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).

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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PART B

List of Figures

List of Tables

List of Charts

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1 Draft environmental management programme

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

It is hereby confirmed that the details and expertise of the EAP are already included in Part A, Section 3 (a).

b) Description of the aspects of the activity (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, Section (1) (h) herein as required).

The aspects of the activity are included in Part A, Section 3 (h).

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

The composite map of the site which shows the proposed activities and related infrastructure and identified environmental sensitivities is included as Appendix 4.

d) Description of impact management objectives including management statements

i. Determination of closure objectives. (Ensure that the closure objectives are informed by the type of environment described in 2.4 herein).

1. Closure objectives

The main objectives of the rehabilitation are outlined below. The details of the closure and rehabilitation approaches are indicated as Appendix 1 of the EMPr, which is Volume 2, Part B of the entire EIAr.

- To ensure the availability of sufficient finances to attain the set environmental measures to be executed at the planning stage and during implementation of the EMPr.
- To ensure that budgeting for achieving of set environmental management measures to be incorporated at planning stage or as part of EMPr implementation.
- Rehabilitating the disturbed land to a state that is:
    - Suitable for its agreed post closure uses (to be determined in conjunction with landowners, stakeholders and IAPs);
    - Reduces visual impact of the disturbed land; and
    - Provides for minimal need of closure management.
- To keep relevant authorities and key stakeholders, landowners and IAPs informed of the progress of the decommissioning phase.

- To submit monitoring data to the relevant authorities as required.
- To ensure maintenance of the biodiversity on site.
- To assist, where necessary, in the re-establishment and sustainability of vegetation in the rehabilitated land, and thereby avoiding loss of any species habitat.
- To ensure that the rehabilitated land is in the state that is suitable for it's agreed upon post-closure uses.
- To develop good remediation methods and proper closure plans, to minimize degradation of the environment.
- Rehabilitate disturbed land and residue deposits to a state that:
    - facilitates compliance with applicable environmental quality objectives (air quality and water quality guidelines);
    - reduces visual impact of the disturbed land;
    - Limits post closure management.
- To ensure that the infrastructure is safe after rehabilitation.
- To keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities as required.
- Maintain required pollution control facilities and rehabilitated land until closure.
- To ensure that the disturbance of the beach is reduced i.e. beaches should be clean.
- Plan with closure in mind, by designing and operating to minimize environmental damage and factoring post-mining land use into decision making.

1.1 Other items to that will form part of the preliminary mine closure plan

- Generate closure estimate using outputs of the physical, bio physical, socio-economic cost estimates.
- Design a closure planning schedule
- Closure programme that reflect on main items to be closed and areas to be rehabilitated with inclusion of monitoring, additional environmental studies as well as rehabilitation tests/trials
- Update closure plans annually and update financial provision accordingly
- Generate a cash flow model that is linked to the closure plan

1.2 Rehabilitation objectives

The rehabilitation of the site will involve the following:

Overburden Dumps

- Backfill where appropriate.
- Full rounding of dumps to 1:3 slope inclusive of smooth rounding of the central dump top applied to 50% of the dump area.
- Shoulder rounding of flat dumps with perimeter sloping from angle of repose to 1:3.
- Surface remedial treatment of rounded but significantly eroding dumps.

Face Edge (high-wall) Sloping

- All faces of excavations and sides of trenches to be sloped to 1:3 (excluding shallow trenches in isolation where natural revegetation is already well advanced.
- Sloping to be preceded by doze-back of topsoil adjacent to the face edge and subsequent re-dozing of the topsoil over the dozed face slope. Such face edge sloping is to be conducted on all steep cuts inclusive of high walls excavation edges of mine blocks and high trench edges.

Back-fill Edge Sloping

This involves sloping all backfilled edges (angle of repose slopes)

Smoothing of Dumped Areas

All areas where material has been dumped or where especially dozing activities have left an undulating surface, such areas are identified for smoothing by dozer in three categories:

- Smoothing of rough areas (SRA's) (undulations greater than 3 m).
- Smoothing of medium undulating areas (SMA's) (undulations 1,5 – 3 m).
- Smoothing of dumped areas (SDA's) (tipper truck dumps).

Topsoil Recovery and Re-topsoiling of Sloping

Where sloping of faces (high walls), adjacent natural vegetation and topsoil is to be back-dozed in a strip proportional in width to the height of the treatment feature with dozing to 0,3 - 0,5 m deep to a temporary berm. Such dozing to include the occurrence of topsoil berm immediately above many of the later dated cut faces where topsoil stripping of the excavation retains the topsoil in these berms which to date have also acted as safety berms.

Upon completion of the slope dozing, the topsoil is to be replaced by dozing over the 1:3 slope to minimum 100 mm deep (note: that despite the 300-500mm target depth, the achievement of this depth is subject to the inspection of suitability of the soil to such depth to serve a growing medium.

Fine Residue Dams (FRD's)

- Cover surface of dams after drying with coarse tailings from adjacent coarse tailings dumps assessed to have low ore-grade or with material already re-processed) to a depth of 150-200mm average 175mm as soon as dumps have dried sufficiently to carry equipment (avoiding loss of dozers by solfluction of the slimes through especially dozer vibration). Interim netting should be applied to control dust generation during the drying period.
- Shape perimeter walls of FRD's to 1:3 to permit similar armouring (cover with coarse tailings as above).
- Provide FRD walls with basic outer paddock to catch seepage water and prevent such saline water spreading into the veld.
- Plant Area Rehabilitation.

As all processing plants are determined to be demolished to floor level by a demolition contractor (as per current Jet Demolition Contract) (at "no" cost to the Mine given sale of equipment/scrap by the contractor) the only additional works include to the following:

- Cover of remaining reinforced concrete foundations and floors with 1m deep coarse tailings to the De Beers Namaqualand Mines (DBNM) EMP spec of "retaining concrete foundations below -1m below final ground level".
- Demolish reinforced concrete retaining walls of the primary hopper ramps to retain the lower 50% of current height above nil which will be covered by the rounding of the ramp perimeter as costed as a backfill edge sloping.
- Ripping of the general compacted areas surrounding the plants and promoting natural revegetation by (with light top soiling if locally available).
- Providing a basic interim paddock around the perimeter of the slimes dams to trap fines washed from the toe of the sumps.

Roads

- The main spine road and access roads to future farming portions, sea-water pumps, and probable mariculture sites will be retained.
- Other layered roads will be grader-ripped prior to the grader blading the roadside topsoil berm back over the road surface to provide target of 20-50mm topsoil over the ripped road surface. Such treated roads will be netted to promote revegetation.
- Tracks will be lightly scarified by tractor and "grop" to promote seed entrapment.

Other rehabilitation activities to be undertaken will include:

- To clear equipment around the site.
- Removal of the boulders and overburden.
- Concurrent back- filling into mined out areas.
- Shape steep sided slopes, overburden dumps and dangerous benches to about 1:3 slope.
- Clean up and remove discarded equipment, garbage dumps or abandoned structures within the property as part of responsible environmental management.
- Removal of contaminated soil from vehicle maintenance and processing areas.

The intended specific closure objectives to ensure that mining activities do not impact negatively on the environmentare outlined below.

Rehabilitation below High Water Mark (HWM)

- The oversize and undersize are returned to the sea near their origin.

Removal of general and industrial waste from beaches

- Be vigilant in promoting indiscriminate discarding of general wastes on the beaches.
- Facilitate means of promoting removal of any genera, including plastic and non-biogradable materials as well as industrial waste associated with the mining activities so that all this is collected and disposed of appropriately according the mines development waste disposal strategies (such removal excludes removal of overburden and tailings heaps)

Discharge or release of any oil, bilge water and domestic waste-water

- Water or other substances containing oil or other hazardous chemicals are not thrown into the sea.

Spillage of cleaning solvents, oils and other chemicals

- Spilling of toxic chemicals is avoided but if spillages occur then the spilled chemicals are cleaned up and rags used for cleaning are placed in a toxic waste container for safe disposal.

Pollution Control

There are no toxic chemicals used in the DMS or X-ray diamond extraction

1.3 Updating the Socio – economic closure component of the mine closure plan

- A provision for retraining, re-skilling, redeployment and retrenchment costs must be incorporated into the mine's operating costs and linked to provision made in the social and labour plan
- Potential additional closure costs that are not included in operating costs must be identified.

- Updating of social closure assumptions and criteria in overall closure estimate.
- Develop and I&AP community profile and develop a community engagement plan (CEP) that is based on the community profile.
- Host in - house Rapid Strategic Environmental Assessment (SEA) workshops to discuss all factors associated with the environment needed to close the operation.
- Consultation with I&AP's to take place after capturing of broad boundaries for sustainability post closure as part of the closure vision as will be contained in the preliminary mine closure plan
- Hold one-on-one meetings and workshops with IAPs to determine their closure needs and expectations
- Summarise anticipated potential I& AP issues and needs must be summarised.
- Social and economic impacts to be review on I & AP's using the outputs from the Rapid SEA's internal workshop.
- Closure assumptions and criteria to be reviewed and changed to reflect any socio-economic closure costs associated with I & AP's.

1.4 Rehabilitation risk objectives

The identified risks will be addressed by ensuring that final choices of rehabilitation design mechanisms have paid respect to:

- The existing activities to prevent further environmental impact resulting from the rehabilitation activities relating to dust generation at the activity, road use risk and road dust generation from excessive material transport in rehabilitation.
- The challenging climate and associated difficulty of revegetation, dictating that disturbance of areas during rehabilitation be limited to the absolute minimum, to focus the rehabilitation methods and to avoid vast areas of further dust generation. The activities to be undertaken during decommissioning will include: the plant and associated disused infrastructure will be demolished. Building foundations will be removed or covered with coarse tailings where appropriate. All land exposed by the demolition of infrastructure and other land disturbed will be rehabilitated

1.5 Post mining land use plan

While the current WCR property excludes the Kleinzee Buffels Marine Complex between Port Nolloth, Kleinzee and South to the northern end of Samsonsbak, it would be futile to discuss the WCR post-mining land use without including Kleinzee to as far north as Port Nolloth and south to the Spoeg River promontory.

Integral to the updating of the Post-mining Land Use Plan of the EMP, is an assessment of the WCR property within its regional perspective.

Regional Perspective informing the Post-mining Land Use Plan (PMLUP)

The PMLUP serves as a framework for informing and guiding further mining and infrastructure development within the context of achieving the objective of mine closure namely, to reintegrate the hitherto totally isolated mining right area into the West Coast Region's Infrastructure, urban centre hierarchy and economic and socio-economic development potential.

Furthermore, over the recent years, the towns of Kleinzee and Koingnaas and the DBMN constructed tar road (Koingnaas to Kleinzee), have been 'made public', removing them from their many years of isolation from the remainder of the region.

Diamond mining has historically been the sole large economic activity of the region as the agricultural potential is effectively non-existent (even small-stock farming being marginal) and given the lack of harbour opportunities between Port Nolloth and Lamberts Bay, as well as the prohibition of small boat launching under diamond security has largely excluded any fishing industry development. Only limited facilities in the absence of a protective sea-wall were developed but not maintained at Hondeklipbaai. Recently, a perlemoen farm has been developed through utilization of the old buildings. Accordingly, to-date the road infrastructure of this central West Coast zone, has been entirely undeveloped with no continuous coastal route and very long arduous gravel roads accessing the isolated urban nodes from the N7.

Recent initiatives, which have served to initiate upliftment of the mining region include;

- The proclamation of the Koingnaas-Kleinzee road as a public road, together with the current Provincial Roads contract, which is rehabilitating/ upgrading Main Roads 2963 and 739 to surface level reinforcing Hondeklipbaai access from N7 and thereby forming a significant part of a developing ring road from the Garries N7 to Hondeklipbaai-Koingnaas-Kleinzee-Komaggas-Springbok N7 as seen in Figure d(i)1-1: Regional Context.
- The proclamation of Kleinzee town as a public town, which together with the popular eco-tourism stopover of Hondeklipbaai and fair gravel road connection from Kleinsee to Port Nolloth form a series of coastal resort towns.
- The proclamation of the Namaqua National Park with continuous expansion and its spin-off in creating numerous visitor accommodation B&Bs and Farmsteads in the region has highlighted the region as a conservation/ wilderness/ eco-tourism region and provided the context within which the post-mining WCR/ BMR area, will find itself and accordingly integrate itself therewith to fulfil such eco-tourism role with the added opportunities presented by its coastal character and attractive sites.

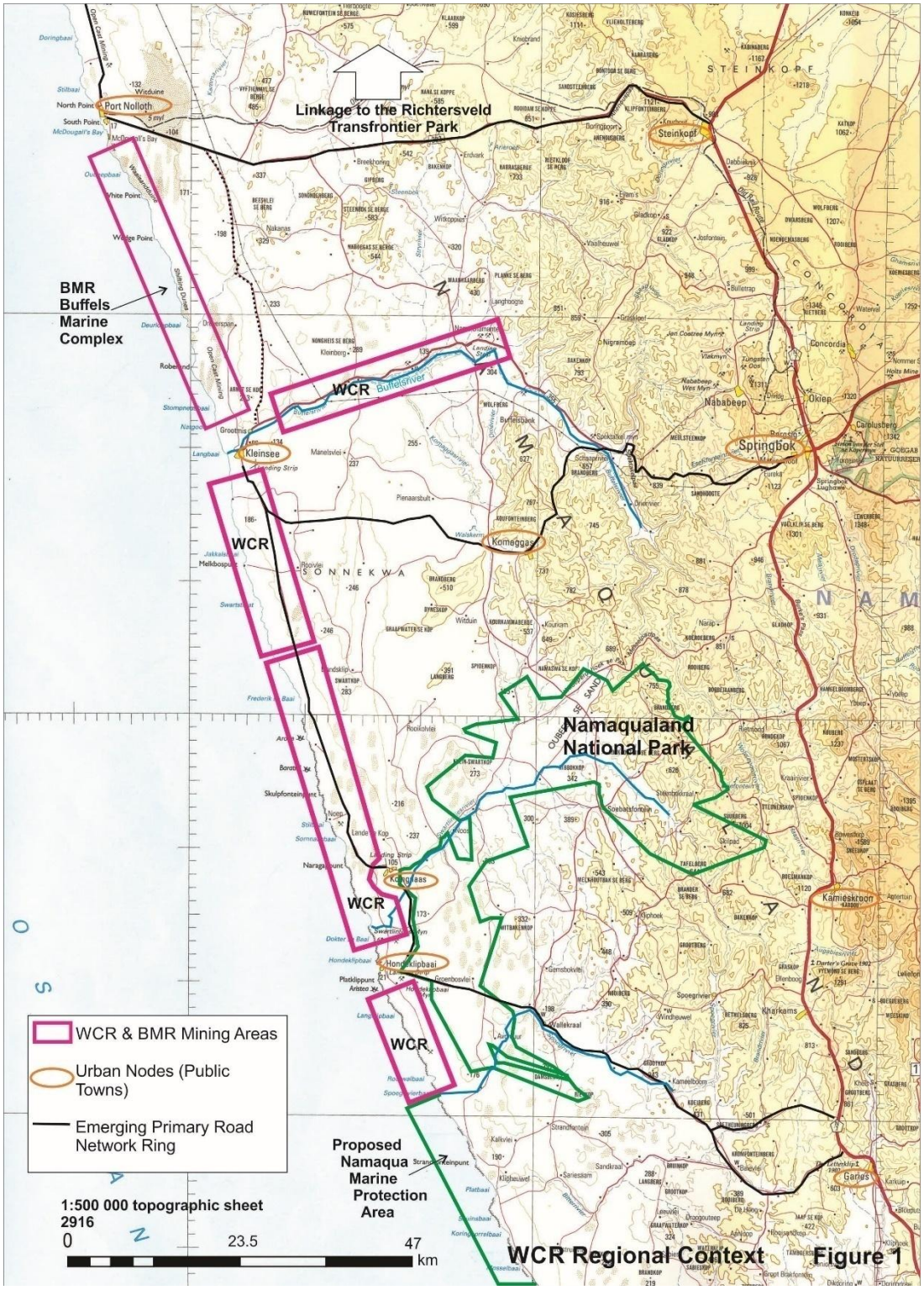


Figure d (i) 1 - 1: WCR Regional Context

Roles of post-mining land use plan

- To guide the nature of future development/ rationalisation of the existing towns of Kleinzee, and especially Koingnaas through liaison with the planning directorates of the local authority and its Spatial Development Framework (SDF).
- To guide mine management in applying caution in the nature of mining disturbances and level of rehabilitation to mining areas, adjacent to new main tourism routes and nodes in terms of residual visual impact after rehabilitation.
- To apply elevated levels of rehabilitation to existing mining disturbed areas along tourist routes and adjacent to tourist nodes.
- To avoid the creation/ upgrading of coastal "beach" routes and instead rely on individual or small clustered coastal nodes having individual road access from the set back spine road (avoiding the beach road phenomenon).

Coastline opportunity assessment

The opportunity for tourism visitor nodal development (to at least basic overnight accommodation level) is based on the background knowledge of the coast by Site Plan Consulting and reviewing this by GoogleEarth™ assessment in identifying the opportunities tabled in Figure d(i)1-2 hereafter. Such assessment is based on the consideration that an identified site should either provide for or avoid the following features;

(i) Provide;

- Being a promontory with;
  - Preferred north view over adjacent bay; and
  - North orientation offering the use to turn its back on the unpleasant southerly winds.

(ii) Avoid;

- Promontories or areas of promontories where, especially headland by-pass dunes or other sand plumes detract from, or eliminate the opportunity.

Figure d(i)1-2 hereafter records the identified coastal nodes and highlights those of significant opportunity as Top-order sites.

In light of restrictions on diamond security, only the following two sites have been developed to-date;

(i) Melkbospunt on the farm Brazil, as seen in the GoogleEarth™ image below and having significant development potential;

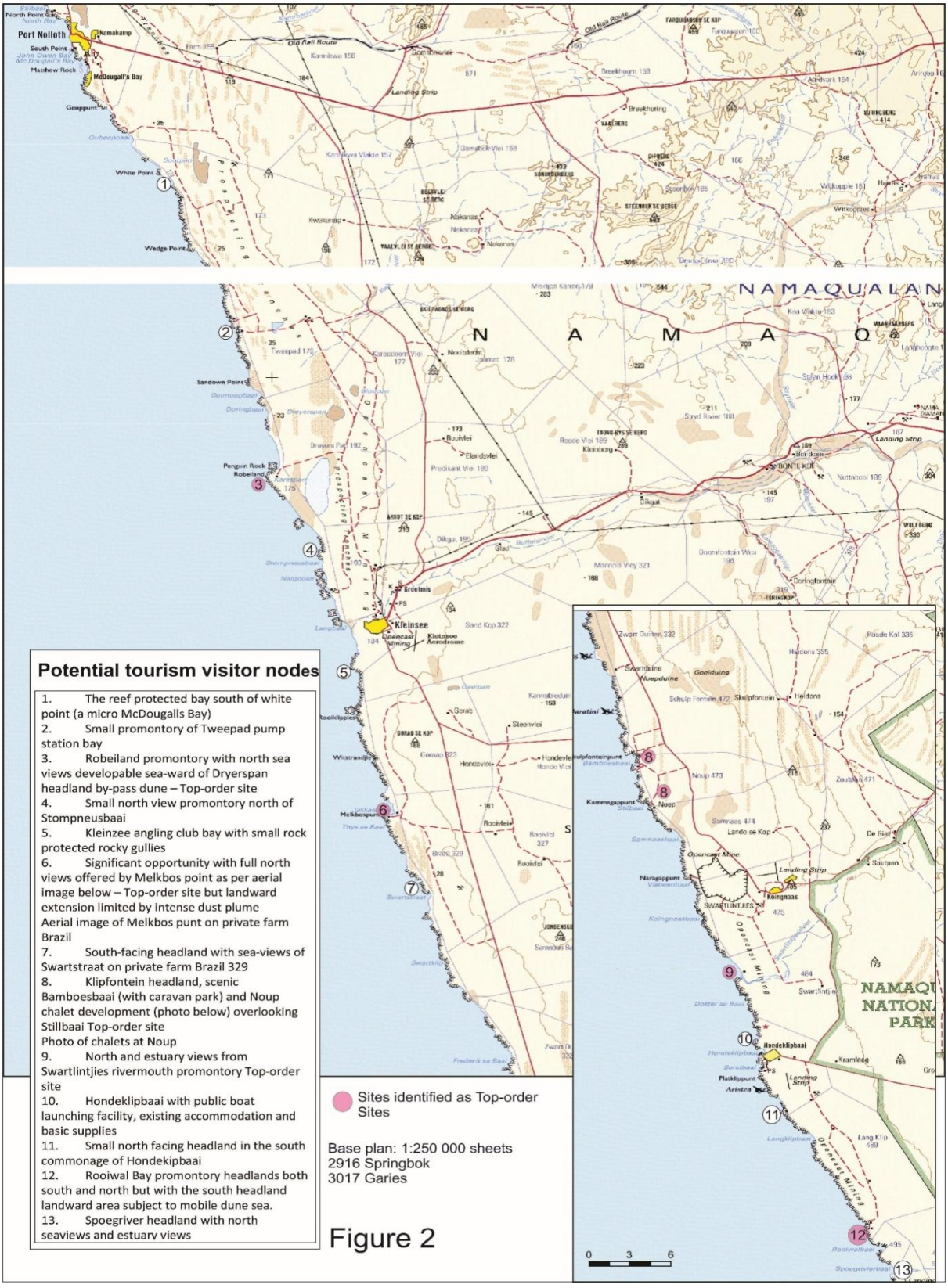


Figure d (i) 1 - 2: Potential tourism visitor nodes

(ii) The chalets of Noup as seen in the photo below and the scenic Bamboesbaai with caravan park.

South of the WCR, the coastline only offers small rocky views over narrow deep gullies in a largely cliffed coastline only with Skuinsbaai offering significant areas with north views with very poor access all the way to Groenriviersmond far south of the WCR.

The site assessment further considered a future route network development as a key element of the post-mining land use plan.

WCR concept Post-mining Land Use plan

Informed by the regional context considerations, the coastline opportunity assessment and the background the team has on facilities available in the various urban nodes and activities associated with them, without laboriously assessing these known elements including availability of fisheries facilities, suitability of harbour infrastructure, further mining contemplated, as both land-based, beach/ coffer dam mining and boat-based marine diamond mining, Figure d(i)1-3 reflects the following concept land uses which are considered realistic for the intense post-terrace mining stage when further mining may concentrate on beach/ coffer and off-shore boat mining:

(i) The regional ring road network will bring about increased recreational and eco-tourism visitor opportunity as the links will be provided from the N7 and along the West Coast, especially connecting this region to the established Richtersveld Transfrontier Park attraction.

(ii) The urban nodes (towns**)**, having been proclaimed and linked have an improved opportunity to serve their central-place urban role at appropriately different levels as follows:

- Port Nolloth, the most diversified existing town with the highest level of opportunities, given the very well established visitor accommodation including hotel and B&Bs and chalet/ caravan park, mining support and fisheries infrastructure, with the safest harbour on the coast, north of Lamberts Bay. Furthermore, both Port Nolloth and especially McDougalls Bay, provide the seaside holiday resort attraction to serve as impetus for this use's stimulation of Hondeklipbaai and Kleinsee.

