




ECC-134-384-REP-01-D

ENVIRONMENTAL COMPLIANCE REPORT FOR THE ONGOING EXPLORATION ACTIVITIES ON EPL 8550, HOCHVELD, KHOMAS REGION NAMIBIA

RENEWAL ENVIRONMENTAL CLEARANCE CERTIFICATE

PREPARED FOR

CRATON MINING AND EXPLORATION (PTY) LTD

March 2022

ENVIRONMENTAL COMPLIANCE CONSULTANCY CC/2013/11404
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TITLE AND APPROVAL PAGE

Project Name:	Environmental compliance report for the ongoing exploration activities on EPL 8550, Hochveld, Khomas Region Namibia
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Confidentiality

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DEFINITIONS AND ABBREVIATIONS

ECC	Environmental Compliance Consultancy
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPL	Exclusive Prospecting Licence
MEFT	Ministry of Environment, Forestry and Tourism

1 INTRODUCTION

1.1 PROJECT INTRODUCTION

Craton Mining and Exploration (Pty) Ltd (herein referred to as the proponent or Craton) is the Namibian registered subsidiary of Mauritian registered Omico Copper Limited. The proponent is an exploratory mining prospector for base and rare metals, namely copper. Their current exploration project the Omitiomire Copper Project (herein referred to as the Project) is approximately 120 km northeast of Windhoek, Khomas Region, on the Exclusive Prospecting Licence (EPL) 8550 (Previously EPL 3589) (Figure 1).

The environmental clearance certificate for the exploration activities on EPL 8550 (Previously EPL 3589) which was valid for three (3) years and was issued by the Environmental Commissioner on the 16th of September 2016 (Appendix A).

In terms of the Environmental Management Act. No. 7 of 2007 a renewal application for the project's environmental compliance certificate is required. As part of this application an environmental compliance review of the works undertaken on site and in compliance with the Environmental Management Plan (EMP) is to be submitted to the Ministry of Environment, Forestry and Tourism (MEFT).

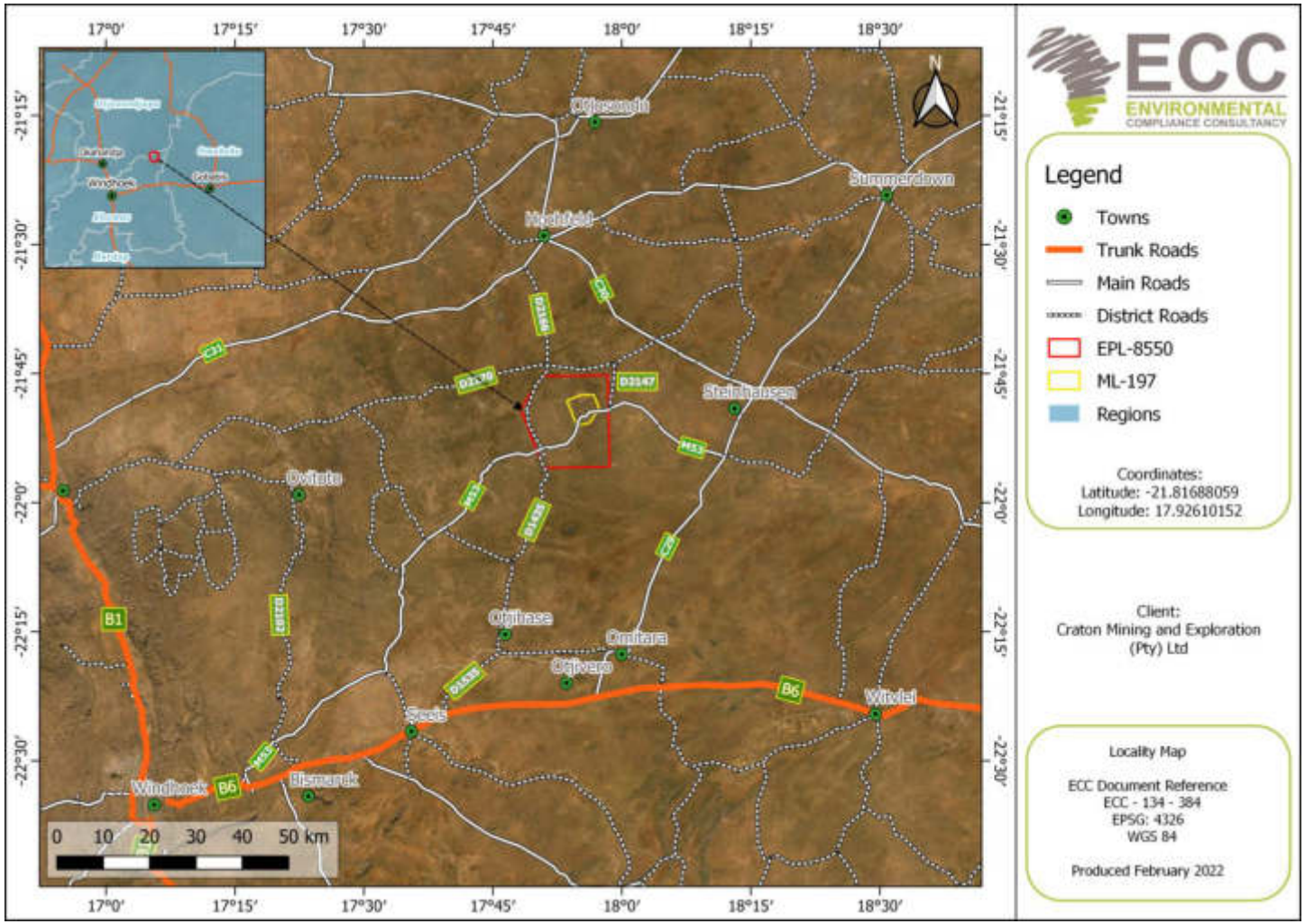

Figure 1 - LOCALITY MAP OF EPL 8550

1.2 The Proponent of the Project

TABLE 1 - PROPONENTS DETAILS

CONTACT	POSTAL ADDRESS	EMAIL ADDRESS	TELEPHONE
Mike Stuart	P O Box 90128, Windhoek	mikestuart1@gmail.com	+264816334908

1.3 Environmental Consultancy

ECC, a Namibian consultancy registration number CC/2013/11401, has prepared this document on behalf of the proponent. ECC operates exclusively in the environmental, social, health and safety fields for clients across Southern Africa in the public and private sector. ECC is independent of the proponent and has no vested or financial interest in the proposed project except for fair remuneration for professional services rendered.

All compliance and regulatory requirements regarding this document should be forwarded by email or posted to the following address:

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1.4 Purpose of Report

Environmental Compliance Consultancy (ECC) has been appointed by the proponent to apply for their renewal of an environmental clearance certificate for the exploration activities on EPL 8550 in the Khomas Region, Namibia. The purpose of this environmental compliance report is to document the findings of an environmental compliance audit covering the period since the approval of the renewal environmental clearance licence from the 13th of September 2016 to 16th of September 2019.

2 BACKGROUND OF THE PROJECT

Craton is a licenced mining prospector operating on EPL 8550 (Previously EPL 3589). The project is located 120 km Northeast of Windhoek on farms Omitiomire, Korasie Plaats, Ekuja, Ekuja Suid, Otjere, Barreshagen, Borealis, Waaihoek, and Okamapu, Khomas Region. The proponent acquired the exploration prospecting licence in 2007. Prospecting and drilling on Omitiomire has delineated a large, mainly copper sulphide bearing deposit that contains copper (Cu), mainly in the form of copper sulphides with some oxides, which contain high proportions of copper and low proportions of sulphur. This deposit is about 4 km along its north-south axis and about 0.8 km along the east-west axis. The copper sulphides have been oxidised near the surface, and next to faults and major fractures at depth. About 15% of the total Omitiomire deposit's copper including the copper oxides at depth, is in the form of the oxidised copper ores.

As per the EIA Regulations and Environmental Management Act No. 7 of 2007, exploration activities on EPL 8550 (Previously EPL 3589) cannot be undertaken without an environmental clearance certificate.

3 ENVIRONMENTAL COMPLIANCE AUDIT

3.1 SITE INSPECTION

Environmental Compliance Consultancy (ECC) undertook a site inspection on EPL 8550 on 27 January 2022. This report is based both on the site visit inspection, desktop review, verification of owner documentation, and in consideration of all records made available to ECC. The findings of this inspection are included in Table 2, which is provided as additional support for the renewal, and is submitted aligned with the EMP.

3.2 ANNUAL COMPLIANCE AUDIT

The EMP compiled by SLR Consultants CC in August 2013 set out feasible and cost-effective mitigation, monitoring and institutional measures to avoid adverse environmental and social impacts, reduce them to acceptable levels, or compensate for them. Furthermore, the EMP covers all adverse environmental impacts, including any that may result from the exploration activities on EPL 8550 (Previously EPL 3589). The EMP provides details for each mitigation, monitoring and institutional measure, including the impact(s) to which it relates and when it is required, together with designs, equipment descriptions and operating procedures in compliance with the approved EMP.

In addition to the compliance audit, the EMP is revised to identify gaps to reflect experience with the activities and recommend additional best practice measures that were not captured in the previous EMP, if necessary.

3.3 COMPLIANCE AUDIT FINDINGS

The section outlines the findings of the environmental audit completed for the project in January 2022. It addresses obligations in terms of the key acts that govern the activities on the site, the commitments made in the EMP accompanying this renewal, and presents the findings and recommended corrective actions where applicable (Table 2 - 3).

The EMP:

- identifies all mineral exploration activities that could cause environmental damage (risks) and provides a summary of actions required;
- identifies institutions, departments, and related individuals responsible for ensuring compliance with the EMP and provides their contact information;
- provides standard procedures to avoid, minimise and mitigate the identified negative environmental impacts and to enhance the positive impact of the proposed activities on the environment;
- provides for site and exploration rules and actions required;
- forms a written record of procedures, responsibilities, requirements and rules for

contractor/s, their staff and any other person who must comply with the EMP;
- provides a monitoring and auditing programme to track and record compliance and identify and respond to any potential or actual negative environmental impacts; and
- Provides a monitoring programme to record any mitigation measures that are implemented.

TABLE 2 - EXPLORATION ACTIVITIES COMPLIANCE TABLE

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
– **Safety and security**	– Prevent access of unauthorized people	– Warning signs will be erected and maintained at the site boundary and the working area of the mine will be fenced. – Security control will be in place at the access point to prevent uncontrolled vehicle and pedestrian access to existing and future mining, stockpile and waste facility areas during the construction, operation and decommissioning phases. – Any persons entering the mine area (pit & plant) will be required to undergo a formal induction. – The security company will not live in the mine village – they should not be able to fraternize with the workforce. – Security cameras and traffic monitoring of all vehicles entering the site will be carried out.	– N/A	– No work has commenced on site and therefore there are no security personnel on site or warning signs erected
	– Safety risks	– Operate an alcohol-free site and will include random testing of employees/contractors on entry to site, at the beginning of shifts and at any time on duty.	– N/A	– No work has commenced on site and therefore not applicable

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		– Develop a detailed fire management policy and ensure all employees/contractors – are regularly drilled. – Ensure all security personnel are well-vetted and trained.		
	– Emergency	– Develop and implement an emergency response plan for third parties falling into, or off, hazardous excavations and causing injury. This will be kept by the EHS department.	– N/A	– No work has commenced on site and therefore not applicable
	– Blasting and fly rock	– A system will be designed to advise neighbours of intended blasting times, and road closures will be made prior to the blast (as required), in accordance with the rules of the use of explosives. Notifications will take place at least 1 week prior to blasting. This will occur via email, SMS and signboard. Other means of notification recommended by surrounding land users will also be considered and implemented – Adequate notification will also be provided to any partners/wives of mine workers to ensure their safety during blasting.	– N/A	– No work has commenced on site and therefore not applicable

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
– Surface water (Altering drainage patterns)	– Prevent Natural flow of stormwater (clean and dirty) flowing from surrounding areas into operational area.	– Design all clean and dirty stormwater interventions in such a way that the natural flow of water off site is not too greatly impeded by the mine and its infrastructure. – Ensure that dirty stormwater does not erode the HLF, ROM stockpile and topsoil stockpile. – Ensure that these facilitates are designed, constructed and operated to avoid runoff entering the clean water systems.	– N/A	– No work has commenced on site and therefore not applicable
	– Prevent Flow of dirty stormwater (rainwater that falls onto, and flows across, the site)	– Construct engineered stormwater management systems to direct contaminated water from the processing areas, roads and offices areas, to the PCD for storage and re-use. Clean water must be directed around and away from the mine site.	– N/A	– No work has commenced on site and therefore not applicable
– Surface water (General)	– Clean & dirty water separation	– Where possible, surface water management facilities will be designed, constructed and operated so that dirty water is kept separate from clean water run-off through a system of berms, channels, trenches, flood protection measures, erosion protection or dams. The need for long term	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		controls around the HLF will be determined as part of closure planning. These commitments apply to construction, operation and decommissioning		
–	– Wash water, workshop areas etc.	– Install silt and oil traps at all areas where there is a possibility of contaminated water entering the environment. Ensure that these traps are regularly maintained / emptied and that the contents are disposed of at the relevant waste facility (waste oils, contaminated silt and effluent water).	– N/A	– No work has commenced on site and therefore not applicable.
–	– General surface water pollution/spills	– All hazardous chemicals (new and used), dirty water, mineralised wastes, and non-mineralised wastes are handled in a manner that they do not contaminate surface water run-off or, where this is not possible, demonstrate (through regular monitoring) that the potential contamination is within acceptable limits from a human and environmental health perspective – Prevent pollution through sound infrastructure design and through education and training of workers (permanent and temporary) in the	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		storage, handling, dispensing and dispersal of hazardous materials (solid and liquid). – Develop an emergency response plan to ensure fast reaction to contain and remediate pollution incidents. This plan will be kept by the EHS department. – Ensure that contractors provide MSDS documents for all products brought to site, and that they have all the necessary hazardous protection equipment for people utilising the product, as well as the necessary equipment for the containment and clean-up of the environment in the advent of a spill – Verify that the fuel transport company's spill containment (emergency clean-up plan and spill clean-up agreement are in place. – Ensure that fuel transporting companies adhere to the Petroleum Products and Energy Act (13 of 1990) and Regulations – Establish and maintain concrete or lined impermeable bunded areas around diesel generators, hazardous material stores, wash		

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		bays, workshop floors etc. Ensure drainage to oil and silt sumps that are regularly cleaned. – Develop, implement and maintain hazardous materials and hydrocarbon spill management procedures. – Ad hoc spills will be cleaned up/remediated immediately in line with spillage management procedure. – Place spill kits in all areas where hazardous substances are dispensed and stored and train staff to use it.		
	– Safe disposal and rehabilitation of hydrocarbon contaminated soils and water	– Develop and implement a hydrocarbon remediation procedure that explains how to deal with the treatment of contaminated environments (soil and water). Train selected staff in the remediation of soils or water contaminated by hydrocarbon spills.	– N/A	– No work has commenced on site and therefore not applicable.
	– Monitoring of hydrocarbon and other hazardous spills	– Ensure that checking for hydrocarbon spills is included in the daily inspections. – Report spillages as per the incident management procedure and	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		Namibian legislation.		
	– Mine infrastructure	– Ensure that where mine infrastructure becomes damaged, or causes surface water contamination, that it is adequately repaired and maintained.	– N/A	– No work has commenced on site and therefore not applicable.
– Industrial effluent	– Prevent industrial effluent from polluting the environment	– Ensure that the various effluent streams are managed to prevent overflow of the Pollution control dam (PCD) – Ensure that a freeboard is maintained to accommodate run-off during a 1:50 year storm event – Monitor the effectiveness of the mitigation measures (e.g linear) for damage to ensure the seepage doesn't occur. – Design storage/containment facilities with sufficient capacity to cater for the various sources of water, including rainfall.	– N/A	– No work has commenced on site and therefore not applicable.
–	– Discharge of industrial effluent to the PCD	– Ensure that all industrial effluent is discharged into the PCD – Install oil separators at all wash bays to separate hydrocarbons from the water	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		– Skim oil separator regularly and dispose of hydrocarbons as per the waste management procedure		
–	– Spillage of industrial effluent	– Maintain pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks.	– N/A	– No work has commenced on site and therefore not applicable.
– Domestic effluent	– Discharge of raw sewage and grey water	– Conduct regular monitoring to ensure that effluent is not being discharged into the environment.	– N/A	– No work has commenced on site and therefore not applicable.
	– Spillage of domestic and treated effluent	– Report spillages as per the incident management procedure and clean up spills within as soon as possible in line with the spillage management procedure.	– N/A	– No work has commenced on site and therefore not applicable.
	– Pollution of soil and/or groundwater when a spillage occurs	– In the event of domestic effluent discharge into the environment, stop the incident as soon as possible and find the root cause. – In the event of soil or water pollution, decontaminate the polluted area(s) using an appropriate methodology. Once clean, rehabilitate the area.	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Awareness and training	– Train operators to understand the legal requirements and how to achieve compliance. – Induct Craton employees and contractors in the use of the spill management procedure.	– N/A	– No work has commenced on site and therefore not applicable.
	– Discharge of raw sewage and grey water into appropriate sewage treatment facilities	– Ensure that portable facilities/septic tanks constructed during the construction and decommissioning phases are managed according to the design specifications.	– N/A	– No work has commenced on site and therefore not applicable.
	– Spillage of domestic and treated effluent	– Maintain portable facilities, pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks. – Ensure that sewage from the portable toilets is disposed of at the nearest municipal sewage works (Windhoek).	– N/A	– No work has commenced on site and therefore not applicable.
	– Ablution facilities	– Ensure that portable toilets are working properly and are cleaned at least weekly, so they do not pollute the surrounding environment or create hygiene problems	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Transport of sewage to a municipal facility	– Ensure that the contractor responsible for the removal of sludge to a municipal facility has an emergency response plan in place in case of accidental spills. – Also, the contractor must provide proof of safe disposal of sewage at the Municipal sewage works.	– N/A	– No work has commenced on site and therefore not applicable.
– Spills (Hazardous and hydrocarbons)	– Emergency situations – very large spills	– Maintain and implement the emergency response procedure to address large-scale hydrocarbon, hazardous materials or reagent spills on and off-site.	– N/A	– No work has commenced on site and therefore not applicable.
	– Hydrocarbon spills	– Ensure Craton or its contractor has the relevant licences and can provide reports that all surface storage tanks are in good condition (as per legal requirements). – Ensure that hydrocarbon (used and new fuel and oil) tanks and drums are stored inside bunded areas on impermeable floors with traps and separators for containing spillages. These areas are designed to contain 110% of the volume of one or the largest (in a multi-tank setup) tank and that pumps and pipes are maintained in good working order. – All wash bays will be equipped with	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		oil traps and separators. All collected oil will be stored as above. – Ensure that all fuel and oil storage facilities and transport tankers have spill kits – Ensure that the fuel transport company has a system in place to deal with hydrocarbon spills and subsequent clean-up thereof. – Contain the spill and commence with remediation as soon as possible. Log an incident and report to the authorities if volumes released are above specific limits.		
	– Domestic and Industrial effluent	– Prevent effluent spills by ensuring that treatment and storage facilities are adequate and that pipes are in a good condition. – Ensure that capacities of the various facilities and pipes are not exceeded. – All vehicles and equipment will be serviced in workshops and wash bays with contained impermeable floors, dirty water collection facilities and oil traps. – Contain any spills and clean up as soon as possible and report as per the incident management	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		procedure. – If in situ treatment is not possible or acceptable then the polluted soil must be excavated, and treated as per the Omitiomire waste management procedure		
	– Legal Compliance - all spills	– Comply with all legal requirements regarding spills and containment structures – Hydrocarbon spills of 200l or more must be reported to MME in terms of Section 49 of the Petroleum Products Regulations 2000	– N/A	– No work has commenced on site and therefore not applicable.
	– Monitoring of spills – all spills	– Ensure that the monitoring of all tanks, pipelines and bunds are included in the daily inspection program to develop an early detection system for leaks – Update, maintain and implement a maintenance plan for tanks, tankers, pipelines and bunds. – Identify post rehabilitation audit criteria for verifying that remediation has been successful. – Conduct periodic audits of facilities to ensure compliance with legal and company standards.	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Awareness and training – all spills	– Induct all Craton employees and contractors in the Environmental Policy, spillage management and incident management procedures – Train selected employees in the containment, and handling of spills and in the decontamination and rehabilitation of affected environments	– N/A	– No work has commenced on site and therefore not applicable.
	– Emergency situations – all large or remote spills	– Major spillage incidents must be handled in accordance with the emergency response procedure – Identify and contract a service provider/specialist to assist with the handling and clean-up of emergency spills off site. I&APs will be provided with the details of the EHS team so that they can notify them of any spills that have occurred in the area. The EHS team will be responsible for contacting the above-mentioned service provider. – Periodically test the emergency response procedures.	– N/A	– No work has commenced on site and therefore not applicable.
	– Rainfall-runoff mobilizes contamination from the site and pollutes	– Divert clean off-site runoff water around potential contaminant sources with drainage ditches – Collect runoff from potential	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	surface water	seepage sources to containment dams for reuse within the mine and/or plant. – Design of diversion berms or channels and containment dams to deal with 1:50 year storm.		
– Groundwater	– Water abstraction	– Groundwater levels in the monitoring network must take place at least quarterly, and the results analysed. – Abstraction boreholes and related equipment should be protected against vandalism and/or theft. – Records of volumes of water abstracted must be recorded and a water balance for the mine must be kept. – Craton must adhere to permitted abstraction rates as stimulated in the water abstraction permits. This excludes the abstraction required in order to prevent pit in flooding. – Water-saving measures in mining and operational processes should be implemented and continuously improved. – If monitoring results prove conclusively that surrounding farmer's supply boreholes are	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		affected because of Craton's mining activities, they will be provided with an alternate water source – Water meters and water depth monitors must be fitted to all abstraction holes and monitored throughout the life of the mine. – Monitoring of the *Vachellia erioloba* health in the dewatering cone must be undertaken. – Minimize abstraction during dry seasons and droughts when abstraction is not offset by precipitation and floods – Consider using the borehole located close to the river (ORC514) only as a standby, especially in dry seasons. Alternatively, provided yields can match expected production requirements, consider using any alternative borehole located north of the pit. – Minimise the mine's water usage through an integrated water management plan that addresses both demand and supply aspects. – Regulate and manage all water usage, including domestic consumption through education		

