	Sediment mobilising to wetlands	Wetland	Decommissioning and closure phase	Moderate	Remedy through rehabilitation	Low
Topsoil placement on dump slopes as part of rehabilitation	Establishment of alien vegetation	Wetland	Decommissioning and closure phase	Moderate	Control through impact management	Low
Leaching from the Co-disposal Facility	Water quality deterioration	Wetland	Decommissioning and closure phase	High	Control through impact management	Moderate

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Runoff emanating from rehabilitated dumps	Increased flow velocities in wetlands	Wetland	Decommissioning and closure phase	Moderate	Control through impact management	Low
Groundwater						
Use of construction vehicles	Chemical leaks and spills from construction vehicles	Water quality	Construction phase	Low	Modify	Low
Haulage of coarse discard	Discard spills, chemical and oil spills	Water quality	Operations phase	Low	Modify	Low
Deposition of fine discard in Venture Co-disposal Facility	Seepage of process water from fine discard	Water quantity and water quality	Operations phase	High	Control decant through pit levels	Moderate
Deposition of slurry in Venture Co-disposal Facility	Seepage from dried fine discard	Water quality	Post-closure phase	High	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Moderate
Deposition of coarse discard in Venture Co-disposal Facility embankments	Seepage from coarse discard	Water quality	Operations and post-closure phases	High	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Moderate
Deposition of coarse discard in South Pit Discard Dump	Seepage from coarse discard	Water quality	Operations and post-closure phases	High	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Moderate
Prevention of decant via abstraction boreholes	Reduction in baseflow to Steenkoolspruit and Saaiwaterspruit	Water quantity	Operations and post-closure phases	Moderate	Prevent decant through control of water levels in pit.	Low
Visual						
Site preparation and construction (haul road and dumps)	Activities leading to visible plumes of dust	Visual	Construction phase	Moderate	Control through impact management	Low
Progression in footprint and height of discard facilities	Visibility of dumps as a result of increasing height	Visual	Operational phase	Moderate	Control through impact management	Moderate

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Placement of discard on discard dumps	Visible dust plumes emanating from the disposal activities and hauling discard	Visual	Operational phase	Moderate	Remedy through rehabilitation	Low
Rehabilitation of discard dumps involving the capping and vegetation	Presence of the discard dumps at final closure, the discard dump will remain in place, but it will be shaped and revegetated	Visual	Decommissioning and closure phase	Moderate	Remedy through rehabilitation	Moderate
Socio-economic						
Site preparation and construction	Created job opportunities	Local Community	Construction phase	Positive	Control through impact management	Positive
Completion of site preparation and construction/ Commencement of activity	Job losses of contactors/ temporary workers after construction ceases	Local Community	Operational phase	Moderate	Control through impact management	Low
Progression of footprint of discard facilities and maintenance of haul roads	Job security and skills transfer	Current employees	Operational phase	Positive	Control through impact management	Positive
Noise						
Site preparation and construction (haul road and dumps)	Elevated noise levels emanating from site clearance and construction	Noise levels	Construction phase	Low	Control through impact management	Low
Progression in footprint of discard facilities (hauling and placement of discard onto dumps)	Elevated noise levels associated with the hauling and placement of discard material on the dumps	Noise levels	Operational phase	Low	Control through impact management	Low
Rehabilitation of discard dumps involving the capping and vegetation	Elevated noise levels emanating from rehabilitation practices (topsoil placement and seeding)	Noise levels	Decommissioning and closure phase	Low	Control through impact management	Low
Surface water						
Construction of the required additional operational “dirty” storm water management infrastructure around the extension discard area and existing facility.	Preparation work may result in increased erosion and sediment loads.	Receiving water course	Construction phase	Low	Control through impact management	Low

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Discard placement on discard facility	Increased erosion and runoff from the discard material resulting in increased sedimentation and potential contaminated runoff reporting to surface water environment.	Receiving water course	Operational phase	Low	Control through impact management	Low
Loading of rehabilitation cover material onto truck for transportation to the discard facility	Hydrocarbon spills may result from discard vehicles and equipment during loading.	Receiving water course	Operational phase	Moderate	Control through impact management	Low
Contamination of environment due to pipe breakage/leakage	Contamination of environment due to pipe breakage/leakage	Receiving water course		Moderate	Control through impact management	Low
Storm water management control	Mixing of dirty and clean water, resulting in prevention of clean surface water reporting to downstream catchment	Receiving water course	Operational phase	Moderate	Control through impact management	Low
Storm water management control	Discharge from dirty storm water sump due to an extreme rainfall period.	Receiving water course	Operational phase	Low	Control through impact management	Low
Soil placement, capping and revegetation of discard site sections	Soil handling to convey soil and capping from stockpiles for surface rehabilitation activities may result in erosion and sedimentation. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling discard material).	Receiving water course	Operational phase	Moderate	Control through impact management	Low
Insufficient capping material with the appropriate soil characteristics as assumed in the capping design.	The desired lower recharge rates will not be achieved resulting in increased seepage, higher decant volumes and potential contamination of water resources.	Surface and groundwater water resources	Operational phase	Moderate	Control through impact management	Low
Capping material properties inadequate to sustain vegetation growth.	Increase in erosion of discard facility and mobilisation of sedimentation. Increase in recharge rates and decant volumes and subsequent impact of receiving environment.	Surface and groundwater water resources	Decommissioning and closure phase	Moderate	Remedy through rehabilitation	Low
Decant of post closure water	Contamination of receiving water environment (surface and groundwater) due to decant acidic pit water (AMD).	Surface and groundwater water resources	Decommissioning and closure phase	High	Control through impact management	Low

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Higher volumes of decant at post closure than predicted.	Inefficiency of water treatment plant to treat required volumes and quality of water.	Receiving water course	Decommissioning and closure phase	Moderate	Control through impact management	Low
Inadequate rehabilitation of the discard facility (inadequate cover)	Higher recharge rates will occur, resulting in increased seepage and consequently higher decant water volumes. This will impact on the treatment volumes and quality (impact on capacity of treatment plant), which could result in contamination of water resources if not treated.	Receiving water course (non-perennial stream) and groundwater resource	Decommissioning and closure phase	Moderate	Remedy through rehabilitation	Low
Storm water management control	Inadequate storm water control measures on decommissioning may result in mixing of dirty and clean water. This could result in prevention of clean water surface water reporting to downstream catchment and potential contamination of receiving water resources by dirty water.	Receiving water course (non-perennial stream) and groundwater resource	Decommissioning and closure phase	Moderate	Control through impact management	Low
Cultural and Heritage Resources						
Operation of construction equipment	Disturbance of graves	Cultural and Heritage Resources	Construction phase	N/A	N/A	N/A
Expansion of haul road footprint	Disturbance of graves	Cultural and Heritage Resources	Construction phase	N/A	N/A	N/A
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Cultural and Heritage Resources	Operational phase	N/A	N/A	N/A
Progression of footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Cultural and Heritage Resources	Operational phase	N/A	N/A	N/A
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of archaeological or cultural significance	Cultural and Heritage Resources	Decommissioning and closure phase	N/A	N/A	N/A

Activity	Potential impact	Aspects affected	Phase	Significance (if not mitigated)	Mitigation type	Significance (if mitigated)
Palaeontological Resources						
Operation of construction equipment	Disturbance of plant and animal fossils	Palaeontological Resources	Construction phase	Moderate	Control through impact management	Low
Expansion of haul road footprint	Disturbance of plant and animal fossils	Palaeontological Resources	Construction phase	Moderate	Control through impact management	Low
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Palaeontological Resources	Operational phase	N/A	N/A	N/A
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Palaeontological Resources	Operational phase	N/A	N/A	N/A
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of palaeontological significance	Palaeontological Resources	Decommissioning and closure phase	N/A	N/A	N/A

11.0 OTHER INFORMATION REQUIRED BY COMPETENT AUTHORITY

11.1 Impact on socio-economic conditions of any directly affected persons

The socio-economic impacts on the residents close enough to be directly affected can only be determined after the specialist studies described in Section 9.3.11 have been completed. No relocation is required.

11.2 Impact on any national estate

No cultural/heritage resources close enough to the proposed activities to be impacted were found. However, the possibility of chance finds during construction and mining cannot be ruled out.

12.0 OPINION ON WHETHER THE ACTIVITY SHOULD BE AUTHORISED

It is expected that the proposed discard facility establishment, expansion and haul road expansion project will not result in any environmental impacts that cannot be mitigated to acceptable levels, provided that all the environmental management measures described in the environmental management programme report (EMPr) are applied diligently.

By not granting this granting this authorisation, the benefits of the project to GOSA (iMpunzi), as well as local residents will not being realised. Therefore, it is the opinion of the environmental assessment practitioner (EAP) that the Environmental Authorisation (EA), and Waste Management Licence (WML) be granted to enable GOSA to undertake the activities described in this EIA/EMPr.

13.0 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

13.1 General conditions

- Implement all aspects of the EMPr in sections Part B of this document;
- Comply with all relevant legislation at all times;
- Undertake annual internal auditing of environmental performance and annual reporting to the DMRE; and
- Undertake biennial external auditing of environmental performance and provide the DMRE with a copy of the audit report.

13.2 Design conditions - South Pit Discard Dump

GOSA – iMpunzi must:

- Undertake detailed design of the South Pit Discard Dump;
- Update the conceptual landform designs for the overall ATCOM mining areas;
- Undertake detailed design and efficacy studies of the final dump cover thickness, as the 300 mm thick soil cover was determined for managing infiltration for pollution control (decreasing mass loads to the groundwater system) and water use efficiency (decreasing the volume of dirty water generated). Additional soil might be required for a growth medium, depending upon the final determined land use;
- Investigate the use of the proposed borehole as drainage conduit to a suitable level of detail;
- Include differential settlement and low wall stability analysis in the next design phase;

- Apply a 1m blanket layer as a cooling mechanism prior to the placement of discard on hot areas; and
- Conduct hydrological modelling to determine how run-off from the upper surface of the facility can best be drained with a dedicated engineered channel on the western side.

13.3 Design conditions - Venture Co-disposal Facility

GOSA – iMpunzi must:

- Conduct hydrological modelling to determine how runoff from the upper surface of the Venture Co-disposal Facility and the South Pit Discard Dump can best be drained with a dedicated engineered channel on the western side;
- Undertake detailed design and efficacy studies of the final dump cover thickness, as the 300 mm thick soil cover was determined for managing infiltration for pollution control (decreasing mass loads to the groundwater system) and water use efficiency (decreasing the volume of dirty water generated). Additional soil might be required for a growth medium, depending upon the final determined land use;
- Conduct additional geotechnical investigations to update the stability analysis and to complete the design of the facility (e.g. founding conditions for structures, embankment construction, etc) and must include:
  - Foundation assessment of the material used to backfill the historic Venture opencast pit. This must include *in-situ* investigations and laboratory testing of sampled materials to conceptualize the type and condition of the backfill material; and
  - Laboratory testing of the discard material.
- Install a barge pump (with a maximum pumping capacity of 250 m^3/day) to route runoff and operational slurry return water from the slurry pool to the perimeter channels; the channels must route the water to the new RWD; and
- A new RWD with minimum capacity of 56 000 m^3 must be constructed to receive runoff from the discard dump side slopes as well as the slurry return water and runoff from the dump top (embankment crest, dry beach, wet beach and slurry pool) must be routed through the barge pump system and diverted to the new RWD through the trapezoidal stormwater channel.

13.4 Site Specific conditions

- Conduct kinetic testing of the discard dump and fine discard material to confirm predicted post closure groundwater quality;
- Conduct the following assessments relating to the existing Tweefontein WTP (design):
  - Develop a predicted 95th percentile concentration scenario, to indicate potential variability in feed concentrations to even higher levels than currently indicated in the average scenarios (as completed in the Groundwater impact assessment report APPENDIX K);
  - Run reverse osmosis (RO) simulations to ascertain the impact of the higher ionic concentrations in the feed on the % water recovery that can be achieved. Some components associated with scale formation, e.g. Calcium still seems to be within range, but the overall TDS increase impact on recovery needs to be quantified;

- Since the treatment plant was designed for modular expansion, some expansions may need to be assessed; and
- Verify revised flow rates from Glencore Goedgevonden and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded.