- Hondeklipbaai similarly to Port Nolloth but at a vastly reduced level, Hondeklipbaai exists as a diversified town, with a land use and opportunities base, which includes;
    - The relatively safe natural anchorage,
    - Opportunity for private launching of boats,
    - Visitor accommodation in the form of B&Bs and caravan park,
    - The current re-use of earlier redundant fisheries infrastructure now accommodating perlemoen farm, and
    - Basic shopping (groceries).

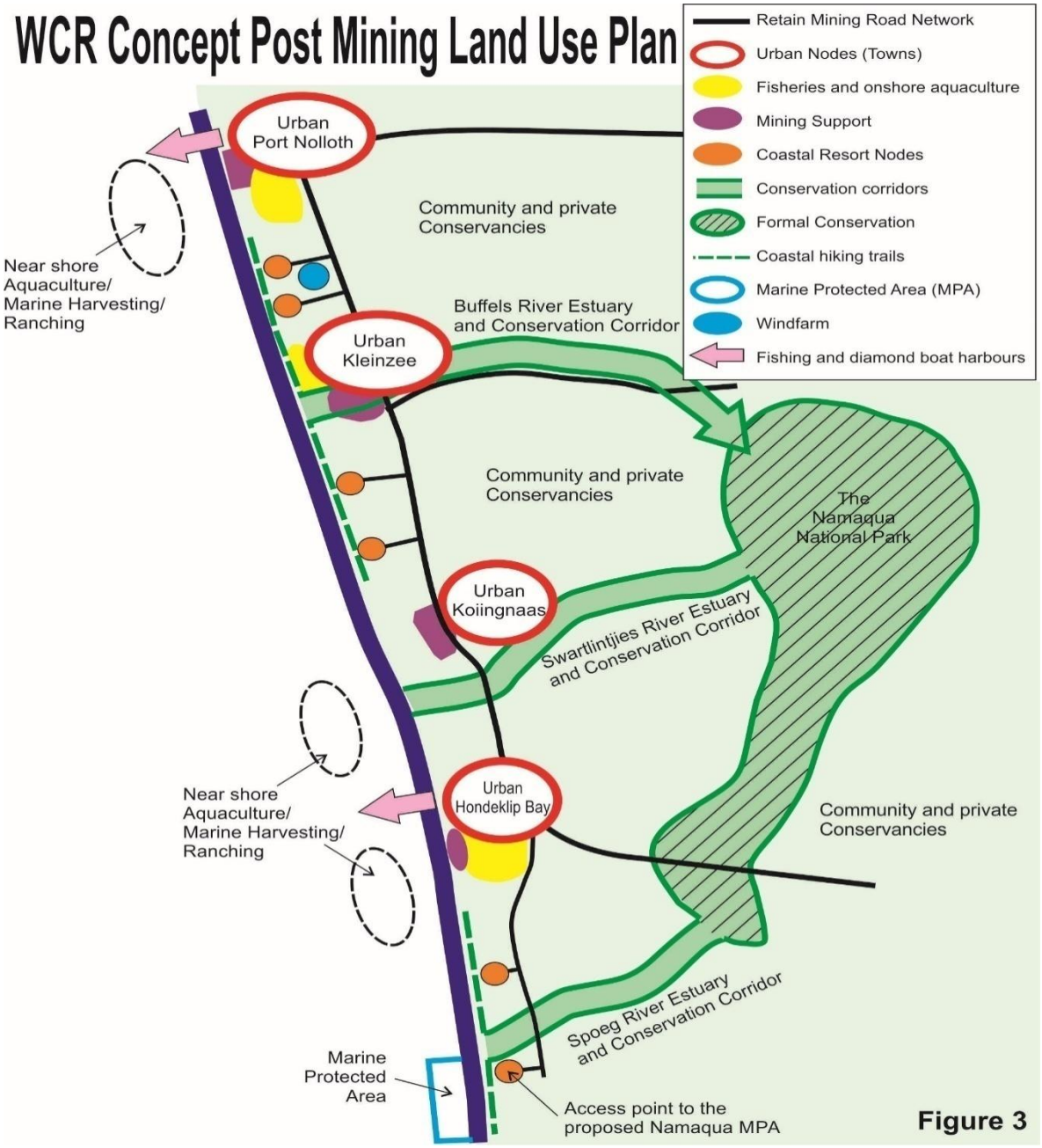


Figure d (i) 1 - 3: WCR Concept Post Mining Land Use Plan

- Kleinsee, with its different diversification of its base, which includes mining support, aquaculture support and retirement/ recreational (sporting) facilities and its airport can continue to fulfil these roles, given that no additional capital expenditure is required.
- Koingnaas, which to-date fulfilled a solely mining support function and accordingly had very little diversification of land uses, other than basic sporting facilities and the visitors centre now employed as a B&B, would best continue to serve this mining support function to the WCR Buffels inland right and other terrace mining as well as the longer term beach/ coffer dam mining and

walpomp activities through retention of employee accommodation, visitor accommodation, workshop and security services.

(iii) Fisheries and aquaculture. The opportunity exists for the expansion and diversification of the existing fisheries and on-shore aquaculture activities at Port Nolloth, Kleinsee and Hondeklipbaai. Given the availability of support services in these towns, they offer a better opportunity for further on-shore aquaculture than the development of new aquaculture nodes with high infrastructure and logistical costs.

The boat launching (harbour) facilities at Port Nolloth at Hondeklipbaai further offer the opportunity for these centres to support near-shore aquaculture/ marine harvesting/ ranching.

(iv) Coastal resort nodes**.** Given the diamond security restriction, only two nodes have developed, namely that of Melkbospunt on the private farm Brazil, north of Kleinsee and Noup, north of Koingnaas with its chalet complex (photo above) and caravan park at nearby Bamboesbaai.

As noted above, the coastline opportunity assessment revealed numerous sites along the coastline offering the opportunity for future development of coastal resort nodes in the post-diamond security restriction period.

(v) Coastal hiking trails**.** Given the popularity of this outdoor activity, the coastline offers numerous areas for trail establishment supported by coastal resort nodes.

(vi) Riverine conservation corridors. Within the WCR, the opportunity exists for the identification and reservation of three estuarine/ riverine corridors along the Buffels River through Kleinsee, the Swartlintjies river past Koingnaas and the Spoeg River, south of Rooiwal, both of which southern rivers have the opportunity to serve as corridors between the Namaqua National Park and the sea.

(vii) Wind farming**.** The prevailing wind regime offers a significant opportunity for wind farm establishment at this remote end of the ESKOM grid.

(viii) Community and Private Conservancies. In light of the extremely low carrying capacity of the veld yielding small-stock farming largely below marginal level, and hence identifying conservation as the most appropriate land use for the coastal plain, the larger extent of the WCR Mining Right areas and their interland are identified best registered as conservancies allied to the outdoor recreational tourism and ecotourism, further supported by the Namaqua National Park and the proposed Namaqua Marine Protection area (south of the Spoeg river).

Detail Post-Mining Land Use Plan

At this stage of continued mining, the team has concluded that the consideration of preparing a detailed post-mining land use plan, is premature as the following matters will first need confirmation/ finality:

(i) Definite decisions on further on-shore mining,

(ii) Definite programme on beach/ coffer dam mining,

(iii) Further detail on the release of mining infrastructure and built structures in support of non-mining initiatives,

(iv) Scheduling of release of areas from diamond security restricted access (now pertinent at Noup),

(v) Integration of the BMR and WCR and possible release of certain Mining Right areas held to-date.

2. General Management Objectives

- To assign time frames for achieving those set objectives.
- To have a system of ensuring that environmental requirements are updated as modifications occur in activities and structures.
- To ensure that responsible parties to be involved in environmental management planning process have set time frames, and these are agreed with the environmental impact generating divisions
- Environmental Management System (EMS) to include designation of responsibility for achieving objectives at each function
- Targets to be developed in line with EMPr commitments and acceptable standards for:
    - Solid, liquid waste and gaseous emissions
    - Waste reduction, recycling, recovery and treatment rather than disposal
    - Rehabilitation KPAs
    - Biodiversity management
    - Eco-efficiency such as electricity consumption

3. Resources, Structure and Responsibility objectives

To ensure that:

- There is allocation of sufficient personnel and other resources to meet objectives and targets.
- EMS procedures to stipulate equipment requirements and personnel requirements to ensure that there is clearly defined roles and responsibilities
- Compliance roles and responsibilities of environmental protection personnel to be clearly defined and incorporated into key performance areas as a comprehensive part of the performance management system
- Accountability for achieving and maintaining compliance is set through formal appointments for any delegated environmental roles

- Accountability of general impact generating personnel is formally controlled through key performances areas (KPAs)

3.1 Guidelines for attaining the objectives

- Develop a procedure for ensuring that the company identifies and allocates human, technical and financial resources necessary to meet its environmental objectives and targets
- Develop a procedure for tracking costs and benefits of environmental activities
- Review environmental management system procedures and ensure that human resources are allocated to set environmental management objectives
- Define roles and responsibilities
- Describe how environmental performance and compliance information will be communicated to employees, on-site service providers and contractors
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed
- Develop procedures to ensure that responsibilities and accountability of personnel who manage, perform, verify work affecting environment are defined and documented
- Key performance areas of identified environmental responsible personnel to include environmental obligations
- All EMP commitments to be included in contractor's contracts

4. Emergency preparedness and Response objectives

The WCR environmental emergency procedures will ensure appropriate responses to unexpected/accidental actions/incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

It is intended that all environmental emergency situations are identified and are linked to the identified significant risks, made known to employees and surrounding communities that proper response action are in place and are communicated to those who might encounter such emergency situations.

4.1 Guidelines for attaining the objectives

- Develop emergency preparedness and response procedure with respect to environmental management to:
- Identify potential for accidents and emergency situations
- Respond to accidents and emergency situations
- Prevent and mitigate environmental impacts
- Review emergency procedures (particularly after emergency situations) and periodical test such procedures where practicable.
- Identify and draw term of reference for the rescue team
- Significant environmental aspects and their associated environmental impacts will be identified for all WCR's operational areas.
- In formulating the emergency plan the following factors should be taken into consideration:
- All significant environmental aspects likely to result to emergency conditions;
- Historic emergency events of activities, products and services on/off the site;
- Chemicals, oils and other materials used on site;
- Activities of contractors;
- Concerns of communities and authorities were submitted;
- Proximity to sensitive area such as residential areas, schools, wetlands, rivers Availability of local emergency services;
- Availability of local emergency services;
- Availability of trained, on-site personnel for emergency situations.
- Potential emergency situations identified should include petrochemical/chemical spillages, hazardous material spillages, fires, tailings spillages and failures, untreated effluent spillages, explosions and natural disasters, and electrical failure.
- A risk assessment should be undertaken to identify such potential emergency risk situations.
- Emergency plans should be documented for each of these stipulated emergencies, which include responsibilities in emergency situations, corrective and preventative actions and the reporting of such emergencies.
- Identification of evacuation routes;
- Identification of safety showers and eye-wash stations;

- Identification of fire extinguishers;
- Identification of spill containment equipment;
- Effluent drains, storm water channels, sewage treatment and other water systems;
- Site infra-structure such as bulk storage facilities;
- Prevailing wind direction and neighbouring communities and facilities; and
- Emergency generators.

5. Biodiversity objectives

Vegetation

- To ensure long-term survival of the ecosystem where the mining activity will be conducted
- To prevent loss of vegetation due to unnecessary clearing during construction activities.
- To limit and prevent the establishment of invasive and/or alien vegetation.
- To limit the impact on the flora within the stipulated footprints of the infrastructural areas.

Animals

- To prevent loss of biodiversity.
- To limit the impact on the fauna in the area of the mine complex and related infrastructure sites over which WCR has control.
- To prevent the incidents of snaring, poaching and accidental killings of wildlife and livestock within the area over which WCR has control.

The guiding principles to ensure attainment of these objectives are captured under Volume 4 (specialist studies) of the EIAr under the biodiversity study. These include ensuring that only carefully demarcated areas are accessed i.e. areas not directly involved with a mine operation should be avoided and as such random traversing of the natural vegetation off designated mining areas and roads will be avoided and awareness raised to ensure these guiding principles are adhered to.

6. Soils, land capability and land use objectives

Soils

- To preserve as much soil as possible from areas to be disturbed to ensure that the maximum amount of soil is available for future use during rehabilitation.
- To preserve soil horizons and group similar soil units together in stockpiles.
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To maintain the fertility of the soils so as to ensure good re-vegetation of the rehabilitated areas.

- Prevent soil loss through wind and water erosion.
- Prevent reduction of soil quality through contamination
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To ensure the correct rehabilitation of contaminated soils.
- To ensure the correct placement, sequence and depths of soils during rehabilitation.
- To encourage re-growth and biological activity within the replaced soils and to minimise the loss of soil.

Land capability

- To minimise the area to be disturbed during construction and operational activities.
- To manage and rehabilitate the disturbed areas to an appropriate level.
- Tominimise soil erosion.

Land use

- To limit the impact of the mining operations to as small a footprint as is possible.
- To manage and rehabilitate the disturbed areas to an appropriate level.

6.1 Guidelines to attain the objective goals

Soils

- Earthworks and clearing to be limited to the stipulated footprints of the infrastructural areas.
- Soils to be stored for longer than three years should preferably not be stockpiled in piles greater than 1.5 m in height.
- Slopes of the berm/stockpiles should be constructed to minimise the chances of erosion of the soils.
- Topsoil stockpiles should be vegetated as soon as possible to prevent loss of the resource by wind and water erosion and to retain its microbiological functions.
- Limit the number of times the soil is handled and do not drive on soil stockpiles to avoid compaction and loss of structure.
- All hydrocarbons to be stored in a bunded area during all the phases of the project. If a spillage occurs it must be cleaned up in situ, if small enough. If the spill covers an extensive area the soil must be removed and rehabilitated elsewhere, then replaced.
- Install and maintain long-term erosion control structures, using sustainable methods and natural vegetation.

- Remediation of contaminated areas either by in situ bioremediation or by the removal and handling as per waste management plan.
- Soil and rehabilitation guidelines provided in the rehabilitation plan must be complied with for the rehabilitation
- All chemicals and hydrocarbons will be stored in bunded areas during all the phases of the project. If a spillage occurs, it must be cleaned up in accordance with the MPRDA and the water management plan.
- All contaminated soils should be rehabilitated or replaced with uncontaminated soils.
- Remediation of contaminated areas either by in situ bioremediation or by the removal and handling as per waste management plan.
- To ameliorate altered physical and chemical properties of soil using appropriate methodologies and monitoring the progress thereof.
- To install and maintain long-term erosion control structures, using sustainable methods and natural vegetation.

Land use and Land Capability

- Earthworks and clearing must be limited to the stipulated footprints of the infrastructural areas.
- Soils to be replaced and rehabilitated throughout the mining operation, to ensure continuous remediation and rehabilitation of the disturbed areas in view of the closure objectives.
- The surface to be contoured to potentially resemble the pre-mining conditions, where practically possible.

7. Cultural Heritage

Objectives

- To ensure the preservation of identified sites of cultural importance (such as graves, should there be any of such encounters)
- To ensure that any necessary, destruction of identified cultural sites that fall within the mine foot print is done in accordance with the National Heritage Resources Act (NHRA) and under the guidance of South African Heritage Resources Agency (SAHRA).

7.1 Guiding principles to achieve the objectives

- Any earthmoving activities, establishment of roads and areas for setting up processing plants in areas immediately behind beaches and bays hold the possibility of impacting some of the many shell middens and other archaeological sites that exist close to the shoreline, in particular, estuaries, rocky headlands and sheltered bays tend to be very archaeologically rich. Pro-active measures will involve contracting an archaeologist to survey and mitigate the coastal zone adjacent to beach mining operations, as well as any proposed roads and infrastructure. This work may happen on a periodic basis to coincide with mining schedule.
- Relevant construction staff will receive training in basic archaeological identification and the communication routes to follow in the case of a discovery since additional heritage resources may be unearthed during construction, should this occur, work in that area should be halted until such time as an appropriately qualified person can make an expert decision on the mitigation measures required. A responsible archaeologist will be identified for this commission.
- The expert would notify SAHRA (in line with the provisions of Schedule 35 of the National Heritage Resources Act of 1999 [Act 25 of 1999]) and carry out an emergency recovery.
- Identified archaeological sites and stone cairns will be monitored.In such cases where the archaeologist spots, investigate and report fossil material, a separate monitoring by a palaeontologist would not be necessary. According the specialist report (Volume 4 of the EIAr) most areas have relatively low potential for fossil bone material and it is expensive and impractical to have excavations constantly monitored by a professional during the construction phase. Notwithstanding, the sporadic fossil occurrences are then particularly important. In order to spot the rare occurrences, would be crucial to have the co-operation of the personnel responsible for mining activities such as excavations.
- Awareness training would be conducted and guidelines for potential finds and a reporting/action protocol would be in place when finds are uncovered.
- WCR will contribute towards research by forstering a relationship with a paleontologist and where necessary (as per results of the monitoring exercise) a palaeontologist will inspects pits and profiles before they are rehabilitated, since deep excavation contains some form of palaeontology that is exposed in the stratigraphy.
- Should destruction of the cultural sites, necessary permits should be in place from SAHRA prior to construction activities commencing at or near the relevant identified sites. Through induction training, staff on site will be mindful of artefacts that may appear in excavated material from seabed. Such material can include lumps of iron, ballast stones or ingots, pieces of rope, wood, leather as well as ceramics and porcelain. Iron and bronze cannons are also possible. In the event of a find, an archaeologist will be consulted.

- Any shipwrecks that might need to be destroyed or moved that are more than 60 years old require a permit for this to be issued by SAHRA.

8. Contamination control – cleanup of machine fluid spills

Objectives

To ensure that:

- Ensure that polluted soil is removed from the spillage site to the treatment site where it will be rehabilitated.

8.1 Guiding principles to attain the objectives

- It is the responsibility of the person (s) causing or involved in the spilling of the machine fluids to report it to the supervisor responsible for the area in which the spill happened. The responsibility is however not limited to the persons involved in the incident, but also transferred to each person observing a polluted area to investigate whether the incident has been reported.
- Any spill incidents will be reported internally, as soon as possible (within 24 hours) by completion the Accident / Incident Report.
- The Waste Act and associated regulations and standards must be followed with respect soil decontamination site.

9. Waste management (Natural resource use and eco-efficiency)

Waste sources identified as part of the mining activities will include:

- Filter cloths.
- Contaminated process water.
- Steel balls.
- Scrap metal.
- Dirty water.
- Used oils and grease.
- Paint and paint tins.
- Aerosol cans.
- Batteries.
- Hazardous material packaging.
- Office waste and domestic waste.
- Sewage.

- Fluorescent tubes.
- Recyclable, including
    - Paper
    - Glass
    - Metals
    - Plastic
- Garden Refuse

Volumes of produced materials should be recorded in a waste register

9.1 Solid Waste

- WCR will not be constructing a new landfill site on site for the disposal of solid waste.
- All domestic and industrial waste (excludes mine residue deposits) will be collected at appropriately designated areas on site, sorted and removed by a registered contractor to be disposed of to the existing approved landfill site.
- Records of waste produced and volumes disposed of will be kept
- Targets for waste reduction at source will be determined and thus waste production targets will be set for each month
- Recyclable waste should be recycled at an appropriate recycling facility.
- A temporary transfer station or collection point will be demarcated and fenced off
- Skip bins will be provided for collection of domestic waste from various sources around the mine

9.2 Sewage Treatment

- Sewage generated on site to be contained and treated on site by means of permitted sewage treatment plant. Treated effluent will conform to specifications as published by DWA&S or the catchment management authority of the area and will be directed to pollution control dams on site.

9.3 Hazardous Waste

- All hazardous waste should be collected on site at a temporary storage facility
- Streams of hazardous substances stored on site should be recorded and Materials Safety Data Sheets kept for all of these. The hazardous substances waste streams (type of waste, volumes, where generated, current disposal strategy) should form part of the overall waste register for the mine. Ensure that safety disposal certificates are obtained from the supplier.

- Materials safety data sheets will be kept for all materials stored on site and shall be displayed at the stores and well as at points of use.
- The hazardous waste should be collected by a registered hazardous waste carrier and disposed of at a registered H:H site. A certificate for the safe disposal of hazardous waste will be supplied to the mine.
- Ensure that transformers are stored in properly bunded areas to prevent possible release of Polychlorinated Biphenyls into the environment and potential exposure.
- Fluorescent tubes should be put in closed drum and transported to a permitted hazardous waste disposal site. Investigate an option of obtaining tube crushers, usually 220l drum containing treatment solution with a close-fitting cap. This cap has a small device on top through which the tubes are pushed into the drum and broken inside the drum and the drums are then sealed and taken to a hazardous waste site.

10. Surface water management (Natural resource use and eco-efficiency)

Objectives

- To reduce the area of the catchment not contributing to runoff tominimise the impact on the catchment yield.
- To keep clean and dirty water separate.
- To minimise water consumption from external sources and recycle as much water as possible.
- To prevent contamination of the watercourses.
- To ensure compliance with all legal obligations.
- All plant and surface infrastructure (including the TSF and Overburden dumps) to be designed and constructed according to national standards and applicable legislative requirements, to prevent surface water contamination.
- To maximise the re-use of water during the operational phase in order to minimise the use of clean water. To recycle water from points such as return water dams to avoid water wastage
- To minimise the risk of polluted water leaving each site and to prevent the contamination of local watercourses.
- To ensure tailings pipelines are maintained and that failures and spillages are contained.
- To keep clean and dirty water separate.
- At closure, to ensure that the existing surface water flow is returned to as close as is possible to the original flows through contouring of the site during rehabilitation.

10.1 Guiding principles

- Surface water, particularly storm water for all phases of the proposed mining operation to be managed in accordance with legislative requirements, in particular, Regulation GN R704.
- All applicable water uses to be licensed.
- Temporary storm water diversion berms to be constructed around all construction sites to divert clean water around and away from the sites.
- The pollution control dams, to be sized to accommodate all the dirty water from the area and not spill once in 50 years due to a storm event. The dams to have a minimum of 0.8m free board as required in Regulation GN R704.
- The pollution control facilities (pollution control dams, silt traps and return water dam) to be placed on planned maintenance, routine inspections to be implemented.
- Water consumption to be managed by setting key performance indicators to achieve water reduction based on the current water balance and the implementation of annual water audits.
- All chemicals, bulk fuels, oils and grease and any other hazardous substance, to be stored and handled as per all applicable legislation and national standards.
- All vehicle transfer of hazardous materials must be done within bunded areas to minimise potential effects of spills.
- DW&S to be given details of the design of pollution control facilities before these are constructed.
- All surface water management measures to be implemented in accordance with the Integrated Water and Waste Management Plan (IWWMP) and IWUL.
- The pollution control facilities (pollution control dams and return water dam) to be placed on planned maintenance, routine inspections to be implemented and they to be de-silted periodically to ensure effective performance.
- Water in the pollution control dams to be used for road watering, industrial water or for construction.
- DW&S to be given details of the design of pollution control facilities before these are constructed.
- Seepage water captured by drains beneath the slimes facility to be channeled to the return water dam and into the pollution control dams for re-use in the plant.
- A site wide water balance to be kept and updated annually.
- As the slimes facility develops, surface water control structures (contours and down drains) to be installed to prevent erosion and guide water into the return water dam.