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		and awareness-raising and through metering of all usage		
– Air Quality	– Dust and PM_{10}	– Prepare an air quality management plan to include the following: ➢ Land clearing activities: o If soils are dry, and water is available then utilise water sprays at areas that are to be cleared. o Limit the travel distance between the area to be cleared and the topsoil stockpiles. ➢ Haul an internal road construction activities: O if water is available, taking into account allowable limits from abstraction, use a water bowser to dampen areas to be graded. ➢ Wind erosion from exposed areas: O If water availability, periodically wet exposed areas by water bowser especially during dry, windy periods	– N/A – N/A – N/A	– No work has commenced on site and therefore not applicable. – No work has commenced on site and therefore not applicable. – No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		➢ Using cost-effective dust suppression methods, try to keep vehicle entertainment on unpaved internal and haul roads at a 75% control efficiency. ➢ Ensure all construction equipment is subject to an inspection and maintenance program to ensure proper combustion.		
– Noise & Vibrations	– Impact of noise on the environment/ sensitive receptors	– Document and investigate all registered complaints and make efforts made to address the area of concern where applicable – Communication channels are to be established to ensure that prior notice is given to potential receptors if blasting is to occur. Refer to EIA for details on potential receptors. – Ensure that plant and equipment is well-maintained and fitted with the correct and appropriate noise abatement measures. – All diesel-powered equipment must be regularly inspected and maintained and, necessary, replacement of intake and exhaust silencers should be done.	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		– Vendors should be requested to optimise equipment design noise levels. – During the planning and design stages of the project, ways to reduce potential noise aspects should be considered. – Vibrating structures are known to be noisy. Efforts should be made in the plant design to limit noise from these structures. – Baseline noise levels should have returned within 2 km of the project boundary so as not to impact on hunting activities taking place on neighbouring farms. – Minimise the need for trucks/equipment to reverse. This will reduce the frequency at – which disturbing but necessary reverse warnings will occur. Alternatives to the traditional reverse 'beeper' alarm such as a 'self-adjusting' or 'smart' alarm could be considered.		
– Biodiversity	– Physical destruction of biodiversity	– Keep the footprints of disturbance of all facilities and roads as small as possible – As far as possible, avoid areas	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		identified sensitive areas such as pans and riverine habitat – Mark out all construction footprints and clearly convey the rule of staying inside these boundaries to all construction crews – Enforce and monitor speed limits to reduce likelihood of road kills. A GPS installed in a vehicle is an example of an effective method to monitor speed – Protect undisturbed areas outside planned mining operations from all forms of disturbance (these must serve as future source areas for re-colonisation after mining). – Prior to construction and in consolation with a specialist, visually scan proposed construction sites for any sensitive flora and fauna and implement the recommendations of the specialist – these could include but not be limited to: a search and rescue of dens and burrows, relocating/demarcating nests (especially large raptors), demarcating flora (protected trees) to either be conserved within the		

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		construction site or relocated. – Construct roads as narrow as operationally feasible and regularly maintain all roads in good condition so that diversions off roads will not be necessary. Preferably demarcate tracks with wooden poles. – Develop road use policy, including speed limits, and enforce this to avoid off track driving.		
	– General disturbance of biodiversity	– The working area of the "mini mine" will be fenced. – Allow only mining personnel, service providers and construction staff, as well as registered mine visitors on site. – Drivers must be licensed, and given regular awareness training on the need to keep to speed limits, keep on designated tracks. Some form of speed monitoring should be implemented. Limit nighttime driving. – Develop a site waste management policy and actively enforce it. – Provide temporary waste deposition facilities on site (rubbish bins, skips), which are secure from scavengers, storms, or other	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		disturbance (especially jackals and badgers). – Provide adequate toilet facilities for all workers at work sites. – Where possible, avoid destroying trees or disturbing their proximity, so that animals can continue to use them – Implement strict controls over the movement of materials onto and off the site to minimise the spread of invasive plant species; if this becomes a problem monitor the occurrence and spread of invasive species so as to instigate steps for their control, following expert advice.		
	– Disruption of animal dispersal routes along the Black Nossob River	– Do not place any infrastructure in the Black Nossob River valley. – Minimise all activities close to the river, especially at night when nocturnal species – are active	– N/A	– No work has commenced on site and therefore not applicable.
– Visual	– Earthworks	– During earthworks, all reasonable measures should be taken to prevent excessive dust. – Keep the working footprint to the minimum size possible, and rehabilitate once no longer in use	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Access	– If at all possible, permanent roads must be tarred/paved in order to minimise dust creation. Speed limits on unpaved surfaces must be controlled to reduce entrainment.	– N/A	– No work has commenced on site and therefore not applicable.
	– Lighting	– Light pollution should be carefully considered and kept to a minimum – without compromising safety. – Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. – Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. – Avoid high pole top security lighting where possible.	– N/A	– No work has commenced on site and therefore not applicable.
	– Project Area, Development and General	– Retain as much as possible of the existing vegetation within the project area and along the project boundaries and roads in aid of screening the project	– N/A	– No work has commenced on site and therefore not applicable.
– Archaeology	– Disturbance of archaeological sites	– The site identified in the Scoping Report should be indicated on the project GIS and although it is not possible to conserve this site (since it is in the footprint of the proposed	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		pit) all relevant mine and infrastructure planning should take this position into consideration. Refer to the Scoping Report for an indication of the location of this site. – Craton should apply for necessary destruction permits from the NHC, if applicable.		
– Socio-economic	– Issues relating to change of land use and neighbouring communities	– Continue with the Omitiomire Farmers Committee as a platform for dialogue and annually arrange meeting schedules. These are to take place quarterly. – Provide an alternative water source should any of the farmers' boreholes run dry and it is proven to be a direct result of the mining activities.	– N/A	– No work has commenced on site and therefore not applicable.
– Resource	– Water usage and control	– Install and calibrate water flow meters on pipes at selected locations (where required) – Monitor monthly abstraction volumes to ensure that the permitted monthly and annual volumes are not exceeded	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Maintenance of equipment	– Regularly inspect and maintain tanks, tankers, pumps and pipes.	– N/A	– No work has commenced on site and therefore not applicable.
	– Monitoring of water leaks	– Checking for water leaks daily. Report water losses.	– N/A	– No work has commenced on site and therefore not applicable.
	– Fuel consumption	– Maintain and implement the preventive maintenance plan for all equipment and mine vehicles using diesel, petrol and gas on site to avoid wastage and leakages – Monitor fuel consumption in all departments.	– N/A	– No work has commenced on site and therefore not applicable.
– Waste Management (Non-hazardous solid waste, non-mineralised)	– General	– The waste management procedure for Craton must cover the recycling, reuse, storage, handling, transportation and disposal. Ensure that the contractor's responsible for the above are made aware of these procedures.	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Collection of waste	– Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity. Receptacles must have lids to prevent wind borne litter, or scavenging by animals	– N/A	– No work has commenced on site and therefore not applicable.
	– Waste storage/separation – domestic waste	– Determine what recycling initiatives are feasible on site and in the area. – All recyclable waste must be separated at source into the relevant containers, before being removed to wheelie bins or luggar bins and skips – Provide the recyclable materials to agencies that can utilise them. – Non-recyclable waste will be collected and taken to an off-site waste facility.	– N/A	– No work has commenced on site and therefore not applicable.
	– Waste classification (domestic and industrial)	– A waste inventory should be maintained.	– N/A	– No work has commenced on site and therefore not applicable.
– Waste Management (Hazardous solid waste, non-	– General	– The waste management procedure for Craton will cover the storage, handling, and transportation of waste. Ensure that the contractor's responsible are made aware of	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
mineralised)		these procedures.		
	– Collection of waste	– Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity.	– N/A	– No work has commenced on site and therefore not applicable.
	– Waste storage	– Ensure that hazardous waste is kept covered, in impermeable bunded areas until it can be removed from site to the hazardous facility at Windhoek/Kupferberg. – Store empty print cartridges in a designated box at the office assistant's desk until removal from site. – Store fluorescent tubes in a special labelled steel drum at the engineering workshop. – Collect and accumulate other hazardous waste i.e. car batteries, miscellaneous batteries, oil filters, etc. at the engineering workshop until such time that the amounts can be removed from site. – Explosives packaging shall be safely burnt at the magazine site	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
		according to permit conditions and procedures. – Place oil and greasy cloths and rags into a steel drum and when full transported off site to the hazardous waste site. – Keep empty reagent bags (for a short period of time) at the reagents store until removed by the reagent contractor for refills. – Ensure that waste storage areas and/or containers meet the risk needs for that specific waste (e.g. impervious floor, bunded areas with drainage/containment – systems, lids to prevent light material from blowing away or sealed containers for hazardous material).		
	– Waste classification	– An inventory of wastes will be compiled and will include estimated quantities of waste. The inventory will be kept up to date.	– N/A	– No work has commenced on site and therefore not applicable.
	– Waste transport	– Appoint a reputable waste management subcontractor to transport waste to the Windhoek landfill.	– N/A	– No work has commenced on site and therefore not applicable.

Aspect	Management objectives	Management actions	Compliance	Comments or recommendations
	– Disposal	– Disposal of waste at appropriate permitted waste disposal facilities as follows: • Hazardous waste shall be removed from site and may be recycled or disposed of at the nearest hazardous site (i.e. Windhoek/Kupferberg); • Dispose of spoiled reagents offsite at the reagents facility in Windhoek; and • Damaged reagent bags shall also be removed by the reagent contractor for repairs or disposal.	– N/A	– No work has commenced on site and therefore not applicable.
	– Disposal records	– Written evidence of safe disposal of waste will be kept.	– N/A	– No work has commenced on site and therefore not applicable.

4 CONCLUSION AND RECOMMENDATIONS

(i) The proponent had Access Agreements with the landowners as was required;

(ii) The Proponent adhered the provisions of the EMP, and conditions of the Access Agreement entered between the proponent and the landowners in line with all applicable national regulations, typically related to drilling and related activities;

(iii) Before entering any private property such as a private farm, the proponent gave advanced notices and obtained access permission from the landowners;

(iv) The proponent implemented the precautionary-measures approach to environmental management;

(v) The proponent provided all the necessary support including human and financial resources for the implementation of the proposed / ongoing mitigations and effective environmental management; and

(vi) The proponent implemented internal and external (management contractor) monitoring of the actions and management strategies developed during the mineral exploration process.

The ongoing exploration activities are being undertaken following its company's Health, Safety and Environment (HSE) commitments. It is recommended that the proponent continue to adhere to all environmental legislation and company standards to ensure that the best practical environmental protection performance continues as the project activities progress.

APPENDIX A: ENVIRONMENTAL CLEARANCE CERTIFICATE

REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT AND TOURISM

Tel: (00 26461) 284 2111
Fax: (00 26461) 220 930

E-mail:
Enquiries: Mr. Josafat K Iiyambo

Cnr Robert Mugabe &
Dr Kenneth Kaunda Street
Private Bag 13306
Windhoek
Namibia

7 September 2016

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

AND ENERGY
13 SEP 2016
P.O. BOX 13306 WINDHOEK
OFFICIAL

The Managing Director
Craton Mining and Exploration (Pty) Ltd
P. O. Box 11363
Windhoek

Dear Sir/Madam

SUBJECT: ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE EXCLUSIVE PROSPECTING LICENCE (EPL) 3589 SITUATED IN WINDHOEK RURAL DISTRICT, KHOMAS REGION

The Environmental Management Plan submitted is sufficient as it made provisions of the environmental management concerning the proposed activities. From this perspective regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored throughout the process.

This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project.

On the basis of the above, this letter serves as an environmental clearance certificate for the project to proceed. However, this clearance letter does not in any way hold the Ministry of Environment and Tourism accountable for misleading information, nor any adverse effects that may arise from this project's activities. Instead, full accountability rests with Craton Mining and Exploration (Pty) Ltd and its consultant.

This environmental clearance is valid for a period of 3 (three) years from the date of issue unless withdrawn by this office.

Yours sincerely,

Teofilus Nghitila
ENVIRONMENTAL COMMISSIONER

Sigrid Hess
COMPANY SECRETARY / ADMINISTRATION MANAGER
6 Schuster Street
Windhoek
Namibia
Date: 12/9/16
(Signature)
P. O. Box 81128
Windhoek
Namibia

Office of the Environmental Commissioner

"Stop the poaching of our rhinos"

All official correspondence must be addressed to the Permanent Secretary

APPENDIX B: ENVIRONMENTAL MANAGEMENT PLAN

global environmental solutions

Omitiomire Copper Oxide Mine

Environmental Management Plan for the Omitiomire Copper Oxide Mine Project

SLR Project No.: 734.19040.00008

Report No.: 1

November 2013

Omitiomire Copper Oxide Mine

Environmental Management Plan for the Omitiomire Copper Oxide Mine Project

SLR Project No.: 734.19040.00008

Report No.: 1

November 2013

DOCUMENT INFORMATION

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ENVIRONMENTAL MANAGEMENT PLAN FOR THE OMITIOMIRE COPPER OXIDE MINE PROJECT

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ACRONYMS AND ABBREVIATIONS

Below a list of acronyms and abbreviations used in this report.

Acronyms / Abbreviations	**Definition**
ASEC	Alex Speiser Environmental Consultants
DWA	Department of Water Affairs and Forestry
EC	Environmental Clearance
EMP	Environmental Management Plan
EMS	Environmental Management System
EIA	Environmental Impact Assessment
Ha	Hectare
ISO	International Standard Organisation
LOM	Life of mine
MAWF	Ministry of Agriculture Water and Forestry
MC	Mining Commissioner
MET	Ministry of Environment and Tourism
MME	Ministry of Mines and Energy
MS	Method Statement
MP	Management plan
NSD	Noise sensitive development
PM10	Particular matter less than 10 micrometre
RoM	Run of Mine
SANS	South African National Standards
SME	Small-medium enterprise
STP	Sewerage treatment plant
Tpa	Tons per annum
TSF	Tailings storage facility
WRD	Waste rock dump

ENVIRONMENTAL MANAGEMENT PLAN FOR THE OMITIOMIRE COPPER OXIDE MINE PROJECT

1 INTRODUCTION

This Environmental Management Plan (EMP) documents a series of individual management plans (MPs) which are designed to meet legal requirements, avoid, minimise or manage the impacts associated with the implementation of the Omitiomire Copper Oxide Mine project. An EIA process was conducted for the Omitiomire Project between 2010 and 2013. A Scoping Report was produced by ASEC in 2010 and SLR Consulting has prepared this final EIA Report and EMP.

The management plans recommended by the individual specialists have been compiled into this EMP based on a review of the findings and recommendations of the Environmental Impact Assessment Report for the proposed Omitiomire Copper Oxide Mine (See Table 1-1.)

1.1 KEEPING EMPS CURRENT

Section 50 (g) of the Minerals (Mining and Prospecting) Act, 33 of 1992 states that the holder of a mining license shall undertake the periodic review of the EMP(s) should circumstances change.

Should a listed activity(s) as defined in the Environmental Impact Assessment Regulations: Environmental Management Act (EMA), 2007 (Government Gazette No. 4878) be triggered (as a result of future modifications/changes at the mine), this EMP will be required to be updated through another EIA process as stipulate in the EMA and its Regulations.

1.2 DETAILS OF THE PERSONS WHO PREPARED THIS EMP

SLR Namibia (Pty) Ltd (SLR), the independent firm of consultants who undertook the Omitiomire Copper Oxide Mine EIA has also compiled this EMP.

Simon Charter, with the assistance of Werner Petrick, who are both Environmental Practitioners from SLR, prepared this EMP. Simon Charter, the EIA project manager, has 7 years of experience of EIA preparation, compilation of EMPs, conducting audits and reviewing relevant reports. Werner Petrick has over sixteen years of relevant experience in conducting and managing EIAs, compiling EMPs and implementing EMPs and Environmental Management Systems.

TABLE 1-1: SUMMARY OF ISSUES IDENTIFIED IN THE SPECIALISTS AND THE EIA REPORT AND CORRESPONDING MANAGEMENT PLANS

Environmental component (reference to Section 7 of the EIA report)	Issue (reference to Section 7 of the EIA Report)	Relevant MP (reference to Section 6 of the EMP)
Topography (7.1)	Surface excavations and infrastructure (Section 7.1.1)	MP7.1 – Stakeholder consultation MP7.2 – Safety & Security
Soils and land capability (7.2)	Loss of soil resources from soil pollution (Section 7.2.1)	MP7.14 – Waste management
	Loss of soils resource through physical disturbance	MP13 – Soil management
Biodiversity – Natural vegetation and animal life (7.3)	Physical impacts on biodiversity (Section 7.7.1)	MP7.7 – Biodiversity
	Reduction of water resources as an ecological driver (Section 7.7.2)	MP7.7 – Biodiversity MP7.3 – Surface Water MP7.4 – Groundwater
	General disturbance of biodiversity (Section 7.7.3)	MP7.7 – Biodiversity MP7.14 – Waste management
Surface water (7.4)	Altering drainage patterns (Section 7.4.1)	MP7.3 – Surface Water
	Impacts on surface water quality (Section 7.4.2)	MP7.3 – Surface Water MP7.14 – Waste Management
Groundwater (7.5)	Dewatering and groundwater abstraction (Section 7.5.1)	MP7.4 – Groundwater MP7.11 – Socio-Economic
	Impacts on groundwater quality (Section 7.5.2)	MP7.4 – Groundwater MP7.14 – Waste management
Air quality (7.6)	Air pollution (Section 7.6.1)	MP7.5 – Air quality
Noise and Vibration (7.7)	Noise pollution and vibration (Section 7.6.1)	MP7.6 – Noise & Vibrations
Blasting (7.8)	Blasting (Section 7.8.1)	MP7.2 – Safety & Security MP7.6 – Noise & Vibrations
Archaeology (7.9)	Impacts on archaeological resources (Section 7.9.1)	MP7.9 – Archaeology
Visual (7.10)	Visual impact (Section 7.8.1)	MP7.8 – Visual
Socio-economic (7.11)	Economic (income and employment) impact due to change of land use (Section 7.11.1)	MP7.1 – Stakeholder consultation MP7.2 – Safety & Security MP7.11 – Socio-Economic
	Social impact of Change of Land Use (Section 7.11.2)	
	Impact on surrounding land users (Section 7.11.3)	
	Employment and skills development (Section 7.11.4)	
	Impacts associated loss of housing at closure (Section 7.11.5)	
	Community health, safety and security (Section 7.11.6)	
Traffic (7.12)	Traffic Impact (Section 7.10.1)	MP7.10 - Traffic

2 SCOPE OF EMP

The components of the EMP are included in table 2-1 below.