- Compile a site-wide topsoil balance for all areas of the iMpunzi complex and related mine residue facilities indicating the topsoil volume (and quality) requirements for rehabilitation and closure, topsoil volumes available and their location (in-situ ahead of mining and stockpiled) and the shortfall or surplus;
- Identify and quantify potential topsoil sources to address any shortfalls;
- Update the proposed land preparation, soil amelioration and hydroseeding rates based on site specific soil sampling and analysis;
- Incorporate the Venture Co-disposal Facility and the South Pit Discard Dump into the mine wide closure planning and costing to ensure the alignment of end land use planning and closure objectives;
- Investigate and implement alternative water management solution to manage potential decant if dewatering boreholes are deemed to be ineffective to manage potential decant;
- Continue investigations in support of the development of the post-closure water management strategy for the mine;
- Take appropriate remedial actions if deviations from expected environmental performance occurs; and
- Amend the EMPr as and when necessary to maintain acceptable environmental performance.

14.0 PERIOD FOR WHICH AN ENVIRONMENTAL AUTHORISATION IS REQUIRED

iMpunzi intends to commence with this project as soon as practicable after receiving the Environmental Authorisation (EA), Waste Management Licence (WML) and the Water Use Licence (WUL).The planned LoM, based on proven coal reserves and market related requirements, is estimated at 16 years. To accommodate the expansion activities, production/operation, mine closure and site rehabilitation, the authorisation is required for a period of at least **21 years**.

15.0 UNDERTAKING

The environmental assessment practitioner hereby confirms:

- The correctness, to the best of her knowledge, of the information provided in the specialist reports and of information provided by GOSA. The information was accepted as being as reliable as information generated during an EIA and a feasibility study, and provided in good faith, can be;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- That the information provided to I&APs and the responses to comments and inputs made by the I&APs are correctly reflected herein.

16.0 OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4) (A) AND (B) OF THE NEMA

This section requires proof of compliance with section 24(4)(b)(i) of the National Environmental Management Act, which section reads as follows:

"24. Environmental authorisations

(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment –

> *(b) must include, with respect to every application for an environmental authorisation and where applicable-*
>
> *(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;"*

Please note: An application for environmental authorisation for listed activities associated with the proposed iMpunzi discard facility expansion project was submitted to the DMRE on **8 November 2019**. The Final Scoping (FSR) report was submitted to the Department of Mineral Resources and Energy (DMRE) on 8 January 2020. The acceptance of the Final Scoping report was received from DMRE on **1 July 2020**.

- Section 24(4)(a) (iii) requires that a description of the environment likely to be significantly affected by the proposed activity be provided. The description of the environment is provided in Section 6.0 of this report;
- Section 24(4)(a) (iv) requires an investigation of the potential consequences for or impacts on the environment as a result of the activity and assessment of the significance of those potential consequences or impacts. See section 8.7, 8.11 and Table 31 to Table 36 of this report, where potential impacts and impact significance were identified; and
- Section 24(4)(a) (v) references public information and participation procedures, which have been dealt with in section 5.0 of this report.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME

17.0 DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

17.1 Details of the Environmental Assessment Practitioner (EAP)

The required details have been supplied in PART A, section 2.2 of this report.

17.2 Description of the aspects of the activity

See section 2.5 of this report.

17.3 Composite map

See Figure 5 and Figure 10, which shows the preferred infrastructure layout and the identified environmental features in the project area and its surrounding areas. The project area does not coincide with any protected or environmentally sensitive areas.

17.4 Environmental quality and managing environmental impacts

GOSA will endeavour to ensure that local environmental quality is not adversely affected by the proposed iMpunzi project, by:

- Limiting the footprint area and thus reducing the area of vegetation to be cleared for site construction;
- Limiting dust generation during construction that could cause nuisance and/or health effects to surrounding landowners/communities;
- Requiring all contractor vehicles to be maintained in good working order so as to reduce the probability of leakages/spills;
- Cleaning up of any sources of possible soil contamination still present on the site after construction, to protect the downstream receiving environment; and
- Continue with the amended and approved GOSA environmental monitoring programme (EMP), for at least 5 years after closure of the overall GOSA mining operations.

17.5 Has a water use licence been applied for?

Section 21 of the NWA lists the water uses for which a water use licence (WUL) is required. The water uses in terms of section 21 of the NWA that are being applied for, are listed in Table 9 above. It is important to note that the WULA process has been initiated and will by large run in parallel with the EIA process.

Golder is in the process of compiling an Integrated Water and Waste Management Plan (IWWMP) summary report to support a water use licence application (WULA) for the additional water uses associated with the discard dump and haul road expansion. This summary report will be submitted to the Department of Water and Sanitation (DWS) as required.

17.6 Assumptions, uncertainties and gaps in knowledge

The impact assessment was limited to the scope described in detail in sections 6.0 and 8.0 of this document. The following gaps in knowledge exist:

General

- There were no site-specific emission factors for iMpunzi available regarding spontaneous combustion. Thus, the assessment of the impacts of these emissions on air quality was therefore undertaken qualitatively;
- Confirmed understanding of geotechnical risks associated with the discard dump related to short- and long-term settlement and resistance of the cover material to sliding; and
- Confirmation that the mine's dirty water management system has capacity to handle the excess mine water make on site, with the addition of the proposed activities need to be confirmed.

Uncertainties listed in the wetland impact assessment report (Wetland Consulting Services (Pty) Ltd, August 2020) are as follows:

- No hydrological flow modelling or hydro-pedological assessments of the wetlands were undertaken as part of this study. However, given the nature of the proposed project and the distance from adjacent wetlands, this is not considered a significant short-coming and sufficient wetland information is available to inform the study and decision making.

Uncertainties listed in the groundwater report (Golder Associates Africa (Pty) Ltd (h), August 2020) are as follows:

- Pumping yields would need to be confirmed by means of pumping test after borehole construction at the various pits - this, together with an independent estimation of recharge rates for backfilled areas, will allow development of a pit calibrated groundwater model to improve evaluations of decant rates and abstraction rates for both pits;
- Kinetic testing of the spoils, discard and fine discard material is needed to better predict post closure water quality - the results of kinetic testing allow for simulation of long-term leachate qualities post-closure, and resolve uncertainties in the available data which were used in this study;
- When pit decant rates have been refined based upon pump test data, and long-term seepage chemistry fined using kinetic testing, a predicted 95th percentile concentration scenario can be developed for each pit and used to indicate potential variability in feed concentrations to higher levels, which is essential for water treatment plant design;
- Nearer the end of LoM, the abstraction volumes and treatment requirements required for post-closure decant management should be remodelled;
- Verify or develop post-closure flow rates from GGV and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded; and
- Confirmed post-closure water management strategy and treatment options.

The following assumptions have been made in the compilation of the closure plan (Golder Associated Africa (Pty) Ltd (k), August 2020):

- Based on the information used, the accuracy of this assessment can be classified to be at a -30% to +50% accuracy;
- The plan has been compiled without input from external stakeholders. Stakeholder consultation will be undertaken by the mine during operations to obtain stakeholder views and opinions, and these will be considered and incorporated in future versions of the overall mine closure plan;

- The closure plan is based on available information supplied by the mine along with other updated specialist studies conducted by Golder. It is however important that closure-related knowledge gaps be addressed based on priority, during the operational life of the mine;
- Successful closure of the discard dump and Co-disposal Facility will require buy-in from, and collaboration with, district municipalities, regulators, mine employees and surrounding landowners and communities. This closure plan assumes that the working relationship required with these stakeholders for successful closure will be well established at the onset of closure;
- Decommissioning and rehabilitation activities will follow directly on the cessation of operational life of the discard dump and co-disposal;
- Closure planning will be a progressive/iterative process where new information, as it becomes available, will be assimilated and incorporated into the closure planning to achieve an appropriate, up-to-date and implementable closure plan at the time of actual closure; and
- Dedicated contractors would be commissioned to conduct the demolition and rehabilitation work on the site. This would, inter alia, require establishment costs for the contractors and hence, the allowance for preliminary and general (P&Gs) in the cost estimate.

18.0 IMPACT MANAGEMENT OUTCOMES

A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph.

Table 32: Description of impact management outcomes

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Air Quality					
Site preparation and construction	Wind-blown emissions/dust from expansion site open and exposed areas	Air quality	Construction phase	Control through impact management	Avoidance
Progression in footprint of discard facilities	Spontaneous combustion	Air quality	Operational phase	Control through impact management	Avoidance
Progression in footprint of discard facilities	Wind-blown emissions from hauling of discard and expansion of the discard dumps	Air quality	Operational phase	Control through impact management	Avoidance
Rehabilitation of discard dumps involving the capping and vegetation	Wind-blown emissions from handling activities associated with Rehabilitation (hauling, loading and offloading)	Air quality	Decommissioning and closure phase	Remedy through rehabilitation	Avoidance
Visual					
Site preparation and construction (haul road and dumps)	Activities leading to visible plumes of dust	Visual	Construction phase	Control through impact management	Avoidance
Progression in footprint and height of discard facilities	Visibility of dumps as a result of increasing height	Visual	Operational phase	Control through impact management	Avoidance
Placement of discard on discard dumps	Visible dust plumes emanating from the disposal activities and hauling discard	Visual	Operational phase	Remedy through rehabilitation	Avoidance
Rehabilitation of discard dumps involving the capping and vegetation	Presence of the discard dumps at final closure, the discard dump will remain in place, but it will be shaped and revegetated	Visual	Decommissioning and closure phase	Remedy through rehabilitation	N/A
Biodiversity					
Construction of Venture Co-disposal Facility extension	Loss and disturbance of artificial wetland habitat	Wetland	Construction phase	Remedy through rehabilitation	Avoidance

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Site clearance and preparation work for construction	Increased sedimentation within the wetlands due to sediment rich runoff from the construction site	Wetland	Construction phase	Remedy through rehabilitation	Avoidance
Construction of Venture Co-disposal Facility extension and the haul road	Increased turbidity and water quality degradation in adjacent wetlands	Wetland	Construction phase	Control through impact management	Avoidance
Widening of haul road	Loss and disturbance of rehabilitated / secondary grassland	Wetland	Construction phase	Control through impact management and Remedy through rehabilitation	Avoidance
Widening of haul road	Establishment of alien vegetation	Wetland	Construction phase	Control through impact management	Avoidance
Widening of haul road	Interruption of wetland hydrology	Wetland	Construction phase	Control through impact management	Avoidance
Progression is footprint of discard facilities	Decreased flows within adjacent wetlands due to catchment exclusion	Wetland	Operational phase	Control through impact management	N/A
Progression is footprint of discard facilities	Water quality deterioration due to seepage from the dumps	Wetland	Operational phase	Control through impact management	Avoidance
Widening of haul road	Establishment of alien vegetation	Wetland	Operational phase	Control through impact management	Avoidance
Widening of haul road	Interruption of wetland hydrology	Wetland	Operational phase	Control through impact management	Avoidance
Widening of haul road	Deterioration in wetland water quality	Wetland	Operational phase	Control through impact management	Avoidance
Rehabilitation of discard dumps involving the capping and vegetation	Sediment mobilising to wetlands	Wetland	Decommissioning and closure phase	Remedy through rehabilitation	Avoidance