- Slimes, chemical and hydrocarbon spillages from trucks, conveyors and pipelines to be cleaned up timeously to prevent contamination.

11. Ground water

Objectives

- To minimize impacts on the volume of ground water available for use.
- To prevent pollution of groundwater.
- To minimize the impact of dewatering along preferential pathways.
- To gather sufficient information to allow future interpretations and to guide planning for closure.

11.1 Guiding principles

- The slimes facility and return water dam to be constructed in accordance with the proposed design document.
- Ground water inflows into the workings and water pumped from workings during operations should be treated as dirty water and to be pumped to the pollution control dams.
- All plant and surface infrastructure (including slimes dams, overburden dumps and pollution control dams) to be constructed in accordance with national standards and applicable legislative requirements, to prevent ingress of surface water into the groundwater regime.
- All groundwater management measures to be implemented in accordance with the Integrated Water and Waste Management Plan (IWWMP) and IWUL.
- Clean and dirty water to be separated.
- Groundwater quality and level monitoring to be conducted monthly as per the water management plan. Internal quarterly reporting to be undertaken and an annual report to be submitted.
- All hydrocarbon spills should be cleaned up, as soon as possible, to prevent seepage of pollutants into the ground water regime.
- Surface water quality needs to be monitored until any impacts attributable to mining have been eliminated and are acceptable to the receiving water environment.

12. Visual

Objectives

- To limit the perception of visual intrusion of the mining activities, where reasonably possible.

12.1 Guiding principles

- Mining infrastructure is generally designed as per functional engineering requirements. Efforts will be made, where possible, to design structures with a more aesthetic appeal.
- The final design will be concluded prior to the commencement of the construction phase and will be signed off by a professional engineer.
- The design will include both visual and noise design criteria.
- Designs will be optimised to try to decrease visual exposure of mining infrastructure.
- Exclusive use of lay down areas will be enforced and the uncontrolled dumping of waste or construction material will be prohibited.
- This will be undertaken where the visual impact on sensitive receptors is considered high.
- Uncontrolled, open fires will be prohibited on site.
- Dust will be controlled using appropriate dust suppression measures.
- The mine and plant will operate on a 24 hour basis. Lighting is thus required for safe operating conditions. As far as is possible, without compromising safety of mine personnel and operating processes, all light sources will be directed downwards and away from the public roads and surrounding communities.
- All light sources will be directed downwards and away from the public roads and surrounding communities.
- Rehabilitated areas will be maintained and monitored.

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

The environmental management measures developed for all the identified impacts will be implemented and incorporated into the plant daily activities. The effectiveness of management measures in mitigating the impacts will be monitored. Compliance with environmental conditions of approval will be assessed through undertaking of performance audits.

Throughout the life of the operating, it will be checked that closure objectives are clearly defined and that monitoring data collected will be meaningful at closure and that management measure are monitored timeously to minimize environmental liabilities at closure.

1. General Management

The activities will be managed and operated:

a) In accordance with EMPr that inter alia identifies and minimizes risk pollution, including those arising from operations, maintenance, accidents, incidents and non-conformances and those drawn to the attention of the developer as a result of stakeholder complaints.

b) In accordance with the requirements of the issued licenses and associated conditions of those licenses such as water use license or waste license.

c) In accordance with conditions of this license

d) By sufficient persons, who are competent in respect of the responsibilities to be undertaken by them, in connection with the operation of the activities.

e) Any persons having duties that are or may be affected by the matters set out in the EMPr will have convenient access to a copy of it, kept at or near the place where those duties are carried out.

The EMPr specifies the minimum requirements to be implemented, according to the scope of work and the scope of the environmental authorisation. This is done to reduce and manage the potential environmental impacts for sustainable environmental management practices. The EMPr is binding to any party which responsibility for the mining activities has been delegated to, until such time that the competent authority has been formally released WCR from its responsibilities in terms of this EMPr.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all times. The key environmental elements which are necessary for the implementation of the EMPr requirements are outlined below.

Environmental Policy

WCR recognizes that concern for the environmental impact of our operations is an integral part of best practice and is committed to meeting the challenges this represents.

Where practicable WCR will contribute to sustainable development by integrating environmental consideration into the design and management of our procurement of goods and services and the development, operation and maintenance of sites and facilities.

The Environmental Policy assigns responsibility for environmental implementation to all appointed personnel who perform activities with environmental potential impacts. The overall responsibility for ensuring implementation lies with the company Chief Executive Officer.

The policy which is the cornerstone for ensuring environmental consciousness and responsibility, is thus provided below.

WCR will:

- Adopt a systematic approach to environmental management in order to achieve continual improvement of our contribution to the protection and enhancement of both the local and global environment;
- Commit to the reduction and prevention of pollution and waste and take positive action to conserve water, energy and other resources (particularly where non-renewable); and ensure waste disposal and effluent treatment are dealt with in a responsible manner;
- Promote environmental awareness and appreciation through our research and through our interactions with all other stakeholders;
- Ensure compliance with all applicable environmental legislation and other environmental requirements to which the company subscribes and which relate to the company environmental aspects.
- Co-operate with environmental regulatory bodies;
- Provide information and training necessary for employee involvement in meeting the objectives of this policy;
- Maintain contingency plans to minimize the impact of foreseeable environmental incidents;
- Assess and monitor the environmental impacts of our activities and develop ways of minimizing these impacts;
- Establish programs for achieving environmental objectives and progress these through management review.
- Individual, employees or individuals who are working for or on behalf of WCR are required to co-operate with the company in the implementation of this policy by:
- Ensuring that waste is correctly handled, stored and disposed-off;
- Promptly reporting all accidents or incidents which could lead to pollution;
- Feeding back any suggestions for pollution prevention, waste reduction or energy conservation.

2. Organisational Structure and responsibility

This section also indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr. Responsible personnel with respect to the roles highlighted under the management commitments in Section 2, Table 1 (d) (ii) – 1 are outlined in Table 1 (d) (ii) - 2.

Chart 1 provides a guideline forthe teamstructure that plays a role in the successful implementation of the EMPr. It is aimed to indicate the intended plans and commitment by WCR to execute the management commitments within an organised structure, to ensure accountability as well as responsibility of the successful compliance with the conditions of authorisation. Therefore, this chart structure is going to just be utilised as a reminder that the implementation of the EMPr does not solely rest with a single party within the organisation as well as a guide to determine specific role players. It will be updated continuously as part of reporting procedures as per the actual operational activities on site and as new role key players are identified.

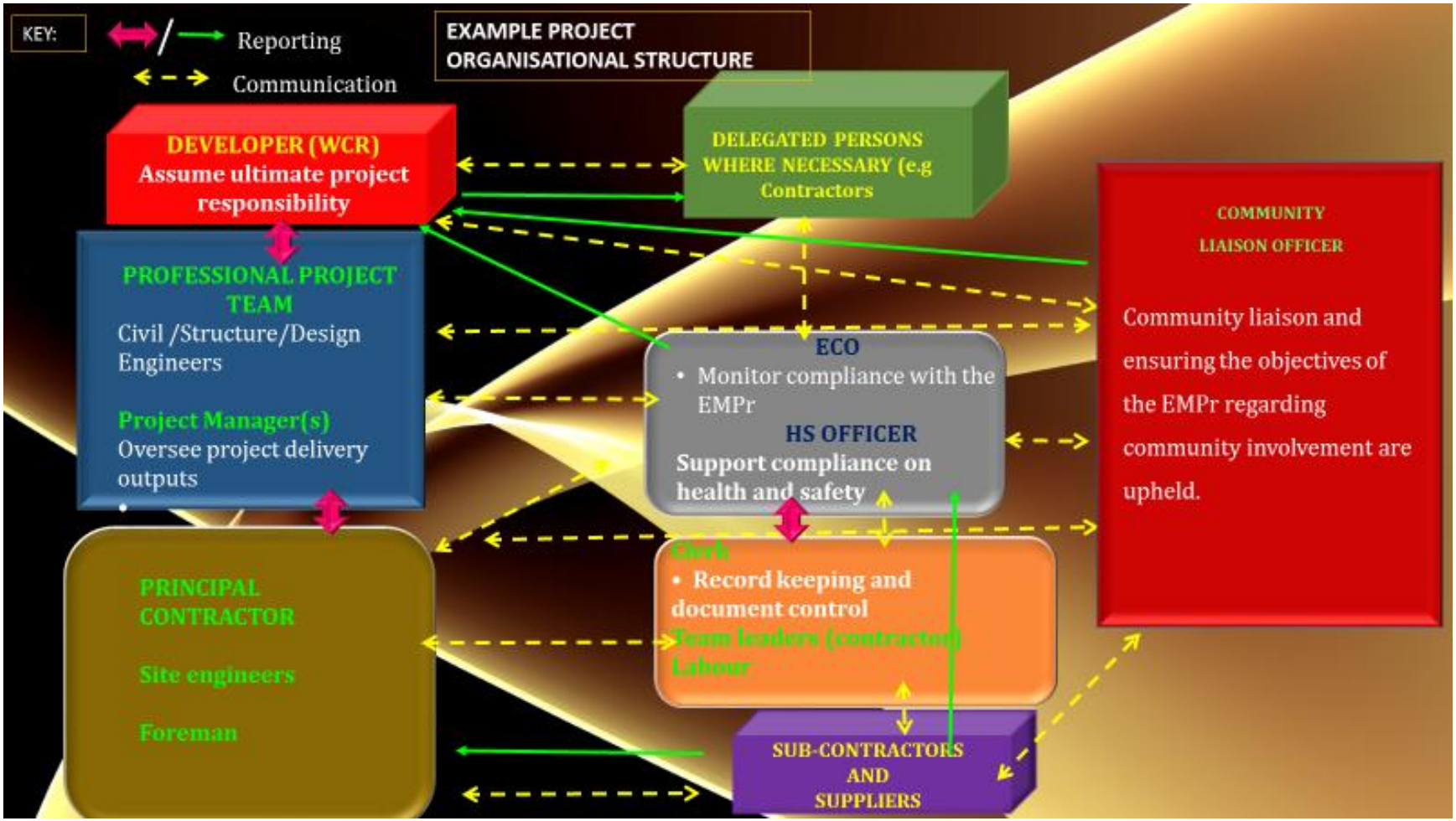


Chart 1: Example of a Project Organisational Structure

2.1 *Appointment of contractor*

- The WCR will ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The contractor must make adequate provision in their budgets for the implementation of the EMPr.
- The principal contractor (including sub-contractors and suppliers) will comply with the relevant provisions of the EMPr, applicable environmental legislation, by-laws and associated regulations promulgated in terms of these laws. Tender documents should include statements to include the use of local communities or local community organisation where possible in supplying services and labour to the construction activities.
- Tender documents for any procured services regarding implementation of the EMPr, should include statements to include the use of local communities or local community organisation where possible in supplying services and labour to the construction activities

Preparation of Method Statements and procedures

- Method Statements will be submitted by the contractor to the SHE Officer and will be adhered to by the Contractor and project engineers. These relate to water and storm water management requirements, traffic requirements, solid waste management requirements, fuel storage and filling and dispensing of fuel (diesel and petrol), hydrocarbon spills, contaminated water treatment, the storage of hazardous materials, standard emergency procedures, amongst others.
- The ECO will monitor the implementation of the statements and as such all copies of the statements and plans will be submitted to the appointed ECO;
- The recommendations of the specialists regarding sensitive site features will be upheld and recommendation of a site ecologist will be sought, when necessary, prior to vegetation clearing.

2.2 Appointment *of ECO*

- ECO will be appointed to monitor the implementation of the EMPr;
- The monitoring of the success of the implementation in the form of internal audits and progress reports will be the role of the ECO.

2.3 The *developer/ WCR*

The developer is ultimately responsible for ensuring compliance with the environmental specification and upholding the team to environmental commitment to compliance with all national, provincial and local legislation that relates to management of this environment.

- May on the recommendation of the engineer and/or ECO and Community Liaison Officer (CLO) order the contractor to suspend any or all works on site if the contractor or his sub-contractor/supplier fails to comply with the said environmental specifications;
- More specifically WCR shall:
  - Ensure that it complies with the requirements of this operational EMPr
  - Designate a staff member as ECO, who will assess compliance with the office of EMPr;
  - Maintain a record of all environmental management activities relating to the site (including all environmental reports, complaints made by the public, etc.)
  - Appoint an independent Environmental Auditor (EA) to undertake operational phase environmental audits every two years, to determine compliance with the operational EMPr.
  - Implement the recommendations made by the EA timeously

2.4*The engineer and professional project team*

The engineer will:

- Enforce the environmental specification on site;
- Monitor compliance with the requirements of the specification;
- Assess the contractor's environmental performance in consultation with the ECO, from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported to project meetings; and
- Ensure the documentation, in conjunction with the contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

2.5*The contractor (including sub-contractors)*

The contractor is required to:

- Be fully conversant with the EMPr and all conditions of the EA;
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the contract document;
- Supply method statements timeously for all activities requiring special attention as specified and/or requested by the developer, ECO and/or engineer during the duration of the contract;

- Be conversant with the requirements of this environmental specification/EMPr. Brief all his/her staff about the requirements of the environmental specification;
- Comply with requirements of the ECO in terms of this specification and the project specification, as applicable, within the time period specified;
- Ensure any sub-contractors/suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The contractor will be held responsible for non-compliance on their behalf;
- Bear the cost of any delays, with no extension of time granted, should he or his sub-contractors/suppliers contravene the said specifications such that the engineer orders a suspension of work. The suspension will be enforced until such time, as the offending party(ies), procedure, or equipment is corrected;
- Be conversant with the requirements of this environmental specification/ EMPr. Brief all his/her staff about the requirements of the environmental specification.

2.6Environmental Control Officer

The ECO shall be a WCR or a qualified environmental professional or professional firm with the relevant environmental expertise and shall be responsible for:

- Informing key, on-site staff through initial environmental awareness training of their roles and responsibilities in terms of the EMP and ensuring that such roles are included in their key performance areas
- Undertaking site inspections to determine compliance with the EMP;
- Identifying areas of non-compliance, and recommending measures to rectify them;
- Compiling a checklist of areas of non-compliance;
- Ensuring follow-up and resolution of all non-compliance;
- Acting as a community liaison officer to receive and respond to complaints raised by the public.
- Monitor that the principal contractor, sub-contractors, construction teams and the developer are in compliance with the EMPr, at all times during the construction and rehabilitation phases of the project;
- Monitor all site activities monthly for compliance;

- Conduct monthly audits of the site according to the EMPr, and report findings to the developer/contractor;
- Attend monthly site meetings;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions.
- Conduct training with the contractor on the EMPr and general environmental awareness.
- It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of WCR.
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compilation of method *statements* together with the principal contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved;
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the contractor;
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr;
- Take appropriate action if the specifications contained in the EMPr are not followed;
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible;
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr;
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr;
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that the list of transgressions is available on request; and

- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
    - Public involvement/complaints.
    - Health and safety incidents.
    - Incidents involving hazardous materials stored on site.
    - Non-compliance incidents.

2.7*Occupational Health and Safety Officer*

The Occupational Health and Safety (OHS) Officer will be responsible for undertaking of the following:

- Compilation of a comprehensive project Health and Safety Risk Assessment (HSRA);
- Compilation of health and safety specifications based on risks identified;
- Reviewing and approval of health and safety plan(s) submitted by appointed principal contractor(s);
- Conducting monthly health and safety inspections and compiling monthly OHS reports;
- Conducting monthly health and safety audits with audit reports;
- Assisting the developer/contractor in the investigation of major accident/incidents;
- Monitoring of site activities for compliance to the Occupational Health and Safety Act, (Act No. 85 of 1993) (OHSA) and Regulations;
- Establishment and monitoring of project health and safety file;
- Monitoring the principal contractor(s') health and safety performance; and
- Preparation of project close-out reports and submission of project health and safety files to the Client.

3. Legal Compliance

Compliance with Environmental Development

The EMPr will form part of the contract documentation for any contractors who will be responsible for environmental responsibilities, and this EMPr will be a legally binding document. As such, contractors will be held liable for failure to implement environmental responsibilities. Evidence of contravention of clauses within the boundaries of the site, site extensions and haul/access roads will be subjected to internally agreed penalties. There will be enforced dedication to comply with corrective or other instructions issued by the developer, Environmental Control Officer (ECO) or engineer within a specified time by all contractors

WCR will ensure that the provisions of the National Environmental Management Act (Act No. 107 of 1998), (NEMA) Section 28 are also upheld in that a responsibility to avoid environmental damage, the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring will be developed and implemented.

iii. Potential risk of Acid Mine Drainage. (Indicate whether or not the mining can result in acid mine drainage).

There is no risk of acid mine drainage.

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

N/A

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

N/A

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

N/A

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

The following operational assumptions were made:

- Storage dam will be placed at the open-cast mining area, to collect seawater to be used at the plant. Seawater is abstracted for processing diamond mining and released back to the sea.

Water balance calculations

Rainfall and evaporation data was used to quantify the annual rainfall and evaporation in cubic meters per annum (m^3/annum).

Natural water sources are as follows:

- Rainfall (mm) was multiplied by the surface area and the runoff coefficient to determine the runoff for the following area:
  - Slimes dam area (Disposal area)
  - Water Return Dam (WRD)

Natural Water losses

- Evaporation losses were quantified by multiplying evaporation with the surface area of exposed water storage areas.
- Plant losses

Component water circuit

Water balance calculations were conducted for each component as summarised in the tables below:

Table (d) (vii) 1 - 1: Processing plant water balance

Water-Balance	**Source: Water-In (m^3/annum)**		**Loss: Water-Out (m^3/annum)**		
Description	**Seawater-Storage dam**	**Return Water from RWD**	**RWD**	**Slime Dams**	**Plant Losses**
Screening Plant	3120000	716065	1223040	2496000	117025
Total (m^3/a)	3836065		3836065		
Surplus/Deficit	0				

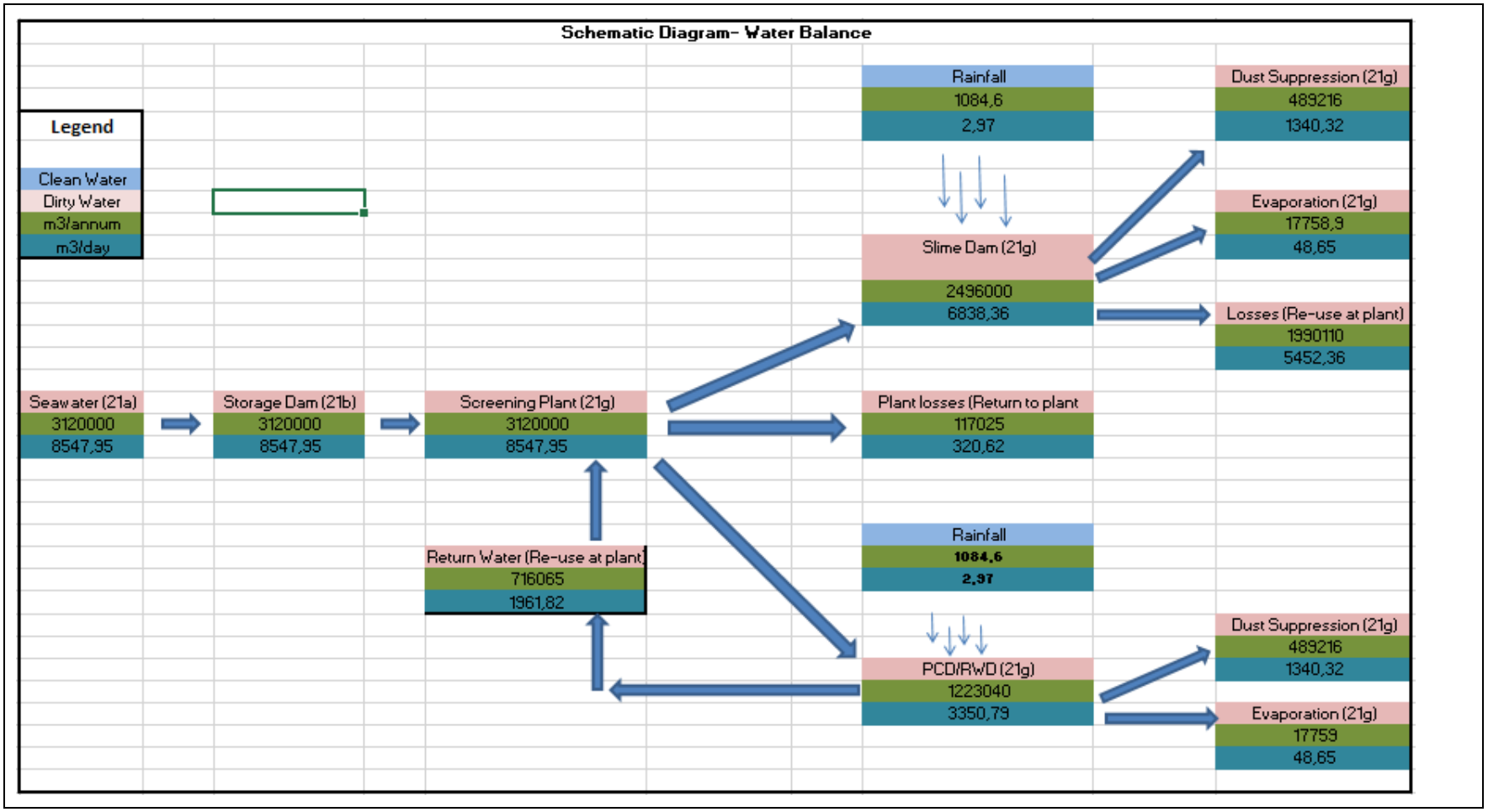
Table (d) (vii) 1 - 2: Operational area water balance components

Water-Balance	**Source: Water-In (m3/annum)**	**Source: Water-In (m^3/annum)**	**Loss: Water-Out (m^3/annum)**		
Description	**Plant**	**Rainfall**	**Evaporation**	**Dust suppression**	**Return to Plant (losses)**
Slime Dams	2496000	1084.6	17758.9	489216	1990110
Total (m^3/a)	2497084.6		2497084.6		
Surplus/Deficit	0				

Table (d) (vii) 1 - 3: RWD

Water-Balance	**Source: Water-In (m^3/annum)**		**Loss: Water-Out (m^3/annum)**		
Description	**Plant**	**Rainfall**	**Evaporation (at 10% $Area_{IC}$)**	**Dust suppression**	**Return to Plant (losses)**
RWD	1223040	1084.6	17759	489216	717150
Total (m^3/a)	1224124.6		1224124.6		
Surplus/Deficit	0				

Figure (d) (vii) 1 - 1: Water Balance Sketch



Dewatering sites and volume

Section 21 (j) of the National Water Act, 1998 (Act 36 of 1998) entails: removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

The amount of water that will be removed from underground will be 600 000 m^3/a. This process of dewatering will take place on the following farm areas each with 150 000 m^3/a; Somnaas 474, Langklip 489, Zwartlinjies River 484 and Koingnaas 475.