TABLE 2-1: CONTENT OF THE EMP

EIA Regulation requirement	EMP Reference
Details of the persons who prepared the EMP and the expertise of those persons to prepare an environmental management plan.	Section 1.2
Information on any proposed management or mitigation measures to address the environmental impacts that have been identified in a report contemplated by these regulations, including environmental impacts or objectives in respect of – i. Planning and design ii. Construction activities iii. Operation or undertaking of the activity iv. Rehabilitation of the environment v. Closure, where relevant	Section 7
A detailed description of the aspects of the activity that are covered by the EMP.	Sections 4 & 5
An identification of the persons to be responsible for the implementation of the mitigation measures.	Sections 5 & 8
Where appropriate, time frames within which the measures contemplated in the EMP must be implemented.	Section 8
Proposed mechanisms for monitoring compliance with the EMP and reporting on it.	Section 7 & 9

3 ENVIRONMENTAL LEGISLATION

3.1 INTRODUCTION

Craton complies with all Namibian legislation, and where legislation is lacking will comply with international best practice procedures.

Table 3-1 provides a summary list of the relevant legislation applicable to the mine of the Omitiomire copper oxide ore.

TABLE 3-1: LIST OF LEGISLATION RELEVANT TO MINING IN NAMIBIA

Year	Name
Current Namibian legislation & Bills	
1990	Petroleum Products and Energy Act No. 13 of 1990, as amended
1990	The Constitution of the Republic of Namibia of 1990
1992	The Labour Act, No. 6 of 1992
1992	The Minerals (Prospecting and Mining) Act No. 13 of 1992
1997	Regulations relating to the Health and Safety of Employees at Work (promulgated in terms of Section 101 of the Labour Act, No. 6 of 1992 (GN156, GG 1617 of 1 August 1997)
1998	Affirmative Action (Employment) Act No. 29 of 1998
1997	Namibian Water Corporation Act, No. 12 of 1997
1998	The Health Act No. 21 of 1998
1999	Road Traffic and Transport Act No. 22 of 1999
2000	Petroleum Products regulations
2000	Electricity Act No. 2 of 2000
2000	Explosives Act of 2000
2001	The Forestry Act No. 12 of 2001
2003	Pollution control and waste management bill, 2004
2004	Water Resources Management Act, 2004
2004	National Heritage Act No. 27 of 2004
2007	Labour Act No. 11 of 2007
2005	Atomic Energy and Radiation Protection Act No. 5 of 2005
2007	Electricity Act, No, 4 of 2007
2007	Environmental Management Act No. 7 of 2007
Former South African and SWA legislation still applicable in Namibia	
1919	Public Health Act No. 36 of 1919
1956	Water Act No. 54 of 1956
1956	Explosives Act No. 26 of 1956
	Regulations promulgated in terms of the Explosives Act No. 26 of 1956
1968	Regulations made under the provisions of the Mines, Works and Minerals ordinance, 1968 (Ordinance 20 of 1968)
1969	Soil Conservation Act No. 76 of 1969
1974	Hazardous Substances Ordinance No. 14 of 1974
1975	Nature Conservation Ordinance No. 14 of 1975

Year	Name
1976	Atmospheric Pollution Prevention Ordinance No. 11 of 1976
Namibian policy	
1994	Policy for the Conservation of Biotic Diversity and Habitat Protection
1995	Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation
1998	Draft White Paper on the Energy Policy of Namibia
1999	Policy for Prospecting and Mining in Protected Areas and National Monuments
2000	National Water Policy White Paper
2004	Minerals Policy for Namibia
International law to which Namibia is a signatory	
1985	Vienna Convention for the Protection of the Ozone Layer
1987	Montreal Protocol on substances that deplete the Ozone Layer
1989	The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal
1989	The Rotterdam convention on the Prior Informed Consent Procedure for Certain Hazardous chemicals and Pesticides in International Trade
1992	The Rio de Janeiro Convention on Biological Diversity
1992	United Nations Framework Convention on Climate Change

3.2 PERMITS

Before mining and processing of copper ore can commence, Craton will need to acquire a number of permits and certificates. Craton holds an exclusive prospecting license (EPL) (No. 3589) for the Omitiomire farm area. Table 3-2 summarises the notification, registration, approval and permits relating to environmental aspects. **Error! Reference source not found.** identifies the permits and certificates that Craton may be required to apply for prior to the start of mining.

TABLE 3-2: NOTIFICATION, REGISTRATION, APPROVAL AND PERMITS

Issue	Act/Section	Type of requirement/Ministry
Mining licence	Section 91(f)	Approval of EIA and EMP/MME and MET
Written permission of the MC to erect any accessory works	Section 90 (2) (a)	Written permission from MC/MME
Permission to sell, discharge, etc. Minerals mined	Section 102 (1)	Permission from MC/MME
Permit to store and handle explosives on site	Explosives Act No. 26 of 1956	Permit
Stipulates the use of public water for industrial purposes	Water Act, No 54 of 1956 Section 11 (1) – (7)	Permit
Sets out the requirements to obtain a permit to use public water for industrial purposes	Section 12 (1) – (9)	Permit
Water Abstraction permit – WA002	Section 13 (2)	Permit
Stipulates the purification of waste	Section 21 (1) (2) (3) (4) (5)	Permit for industrial waste water

Issue	Act/Section	Type of requirement/Ministry
water and discharge	& 22	and effluent disposal/ water abstraction/ Directorate of Water Affairs in MAWF
Picking and transport of protected plants	Nature Conservation Ordinance, No. 4 of 1975 Section 73	Plant removal permit/Approval of landowner/Directorate of Parks and Wildlife in MET or the NBRI
Picking, removal of protected plants	Section 73	Permit/DPW in MET
Sale, donation, export and removal of protected plants	Section 74	Plant export permit /MET
Cultivation of protected plants in nursery (if required)	Section 75	Permit/MET
Scheduled processes in controlled area	Atmospheric Pollution Prevention Ordinance, No. 11 of 1976 Section 5(1)	Air pollution control certification/Ministry of Health and Social Service (MHSS)
Registration, selling, operating, installing of infrastructure related to Group I and III hazardous substances	Hazardous Substance Ordinance, No. 14 of 1974 Section 5 (1)(a)(b)(c)	Licences required for the sale, use and storage of "hazardous substances", which are specified in certain groups. MET and MHSS
Disturbing or destroying of national heritage sites (archaeological/paleontological sites)	National Heritage Act, 2004 Section 48 – 52 and 55	Requirement to obtain consent in terms of section 55 before altering or developing any land in which an archaeological object or paleontological site is believed to be located. National Heritage Council
Consumer installation certificate	Petroleum Product Regulations, 2000 Section 18 (5)	Certificate/license MME, Department of Energy
Actions to be taken after a spill has occurred (major petroleum spill means 200 l per spill)	Section49(1)(4)	Notification/MME, Department of Energy
Storage and use of explosives	Explosive Act, 1956 Section 22	Permit/MME
30-days notification prior to commencement of construction	Labour Act,1992, Regulations for Labour Act 1992, Section 20	Notification/Ministry of Labour (MoL)
30-days notification prior to commencement of mining operation	Section 21	Notification/MoL
Transport/operating licence to transport goods on public roads	Roads Traffic and Transport Act, 1999 Section 60	Licence/Ministry of Works, Transport and Communication
Approval to work on Sundays, public holidays and continuous operation	Section 33	Approval/Ministry of Labour
Company must inform Chief Inspector (Ministry of Health and Social Services) before commencing building or construction work on the mine	Regulations concerning the Health and Safety of Employees at Work, 1997 (Government Notice 156 of 1997)	Ministry of Health and Social Services and Notification to MME

Issue	Act/Section	Type of requirement/Ministry
VAT registration	Value Added Tax Act, 2000	Certification
Tax registration	Income Tax Act, 1981	Certification
Social Security	Social Security Act, 1994 Section 20	Registration
Valid Affirmative Action compliance certificate	Affirmative Action Act, 1998, Section 42	Certification

TABLE 3-3: LIST OF PERMITS OR CERTIFICATES THAT MAY BE REQUIRED

Permit name	Regulator
Mining licence	MME
Environmental clearance for EIA and EMP	MET
Consumer installation certificate (Fuel farm)	MME
Water abstraction and discharge (NamWater)	Ministry of Agriculture, Water and Forestry (MAWF)
Disposal of domestic and industrial water/solid waste	MET/MAWF
Disposal of domestic and industrial effluent	MET/MAWF
Licence for explosives magazine	MME/Police
Explosive burning permit	MME
Registration certificate for scheduled process	MME
Storage of diesel above 600 litres or more	MME under the Energy & Petroleum Act and regulations
Generation of power above 500kVA	Electricity control board (ECB)

4 PROJECT OVERVIEW

4.1 INTRODUCTION

The Omitiomire Copper Oxide Mine project is located on the farm Groot Omitiomire (Omitiomire), which is approximately 120 km north east of Windhoek, and approximately 39 km south of Hochfeld, in the Khomas Region of Namibia. The in 2007 the exploration prospecting licence (EPL 3589) was acquired by Craton Mining and Exploration (Pty) Ltd ('Craton'), the Namibian-registered subsidiary of Australian-based International Base Metals Limited.

Prospecting and drilling on Omitiomire has delineated a large, mainly copper sulphide bearing deposit that contains copper (Cu), mainly in the form of copper sulphides, which contain high proportions of copper and low proportions of sulphur. This deposit is about 4km along its north-south axis and about 0.8 km along the east-west axis. The copper sulphides have been oxidised near surface, and next to faults and major fractures at depth. It is the near-surface copper oxides that Craton intends to mine in Phase 1 which is the focus of this EIA. About 15% of the total Omitiomire deposit's copper including the copper oxides at depth, is in the form of the oxidised copper ores.

The Phase 2 would be a larger project based on extracting the deeper sulphide copper resource for which a new full SEIA will be required wand will be undertaken before this resource can be mined.

The Omitiomire Copper Oxide Ore scoping study report was completed during March 2013 following which a definitive feasibility study (DFS) was undertaken and completed by Craton in September 2013. The DFS has indicated that 3 near surface oxide deposits can be successfully mined and the ore processed to produce rough copper metal plate and copper concentrate. Operational management will be provided by Craton personnel, and a contractor will be responsible for mining.

The three oxide pits, each averaging about 280 m long and 50 m depth will be mined by a series of small open pits with a conventional drill, blast, load and haul mining configuration. Ore will be transported to the plant by haul truck, and waste rock to one of three waste rock dumps associated with each pit.

The plant comprises of the following processing steps: Two stage crushing and screening, milling, flotation, leaching, belt filter filtration, solvent extraction and electrowinning. The twice washed, dewatered tailings, will be sent by conveyor to a tailings storage facility (TSF) for disposal (See schematic diagram overleaf).

The mine and plant will work weekly shifts, twenty four hours a day and all personnel employees will be accommodated in an on-site village.

The village will comprise the accommodation units, kitchen, mess hall, laundry and a recreational centre. Also included will be three sports fields, for example, soccer, basketball and volleyball. Access to both the mine site and the village will be strictly controlled.

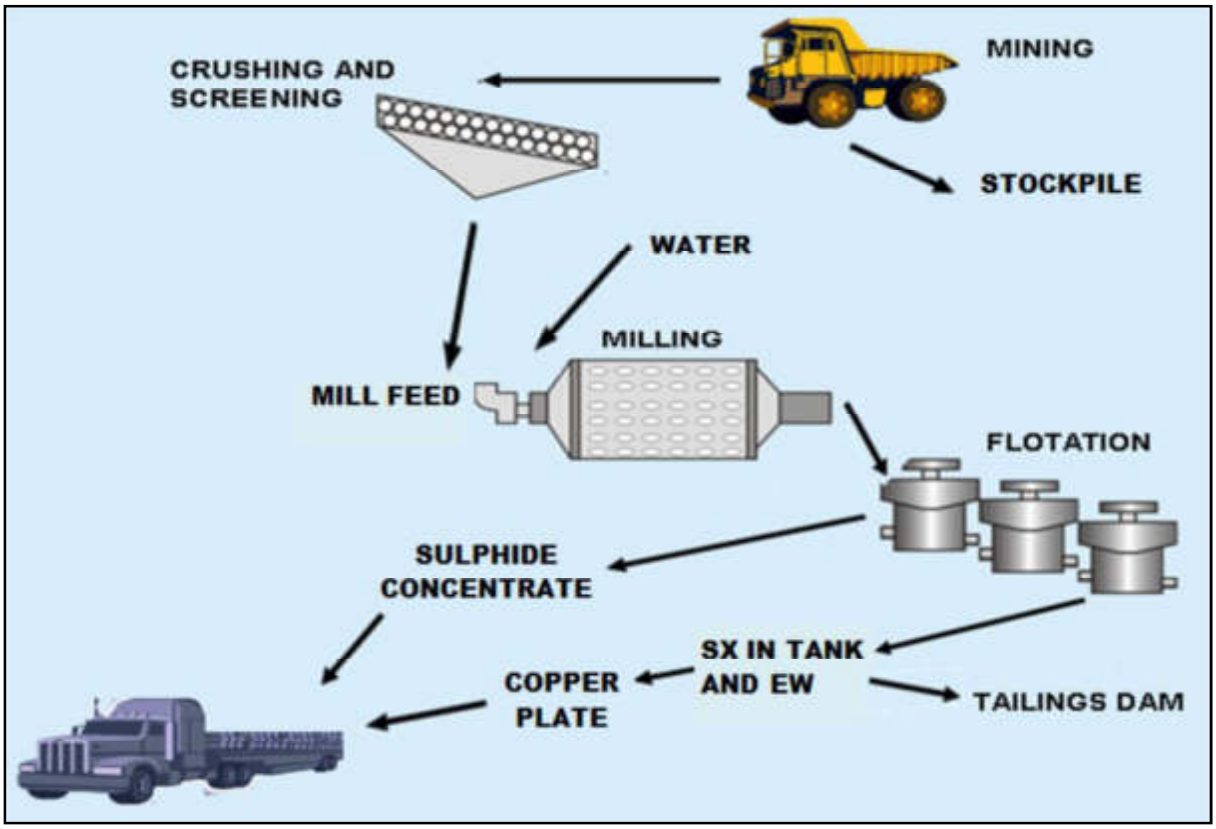

FIGURE 4-1: PROCESS FLOW DIAGRAM SHOWING THE COPPER OXIDE PROCESSING PLANT

Potable water will be supplied from boreholes on Omitiomire, sewage will be treated at a treatment plant, and power supplied by the upgrading of the existing NamPower supply. The entre mine site and village will be surrounded by high security fencing.

5 ENVIRONMENTAL MANAGEMENT PLAN (ASPECTS AND IMPACTS)

Understanding the biophysical and human environment in which a mine operates is the first step to understanding environmental impacts. The next and possibly more important step is to identify the environmental aspects that give rise to the impacts. For example, the activity of blasting has more than one environmental aspect associated with it; namely, noise, vibration, dust generation and fallout debris. All of these aspects have the potential to cause impacts on the environment in a different way.

Successful management will be gauged by how well Craton avoids, minimises or mitigates all the impacts associated with each environmental aspect at their Omitiomire Copper Oxide Mine.

As part of the EIA process for the Omitiomire, environmental aspects and potential environmental impacts associated with the activities and facilities were identified. The full suite of Craton's facilities and activities, associated with the construction, operation, decommissioning, and closure phases are described in the EIA Report and in section 4 of this EMP. Table 5-1 provides a description of the environmental aspects that are associated with Omitiomire mining operations and how they impact the biophysical and human environment.

TABLE 5-1: DESCRIPTION OF ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS ASSOCIATED WITH OMITIOMIRE MINING OPERATIONS

Environmental aspects	Potential impact
Aspects associated with consumption of resources	
Energy use	• Energy resource depletion, remote impacts
Use of natural resources	• Natural resource depletion, loss of land (habitat), change in land-use potential, loss of future economic opportunities.
Aspects associated with waste/pollution generation	
Emissions to air:- Fall-out dust and PM_{10}	• Reduction in visibility. • Nuisance impact and health impact. • Impact on flora (dust impacts growth and health of plant, etc.)
Emission to land (solid and liquid non-hazardous waste)	• Visual pollution (e.g. littering). • Pollution of water – surface and ground water. • Alteration of soil chemistry and/or composition. • Safety and health. • Scavenging by animals.
Emission to land (solid and liquid hazardous waste)	
Emission to water (domestic effluent)	• Contamination of streams, dams and groundwater. • Alteration of soil chemistry and/or composition. • Impact on fauna and flora living in aquatic environments. • Safety and health.
Emission to water (industrial effluent)	

Environmental aspects	Potential impact
Emissions to land and water (medical waste)	• Impact on surface water flow.
Sound or visual pollutants	
Noise	• Negative public perception – nuisance impact. • Potential changes in animal behaviour.
Visual	• Change to the visual landscape • Visual impact (aesthetic quality of environment) - negative public perception • Potential alteration in nocturnal activities of fauna and flora.
Blasting & Vibrations	• Will there be impacts on the safety of third parties? • What impacts on property – buildings and other infrastructure • Impacts on biodiversity
Disturbance or alteration of ecosystems	
Disturbance of land	• Visual change in surroundings, scars, loss of biodiversity, damage to ecosystems, altered soil potential, change in land- use potential, loss of future economic opportunities.
Disturbance of biodiversity	• Impact on biodiversity (physical disturbance or general disturbance). • Reduction of water resource as an ecological driver.
Disturbance of water courses or groundwater	• Alteration of drainage patterns. • Surface and groundwater pollution. • Depletion in water levels in boreholes due to over pumping. • Potential depletion of community supply boreholes.
Disturbance or alteration of archaeology	
Disturbance of archaeological sites	• Damage to archaeological sites.
Socio-economic aspects	
Economic	• Direct contribution to Gross Namibian Income (GNI) of the mine during LOM • Reducing income inequality, increasing job creation and economic growth.
Inward migration of job seekers	• Community health & safety and security impacts. • Stimulating the local economy and community organization • Increasing pressure on government services • Informal settlements
Change of land use	• Land prices may devalue due to mine development • Potential lowering of the local groundwater table and concern re the consequent long-term threat to sustainable farming • Loss of sense of place and potential reduction in livelihoods from tourism during construction and operations. • Squatter camps and reduction of safety.
Traffic	• Increased potential for road traffic accidents; • Road deterioration due to road use by mine-related vehicles. • Loose gravel can lead to cracked windscreens; and • The presence of animals and the risk of collision.

Environmental aspects	Potential impact
Other (any aspect not considered to fall into the defined aspect categories)	
Emergency situation	• There are a number of different situations which could arise, each with its own suite of impacts, e.g. fire will have an impact on air quality, health and safety, surrounding properties, equipment, fauna and flora.

6 OVERALL ENVIRONMENTAL OBJECTIVES FOR THE EMP

The following overall environmental objectives have been set for the Omitiomire Copper Oxide Mine:

- To comply with national legislation and standards for the protection of the environment.
- To limit potential impacts on biodiversity through the minimisation of the footprint and the conservation of residual habitat within the mine area.
- To investigate and exploit measures to reduce resource and energy consumption.
- To keep surrounding communities informed of mining activities through the implementation of forums for communication and constructive dialogue.
- To limit contaminated effluent discharge into the environment through the containment, recycling or removal of contaminated water.
- To conserve soil resources by stripping, stockpiling and managing topsoil.
- To protect soils and groundwater resources through the implementation of measures for spill prevention and clean-up.
- To ensure the legal and appropriate management and disposal of general and hazardous waste, through the implementation of a strategy for the minimisation, recycling, management, temporary storage and removal of waste.
- To minimise the potential for dust emissions through the implementation of dust control measures.
- To minimise the potential for noise and vibration disturbance in surrounding areas.
- To protect cultural heritage by avoiding sites of significance, or, if this cannot be done, to ensure thorough documentation and the obtaining of necessary legal approvals thereof prior to destruction.
- To undertake rehabilitation wherever possible during the life of the mine.
- To incorporate final closure objectives in construction and mine planning.
- To develop, implement and manage monitoring systems to ensure good environmental performance in respect of the following: ground and surface water, air quality, noise and vibration, biodiversity and rehabilitation.
- To reduce potential impacts on the safety of the surrounding properties through strong site access controls and discouragement of kapana sellers/informal settlements.
- To support and encourage environmental awareness and responsibility amongst all employees and service providers.
- To provide appropriate environmental education and training for all employees and service providers.
- To prevent pollution and clean up if incidents occur.
- To incorporate the relevant requirements stipulated in this EMP into the mine, plant process design and mine waste residue disposal.
- To ensure the all the contractors adhere to the construction related management commitments.

- Ensure compliance to the EMP.