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Topsoil placement on dump slopes as part of rehabilitation	Establishment of alien vegetation	Wetland	Decommissioning and closure phase	Control through impact management	Avoidance
Leaching from the Co-disposal Facility	Water quality deterioration	Wetland	Decommissioning and closure phase	Control through impact management	Avoidance
Runoff emanating from rehabilitated dumps	Increased flow velocities in wetlands	Wetland	Decommissioning and closure phase	Control through impact management	Avoidance
Cultural and Heritage Resources					
Operation of construction equipment	Disturbance of graves	Cultural and Heritage Resources	Construction phase	Control through impact management	Avoidance
Expansion of haul road footprint	Disturbance of graves	Cultural and Heritage Resources	Construction phase	Control through impact management	Avoidance
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Cultural and Heritage Resources	Operational phase	Control through impact management	Avoidance
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Cultural and Heritage Resources	Operational phase	Control through impact management	Avoidance
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of archaeological or cultural significance	Cultural and Heritage Resources	Decommissioning and closure phase	Remedy through rehabilitation	N/A
Palaeontological Resources					
Operation of construction equipment	Disturbance of plant and animal fossils	Palaeontological Resources	Construction phase	Control through impact management	Avoidance
Expansion of haul road footprint	Disturbance of plant and animal fossils	Palaeontological Resources	Construction phase	Control through impact management	Avoidance

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Palaeontological Resources	Operational phase	Control through impact management	Avoidance
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Palaeontological Resources	Operational phase	Control through impact management	Avoidance
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of palaeontological significance	Palaeontological Resources	Decommissioning and closure phase	Remedy through rehabilitation	N/A
Groundwater					
Use of construction vehicles	Chemical leaks and spills from construction vehicles	Water quality	Construction phase	Modify	Measured water quality parameters in the river and shallow groundwater are compliant
Haulage of coarse discard	Discard spills, chemical and oil spills	Water quality	Operations phase	Modify	Measured water quality parameters in the river and shallow groundwater are compliant
Deposition of fine discard in Venture Co-disposal Facility	Seepage of process water from fine discard	Water quantity and water quality	Operations phase	Control decant through pit levels	Measured water quality parameters in the river and shallow groundwater are compliant
Deposition of fine discard in Venture Co-disposal Facility	Seepage from dried fine discard	Water quality	Post-closure phase	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Measured water quality parameters in the river and shallow groundwater are compliant

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Deposition of coarse discard in Venture Co-disposal Facility embankments	Seepage from coarse discard	Water quality	Operations and post-closure phases	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Measured water quality parameters in the river and shallow groundwater are compliant
Deposition of coarse discard in South Pit Discard Dump	Seepage from coarse discard	Water quality	Operations and post-closure phases	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Measured water quality parameters in the river and shallow groundwater are compliant
Prevention of decant	Reduction in baseflow to Steenkoolspruit and Saaiwaterspruit	Water quantity	Operations and post-closure phases	Prevent decant through control of water levels in pit.	No streamflow reduction activity
Noise					
Site preparation and construction (haul road and dumps)	Elevated noise levels emanating from site clearance and construction	Noise levels	Construction phase	Control through impact management	Avoidance
Progression in footprint of discard facilities (hauling and placement of discard onto dumps)	Elevated noise levels associated with the hauling and placement of discard material on the dumps	Noise levels	Operational phase	Control through impact management	Avoidance
Rehabilitation of discard dumps involving the capping and vegetation	Elevated noise levels emanating from rehabilitation practices (topsoil placement and seeding)	Noise levels	Decommissioning and closure phase	Control through impact management	Avoidance
Socio-economic					
Site preparation and construction	Created job opportunities	Local Community	Construction phase	Control through impact management	N/A

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Completion of site preparation and construction/ Commencement of activity	Job losses of contactors/ temporary workers after construction ceases	Local Community	Operational phase	Control through impact management	N/A
Progression is footprint of discard facilities and maintenance of haul roads	Job security and skills transfer	Current employees	Operational phase	Control through impact management	N/A
Soil					
Site preparation and soil excavation	Soil losses and compaction	Soil Health	Construction phase	Control through impact management	N/A
Soil stockpiling	Soil losses and deterioration of soil quality	Soil Health	Construction phase	Control through impact management	N/A
Progression in footprint of discard facilities	Inadequate soil stockpile management	Soil Health	Operational phase	Control through impact management	N/A
Rehabilitation of discard dumps (Soil replacement)	Soil losses and deterioration of soil quality	Soil Health	Decommissioning and closure phase	Control through impact management	N/A
Surface water					
Construction of the required additional operational “dirty” storm water management infrastructure around the extension discard area and existing facility.	Preparation work may result in increased erosion and sediment loads.	Receiving water course	Construction phase	Control through impact management	Avoidance
Discard placement on discard facility	Increased erosion and runoff from the discard material resulting in increased sedimentation and potential contaminated runoff reporting to surface water environment.	Receiving water course	Operational phase	Control through impact management	Avoidance
Loading of rehabilitation cover material onto truck for	Hydrocarbon spills may result from discard vehicles and equipment during loading.	Receiving water course	Operational phase	Control through impact management	Avoidance

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
transportation to the discard facility					
Storm water management control	Mixing of dirty and clean water, resulting in prevention of clean surface water reporting to downstream catchment	Receiving water course	Operational phase	Control through impact management	Avoidance
Storm water management control	Discharge from dirty storm water sump due to an extreme rainfall period.	Receiving water course	Operational phase	Control through impact management	Avoidance
Soil placement, capping and revegetation of discard site sections	Soil handling to convey soil and capping from stockpiles for surface rehabilitation activities may result in erosion and sedimentation. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling discard material).	Receiving water course	Operational phase	Control through impact management	Avoidance
Insufficient capping material with the appropriate soil characteristics as assumed in the capping design.	The desired lower recharge rates will not be achieved resulting in increased seepage, higher decant volumes and potential contamination of water resources.	Surface and groundwater water resources	Operational phase	Control through impact management	Avoidance
Capping material properties inadequate to sustain vegetation growth.	Increase in erosion of discard facility and mobilisation of sedimentation. Increase in recharge rates and decant volumes and subsequent impact of receiving environment.	Surface and groundwater water resources	Decommissioning and closure phase	Remedy through rehabilitation	Avoidance
Decant of post closure water	Contamination of receiving water environment (surface and groundwater) due to decant acidic pit water (AMD).	Surface and groundwater water resources	Decommissioning and closure phase	Control through impact management	Avoidance
Higher volumes of decant at post closure than predicted.	Inefficiency of water treatment plant to treat required volumes and quality of water.	Receiving water course	Decommissioning and closure phase	Control through impact management	Avoidance
Inadequate rehabilitation of the discard facility (inadequate cover)	Higher recharge rates will occur, resulting in increased seepage and consequently higher decant water volumes. This will impact on	Receiving water course (non-perennial	Decommissioning and closure phase	Remedy through rehabilitation	Avoidance

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	the treatment volumes and quality (impact on capacity of treatment plant), which could result in contamination of water resources if not treated.	stream) and groundwater resource			
Storm water management control	Inadequate storm water control measures on decommissioning may result in mixing of dirty and clean water. This could result in prevention of clean water surface water reporting to downstream catchment and potential contamination of receiving water resources by dirty water.	Receiving water course (non-perennial stream) and groundwater resource	Decommissioning and closure phase	Control through impact management	Avoidance

19.0 IMPACT MANAGEMENT ACTIONS

A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved.

Table 33: Impact management actions

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
CONSTRUCTION PHASE				
Air Quality				
Site preparation and construction	Wind-blown emissions/dust from expansion site open and exposed areas	Control through impact management	Continuously during Construction phase	NEM: AQA ambient air quality standards
Visual				
Site preparation and construction (haul road and dumps)	Activities leading to visible plumes of dust	Control through impact management	Continuously during Construction phase	
Biodiversity				
Construction of Venture Co-disposal Facility extension	Loss and disturbance of artificial wetland habitat	Remedy through rehabilitation	Construction phase	
Site clearance and preparation work for construction	Increased sedimentation within the wetlands due to sediment rich runoff from the construction site	Remedy through rehabilitation	Construction phase	
Construction of Venture Co-disposal Facility extension and the haul road	Increased turbidity and water quality degradation in adjacent wetlands	Control through impact management	Continuously during Construction phase	Water use license water quality specifications for the resource
Cultural and Heritage Resources				
Operation of construction equipment	Disturbance of graves	Control through impact management	Continuously during Construction phase	South African Heritage Resources Agency (SAHRA) requirements

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Expansion of haul road footprint	Disturbance of graves	Control through impact management	Continuously during Construction phase	South African Heritage Resources Agency (SAHRA) requirements
Palaeontological Resources				
Operation of construction equipment	Disturbance of plant and animal fossils	Control through impact management	Continuously during Construction phase	South African Heritage Resources Agency (SAHRA) requirements
Expansion of haul road footprint	Disturbance of plant and animal fossils	Control through impact management	Continuously during Construction phase	South African Heritage Resources Agency (SAHRA) requirements
Groundwater				
Use of construction vehicles	Chemical leaks and spills from construction vehicles	Modify	Construction phase	Water use license water quality specifications for the resource
Noise				
Site preparation and construction (haul road and dumps)	Elevated noise levels emanating from site clearance and construction	Control through impact management	Continuously during Construction phase	SANS 10103 Code of Practice, Suburban districts with little road traffic
Socio-economic				
Site preparation and construction	Created job opportunities	Control through impact management	Continuously during Construction phase	As outlined in the Social and Labour Plan (SLP)
Soil				
Site preparation and soil excavation	Soil losses and compaction	Control through impact management	Continuously during Construction phase	N/A
Soil stockpiling	Soil losses and deterioration of soil quality	Control through impact management	Continuously during Construction phase	N/A
Surface water				

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Construction of the required additional operational “dirty” storm water management infrastructure around the extension discard area and existing facility.	Preparation work may result in increased erosion and sediment loads.	Control through impact management	Continuously during Construction phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
OPERATIONAL PHASE				
Air Quality				
Progression in footprint of discard facilities	Spontaneous combustion	Control through impact management	Continuously during Operational phase	NEM: AQA ambient air quality standards
Progression in footprint of discard facilities	Wind-blown emissions from hauling of discard and expansion of the discard dumps	Control through impact management	Continuously during Operational phase	NEM: AQA ambient air quality standards
Visual				
Progression in footprint and height of discard facilities	Visibility of dumps as a result of increasing height	Control through impact management	Continuously during Operational phase	
Placement of discard on discard dumps	Visible dust plumes emanating from the disposal activities and hauling discard	Remedy through rehabilitation	Continuously during Operational phase	
Biodiversity				
Progression is footprint of discard facilities	Decreased flows within adjacent wetlands due to catchment exclusion	Control through impact management	Continuously during Operational phase	
Progression is footprint of discard facilities	Water quality deterioration due to seepage from the dumps	Control through impact management	Continuously during Operational phase	Water use license water quality specifications for the resource
Cultural and Heritage Resources				
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Control through impact management	Continuously during Operational phase	South African Heritage Resources Agency (SAHRA) requirements

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Control through impact management	Continuously during Operational phase	South African Heritage Resources Agency (SAHRA) requirements
Palaeontological Resources				
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Control through impact management	Continuously during Operational phase	South African Heritage Resources Agency (SAHRA) requirements
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Control through impact management	Continuously during Operational phase	South African Heritage Resources Agency (SAHRA) requirements
Groundwater				
Haulage of coarse discard	Discard spills, chemical and oil spills	Modify	Operations phase	Water use license water quality specifications for the resource
Deposition of fine discard in Venture Co-disposal Facility	Seepage of process water from fine discard	Control decant through pit levels	Operations phase	Water use license water quality specifications for the resource
Deposition of coarse discard in Venture Co-disposal Facility embankments	Seepage from coarse discard	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Water use license water quality specifications for the resource
Deposition of coarse discard in South Pit Discard Dump	Seepage from coarse discard	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Water use license water quality specifications for the resource
Prevention of decant	Reduction in baseflow to Steenkoolspruit and Saaiwaterspruit	Prevent decant through control of water levels in pit.	Operations and post-closure phases	
Noise				