Table (d) (vii) 1 - 4: Dewatering

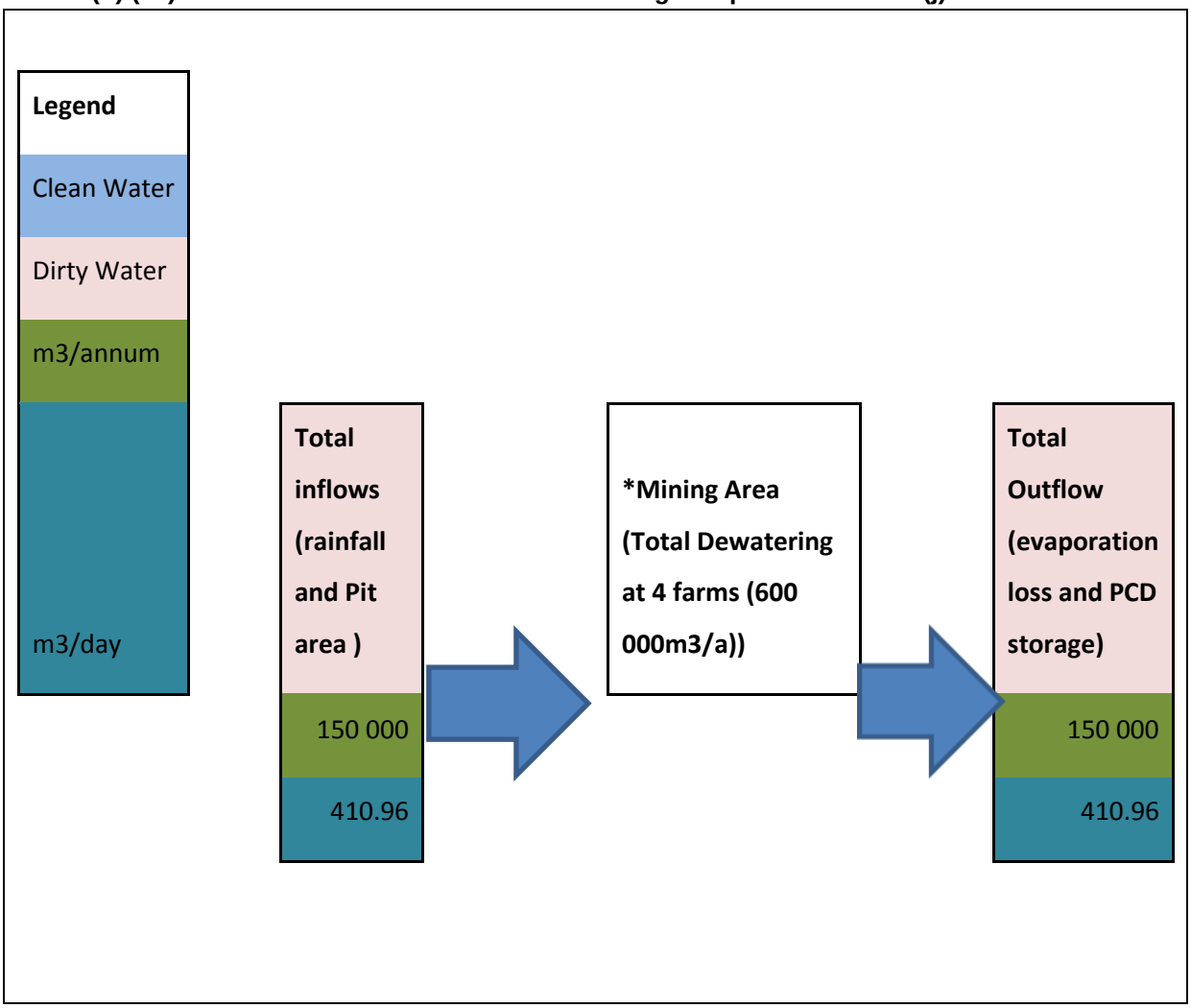
Type of water use	Description	Farm name	Co-ordinate	Volumes
Section (j): removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	*Removing Water from underground /dewatering.*	Somnaas 474	E 17° 13' 25.86" S 30° 9' 47.76"	150 000 m^3/a
Section (j): removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	Removing Water from underground / dewatering.	Koingnaas 475	E 17° 17' 57.67" S 30° 17' 51.83"	150 000 m^3/a
Section (j): removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	Removing Water from underground / dewatering.	Langklip 489	E 17° 19' 31.75" S 30° 22' 37.70"	150 000 m^3/a

Type of water use	Description	Farm name	Co-ordinate	Volumes
Section (j): removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	Removing Water from underground / dewatering.	Zwartlinjies River 484	E 17° 20' 54.06" S 30° 25' 51.08"	150 000 m^3/a

Table (d) (vii) 1 - 5: Component Water Balance at the Opencast area

Water-Balance	Source: Water-In (m^3/annum)	Loss: Water-Out (m^3/annum)
Description	Total inflows (rainfall and pit area)	Total outflow (evaporation and PCD storage)
Mining Area (Pit)	150000	150000
Total (m^3/a)	150000	150000

Table (d) (vii) 1 - 6: Water Balance for the dewatering component for S 21 (j)



*Dewatering activities at 4 different operational areas at a rate of 150 000 m^3 per site.
At a combined capacity of 600 000 m^3

viii. Has a water use license been applied for?

A water use licence was applied for and an Integrated Water and Waste Management Plan (IWWMP) was compiled as part of the WULA application.

iii. Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity.

This section contains a comprehensive matrix of all identified prospecting, mining and incidental activities, products and services that are controllable and may have an impact on the environment. The matrix lists activities, provides environmental objectives that should be met, and lists management actions required to address impacts/effects arising directly and indirectly from mining actions.

As there is no discernible difference between the starting up and operational phases of the project, they have been combined and addressed simultaneously. Generic environmental issues of concern typical for the WCR mining operations, together with those identified by I&APs which are also tabled in the environmental impact assessment report in Part A, are addressed. The phase of operation in which the activity will take place are planning and design (P&D), Pre-construction, construction, operational rehabilitation, closure and post-closure.

Table (d) (ix) 1 - 1: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
Land use based activities										
1. Drilling and prospecting • SONIC drilling • Large diameter LDA auger drilling • Tunnelling • Bulk sample extraction from drill holes and tunnels • Bulk sample excavation, from trenches, pits and tunnels including transport and	a) Positive benefits of sharing research data through research and development for development and design of effective alternatives and modifications in the mining technologies for optimal resource extraction and utilisation. b) Dust generation impacts c) Impact on vegetation species	Medium Low	P&D	Section d) 2 and d) ii) 1.4: Drilling of small and large diameter SONIC and/or auger drill holes and recovering bulk samples from drill core and by pitting and tunnelling on surface or in depth from drill holes. Section d) 3 and d) ii) 1.3, Appendix 5: Establishment and mining of new	• Share information with research institutions and position the company as a contributor in research and development in the West Coast and innovators in seeking new technologies for optimal and sustainable extraction of resources.	Management and control.	MPRDA standards regarding optimal extraction of mineral resources.	On going	Geologist and Mine Manager	Improved sharing of research information Better blasting technologies utilised

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treatment • Bulk sample extraction by means of directional drilling.				mining areas/blocks	• Limit disturbance to vegetation, use existing tracks, where available. Limit making ne vehicle track in the veld. • Rigs will be equipped with dust extraction equipment.					
2. The development of processing activities including associated structures and infrastructure e.g. construction and/or	a) Possibility of sterilisation of the mineral reserves/resources due to improper placement of infrastructure. b) Changes to surface	Medium	P&D, C,O	Land based mining: Section d) 3.3 and d) ii) 1.3.2 of Volume 1, Part A: 1. 200 tph screening and scrubbing plant (see Appendix 4.4) feeding the existing	• Proper planning as supported by 50 years' worth of data • Plan and place structures with also closure in mind	Avoid sterilisation of mineral resources through effective management and utilisation of mine plan	• Adhere to license conditions regarding crossing over of streams activities (Covered as part of the	On receipt of environmental authorisation	Mine engineers, Metallurgist, Geologists, Mine Manager	Proper placement of infrastructure as guided by a mine plan

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
establishment of screening and processing plants, crushing plants, pans and classifiers, mobile treatment plants, • The construction and maintenance of sea water abstraction pumps and pipelines for pumping to treatment plants and the construction of slimes delivery or deposition pipelines.	topography due to placement of infrastructure and development of residue deposits c) Visual intrusion and slimes dams as permanent features of the landscape. d) Crossing over of streams and alteration of river banks e) Deterioration of water quality due to spillages			50 tph Michell's Bay Dense Media For hydraulic mining activities pipelines of approximately 120 m length and 150 to 200 mm diameter will be established. Section d) 3.2.3 and d) 3.2.4: Pipelines of approximately 2000 m length will carry return process water from the process water tanks to the processing plant. The pipes are made of steel bar or HDPE with diameters of	• Ensure that the slimes dams are deposited with the key landscape considerations of the surrounding areas. Where feasible existing voids will be utilised. The disturbed areas will be rehabilitated with due considerations of the landscape character and ecosystem dynamics		application for Section 21 (c and i) of the water use licenses).			

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• Establishment of ablution facilities • Establishment of parking areas				200 to 350 mm.	• Utilise a detailed civil engineering design that was completed for each of the slime dam sites. As was done during feasibility site selections, continue for all the slimes dam positions to ensure that the bedrock profiles in each of these areas are checked to ensure that the bedrock slope dipped towards the coast and that the sites are within 1 km					

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					from the coastline. • Avoidance of seepage and slumping by continuous monitoring and routine scheduled monitoring by a professional registered engineer. Interpret results of bedrock elevation studies, those sites that seep into aquifers be identified. • Consider the flow					

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					characteristics and considered in the placement of the structures. • Provide mobile chemical toilets at convenient points to serve construction and operational teams • Properly dispose of septic tank contents • Adhere to licensing stipulations					

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					regarding sewage handling and disposal					
3. The clearance of the area for proposed mine blocks, overburden areas, new plants at Mitchell's Bay, Koingnaas and elsewhere (mobile plant) as required and new slimes dam areas Construction of 200 tonnes per hour (tph) screening and scrubbing plant Construction of 450 tph tailings treatment	Soils a) Loss of soil resources due to topsoil removal and wind erosion susceptibility Vegetation b) Loss of species of conservation value c) Fragmentation and loss of habitats d) Impact on faunal migration due to fencing e) Proliferation of alien	Low	C	New slimes dams will cover an area greater than 1 ha (Appendix 4.2) in Volume 1, Part A. New plant sites will also cover an area greater than 1 ha (cf. Appendix 4.5 and 4.6 of Volume 1, Part A)..	• Limit vegetation clearing to the areas that will be used • Align all sensitive areas with the mine plan and determine which areas will need to be priorities and which areas require environmental interventions prior to mining. As such, utilise sensitivity	Alleviate impacts through management and control Control and manage improvement of positive impacts on community well-being i.e. prosperity of the community, employment and general significant economic stimulation of the local economy through job creation;	• National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) regulations: National Dust Control regulations (Nov 2013): and National Framework for Air Quality	• During construction activities.	• ECO/ • Engineer/ Health and Safety Officer/ • CLO	Infrastructure areas that have observable reduced impact on the environmental components such as soils, vegetation, air and noise.

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
facility	invasive species and disturbance of fauna Land capability f) Impact on soil capability and quality, e.g. loss of seedbed ecosystems, degraded agricultural potential g) Dust generation h) Impact on health and safety such as occupational health and safety; i) Positive impacts on community well-				map to ensure the identified sensitive areas are avoided • Rehabilitate disturbed areas utilising adopted appropriate strategies • Adopt soil amelioration strategies • Conduct dust monitoring and align this to health and safety dust monitoring • Establish a dust management plan		management in the Republic of South Africa (Nov 2013) • National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) standard relating to the prevention of pollution and ecological			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
	being i.e. prosperity of the community, employment and general significant economic stimulation of the local economy through job creation; j) Impact on land use and availability i.e. restricted access due to diamond security;				in consultation with the environmental manager and include dust suppression as part of the contractor's contracts • Consider the land capability and current land uses before placement of new structures and ensure planned rehabilitation strategies are such that the post-mining land use can still be for the benefit of		degradation. Regulations: national norms and standards for the storage of waste (Nov 2013); List of Waste Management activities that have, or are likely to have, a detrimental effect on the environment (Jul 2015); and Regulations regarding the			

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					the post-mining land users.		Planning and Management of residue stockpiles and residue deposits (Jul 2015) • Occupational health and Safety Standards			
3 (continued)	k) Surface water deterioration in water quality due to suspended solids from erosion of disturbed soil Lack of storm control	Low	C,O,D		• Mine infrastructure will have clean water diversions (these will be built prior to construction to minimise the impact of	Pollution control through provision of adequate structures	National Water Act and Regulation 704 principles and guidelines.	On commencement of site establishment and during construction	Project engineer/ECO	Reduction in pollution due to adequate pollution control structures

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	structures will lead to erosion of the stockpiled materials during heavy rains and run –off will thus carry suspended solids into the downstream environment, causing high silt load and affecting stream flow. Water quality might p deteriorate due to sewage effluents, surface run-off.				construction activities • The surface area of clean water areas should be maximised and the size of dirty water management areas minimised within the mine boundary area; • All storm water management measures should be designed to separate clean water from dirty water (and vice versa);					

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					• All storm water management structures such as the return water dams and catchment paddocks in the slimes dams, will be designed to require minimum maintenance, including maintenance required after floods exceeding the design capacity • For the IWWMP, haul and access roads were not					

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					included as part of the dirty water management except, where the roads are established on dirty water areas; and • Concurrent rehabilitation will be essential to reduce the recharge of rain water through the overburden dumps and to increase clean surface runoff to the clean environment.					

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					Surface water management infrastructure is designed to cater for 5 year intervals. This will require that clean and dirty water berms and trenches be placed in locations to minimise the dirty water catchment during a 5-year stage.					
4. The construction and	a) Impacts on the natural landscape due to vegetation clearing	Medium	C&O	Section d) 3.5 for Volume 1, Part A: Access roads wider	• Implement all required safety measures when collecting road	Control through management and monitoring	Road regulations	On completion of planning and prior to	Mine managers and	Loading, hauling and trans port activities that have minimal

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maintenance of access roads to beach mining areas, sea-water intake pumps, land mining areas, overburden dumps, tailing dumps and slimes dams and processing plants, including road maintenance	b) Impact on soil capability and quality e.g. loss of seedbed ecosystems, and reduced land capability to potential soil erosion			than 8 m from the land and beach mining areas to the processing plant.	construction material and during transport thereof. • Rehabilitate or remove any access roads, gates or fences constructed, as per approved rehabilitation plan.	Alleviate through rehabilitation		placement of infrastructure	Engineers	impact on vegetation, soils.
5. Overburden stripping and mechanical extraction of ore	a) Noise b) Damage to archaeological and heritage sites.	Medium	C,O,D	The total extent of the land mining operations is shown in Drawing 001,	• Compile a rehabilitation plan that is safe and non –polluting.	Alleviate through rehabilitation initiatives	• Northern Cape Nature Conservation Act and	On-going during the entire life cycle of mining	ECO/Mine Manager	Controlled systematic overburden stripping with

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and mine block development, including blasting activities Establishment of temporary stockpiles and/or residue deposits during mining operations; Re-mining of residue stockpiles or residue deposits; Certain mine residue deposits (CRD's) at the existing Koingnaas and Michell's Bay plant sites that will be re-mined and	c) Dust generation d) Deterioration in water quality due to elevated nitrate levels associated with blasting e) Noise generation f) Topsoil removal g) Loss of soil resources due to wind erosion susceptibility h) Surface water deterioration due to suspended solids from erosion of disturbed soils i) Vegetation clearing i. Loss of species of conservation value			Volume 1, Apart A of the EAIr.	• Notify stakeholders of blasting times when blasting will be done in areas of public access. • Adhere to Mine health and safety noise regulations • Avoid disturbance of archaeological sites and notify SAHRA, through the appointed archaeologist, should there be archaeological finds. • Strip and store	Control excessive noise through management and monitoring Control increased nitrate levels through adherence to blasting regulations and consideration of alternative blasting methodologies Management and control of disturbance of archaeological	National Environmental Biodiversity Act should be observed with regards to identified critical biodiversity areas and clearance of vegetation in these areas. • National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	activities, until decommissioning phase		minimal impact on the environmental components

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reclaimed. Some overburden dumps will be used in continuous rehabilitation. Mobile treatment plant stockpiles and residue dumps that will be processed and rehabilitated on an ongoing basis.	ii. Fragmentation and loss of habitats ii. Impact on faunal migration due to fencing v. Proliferation of alien invasive species and disturbance of fauna j) Removal and loss of Namaqualand Seashore Vegetation and Namaqualand Coastal Duneveld.				topsoil prior to placement of infrastructure as far practical as possible and avoid sterilization of such soil stockpiles by ensuring for adequate windrows and heights (generally not more than 2 m where possible to avoid loss of seedbank) • Adopt soil amelioration strategies • Conduct dust	sites. Prevent loss of soil due to wind erosion	regulations: National Dust Control regulations (Nov 2013): and National Framework for Air Quality management in the Republic of South Africa (Nov 2013) • National Environmental Management: Biodiversity			

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					monitoring and align this to Health and Safety dust monitoring. • The requirement that any removal of surface vegetation be restricted to as small a footprint as possible. • Regular monitoring (approximately every 6 months) should be carried out across all areas of mining activity. This can		Act, 2004 (Act No. 10 of 2004) regulation: Norms and Standards for Biodiversity management plans for species (March 2009)			

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					be done visually, but any signs of soil loss by wind or water, should be reported in order that preventative measures can be taken before any problem becomes worse. • Within the broader study area, there are no specific sensitive areas that need to be avoided, in terms of the soils or agricultural					

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					potential.					
5 (continued)					• Limit vegetation clearing to the areas that will be used • Utilise and continuously update sensitivity map to ensure the identified sensitive areas are avoided • Rehabilitate disturbed areas utilising adopted appropriate strategies • An important objective should be to reduce	Minimise loss of species of conservation value through monitoring and management	• National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) regulation: Norms and Standards for Biodiversity management plans for species (March 2009) • Northern Cape Nature Conservation, 2009 (Act No. 9 of	Before construction/During activities During construction	ECO/Health & Safety officer/ Ecologist	Monitored and positive records showing reduction in vegetation clearing impacts a) loss of species of conservation value; b) fragmentation and loss of habitats c) impact on faunal migration due to fencing; d) proliferation of alien

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					negative edge effects by ensuring that all regularly used informal roads have acceptable surfaces, are free from erosion, and have effective drainage. • New and existing mining pits will be backfilled, where appropriate, with existing spoil and any new spoil generated according to a systematic plan. • New soil dumps		2009), part 63; Regulations and Schedules.			invasive species and disturbance of fauna; e) Loss of Namaqualand Seashore Vegetation and Namaqualand Coastal Duneveld.

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					will not be positioned within areas of intact habitat adjacent to mining pits, but will be used to backfill or rehabilitate existing disturbed areas. • Material for coffer dams will be sourced from existing disturbed sites, as far as possible. Existing roads will be used wherever possible and they will be					

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					constructed so as to avoid undisturbed habitat. • An ECO will be appointed who will be involved with planning of roads and other infrastructure and who will monitor and audit impacts on the undisturbed natural environment. • A long-term monitoring program will be developed for the					

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					site that monitors and should aim to quantify changes in habitat. • ECO to keep a log of activities which must be inspected and signed off once monthly by the relevant manager. • The mine should appoint a suitably qualified restoration specialist to compile a vegetation rehabilitation plan					

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					for areas deemed necessary. The restoration specialist must submit the vegetation rehabilitation plan to the ECO and mine management for approval.					
5 (continued)	k) Impact on Land capability i. Impact on soil capability and quality, e.g. loss of seedbed ecosystems and loss of agricultural				• Restricted footprint: as little surface disturbance as possible so that there is minimum disturbance • Removal and storage of cover	i. Minimise impact on soil capability and quality, e.g. loss of seedbed ecosystems and loss of agricultural	• National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) regulation: Norms and	• During entire life cycle of mining activities	• ECO/Health & Safety officer/ Ecologist	

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	potential; ii. Loss of agricultural land due to low prevailing agricultural potential ii. Whenever any excavation or other surface disturbance is involved, the possibility of increased erosion exists. In the case of the West Coast Resources mining project, due to the sandy nature of the topsoils, coupled with the dry				soil (>0.5 m, if possible). Soil should be stored for the shortest possible time (<2-3 yrs, if possible) and stored to a height of less than 2-3 metres, if possible before being replaced for rehabilitation. • Effective re-establishment of natural vegetation (in consultation with vegetation specialists), with	potential; ii. Prevent Loss of agricultural land due to low prevailing agricultural potential ii. Prevent loss of increased erosion exists.	Standards for Biodiversity management plans for species (March 2009) • Northern Cape Nature Conservation, 2009 (Act No. 9 of 2009), part 63; Regulations and Schedules.			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
	climate, the erosion hazard will be in the form of increased susceptibility to wind erosion, whereby any activity that removes the vegetation cover (no matter how sparse) will expose the topsoil to the possibility of removal and re-deposition at a distance, by wind action.				appropriate soil conservation n measures during this phase. • Regular monitoring (at least every 6 months) to check on progress of rehabilitation.					

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6. General mining related activities	a) General mining related activities Potential noise, dust and safety impacts associated with mining related activities Mining related activities have the potential to impact negatively on adjacent landowners and communities. The typical impacts include dust, noise and safety. The movement of heavy construction vehicles along local public	Low	C, O and D	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	• Noise complaints will be recorded and address as soon as possible • •	• Reduce noise and dust pollution through adequate controls and monitoring	• National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) regulations: National Dust Control regulations (Nov 2013): and National Framework for Air Quality management in the Republic of South Africa (Nov 2013) • Noise	• During entire life cycle of mining activities	• ECO, CLO, Project engineers and Mine Manager	• Observable reduction in dust emissions and reduced complaints of dust pollution.