7 MANAGEMENT PLANS

The management plans (MPs), listed in the table below, are applicable to all the relevant activities and facilities of the Omitiomire Copper Oxide Mine. (The MPs follow in the subsequent sections).

TABLE 7-1: VARIOUS MPS AND NUMBERS

Number	Management plan (MP)
7.1	Stakeholder Consultation/Communication MP
7.2	Safety and Security MP
7.3	Surface water/stormwater MP
7.4	Groundwater MP
7.5	Air Quality MP
7.6	Noise & Vibrations MP
7.7	Biodiversity MP
7.8	Visual MP
7.9	Archaeology MP
7.10	Traffic MP
7.11	Socio-Economic MP
7.12	Resource MP
7.13	Soil MP
7.14	Waste Management MP

7.1

Stakeholder Consultation/Communication MP

7.1 STAKEHOLDER CONSULTATION/COMMUNICATION MANAGEMENT PLAN

It is important that channels of communication are maintained over the life of the project for surrounding landowners and other relevant stakeholders. Table 7-2 shows the stakeholder's communication management plan.

7.1.1 COMPONENTS

This plan is made up of the following components:

- General Stakeholder communication.

7.1.2 MANAGEMENT AND MITIGATION

7.1.2.1 General Stakeholder communication

Objectives

To ensure that regular communication is provided on the relevant mining activities, together with feedback on the environmental management performance of the mine and that opportunity is provided for interested and affected parties to continue to raise comments and concerns (complaints) on the same – as indicated in the IFC requirements.

Actions

TABLE 7-2: ACTIONS RELATING TO STAKEHOLDER COMMUNICATION

No	Issue	Management commitment
These commitments apply to <u>all phases</u> of the mining operation		
1	Understanding who the stakeholders are	Maintain and update the stakeholder register. Ensure that all relevant stakeholder groups are included.
2		A representative database would include government, employees, service providers, contractors, farmers, local communities, NGOs, shareholders, customers, the investment sector, community-based organizations, suppliers and the media.
3		If relevant, include marginalised and vulnerable groups in the stakeholder communication process.
4		Record partnerships with local suppliers and investors as well as their roles, responsibilities, capacity and contribution to development.
5	Liaison with interested and affected parties in all phases of the life of mine	Devise and implement a stakeholder communication and engagement strategy.
6	Cooperative working relationship with our stakeholders	Keep identified stakeholders informed about the mine's activities.
7		Use appropriate communication channels to consult with, and disseminate information to, the identified stakeholder groups.
8	Managing perceptions, issues and/or complaints	Develop and implement a concerns/complaints (grievance) process for stakeholders and publicise the channels through which issues can be submitted to Craton.

No	Issue	Management commitment
		• Document all complaints in an external communications register. • Respond immediately to acknowledge receipt of complaints and comments. • Investigate and report on findings of issue to the complainant. • Keep complete auditable records of complaints, responses and actions taken. • Introduce a mediator if the grievance / complaint cannot be resolved between Craton and the affected party.
9	Safety of 3rd parties	Through appropriate communication and inductions, provide information to educate third parties about the dangers associated with hazardous excavations and infrastructure.

7.2

Safety & Security MP

7.2 SAFETY AND SECURITY MANAGEMENT PLAN

It is essential that safety and security measures are defined and implemented to adequately protect the mine site from being accessed by unauthorized people. An emergency response plan for incidents is also essential.

Note that a separate Occupational Health and Safety Plan shall be developed for the mining activities and that this does not form part of this EMP.

7.2.1 COMPONENTS

This plan is made up of the following components:

- General (third party) safety and security.
- Construction workers (after hours) - Contractors camp.
- Occupational Health & Safety.

7.2.2 MANAGEMENT

7.2.2.1 General (third party) safety and security

Objectives

The objective of the management measures is to prevent physical harm to third parties and animals from potentially hazardous excavations and infrastructure.

Actions

TABLE 7-3: ACTIONS RELATING TO GENERAL (THIRD PARTY) SAFETY AND SECURITY

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommission</u> phases		
1	Access of unauthorised people	Warning signs will be erected and maintained at the site boundary and the working area of the mine will be fenced.
2		Security control points will be in place, to prevent uncontrolled vehicle and pedestrian access to existing and future mining, stockpile and waste facility areas during the construction, operation and decommissioning phases.
3		Any persons entering the mine area (pit & plant) will be required to undergo a formal induction.
4	Emergency	Develop and implement an emergency response plan for third parties falling into, or off, hazardous excavations and causing injury.
5	Blasting and fly rock	A system will be designed to advise neighbours of intended blasting times, and road closures will be made prior to the blast, in accordance with the rules of the use of explosives.
These commitments apply to <u>operation and decommission</u> phases		
5	Safety Risks	Permanent aboveground waste facilities and stockpiles will be rehabilitated in a manner that they present as land forms that will be stable, protected from flood damage. As far as is possible, the slopes will be re-vegetated.
6		Any mining voids that remain open will be made safe to ensure that there is no risk to the safety of people and animals.
These commitments apply to <u>design, construction and operation</u> phases		
7	Safety Risks	The permanent above ground waste facilities will be designed, constructed and operated in a manner that stability is a priority, flood protection is provided and the risk of failure is limited to acceptable levels.

7.2.2.2 Construction workers (after hours) – Construction Camp

Objectives

The objective of the management measures is to prevent physical harm to contractors/employees staying over at the temporary contractor's camp resulting from mining and associated mining activities.

Actions

TABLE 7-4: ACTIONS RELATING TO CONTRACTORS/EMPLOYEE VILLAGE

No	Issue	Management commitment
These commitments apply to the <u>construction phase</u>		
1	Safety risks	Occupants of the employee village will remain within the area after working hours

7.2.3 OCCUPATIONAL HEALTH & SAFETY

Occupational health and safety aspects of the proposed Omitiomire Copper Oxide Mine do not form part of this EMP. Craton will however, adhere to all the relevant Namibian Legislation regarding health and safety, and implement a formal health and safety management system. The main components which should be included in such a management system are summarised below.

The objectives of the health and safety management system will be to ensure:

- A healthy and safe work environment.
- Safe systems of work.
- Safe plant and equipment.
- The availability of such information, instruction, and training as required for worker health and safety.

Health and safety induction will be a requirement for all employees, contractors and visitors. Specific training sessions will be developed and provided to employees regarding specific health and safety skill sets.

All hazardous chemicals used on site will have readily available material safety datasheets (MSDSs). Chemical hazards training will be an integral part of safety training and induction. Procedures will be developed for the use and handling of all dangerous chemicals. Correct personal protective equipment will be supplied for the relevant work.

7.3

Surface Water MP

7.3 SURFACE WATER MANAGEMENT PLAN

Water is a scarce resource in Namibia, Craton will undertake its operations to maximise the recycling and reuse of water.

Industrial effluent (from the plant, laboratory, wash bay and stormwater drains) will be recycled into the plant if it is suitable for use in the process. The aim is to have a facility that does not discharge effluent into the environment. Treated effluent from the sewage plant will also be re-used in the plant.

Domestic effluent includes grey water from the laundries, shower blocks and kitchens and sewage from the ablution facilities. During construction the sewerage from the portable toilets will be disposed of at the nearest sewage works. During operations this effluent will flow into a sewage treatment plant. If the treated water is acceptable for discharge it will either be used for the sports field or dust suppression. No water that is not suitable for discharge be released to the environment.

Hydrocarbons

Used hydrocarbons are hazardous liquid wastes and will be disposed of in compliance with Craton's waste disposal procedures and according to Namibian legislation.

There are a number of sources in all project phases that have the potential to pollute surface water, particularly in the unmanaged scenario. Generally, in the construction and decommissioning phases these potential pollution sources, such as oil spills, are temporary and can generally be readily mitigated.

The operational phase will potentially develop long term pollution sources through the construction of the final land forms (TSF and WRDs) that may have the long term potential to contaminate surface water through long term seepage and/or run-off. (Note, neither the ore, waste rock, or the tailings produced contain major pollutants). The potential for spillage of chemicals use in the plant process present a slightly greater threat to pollution of surface waters.

Refer to Section 7.3.2 for conceptual stormwater management requirements.

The commitments derived from the EIA Report with regards to surface water, form the basis of this MP:

7.3.1 COMPONENTS

This plan is made up of the following components:

- Altering drainage patterns.
- Pollution of surface water – general.
- Industrial effluent.
- Domestic effluent.

- Spills.

7.3.2 CONCEPTUAL STORMWATER DESIGN REQUIREMENTS

The waste dumps have been relocated outside of the 1:100 year flood-lines and seepage protection measures are to be put in place. Flood risk to the pits will be managed by flood bunds, the height of which is informed by modelled flood levels. Without flood protection it is estimated that the pits would be inundated by floodwater during a 1:10 year event.

A conceptual stormwater management plan is proposed in accordance with current best practice standards. Stormwater from dirty catchments will be conveyed to containment dams and water will be re-used on site. Dirty water drainage channels were sized to convey 1:50 year flows and the containment dams were sized to accommodate runoff from a 1:50 year 24 hour storm event + a wet month's rainfall. Recommendations are made for in-pit drainage sumps to accommodate runoff from 1:10 year 24 hour storm event, to ensure reduced risk of flooding to any vulnerable in-pit infrastructure.

7.3.2.1 Design Principles

A series of design principles for stormwater management have been prepared based on the requirements of Government Notice (GN) 704 established by the South African Department of Water Affairs and Forestry (DWAF) regulating the use of water for mining. The proposed conceptual Stormwater Management Plan (SWMP) is presented on Figure 7-1, the key features including:

- Runoff from clean areas will be diverted around dirty areas and the clean water allowed to flow into the natural environment;
- Stormwater from dirty water catchments will be conveyed to one of the suitably sized containment dams at the site;
- Dirty stormwater from the containment dams will pumped out of the dams and re-used by operations at the site;
- Runoff from within the pits will be collected in drainage sumps; and
- Flood bund walls will protect the pits and waste dumps from floods in the Black Nossob River.

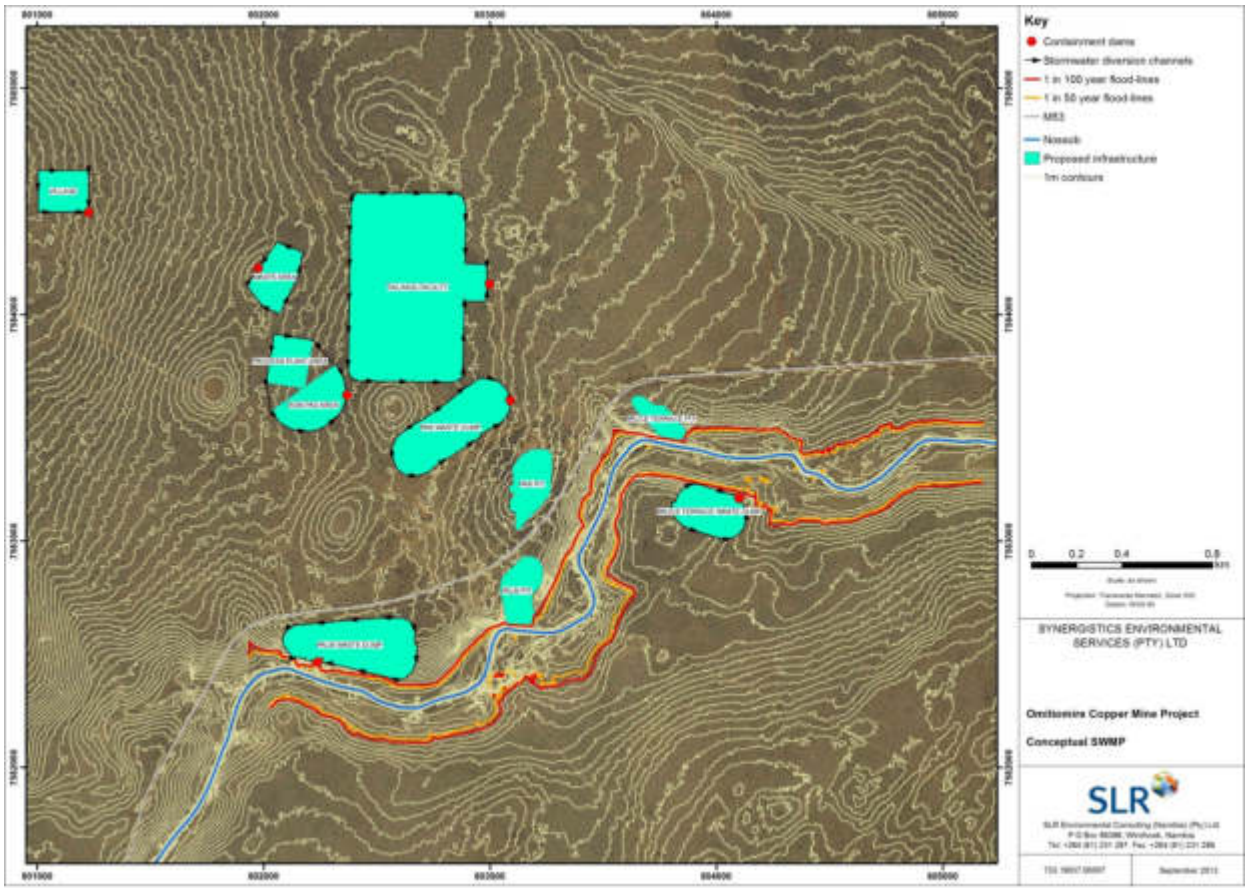

FIGURE 7-1: CONCEPTUAL STORMWATER MANAGEMENT PLAN

7.3.2.1.1 Proposed Stormwater Management Measures

In order to satisfy the design principles outlined above, the following stormwater management measures are proposed:

- Six (6) separate containment dams for dirty areas:
  - Oxide Plant (Stormwater Dam 1);
  - Filter Cake Tailings (Stormwater Dam 2 and Stormwater Dam 3)
  - Waste Rock Dump N (Stormwater Dam 4);
  - Waste Rock Dump S (Stormwater Dam 5);
  - Waste Rock Dump E (Stormwater Dam 6);
- Three (3) drainage sumps within each of the pits.
- Water diversion channels:
  - Dirty water; and
  - Clean water.
- Two (2) berms/bund walls for the pits.

Conceptual design details for the above stormwater management measures are presented below along with the specific hydraulic design standards, methodologies, assumptions and input parameters for each measure proposed.

7.3.2.2 Containment Dams

The design detail for each of the following containment dams is presented below:

- Six (6) stormwater dams; and
- Three (3) drainage sumps.

7.3.2.2.1 Hydraulic Design Standards

GN 704 requires that dirty water containment facilities are designed, constructed, maintained and operated so that they are not likely to spill into a clean water environment more than once in 50 years. A critical component in sizing the containment pond is the rate at which water is pumped out of the pond for re-use at the site, which forms part of the site wide water balance.

This report has estimated the volumes of dirty stormwater dams to accommodate runoff from the 1:50 year design rainfall (24 hour) event **and** the highest monthly rainfall (January) falling over the catchment, **less** the corresponding monthly evaporation (January) taking place over the surface area of the proposed containment facility. This does not include the addition of any process water and/or dewatering inputs.

It is recommended that the capacities of stormwater dams are revisited as part of the detailed design process and the containment volumes should be assessed using stochastic or daily time step water balance. Modelling should be undertaken using daily rainfall and evaporation data from nearby weather stations in addition to the predicted inflows to and outflows from each containment facilities taken from the site wide water balance. GN 704 also requires that a 0.8m freeboard be provided above the design capacity of a dirty water dam.

It must be noted that the volumes presented herewith exclude any freeboard. During the detailed engineering design of the dirty water dams, it is recommended that 0.8m freeboard is provided above the design capacities presented here. Furthermore, the dams should include an engineered spillway structure to ensure that any events which exceed the design standard are discharged from the dam without compromising the structural integrity of the dam wall.

Drainage sumps for stormwater generated by the base of the pits will be accommodated at the lowest point of the pit floor. The drainage sumps should be designed to accommodate runoff generated by a 1:10 year design rainfall (24 hour) event. No allowance for an additional month's rainfall and evaporation is required and no consideration of groundwater inflows has been taken into account in sizing these drainage sumps. Any events which exceed this will be contained within the pits but water levels could rise above the top of the drainage sumps and temporarily flood the lowest parts of the pit floor until pumping can remove this water.

7.3.2.2.2 Results and Recommendations

The recommended containment volume requirements for the dirty stormwater dams are presented in Table 7-5.

The table also presents recommendations on the volume of the in-pit drainage sumps, which are sized for a 1:10 year event. To advise the location of vulnerable infrastructure, the volume associated with a 1:100 year events are provided and it is recommended that any vulnerable infrastructure is positioned above the water level in the base of the pit in case of a 1:100 year event.

As excavations of the pit progress, the dimensions will be continually varying and it is recommended that the possible flood levels that may be reached during a 1:100 year event are continually re-evaluated. In all scenarios the 1:100 year flood volume must be contained within the pit i.e. without overtopping the pit walls and discharging to the environment.

It is recommended that operation of these dams ensures that water levels are maintained at a sufficient level to accommodate the recommended volumes without spillage into the clean water environment. (I.e. ponds/dams that have fill with rain or by other event should be pumped as soon as possible to maintain the ideal pond containment capacity.)

TABLE 7-5: CONTAINMENT DAMS - VOLUME REQUIREMENTS

Dam	Storm			January				Containment Required (m^3)
	Event	Rainfall (mm)	Runoff (m^3)	Rainfall (mm)	Runoff (m^3)	Evaporation (mm)	Evaporation (m^3)	
Stormwater Dam 1	1:50 year 24 hour	141	12 232	98	5 098	252	1 663	15 667
Stormwater Dam 2	1:50 year 24 hour	141	8 201	98	10 253	252	377	18 077
Stormwater Dam 3	1:50 year 24 hour	141	8 201	98	17 088	252	377	24 912
Stormwater Dam 4	1:50 year 24 hour	141	3 362	98	9 808	252	466	12 705
Stormwater Dam 5	1:50 year 24 hour	141	5 333	98	2 223	252	722	6 834
Stormwater Dam 6	1:50 year 24 hour	141	3 601	98	1 501	252	528	4 573
Drainage Sump 1	1:10 year 24 hour	141	1 264					2 003
Drainage Sump 2	1:10 year 24 hour	141	948					1 502
Drainage Sump 3	1:10 year 24 hour	141	1 140					1 806

7.3.2.3 Stormwater Diversion Channels

The proposed dirty stormwater diversion channels are presented in Table 7-5. No significant clean water catchments are identified which need diversion around the dirty water catchments.

7.3.2.4 Hydraulic Design Standard

All stormwater diversion berms and channels should be designed to convey flows generated during a 1:50 year rainfall event. In the vicinity of a watercourse (perennial or non-perennial), flow diversion berms or flood protection bunds should be sized to convey the 1:100 year flow event.

7.3.2.5 Channel Sizing

In order to accommodate the design flows, the recommended channel sizes are presented in **Error! Reference source not found.**, and Figure 7-2 presents a typical cross-section through the channel.

The following assumptions were made during the design of the flow diversion channels:

- The channels are sized to take the maximum flow calculated for the entire catchment as estimated for the downstream end of the channel, and the channel sizing will be uniform along its entire length;
- Channels are sized for the maximum catchment area which may drain to them, regardless of relative phasing of plant, stockpiles, dumps and tailings which may later create catchment divides; and
- Clean water will be kept out of the dirty water channels by constructing a linear bund with the material excavated from the channel (as shown in Figure 7-2).

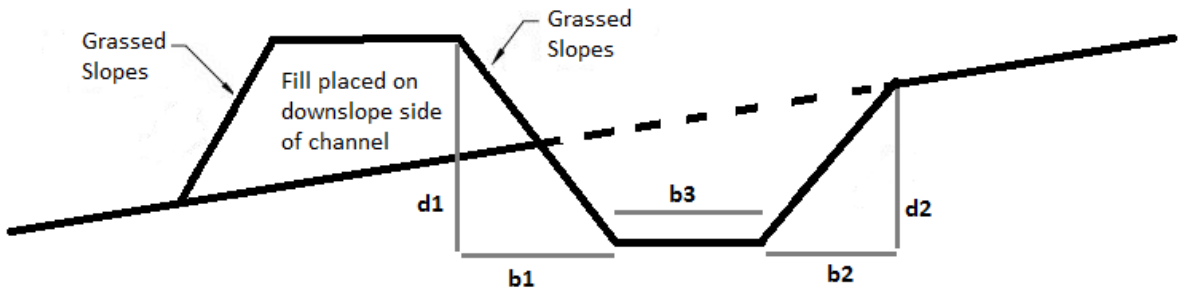

FIGURE 7-2: STORMWATER DIVERSION CHANNEL SIZING

7.3.3 FLOOD BUND WALLS

There are two pits (Palm Pit and Bruce Terrace Pit) and two waste dumps (south and east) which are located adjacent to the 1 in 100 year flood-line of the Black Nossob River. There is a risk of floodwater spilling into the pits which could pose a danger to any operational personnel working within the pit, could damage vulnerable equipment and could undermine the structural integrity of the pit walls. There is also a risk of waste dumps within the flood-lines being eroded by fast moving floodwater which would impact on the water quality of the river and could undermine the structural integrity of the waste dump.