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Progression in footprint of discard facilities (hauling and placement of discard onto dumps)	Elevated noise levels associated with the hauling and placement of discard material on the dumps	Control through impact management	Continuously during Operational phase	
Socio-economic				
Completion of site preparation and construction/ Commencement of activity	Job losses of contactors/ temporary workers after construction ceases	Control through impact management	Continuously during Operational phase	Social and Labour Plan (SLP)
Soil				
Progression in footprint of discard facilities	Inadequate soil stockpile management	Control through impact management	Continuously during Operational phase	N/A
Surface water				
Discard placement on discard facility	Increased erosion and runoff from the discard material resulting in increased sedimentation and potential contaminated runoff reporting to surface water environment.	Control through impact management	Continuously during Operational phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
Loading of rehabilitation cover material onto truck for transportation to the discard facility	Hydrocarbon spills may result from discard vehicles and equipment during loading.	Control through impact management	Continuously during Operational phase	WHO Guidelines for Drinking Water Quality
Storm water management control	Mixing of dirty and clean water, resulting in prevention of clean surface water reporting to downstream catchment	Control through impact management	Continuously during Operational phase	Compliance with Regulations GN704
Storm water management control	Discharge from dirty storm water sump due to an extreme rainfall period.	Control through impact management	Continuously during Operational phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
Soil placement, capping and revegetation of discard site sections	Soil handling to convey soil and capping from stockpiles for surface rehabilitation activities may result in erosion and	Control through impact management	Continuously during Operational phase	Compliance with Water Quality Planning Limits

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
	sedimentation. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling discard material).			Compliance with Regulations GN704
Insufficient capping material with the appropriate soil characteristics as assumed in the capping design.	The desired lower recharge rates will not be achieved resulting in increased seepage, higher decant volumes and potential contamination of water resources.	Control through impact management	Continuously during Operational phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
DECOMMISSIONING AND CLOSURE PHASE				
Air Quality				
Rehabilitation of discard dumps involving the capping and vegetation	Wind-blown emissions from handling activities associated with Rehabilitation (hauling, loading and offloading)	Remedy through rehabilitation	Continuously during decommissioning and closure phase	NEM: AQA ambient air quality standards
Visual				
Rehabilitation of discard dumps involving the capping and vegetation	Presence of the discard dumps at final closure, the discard dump will remain in place, but it will be shaped and revegetated. .	Remedy through rehabilitation	Continuously during decommissioning and closure phase	
Biodiversity				
Rehabilitation of discard dumps involving the capping and vegetation	Sediment mobilising to wetlands	Remedy through rehabilitation	Decommissioning and closure phase	
Topsoil placement on dump slopes as part of rehabilitation	Establishment of alien vegetation	Control through impact management	Decommissioning and closure phase	
Leaching from the Co-disposal Facility	Water quality deterioration	Control through impact management	Decommissioning and closure phase	Water use license water quality specifications for the resource
Runoff emanating from rehabilitated dumps	Increased flow velocities in wetlands	Control through impact management	Decommissioning and closure phase	

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Cultural and Heritage Resources				
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of archaeological or cultural significance	Remedy through rehabilitation	Decommissioning and closure phase	South African Heritage Resources Agency (SAHRA) requirements
Palaeontological Resources				
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of palaeontological significance	Remedy through rehabilitation	Decommissioning and closure phase	South African Heritage Resources Agency (SAHRA) requirements
Groundwater				
Deposition of fine discard in Venture Co-disposal Facility	Seepage from dried fine discard	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Post-closure phase	Water use license water quality specifications for the resource
Deposition of coarse discard in Venture Co-disposal Facility embankments	Seepage from coarse discard	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Water use license water quality specifications for the resource
Deposition of coarse discard in South Pit Discard Dump	Seepage from coarse discard	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Water use license water quality specifications for the resource
Prevention of decant	Reduction in baseflow to Steenkoolspruit and Saaiwaterspruit	Prevent decant through control of water levels in pit.	Operations and post-closure phases	
Noise				
Rehabilitation of discard dumps involving the capping and vegetation	Elevated noise levels emanating from rehabilitation practices (topsoil placement and seeding)	Control through impact management	Continuously during decommissioning and closure phase	SANS 10103 Code of Practice, Suburban districts with little road traffic
Socio-economic				

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
Progression is footprint of discard facilities and maintenance of haul roads	Job security and skills transfer	Control through impact management	Continuously during Operational phase	As outlined in the Social and Labour Plan (SLP)
Soil				
Rehabilitation of discard dumps (Soil replacement	Soil losses and deterioration of soil quality	Control through impact management	Continuously during decommissioning and closure phase	N/A
Surface water				
Capping material properties inadequate to sustain vegetation growth.	Increase in erosion of discard facility and mobilisation of sedimentation. Increase in recharge rates and decant volumes and subsequent impact of receiving environment.	Remedy through rehabilitation	Continuously during decommissioning and closure phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
Decant of post closure water	Contamination of receiving water environment (surface and groundwater) due to decant acidic pit water (AMD).	Control through impact management	Continuously during decommissioning and closure phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
Higher volumes of decant at post closure than predicted.	Inefficiency of water treatment plant to treat required volumes and quality of water.	Control through impact management	Continuously during decommissioning and closure phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
Inadequate rehabilitation of the discard facility (inadequate cover)	Higher recharge rates will occur, resulting in increased seepage and consequently higher decant water volumes. This will impact on the treatment volumes and quality (impact on capacity of treatment plant), which could result in contamination of water resources if not treated.	Remedy through rehabilitation	Continuously during decommissioning and closure phase	Compliance with Water Quality Planning Limits Compliance with Regulations GN704
Storm water management control	Inadequate storm water control measures on decommissioning may result in mixing of dirty and clean water.	Control through impact management	Continuously during decommissioning and closure phase	Compliance with Water Quality Planning Limits

Activity	Potential impact	Mitigation type	Time period for implementation	Compliance with standards
	This could result in prevention of clean water surface water reporting to downstream catchment and potential contamination of receiving water resources by dirty water.			Compliance with Regulations GN704

20.0 SUMMARY OF POTENTIAL IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

This section summarizes the potential impacts of various aspects of the iMpunzi project in all its stages, from construction, through operations to eventual decommissioning, together with the appropriate mitigation and monitoring measures to manage the identified impacts (Table 34 to Table 36). Impact management actions as well as impact management outcomes are provided in Table 32 and Table 33. Responsibilities for implementing the mitigation measures are identified and the frequencies with which the results of the various measures are to be monitored are set out in the same tables listed above. Additionally, Glencore must submit environmental audits and performance reports as stipulated in the various authorizations. The responsibility for monitoring and reporting the results to the appropriate level of management within Glencore rests with the Environmental Control Officer (ECO).

20.1 Construction phase

Table 34 outlines construction phase impacts that need to be mitigated and monitored and their associated impact management outcomes and impact management actions.

Table 34: Impacts to be mitigated and monitored in their respective phases, impact outcomes and impact actions – construction phase

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Groundwater							
Use of construction vehicles	Chemical leaks and spills from construction vehicles	water quality	Maintenance, use of drip trays.	Modify	Construction phase	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Suitability of the Tweefontein WTP to handle post closure water volumes from the proposed discard facilities	Tweefontein WRP not designed for the potential quantity and quality of feed from the proposed discard facilities		Develop a predicted 95th percentile concentration scenario, to indicate potential variability in feed concentrations to even higher levels than currently indicated in the average scenarios (as completed in the Groundwater impact assessment report APPENDIX K); Run RO simulations to ascertain the impact of the higher ionic concentrations in the feed on the % water recovery that can be achieved. Some components associated with scale formation, e.g. Calcium still seems to be within range, but the overall TDS increase impact on recovery needs to be quantified; Since the treatment plant was designed for modular expansion, some expansions may need to be assessed. Verify revised flow rates from Glencore Goedgevonden and Tweefontein to the treatment plant to confirm that treatment capacity is not exceeded. Ensure that the mine's dirty water management system and Tweefontein Water Treatment Plant (WTP) has capacity to handle the excess mine water make from both of the South Pit Coarse Discard Dump and the Venture Co-disposal facility that are and will in future be pumped to the Tweefontein WTP;	Control through impact management	Construction phase		Environmental Manager; iMpunzi Site Manager; ECO
Cultural and Heritage							
Operation of construction equipment	Disturbance of graves	Cultural and Heritage Resources	Chance find procedure to be implemented immediately should any heritage resources be unearthed: Cease all work in the immediate vicinity of the find; Demarcate the area with barrier tape or other highly visible means; Notify the South African Heritage Resources Authority (SAHRA) immediately; Commission an archaeologist accredited with the Association for Southern African Professional Archaeologists (ASAPA) to assess the find and determine appropriate mitigation measures. These may include obtaining the necessary authorisation from SAHRA to conduct the mitigation measures; and Prevent access to the find by unqualified persons until the assessment and mitigation processes have been completed.	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Expansion of haul road footprint	Disturbance of graves	Cultural and Heritage Resources		Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Palaeontological Resources							