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	roads in the area may also pose potential safety risks to other road users. Most the mining and associated activities will take place within the mining area which is not open to the public. The transport of heavy mining and plant equipment to the site may however pose potential risks to motorists.						regulations and standards			
6.1 Vehicular movements within the site and associated	b) Impacts on air quality due to vehicle	Low	P&D, C,O,D		• Use existing roads in as far as applicable • Ensure that all	Swift movement of vehicles through		Ongoing	Mining engineers and support	Reduced accidents

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transport routes. Loading, hauling and transport activities	entrainment emissions and potential accidents due to uncontrolled vehicle movements (Traffic safety) c) Noise				regularly used informal roads have acceptable surfaces, are free from erosion, and have effective drainage. • Remove foreign road-construction materials which may hamper vegetation re-growth and dispose of in an approved manner prior to rehabilitation. • Monitor the emissions of dust by conducting	management and control			personnel	

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					dust suppression methods like sprinkling, where adequate. • Avoid abnormal loads along N7 on weekends and public holidays; • All vehicles will be road-worthy and drivers will be qualified, made aware of the potential road safety issues, and need for strict speed limits. • Equipment and vehicles will be					

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					maintained in good operating condition. Any worn or faulty exhaust- and/or intake silencers will be replaced immediately.					
6.2 Re-fuelling of machinery (drill rigs, vehicles), and spillage of cleaning solvent, oils and other chemicals	d) Deterioration in water quality due to spillages during re-fuelling of machinery (drill rigs, vehicles), and spillage of cleaning solvent, oils and other chemicals	Medium	C,O,D		• Educate contractors and all other personnel about the importance of environmental management and encourage them to minimise direct and indirect removal or damage through	Management, monitoring and control of spillages		Ongoing	ECO and Transport engineers	Few recorded spillages

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					mining activity. • Investigate means to reduce consumption of fossil fuels like installation of fuel efficient equipment, and servicing and repairing all equipment regularly. • Implement the use of drip trays, whenever a refuelling or machine maintenance activity is being undertaken.					

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					• Compile a procedure for controlling oil spills and use the same as a guide to ensure that oil spills are at a minimum.					
6.3 Storage and disposal of waste 6.4 Fuel and lubricant management, including storage and field management as well as temporary storage of diesel and associated contaminated	e) Pollution of surrounding environment including contamination of soils due to spillages		O Waste generating activities	The volumes of waste are indicated in the existing waste licences. There are existing waste permits issued to WCR for domestic/general waste, hard scrap (recyclable dumps),	• Carry-out regular waste and energy management assessments for all operations • Understanding of waste generating activities, mapping these and design collection,	Minimise generation of waste at source, manage and control disposal	Auditing of waste licence conditions and observance of the NEA: Waste Act standards regarding general waste disposal.	During construction, operation and decommissioning activities	ECO and support services	Well managed waste generation, storage and controlled disposal

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utensils and rags 6.5 Oil spills and recycling				garden refuse, salvage dumps and building rubble dumps. There are existing waste licences. However, there is no sorting, shredding, grinding, crushing, screening or bailing of waste being undertaken. This may be required in the future. The operational area is in excess of 1000 m².	storage and disposal strategies. • Recycling equipment and materials where possible. • Design a recording system to ensure that fuel consumption and levels are monitored. • Retain wastes in leak-proof containers on-board and dispose at the port side to designated port					

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					disposal collection facilities. • Regularly collect all plastic wastes generated during off shore based mining daily and store in suitable waste container for disposal at the nearest licensed landfill site. • Collect discarded pipes etc. on a regular basis from the mine, for disposal at the landfill site. • Maintain accurate					

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					records of all solid waste generated from mining and related activities. • Store non-biodegradable refuse (e.g. glass bottles, plastic bags, metal scrap etc.) in a container at collection points for collection on a regular basis for disposal at the designated mine site waste disposal facility. • Collect and store					

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					biodegradable refuse in a suitable covered container for regular disposal at the designated mine site waste disposal facility. • Recycle waste as far as practicable in accordance with the national strategy for waste management. • Prevent and avoid littering • Keep a record of the quantities and types of waste disposed of, and					

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					the locations and methods used • Re-useable tyres sent to designated holding facility prior to being sent to authorised tyre dealer or supplier. • Conveyor belts to be stored in designated area, subject to the provisions of the GN R.718 and any latest waste regulations, before being					

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					removed for recycling or disposal.					
6.5 (continued)					• Operators to be properly trained in refuelling and avoidance of diesel spills. • Operators to be provided with and trained in the use of oil decontaminants • Provide wash bay with concrete floors which drain to oil catch pits (Para. 6.1). • Clean oil catch pits to waste oil					

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					drums regularly. • Construct supply tanks and used oil storage areas • Ensure all oils are drained from scrap engines, etc. before storage. • Engines, etc. which are to be reconditioned and required to be kept lubricated to stand on suitable floor equipped for a possible leak or spill. • Used oil storage					

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					area to be constructed with used oil disposal contractor or WCR providing suitable drums in these areas at each workshop.					
6.6 Workshops Electrical, mechanical, earth moving boiler making and workshops 6.7 Administration and other buildings: Office buildings, training centre, emergency services and cafeteria 6.8 Housing and recreational facilities;	f) Surface water Deterioration in surface water quality Oil spillages during maintenance may be in contact with storm water. During operation, contamination could occur from oil, diesel and chemical leaks or spills,	L	O	Koingnaas is an existing mining area with most infrastructure requirements already in place. Infrastructure at each mine site and processing operation comprising electric	• Adhere to procedures developed for the management of ancillary activities • Observe methods to reduce utilisation of resources such as electricity efficient mechanism and	Control and physical monitoring of spills and avoidance of spills through regular maintenance of equipment		ongoing	ECO/Designated engineers	Reduced spillages

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
6.9 Powerlines; and access to electricity 6.10 Electricity substation and network 6.11 Railways; 6.12 Sewage plant; 6.13 Pollution control dams, paddocks, and evaporation dams. 6.14 Pipelines 6.15 Process water pumps and storage tanks 6.16 Portable water supply and storage tanks				power supply, roads, potable, fresh and seawater supplies, fuel supply and storage and workshops, have been established and maintained. The main haul roads run from the various mining areas to the main treatment plants and are well constructed. Smaller light vehicle roads connect offices, workshops and other frequently visited destinations.	water management strategies and develop means of optimising fuel consumption on vehicles.					

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				There is an existing sewage plant registered with the then Department of Water Affairs (DWA) and now Department of Water and Sanitation (DWS). There are also existing pollution control dams, paddocks, and evaporation dams.						
6.17 Use of natural resources	g) Loss of natural resources	Low	O							

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7 Processing activities 7.1 Slimes disposal into existing mining voids Existing mining voids in mined out areas were identified in central areas where processing plants would be placed over the life of the operation. The disposal of fine residue and waste water to:Slimes dams from the processing plants,	a) The historic slimes facilities that were created on surface by De Beers have a negative impact on the environment due to windblown dust that is generated. b) Potential seepage of sea-water used in processing into freshwater resources in the area. c) Deterioration in water quality	High	C and O	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2. The location of the slimes dams are shown in Appendix 4.2, 4.2.1, 4.2.2. -1.6 mm slimes material will be pumped to the slimes dams. The total volume of	• Plan and place structures with closure in mind. • Establish a dust management plan in consultation with the environmental manager. • Place the fine fraction of the waste below natural ground level or behind existing overburden dumps to reduce windblown dust • Reduce dust	a) Minimise and reduce dust emissions through monitoring and operational controls b) Avoid seepage into freshwater resources c) Manage and monitor slimes disposal activities	a) National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) standard relating to pollution; and the National Ambient Air Quality Standards. b) National Environmental	During the daily monitoring During the activity of placement of mine residue deposits-slimes dams. During lifespan of slimes dams.	Project Engineer and ECO	a) Reduction of dust emissions b) Maintained monitoring records c) Reduced recorded complaints about visual intrusion of slimes dams as permanent features of the landscape.

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Mining voids during mining and/or overburden stripping. Return water dams.	d) Potential health impact on surface water users and on the natural environment.			waste water to be stored in the slimes dams will be 9 984 000 m^3 per annum.	generation by stabilising dust sources through covering with coarse tailings, where practically possible. • Conduct dust monitoring according to acceptable monitoring protocol as per prescriptions of the dust specialist investigations (Volume 4 of this EIA) Manage the		Management : Waste Act, 2008 (Act No. 59 of 2008) standard relating to the prevention of pollution and ecological degradation; list of waste management activities that have, or are likely to have a detrimental effect on the environment			d) No costs associated with removal of improperly placed structures on top of potential resources and reserves e) Reduced seepage

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					slimes dams as part of the integrated water and waste management plan, which was compiled as part of the water use licence application and any impacts associated with these water uses will be managed as part of a valid licence • Align development strategies to the Estuary		(29 November 2013) ; and c) National Water Act, 1998 (Act No. 36 of 1998) standard relating to prevention of water pollution; and the Regulations on use of water for mining and			

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					Management Plans that have been developed by the district municipality for these estuaries. • Utilise a detailed civil engineering design that was completed for each of the slime dam sites.		related activities aimed at the protection of water resources (Government Notice, June 1999). d) National Water Act, 1998 (Act No. 36 of 1998) standard			

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							relating to preservation of water resources; and the Regulations on use of water for mining and related activities aimed at the protection of water resources (Government Notice, June 1999).			

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7.1 (continued)	e) Potential impact on water resources (Swartlintjies River). While the preferred site of future slimes dam is not going to impact on the Swartlintjies Estuary, the alternative site 9 km upstream (Alternative 2 in Figure (d) (ii) 1.1-9), is located within the Swartlinjies River Catchment. Although the prevailing wind carries some of the dry saline sediment north-east, the possibility exist that	High	O and D		• It is not feasible to cover slimes dams while they are in use Re-consider use of this alternative 2 and remove from the alternatives if feasible and alternatively utilise the preferred sites north of the estuary, which are situated outside of the Swartlintjies River catchment and are anticipated to drain into the sea via existing abandoned mining channels.	d) Reduce potential negative impact on water resources.	h) National Water Act, 1998 (Act No. 36 of 1998) standard relating to protection of water resources; and the Regulations on use of water for mining and related activities aimed at the protection of	h) During lifespan of slimes dams	h) ECO/ Project Engineer	h) Water monitoring records providing evidence of reduced visible or measurable negative impact on water resources.

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	seepage of saline water gets into the Swartlinjties River. The Estuary Study Report in Section 10.42 , Volume 4, provides detailed view in this aspect.				Should alternative 2 be used (Figure (d) (ii) 1-1, this alternative site should be developed with caution to prevent accelerated salinisation of the Swartlintjies Estuarine Functional Zone and associated potential negative long-term impacts on biodiversity.		water resources (Government Notice, June 1999).			
Impacts of Shore based divers and those of Beach and Offshore Channel Mining										
1. Construction of coffer dam walls around	a) The changes in biophysical characteristics on	High	O	The size and scale of operations are presented in	• Berm construction and/or shoreline	Tolerate the risk. - Biota in the Benguela				

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excavate beach and/or offshore channel mine blocks using boulders, bedrock, gravel, sand and other related materials. Excavation by means of bulldozers, excavators and haulage trucks. Movement of rock boulders, gravel, sand to the mine site by trucks, dredge,	open coast beaches may result in cumulative impacts as adjacent blocks are mined. b) Smothering of rocky habitats by sediments and shift in communities from those characterising rocky shore to those typical of sandy beaches. c) Change in the			Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2. of Volume 1, Part of the EIAr. Section d) 5.1 and d) 5.2:- Infilling and depositing of rock boulders, sand and clay into the seashore as rock/sand berms to construct coffer dams, see Figures (d) (ii) 1.1 – 4, 1.1-5,1.1-6, 1.1-7, and	accretion, overburden stripping and removal and processing of target gravels are all an integral part of the mining approach and other than the 'no-go' option, there is no feasible mitigation for these proposed operations. Disturbance of beach habitat adjacent to the mining blocks	ecosystem have behavioural and physiological mechanisms for coping with this feature of their habitat so cumulative impacts are unlikely • Natural rehabilitation				

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conveyor or slurry pump. Infilling and depositing of rock boulders, sand and clay into the seashore as rock/sand berms. Dredging or hydraulic mining of sand overburden in adjacent mining areas and pumped to the shoreline for beach accretion. Pumping of sediments due to operation of coffer	invertebrate macro-faunal communities, Intertidal and shallow subtidal benthic communities or burial of benthic biota by sediments and localised impacts of smothering, burial. However, if the surface sediment is similar to the native beach material when operations cease, and if			1.1-8. Section d) 3.2.1 and d) 5.2.2: Dredging or hydraulic mining, as per Illustration 2 of Volume 1, Part A of the EIAr.	can, however, be minimised through stringent environmental management and good house-keeping practices. • Active rehabilitation involving backfilling of mined out areas, active removal of as much of the berms above the low water mark as feasible and re-structuring of the mining area					

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dams / generation of suspended sediment plumes	the final long-term beach profile has similar contours to the original profile, the addition or removal of layers of sediment does not have enduring adverse effects on the sandy beach benthos and recovery following the initial disturbance can occur within a few years. In contrast, structural changes in grain size over the medium- to long-term due to repeated nourishment or seawall construction results in either permanent				to resemble the natural beach morphology should be undertaken on completion of mining operations. • Profile and sloping of remaining tailings heaps on completion of operations. While recovery of the intertidal and sub tidal communities is rapid, physical alteration and degradation of					

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	changes in community structure or longer recovery times.				the shoreline in ways that cannot be remediated by swell action can be more or less permanent. • Mine beach targets in blocks sequentially from the north to the along the beach, rehabilitating mined-out blocks immediately on cessation of mining in that block; • Avoid re-mining of sites in the medium to long					

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					term, as far as practically possible. • Rely on the fact that after mining activities have ceased, the sea tends to breach dams within a few months as a result of heavy wave action, and depending on the sitting and occurrence of storms, replenish itself to pre-mined state (visual view) over a period of					

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					months to several years • Active rehabilitation below the low water mark is not possible and recovery of habitats and communities will depend on natural processes. Sediments accreted in Mitchell's Bay would be naturally eroded over the long term.					

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
1 (continued)	d) Development of Hypoxic sediments due to accretion • The high wave exposure in combination with the comparatively coarse nature of the beach sediments (D_{50} = ~270 µm; WSP 2015) in the project area make it highly unlikely that hypoxic conditions will develop as a	Low	O		• Consider potential sources of sand and the access requirements by heavy vehicles • Coastal and sea mining activities should be planned and spaced in such a way that it will always be a nearby, undisturbed habitat of the same type as the one that is being disturbed nearby.	Monitoring and natural rehabilitation				

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
1 (continued)	e) Effects on high order consumers	Low	O	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	• Recovery of invertebrate macro faunal communities following disturbance of beach habitats generally occurs within 3 – 5 years after cessation of the disturbance,	Wave action natural rehabilitation and monitoring		During mining	ECO and project engineers	Monitoring records
	f) Sedimentation of intertidal and subtidal reefs due to redistribution of sediments.	Medium	O	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2	• The redistribution of sediments will be monitored and controlled	Tolerate and monitor sediment redistribution	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) regulation: Norms and Standards for Biodiversity	During the lifespan of mining activities	ECO	Monitoring records

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
							management plans for species (March 2009)			
1 (continued)	An increase in turbidity caused by the pumping of bottom sediments and compromised water quality and sediment inundation of areas adjacent to those being mined	Low	O and D	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	Turbidity offshore of the mine site(s) is thus unlikely to exceed levels attained naturally during turn-over of nearshore sediments by wave action or seasonal inputs in river discharges. As turbid water is a natural occurrence along the southern African west coast, any turbidity-related effects in the near-shore	• Monitoring	• National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) standard relating to the prevention of pollution and ecological degradation. With reference to	• During mining operation activities	• ECO	Monitoring records that are used for further understanding of the behavior of the beaches during mining

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					environment as a direct result of mining operations are likely to be insignificant. No mitigation measures are deemed necessary.		regulations: National Waste Management Strategy (May 2012); and List of Waste Management activities that have, or are likely to have, a detrimental effect on the environment (Jul 2015) • National Water Act, 1998 (Act No.			

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							36 of 1998) standard relating to protection of water resources. • National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) standard relating to the prevention of pollution and ecological degradation. With			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
							reference to regulations: National Waste Management Strategy (May 2012); and List of Waste Management activities that have, or are likely to have, a detrimental effect on the environment (Jul 2015) • National Water Act, 1998 (Act			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
							No. 36 of 1998) standard relating to protection of water resources; and the Regulations on use of water for mining and related activities aimed at the protection of water resources (Government Notice, June			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
							1999).			
2. Shore based divers related impacts	a) Disturbance of reef habitat through disposal of tailings. Devaluing of the coastal land due to visual intrusion	Medium	O	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	• Manage disposal of tailings above the high water mark; • Avoid re-mining of sites in the medium term; • Avoid blasting and large-scale removal of rocks from sub tidal gullies into the intertidal; • Designate and actively manage specific access, storage and operations areas;	Tolerate	n) National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) regulation: Norms and Standards for Biodiversity management plans for species (March 2009)	n) During disposal of tailings	n) ECO/Health & Safety officer/ Ecologist	N) Monitoring records

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					• Remove all equipment on completion of activities; and • Flatten all remaining tailings heaps on completion of operations.					
2 (continued)	b) Physical damage due to trampling of intertidal biota	Low	O	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.						
2 (continued)	c) Changes to	Medium	O	The size and scale of operations are	Avoid kelp cutting,	Manage through avoidance and	o) National Environmental	Ongoing operational	ECO/Project engineer	Collaborations with land-

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
	community structure due to kelp cutting			presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	where unnecessary and as a value-add, collaborate with land-based abalone farmers to use kelp for abalone feed, based on feasibility of this value -add option and after discussions with the NC abalone working group.	control of cutting mechanisms	Management: Integrated Management Act, 2008 (Act No. 24 of 2008) standard relating to preserve, protect, extend and enhance the status of the coastal public property around this mining site.	activities.		based abalone farmers to use kelp as a feed, where feasible and on discussions with NC abalone working group
2.1 Discharge of seawater used to screen marine gravels	a. Disposal of process water resulting in disturbance of shallow marine ecosystem	Medium	O		• Reduce the negative effects of salinisation of soils from seawater by locating the outlets from the screens	Minimise the effects of discharge of sea water	• National Environmental Management: Biodiversity Act, 2004			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
	b. Loss of shallow marine habitat c. Disturbance of intertidal and subtidal marine areas d. Mortality of benthic organisms				as close to the top of the intertidal zone as possible. • Educate personnel about the importance of benthic fauna in the marine ecosystem, and encourage them to minimise direct and indirect removal or damage through mining activity.		(Act No. 10 of 2004) standard relating to the management and conservation of biological diversity and the components of such biological diversity as well as the need to protect the ecosystem. • National			

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							Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) standard relating to the prevention of pollution and ecological degradation. • With reference to regulations: National Waste Management			

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							Strategy (May 2012); and List of Waste Management activities that have, or are likely to have, a detrimental effect on the environment (Jul 2015)			
2.2 The establishment of the parking areas and equipment storage areas	a) Changes to ecological environment and biophysical characteristics due to placement of parking areas	Medium	C	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as	• Mining the disturbed areas to the specific foot print areas that will be required • Remove all remnants of pipes	• Limit the changes to ecological environment and biophysical characteristics	• National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) standard	• Before/During construction activities	• ECO/Ecologist	• Keep the Changes to ecological environment and biophysical

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
	b) Pollution of near shore waters and beaches due to spillage of cleaning solvents, oils and other chemicals			Table d (ii) -1 and Table d (ii) - 2.	and parking infrastructure when moving to the next site • Adhere to recommended waste management principles and protocols • Maintain all mining equipment to ensure that no oils, diesel, fuel or hydraulic fluids are spilled. • Minimize general environmental damage to habitats and to maintain ecosystem	due to placement of parking areas	relating to the prevention of pollution and ecological degradation. With reference to regulations: national norms and standards for the storage of waste (Nov 2013); List of Waste Management activities that have, or are likely to have, a detrimental			characteristics due to placement of parking areas, t a bare minimum

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					functioning and biodiversity. • Implement the use of drip trays whenever a refuelling or machine maintenance activity is being undertaken. A procedure for controlling oil spills will be compiled and used as a guide to ensure that oil spills are at a minimum. • Keep an oil spill response kit on site and ensure that the		effect on the environment (Jul 2015); • Regulations regarding the Planning and Management of residue stockpiles and residue deposits			

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					staff is trained on how he kit is used.		(July 2015) • National Environmental Management: Integrated Management Act, 2008 (Act No. 24 of 2008) standard relating to preserve, protect, extend and enhance the status of coastal public property.			

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3. General surf zone mining related impacts	1. Potential conflicts with overlapping coastal activities such as abalone ranching right holders (1). Impact of sea - based access as an alternative to land based access Constraints for access, whether by sea or land are as follows: i. The primary constraint is sea condition – rough seas would not permit either diving	Medium	O and D	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	Co-exist with coastal users such as abalone ranchers and look for positive synergies such as the benefit WCR can contribute to the ranchers through the limited access and diamond security control on the impact poaching has historically had on the coastal activity operations Take cognisance of the draft Northern Cape Coastal Management Programme	Management and control	Northern Cape Province Coastal Management Plan focusing on providing strategies with which to build co-operative governance institutions that can effectively implement integrated coastal management. Spatial Planning and Land Use Management	During periods when coastal activities overlap	ECO/Parties involved in overlapping coastal activities	Collaborations, where feasible, while in compliance with mining rights regulatory requirements

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	(from the shore) or near shore access with a boat to allow divers in the kelp zones for seeding. ii. High wind stress – either from the prevailing SE (summer condition mainly) or NW (winter condition mainly). ii. Delayed access through the mining lease areas by land (WCR), subsequently losing a window of opportunity to seed a designated area.				(NCCMCP) (Breetzke, 2015), which includes priority areas and tangible objectives to achieve the vision for the Northern Cape coastline over a 5 yr circle. Priority 1 in the NNCMCP, for negotiation of permanent coastal access servitudes with land owners and their registration within 2 years. Finalise negotiations with SANParks, regarding management of chalets at NOUP and clearly define public		Act, 2013 (Act No. 16 of 2013) regulation: Spatial Planning and Land Use Management Regulations: land use management and general matters (Nov 2015).			

ACTIVITIES	IMPACTSAND ASPECTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE (Refer to Table d(i) 1-1) of Volume 1, Part A and Appendix 4 of Volume 1, Part A.	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below) Also to be read in conjunction with Appendix e-1)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
					access and registration therefore.					
	(2) Loss of seeded abalone Abalone seeding and harvesting in mined areas will not be possible until recovery of the mined area has been achieved – conceivably this will take at least five years (as proposed by Pulfrich, 2015). At this stage the abalone ranching right will be near to or completed and the	High	O	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.		Management and control	q) (2) National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) regulation: Norms and Standards for Biodiversity management plans for species (March 2009)	q) (2) During life cycle of mining activities	ECO/Mine Manager/ Project Engineers	Collaboration arrangements

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	opportunity to test the feasibility of abalone ranching lost. This opportunity will not be lost in areas where mining will not occur. There would seem to be few alternatives if abalone ranching cannot be accommodated in a systematic way within a plan that incorporates both mining and abalone ranching options.									
3 (continued)	2. Limited access to the coast	Medium	C, O and D	The size and scale of operations are presented in Appendix 4, Drawing	• Discussions with San Parks to input into the conservation	• Management and control	• National Environmental Management:	• During entire life cycle of constructio	• ECO/Mine Manager	• Create adequate access to the coast

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				001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	management plans • Biodiversity off sets and positive spin-offs in the form of relinquishing some of the mining rights, to the south of the operations in to the Marine Protected Areas • WCR has committed to give up all of Sea Concession 9a and 90% of 8a and 8b to contribute to the Marine Protected Area (MPA). Section 11 application for the		Integrated Management Act, 2008 (Act No. 24 of 2008) standard relating to preserve, protect, extend and enhance the status of coastal public property. • Northern Cape Province Coastal Management	n and mining activities		areas around mining site.