It is recommended that the two pits are protected by flood defence bunds. The level of the flood defence bund is recommended to be set at the maximum flood level along the perimeter of the bund plus a freeboard to account for wave action within the channel, construction/engineering tolerances, uncertainties in the peak flow estimation/flood modelling and the potential impacts of climate change on

peak flows. A freeboard of 1m is recommended above the 1:100 year flood levels. The recommended flood defence bunds are: 1 684.12 m AMSL for Palm Pit and 1 682.29 m AMSL for BT Pit.

7.3.4 FURTHER DESIGN CONSIDERATIONS

7.3.4.1 Detailed Channel Design

It is recommended that in the detailed design stage that the channel designs are checked with the lidar topographical survey data to ensure that the channels have been correctly sized for the relevant catchment areas.

7.3.4.2 Dust Suppression

Subject to water quality considerations, it is recommended that dirty water, as opposed to clean water, be collected and used for dust suppression at the site. However, it is recommended that water quality testing be undertaken to inform an assessment of whether the water is suitable for dust suppression.

7.3.5 MANAGEMENT

7.3.5.1 Altering drainage patterns

Objectives

The objective of the management measures is to separate clean water (water that falls outside the mine site) from dirty water (water that emanates from the mine site).

Actions

TABLE 7-6: ACTIONS RELATING TO THE ALTERING OF DRAINAGE PATTERNS

No	Issue	Management commitment
These commitments apply to all <u>phases</u>		
1	Natural flow of stormwater (clean and dirty) flowing from surrounding areas into operational area	Design all clean and dirty stormwater interventions in such a way that the natural flow of water off site is not too greatly impeded by the mine and its infrastructure. Ensure that dirty stormwater does not erode the TSF, WRD and low grade stockpiles and topsoil stockpiles. Ensure that these facilitates are designed, constructed and operated to avoid runoff entering the clean water systems, and that flood protection is provided at the bases of the waste rock dumps.
These commitments apply to <u>construction and operation</u> only		
2	Flow of dirty stormwater (rain water that falls onto, and flows across, the site)	Construct engineered stormwater management systems to direct contaminated water from the processing areas, roads and offices areas, to the return water dam circuit for storage and re-use. Clean water must be directed around and away from the mine site.

7.3.5.2 Impacts on surface water quality - general

Objectives

The objective of the management measures is to prevent pollution of surface water run-off.

Actions

TABLE 7-7: ACTIONS RELATING TO THE MANAGEMENT OF SURFACE WATER – GENERAL

No	Issue	Management commitment
These commitments apply to <u>design, construction and operation phases</u>		
1	Clean & dirty water separation	Where possible, surface water management facilities will be designed, constructed and operated so that dirty water is kept separate from clean water run-off through a system of berms, channels, trenches, flood protection measures, erosion protection or dams. The need for long term controls around the waste rock dumps will be determined as part of closure planning
These commitments apply to <u>construction, operation and decommissioning phases</u>		
2	Wash water, workshop areas etc	Install silt and oil traps at all areas where there is a possibility of contaminated water entering the environment. Ensure that these traps are regularly maintained / emptied and that the contents are disposed of at the relevant waste facility (waste oils, contaminated silt and effluent water)
3	General surface water pollution/ spills	All hazardous chemicals (new and used), dirty water, mineralised wastes, concrete batching activities and non-mineralised wastes are handled in a manner that they do not contaminate surface water run-off or, where this is not possible, demonstrate (through regular monitoring) that the potential contamination is within acceptable limits from a human and environmental health perspective.
4		Prevent pollution through sound infrastructure design and through education and training of workers (permanent and temporary) in the storage, handling, dispensing and dispersal of hazardous materials (solid and liquid).
5		Develop and emergency response plan to ensure fast reaction to contain and remediate pollution incidents.
6		Ensure that contractors provide MSDS documents for all products brought to site, and that they have all the necessary hazardous protection equipment for people utilising the product, as well as the necessary equipment for the containment and clean-up of the environment in the advent of a spill.
7		Verify that the fuel transport company's spill containment (emergency clean up) plan and spill clean-up agreement are in place. Ensure that fuel transporting companies adhere to the Petroleum Products and Energy Act (13 of 1990) and Regulations
8		Establish and maintain concrete or lined impermeable bunded areas around all diesel generators, hazardous material stores, wash bays, workshop floors etc. Ensure drainage to oil and silt sumps that are regularly cleaned.
9		Develop, implement and maintain hazardous materials and hydrocarbon spill management procedures.
10		A single concrete batch plant should be established on a compacted surface, and measures put in place to prevent discharge to / pollution of the environment from concrete wash water and waste concrete.
11		Ad hoc spills will be cleaned up/remediated immediately in line with spillage management procedure.
12		Place spill kits in all areas where hazardous substances are dispensed and stored and train staff to use it.
13		Develop audit criteria for post rehabilitation in situ spills to ascertain when/whether the remediation has been successful.
14	Mine	Ensure that where mine infrastructure becomes damaged, or causes surface

No	Issue	Management commitment
	infrastructure	water contamination, that it is adequately repaired and maintained.
15	Emergency	Major spillage incidents that contaminate flood waters will be handled in accordance with the Craton emergency response procedure and reported to the authorities as stipulated in the Namibian legislation.
16	Training and awareness	Induct all employees and contractors in Craton's spillage management procedure.
17	Safe disposal and rehabilitation of hydrocarbon contaminated soils and water	Develop and implement a hydrocarbon remediation procedure that explains how to deal with the treatment of contaminated environments (soil and water). Train selected staff in the remediation of soils or water contaminated by hydrocarbon spills.
18	Monitoring of hydrocarbon and other hazardous spills	Ensure that checking for hydrocarbon spills is included in the daily inspections.
19		Report spillages as per the incident management procedure and Namibian legislation.

Please refer to Section 7.14 for management measures relating to waste management.

Spill remediation options include in situ treatment or disposal of hydrocarbon contaminated soils as hazardous waste. The former is generally considered to be the preferred option because with successful in situ remediation the soil resource is retained. The *in situ* options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are replaced. Soils contaminated with more hazardous materials should be disposed of at a registered hazardous landfill site.

7.3.5.3 Industrial effluent

Objectives

The objective of the management measures is to prevent pollution of surface water, etc. due to industrial effluent.

Actions

TABLE 7-8: ACTIONS RELATING TO INDUSTRIAL EFFLUENT

No	Issue	Management commitment
These commitments apply to <u>operation phase only</u>		
1	Discharge	Ensure that no discharge takes place (closed system).
2	Spillage of industrial effluent	Prevent spillages of industrial effluent. Where spillage does occur, ensure it is properly contained.
3		Checking for industrial effluent spills included in the daily inspection checklist.
4		Report spillages as per the incident management procedure and clean up spills as soon as possible.
5	Pollution of soil and / or water when spillage or discharge occurs.	In the event of industrial effluent discharge into the environment, follow the relevant emergency response procedures and then investigate the cause of the incident.
6		In the event of soil or water pollution, spills will be cleaned up/remediated as soon as possible in line with spillage management procedure.

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
7	Prevent industrial effluent from polluting the environment (return water dam)	Ensure that the various effluent streams (tailings runoff, treated effluent dirty stormwater, process effluent) are managed to prevent overflow of the return water dam.
8		Ensure that a freeboard is maintained to accommodate run-off during a 1:50 year storm event.
9		Monitor the effectiveness of the mitigation measures (e.g. liner) for damage to ensure that seepage does not occur.
10		Design storage/containment facilities with sufficient capacity to cater for the various sources of water, including rainfall.
11	Discharge of industrial effluent to the return water dam and TSF	Ensure that all the industrial effluent is discharged into the return water dam.
12		Install oil separators at all wash bays to separate hydrocarbons from the water. Send the water to the return water dam.
13		Skim oil separator regularly and dispose of hydrocarbons as per the waste management procedure.
14	Spillage of industrial effluent	Maintain pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks.
These commitments apply to <u>construction and operation</u> only		
15	Prevent industrial effluent from polluting the environment	Recycle all process water from the process dam back into the plant as per the design specifications.
16	Storage and disposal of liquid waste (hydrocarbons)	All liquid hydrocarbon waste will be collected, safely stored in sealed drums on impermeable surfaces within bunded areas, preferably under rain proof cover. These areas will be designed to contain 110% of the volume of one or the largest (in a multi drum setup) drum and will be equipped with traps and oil separators to contain spilled hydrocarbons. The used hydrocarbon liquid waste will be provided to third parties for environmentally acceptable recycling thereof. Related records will be kept.

7.3.5.4 Domestic effluent

Objectives

The objective of the management measures is to prevent pollution of surface water, etc. due to domestic effluent.

Actions

TABLE 7-9: ACTIONS RELATING TO DOMESTIC EFFLUENT

No	Issue	Management commitment
These commitments apply to <u>construction, operations and decommissioning</u>		
1	Discharge of raw sewage and grey water	Conduct regular monitoring to ensure that effluent is not being discharged into the environment.
2	Spillage of domestic and treated effluent	Report spillages as per the incident management procedure and clean up spills within as soon as possible in line with the spillage management procedure.
3	Pollution of soil and / or ground	In the event of domestic effluent discharge into the environment, stop the incident as soon as possible and find the root cause.

No	Issue	Management commitment
4	water when spillage occurs.	In the event of soil or water pollution, decontaminate the polluted area(s) using an appropriate methodology. Once clean, rehabilitate the area.
5	Awareness and Training	Train operators to understand the legal requirements and how to achieve compliance.
6		Induct Craton Employees and Contractors in the use of the spill management procedure.
These commitments apply to the <u>construction</u> phase		
7	Discharge of raw sewage and grey water into appropriate sewage treatment facilities	Ensure that portable facilities / septic tanks constructed during the construction and decommission phases are managed according to the design specifications.
8	Spillage of domestic and treated effluent	Maintain portable facilities, pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks.
9		Ensure that checking for domestic and treated effluent spills is included in the daily inspection checklist.
10	Ablution facilities	Ensure that portable toilets are working properly and are cleaned at least weekly, so they do not pollute the surrounding environment or create hygiene problems.
11		Ensure that sewage from the portable toilets is disposed of at the nearest municipal sewage works.
12	Transport of sewage to municipal facility	Ensure that the contractor responsible for removal of sludge to a municipal facility has an emergency response plan in place in case of accidental spills. Also, the contractor must provide proof of safe disposal of sewage at the Municipal sewage works.
These commitments apply to <u>operation and decommissioning</u> only		
13	Sewage treatment plant (STP)	Regularly service and maintain sewage treatment plant to keep it in proper working condition.
14		If the treated water is acceptable for discharge it will be reused. Under no circumstance will water that is not suitable for discharge be released to the environment
15		Sewerage sludge shall be removed by the sewage services contractor for disposal appropriate disposal.
16	Legal compliance	Apply to DWA for the STP and a possible Waste Water Discharge permit. Conduct regular inspections and audits relating to the STP activities and ensure compliance to conditions of such possible permits issued by DWA (i.e. monitoring, etc.), where required.
These commitments apply to <u>operation</u> only		
17	Treatment of sewage and grey water	Operate the sewage treatment plant according to the operations manual to ensure optimum performance.

7.3.5.5 Spills (Hazardous and hydrocarbons)

Objectives

The objective of the management measures is to prevent pollution of surface water, etc. due to spillages.

Actions

TABLE 7-10: ACTIONS RELATING TO SPILLAGES

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Emergency situations – very large spills	Maintain and implement the emergency response procedure to address large scale hydrocarbon, hazardous materials or reagent spills on and off site.
2	Hydrocarbon spills	Ensure Craton or its contractor has the relevant licences and can provide reports that all surface storage tanks are in good condition (as per legal requirements).
3		Ensure that hydrocarbon (used and new fuel and oil) tanks and drums are stored inside bunded areas on impermeable floors with traps and separators for containing spillages. These areas are designed to contain 110% of the volume of one or the largest (in a multi tank setup) tank and that pumps and pipes are maintained in good working order.
4		All wash bays will be equipped with oil traps and separators. All collected oil will be stored as above.
5		Ensure that all fuel and oil storage facilities and transport tankers have spill kits.
6		Ensure that the fuel transport company has a system in place to deal with hydrocarbon spills and subsequent clean-up thereof.
7		Contain the spill and commence with remediation as soon as possible. Log an incident and report to the authorities if volumes released are above specific limits.
8		If contamination of water ponds occurs, separate the hydrocarbons from water and treat the water before recycling and re-use.
9	Domestic and Industrial effluent	Prevent effluent spills by ensuring that treatment and storage facilities are adequate and that pipes are in a good condition.
10		Ensure that capacities of the various facilities and pipes are not exceeded.
11		All vehicles and equipment will be serviced in workshops and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps.
12		Contain any spills and as clean up as soon as possible and report as per the incident management procedure.
13		Spilled tailings slurry is to be returned to the plant processing circuit..
14		If in situ treatment is not possible or acceptable then the polluted soil must be excavated, and treated as per the Omitiomire waste management procedure.
15	Legal Compliance – all spills	Comply with all legal requirements regarding spills and containment structures.
16		Hydrocarbon spills of 200l or more must be reported to MME in terms of Section 49 of the Petroleum Products Regulations 2000.
17	Monitoring of spills – all spills	Ensure that the monitoring of all tanks, pipelines and bunds are included in the daily inspection programme to develop an early detection system for leaks.
18		Update, maintain and implement a maintenance plan for tanks, tankers, pipelines and bunds.
19		Identify post rehabilitation audit criteria for verifying that remediation has been successful.

No	Issue	Management commitment
20		Conduct periodic audits of facilities to ensure compliance with legal and company standards.
21	Awareness and training – all spills	Induct all Craton employees and contractors in the Environmental Policy, spillage management and incident management procedures.
22		Train selected employees in the containment, and handling of spills and in the de-contamination and rehabilitation of affected environments.
23	Emergency situations – all large or remote spills	Major spillage incidents must be handled in accordance with the emergency response procedure.
24		Identify and contract a service provider/specialist to assist with the handling and clean-up of emergency spills off site.
25		Periodically test the emergency response procedures.
26	Discharge of dewatering from mine pits causes pollution of surface water	The risk of dewatering discharge transporting contaminants could be minimized by dewatering from boreholes not the pit itself.
27		Retain and use dewatering water for mine and plant processes
28		No water will be discharged into the river,
29	Rainfall runoff mobilizes contamination from site and pollutes surface water	Divert clean offsite runoff water around potential contaminant sources with drainage ditches.
30		Collect runoff from potential seepage sources to containment dams for reuse within the mine and/or plant.
31		Design of diversion berms or channels and containment dams to deal with 1:100 year storm.
32		Rehabilitation (concurrent) of waste rock dumps with vegetation
33	Flow in Black Nossob River Floods Mine pits	Flood defence bunds will be constructed to prevent 1 in 100 year river flows from entering mine pits – this is considered unlikely to be completely effective against major flows, but would reduce the speed of mine pit flooding.
34		Implement warning system to ensure that mine pits are evacuated in the event of major upstream river flows (e.g. due to upstream dam collapse) which could overflow bunds.
35	Dewatering of pits in the event of flood events	In consultation with the MWAF, test water quality before pumping to available containments dams, or into the environment.
These commitments apply to <u>operation</u> only		
36	Reagent spills	Ensure that the reagent supply and/or transportation companies are in possession of the relevant transport licences, can prove transport and storage tanks are in good condition and have and emergency response system in place to deal with spills the clean-up thereof.
37		Ensure that reagent tanks are housed inside impermeable lined, or concrete, bunds and that dispensing takes place on an impermeable surface. No reagents may be discharged to the environment. Spills must be cleaned up and waste disposed of according to MSDS recommendations.
38		Ensure that bunds are designed to contain 110% of the volume of the SX area and that pumps and pipes are maintained in good working order. (Risk assessment mitigation measures must be implemented)
39	Process solution spills	Ensure that bunds have been designed to capture any release of solution to the extent of 110% of the largest tank constructed inside the bunded area.
40		As far as possible keep bunds clean and empty.

No	Issue	Management commitment
41		Ensure that pumps and pipelines are in place to pump solutions from the bunds back into the process.
42		Maintain and implement an emergency procedure for the containment and clean-up of process solutions if bunds are breached, and the consequent treatment of contaminated areas.
These commitments apply to <u>operation and decommissioning</u> only		
43	Reagent spills	Contain the spill using appropriate spill kits, and clean up as soon as possible as per the MSDS specification, report and investigate as per the incident management procedure.
44		All solid reagents to be picked up and placed in the relevant reagent tank for use in the plant. If the reagent is polluted it must be disposed of at a hazardous landfill.
45		If contamination of water occurs, contain the water and treat it, or direct it into the process dam for use into the process plant.
46		Identify and utilise a service provider to assist with the clean-up of very large reagent spills (emergency situations) as required.
47		All major spills (>200l) will be reported to the MAWF
48	Slightly elevated copper and other trace metal concentrations reach the Black Nossob River alluvial aquifer by contaminant transport in surface water	Ensure that all discharges of dewatering water are contained for re-use in mine processes.
49		Construct flood-proof erosion containment structures for the waste rock dumps.
50		Erosion protection e.g. rehabilitation of waste rock dumps with vegetation.
51		Ensure safe passage of vehicles across the Nossob River from the BT Pit to its waste rock dump. Any oil leaks, or spillage of waste rock, must be cleaned up immediately. The river crossing must remain uncontaminated.

7.4

Groundwater MP

7.4 GROUNDWATER MANAGEMENT PLAN

Potential groundwater quality and quantity impacts are a potential issue during the construction and operation of the various mining activities and infrastructure, unless measures are undertaken to prevent and mitigate such impacts. The purpose of this groundwater management and mitigation plan is to provide for methods to be followed to achieve such mitigation.

The commitments derived from the EIA Report with regards to groundwater management forms the basis of this MP.

7.4.1 COMPONENTS

This plan is made up of the following components:

- Water abstraction and dewatering of mine pits.
- Contamination of groundwater.

7.4.2 MANAGEMENT

7.4.2.1 Water Abstraction and Dewatering of Mine Pits

Objectives

The objective of the groundwater management measures is to minimise the impact of the abstraction of water and to prevent the loss of groundwater to other users in the area.

Actions

TABLE 7-11: ACTIONS RELATING TO WATER ABSTRACTION AND DEWATERING OF MINE PITS

No	Issue	Management commitment
1	Water abstraction and pit dewatering	Groundwater levels in the monitoring network must take place at least quarterly, and the results analysed.
2		Abstraction boreholes and related equipment should be protected against vandalism and/or theft.
3		Records of volumes of water abstracted must be recorded and a water balance for the mine must be kept. Craton must adhere to permitted abstraction rates as stimulated in the water abstraction permits.
4		Water saving measures in mining, operational and tailings deposition processes should be implemented and continuously improved.
5		If monitoring results prove conclusively that surrounding farmer's supply boreholes are affected as a result of Craton's mining activities, they will be provided with an alternate water source.
6		Water meters and water depth monitors must be fitted to all abstraction holes and monitored throughout the life of the mine.
7		Monitoring of the *Vachellia erioloba* health in the dewatering cone must be undertaken.
8	Legal aspects	Ensure that permits for abstraction and pit dewatering are renewed as required.
9		Conduct regular audits to ensure that the conditions of the permits are being met.

Refer to the Biodiversity MP for management requirements relating to the potential impacts of the reduction of water resources as an ecological driver.

7.4.2.2 Impacts on Groundwater Quality

Objectives

The objective of the management measures is to limit groundwater pollution related impacts.