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Operation of construction equipment	Disturbance of plant and animal fossils	Palaeontological Resources	iMpunzi needs to clearly stake or peg-out (survey) the areas affected by the operations and dig representative trenches and if possible supply geological borehole data; When clearing topsoil, subsoil or overburden and hard rock (outcrop) is found, the contractor needs to stop all work; A Palaeobotanist / palaeontologist must then inspect the affected areas and trenches for fossiliferous outcrops / layers. The iMpunzi may be asked to move structures, and put the development on hold; If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue; After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected; When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once a week); and At this stage the palaeontologist / palaeobotanist in consultation with the iMpunzi must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Expansion of haul road footprint	Disturbance of plant and animal fossils	Palaeontological Resources		Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Wetland							
Construction of Venture dump extension	Loss and disturbance of artificial wetland habitat	Wetland	All construction areas should be fenced off/clearly demarcated prior to commencement of vegetation clearing activities to prevent access to adjacent wetlands and their associated buffer zones by construction machinery and personnel. All wetland areas should be clearly demarcated as such to alert construction staff on site. All construction staff should also be educated on the importance and sensitivity of the wetland systems on site. Develop and implement a construction storm water management plan prior to the commencement of site clearing activities including strategically placed sediment barriers and energy dissipaters. Install sediment traps and sediment barriers where necessary; Limit the area of disturbance and vegetation clearing to as small an area as possible; Protect storm water discharge points against erosion and incorporate energy dissipaters; Ensure that abstracted mine affected water is treated to a standard suitable for discharge to the environment; Any changes in the biotic integrity of the Steenkoolspruit should be investigated following the implementation of the project; Erosion within the construction site must be minimised through the following: Limit the area of disturbance and vegetation clearing to as small an area as possible; Where possible, undertake construction during the dry season; Phase vegetation clearance activities and limit the exposure time of bare soil; Control of storm water flowing into and through the site. Where required, storm water from upslope should be diverted around the construction site; Revegetate soils, as soon as possible, after disturbance and construction activities; and Slopes should be protected and stabilised using geotextiles or any other suitable product designed for the purpose.	Remedy through rehabilitation	Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Site clearance and preparation work for construction	Increased sedimentation within the wetlands due to sediment rich runoff from the construction site	Wetland	Sediment transport off the site must be minimised through the following: Establishment of perimeter sediment controls that can be achieved through the installation of sediment fences along downslope verges of the borrow pit site where surface flows leave the site. Where channelled or concentrated flow occurs, reinforced sediment fences or other sediment barriers such as sediment basins can be used; Discharge of storm water from the construction site into adjacent grassland. Discharged flows must be slow and diffused; and Regular inspection and maintenance of sediment controls. Ensure that no equipment is washed in the streams and wetlands and washing bays should be placed no closer than 500 m from a wetland or watercourse. No abstraction of water from the wetlands or pans should be allowed unless authorised by a WUL; To reduce the potential impacts associated with the introduction of contaminants dissolved or suspended in the runoff from construction sites, where practically possible, no runoff should be introduced into wetlands directly. Introduction into dryland areas is preferred as the vegetation and soils provide an opportunity to limit the movement of contaminants and the environment is conducive for natural degradation; Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks. Sufficient spill clean-up material must be kept on site at all times to deal with minor spills. Larger spills should be reported to the Environmental Manager and/or Environmental Control Officer (ECO), coordinator and the relevant authorities (DWS) immediately, with specialists appointed to oversee the clean-up operations.	Remedy through rehabilitation	Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Construction of Venture dump extension and the haul road	Increased turbidity and water quality degradation in adjacent wetlands	Wetland	Deterioration in wetland water quality as a result of the haul road expansion: Appropriate erosion protection and sediment control measures should be implemented during both construction and operation to prevent discharge of sediments to the valley bottom wetland; Any waste from the construction process should be removed from the construction site; Keep sufficient quantities of spill clean-up materials on site and/or on the construction vehicles to manage any incidental spills; and Maintenance of construction vehicles is to be undertaken offsite and all vehicles used on site are to be in good working order without leakage of any oils, greases etc.	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Socio-economic							
Site preparation and construction	Created job opportunities	Local Community	General workers should be sourced locally as far as possible as they will be the most affected by the proposed project A local skills database must be developed and updated regularly. The skills database should be used for recruitment purposes. A monitoring system should be put in place to ensure that iMpunzi's recruitment policy is adhered to.	Control through impact management	Continuously during Construction phase	N/A	Environmental Manager; iMpunzi Site Manager; ECO
Visual							
Site preparation and construction (haul road and dumps)	Activities leading to visible plumes of dust	Visual	Limit the physical extent of cleared areas as much as possible and implement concurrent rehabilitation as far as practically possible. Apply sufficient wet suppression to ensure absence of visible dust. Enforce a speed limit on-site and haul roads for all construction vehicles. Plant indigenous trees along the eastern embankment of the Venture discard dump. Placement of topsoil stockpiles and earth berms, which should be vegetated as soon as possible, along the regional road at the Venture dump to act as a windbreak. Establish a dust bucket system around the site perimeter to monitor dust fall out.	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Air Quality							
Site preparation and construction	Wind-blown emissions/dust from expansion site open and exposed areas	Air quality	Apply dust suppression on the haul roads and the cleared footprint areas All equipment and vehicles should be maintenance on a regular basis to prevent huge amounts of carbon dioxide emissions associated with poorly maintained vehicles. Attempt to keep the cleared footprint to a minimum as far as possible. Investigate and implement alternative abatement measures, like wind net stabilizer or the planting of indigenous trees along the dump footprint to act as a windbreak. Dust collection buckets installed downwind discard dumps.	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Noise							
Site preparation and construction (haul road and dumps)	Elevated noise levels emanating from site clearance and construction	Noise levels	The most appropriate equipment should be used for the particular purpose of site clearance and construction. The equipment should be well maintained and fitted with the correct and appropriate noise abatement measures. All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced. Vehicles should not be allowed to idle when not in use.	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Soil							
Site preparation and soil excavation	Soil losses and compaction	Soil Health	Conduct soil stripping during the dry season, when the moisture content is as low as possible, to prevent compaction and hard setting of soil Develop and implement a soil handling procedure to reduce overhandling which can compromise the soil health Appropriate equipment should be used Implement an effective loading and offloading plan to ensure no soil losses as a result of soil spillages	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Soil stockpiling	Soil losses and deterioration of soil quality	Soil Health	Place removed soil at the final location in the rehabilitation profile to reduce re-handling Ensure the soils are stockpiled at flat slopes (smaller or equivalent to the soils natural angle of repose) to prevent erosion and soil losses Prevent compaction of the topsoil stockpile by end-tipping and restricting the stockpile height Ensure the stockpiles are situated in a free draining location to prevent water logging Revegetate the stockpile as soon as possible to prevent further soil losses	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Surface water							
Construction of the required additional operational “dirty” storm water management infrastructure around the extension discard area and existing facility.	Preparation work may result in increased erosion and sediment loads.	Receiving water course	Mitigation measures should include installation of drainage control berms to limit erosion and sedimentation. The construction activity should be maintained as small as possible.	Control through impact management	Continuously during Construction phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

20.2 Operational phase

Table 35 outlines operational phase impacts that need to be mitigated and monitored and their associated impact management outcomes and impact management actions.

Table 35: Impacts to be mitigated and monitored in their respective phases, impact outcomes and impact actions – operational phase

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Groundwater							
Haulage of coarse discard	Discard spills, chemical and oil spills	water quality	Correct loading Safe Operating Procedure (SOP) to be developed Regular maintenance of vehicles and the usage of drip trays	Modify	Operations phase	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Deposition of slurry in Venture Co-disposal Facility	Seepage of process water from slurry	water quantity and water quality	Implement a min. 300mm cover on the discard dumps to decrease recharge into the groundwater resource; Continuous abstraction of contaminated pit water to prevent decant. Existing groundwater level monitoring network for the study area should continue to be utilised; Boreholes downgradient of backfilled or rehabilitated pits should be monitored for rising water levels, and potential decant of these pits; Groundwater levels should continue to be monitored monthly. Should it be identified that groundwater dependent/private users within the vicinity are impacted, it may be necessary to conduct a water supply options analysis and develop a supply strategy to meet the deficits; Kinetic testing of the discard dumps and fine discard material to predict post closure groundwater quality; Instillation of interceptor boreholes downgradient of facilities to capture the contaminant plume from reaching river channels (Steenkoolspruit); The discard should be compacted sufficiently directly after placement to avoid oxygen ingress and consequently spontaneous combustion The side slopes of the advancing face of the dump were therefore designed to a slope of 1V:3H. Discard should not be steeper than a slope of 1V:3H during any stage of discard placement to allow for safe access of construction and compaction vehicles; All areas of spontaneous combustion must be extinguished as soon as possible; The drop distance from which the discard is tipped should be minimized where possible; Avoiding, as far as possible, the disposal of discard onto the dump during windy conditions to reduce dust generation; Implement concurrent rehabilitation as far as practically possible; and Actual boreholes yields would need to be verified and confirmed on site upon construction of the proposed abstraction boreholes.	Control decant through pit levels	Operations phase	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Deposition of coarse discard in Venture Co-disposal Facility embankments	Seepage from coarse discard	water quality		Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Deposition of coarse discard in South Pit Coarse Discard Dump	Seepage from coarse discard	water quality		Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Prevention of decant	Reduction in baseflow to Steenkoolspruit and Saaiwaterspruit	water quantity		Prevent decant through control of water levels in pit.	Operations and post-closure phases	No streamflow reduction activity	Environmental Manager; iMpunzi Site Manager; ECO
Cultural and Heritage							
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Cultural and Heritage Resources	Chance find procedure to be implemented immediately should any heritage resources be unearthed: Cease all work in the immediate vicinity of the find; Demarcate the area with barrier tape or other highly visible means; Notify the South African Heritage Resources Authority (SAHRA) immediately; Commission an archaeologist accredited with the Association for Southern African Professional Archaeologists (ASAPA) to assess the find and determine appropriate mitigation measures. These may include obtaining the necessary authorisation from SAHRA to conduct the mitigation measures; and Prevent access to the find by unqualified persons until the assessment and mitigation processes have been completed.	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Cultural and Heritage Resources		Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Palaeontological Resources							
Operation and maintenance of haul roads	No impacts expected, but chance finds with potentially high impacts could occur	Palaeontological Resources	iMpunzi needs to clearly stake or peg-out (survey) the areas affected by the operations and dig representative trenches and if possible supply geological borehole data; When clearing topsoil, subsoil or overburden and hard rock (outcrop) is found, the contractor needs to stop all work; A Palaeobotanist / palaeontologist must then inspect the affected areas and trenches for fossiliferous outcrops / layers. The iMpunzi may be asked to move structures, and put the development on hold; If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue; After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected; When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once a week); and At this stage the palaeontologist / palaeobotanist in consultation with the iMpunzi must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Progression is footprint of discard facilities	No impacts expected, but chance finds with potentially high impacts could occur	Palaeontological Resources		Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Wetland							
Progression is footprint of discard facilities	Decreased flows within adjacent wetlands due to catchment exclusion	Wetland	Development and implementation of a mine water management strategy for effective clean and dirty water separation. This strategy must include allowance for the treatment of contaminated water; Implementation and maintenance of dirty water infrastructure surrounding the facilities, which also include regular inspections of all water management infrastructures; Minimising the extent of dirty water areas as far as practically possible; Ensure all clean water is diverted around dirty water areas and allowed to re-enter the environment; Construction of clean water diversion canals as vegetated swales rather than cement lined canals wherever possible; Implement dust suppression within areas where carbonaceous dust may be generated and areas of heavy vehicle traffic; Implementation of a water quality and biomonitoring strategy; and Develop and implementing an emergency response procedure for clean-up of any major spillages	Control through impact management	Continuously during Operational phase	N/A	Environmental Manager; iMpunzi Site Manager; ECO
Progression is footprint of discard facilities	Water quality deterioration due to seepage from the dumps	Wetland		Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Socio-economic							
Completion of site preparation and construction/ Commencement of activity	Job losses of contactors/ temporary workers after construction ceases	Local Community	Skills development programmes should be implemented to capacitate temporary workers/ contractors with the skills necessary to secure other employment opportunities.	Control through impact management	Continuously during Operational phase	NA	Environmental Manager; iMpunzi Site Manager; ECO
Progression is footprint of discard facilities and maintenance of haul roads	Job security and skills transfer	Current employees	Employees will continue to benefit from work experience as well as formal training programmes, especially those individuals who start with a low-level skill set. As per iMpunzi's SLP, employees will be exposed to a human resources development strategy. iMpunzi will continue contributing positively to the local economic development of communities in the project area through its local economic development programme	Control through impact management	Continuously during Operational phase	NA	Environmental Manager; iMpunzi Site Manager; ECO
Visual							