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					ceding of rights had currently been applied for with DMR. • Consider opening additional access at certain areas that are not critical in terms of diamond security.		Plan focusing on providing strategies with which to build co-operative governance institutions that can effectively implement integrated coastal management. • Spatial Planning and Land Use Management Act, 2013			

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							(Act No. 16 of 2013) regulation: Spatial Planning and Land Use Management Regulations: land use management and general matters (Nov 2015).			

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
4. Slimes disposal into the ocean, as an alternative to land based slimes disposal	Disposal of slimes into the sea/ocean through a process of discharge as an alternative to surface disposal and natural seepage into the sea, in certain instances) Even though the discharge of the slimes into the sea would avoid contamination of land /surface with sea water, the discharge of slimes into the sea will cause tailings plumes and high sedimentation with fine slimes remaining in suspension for longer periods than	High	0	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	Should there be a need for a discharge, apply for relevant licences to DEA to ensure such discharge in conducted in a controlled manner.	i)	i) National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) Implementation of the Department of Water Affairs' Best Practice Guidelines (DWA BPGs standard relating to preserve, protect, extend and enhance the status of the coastal public property around this	i) During the possible disposal of slimes into the sea/ocean through a process of discharge as an alternative to surface disposal and natural seepage into the sea	i) ECO	a) Should there be a need for a discharge, successfully apply for relevant licences to DEA to ensure such discharge is conduct in a controlled manner without any spillages.

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
	the coarse and is as such currently not a favoured option. Since this is an existing operation, there are already existing slimes, which are already contaminated with sea water and which are targeted to be used continual slimes discharge.						mining site.			
General Environmental control and management										
On-going operations	Lack of implementation of environmental management requirements	High	C,O,D	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface	• Specify the job description and responsibilities of persons involved in	• Implement environmental managed requirements	• National Environmental Management: Integrated Management Act, 2008 (Act No. 24 of 2008) standard	• During entire life cycle of mining activities	• ECO	Successful implementation of environmental management requirements

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
				Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	environmental management. • Incorporate environmental factors into contracts, job descriptions and performance appraisals to improve environmental awareness and performance.		relating to preserve, protect, extend and enhance the status of coastal public property			

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
Socio-economic related impacts for all operations										
	a) Potential positive impacts • Creation of employment opportunities; • Creation of skills development and training opportunities; • Creation of business opportunities; • Creation of opportunities to revitalise Koingnaas and Kleinzee; • Support for local community initiatives and	Medium and high (positive impacts)	C,O,D	The size and scale of operations are presented in Appendix 4, Drawing 001, Surface Infrastructure Layout Plan as well as Table d (ii) -1 and Table d (ii) - 2.	Requirements as set out in the SLP will be im plemented.	Avoid socio-economic challenges through management, monitoring and control socio-economic related activities	Constitution of the republic of South Africa and Social and Labour Plan principles	Ongoing	CLO, ECO, Mine Manager	Improved stakeholder relations with the affected communities Significant employment opportunities created Up-skilled personnel

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	developments. b) Potential negative impacts • Risk to abalone and crayfish operations; • Noise, dust and safety impacts associated with mining related activities and the movement of heavy vehicles. c) Creation of Employment Opportunities									

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
Decommissioning impacts										
1) Decommissioning of marine operations: 1.1 Decommissioning of surf zone, beach and off shore channel mining activities, including decommissioning ofcofferdamsrock source quarries, and earthworks associated with the marine operations	a) Decommissioning impact Closure or decommissioning marks the end of a project. As in the planning stage, the social effects of closure begin when the intent to close is announced or romours start to circulate. The social impacts area typically linked to loss of jobs. In terms of South Africa, the Mineral and Petroleum Resources Development Act, 2002, (Act No 28 of 2002) (MPRDA), the potential impacts				The impacts and risks associated with closure are presented under Section m subsection 2 of the EMPr (Table R-RI). Appendix 1 of this EMPr provides rehabilitation strategies that will be adopted.		Closure standards as per MPRDA	Decommissioning	Mine manager/ECO/CLO/Project engineers	keep relevant authorities informed of the progress of the decommissioning phase. Submit monitoring data to the relevant authorities as required. Maintain required pollution control facilities and rehabilitated land until closure.

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
e.g. tailings dumps, slimes dams, slimes pipelines Access and service roads 1.2 Decommissioning of land mining and prospecting activities, including: Mine excavations Overburden dumps, tailings dumps, slimes dams Sea-water pumps and pipe lines, slimes pumps and pipelines	associated with downscaling and retrenchments must be addressed in the SLP. In this regard one of the objectives of the SLP is to provide mine workers with additional skills, save jobs and manage downscaling and/or closure.									

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
Buildings and associated structures and electrical works no longer required Treatment plants and associated structures and electrical works that are no longer required as well as Access and service roads.										

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
Removal of scrap	Disturbance of topsoil Removal of scrap allows rehabilitation of areas, but can also result in negative environmental impacts.	Low	D		Ensure that adequate soil management measures are put in place for removal of scrap.					
Concurrent back- filling into mined out areas	Soil contamination through mixing of different soil horizons.	Low	D		As presented in Appendix 1.					

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
Sloping steep sided slopes, overburden dumps and dangerous benches.	Change in the original landscape.	Low	D		Slope un-contaminated mounds or heaps of other material, other than topsoil and subsoil, to reduce visual impacts.					
Handling of topsoil	Soil mixing leading to soil contamination due to mixture of soil content from different soil horizons.				Ensure that topsoil used to cover up has minimal to no contamination that might have a negative impact on soil content.					

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
General rehabilitation aspects such as waste management • Solid waste management (domestic and industrial) • Asbestos handling • Hydrocarbon fuel and lubricant management • Alien vegetation control • Demolition of		D	Low		• The rehabilitat-ion of the site will involve the following: • Overburden Dumps. • Backfill where appropriate. • Adopt closure objectives and refer to Appendix 1 of this EMPr.					

ACTIVITIES	IMPACTS	SIGNIFICANCE RATING	PHASE	SIZE AND SCALE OF DISTURBANCE	TYPICAL MITIGATION MEASURES	MITIGATION TYPE	COMPLIANCE WITH STANDARDS (Through observing and complying with the prescriptions of the standards noted below)	TIMEFRAMES	ROLES	STANDARD TO BE ACHIEVED
buildings and burial of building rubble										
Ceasing of mining activities	Employment Loss of jobs and income.	High	Closure		Manage as per SLP requirements					Sustainable and economically functional communities

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated)

The impact management outcomes are provided under Section (d (ix).

f) 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).

The impact management actions are provided under Section (d (ix).

i)Financial Provision

The financial provision is provided as part of the quantum calculation in Appendix I of the Part A

of EIAr and is also included as Appendix 1 of Part B of this EMPr.

(1)Determination of the amount of Financial Provision

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

The closure objectives are outlined in Appendix 1 and Section (d) (i).

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

The closure objectives were consulted with stakeholders

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

See Appendix 1 of this EMPr and Appendix 4 of the EIAr,

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

See Appendix 1 of this EMPr.

- A summary of the results of the environmental risk report and details of identified residual and latent impacts were incorporated into the costing;
- A summary of the results of progressive rehabilitation undertaken were considered;
- A description of the methods to decommission each prospecting component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts influenced the overall calculation;
- Details of any long-term management and maintenance expected were considered;
- Details of a proposed closure cost and financial provision for monitoring, maintenance and post closure management;
- A final and future land use proposal and arrangements for the site was an input into the calculations;
- A record of interested and affected persons consulted was considered.

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

A surveyed plan of the areas on the site was provided as input into the Quantum Calculation. All the disturbances were categorised using the DMR guideline document for finance calculation. The machinery requirements and volumes of materials to be moved were determined, and rates for such rehabilitation was determined. Requirements for aftercare and maintenance was understood, and allocations of rates and fees for such was provided. In addition, closure objectives and how these relate to the mine operation, and its environmental and social setting also form the basis of the closure calculation. The estimated cost for rehabilitation is R66 038 780.99

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

The financial provision will be provided by WCR as per the quantum calculation included as appendix 1 of this EMPr.

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

Monitoring of impact management actions

This section indicates when the actions for that specific aspect must be implemented and/or monitored ad all these are captured under Table g.1-1.

h) Monitoring and reporting frequency

1. Reporting Documentation

The following documentation must be kept on site in order to record compliance with the EMPr:

- An environmental file which includes:
  - Copy of the EMPr;
  - Copy of the Environmental Authorisation;
  - All necessary authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction
  - Copy of all rehabilitation plans;
  - Copy of the rehabilitation interventions
  - Copy of relevant legislation;
  - Environmental Policy
  - Environmental method statements compiled by the contractor;
  - Non-conformance reports;

- Environmental register, which shall include:
  - Communications Register–including records of complaints, and, minutes and attendance registers of all environmental meetings;
  - Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR);
  - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record
  - Waste Documentation
- Material Safety Data Sheets for all hazardous substances;
- Dust suppression register;
- Water Quality Monitoring reports (if necessary);
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

1.1 Environmental Register

The WCR as the developer will put in place an environmental register. WCR will ensure that the following information is recorded for all complaints/incidents:

- Nature of complaint/incident;
- Causes of complaint/incident;
- Party/parties responsible for causing complaint/incident;
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented;
- Copies of all correspondence received regarding complaints/incidents.

The above records will form an integral part of the contractors' records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the developer.

1.2 Non-Conformance Report

A NCR will be issued to the contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the contractor in writing. Preceding the issuing of an NCR, the contractor must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR.

The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects.
- Nature of the risk.
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account.
- Agreed timeframe by which the actions documented in the NCR must be carried out.
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and contractor should sign the close-out portion of the Non-Conformance Form (NCF) and file it with the contract documentation.

The performance Assessment Report will be submitted every two years.

The WRC will within 24 hours notify the relevant Government Department of the occurrence or detection of an incident on the site, or incidental to the operation of the site, which has the potential to cause, or has caused pollution of the environment, health risks, nuisance conditions or water pollution.

The WCR will within 14 days, from detection of any incident mentioned in the above sentence, submit an action plan, which will include a detailed time schedule, and resource allocation providing measures.

a) Correct the impact resulting from the incident;

b) Prevent the incident from causing any further impact; and

c) Prevent a recurrence of a similar incident.

WCR will keep an incident report and complaints register, which must be made available to external auditor, Departmental auditors for the purpose of audit.

The relevant departments with jurisdiction over the incident or environmental components affected by the incident must be notified without delay in the case of the following:

a) Any malfunction, breakdown or failure of equipment or techniques, accident or fugitive emission which caused, is causing or may cause significant pollution;

b) The breach of this license and

c) Any significant adverse environmental and health effects.

i) Responsible persons

Objectives

To ensure that:

- There is allocation of sufficient personnel and other resources to meet objectives and targets.
- The budget should provide a clear indication of the capital and annual maintenance costs associated with dust control measures and dust monitoring plans. It may be necessary to make assumptions about the duration of aftercare prior to obtaining closure. This assumption must be made explicit so that the financial plan can be assessed within this framework. Costs related to inspections, audits, environmental reporting and I&AP liaison should also be indicated where applicable. Provision should also be made for capital and running costs associated with dust control contingency measures and for security measures and other monitoring requirements.
- EMS procedures to stipulate equipment requirements and personnel requirements to ensure that there is clearly defined roles and responsibilities
- Compliance roles and responsibilities of environmental protection personnel to be clearly defined and incorporated into key performance areas as a comprehensive part of the performance management system
- Accountability for achieving and maintaining compliance is set through formal appointments for any delegated environmental roles
- Accountability of general impact generating personnel is formally controlled through KPAs.

j) Time period of implementation

This is provided in Table (g) 1-1

k) Mechanism for monitoring compliance

This is provided in Table (g) 1-1.

1. Monitoring Objectives

Monitoring objectives will be to ensure that:

- There is assessment of compliance with dust fall limits within the main impact zone of the operation.
- There is facilitation of the measurement of progress against environmental targets within the main impact zone of the operation.
- There is temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation.
- There is tracking of progress due to pollution control measure implementation within the main impact zone of the operation
- There is information of the public of the extent of localized dust nuisance impacts occurring in the vicinity of the proposed operations.

Objectives

- Measure environmental performance by conducting regular audits and assessment of compliance with company and legal requirements
- Develop corrective and preventative actions to allow for continual improvement

Guidelines

- Conduct annual external and quarterly internal environmental performance assessment of the EMPr
- Define roles and responsibilities and link these to key performance areas to ensure that (Key performance areas of identified environmental responsible personnel to include environmental obligations);
- Describe how environmental performance and compliance information will be communicated to employees, on-site service providers and contractors;
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed;
- Develop procedures to ensure that responsibilities and accountability of personnel who manage, perform, verify work affecting environment are defined and documented;
- Document findings reached during audits and provide corrective actions

- Design a formal process of ensuring that corrective actions are implemented
- Design systematic follow-up to ensure effectiveness of the implemented actions
- Develop a monitoring plan with a detail of items to be monitored, parameters to be monitored, frequency of monitoring and reporting schedule
- Monitoring plan to include all set targets listed under objectives and targets
- Keep records of inspections, calibration and maintenance activity
- Ensure that test results to be distributed to relevant personnel for analysis and action
- Install sufficient flow meters to develop adequate water balance and for adequate water management
- Monitor use of natural resources such as electricity and water
- Monitor rehabilitation
- Keep all monitoring records
- Report annually or according to set time frames stipulated in the monitoring plan

2. Performance assessment

An internal Environmental Auditor (EA) will be appointed by WCR. The EA shall be commissioned to undertake an environmental audit on a yearly basis. The yearly audits shall include:

- Undertaking site inspections to determine whether compliance with this operational EMPr;
- Compilation of annual audit reports;
- Identifying areas of non-compliance, and recommending measures to rectify.

WCR will conduct these internal audits, to check compliance of project activities with the approved EMP. The site will be visited and any non-compliance will be addressed through development of corrective actions. The corrective actions will be assigned to responsible personnel who will then implement them. EMP performance will be part of weekly project meetings.

Internal audits will be conducted six monthly and on each audit occasion an official report will be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor.

WCR will appoint an independent external auditor to audit the site bi-annually and this auditor will compile an audit report documenting the findings of his audit, which will then be submitted by DMR and any other regulatory authorities affected by the activities covered in the audit, if necessary.

All site personnel will be given a copy of the management measures committed to in this EMPr, to keep with them during the duration of the construction activities. Internal audits will be conducted on a

weekly and monthly basis to check compliance with the approved EMP. During the internal audits, the site will be visited and any non-compliance identified will be addressed through development of corrective actions. The corrective actions will be assigned to site safety representative on site, who will then implement them. The project/site engineer will follow-up on the corrective actions on a weekly basis and sign them off once satisfied that they have been implemented.

In addition to the above mentioned performance and monitoring commitments, WCR shall adopt the following strategies to ensure that the commitments stipulated in this EMP are adhered to:

1. Develop a procedure for ensuring that the company identifies and allocates human, technical and financial resources necessary to meet its environmental objectives and targets;
2. Review EMS procedures and ensure that human resources are allocated to set environmental management objectives;
3. Define roles and responsibilities and link these two key performance areas to ensure that key performance areas of identified environmental responsible personnel to include environmental obligations;
4. Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed;
5. Update environmental awareness plan annually and implement;
6. Focus training on means on enhancing ability of personnel to ensure compliance with environmental requirements;
7. Conduct environmental inductions for contractors and subcontractors;
8. Conduct environmental inductions for employees;

In addition, the following initiatives will be adhered to:

- New opportunities to be communicated to relevant affected parties through an agreed formal communication channel and concerns to be incorporated into feasibility decisions;
- Complaints registers to be utilised and reviewed and corrective actions done;
- Interested and affected parties (IAPs) concern to be incorporated into project implementation;
- Internal communication to be strengthened to support continual improvement.

Table (g) 1 - 1: Monitoring plan

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• Return water dams and slimes dams and water abstraction points	• Potential contamination of water resources due to seepage, leakage and surface -water run-off	• Chemical and bacteriological tests at designated points. Build up database and graph the results. Compare with limits and take action on non-conformances. • It is proposed to regularly sample for those constituents expected to be elevated in the mine water i.e. Electrical Conductivity, pH, TDS, SS, Cl, SO4, Na, F, Fe, Al, Mn, Zn, Total Alkalinity, Ca, Mg, K, Total Hardness, turbidity	• ECO and designated project engineers/managers	All the data will be in a data base from WCR will be compiled in accordance with legal requirements and the requirements of the Water Monitoring and Measurement Guideline. Trend analysis will be conducted to assess possible trends and/or changes with regard to water quality by tracking the contaminants of concern as indicators of pollution. Reporting on the surface water quality will be done by means of monthly, quarterly and annual reports. frequency of reporting will be as follows: • Monthly -Internal Data Report • Quarterly-Data Report to Authorities • Annually -Annual Status / Audit Report

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		• The objective of the groundwater monitoring system is the following: – Assess possible trends and/or changes with regard to groundwater quality by tracking contaminants of concern as indicators of pollution; – To monitor the water quality of the groundwater monitoring boreholes, in order to gather more data to inform the calibration and updating of the numerical groundwater model; and – To monitor the water quantity of the groundwater in order to assess compliance with water quantity requirements stipulated by regulatory authorities. • A groundwater monitoring programme has been developed for implementation and the locations of the sampling points.		The quarterly reports will be guided by the authority requirements and might contain brief compliance assessment description, brief description of monitoring actions performed and flow characteristics as well as geographic presentations of monitoring points. The annual reports will also be guided by the applicable statutory requirements and relevant resource quality objectives and SANS 241 and other applicable standards.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		• The groundwater monitoring boreholes for Namaqualand Mine have been sited mainly downstream and upstream of the planned opencast mining operation. • Very few up-gradient monitoring boreholes occur apart from boreholes near some of the pans and near watershed areas in the central part of the area. Groundwater monitoring at Namaqualand Mine will be undertaken in accordance with the monitoring procedures of WCR. • In addition, the recommendations contained in the DW&S's Best Practice Guideline: 'Water Monitoring Systems', dated July 2007, will be taken into consideration when groundwater monitoring is conducted in mining operation.		

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		• Samples will be analysed for chemical and physical constituents normally associated with diamond mining. These constituents are listed in table below.		
		• If in the opinion of the ECO, environmental pollution nuisance or health risks maybe or are occurring on site, WCR will initiate an investigation into the cause of the problem or suspected problem. Such investigation will include monitoring of the relevant environmental pollution, nuisance and health risk variables, at those monitoring points and such frequency to be determined in consultation with the ECO. Should the investigation reveal any unacceptable levels of pollution, the WCR will prepare mitigatory measures and rectify the pollution concern.		

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• Water abstraction points and water reticulation output outlet points		• All information obtained during the sampling and analyses of the water samples will be entered into an electronic database. This will allow for structured data storage, and also facilitate optimal information generation. • Record total water use by recording flow meters. • Ensure compliance with DW&S conditions of a license		
• Natural revegetated areas	• Visual intrusion and impact and dust generation	• Map all rehabilitated areas • Determine extent of the treated areas • Foot inspection • Photographs every two weeks for the first month and thereafter every month • Keep photographs with detailed record of vegetation establishment		

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• Pumps and pipelines • All cleared areas	Erosion	• Visual inspection • Walk over landscaped areas. • Check pipelines and pumps; • Record and Photograph.	ECO	Six monthly, until closure
• Whole site.	• Alien infestation	• Visual inspection on foot patrol. Map presence of invasive plants. Plan removal, remove and document area covered on monthly basis. Verify. • Photographs.	ECO	On-going until under control – then every 6 months.
• Water settlement ponds and drainage and diversion canals	• Stability to avoid risk of failure	• Follow specifications in mandatory code of practice for tailings dams	Until closure	Monthly and summarise every 3 months
• Monitoring of maintenance of general waste disposal	• All loads of waste to be recorded and quantity also recorded	• Running total of loads of waste taken.	Until closure	
• Perimeter fence	• Safety and security	• Foot or vehicle patrol. Record	• Designated engineer	• Monthly and following any heavy rainfall
• Mined out and rehabilitated areas • Mine residue dam walls • Old roads	• Scarring of the landscape	• Determine vegetation establishment • Disturbed areas should be monitored for at least three years after the rehabilitation is	• ECO and Ecologist	• Every 6 months

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		initiated to check on progress of vegetation rehabilitation and any alien invasion. • Check compliance with gradients and variation in topography • Foot inspection		
• Biodiversity monitoring should be undertaken. This program	• Disturbed areas and loss of vegetation	• Will include, but is not limited to: • Monitoring of the condition of habitats, ecosystems, topsoil stockpiles, species inventory and alien vegetation control.	• ECO and designated ecological specialist	• Bi-annual audit of condition of vegetation at mining sites and submit annual report to biodiversity section of DEA.
• Monitoring of erosion • Roads • Mine residue dam walls • Rehabilitated mined out areas • Dumps • Pumps and pipelines • Any other areas	Every 6 months and following any heavy rainfall	• Visual inspection • Walk over rehabilitated areas • Drive along roads • Check pipelines and pumps; mine residue dams, dumps • Photographic records	DMR and DW&S	
• Monitoring of disposal of metal scrap, old oil, oil filters, old oil drums, oily cloths, batteries, fluorescent tubes, tyres and contaminated soil. (Hazardous waste site)	• Pollution of surrounding environment	• Record each load sent off the site • Ensure safe disposal certificates are obtained from suppliers if the material are given back to them	• ECO and Designated engineer	• Monthly report and submit annually as part of the waste licence requirements

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• General waste disposal	• Odours and pollution of the surrounding environment	• Running total of loads of waste taken. • Record of waste taken to waste disposal site • Keeping records of waste taken to disposal site • All loads of waste to be recorded and quantity extrapolated. • Covering of waste pit -	• ECO and Support Services Managers	• Monthly
• Sewage facilities	• Condition and oveflow	• Visual inspection. • Record condition.	• ECO and Project engineer	• Every 6 months and Bi-annual report
• Bunded areas around diesel/fuel tanks, refuelling area, old oil tank; and petrol tanks	• Risk of failure and leak and contamination of soils	• Visual inspection	• ECO and Project engineers	• Monthly
• Observations of all excavation or ground breaking activities during the construction phase in accordance with the Heritage impact assessment report.	• Disturbance of heritage resources	Survey to identify the status of existing heritage sites during operation	• Mining engineers and ECO and Commissioned Heritage Specialist	• Periodically and annual report to SARS
• Waste manage sections	• Storage and disposal of general waste	• Quantities, glass, paper, tins, plastic recycled •	• ECO and Project engineers	• Monthly
• Waste management and recycling stations	• Storage and disposal of paper waste	• Quantities shredded for packaging	• ECO and Project engineers	• Monthly