Actions

TABLE 7-12: ACTIONS RELATING TO PROTECTION OF GROUNDWATER CONTAMINATION

No	Issue	Management commitment
These commitments apply to <u>design phase</u> only (refer to design criteria following this table for further details)		
1	Groundwater contamination from the TSF	Although tests have shown that the tailings not considered acid forming, and that a second tailings washing stage has been added to the plant process to increase the pH of the tailings sent to the TSF, it has been recommended that follow-up geochemical studies are required corroborate the preliminary geochemical assessment and confirm the orebody, waste rock and tailings are unlikely to produce acid rock drainage.
2		Measures identified during the detail design phase of the mineralised waste facilities and low grade stockpiles will aim at further reducing potential impacts on the environment.
These commitments apply to <u>construction and operations phases</u>		
3	Groundwater contamination from construction and operational activities	The ground water quality monitoring network currently in place will be retained, and improved upon if deemed necessary.
4		Ground water seepage monitoring points shall be identified/installed. Water quality results will be regularly analysed and abnormal trends investigated. Mitigation measures will be installed should pollution plumes of concern are identified.
5		Adequate hydrocarbon and hazardous materials containment and bunding facilities to be used. All fuel tanks will be bunded and fuel transfer will take place over an impermeable surface.
6		All hydrocarbons and other hazardous materials (including chemicals) will be managed to prevent contamination of groundwater.
7		All vehicles and machines must be maintained to limit oil leaks, and drip trays are to be used by problem equipment.
8		Refuelling of construction vehicles must take place over a bunded area draining to an oil separator.
9		Adequate ablution facilities must be provided for all persons working on site. Sewage must be contained, in mobile toilets, or septic tanks and regularly removed and disposed of at a municipality. Sewage disposal certificates must be obtained from the municipality.
10		No uncontrolled discharges from the construction/employee village shall be permitted.
These commitments apply to the <u>operational phase</u> only		
11	Groundwater contamination from the mining operation	No uncontrolled discharges shall be permitted from the plant, mine, pollution control dams or other containment ponds that may result in pollution of the receiving environment and aquifer.
12		Water seeping into the open pit during mining should be directed into a sump and pumped to specifically designed surface drainage dams and not into any clean water system, natural drainage line, or the aquifer.

No	Issue	Management commitment
		The risk of dewatering discharge transporting contaminants could be minimized by dewatering from boreholes not the pit itself.
13		If monitoring results prove conclusively that surrounding farmer's supply boreholes are affected as a result of Craton's mining activities, they will be provided with an alternate water source.
14		All water retention structures, including tailings disposal facilities, return water dams, stormwater dams, retention ponds etc. should be constructed to have a freeboard of 1 m above the 1:100 year flood levels.
15		The groundwater flow model should be updated within one year after mining commences and every two years thereafter.
16	Emergency	Major spillage incidents will be handled in accordance with the Craton emergency response procedure. The MWAF will be informed of, and consulted on, major spillages.

7.4.2.3 Design criteria relating to groundwater quality

Looking at the relative low source concentration and the favourable soil and groundwater flow conditions (permanent sink in mine pit) Craton can support a TSF without polymer liner, but with a proper foundation in form of compacted cambisols/calcretes found in the Omitiomire soils. The site soil survey, and geotechnical test work undertaken for the TSF design show that the cambrisols beneath the TSF position, when compacted, will make a suitable "liner" for the TSF. In addition, since the ground water studies were undertaken, an additional tailings wash process has been introduced that will raise the pH of the tailings from 4.5 to about 5 (much the same as balsamic vinegar).

However, there were recommendations made in the geochemical study that were carried over into the EIA that should be addressed to confirm the decision regarding the TSF and proposed lining method:

These are:

- Samples should be collected to corroborate the preliminary geochemical assessment and confirm the ARD potential characteristics of the orebody, waste rock and tailings.
- The aerial extent of the calcrete deposits should be delineated more accurately as calcrete has good neutralising potential if this is required for the TSF.
- It is recommended that further geochemical tests are undertaken on the tailings material to confirm the results of the preliminary assessment and modelled, even although tests have shown that the tailings not considered acid forming, a two stage tailings wash has been included in the plant process to increase the pH.

7.5

Air Quality MP

7.5 AIR QUALITY MANAGEMENT PLAN

There are a number of emission sources in all phases of the Omitiomire Mine that have the potential to pollute the air. In the construction and decommissioning phases these potential pollution sources are temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long term potential sources and the closure phase will present final land forms that may have the potential to pollute the air through long term wind erosion if not mitigated in some way.

The EIA showed that the more significant emissions are inhalable particulate matter that is less than 10 microns in size (PM_{10}).

The commitments derived from the EIA Report with regards to Air Quality forms the basis of this MP.

7.5.1 COMPONENTS

This plan is made up of the following components:

- Fall-out dust, PM_{10} and other gaseous emissions

7.5.2 MANAGEMENT

Objectives

The objective of the management measures is to prevent unacceptable air quality related pollution impacts.

Actions

TABLE 7-13: ACTIONS RELATING TO FALL-OUT DUST, PM_{10} AND GASEOUS EMISSIONS (SO_2 AND NO_2)

No	Issue	Management commitment
These commitments apply to the <u>construction</u> phase		

3	Dust and PM_{10}	Prepare an air quality management plan to include the following:
		• Land clearing activities:
		  o If soils are dry, and water is available then utilise water sprays at areas that are to be cleared.
		  o Limit the travel distance between the area to be cleared and the topsoil stockpiles.
		• Haul and internal road construction activities:
		  o If water is available, use a water bowser to dampen areas to be graded..
		  o A fallout dust bucket needs to be placed downwind of the proposed plant area during construction. Monthly dust fallout rates should not exceed 1 200 mg/m²/day.
		• Wind erosion from exposed areas
		  o If water is available, periodically wet exposed areas by water bowser, especially during dry, windy periods.
		• Using cost effective dust suppression methods, try to keep vehicle entrainment on unpaved internal and haul roads at a 75% control efficiency.
		• Ensure all construction equipment is subject to an Inspection & Maintenance

No	Issue	Management commitment
		programme to ensure proper combustion.
These commitments apply to <u>operation</u> phase		
4	Dust and PM_{10}	• Prepare an air quality management plan. • The proposed new fallout dust monitoring network described in Section 9.1.5 will be implemented. • Should wind erosion from exposed storage piles result in visible dust generation these must be controlled through effective mitigation measures. • Monitor the TSF slopes to determine if sufficient vegetation cover has grown to limit erosion of the facility sides by wind and water. Put in place management measures if erosion is occurring. • Speed limits on all haul roads (max 40 km/h) • Ensure that the entire mine fleet is effectively maintained.
These commitments apply to the <u>decommission and closure</u> phases		
8	Dust and PM_{10}	Prepare a dust and PM_{10} management plan to include the following: • Stockpiled topsoil must be used for rehabilitation and re-vegetation of the area. • Place topsoil cover onto TSF and supplement with native grass species. • Contour berm at pits and vegetated with native grass species. • Should the infrastructure removal at the processing plant site produce significant dust, mitigation measures should be applied. • Replant any previously removed native plant species in disturbed areas. • Indigenous plant species should be used in the final landscaping of the rehabilitated mine site. • Ensure an adequate dust prevention vegetation cover on WRDs and TSF as defined by the final closure and decommissioning plan. • Use water sprays, if available, where demolition of infrastructure generates dust. • Ensure the site is restored to grazing or wilderness conditions.

7.6

Noise & Vibrations MP

7.6 NOISE AND VIBRATION MANAGEMENT PLAN

There are a range of construction, operation and decommissioning activities that have the potential to generate noise and cause noise pollution. This will have different impacts on different receptors because some are very sensitive to noise and others are not. For example, mine workers in general do not expect an environment free of mine related noise and so they will not be sensitive to environmental noise pollution at work. In contrast, local communities are likely to be more sensitive to unnatural noises and so any change to ambient noise levels because of mine related noise may have a negative impact on them. Omitiomire's noise study has shown that only one neighbouring property is likely to be affected.

In addition, the mine will introduce blasting vibration and the potential for fly rock into an area where there is currently none.

The commitments derived from the EIA Report with regards to noise and vibrations forms the basis of this MP.

7.6.1 COMPONENTS

This plan is made up of the following components:

- Noise pollution

7.6.2 MANAGEMENT

7.6.2.1 Noise

Objectives

The objective of the management measures is to limit excessive noise on sensitive receptors such as nearby homesteads and tourism.

Actions

TABLE 7-14: ACTIONS RELATING TO NOISE

No	Issue	Management Commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Impact of noise on the environment/ sensitive receptors	Document and investigate all registered complaints and make efforts made to address the area of concern where applicable.
2		Communication channels are to be established to ensure that prior notice is given to potentially sensitive receptors if blasting is to occur.
3		Ensure that plant and equipment is well-maintained and fitted with the correct and appropriate noise abatement measures.

No	Issue	Management Commitment
4		All diesel powered equipment must be regularly inspected and maintained and, if necessary, replacement of intake and exhaust silencers should be done.
5		Vendors should be requested to optimise equipment design noise levels.
6		During the planning and design stages of the project, ways to reduce potential noise aspects should considered.
7		Vibrating structures and mills are known to be noisy efforts should be made in the plant design to limit noise from these structures.
8	Reverse sirens	At night the dump trucks must deposit waste rock behind a berm on the WRD created specifically to limit noise travel in the direction of sensitive receptors.
9	Monitoring	Periodic noise monitoring programme should be undertaken, as per suggestion in Table 9-4.

7.6.2.2 Blast Impacts

Objectives

The objective of the management measures is to limit air blast and ground vibrations.

Actions

TABLE 7-15: ACTIONS RELATING TO AIR BLAST IMPACTS

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Minimise impacts of blasting	The blast design, implementation and monitoring will, as a general rule, ensure that: • ground vibration when blasting, must be must be less than 12mm/s peak particle velocity at the closest third party structures (farm buildings directly adjacent to the south-western farm boundary and the Otjere Farmhouse); • air blast at the closest third party structures mentioned above must be less than 130dB; • Noise monitoring will be carried periodically, at a specified point, day and night, to provide records of nose impacts from the mining operation. • all registered complaints will be documented, investigated and efforts made to address the area of concern where possible.

7.7

Biodiversity MP

7.7 BIODIVERSITY MANAGEMENT PLAN

To understand biodiversity one must appreciate all of its components. It is not just about the species of plants and animals and the different habitats in which they live (biodiversity patterns), but also the way that factors, such as wind, water, steepness of slope and presence of pollinators, affect the habitats and the species living in them (ecosystem processes).

The commitments derived from the EIA Report with regards to Biodiversity form the basis of this MP.

7.7.1 COMPONENTS

This plan is made up of the following components:

- Managing the physical destruction of biodiversity.
- Reduction of water resource as an ecological driver.
- Managing general disturbance.

7.7.2 MANAGEMENT

7.7.2.1 Physical destruction of biodiversity

Objectives

The objective of the management measures is to prevent or limit the unacceptable loss of biodiversity and related functionality through physical disturbance.

Actions

TABLE 7-16: ACTIONS RELATING TO THE PHYSICAL DESTRUCTION OF BIODIVERSITY

No	Issue	Management commitment
These commitments apply to <u>design phase</u>		
1	Physical destruction of biodiversity	Keep the footprints of disturbance of all facilities and roads as small as possible.
These commitments apply to <u>construction phase</u>		
2	Physical destruction of biodiversity	• As far as possible, avoid areas identified as ecologically or biologically sensitive, such as pans habitat. • Design footprints of roads to be as small as is legally and practically possible. • Mark out all construction footprints and clearly convey the rule of staying inside these boundaries to all construction crews • Enforce and monitor speed limits to reduce likelihood of road kills. A GPS installed in a vehicle is an example of an effective method to monitor speed. • Implement a restoration plan for all disturbed areas as soon as possible.

No	Issue	Management commitment
		• Protect undisturbed areas outside planned mining operations from all forms of disturbance (these must serve as future source areas for re-colonisation after mining). • Prior to construction and in consolation with a specialist, visually scan proposed construction sites for any sensitive flora and fauna and implement the recommendations of the specialist – these could include but not be limited to: a search and rescue of dens and burrows, relocating/demarcating nests (especially large raptors), demarcating flora (protected trees) to either be conserved within the construction site or relocated.
These commitments apply to <u>construction and operation phase</u>		
3	Physical destruction of biodiversity	• Clearly demarcate boundaries of the waste rock dump and TSF; • At least a 100 m wide boundary zone should be kept free of developments and mine-related activities around pans, specifically, the large ephemeral pan located west of the mine site should be avoided – the delineation of the pan as provided by the specialist could be used as the pan boundary; • Where possible avoid cutting or relocating protected trees and develop plans to care for them during the life of mine until their surroundings have been restored. • Where disturbance of protected trees is unavoidable, apply for the necessary permits in a timely manner. • Remove and stockpile topsoil, along with its soil fauna and seed banks, and devise management plan for stockpiling and redeployment for restoration to prevent erosion by wind and water and devise plans. • All large animals will be removed from the mining area (smaller ones are likely to move away because of the disturbance). • Construct roads as narrow as operationally feasible and regularly maintain all roads in good condition so that diversions off roads will not be necessary. Preferable demarcate tracks with wooden poles. • Aggregate borrow pits for road construction should be sited on the proposed mining site to reduce overburden stockpiling and unnecessary environmental disturbance. • Develop road use policy, including speed limits, and enforce this to avoid off track driving. • Upon completing construction, initiate restoration of all roads and other sites that were only impacted during construction and will not be required for mining operation. • Increase environmental awareness through training of key staff, including

No	Issue	Management commitment
		their ability to handle animals during evacuation; and • Rigorously police the construction crews' and mining staff's adherence to the rules and utilise the appropriate management measures to discipline the offenders.

7.7.2.2 Reduction of water resources as an ecological driver

Objectives

The objective of the management measures is to prevent the unacceptable loss of biodiversity and related functionality through a reduction in the key ecological drivers of groundwater and temporary surface water flow.

Actions

TABLE 7-17: ACTIONS RELATING TO THE REDUCTION OF WATER RESOURCES AS AN ECOLOGICAL DRIVER

No	Issue	Management commitment
These commitments apply to <u>design phase</u>		
1	Diverting clean surface water flow	Clean surface water diversion measures are provided around infrastructure and activities.
2		Ensure long term designs for waste rock dump and TSF allow for the diversion of water to maintain surface water flow paths.
These commitments apply to <u>Construction & Operation phases</u>		
3	Decreases in the level of the water table	Minimise water abstraction other than dewatering of the pit by reducing the mine's water requirements as much as possible.
4		Recycle pit drainage water as far as possible, provided that the quality of the water meets the standards of the purpose it will be used for.
5		Minimize abstraction during dry seasons and droughts when abstraction is not offset by precipitation and floods.
6		Avoid infrequent high abstraction and rather spread out abstraction over time.
7	Monitoring	Monitor groundwater levels in boreholes on an on-going basis; and
8		Demarcate the potential drawdown area and count numbers of protected trees that may be affected. Install a tree health monitoring programme above the potential areas of draw down. Select trees in a radius form the area of deepest drawdown to the edge of the potential cone. Select an area that is unlikely to be affected as a control. Monitor at least annually, and if trees' condition decline, investigate measures to reduce this, where practical. Should there be a significant decline in health or increase in mortalities that can be linked to groundwater changes caused by mining activities, a detailed action plan should be drafted that will define and refine further mitigation options. Should there be no mitigation options, biodiversity offsets should be considered.
These commitments apply to <u>decommissioning & closure phases</u>		
9	Closure planning	As part of closure planning, the designs of any permanent structures will take into consideration the requirements related to surface water flow.

7.7.2.3 Managing general disturbance

Objectives

The objective of the management measures is to prevent disturbance to biodiversity.

Actions

TABLE 7-18: ACTIONS RELATING TO THE GENERAL DISTURBANCE TO BIODIVERSITY

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning phases</u>		
1	General disturbance of biodiversity	The working area of the ML will be fenced.
2		Develop a policy that limits independent movements by staff into the veld outside the fenced-in mining site. Strictly prevent poaching and harvesting, including of firewood, or possession of any such natural materials.
3		Provide, or ensure, that there is adequate food for workers on site to prevent foraging.
4		Allow only mining personnel, service providers and construction staff, as well as registered mine visitors on site.
5		Train all mine staff to appreciate the values of biodiversity, as well as legislation relating to protected species.
6		Raise awareness concerning recognising venomous snakes (of which there are some extremely venomous in the area) and invertebrates (scorpions) from non-dangerous ones, and ensure that sufficient personnel are trained to handle snakes/invertebrates so as to move them away from the mine without killing them.
7		Mosquito screens should be considered for certain areas to exclude flying insects from indoor working areas. This should be considered important for the site kitchen and canteen area.
8		Drivers must be licensed, and given regular awareness training on the need to keep to speed, limits, keep on designated tracks, Some form of speed monitoring should be implemented. Limit night time driving.
9		Use yellow outdoor lights (sodium vapour floodlights with orange covers, or yellow bulbs/tubes for incandescent and fluorescent lights) wherever possible as this is less glaring to invertebrates while serving human requirements.
10		Consider ways to keep night insects out of the mine and village buildings.
11		If automated, UV-attractant pest management devices have to be deployed, such systems should be either kept indoors (e.g. in maintenance sheds, inside administrative blocks, or inside production plants) or should be covered with wire mesh to ensure that only target organisms of the right size are electrocuted.
12		Ensure that animals have no access to contaminated water sources.
13		Fence in TSF and other areas that are regularly artificially wetted and use other proven means to deter birds from reaching them; try to avoid pooling of mine related water.
14		All chemicals, emissions, and leaching products as well as tailings must be strictly contained and regularly and timely cleaned or neutralised, adhering to best practices
15		Develop a site waste management policy and actively enforce it
16		Develop policy for the management of hazardous materials and actively enforce it
17		Provide temporary waste deposition facilities on site (rubbish bins, skips), which are secure from scavengers, storms, or other disturbance (especially jackals and badgers)
18		Provide adequate toilet facilities for all workers at work sites.
19		Where possible, avoid destroying trees or disturbing their proximity, so that animals can continue to use them
20		Locate linear infrastructure in a way that minimises new fragmentation, e.g. using infrastructure corridors
21		Rehabilitate areas around linear infrastructure after installing it such that they minimise habitat fragmentation, allowing populations to be connected across them
22		Implementing strict controls over the movement of materials onto and off the site to minimise the spread of invasive plant species; if this becomes a problem monitor the occurrence and spread of invasive species so as to instigate steps for their control, following expert advice.

No	Issue	Management commitment
24	Disruption of animal dispersal routes along the Black Nossob River	Minimize the placement of any infrastructure in the Black Nossob River valley
25		Minimize all activities close to the river, especially at night when nocturnal species are active
26		Provide an unobstructed path around the perimeter fence between the Bruce Terrace pit and its waste rock dump.
27	Emergency	Major spillage incidents will be handled in accordance with the Craton emergency response procedure. Refer to Section 7.14.2.2.
29		Certain instances of injury to animals may be considered emergency situations. These will be managed in accordance with the Craton emergency response procedure.
These commitments apply to <u>decommissioning & closure phases</u>		
30	Closure planning	As part of closure planning, the designs of any permanent and potentially polluting structures will take consideration of the requirements for long term pollution prevention and confirmatory monitoring.
31		Dispose of re-usable waste (such as power cables, pipelines and building material) in the appropriate manner.
32		A mine rehabilitation and closure plan must be developed and updated at least every two years, and adequate provision made for decommissioning and closure.

7.8

Visual MP

7.8 VISUAL MANAGEMENT PLAN

It is predicted that negative visual impacts would result from the construction, operational and decommissioning phases of the proposed Project. During the closure phase the site will be rehabilitated but the waste dump and the tailings storage facility will remain and will therefore contribute to the long term negative visual impact of the Project.

The commitments derived from the EIA Report with regards to visual impacts form the basis of this MP.

7.8.1 COMPONENTS

This plan is made up of the following components:

- Visual disturbance.

7.8.2 MANAGEMENT

7.8.2.1 Visual disturbance

Objectives

The objective of the management measures is to limit visual impacts.