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Progression in footprint and height of discard facilities	Visibility of dumps as a result of increasing height	Visual	Water down haul roads and large bare areas as frequently as is required to minimise airborne dust. Plant and maintain a screen of indigenous trees around the perimeter of the site. Strategic placement of topsoil stockpiles and earth berms along the regional road at the Venture dump to decrease the visual impact and to act as a wind break. Apply chemical dust suppressants if deemed necessary. Enforce a speed limit on-site and on haul roads for all vehicles. Implement concurrent rehabilitation to reduce the visual impact of the bare side slopes of the dumps.	Control through impact management	Continuously during Operational phase	Avoidance	
Placement of discard on discard dumps	Visible dust plumes emanating from the disposal activities and hauling discard	Visual		Remedy through rehabilitation	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Air Quality							
Progression in footprint of discard facilities	Spontaneous combustion	Air quality	Investigate and implement alternative abatement measures, like wind net stabilizer or the planting of indigenous trees along the dump footprint to act as a windbreak; Apply dust suppression on the haul roads and areas as necessary; Discard should be compacted as frequently as possible to create anoxic conditions which could reduce the probability of spontaneous combustion; If spontaneous combustion commonly occurs on site, trace gas monitoring of the fugitive combustion emissions must be undertaken to determine the impact on the ambient air quality and compliance with the National Ambient Air Quality Standards (NAAQS); All areas of spontaneous combustion must be extinguished as soon as possible; The drop distance from which the discard is tipped should be minimized where possible; Avoiding, as far as possible, the disposal of discard onto the dump during windy conditions to reduce dust generation; Dust and fine particulate monitoring should be implemented to monitor compliance with NAAQS; and Implement concurrent rehabilitation of the discard dumps to reduce the visual intrusion.	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Progression in footprint of discard facilities	Wind-blown emissions from hauling of discard and expansion of the discard dumps	Air quality		Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Noise							
Progression in footprint of discard facilities (hauling and placement of discard onto dumps)	Elevated noise levels associated with the hauling and placement of discard material on the dumps	Noise levels	Speed limits should be enforced to reduce the noise from vehicle traffic; The most appropriate equipment should be used for the particular purpose to haul and deposit the discard material; The haul road must be levelled and compacted on a regular basis to reduce friction on the road leading to noise arising from the road/tyre interaction; All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and Vehicles should not be allowed to idle when not in use. If noise levels associated with material handling activities are deemed as too high, mechanisms to reduce noise levels must be investigated	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Soil							
Progression in footprint of discard facilities	Inadequate soil stockpile management	Soil Health	Revegetate the bare patches on stockpiles every growing season Fertilize and seed by hand as far as practically possible to prevent compaction Do not dump any waste material/ discard next to the stockpile to reduce possibility of contamination Develop and implement a stockpile management / monitoring / awareness raising programme to ensure that soil is only used for it's intended use.	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Surface water							
Discard placement on discard facility	Increased erosion and runoff from the discard material resulting in increased sedimentation and potential contaminated runoff	Receiving water course	Protect spoils area from erosion by utilising applicable erosion procedures. Ensure adequate compaction of discard material and concurrent rehabilitation. Ensure that the storm water controls are in compliance with GN704 for the discard facility. Ensure regular maintenance of the diversion channels. Channels that have been eroded during storms should be maintained, including excavation of sediments, reinstatement of channels, removal of washed down vegetation and litter	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
	reporting to surface water environment.						
Loading of rehabilitation cover material onto truck for transportation to the discard facility	Hydrocarbon spills may result from discard vehicles and equipment during loading.	Receiving water course	Clean up spillages immediately and dispose of contaminated materials to a permitted waste site.	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Contamination of the environment and receiving water course due to pipe breakage/ leakage	Contamination of the environment and receiving water course due to pipe breakage/ leakage	Receiving water course	Inspect the pipeline monthly to assess any weaknesses, and Ensure that the pipeline is not accessible to vandals.	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Storm water management control	Mixing of dirty and clean water, resulting in prevention of clean surface water reporting to downstream catchment	Receiving water course	Design storm water management facilities for the discard facility is to comply with regulation GN 704 so that clean water is diverted away from the mining operations to the water resources.	Control through impact management	Continuously during Operational phase	Avoidance	
Storm water management control	Discharge from dirty storm water sump due to an extreme rainfall period.	Receiving water course	Ensure regular maintenance of the diversion channels. Channels that have been eroded during storms are to be maintained, including excavation of sediments, reinstatement of channels, removal of washed down vegetation and litter. Provide erosion protection for the clean water conveyance trench. Erosion protection in the form of scour aprons with energy dissipation must be provided at the discharge points of each channel and scour aprons with stilling basins are required at the outlet of pipe chutes	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Soil placement, capping and revegetation of discard site sections	Soil handling to convey soil and capping from stockpiles for surface rehabilitation activities may result in erosion and sedimentation. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling discard material).	Receiving water course	Revegetate placed cover material as quickly as possible; Manage the use of earth moving machinery in accordance with the mine's standard operating procedures; Develop the discard facilities in accordance with the design slopes	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Insufficient capping material with the appropriate soil characteristics as assumed in the capping design.	The desired lower recharge rates will not be achieved resulting in increased seepage, higher decant volumes and potential contamination of water resources.	Surface and groundwater water resources	Implement the required min. 300mm cover design option to ensure optimal recharge rates. Ensure adequate overburden and topsoil material as required to meet the optimal capping make-up to limit seepage to groundwater resources. Comply to rehabilitation and closure plan Ensure adequate compaction of discard material and ensure that concurrent rehabilitation takes place Implement corrective measures identified in ongoing rehabilitation performance monitoring and assessment	Control through impact management	Continuously during Operational phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

20.3 Closure and rehabilitation phase

Table 36 outlines decommissioning and closure phase impacts that need to be mitigated and monitored and their associated impact management outcomes and impact management actions.

Table 36: Impacts to be mitigated and monitored in their respective phases, impact outcomes and impact actions – closure and rehabilitation phase

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Groundwater							
Deposition of coarse discard in Venture Co-disposal Facility embankments	Seepage from coarse discard	water quality	Implement a min. 300mm cover on the discard dumps to decrease recharge into the groundwater resource; Actual boreholes yields would need to be verified and confirmed on site upon construction of the proposed abstraction boreholes; and Continuously abstract contaminated pit water to prevent decant, in line with the minimum required as to not result in decreased baseflow	Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Deposition of coarse discard in South Pit Coarse Discard Dump	Seepage from coarse discard	water quality		Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Operations and post-closure phases	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Prevention of decant	Reduction in baseflow to Steenkoolspruit and Saaiwaterspruit	water quantity		Prevent decant through control of water levels in pit.	Operations and post-closure phases	No streamflow reduction activity	Environmental Manager; iMpunzi Site Manager; ECO
Deposition of slurry in Venture Co-disposal Facility	Seepage from dried slurry	water quality		Prevent decant through control of water levels in pit. Remedy recharge through rehabilitation	Post-closure phase	Measured water quality parameters in the river and shallow groundwater are compliant	Environmental Manager; iMpunzi Site Manager; ECO
Cultural and Heritage							
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of archaeological or cultural significance	Cultural and Heritage Resources	Not applicable	Remedy through rehabilitation	Decommissioning and closure phase	N/A	Environmental Manager; iMpunzi Site Manager; ECO
Palaeontological Resources							
Site rehabilitation and closure	Closure and rehabilitation activities cannot affect any sites of palaeontological significance	Palaeontological Resources	Not applicable	Remedy through rehabilitation	Decommissioning and closure phase	N/A	Environmental Manager; iMpunzi Site Manager; ECO
Wetland							
Rehabilitation of discard dumps involving the capping and vegetation	Sediment mobilising to wetlands	Wetland	The discard facilities should be rehabilitated in whaleback fashion with as low slopes as possible; Discard facilities to be covered with topsoil and re- vegetated with indigenous grass as soon as possible to reduce the exposure time of the bare soil; The discard facilities must be designated clean water areas following completion of rehabilitation; Rehabilitation monitoring should be implemented to ensure the successful establishment of vegetation; Measures should be implemented to manage storm water runoff from the steep slopes of the rehabilitated dump; Implement velocity dissipater structures at the confluence of clean surface runoff from the rehabilitated areas and the receiving environment; Sediment traps should be strategically placed to reduce sedimentation of the wetlands; and	Remedy through rehabilitation	Decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
Topsoil placement on dump slopes as part of rehabilitation	Establishment of alien vegetation	Wetland	The mitigation measures recommended in the groundwater section of this report should be implemented to ensure that no decant reports to the receiving environment	Control through impact management	Decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Leaching from the Co-disposal Facility	Water quality deterioration	Wetland		Control through impact management	Decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Run-off emanating from rehabilitated dumps	Increased flow velocities in wetlands	Wetland		Control through impact management	Decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Visual							
Rehabilitation of discard dumps involving the capping and vegetation	Presence of the discard dumps at final closure, the discard dump will remain in place, but it will be shaped and revegetated. .	Visual	A post-closure land use plan for the mine, considering current and proposed future land uses should be developed and implemented, to ensure successful re-integration of the dumps into the visual fabric of the surrounding area at closure; Maintain a screen of indigenous trees around the perimeter of the Venture Co-disposal Facility; and Effective establishment of indigenous grass species on the dumps and continuous monitoring to ensure effective establishment	Remedy through rehabilitation	Continuously during decommissioning and closure phase	N/A	Environmental Manager; iMpunzi Site Manager; ECO
Air Quality							
Rehabilitation of discard dumps involving the capping and vegetation	Wind-blown emissions from handling activities associated with Rehabilitation (hauling, loading and offloading)	Air quality	Dust suppression should be implemented continuously throughout the rehabilitation phase. Where practically possible, concurrent rehabilitation should be implemented. Speed limits should be enforced to reduce dust emanating from haul roads. The placement of topsoil should be conducted during months with low wind speeds. Vegetation should directly follow topsoil placement, if possible, to decrease the exposure time.	Remedy through rehabilitation	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Noise							
Rehabilitation of discard dumps involving the capping and vegetation	Elevated noise levels emanating from rehabilitation practices (topsoil placement and seeding)	Noise levels	The most appropriate equipment should be used for the particular purpose of topsoil placement and vegetation; The haul road must be levelled and compacted on a regular basis to reduce friction on the road leading to noise arising from the road/tyre interaction; Rigorous speed control measures should be implemented, either speed bumps or speed limits to reduce the noise from vehicle traffic All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and Vehicles should not be allowed to idle when not in use	Control through impact management	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Soil							
Rehabilitation of discard dumps (Soil replacement	Soil losses and deterioration of soil quality	Soil Health	Use appropriate equipment and soils should be replaced to the greatest possible thickness in single lifts to prevent compaction Soils should be replaced when they are dry Smooth the replaced soils using dozers rather than graders to prevent compaction and surface crusting Soils should be ripped to effective root-depth and seeded as soon as possible	Control through impact management	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Surface water							
Capping material properties inadequate to sustain vegetation growth.	Increase in erosion of discard facility and mobilisation of sedimentation. Increase in recharge rates and decant	Surface and groundwater water resources	Ensure adequate overburden and topsoil material as required to meet the optimal capping make-up to limit seepage to groundwater resources. Comply to rehabilitation and closure plan and EMPr requirements.	Remedy through rehabilitation	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

Activity	Potential impact	Aspects affected	Detailed mitigation measures	Mitigation type	Time period for implementation	Standards to be achieved	Responsible person
	volumes and subsequent impact of receiving environment.						
Decant of post closure water	Contamination of receiving water environment (surface and groundwater) due to decant acidic pit water (AMD).	Surface and groundwater water resources	Implementation of water management options to pump and treat water to the required specifications to achieve desired discharge water qualities as per the recommendation made in Golder, 2019d.	Control through impact management	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Higher volumes of decant at post closure than predicted.	Inefficiency of water treatment plant to treat required volumes and quality of water.	Receiving water course	Finalise the integrated water balance for entire iMpunzi MRA to determine excess water required to be managed. Continue with level measurements and metering in order to improve calibration of models. Monitor the performance of the treatment plant on an ongoing basis. Maintenance activities to be scheduled during dry seasons. Conduct ongoing rehabilitation performance monitoring and assessment.	Control through impact management	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Inadequate rehabilitation of the discard facility (inadequate cover)	Higher recharge rates will occur, resulting in increased seepage and consequently higher decant water volumes. This will impact on the treatment volumes and quality (impact on capacity of treatment plant), which could result in contamination of water resources if not treated.	Receiving water course (non-perennial stream) and groundwater resource	Implement the optimal cover design option and depth to ensure the lower recharge rates are achieved.	Remedy through rehabilitation	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO
Storm water management control	Inadequate storm water control measures on decommissioning may result in mixing of dirty and clean water. This could result in prevention of clean water surface water reporting to downstream catchment and potential contamination of receiving water resources by dirty water.	Receiving water course (non-perennial stream) and groundwater resource	Ensure that the storm water controls are in compliance with GN704 or the necessary GN-704 exemption has been applied for, and that clean water is separated enabling runoff into catchment. Implement monitoring programme to regular monitor water quality or more frequently during the rainy season to get an understanding of the potential contaminants of concern and adequacy of control measures	Control through impact management	Continuously during decommissioning and closure phase	Avoidance	Environmental Manager; iMpunzi Site Manager; ECO

21.0 FINANCIAL PROVISION IN RESPECT OF THIS PROPOSED SOUTH PIT DISCARD DUMP AND VENTURE CO-DISPOSAL FACILITY

21.1 Closure Objectives

The following points outline the main objectives for rehabilitation and closure of the proposed activities:

- Make all areas stable and sustainable;
- Follow a process of closure that is progressive and integrated into the short and long-term plans, and that will assess the closure impacts proactively at regular intervals throughout project life and in relation to the broader iMpunzi operation;
- Rehabilitation should strive to rehabilitate the soil and land capability to emulate pre-disturbance land capability;
- Minimise negative impacts and maximise positive benefits on the local community;
- Maintain and monitor all rehabilitated areas following re-vegetation and, if this monitoring shows that the objectives have been met, make an application for closure;
- Prevent soil and surface/groundwater contamination by managing all water on site to acceptable and agreed standards;
- Comply with local, district and national regulatory requirements; and
- Long-term monitoring of key environmental variables (i.e. soils, erosion, vegetation, groundwater, surface water and air quality).