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• Recycling or transfer stations	• Generation storage of cardboard boxes	• Quantities recycled	• ECO and Project engineers	• Monthly
• Potential release of ozone depleting substance	• Potential release of ozone depleting substance	• Amount of equipment using this substance	• ECO and Project engineers	• Annual •
• Waste drum generation and storage areas	• Storage and disposal of empty drums	• Amount back for reuse by supplier	• ECO and Project engineers	• 3 Monthly
• Storage and disposal of hazardous(hazardous) waste areas	• Storage and disposal of hazardous(hazardous) waste	• Amount generated for disposal	• ECO and Project engineers	• Ad hoc
• Storage and use of hazardous substances and raw material areas	• Storage and use of hazardous substances and raw material	• Number of spillages reported	• ECO and Project engineers	• Ad hoc
• EMPr	• Objectives and targets achieved exceeding target dates and those that are overdue	• Numbers	• ECO and Project engineers	• Monthly
• Awareness training plan	• Awareness training and effectiveness • Conducted training • Training schedule	• Perceptions and number of trained, aware and competent and numbers scheduled.	• ECO and Project engineers	• 6 Monthly
• Complaint registers	• Complaint received	• Numbers	• ECO and Project engineers	• Monthly
• Communication plan	• Communiqués sent out	• Numbers	• ECO and Project engineers	• 2 Monthly
• Emergency response plans	• Emergency plans tested	• Numbers	• ECO and Project engineers	• 6 Monthly
• Internal Audits	• Internal Audits done and scheduled	• Numbers	• ECO and Project engineers	• 6 Monthly
• Management review	• Management Review done and scheduled	• Numbers	• ECO and Project engineers	• 6 Monthly

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• Management commitment	• Management commitment	• Perceptions	• ECO and Project engineers	• Ad hoc
• Management commitment	• Management commitment	• Resources allocated	• ECO and Project engineers	• 3 Monthly
• Dust sources Attenuating fall-out dust relates to all mining and site development activities and relies on pre-establishment consideration of dust risk in terms of location relative to downwind uses, planned disturbance of vegetation exposing the surface to wind generated dust, trafficking of roads and areas where soils are pulverised to significantly increase dust generation potential and to processing activities which may be related to the specific project and present as high dust generating sources.	• Dust fall out	• Monitoring of fall-out dust would best be achieved by using the DustWatch™ equipment or similar equipment • Assess dust source, wind-path and affected receiving environment.	• ECO and air quality specialist	• Regular periods preferably once per month, collect the dust cups and weigh the dried dust content • To be done for a period of a year
Dust sources	Dust plume extent and intensity	• As measurement of sand mass in drifts is extremely difficult, the monitoring of dust plumes is to be based on:		

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		(i) Visual observation and photographic recordal of plumes within the categorisation of low, medium and high (To be expanded on by the E.C.O. based on further observations and categorisation definition). (ii) Aerial photo record of plume extent/ advance and intensity. (iii) Capture of the plume extent and intensity by .shp polygon overlays and hectarage measurement expressed in a tabled record of measurement plume mapping .shp files as the current baseline data.		
Dust fall out	Intervention success and failures	• By DustWatch™ result recordal in spreadsheets and graph generation of the data over the period when attenuations have been applied, the success of intervention can be assessed in terms of reduction of dust expressed in grams/ m²/ day.	ECO and air quality specialist	Over the period when attenuations have been applied

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Dust plume		• Subsequent .shp polygon shapes can be overlain to reflect lateral growth of plumes per intensity after each mapping cycle while the tabled hectarages can be expressed in graph format also reflecting the growth of plumes. • With such monitoring traversing the attenuation implementation period within the consideration of response time, the success and failure of interventions can be assessed in hectarage, length of plume and changes in intensity	ECO /Mine manager/ SHE officer and air quality specialists	Yearly periodic measurement

3. Dust Fall Out Monitoring

The following considerations serve as a basis for preparation of operational monitoring costing:

(i) Stabilization of dust sources if by coarse tailings cover to include shaping of the source and then the cost of hauling and spreading the coarse tailings.

(ii) Dust trap netting systems to be costed per linear meter of netting as construction cost.

(iii) Provision for the cost of periodically loading, hauling and dumping the accumulated sand.

Once a representative recordal is achieved over an appropriate period (season or year), the DustWatch™ stations can be relocated to other monitoring sites (always record the locality of the equipment by GPS in order that the equipment can be reinstalled later at the same place, if required and will report comparative results).

a. Monitoring of plume extent and intensity by periodic measurement

As measurement of sand mass in drifts is extremely difficult, the monitoring of dust plumes is to be based on:

(iv) Visual observation and photographic recordal of plumes within the categorisation of low, medium and high as per the description and photographs in paragraph 4.2 of volume 4 of the EIAr, dust plume study report. (To be expanded on by the ECO. based on further observations and categorisation definition).

(v) Aerial photo record of plume extent/ advance and intensity.

(vi) Capture of the plume extent and intensity by .shp polygon overlays and hectarage measurement expressed in a tabled record of measurement using Table 2 in paragraph 4.3 of the dust plume study included in Volume 4 of the EIAr and plume mapping in Figures 2a, 2b and 2c .shp files (Volume 4, Dust Study) as the current baseline data.

b. Monitoring of intervention successes and failures of methods

- **Fall-out Dust**

By DustWatch™ result recordal in spreadsheets and graph generation of the data over the period when attenuations have been applied, the success of intervention can be assessed in terms of reduction of dust expressed in grams/ m²/ day.

- **Dust Plumes**

Subsequent .shp polygon shapes can be overlain to reflect lateral growth of plumes per intensity after each mapping cycle while the tabled hectarages can be expressed in graph format also reflecting the growth of plumes.

With such monitoring traversing the attenuation implementation period within the consideration of response time, the success and failure of interventions can be assessed in hectarage, length of plume and changes in intensity

4. Requirements for a Monitoring Progamme to Detect Environmental Impacts of Coffer Dam Mining and Accretion on the Mining environment

In identifying and assessing environmental impacts it is important to acknowledge that change is not necessary unnatural nor is it due to human disturbance alone (Green 1979, 1993). An impact should not therefore be characterised as being the difference in some measure at a particular site before and after a disturbance only. An impact should be characterized as being the relative difference between changes at a disturbed site (*i.e*. the change from before to after a disturbance) compared with changes that have occurred in a similar undisturbed (or control or reference) site (Underwood 1992, 1993, 1994). In other words, there must be some change from before to after a disturbance and such change must be different from what occurred in undisturbed control areas. To achieve this, it is necessary to study communities in impacted and reference sites prior to (provided that this is of course possible) and after an impact has occurred. If such conditions are not met, the interpretation of the impact will be compromised (Underwood 1996).

Having established the basic protocol required for an impact assessment, several decisions have to be taken with regard to how one should proceed with the research or monitoring program. The most important of these include how much monitoring should be undertaken (intensity, frequency and duration), what in terms of community parameters should be monitored and, if monitoring is continued through to the recovery stage, when can a site be declared fully rehabilitated. Central to all of these is the question of how much change or disturbance matters. Two sorts of mistakes are inherent in monitoring programs because of the need for statistical analyses. Type I error occurs where results of a monitoring program suggest that there has been an environmental changes when there has not. Type II errors occur when there has been an environmental change but the monitoring program fails to detect it. The most common reason for the occurrence of Type II error is a sampling program that it poorly designed or one that is not comprehensive enough (i.e. insufficient samples) (Underwood 1996). Assuming that the whole point of a monitoring program is to illicit managerial response in the event that there is an impact, Type I error should become self-correcting (further investigation is likely to expose the error). (It may however result in a waste of money, time, resources, reputations and possible loss of economic activity). In contrast Type II error elicits no response. The cost is in terms of the environment – environmental degradation continues unnoticed.

In terms of environmental management, precautionary principles require that more attention be paid to Type II error, such that this is unlikely to occur (Mapstone 1995; Underwood 1996). The only realistic trade-off is to increase the probability of the Type I error until costs of errors (the cost of responding to a non-existent environmental threat) are likely to be unacceptably high. Then trade back the rate of the Type I error in return for more resources for sampling. The potential costs to

society through crying wolf – mistakenly declaring there to be an environmental change because of a Type I error – can be reduced provided proper resources are made available to detect real changes (i.e. to have a small probability of Type II error).

To quantify the full impact of the proposed coffer dam mining or accretion of Mitchell's Bay on the marine environment, all affected habitats and/or communities should be monitored before, during and after mining. However, prior research has indicated that this is impractical, impossible or simply unnecessary. Monitoring should rather focus on what are likely to be the most sensitive, significantly affected and/or representative species, communities, habitats and resources. The proposed mining areas comprises intertidal sandy beach and rocky shore habitat, as well as subtidal sandy and rocky habitats. A suite of standard, and widely accepted techniques have been developed for the monitoring of benthic communities associated with these habitats, and it is proposed that these be adopted for this study. These techniques include both univariate and multivariate statistical analyses. Vertebrate communities, specifically birds and fish, associated with surf-zone habitats require a different approach. Previous studies have shown that these highly mobile animals are generally not significantly affected by beach mining operations. Monitoring of these populations is therefore considered unnecessary.

The final question that needs to be resolved, is how long should a habitat appear to be restored before it can be declared restored? It is now widely accepted that when assessing recovery following a disturbance event, the classic scientific approach of testing a null hypothesis is not really valid (Dixon & Garrett 1992; McDonald & Erickson 1994; Underwood 1996). The classic approach is an attempt to reject or disprove the "null" hypothesis, which assumes that two populations are identical. The alternative hypothesis, that the two populations are not identical, can only be accepted if the probability that any differences detected are due to chance alone is less than 5%. In deciding whether an impact has occurred, this approach is perfectly acceptable, as it largely eliminates the probability of declaring a false positive i.e. that an impact has occurred when this is not the case. However, when we are assessing recovery, this is not the case. We have accepted that an impact has occurred (otherwise we would not be monitoring recovery), and we now wish to establish an end point at which we can declare recovery complete. The approach proposed as an alternative to the classic significance testing is known as the test for bioequivalence. The approach is to define two areas to be bioequivalent if, for example, the mean density of a particular organism or organisms on the impacted site exceed a predefined percentage (R say 80%) of the mean density on the reference site for a defined time interval. Conversely, a site is said to be impacted or disturbed until the selected variable(s) exceed(s) the predefined level over a defined time interval. This procedure is commonly used in testing the equivalence of drugs (Kirkwood 1981; Westlake 1988) and is becoming more popular in other biological sciences (Dixon & Garret 1992; McDonald & Erickson 1994).

It has recently been successfully applied in assessing recovery of deepwater invertebrate macrofauna following remote mining (Clark 2014), as well as beach macrofauna following seawall mining and shoreline accretion in southern Namibia (Pulfrich et al. 2015). Full details of the test are contained in McDonald & Erickson (1994).

One of the greatest merits of this approach is that it recognises (a) that systems are naturally variable and (b) that one does not always have "adequate" baseline data for the assessment of the significance of a particular impact. It also recognises that while physico-chemical factors are an important determinant of the structure of biotic communities, other biological factors (such as timing of recruitment and variations in recruitment success which, to some extent are linked to the abundance of adults in neighbouring areas, as well as competition and predation) also play an important role in structuring biotic communities, which can vary greatly in both space and time even when biophysical conditions remain constant (see for example Hall 1994; Kenny & Rees 1994, 1996; Herrmann et al. 1999; Ellis 2000; Schratzberger et al. 2004a).

The predefined percentage is necessarily site- or situation-specific, but the value of 80% seems to have attained fairly wide acceptance (McDonald & Erickson 1994; Underwood 1996). Similarly, the number of successive intervals over which this value should be achieved is site- and situation-specific but also depends on the sampling interval. It is proposed that sampling of sandy beach invertebrates, and rocky intertidal and subtidal benthic communities be conducted annually. Selected parameters include measures of the abundance and/or biomass of the communities or certain key species in each case, as well as a measure of the diversity of the community as a whole (e.g. Shannon-Weiner Diversity), and that the value of R must exceed 80% in each case for at least three to five years before a site can be considered to have recovered. For the purposes of this study, the term recovery would thus be defined as: "the re-establishment of ecological function through colonisation of previously mined areas by marine faunal communities that can be considered to be functionally equivalent to those that exist in comparable undisturbed sites, taking into account natural variability, as judged by the fact that they are at least 80% similar in terms of their species composition, abundance and biomass, measured over a period of at least 3-5 years". The bioequivalence tests should also be supplemented with standard multivariate graphical and statistical tests (e.g. hierarchical cluster analysis, multidimensional scaling, ANOSIM) for which no bioequivalent alternatives exist. Levels of significance for these tests should be set at 95%.

A graphic depicting how such a process may play out in the case of the assessment of mining impacts, as presented in Clark 2014) is shown in Figure(g) 1-1below. The blue and purple line represents the average number of individuals, biomass or species at a suite of stations at reference sites outside of the mining area, and a second group in close proximity to the area being mined (Discharge), but potentially affected by other mining-related activities, respectively (in the example the 'indirect' effect was the discharge onto the beach of a sediment slurry of fine tailings from an on-site processing plant to aid with accretion). The red line represents average abundance at a suite of

stations in an area that is subject to mining during the course of the study. The dots on each line represent average values derived from discrete samples collected, in the example, at quarterly intervals (every 3 months) at these respective sites. The horizontal dotted lines indicate abundance/biomass/no. species for all the reference sites averaged across the full time period of the study, and the 80th percentile for these sites. Sampling at all sites commenced 2 years before mining started and continued until it was established that the biota at the reference sites in close proximity to the impact site (Discharge) and at the mined sites (Impact) had recovered to a level where the average abundance/biomass/no. species (dotted red line) had recovered within the 80th percentile for the reference stations (blue shaded area). Note that in this diagram abundance at the reference station in close proximity to the impact site (Discharge) dropped during the construction phase but recovered again shortly thereafter.

In light of the above, an impacted site would be considered recovered or “functionally equivalent” if the data measured over a period of at least three years falls between the 20th and 80th percentiles of the reference and baseline data. Should the pre-mining and reference site data show extremely high variability, the more conservative approach of using the 25th to 75th percentile can be adopted.

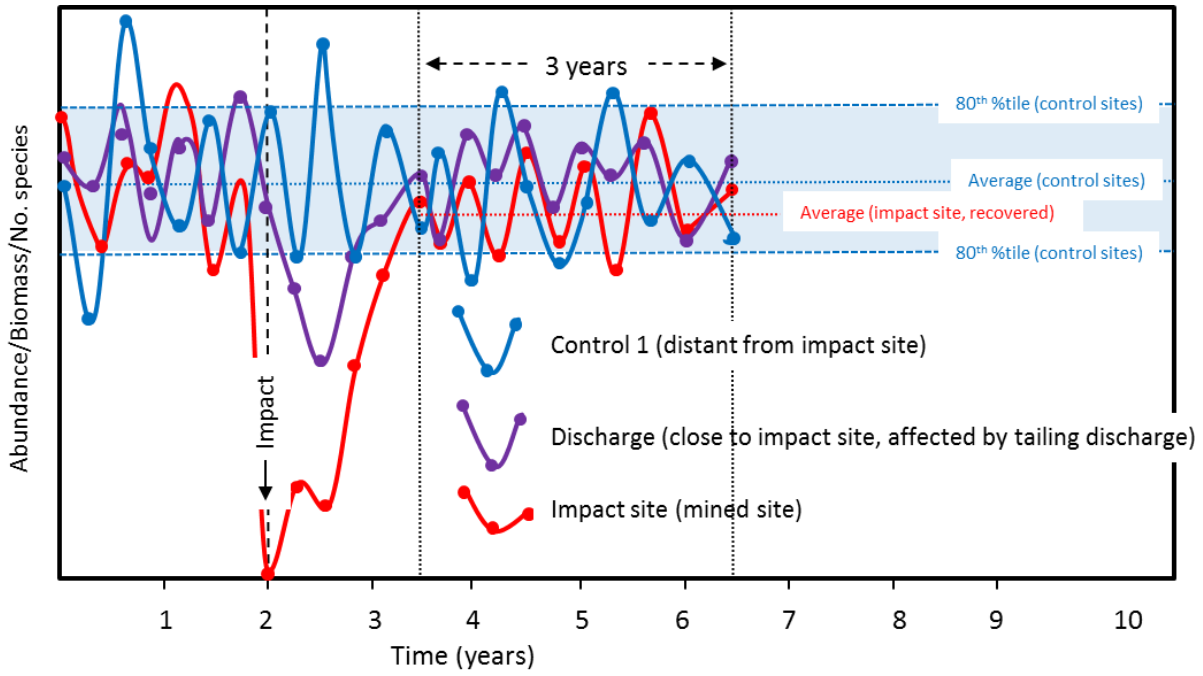

Figure (g) 5 - 1: Graphic demonstration of procedures for monitoring environmental impacts and recovery. See text for details. Source: Clark (2014)

5. Proposed Methodology for Monitoring of Sandy Beaches, Rocky Shores and Subtidal Reefs

The monitoring study should consider both physical and biological parameters at reference sites some distance from the mining sites and at sites targeted for cofferdam mining or beach accretion. Monitoring sites would span three habitat types, namely 1) sandy beaches, 2) intertidal rocky shores, and 3) shallow subtidal reef habitats. It is recommended that the respective sites be selected following a site visit and in close collaboration with both the mine planners and DEA: Oceans & Coast. Monitoring should be conducted on an annual basis starting a minimum of two years prior to that in which mining commences, and continuing until all impacted communities have recovered to acceptable levels as defined in the monitoring program requirements outlined above. It is recommended that sampling be conducted at approximately the same time (March-June) each year to eliminate any seasonal variations.

The intertidal beach and rocky-shore surveys have to be undertaken over a spring tide period when the tides are low enough to permit access to the low shore. Because the amplitude of any given spring tidal movement can vary considerably during the course of a year, the timing of surveys is crucial if accurate and reliable data are to be collected. Consequently, surveys must be scheduled over spring tides when the height of the low tides above chart datum (= Lowest Astronomical Tide) is at a minimum. A 'rule of thumb' for intertidal surveys is that data is only collected when the height of the low tide is 0.25 m or less, above chart datum. As natural variables such as oceanic swell and wind-induced waves will affect the predicted tidal levels, it is all the more critical that surveys are conducted during the lowest possible tides. The lowest spring tides during the year usually occur between February - June and in some years between August - October. Commencement of the monitoring programme will be determined by the issuing of an environmental authorisation and the scheduling of the mining activities.

The recommended methodologies for the quantitative collection of community data in each of the habitat types is detailed below.

5.1 Sandy Beach Macrofauna

Beach faunal community sampling would be carried out using established sandy-beach sampling techniques. At each identified sampling site three transects, perpendicular to the shore and spaced 5 m apart, would be surveyed from above the drift line to the lowest point of the swash during spring low tide. Ten stations would be positioned along each transect line at equal horizontal intervals across the beach face. At each station, three 0.1-m^2 quadrat samples would be excavated to a depth of 30 cm, and the sediments rinsed in a 1-mm mesh sieve bag. All macrofauna retained in the sieves would be preserved in 96% alcohol, and identified to the lowest taxonomic level possible. Dry biomass of all fauna would be obtained by drying the specimens at 60°C for 24 hours. Macrofaunal densities would be expressed as the number of individuals per square metre, and the biomass as $g.m^{-2}$.

A variety of physical parameters will also be measured at each site. These will include wave height and period, surf-zone width, beach profile and water table depth. Sediment samples will be collected from Station 1 (the drift line), Station 5 (mid-shore) and Station 10 (spring low water mark). In the laboratory, the sediment samples will be passed through a series of graded sieves to determine the grain-size composition. Graphic methods will be used to obtain the mean particle diameter, sorting and skewness of the sediments. These physical data will be used to calculate the dimensionless fall velocity (or Dean's value, Ω) and to rate each site in terms of wave exposure. Using the dimensionless fall velocity an indication of the beach morphodynamic state will be provided.

5.2 Rocky Intertidal Macrobenthos

The macrobenthos of rocky intertidal areas would be sampled in six 0.5-m^2 quadrats along each of five replicate transects laid perpendicular to the shore between the mean low water spring and mean high water spring marks. The quadrats are divided into a regular 50x50 mm grid pattern giving 171 intersecting points in a 1 x 0.5 m frame. The individual species occurring in the algal canopy would be recorded under each intersecting point as primary and secondary cover, as would be rare species and mobile organisms within the quadrat. The point counts would be used to calculate the mean percentage cover of all species (both mobile and sessile), and the counts of individual mobile organisms to calculate densities within the quadrat area. Data on mean percent cover and abundance for the community as a whole, individual species and trophic groups would then be compared.

5.3 Shallow Subtidal Reefs

Experienced scientific divers, familiar with underwater census techniques and identification of benthic organisms, will be used to conduct the underwater benthic assessments within Mitchell's Bay and at an equivalent reference site. The timing and periods of such sampling can be done at least once a year and are weather dependent. A maximum of three to four days can be spent doing the sampling when weather permits. Dive sites will be selected in three depth zones namely, 1-5 m, 5-10 and 10-15 metres below mean sea level. At each dive site, two divers will each conduct 5 point counts at 5-m intervals along transects across the seabed. Within a 2-m diameter circle at each point, the seabed type (percentage composition of rock, boulders, gravel or sand), reef profile (height in metres) and structure (degree of ledging and under-cutting – see Table I) will be recorded. To minimise individual dive time at the depths surveyed, and maximise the number and coverage of dives over the survey area, quantitative benthic quadrats will not be attempted. Instead, the percentage cover of principal benthic community components within the surveyed 2 m will be estimated and ranked using the Braun-Blanquet scale of coverage categories (Kent & Coker 1992, see Table 1). This scale uses smaller categories at lower coverage, ensuring that scarcer species are not outweighed by abundant species in subsequent analyses.

Various benthic studies have indicated that there is considerable redundancy in the species which characterise the composition of benthic communities (Clarke & Warwick 1994; Warwick 1993). This redundancy often allows analysis at higher taxonomic levels, rather than at species level, without weakening the results (Warwick 1988a, 1988b, 1993; Ferraro & Cole 1990; Vanderklift et al. 1996; Bowman & Bailey 1997). As many of the taxa encountered in the southern African west coast hard-bottom epifauna are undescribed and detailed identification by divers is slow underwater, organisms recorded during dives will be aggregated into larger, predefined taxonomic groups (Classes or Families) during actual data collection.

The successful completion of the shallow subtidal surveys will be dependent on sea conditions. Typically a wave height of <1.5 m is required for confident and accurate underwater data collection.

Table (g) 5 - 1: Ranking scales used for estimating the percentage cover of benthic organisms and the degree of crevicing or overhang of reef structure.