Actions

TABLE 7-19: ACTIONS RELATING TO VISUAL DISTURBANCE

No	Issue	Management commitment
These commitments apply to <u>construction and only</u>		
1	Earthworks	During earthworks, all reasonable measures should be taken to prevent excessive dust.
2		Keep the working footprint to the minimum size possible, and rehabilitate once no longer in use.
These commitments apply to <u>design, construction and operation phase</u>		
3	Access	If at all possible, permanent roads must be tarred / paved in order to minimise dust creation. Speed limits on unpaved surfaces must be controlled to reduce entrainment.
4	Lighting	Light pollution should be carefully considered and kept to a minimum – without compromising safety.
5		The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
6	Materials	Buildings and structures could be painted with a matt finish in a shade of grey or green that would best reduce the colour contrast between the structures and the receiving landscape. Avoid the use of bright colours and shiny finishes, especially

No	Issue	Management commitment
		on roofs and taller structures.
7	Project Area Development and General	It is recommended that a vegetation screen be planted along the eastern boundary or that the vegetation along the eastern boundary of the project property be densified to assist with screening the mine from Otjere. Planting vegetation hap hazardously could be considered along the MR 53 to screen the view from motorists
8		In terms of layout, it is proposed that the project components be located as low as possible in the topography in order to avoid elevated views, but also to cluster the structures as close as possible to minimize the area of disturbance / spread of the visual disturbance.
9		Retain as much as possible of the existing vegetation within the study area and along the Project boundaries and roads in aid of screening the Project.
These commitments apply to <u>construction, operation and decommissioning phases</u>		
10	Access	During construction, operation, rehabilitation and closure of the Project, access and haul roads will require an effective dust suppression management plan, such as the use of non-polluting chemicals.
11		Keep the speed limit as low as possible in order to minimise the creation of dust.
12		Ensure that, when trucks are transporting materials on public roads that the load bed is covered to prevent dust pollution.
13	Managing vegetation and soils	All potentially screening vegetation within the mine site that is not removed needs to be protected.
14	General	Rehabilitate / restore exposed areas as soon as possible after construction activities are complete.
15		Only indigenous vegetation should be used for rehabilitation / landscaping purposes.
16	Waste Rock Dumps	Final shaping and dumping should be implemented such that the sides of the waste dump are articulated in a fashion that create areas of light and shadow interplay.
17		Harsh, steep engineered slopes should be avoided if at all possible. As the tailings facility and waste dumps are the only surface infrastructure that remains after decommissioning, it is important that a long-term view of their integration with the surrounding landscape be taken.
18		The final landform height and slope angles for the tailings facility and waste dumps should be designed as low as possible. The preferred slope design is a 'spur-end' slope plan with a concave or complex (convex-concave) profile. The use of terraces or contoured banks should be avoided.
19		Grass seeding and tree planting on the WRDs and TSF should be undertaken to emulate the groupings of natural vegetation within the study area.
These commitments apply to <u>decommissioning & closure phases</u>		
20	Rehabilitation	Rehabilitation of all the faces of the WRD to grass / scrub bushes and some trees; Reduce the angle of the WRD slope if not suitable for rehabilitation; There should be continuous rehabilitation of the TSF dam walls as they are raised;
21	Closure	For the closure phase: • Craton will maintain a closure plan and closure costing plan.. • All components of the non-permanent infrastructure used during operation must be removed. The site must be visually 'cleaned up' so as to portray an uncluttered landscape. • Areas from which infrastructure has been removed must be contoured to fit the surrounding natural landforms, with the natural hydrological patterns recreated as far as possible.

7.9

Archaeology MP

7.9 ARCHAEOLOGY MANAGEMENT PLAN

In summary, the archaeological assessment concluded that the Omitiomire project will have a negligible impact on the archaeology of the project area and that the project is therefore not expected to have any implications in terms of the National Heritage Act.

The commitments are derived from the EIA Report with regards to archaeology and form the basis of this MP.

7.9.1 COMPONENTS

This plan is made up of the following components:

- Archaeological sites.
- Chance heritage finds.
- No Go areas

7.9.2 MANAGEMENT

7.9.2.1 Archaeological sites

Objectives

The objective of the management measures is to prevent the unacceptable loss of archaeological sites and related historical information.

Actions

TABLE 7-20: ACTIONS RELATING ARCHAEOLOGICAL SITES

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning phases</u>		
1	Disturbance of archaeological sites	The sites identified in the EIA Report should be indicated on the project GIS and all relevant mine and infrastructure planning should take these positions into consideration. Protect sites where exploration, construction or mining activities might damage them.
2		In the event that mining activities encroach on the sites identified in the EIA Report, Craton should apply for the necessary destruction permit from the NHC.
3	Training	All workers (temporary and permanent) will be given training on the chance find procedure.

7.9.2.2 Chance archaeological finds

Although the area has been subject to a heritage survey and assessment it is still possible that sites or items of heritage significance may be found in the course of development work. The personnel and

contractor heritage induction process is intended to sensitize people so that they may recognize heritage "chance finds" in the course of their work.

The "chance finds procedure is intended to ensure compliance with the relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): *" a person who discovers any archaeological object must as soon as practicable report the discovery to the Council".* The procedure of reporting set out below must be observed so that heritage remains identified in the field reported to the NHC.

Objectives

To ensure that the correct actions are taken to preserve or document chance archaeological finds.

Actions

TABLE 7-21: ACTIONS RELATING CHANCE ARCHAEOLOGICAL FINDS

No	Issue	Management commitment
These commitments apply to <u>construction and operation phases</u>		
1	Chance Finds Procedure	The "chance finds procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person. <u>Action by person identifying archaeological or heritage material:</u> • If operating machinery or equipment stop work • Identify the site with flag tape • Determine GPS position if possible • Report findings to foreman <u>Action by foreman:</u> • Report findings, site location and actions taken to superintendent • Cease any works in immediate vicinity • <u>Action by superintendent:</u> • Visit site and determine whether work can proceed without damage to findings • Determine and mark exclusion boundary • Site location and details to be added to project GIS for field confirmation by archaeologist <u>Action by archaeologist:</u> • Inspect site and confirm addition to project GIS • Advise NHC and request written permission to remove findings from work area. • Recovery, packaging and labelling of findings for transfer to National Museum <u>In the event of discovering human remains:</u> • Actions as above; and

No	Issue	Management commitment
		• Field inspection by archaeologist to confirm that remains are human Advise and liaise with NHC and Police
2	Legal requirements	

7.9.2.3 No-Go areas

Objectives

All archaeological sites outlined in the Archaeological Assessment will be "no-go" areas and demarcated (with the exception of QRS99/9 which will be impacted by the Pan Pit development)

A "no go" area is closed to walking, driving, cutting access tracks or ground disturbance of any kind. It may

be accessed for purposes of heritage audit, inspection by the National Heritage Council, or legitimate research.

To ensure that areas around archaeological finds remain undisturbed.

Actions

TABLE 7-22: ACTIONS RELATING NO GO AREAS

No	Issue	Management commitment
These commitments apply to <u>construction and operation phases</u>		
1	No-Go Areas	No go areas will be identified for both archaeological and other reasons and reasonable measures taken to prevent access to, and potential disturbance of, such areas. Contractors and Employees will be advised to stay away from no go areas.

7.10
Traffic MP

7.10 TRAFFIC MANAGEMENT PLAN

There will be traffic impacts because of activities associated with the mine, particularly in the construction and operational phases. This MP aims to provide measures to limits the negatives impacts.

The commitments are derived from the EIA Report with regards to traffic issues form the basis of this MP.

7.10.1 COMPONENTS

This plan is made up of the following components:

- Infrastructure – road use.

7.10.2 MANAGEMENT

Objectives

The objective of the management measures is to increase safety and reduce the potential for vehicle related impacts on road users.

Actions

TABLE 7-23: ACTIONS RELATING TO ROAD USE

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Road use	A driver trainer programme for all Craton employees will be implemented to include: complying with speed limits, holding valid licences, ensuring vehicles are roadworthy, zero tolerance for drinking and driving and using lights appropriately for night driving
2		All road users are required to comply with Namibian Roads Authority regulations.
3		The M53/C29 route was identified as the preferred haulage route to the mine but road improvements needs to be considered.
5		Regular liaison with the Roads authority concerning road conditions is to be undertaken.
7		A single entrance to the mine to be positioned at a location with adequate sight distance. A stopping sight distance of no less than 140m is recommended for an 80km/hr road.
8		Signage that warns motorists of crossing traffic be provided on the M53 approximately 200m on either side of the access. The addition of flashing yellow signals can also be considered for night time operations. Signage indicating the speed limit on the M53 be installed approximately 400m either end of the mine entrance.
9		Trucks crossing the M53 should be furnished with flashing orange lights on the cab and several reflector strips placed on either side of the vehicle as night-time measure. These reflective strips and lights should be cleaned daily.
10	Emergency	Any mine related road accident must be handled in accordance with the emergency response procedure.

7.11

Socio-economic MP

7.11 SOCIAL AND ECONOMIC MANAGEMENT PLAN

The activities associated with the mine have socio-economic impacts in all mine phases – some positive and some negative. These impacts related to amongst others employment/job creation, inward migration of potential job seekers, local- and regional economies, land use and surrounding landowners and community safety and security. This MP aims to provide measures to enhance the positive impacts and limits the negatives impacts.

The commitments derived from the EIA Report with regards to socio-economic issues form the basis of this MP.

7.11.1 COMPONENTS

This plan is made up of the following components:

- Economic Impact
- Social impact of change of land use on the Farm Groot Omitiomire
- Socio-economic impact on the neighbouring community
- Employment and skills development
- Housing for construction and mine employees
- Community health, safety and security

7.11.2 MANAGEMENT

7.11.2.1 Economic Impact

Objectives

The objective of the management measures is to enhance the positive impacts associated with job creation and investment.

Actions

TABLE 7-24: ACTIONS RELATING TO ECONOMIC IMPACT

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Spending	Endeavour to integrate potentially affected neighbouring landowners into service provision and supply chains to the mine – e.g. supply of meat, fresh produce and accommodation.
5	Employment opportunities and development benefits.	Refer to Section 7.11.2.4.

7.11.2.2 Social impact of change of land use on the Farm Groot Omitiomire

Objectives

The objective of the management measures is to limit the impacts associated with the change of land use on the Farm Groot Omitiomire.

Actions

TABLE 7-25: ACTIONS RELATING TO CHANGE OF LAND USE ON THE FARM GROOT OMITIOMIRE

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Ensuring land use post closure	Develop and maintain a mine closure plan. Consult the the neighbouring farming community with respect to the closure objective at least two years before the end of life of mine.
2		Ensure that the sides of the waste rock dumps and are sloped and rehabilitated.
3		Disturbed areas should be converted back to productive grazing land, sown with palatable indigenous grass species.
4	Emergency situations	Ensure that access to pits by non-authorised personnel and animals is restricted.
5		All pits should have exit slopes so that any person or animal which has fallen in, can escape.

7.11.2.3 Change of land use and neighbouring communities

Objectives

The objective of the management measures is to reduce negative impacts on land use and neighbouring communities.

Actions

TABLE 7-26: ACTIONS RELATING TO CHANGE OF LAND USE AND NEIGHBORING COMMUNITIES

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Issues relating to change of land use and neighbouring communities	Continue with the Omitiomire Farmers Committee as a platform for dialogue and annually arrange meeting schedules;
2		Develop a grievance procedure and publicise to all stakeholders, so that issues and concerns can be addressed adequately and promptly.
3		Provide an alternative water source should any of the farmers' boreholes run dry and it is proven to be a direct result of the mining activities.
4		Fence the mining area, plant areas, construction camp and mine village and enforce strict access controls.
5		Labour recruitment will not take place on site, but will be done in Windhoek. Local settlements such as Witvlei can be advised of the recruitment process.
6		Informal "kapana" sellers near the fenced areas and land where Craton has control will reported to the police and other local authorities.

No	Issue	Management commitment
7		Inform all employees on site of the law regarding trespassing on private property. Walking or sport running may only take place along public roads.
8		Provide full catering services on site to all employees to reduce the risk of informal buying, and poaching, of meat from neighbouring farms
9		The mine should give the most affected neighbouring farms opportunities to provide goods and services, to the mining contractor such as supplying farm produce (meat, etc.) and accommodation for managers and visitors.
10		The employee camp must ensure that access controls and security are maintained.
11		The planting of bush fences/ thick shrubs around the farm's perimeter should be considered to create a noise and dust shield and to limit employee's access to the farm to the security gate.
12		Neighbours will be informed of blasting schedules.
13		Investigate ways in which to limit the noise range of noise of truck reversing bleepers.
14		Use the minimum nightlights necessary for safety and direct these lights away from neighbours' houses wherever possible.
15		Work closely with the Roads Authority and contribute to repairing the accumulative damage done to the gravel roads by additional mine traffic.

7.11.2.4 Employment and skills development

Objectives

The objective of the management measures is to maximise employment and skills development.

Actions

TABLE 7-27: ACTIONS RELATING TO EMPLOYMENT AND SKILLS DEVELOPMENT

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Employment opportunities and development benefits.	Weight tender selection in favour of contractors and suppliers of goods and services which employ Namibians and Namibian suppliers down the supply chain.
2		Ideally, identify potential employees, including women, and skill them prior to the commencement of mining.
3		To reduce social problems, recruit a balanced workforce – not only Grade 12 youth but also people with experience of different ages.
4		Ensure that Craton's employees, and those of its mining and plant contractor, are paid market related wages
6		Establish credible and trusted operational procedures to address employees' concerns and grievances.
7		Encourage the workforce and labour unions to respect the law and the procedures in place to address their grievances, and to have a responsibility towards the people employed by the support industries that serve the mine.
8		Implement a mine procurement policy which promotes the use of small and medium enterprises (SMEs), giving preference to those provided by the neighbouring community, then other Namibian companies.
9		Ensure that the mine closure plan is understood by the workforce.

No	Issue	Management commitment
10	Emergency situations	An unexpected mine closure leading to a sudden loss of jobs. To mitigate, Craton will: • Ensure there is a detailed Mine Closure Plan in place before construction begins. This is essential, given the very short lifespan of the mine (Phase 1). • Ensure skills upgrading during employment at mine is documented, and accredited where possible, so skills are recognised with future employers
11		At closure, the employee village will be disassembled and removed.

7.11.2.5 Housing for construction and mine employees

Objectives

The objective of the management measures is to ensure suitable housing provision and limit the impacts associated removal of the village at closure.

Actions

TABLE 7-28: ACTIONS RELATING TO HOUSING AND ACCOMMODATION

No	Issue	Management commitment
These commitments apply to construction, operation and decommissioning phases		
1	Housing	Construct the mine village buildings in a way which enhances the ease of their removal.
2		Provide recreational and perhaps educational facilities, i.e. computers, internet and study area, to keep off-duty employees on the mine property.
3		Reduce the number of shared rooms to a minimum.
4		Implement tight security measures (detailed in the next section).
5		Ensure that laundry facilities are provided for all personnel
6		Consider entering agreements to rent guest rooms on neighbouring farms.
7		Encourage MTC/Telecom to provide good telecommunications not only for the mine, but also for the wider community.
8	Emergency situations	In the event of mine stoppages, Craton will employ a security company to protect the employee village from illegal occupation or vandalism. At closure the village will be disassembled and rehabilitated.

7.11.2.6 Community health, safety and security

Objectives

The objective of the management measures is to ensure community health, safety and security.

Actions

TABLE 7-29: COMMUNITY HEALTH, SAFETY AND SECURITY

No	Issue	Management commitment
These commitments apply to construction, operation and decommissioning phases		
1	Community health, safety and security	The mine and plant working areas will be alcohol free. Random testing of employees/contractors on entry to site may be undertaken. Recreational facilities will be provided on the mine site for employees after hours.
2		Craton will install reasonable security measures to prevent labour unrest and to

No	Issue	Management commitment
		protect the neighbours from labour unrest.
3		Provide recreational and educational facilities for off-duty employees and contractors.
4		Provide a comprehensive voluntary HIV/AIDS counselling and testing programme for all employees, contractors and community members.
5		Implement a comprehensive HIV/AIDS policy and programme that could include peer education, an employee wellness programme and HIV/TB information days, condoms in all changing rooms, etc.
6		Develop a detailed fire management policy and ensure all employees/contractors regularly undertake practice fire drills.
7		Fire breaks must be made around the mine site, and the farm boundaries in accordance with the local fire committee/legislation pertaining to land management
8		Neighbouring farm livestock losses due to theft by persons directly related to Craton will be investigated and mutual resolution will be sought.

7.12

Resource MP

7.12 RESOURCE MANAGEMENT PLAN

This MP provides management actions regarding scarce sources like water and provides suggestion for reducing consumption of resources.

7.12.1 COMPONENTS

This plan is made up of the following components:

- Consumption of water.
- Consumption of fuel.

7.12.2 MANAGEMENT

7.12.2.1 Consumption of water

Objectives

The objective of the management measures is to monitor the water consumption and to optimise water usage.

Actions

TABLE 7-30: ACTIONS RELATING TO WATER CONSUMPTION

No	Issue	Management commitment
These commitments apply to <u>all phases</u>		
1	Water usage and control	Install and calibrate water flow meters on pipes at selected locations (including tailings lines and dewatering boreholes).
2		Monitor monthly abstraction volumes to ensure that the permitted monthly and annual volumes are not exceeded.
3	Maintenance of equipment	Regularly inspect and maintain tanks, tankers, pumps and pipes.
4	Monitoring of water leaks	Checking for water leaks daily. Report water losses.
6	Training and awareness	Maintain and implement water awareness programme for Craton employees and contractors.
These commitments apply to <u>operation and decommissioning</u> only		
8	Water usage and control	Ensure that stormwater falling inside the processing area is captured and directed to the relevant dam for containment and reuse.
These commitments apply to <u>operations</u> only		
9	Water usage and control	Ensure that the design of the relevant clean and dirty water systems are sufficient to cater for the water volumes associated with the infrequent flood events and that unacceptable discharges of polluted water are prevented.
10		Optimise the recycling of water in the process plant to reduce the demand for fresh water.
11		Recycle tailings decant water back to the return water dam for reuse.

No	Issue	Management commitment
12		Water dewatered from the pits must be used (e.g. in the process plant).

7.12.2.2 Consumption of fuel

Objectives

The objective of the management measures is to monitor the fuel consumption and to find ways to optimise fuel usage.

Actions

TABLE 7-31: ACTIONS RELATING TO FUEL CONSUMPTION

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Fuel consumption	Maintain and implement the preventive maintenance plan for all equipment and mine vehicles using diesel, petrol and gas on site to avoid wastage and leakages.
2		Monitor fuel consumption in all departments.

7.13
Soil MP

7.13 SOIL MANAGEMENT PLAN

Management of soils is important as mining is a temporary land use where-after rehabilitation is the key to re-establishing post closure land capability that will support conservation, agricultural and tourism type land uses. Soil is a key part of rehabilitation.

The commitments derived from the EIA Report with regards to soil form the basis of this MP.

7.13.1 COMPONENTS

This plan is made up of the following components:

- Topsoil stockpiling/management.

7.13.2 MANAGEMENT

7.13.2.1 Topsoil stockpiling/management

Objectives

The objective of the management measures is to ensure that all topsoil stripping, stockpiling and replacement operations will be undertaken in a manner that limits impacts on the soil functionality and to ensure it can be used for rehabilitation as and when required.

Actions

TABLE 7-32: ACTIONS RELATING TO TOPSOIL STOCKPILING/MANAGEMENT

No	Issue	Management commitment
These commitments apply to <u>construction phase</u>		
1	Topsoil removal and stockpiling	Stripping will only occur where soils are to be disturbed by activities that are described in the design report, and where a clearly defined end rehabilitation use for the stripped soil has been identified.
2		Soils should preferably be handled in dry weather conditions so as to cause as little compaction as possible. Utilizable soil (topsoil and upper portion of subsoil B2/1) must be removed and stockpiled separately from the lower "B" horizon, with the calcrete layer being separated from the soft/decomposed rock, and wet based soils separated from the dry soils if they are to be impacted.
3		The "Utilizable" soil should be stripped to a depth of 750mm where possible or until hard rock/calcrete is encountered. These soils will be stockpiled together with any vegetation cover present (only large vegetation to be removed prior to stripping).
4		Stockpiling areas will be identified in close proximity to the source of the soil to limit handling and to promote reuse of soils in the correct areas.
5		Soils stockpiles will be demarcated, and clearly marked to identify both the soil type and the intended area of rehabilitation.
These commitments apply to <u>operations phase</u>		
6	Topsoil stockpile management	Implement measures, such as seeding or inert rock cladding, the stockpiles to prevent erosion thereof.
7		Stockpiles will be established/engineered with stormwater diversion berms in place to prevent erosion.
8		Soil stockpile and berm heights will be restricted where possible to <1.5m to avoid

No	Issue	Management commitment
		compaction and damage to the soil seed pool. However, depending upon the footprint of the intended stockpiles, where stockpiles higher than 1.5m cannot be avoided, these will be benched to a maximum height of 15m. Each bench should ideally be 1.5m high and 2m wide. For storage periods greater than 3 years, vegetative or rock cover is necessary. The stockpile side slopes should be stabilized at a slope of 1 in 6. This will promote vegetation growth and reduce run-off related erosion.
9		Equipment, human and animal movement on the soil stockpiles should be limited to avoid topsoil compaction and subsequent damage to the soils and seedbank.
These commitments apply to <u>decommissioning and closure phases</u>		
10	Rehabilitation of Disturbed land & Restoration of Soil Utilization	Stockpiled soil will be used to rehabilitate disturbed sites either ongoing as disturbed areas become available for rehabilitation and/or at closure. The stockpiled topsoil must be placed on the rehabilitated areas to 300- 500mm deep and contoured to achieve an approximate free draining surface profile, (Conservation land capability and/or Low intensity wildlife grazing),.
11		The stockpiled soils will be analysed to determine the nutrient status and chemistry Based on the analysis, fertilisers will be applied if necessary.
12		Erosion control measures will be implemented to ensure that the soil is not washed away and that erosion gulleys do not develop prior to vegetation establishment.
13		If soil (whether stockpiled or in its undisturbed natural state) is polluted, the first management priority is to treat the pollution by means of in situ bioremediation.
14		If *in situ* treatment is not possible then the polluted soil must be placed in bins and transported to the hazardous landfill in Windhoek.