A rehabilitation plan for the proposed discard dump expansion project was developed with the baseline environment as a foundation to meet the closure objectives.

21.2 Rehabilitation Plan

For each phase of the dump development, the following rehabilitation strategy is proposed (Golder Associated Africa (Pty) Ltd (k), August 2020):

- The dump will be constructed in layers resulting in benches;
- Once a phase is complete the areas unaffected by the next phase construction will be rehabilitated;
- The first rehabilitation action will be to shape the benches to a uniform 1:5 slope;
- A capillary breaker layer will be installed once the shaping is complete;
- The costing assumes a capping depth of min. 300mm, the exact spilt between subsoils and topsoil is still to be determined;
- Revegetation will include agricultural ripping to alleviate compaction but not to disturb the capillary breaker layer, scarifying, hydroseeding with a seed mix and ameliorants based on dedicated soil sampling;
- Clean water storm water measures aligned with the options analysis report will be constructed to reroute clean water runoff from rehabilitated areas; and
- Post rehabilitation measures include:
    - Rehabilitation monitoring;

- High intensity maintenance to ensure the viability of the rehabilitation; and
- Low intensity maintenance including pasture maintenance (cutting and baling) following the high intensity period.

21.3 Closure Costs

21.3.1 Unit Rates

The unit rates for general rehabilitation and closure measures and activities were obtained from Golder's existing database in consultation with demolition and earthworks contractors, as well as with rehabilitation practitioners. Golder undertakes a thorough review of its unit rate database, as follows:

- Minor unit rates are adjusted with standard inflation, with confirmation generally occurring annually;
- Key rates for the dismantling of infrastructure are benchmarked by a specialised demolition contractor, to ensure that it remains market-related and take account of the latest dismantling and demolition techniques;
- Earthworks rates are benchmarked against recent tenders available to Golder as well as benchmarking in discussions with contractors; and
- Aggregated rates dependent on base infrastructure or earthworks related rates are recalculated given the latest base rates.

The unit rates applied in the closure cost estimate were last updated in March 2019, and were escalated to February 2020, using 3.1% escalation, as informed by CPI data from StatsSA.

21.3.2 Closure cost assessment

The closure measures as per the GN R. 1147 Regulations, where applicable, are reflected in Table 37.

Table 37: Closure measures as per the GN R 1147 regulation (where applicable)

Aspect	Closure Measures
Infrastructural areas	
Steel structures reinforced concrete structures, buildings and related structures and infrastructure	**Return water pump station and concrete channels** ■ Dismantle surface infrastructure; ■ Demolish and dispose of concrete material; ■ Replace topsoil – min. of 300 mm deep topsoil shall be placed under the entire area of the demolished structure; ■ Rip top alleviate compaction; and ■ Ameliorate soils based on dedicated soil fertility sampling and establish vegetation by applying suitable seed mix. **Pipelines** ■ Dismantle pipelines and demolish concrete footings; ■ Sell-off salvageable material (steel, rubber belts, etc.) to identified third party; ■ Ameliorate soils based on dedicated soil fertility sampling, rip and shape footprint area to be free-draining, aligned to site-wide routing; and ■ Ameliorate soils based on dedicated soil fertility sampling and establish vegetation by applying suitable seed mix.
Roads	**Haul road**

Aspect	Closure Measures
	■ Ameliorate soils based on dedicated soil fertility sampling, rip and shape footprint area to be free-draining, aligned to site-wide routing; and ■ Ameliorate soils based on dedicated soil fertility sampling and establish vegetation by applying suitable seed mix.
Fences	■ Not applicable.
Demolishing waste	
Disposal of demolition waste	**General** ■ Allowance for sorting and screening of demolition waste. **Concrete demolition waste** ■ Transport concrete to a licensed disposal facility in eMalahleni. **Steel** ■ Recycle waste that can be recycled/salvaged (e.g. steel) after decontamination. **Hazardous waste** ■ Transport hazardous waste to Holfontein hazardous waste disposal facility.
Mining areas	
Rehabilitation of final voids and ramps	■ Not applicable.
Sealing of shafts, adits and inclines	■ Not applicable.
Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	**Discard dump** ■ Shape the top surface to be free draining; ■ Apply soil cover/ capping material to a depth of min. 300 mm; and ■ Vegetate entire surface of landform. **Co-disposal** ■ Shape the top surface to be free draining; ■ Apply soil cover/ capping material to a depth of min. 300 mm; and ■ Vegetate entire surface of landform.
Rehabilitation of dirty water impoundments	**Return water dam** ■ Remove the contaminated sediment and dispose of in the co-disposal; ■ Remove HDPE liner, shred and dispose of in in the co-disposal; ■ Backfill dam basin and shape area to be free draining; ■ Topsoil placement to 300 mm over rehabilitated area; ■ Rip to alleviate compaction; and ■ Ameliorate soils based on dedicated soil fertility sampling and establish vegetation by applying suitable seed mix.
General surface rehabilitation	
General surface rehabilitation	**Rehabilitated and reshaped areas** ■ Restore land to the agreed land capability by reinstating a free-draining surface topography and placing sufficient soil/growth medium and revegetate. **Vegetation**

Aspect	Closure Measures
	■ Establish vegetation by applying suitable seed mix; and continue with alien plant eradication programme by cutting and/or use of herbicides.
Water management	
Re-instatement of drainage lines	■ No measures applied as it has been assumed general surface rehabilitation shaping will account for the drainage lines and free draining.
River diversion	■ Not applicable (assumed included in site-wide closure plan and costs).
Post-closure aspects	
Surface water and groundwater monitoring	■ Monitor groundwater for a period of 5 years post-closure (or until site relinquishment criteria have been met); and ■ Monitor surface water for a period of 5 years post-closure (or until site relinquishment criteria have been met).
Rehabilitation monitoring	■ Conduct rehabilitation monitoring for a period of 5 years post-closure (or until site relinquishment criteria have been met).
Care and maintenance	Undertake maintenance and aftercare for 5 years after mine production has ceased, by: ■ Applying fertilizer annually over rehabilitated areas; ■ Undertaking monitoring of surface and groundwater quality; ■ Controlling alien plants; and ■ Undertaking general maintenance, including rehabilitation of cracks and subsidence.
Additional allowances	
Preliminary and general	■ Additional allowance of 25% P&Gs and 10% contingencies were applied to Subtotal 1 in Table 38 below.

21.3.3 Rehabilitation and closure costs

The scheduled closure costs for the discard dump and co-disposal, as at February 2020, amount to approximately **R159 million** (including P&Gs and contingencies, and excluding VAT), as summarised in Table 38. The detailed costing spreadsheet is provided in the closure costing report under APPENDIX L.

Table 38: Scheduled closure costs summary for the discard dump, co-disposal and associated infrastructure

Closure components		Scheduled Closure (2041)
1	Infrastructural aspects	R 12,962,916
2	Mining aspects	R 86,155,009
3	General surface rehabilitation	R 10,164,050
	Sub-Total 1	**R 109,281,975**
5	**Post-Closure Aspects**	
5.1	Surface water monitoring	R 1,762,780
5.2	Groundwater monitoring	R 784,532
5.3	Rehabilitation monitoring	R 605,649
5.4	Care and maintenance	R 8,711,380
	Sub-Total 2	**R 11,864,341**
6	**Additional Allowances**	
6.1	Preliminary and general	R 27,320,494

Closure components		Scheduled Closure (2041)
6.2	Contingencies	R 10,928,197
	Sub-Total 3	**R 38,248,691**
	Grand Total Excl. VAT. (Sub-total 1 +2 +3):	**R 159,395,007**

Post-closure water treatment costs

The long-term costs for pumping and treating extraneous groundwater have not been determined in this assessment as it is assumed that these have been included in the iMpunzi site-wide closure costs.

21.3.4 Actions required

The following actions are required to improve the resolution of the closure planning and costing:

- Compile a topsoil balance for all areas of the iMpunzi complex and related mine residue facilities indicating the topsoil volume (and quality) requirements for rehabilitation and closure, topsoil volumes available and their location (in-situ ahead of mining and stockpiled) and the shortfall or surplus;
- Identify and quantify potential topsoil sources to address any shortfalls;
- Review and update the site wide closure planning and costing to align with GN R. 1147 in the next 12 months and include the specific cover depth for the dump;
- Update the proposed land preparation, soil amelioration and hydroseeding rates based on site specific soil sampling and analysis; and
- Incorporate the planned discard dump and co-disposal into the mine wide closure planning and costing to ensure the alignment of end land use planning and closure objectives.

22.0 FINANCIAL PROVISION FOR THE OVERALL IMPUNZI MINING COMPLEX

The overall closure liability assessment completed by Jones and Wagner, as at November 2019, amount to approximately R 1 298 938 350 billion (including P&Gs and contingencies, and excluding VAT), as summarised in Table 39 below.

Table 39: Scheduled closure costs summary for the

Closure Component		Scheduled Closure (2041) amount
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	R 27 399 324
2(A)	Demolition of steel buildings and structures	R 59 611 796
2(B)	Demolition of reinforced concrete buildings and structures	R19 676 156
3	Rehabilitation of access roads	R 23 458 700
4(A)	Demolition and rehabilitation of electrified railway lines	R 20 955 773

Closure Component		Scheduled Closure (2041) amount
4(B)	Demolition and rehabilitation of non-electrified railway lines	-
5	Demolition of housing and/or administration facilities	R 16 495 576
6	Opencast rehabilitation including final voids and ramps	R 630 053 542
7	Sealing of shafts, adits and inclines	R 6 679 069
8(A)	Rehabilitation of overburden and spoils	R 10 470 108
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R 215 838 633
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	-
9	Rehabilitation of subsided areas	R 21 888 395
10	General surface rehabilitation	R 14 540 327
11	River diversions	R 3 405 682
12	Fencing	R 2 599 785
13	Water management	R 10 553 975
14	2 to 3 years of maintenance and aftercare	R 33 147 600
15A	Specialist study	R 1 500 000
15B	Specialist study	R 1 500 000
	Subtotal 1.1	**R 1 119 774 440**
16	Preliminary and General (6% of Subtotal 1.1)	R 67 186 466
	Subtotal 1.2	**R 1 186 960 906**
2.1	Contingency (10% of Subtotal 1.1)	R 111 977 444
	Subtotal 2	**R 1 298 938 350**
Total iMpunzi End of Life Liability (incl. Ps & Gs and Contingency) (Excl. VAT):		**R 1 298 938 350**

23.0 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON

The mechanisms for compliance monitoring with and performance assessment against the environmental management programme and reporting thereof, include:

- Monitoring of impact Management Actions;
- Monitoring and reporting frequency;
- Responsible persons;
- Time period for implementing impact management actions; and
- Mechanisms for monitoring compliance.

The impact of the development of the proposed iMpunzi can be monitored by the following methods (see Table 40 below).