Benthic Communities Rank	Braun-Blanquet scale % Coverage	Reef structure Rank	Extent of crevicing/overhang
0	<1%	0	Flat
1	1-5%	1	0.5 m
2	6-25%	2	1.0 m
3	26-50%	3	1.5 m
4	51-75%		
5	76-100%		

l) Frequency of the submission of the performance assessment report

The performance assessment report will be submitted every two years to DMR. Annual internal audits will be undertaken and availed on request during regulatory authority inspections. The process of environmental performance assessment is provided under Section k (2) above.

m) Environmental awareness plan

1. Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

It is important to ensure that the employees have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. Training needs will be identified based on the available and existing capacity of site personnel (including the contractors and sub-contractors) to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- Promoting environmental awareness;
- Informing the contractor of all environmental procedures, policies and programmes applicable;
- Providing generic training on the implementation of environmental management specifications; and
- Providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

Objectives

- To ensure the ongoing involvement of representatives in the planning, development and management of the rehabilitation interventions.
- To ensure that there is sufficient training of on-site service providers/contractors whose job responsibilities affect the ability to achieve EMS objectives
- To ensure that training objectives to be set in line with the EMP requirements
- To ensure that personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and /or experience
- To develop a change from a paper system to an effective system of implementing provided training (training translated into observable skill)

Guiding principles to achieve the objectives

- Develop environmental awareness implementation plan in line with approved EMPR
- Develop procedure to facilitate training of employees, on-site service providers and contractors
- Training to focus on means on enhancing ability of personnel to ensure compliance with environmental requirements
- Procedures to be established and maintained to make appropriate employees aware of:
- The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with environmental policy, procedures and any implementation measures
- The potential consequences of departure from specified operating procedures;
- Identify training and development needs through analysis of role descriptions. The role description is used to confirm the category of occupation as per WCR's structure templates.
- Source descriptions of activities, aspects and impacts from the Environmental Implementation Plan Section/department and use this information to derived a training and development needs matrix
- Compile a training and development needs matrix displaying the environmental responsibility/role, required knowledge and outputs, intervention required and interval of intervention.
- Evaluate training received
- Top management to build awareness and motivate and reward employees
- Environmental policies to be availed to contractors
- Conduct environmental inductions for contractors
- Conduct environmental inductions for employees
- Employees will adequately be educated, as to the provisions included in the EMPr and general environmentally friendly practice;
- The training will, as a minimum, include the following:
    - The importance of conformance with all environmental policies;
    - The environmental impacts, actual or potential, of their work activities;
    - The environmental benefits of being accountable and improved personal performance;

- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the consultant's environmental management systems, including emergency preparedness and response requirements; and
- The mitigation measures required to be implemented when carrying out their work activities.

The matrix below provides a guideline of the sequential process that will be followed to attach the stipulated goals and objectives.

Chart 2: Training matrix

Shareholders involvement during all stages of the project

Objectives

- To ensure the ongoing involvement of representatives in the planning, development and management of the rehabilitation interventions.
- To ensure that the adjacent landowners are informed and updated throughout the development phases.

Mitigation Measures

- Develop and implement effective mechanisms for ongoing communications with local stakeholders and neighbouring communities.
- Actively participate in local and regional conservation and socio-economic development initiative that may affect or benefit the project during all development phases developmental stages.
- Identify and enable access to employment empowerment and capacity building opportunities for the local community.

2. Manner in which risks will be dealt with in order to avoid pollution or the degration of the environment.

Risk Documents

This section provides details of the supporting documentation that has been and will be used to identify risks and as such will be utilized during the EMPr implementation process, to ensure management of environmental damage. These are the documents used to identify, track and control risks to the project up to the decommissioning and closure phases. This section will support during the implementation process to ensure that the risks associated with activities, especially closure related risks are captured and addressed promptly.

The numbering is aligned with the title called Risk and as such tables will commence with R for Risk, RR is Risk Register, RG is General Risks, RL is Legislation Related Risks, RM is Management Related Risks, RC is Closure Related Risks.

A template that can be used to identify risks is indicated in the table below.

Table R-RT: Risk Identification Template Table Explanation

Identified Risk	Risk Detail	Risk Ratings	Corrective Action
This column deals with all the risk identified and which are associated with that particular activity e.g. demolition of bunded diesel tanks.	This column species the risk number, which is then described in detail under either General Risks table or Legislation Risk table. There are two risks which will be linked to specific permit requirements. These risks are RG – (General Risks) and RL (Legislation Risks) 01 or 02 indicates the unique number allocated to that general or legislation risk. This column should therefore be read in conjunction with Table R-RG and Table R-RL. These tables specify what is the nature of the risk associated with a specific risk number.	This section allocates a rating to the risk.	Corrective Action L01: what should be done to manage or alleviate that identified risk which is detailed with a unique number under the risk detail column. The corrective action will be presented here in the form of a number. This number correlates with the risk detail for which corrective action is required e.g. CAL01 – meaning corrective action for legislative risk associated with legislation risk associated with legislation numbered as 1 in Table R-RL. The corrective actions for all these risks are presented in the implementation plan report as Appendix H and are not duplicate here. In this column only the corrective action numbers e.g. CAL01 is provided. Then you already know that this is a corrective action associated with legislation risk number 1, which according to Table R-LR is NEMA associated risk. The proposed corrective actions will then be provided under that specific heading e.g. NEMA activates management under Appendix H.
	Example: Risk Legislation 02 (RL02) • A legislation risk associated with Waste Management Act • Risk General 02 (RG 02) means a general risk which of waste management nature		Corrective Action General (CAG) 1-12: • Noise • Air quality

Risk Register

The Risk Register is the log where all risks are registered and tracked through to closure. A template for the Risk Register to show how risks should be recorded and monitored during rehabilitation is provided as Table R-RR.

Risk Form

The Risk Form may be used to identify and describe a risk to the project. A template for the Risk Form will be developed.

General risks

General risks were identified and these are those risks that are general risks, which will arise from the general rehabilitation tasks such as during demolition of structures and these are presented in Table R-RG.

Legislation related risks

These are risks that will emanate during mining activities and rehabilitation works, and which will trigger certain legislative requirements such as requirements to observe certain standards or even applying for licences and these risks are presented in Table R-RL.

Project management related risks

These are the risks, which will be related to the management of the rehabilitation execution and are presented in Table R-RM.

Project success risks

These are the risks, which have been identified as risks to the successful management of the rehabilitation execution as a project and these are presented in Table R-RPSR.

Identified risks

A table of identified risks that could emanate during mining activities of the structures are presented in Table R-RI. A summary of all the identified risks is provided under Table R-RI summary.

Risk criteria

The risks were rated and risk rating criteria is included in Table R-TC (for general, legislation, and closure related risks). Table R-TCM is the risk rating template for all the project management related risks.

Legislation risks identification table for only activities that will potentially require licenses from the various acts/statutes listed below. The only various thresholds must be assessed by the contractor to determine if the licenses are indeed required for those risks where they are being generated. This stage can only pre-determine potential risks and the actual activities will determine threshold and the license requirements. Should there be a new risk related to legislation that is identified it will be allocated a risk detail number e.g. LR020 and be added in this table by ECO.

Table R-RL: Legislation Risks.

Legislation risk numbering	**Risk detail explanation**
RL01	National Environmental Management Act, No. 107 of 1998, as amended
	National Environmental Management Act, No. 107 of 1998 (Environmental Impact Assessment Regulation, 2014)
	National Environmental Management Amendment Act, No. 8 of 2004
	National Environmental Management Laws Amendment Act, 2014 (Act No. 25 of 2014)
RL02	Mineral and Petroleum Resources Development Act, No. 28 of 2002 as amended
RL03.1	National Environmental Management: Waste Act, No. 59 of 2008 and National Environmental Management: Waste Amendment Act, No. 26 of 2014
RL03.2	National Environmental Management: Biodiversity Act, No. 10nof 2004
RL03.3	National Environmental Management: Air Quality Act, No. 39 of 2004
RL04	National Water Act, No. 36 of 1998
RL05	National Environmental Integrated Coastal Management Amendment Act, No. 36 of 2014
RL06	National Heritage Resources Act, No. 25 of 1999
RL07	Explosives: Hazardous Substances Act, No. 15 of 1973
RL08	AIR Ports
RL09	Asbestos Regulations
RL10	Boilers: Registration certificates under occupational Health and Safety Act Controlled emitter registration certificates under National Environmental Management: Air Quality Act, No. 39 of 2004
RL11	Hazardous Substances Act, No. 15 of 1973
RL12	Eskom Asbestos
RL13	Medical waste: National Environmental Management: Waste Act, No. 59 of 2008
RL14	Labour: Skills Transfer
RL15	Enterprise Development
RL16	Conservation of Agricultural Resources Act, No. 43 of 1983

The general risks are expected during the demolition and rehabilitation of disturbed areas are linked to environmental aspect/component groupings such as waste management risks related to soil management. The actual risk from these categories are tabulated in the column for risk identification.

Table R-RG: General Risks

General Risks Detail No.	**General Risk Details**
RG01 RG1.1 RG1.2	Climate change consideration • Fundamental Environmental Considerations underlying rehabilitation method • Long-term climatic changes and drought cycles
RG02 RG02.1 RG02.2 RG02.3	Waste Management • Medical waste • Hazardous waste • General waste
RG3	Land use consideration
RG04 RG4.1 RG4.2	Soil management (consideration for phytotoxic and dispersive soils): • Erosion control • Stability considerations
RG05	Land capacity consideration
RG06	Surface water management
RG07	Ground water management
RG08 RG8.1 RG8.2 RG8.3	Biodiversity management (veld carrying capacity and pebble deflation phenomenon consideration): • Selection of basic assisted natural re-vegetation method and level for vegetation rehabilitation in light of the findings of specialist botanists and trials conducted to date. • Fauna
RG09	Sensitive landscape / visual and topography consideration
RG10	Archaeological findings management
RG11	Noise management
RG12 RG12.1	Air quality management / dust control (consideration for dust Wind-blown dust posing environmental threat
RG13	Use oil management
RG13.1	Storage and handling of oil and management
RG14	Excavation management
RG15	Mine residue handling and coarse tailings dump loading and associated fine tailings (slimes) dam cover
RG15.1 RG15.2 RG15.3 RG15.4	• Overburden dump • Slimes dams including risks of soil function of undried slimes dams endangering movement on them • Tailing dump including: Risks associated with slumping of coarse tailings dump slopes at angle of repose and • Risks of soil function of undried slimes dams endangering movement on them
RG16	• Handling hazardous substances
RG17 RG17.1 RG17.2	Socio-economic consideration • Tourism and heritage promotion • Agriculture and stock farming

General Risks Detail No.	General Risk Details
RG17.3 RG17.4 RG.17.5 RG17.6	• Mariculture and fishing • Industrialisation • Small, medium and micro enterprises (SMMEs) development • Skills and targeted competency development
RG18	Rehabilitation through built structure demolition
RG19 RG19.1 RG19.2	General site risks inherent to the mining area: • Risks to pedestrian and vehicle movement on site posed by unmarked and unbarriered excavations and unstable slopes requiring special caution of the contractor. • Traffic safety
RG20	Protection of post-mining land use precincts and tar road and tourism nodes

Table R-RM: Managerial Risks

Project Management Risks No.	**Project Management Risks Detail**
RM01	Planning, scheduling and delay in internal liability reduction
RM02	Mine plan / reserve deviation
RM03	Characteristics of alluvial diamond mining
RM04	Maintaining coastal diamond security
RM05	Community calls for open coastal nodes (public access)
RM05	Defining exclusion areas for wilderness and tourism attraction
RM06	Ongoing listing nodes and facilities: in/out, permanence, role in long term, agency, (harbour, office complex, workshop complex)
RM07	Aligning Social and Labour Plans with receiving community projects
RM07	Schedule for wind-blown dust control
RM7.1	Dust cut-off traps
RM7.2	Stabilisation of dust sources
RM7.3	Coarse tailings dumps availability
RM08	Achieving further definition of RMC prospecting and mining
RM09	Capacity building of day works team
RM10	Managerial Aspects
RM11 RM11.1 RM11.2 RM11.3 RM11.4 RM11.5 RM11.6 RM11.7	Tendering and managing of rehabilitation contracts • Considerations informing tendering • General structure of tendering • Main contract tenders and small works tenders targeted at SME's • Cost estimation during tender preparation • Interface between physical rehabilitation management and receiving environment projects • Project management of the rehabilitation • Managing the environmental impact of rehabilitation
RM12	Rehabilitation implementation: Tendering process and contracts awards

Table R-RM: Managerial Risks

Project Management Risk No.	**Closure sign-off risks**
RC01	Risks emanating from the natural semi-desert ambient environment within which the site exist
RC02	Risks of pollution potential and improper waste management during rehabilitation
RC03	Rehabilitation methods and level of rehabilitation
RC04	Project administration risks related to achieving sign-off and closure sign-off
RC05	Contractor risk outside of the consideration of sign-off or closure

Socio-economic risks

The main risk of the identified deficiencies would in the poor oversight and administration of the community initiatives (identified, planned and implemented). The main root cause of such risks would be:

- Inadequate governance structure and processes to effectively drive the implemented community development initiatives as well as lack of training and skills on governance and related responsibilities.
- Inadequate maturity of associated processes and systems that are required for effective administration and oversight of the community development plan.
- Insufficient management of community development initiatives.

Inability to effectively manage the delivery of initiatives and to be proactive in addressing potential risks and issues.

- Lack of a clearly defined process that must be followed during the implementation of community development and upliftment initiatives.
- Lack of training and skills on project and contract management.
- Inadequate management of the delivery of community development initiatives.

Socio-economic controls

The following controls have been taken into account in the design of the EMPr. The socio-economic consideration are not addressed in isolation but will be effectively implemented through the social and labour plan.

- Ensuring the socio-economic activities are implemented in line with WCR's broader strategy. This umbrella governance approach and guiding principles will aid in proper administration of the development and upliftment of the community.
- Mechanisms for evaluation of the effectiveness of the community development and upliftment in the realisation of the empowerment objectives defined for the different focus areas.
- A clearly defined process for the delivery and management of selected initiatives must be implemented and followed to ensure effective and consistent delivery of projects.
- Custodians and people tasked with the delivery of initiatives should be trained on the standard practices of project and contract management.
- Environmental awareness training of staff and contractors through the extension of the existing induction training programme to cater for environmental management considerations.

- Accommodating community participation and small medium enterprises development within the structuring of the tender procedures during rehabilitation.

Key consideration in defining the risks related to closure

The following key considerations in the determination of the risks has been taken into account:

- Base-line assessments of environmental elements such as vegetation, geology, topography, visual considerations some of which were already available in the EIAr and have been reviewed and updated to match the context of rehabilitation requirements. Accordingly further selective specialist involvement which was directed only at items which may require more detail such as :
- Further botanical definition of indicated critical area; and ongoing In-fill archaeological assessments
- The overriding point of departure is to develop measures that are aligned to the post mining land use, within the various post-mining land use precincts based on their natural and/or cultural attributes, scenic value and tourism opportunities.
- The principle of limiting the volume of material moved during rehabilitation given the inherent impact which would of necessity accompany large scale material movement
- The risk consideration is identified bearing in mind rehabilitation limitations inherent in the site's arid climate, which place limitations on re-vegetation options.

Closure related risks

Regarding risks facing closure and successful rehabilitation, these have been assessed as follows:

- **Risks emanating from the natural semi-desert ambient environment** within which the rehabilitation implementation is to occur. WCR has considered these risks and the limitations they pose, in selecting best possible solutions, methodologies and strategies of implementation. For example, tailoring revegetation as a limited intervention in natural revegetation and having a primary point of departure being "to avoid disturbance of any existing natural vegetation or revegetated areas."
    - Long-term climatic changes and drought cycles.
    - Selection of a basic assisted natural revegetation method and level for vegetation rehabilitation considering the findings of specialist biodiversity study (Volume 4 of this EIAr and EMPr).
    - Acknowledgement of the high risk facing rehabilitation revegetation, WCR accepts in accordance with its general point of departure to take a pragmatic approach, that revegetation will primarily serve to achieve soil stability and is not intended to reach

biodiversity within the liability of, as such biodiversity will occur naturally. Consequently, in light of such risk acceptance, WCR will conduct performance assessments to monitor rehabilitation progress.

- WCR in acknowledgement of these harsh prevailing natural systems in respect of low rainfall, high winds, dust movement patterns, and the extent of rehabilitation required, has not extended itself into idealistic rehabilitation methods nor targets.
- WCR highlights of the natural system risks to the approving authorities, in order to ensure their awareness of the risks related to the natural systems in order that they will give full appreciation to these considerations in adjudicating closure. (both sign-off and final).

Table R-RI Summary: Identified Risks Summary for closure activities

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
What is the source of the risk? What process is being undertaken that will results to a risk?	• Risks associated with the risk source plus its sub-risk sources. Noise generation due to earthworks machinery. Dust generation due to earthworks. Loss of soil nutrients due to earthworks.	This column specifies the risk number, which is then described in detail under either General Risks table or Legislation risk table. There are two risks which will be those that are general to the demolition and rehabilitation of disturbances and those risks which will be linked to specific permit requirements. These risks are RG - (General Risks) and RL (Legislation Risks). 01 or 02 indicates the unique number allocated to that general or legislation risk. This column should therefore be read in conjunction with TableR-RG and Table R-RL. These table specify what is the nature of the risk associated with a specific risk number.	This section allocates a rating to the risk.	Corrective Action L 01: what should be done to manage or alleviate that identified risk which id detailed with a unique number under the risk detail column. The corrective action will be presented here in the form of a number. This number correlates with the risk detail for which corrective action is required. e.g. CA L01- meaning corrective action for a legislation risk associated with legislation numbered as 1 in Table R-RL. The corrective actions for all these risks are presented in the implementation plan report as Annexure H.1-1 (Rehabilitation implementation specification procedures) and are not duplicated here. In this column only the corrective action numbers e.g. CAL01 is provided. Then the ECO will already know that this is a corrective action associated with legislation risk number 1, which according to Table R-LR is NEMA associated risk. The proposed corrective actions will then be provided and populated further from the mitigation measures provided in Table (g) (ix) -1.
Mining disturbance earthworks (Dumps, trenches, excavations, nodes) The activities	Dust generation, noise generation, improper waste management and handling, safety risks	RG22,RG3,RG4, RG12		

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
entail site establishment, recovery of re-usable soil and vegetation from the areas designated for armouring, armouring of the demolition areas with coarse tailings from adjacent coarse tailings dumps • Dumps • Slimes dams • Coarse tailings dumps • Overburden dumps • Dozing • Load and tip • Shaping and Smoothing dumped material with regard for revegetation intervention • Topsoiling • Coarse pebble covering **Built structures** Demolition of Buildings Demolition of buildings and plant areas including floors but with no asbestos materials and including load to tip and dump Asbestos demolition, including load and dump Removal of all plant,	associated with working on slimes dams which are not yet dry.			

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
equipment,containers,mobile facilities and scrap from the site			Annexure E	
Demolition of other structures Fuel tank bund structures (generally plastered blockwork) Primary retaining walls Final recovery plant and inside workshop Reservoirs/dams with either concrete or block walls. Seawater pump stations Concrete columns, beams, support structures and elevated floors in plant nodes, costed in m^3 estimated from on -site photo recordalof each concrete structure.	Legislation risks associated with waste management and handling of asbestos. Potential soil contamination due to handling of oils. Lack of remediation measures.	RL09, RL10,RL11,RG02.2, RG06, RG07		
Revegetation	• Failure to promote on natural revegetation with assistance limited	RG04, RG03, RG08		
Netting and dust control	• Use of improper netting and dust control	RG1, RG5,RG9,RG10,RG14, RG		Limited staggered netting to only break wind speed (aerodynamic increases) on dump crests, lee-slope top-corners of trenches and lee-slope top corners of mine block perimeters.

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
Maintaining coastal diamond security	Lack of access to allow for community utilisation	RL14, RL15,RG17		
Community calls for open coastal nodes (public access)				
Aligning Social and Labour Plans with receiving community projects				
Schedule for windblown dust control • Dust cut-off traps • Stabilisation of dust sources • Coarse tailings dumps availability	Inadequate scheduling for dust control	RG22, RL03.3.1, RG12.1,RG15		
Capacity building of day works team Managerial Aspects	Lack of capacity building of the day works team and thus delays in completion of rehabilitation as per schedules	RL14, RL15, RG17		
• Tendering and managing the historic rehabilitation process • Considerations informing tendering • General structure of tendering • Main contract tenders and small works tenders targeted at		RM1		

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
SMME's • Cost estimation during tender preparation • Interface between physical rehab management and receiving environment projects				
Managing the environmental impact of rehabilitation	• Inadequate management of the risk and impacts associated with rehabilitation plan. • (lack of alignment with the EMPr)	RL01, RG18, RG15,RG22,RL10		
Rehabilitation implementation: Tendering process and contracts awards	• Lack of Capacity building and lack of opportunities to develop people's understanding and to transfer skills. • Lack of Continuous job creations which accommodate the community to relieve poverty. • Lack of empowerment of women and youth • Lack of establishment of small scale contracts and continual training to	RL14,RL15,RG17		

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
	capacitate people in business management. • Lack of a system of monitoring and evaluation and its effective implementation thereof			
New and existing environmental legislation	Shifting goal posts Changes in the legislation and Authority officials and the adopted principles are not endorsed	RL01,RL02,RL3.1		Ensure that the specifications for tenders are drawn up according to the adopted rehabilitation strategies in the rehabilitation implementation plan The rehabilitation implementation plan should be accepted by DMR. No amendments should be done without getting endorsement from the DMR Conduct monthly audits on rehabilitation and ensure all the rehabilitation is being conducted according to the specifications Review legislation and budgets annually
General staff who have overlapping functions				
Risks associated with closure and successful rehabilitation.		RC		
Risks emanating from the natural semi-desert ambient environmentWCR	Harsh prevailing natural systems in respect of low rainfall, high winds, high dust movement patterns, and the extent of rehabilitation required, has not extended itself into idealistic rehabilitation	RC RC01		Tailoring revegetation as a limited intervention in natural revegetation and having a primary point of departure being “to avoid disturbance of any existing natural vegetation or revegetated areas.” Long-term climatic changes and drought cycles. Take a pragmatic approach, that revegetation will primarily serve to achieve soil stability and is not intended to reach biodiversity within the liability of

Risk Source	Identified Risk	Risk Detail	Risk Ratings	Management/Mitigation Measures
	methods nor targets as have been contemplated by others in the matter of especially rehabilitation and post-mining use of the re-established vegetation.			Furthermore, in light of the climatic risk and wind factor, together with excessively high salinities in the processing plant nodes, the pragmatic approach to dealing with rehabilitation of these areas as being to encompass the natural stoney desert deflation surface formation process into the rehabilitation of these nodes by means of armouring such areas in a layer of coarse tailings, and allowing them to serve as seed and windblown dust traps in a simulated natural system. Highlighting of the natural system risks to the approving authorities in order to ensure their awareness of the risks related to the natural systems in order that they will give full appreciation to these considerations in adjudicating closure.
General risks associated with pollution and waste management amongst others		RG02		Inclusion of Environmental Management Programme
Rehabilitation methods and level of rehabilitation	Challenges in achieving desired rehabilitation goals	RG03, RG05		

Specific information required by the Competent Authority (Among others, confirm that the financial provision will be reviewed annually.

Appendix 1 of the EMPr

(iii) UNDERTAKING

The EAP herewith confirms

a. The correctness of the information provided in the reports ☐

YES

b. The inclusion of comments and inputs from stakeholders and I&Aps ☐

YES

c. The inclusion of inputs and recommendations from the specialist reports where relevant and ☐

YES

d. The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed ☐

YES

Appendix 1: Financial provision Quantum Calculation

-END-