Table 40: Mechanisms for monitoring compliance

Phase	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
Construction, Operational and Closure	Air quality	Monitor complaints register held at security gate or administration office for complaints about dust.	Duration of construction, operational and closure phase	As and when required (notified immediately of complaint being lodged)	Complaint and actions taken to address complaint about dust recorded in complaints register	Stakeholder Engagement Specialist
Construction, Operational and Closure	Air quality	Dust fallout monitoring as per existing monitoring schedule including the installation of dust collection buckets downwind of the Venture Co-disposal Facility, and the South Pit Discard Dump	Duration of construction, operational and closure phase	Monthly	Monthly reporting should be used to identify problem areas/ activities to target mitigation.	Environmental specialist
Construction, Operational and Closure	Air quality	Continuous fine particulate monitoring using an E-sampler or similar at the mine boundary must be implemented. Ideally, two monitoring locations should be implemented. One on the upwind side and one on the downwind side of the discard dumps to monitor the emissions coming into sites and leaving sites.	Duration of construction, operational and closure phase	Monthly	Continuous PM_{10} monitoring at the mine boundary. Monthly reporting should be used to identify problem areas/ activities to target mitigation.	Environmental specialist
Operational	Air quality	Spontaneous combustion.	Duration of operational phase	Weekly	Weekly monitoring should be undertaken to identify the presence of spontaneous combustion onsite. Mitigation actions must be implemented within 48 hours of detection. If spontaneous combustion commonly occurs on site, trace gas monitoring of the fugitive combustion emissions must be undertaken to determine the impact on the ambient air quality and compliance with the NAAQS ambient air quality standards.	Environmental specialist Production manager

Phase	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
Operational and Closure	Soil	Undertake soil sampling where contamination is evident on stockpiles or where vegetation establishment is poor	Operational and closure phases	As and when required (when bare patches or contamination is observed/ reported)		Environmental specialist
Construction, Operational and Closure	Groundwater	Existing groundwater level monitoring network for the study area should continue to be utilised (Figure 33). Boreholes downgradient of backfilled or rehabilitated pits should be monitored for rising water levels, and potential decant of these pits. Groundwater levels should continue to be monitored monthly. The current groundwater monitoring network is deemed adequate and should continue to be utilised. Yearly audits of the monitoring network will need to be reviewed to access where new boreholes may need to be located where boreholes have either been demolished or blocked.	Operational and closure phases	Monthly Annually	Monthly reporting should be used to identify problem areas/ activities to target mitigation. Annual audits should be conducted on the adequacy of the existing monitoring programme to see if it additional boreholes are required.	Environmental specialist
Construction, Operational and Closure	Surface water	Monitor water quality at the localities presented in Figure 31.	During the construction, operational and closure phases	Monthly (hydrocarbon monitoring can be conducted six monthly)	As per the mine's existing surface water monitoring programme.	Environmental specialist
Operational and closure	Surface water	Inspection of storm water channels; and	During the operational	Ongoing	Site observations captured in an annual report.	Environmental specialist

Phase	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
		Conduct on-going monitoring and maintenance of the rehabilitated areas to ensure that vegetation establishes successfully, and that erosion does not occur.	and closure phases			Production manager
Construction, Operational and Closure	Biodiversity	Continue conducting aquatic biomonitoring during the wet and dry seasons.	During the construction, operational and closure phases	Biannually	As per the mine's existing biomonitoring programme.	Environmental specialist
Construction, Operational and Closure	Biodiversity	Continue conducting wetland monitoring.	During the construction, operational and closure phases	Annually	As per the mine's existing wetland monitoring programme.	Environmental specialist
Construction, Operational and Closure	Visual	Monitor complaints register held at security gate or administration office for complaints about visual impacts.	Duration of construction, operational and closure phases	As and when required (notified immediately of complaint being lodged).	Complaint and actions taken to address complaint about visual impacts recorded in complaints register	Stakeholder Specialist
Construction, Operational and Closure	Noise	Conduct baseline noise monitoring for the proposed discard dump expansion and wider iMpunzi operations. Monitor complaints register held at security gate or administration office for complaints about visual impacts.	Duration of construction, operational and closure phases	Monitoring to be conducted annually (if noise complaints are registered, the frequency of monitoring should be increased to quarterly)	Monitoring must be undertaken in terms of SANS 10103:2008. Any noise complaints should be directed to the site management. Complaints and any actions arising from a complaint must be recorded in a complaint's register to be maintained by site management. An investigation should be undertaken to determine the specific activities and or equipment/ machinery which is generating the nuisance noise resulting in the noise complaints.	Environmental specialist Stakeholder Specialist

Phase	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
Construction, Operational and Closure	Socio-economic	Continue implementing future forum and monitoring to ensure the effective implementation of iMpunzi's SLP (continuously) and recruitment policy (during construction and closure phase)	Duration of construction, operational and closure phases	Ongoing	Future forum meetings Regular revision of SLP	Stakeholder Specialist

24.0 IMPLEMENTATION OF THE EMPR

A number of activities must take place before commencement of construction. Certain of these activities are not directly related to physical work on site, but are presented below, as they should be addressed before commencement of, or during the early phases of construction.

24.1 Responsibility for EMPr implementation

- Responsibility for implementation of the EMPr will rest with the Mine Manager at iMpunzi discard facility expansion project. The Mine Manager will appoint a Safety, Health, Environmental and Quality (SHEQ) Manager, who will be based on site. The SHEQ Manager will ensure that all environmental activities delegated to contractors operating on the road realignment construction site are implemented. Similarly the SHEQ Manager will ensure that all conditions of the EMPr are implemented. It will furthermore be the responsibility of the SHEQ Manager to resolve any conflicts that may arise between iMpunzi and contracting parties regarding implementation of the EMPr. (Such responsibilities are captured by the legal appointment of the SHEQ Manager);
- iMpunzi will ensure that the responsibility for implementing and adhering to the conditions of the EMPr forms part of the conditions of appointment of all contractors;
- iMpunzi will ensure that all contracting companies tendering for work receive a copy of this EMPr and understand their responsibility to operate within the framework of the measures defined in this EMPr. When adjudicating tenders, iMpunzi will ensure that contractors have made appropriate allowance for management of environmental matters;
- iMpunzi will ensure that, upon appointment, all contracting companies operating on the site receive a copy of this EMPr and understand their responsibility to operate within the framework of the measures defined in this EMPr;
- iMpunzi will ensure that contractor SHE induction includes environmental and social issues and awareness training (“Environmental Awareness Plan”, see section 20.2 of this report) to build capacity of iMpunzi personnel and contract staff regarding management of the environment;
- The SHE Manager will brief contractors about no development/no go areas. These will include:
  - No access to neighbouring properties without prior approval; and
  - No access to fenced-off sensitive areas.
- iMpunzi to appoint a responsible person to audit the implementation of, and adherence to, this EMPr. This party will be an independent environmental practitioner; and
- The SHEQ Manager will bring to the attention of the Mine Manager any major environmental incident or breach of the conditions of the EMPr, within 24 hours of occurrence of such event. If the environmental incident constitutes a breach of any permit or licence condition, the Mine Manager will notify the controlling authority within 48 hours of such an incident.

24.2 Responsibility of contractors

- Each contracting company will receive a copy of the EMPr at time of tender. Each contractor must familiarise himself with the required environmental management measures and ensure that contracting prices allow for environmental costs;

- Appointed contractors must keep their copies of the EMPr on site. It is the responsibility of the contractors to ensure that all their staff are aware of the measures applicable to their area of work; and
- It is the responsibility of the contractors to bring to the attention of the iMpunzi SHE Manager any environmental incident or breach of the conditions of the EMPr, within 24 hours of occurrence of such event through the company's Incident Reporting System.

25.0 ENVIRONMENTAL AWARENESS PLAN

As stipulated in section 24.0 above, environmental conditions will be included in any operational contracts, thereby making contractors aware of the potential environmental risks associated with the project and the necessity of implementing good environmental and housekeeping practices.

The following principles and training will apply to the Environmental Awareness Plan and the Environmental Management System (EMS):

- All personnel, including contactors will as a minimum undergo general safety, health and environmental (SHE) induction and environmental management system (EMS) training;
- The Safety, Health, Environmental and Quality (SHE) Manager will identify the SHE training requirements for all iMpunzi personnel and contractors. The training requirements will be recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and contractors. The training matrix will be administered by iMpunzi's Human Resources Department (HRD); and
- Development of the Training Programme, which will include:
  - Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts;
  - Assessment of extent to which personnel are equipped to manage environmental impacts;
  - Basic environmental training;
  - EMS training;
  - Comprehensive training – on emergency response, spill management, etc.;
  - Specialised skills;
  - Training verification and record keeping; and
  - Periodic re-assessment of training needs, with specific reference to new developments, newly identified issues and impacts and associated mitigation measures.

25.1 General awareness training

- The HRD Manager, together with the SHE Manager, will be responsible for the development of, or facilitating the development of, the required general SHE induction and awareness training. A general environmental awareness training module will be developed and integrated into the general induction programme. The general awareness training must include the Environmental Policy, a description of the environmental impacts and aspects and the importance of conformance to requirements, general responsibilities of iMpunzi personnel and contractors with regard to the environmental requirements and a review of the emergency procedures and corrective actions; and

- A Training Practitioner or the Environmental Control Officer (ECO) will conduct the general awareness training. The training presenter will keep a record of the details of all persons attending general awareness training. Such attendance registers shall indicate the names of attendants and their organisations, the date and the type of training received.

25.2 Specific environmental training

- Specific environmental training will be in line with the requirements identified in the training matrix; and
- Personnel whose work tasks can impact on the environment will be made aware of the requirements of appropriate procedures/work instructions. The SHE Manager will communicate training requirements to responsible supervisors to ensure that personnel and contractors are trained accordingly.

25.3 Training evaluation and re-training

Effectiveness of the environmental training will be reflected by the degree of conformance to EMPr requirements, the result of internal audits and the general environmental performance achieved at iMpunzi;

- Incidents and non-conformances will be assessed through the Internal Incident Investigation and Reporting System, to determine the root cause, including the possible lack of awareness/training;
- Should it be evident that re-training is required, the SHE Manager will inform the Heads of Departments of the need and take the appropriate actions;
- General awareness training of all personnel shall be repeated annually; and
- The re-induction shall take into consideration changes made in the EMPr, changes in legislation, iMpunzi's current levels of environmental performance and areas of improvement.

25.4 Emergency procedures

The following emergency procedures are relevant to the project:

- The SHE Manager shall define emergency reporting procedures for iMpunzi;
- All personnel shall be made aware of emergency reporting procedures and their responsibilities;
- Any spills will be cleaned up immediately in accordance with relevant legislation; and
- Telephone numbers of emergency services, including the local firefighting service, shall be conspicuously displayed.

26.0 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, Mariëtte Weideman herewith undertake that the information provided in the foregoing report is correct and that the comments and inputs from stakeholders and I&APs have been correctly recorded in this report.

Date: 28 August 2020

27.0 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, Mariëtte Weideman herewith undertake that the information provided in the foregoing report is correct and that the level of agreement with I&APs and stakeholders has been correctly recorded and reported herein.

Date: 28 August 2020

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APPENDIX A

Document Limitations

APPENDIX B

CV of Environmental Assessment Practitioner

APPENDIX C

Stakeholder Database

APPENDIX D

Stakeholder Letter, Registration and Comment Sheet

APPENDIX E

Newspaper Advert and Site Notice

APPENDIX F

Authority Correspondence including the Public Participation Plan to be followed during Impact Assessment Phase

APPENDIX G

Comment and Response Report (CRR)

(To be included in Final EIA/EMP Report)

APPENDIX H

Preliminary Design Report for South Pit Discard Dump

APPENDIX I

Preliminary Design Report for Venture Co-disposal Facility

APPENDIX J

Storm Water Management of the South Pit Discard Dump

APPENDIX K

Storm Water Management of the Venture Co-disposal Facility

APPENDIX L

Other Specialist Studies

APPENDIX M

DEA Environmental Screening Tool

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