7.14

Waste Management MP

7.14 WASTE MANAGEMENT PLAN

Waste is generated during all phases of the mine. This MP deals with solid waste management.

7.14.1 COMPONENTS

This plan is made up of the following components:

- Non-hazardous solid waste (non-mineralised).
- Hazardous solid waste (non-mineralised).
- Medical waste.

Waste Inventory list:

Waste type	Waste specifics (example of waste types)	Source
Non-hazardous solid waste (non-mineralised)	Metal Cut offs, rubber, wood, product packaging, organic materials, glass, plastics, food scraps, cardboard/paper, used PPE, etc.	Across site
Hazardous solid waste (non-mineralised).	Printer cartridges, sewerage, batteries, hydrocarbons (oils, grease), fluorescent bulbs, etc.	Admin building, workshops, plant
Medical waste	Syringes, material with blood stains, bandages, etc.	First Aid Centre

7.14.2 MANAGEMENT

7.14.2.1 Non-hazardous solid waste (non-mineralised)

Objectives

The objective of the management measures is to ensure proper storage, recycling, re-using, removal, transportation and disposal of non-hazardous solid waste.

Actions

TABLE 7-33: ACTIONS RELATING TO NON-HAZARDOUS SOLID WASTE (NON-MINERALISED)

No	Issue	Management commitment
These commitments apply construction, operation and decommissioning phases		
1	General	The waste management procedure for Craton must cover the recycling, re-use, storage, handling, transportation and disposal. Ensure that the contractor's responsible are made aware of these procedures.
2	Collection of waste	Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity. Receptacles must have lids to prevent wind borne litter, or scavenging by animals.
3	Waste storage/separation – domestic waste	Determine what recycling initiatives are feasible on site and in the area. All recyclable waste must be separated at source into the relevant containers, before being removed to wheelie bins or luggar bins and skips.

No	Issue	Management commitment
4		Provide the recyclable materials to agencies that can utilise them.
5		Non-recyclable waste will be collected and taken to the on-site waste facility where it will be dumped and compacted once covered with soil.
6	Waste classification (domestic and industrial)	A waste inventory should be maintained.

7.14.2.2 Hazardous solid waste (non-mineralised)

Objectives

The objective of the management measures is to ensure proper storage, removal, transportation and disposal of hazardous solid waste

Actions

TABLE 7-34: ACTIONS RELATING TO HAZARDOUS SOLID WASTE (NON-MINERALISED)

No	Issue	Management commitment
These commitments apply <u>construction, operation and decommissioning</u> phases		
1	General	The waste management procedure for Craton will cover the storage, handling, and transportation of waste. Ensure that the contractor's responsible are made aware of these procedures.
2	Collection of waste	Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity.
3	Waste storage	Ensure that hazardous waste is kept covered, in impermeable bunded areas until it can be removed from site to the hazardous facility at Windhoek.,
		Store empty print cartridges in a designated box at the office assistant's desk until removal from site.
4		Store fluorescent tubes in a special labelled steel drum at the engineering workshop.
5		Collect and accumulate other hazardous waste i.e. car batteries, miscellaneous batteries, oil filters, etc. at the engineering workshop until such time that the amounts can be removed from site.
6		Explosives packaging shall be safely burnt at the magazine site according to permit conditions and procedures.
7		Place oil and greasy cloths and rags into a steel drum and when full transported off site to the hazardous waste site.
8		Keep empty reagent bags (for a short period of time) at the reagents store until removed by the reagent contractor for refills.
9		Ensure that waste storage areas and/or containers meet the risk needs for that specific waste (e.g. impervious floor, bunded areas with drainage/containment systems, lids to prevent light material from blowing away or sealed containers for hazardous material).
10	Waste classification	An inventory of wastes will be compiled and will include estimated quantities of waste. The inventory will be kept up to date.
11	Waste transport	Appoint a reputable waste management subcontractor to transport waste to the Windhoek landfill.
12	Disposal	Disposal of waste at appropriate permitted waste disposal facilities as follows: o Hazardous waste shall be removed from site and may be recycled or disposed of at the nearest hazardous site (i.e. Kupferberg)

No	Issue	Management commitment
		o Dispose of spoiled reagents offsite at the reagents facility in Windhoek. o Damaged reagent bags shall also be removed by the reagent contractor for repairs or disposal.
13	Disposal records	Written evidence of safe disposal of waste will be kept.

7.14.2.3 Medical waste

Objectives

The objective of the management measures is to ensure proper storage, removal, transportation and disposal of medical waste

Actions

TABLE 7-35: ACTIONS RELATING TO MEDICAL WASTE

No	Issue	Management commitment
These commitments apply <u>construction, operation and decommissioning</u> phases		
1	General	The medical waste handling procedure for Craton will cover the storage, handling, and transportation of all medical waste. Ensure that the contractor's responsible are made aware of these procedures.
2	Disposal	Incinerate the medical waste offsite at an approved medical facility.

8 PARTIES RESPONSIBLE FOR THE IMPLEMENTATION OF THE EMP

This section describes the roles and responsibilities for implementing the various management plans.

8.1 GENERAL MANAGER

The Omitiomire Copper Oxide Mine General Manager has overall responsibility for environmental management on the mine and for ensuring this EMP is implemented. To assist the General Manager, Omitiomire will have an Environmental Officer that will be dedicated to managing and monitoring the environmental issues associated with the mine's activities.

The General Manager must ensure the environmental management plan is included in all contracts and to ensure that contractors adhere to the conditions of the EMP.

Contract documents should consider the inclusion of penalties for non-conformance to the EMP, or to link the sign off of the Contract to a retainer clause. The client retains part of the contract fees until the Craton's appointee/SHE or ECO has signed off the a clearance certificate, indicating satisfaction with the rehabilitation of the Contractor's a work and laydown area.

8.2 ENVIRONMENTAL DEPARTMENT

The Omitiomire Environmental Officer will be responsible for assisting the General Manager and various other managers in all environmental and community issues, and specifically to ensure that the commitments as set out in this EMP are implemented during the design, operations, decommissioning and closure phases.

In addition to the above, the Environmental Officer is responsible for ensuring that all persons involved with Omitiomire Copper Oxide Mine comply with this EMP.

As outlined in section 8.3, each contractor will be required to develop their own individual EMPs and/or relevant Method Statements (MS) based on this EMP any other relevant Omitiomire Copper Oxide Mine requirements and specifications, and any permits or authorisations issued to Omitiomire . These contractor EMPs/MS will focus on the specific aspects of the contractors work requirements and work areas.

The Environmental Officer will be responsible for the following aspects related to compliance of this EMP:

- Regular inspections and auditing compliance to this EMP and any other relevant legal requirements e.g. permits and authorisations.

- Conduct environmental awareness training during induction training and on an ad hoc basis thereafter.
- Conduct scheduled monitoring as outlined in section 9 as well as any additional monitoring required by permit and authorisations issued to Omitiomire by relevant authorities.
- Ensure compliance to this EMP and permits and authorisations issued to Omitiomire by relevant authorities. Ensure responsibilities and target dates are developed for each one of the commitments in this EMP. This will be through one of the following mechanisms:
    - Design requirements; or
    - Construction tender documents and contracts.
- Submit required information to relevant authorities such as reporting related to monitoring and with regard to compliance with the EMP, permit and relevant authorisations.
- Liaise with Omitiomire Management and various external stakeholders such as authorities and interested and affected parties on environmental management (where required).

8.3 CONTRACTORS

All Contractors and their sub-contractors and employees will be contractually required to comply with the various commitments in this EMP. As indicated above, the contractors will also be required to develop their own EMPs and or MSs related to their specific work requirements and work areas based on the EMP's, any other relevant Omitiomire Project minimum requirements, specifications, authorisations, procedures and/or permits.

The EMPs/MSs contained in the returned tender documents will be adjudicated by the EPCM contractor and/or the project Owner's Team. This adjudication will be against aspects such as the equipment to be used, waste to be generated, provision of MSDSs etc. An adjudication checklist will be developed for this purpose.

The Environmental Officer, as well as the EPCM Environmental Manager, will conduct regular informal inspections at contractor areas. Non-compliances will be recorded in the EMS to be developed, and action plans developed in conjunction with the contractor that contravened the clause of the EMP.

Contractors will be formally audited on a quarterly basis in order to determine compliance with the relevant EMPs/MSs. In the event of non-conformances, the contractor will be required to take corrective action according to the requirements of the Environmental Officer. Clean up may be done on their behalf, and if so, the contractor will be back-charged accordingly. Final payment certificates can be withheld by the Environmental Officer until the manager is satisfied with the rehabilitation of the contractor's sites.

Two of these formal audits will form the basis of the information to be provided in the Bi-Annual reports to the relevant authorities.

8.4 EXTERNAL SPECIALISTS

Craton may appoint external environmental specialists, as and when required, to assist with the implementation of certain commitments made in the various management plans.

An independent auditor will also assess compliance against the EMP on a bi-annual basis.

9 MONITORING AND AUDITING

9.1 MONITORING

The management plans in Section 7 have covered various aspects of the proposed monitoring. This section both augments those requirements and sets further detail where relevant. Craton will develop detailed monitoring procedures including the relevant monitoring commitments spelled out in this EMP.

As a general approach, the monitoring procedures will comprise the following:

- A formal procedure.
- Appropriately calibrated equipment – regular inspections and calibration of equipment will be undertaken in line with the equipment calibration/validation procedure.
- Where samples require analysis, they will be preserved according to laboratory specifications.
- Where practical, an accredited, commercial laboratory will undertake sample analyses
- Parameters to be monitored can be identified in consultation with a specialist in the field and/or the relevant authority.
- If necessary, following the initial monitoring results, certain parameters may be removed from the monitoring programme in consultation with a specialist and/or the relevant authority.
- Monitoring data will be stored in a structured database.
- Data will be interpreted and reports on trends in the data will be compiled on a quarterly basis.
- Both the data and the reports will be kept on record for the life of mine.

As a general comment, if monitoring points become damaged or redundant then they can be replaced with new points.

9.1.1 WATER MONITORING

The original monitoring area was defined by a 30km radius around the proposed mine site (see Figure 9-1), but groundwater studies have indicated that this is not necessary (especially on the up-gradient north-western side of the project area), so it is recommended to reduce this to correspond to the area of the groundwater model, which will reduce the bi-annual and annual regional borehole visiting to 37 boreholes.

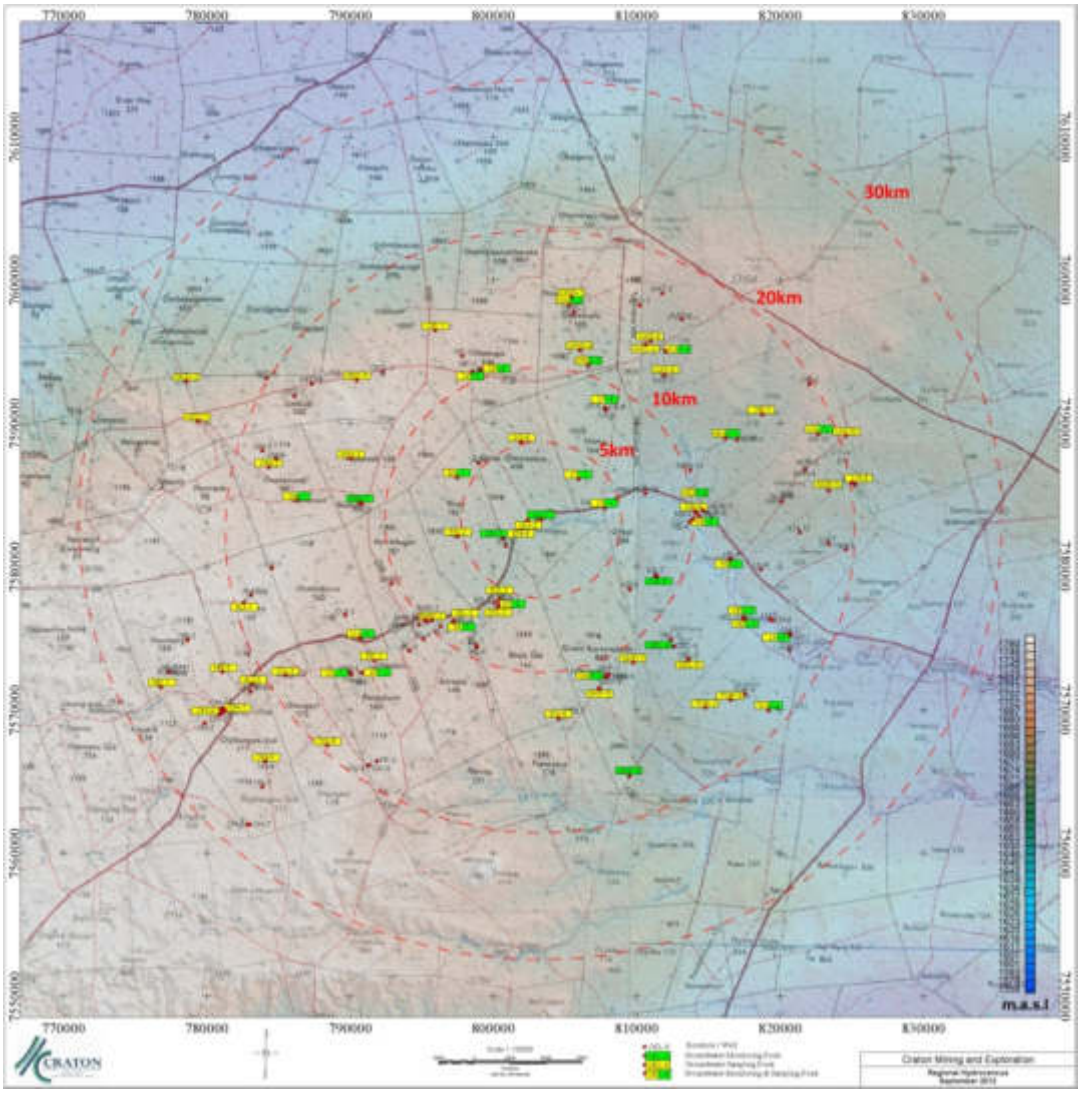

FIGURE 9-1: LOCATION OF CURRENT REGIONAL SAMPLING POINTS

9.1.1.1 Work required

During the initial hydrocensus a total of 70 boreholes and wells were identified as being suitable for regional groundwater monitoring. Additionally, 36 boreholes were chosen for groundwater sampling to determine the groundwater quality of the larger project area.

Regional groundwater monitoring on adjacent farms currently takes place at quarterly intervals, during the month of February, May, August and November of each year, and sampling is carried out bi-annually. On a quarterly basis, 53 boreholes are visited for monitoring purposes, (some of the previously identified boreholes have since become unsuitable due to blockage).

It is recommended, based on the outcomes of the groundwater modelling, that this should now be reduced to bi-annual groundwater monitoring and annual sampling of boreholes that are approximately located within the groundwater model area, which would reduce the number of boreholes visited to 37,

with 31 monitored and 22 sampled (16 boreholes are both sampled and monitored), see Table 9-1 and Figure 9-2.

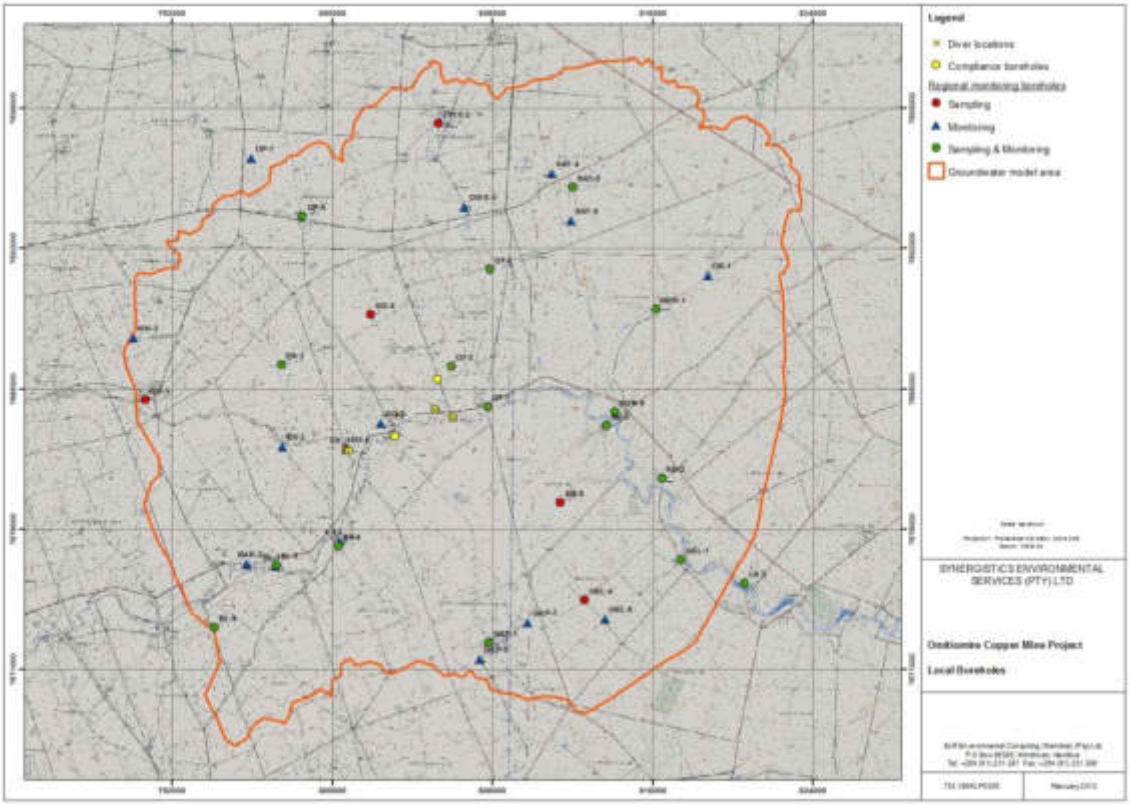

FIGURE 9-2: LOCATION OF PROPOSED REGIONAL SAMPLING POINTS

TABLE 9-1: PROPOSED BOREHOLES FOR REGIONAL MONITORING AND SAMPLING

Borehole	Type	X	Y	Zone
WH-1	Sample	790655	7584452	UTM 33S
WH-3	Monitoring	790055	7587543	UTM 33S
OP-1	Monitoring	795939	7596517	UTM 33S
OP-5	Both	798504	7593616	UTM 33S
OWS-2	Sample	805302	7598252	UTM 33S
OWS-5	Monitoring	806603	7594069	UTM 33S
KAT-4	Monitoring	190186	7595774	UTM 34S
KAT-5	Both	191287	7595138	UTM 34S
KAT-6	Monitoring	191244	7593439	UTM 34S
NOR-1	Both	195683	7589202	UTM 34S
NOR-9	Both	193814	7584000	UTM 34S
OR-1	Monitoring	198180	7590966	UTM 34S
KB-2	Both	196289	7580774	UTM 34S
KB-3	Both	193421	7583287	UTM 34S
KB-8	Sample	191271	7579373	UTM 34S
OEL-1	Both	197401	7576772	UTM 34S
OEL-4	Sample	192677	7574563	UTM 34S
OEL-6	Monitoring	193713	7573643	UTM 34S
LH-3	Both	200612	7575726	UTM 34S
GKP-1	Both	807809	7572332	UTM 33S
GKP-5	Monitoring	807346	7571503	UTM 33S
GKP-7	Monitoring	809756	7573312	UTM 33S
ES-3	Monitoring	800359	7577397	UTM 33S
ES-4	Both	800319	7577166	UTM 33S
BL-3	Monitoring	797169	7576151	UTM 33S
BL-5	Both	797198	7576192	UTM 33S
BL-9	Both	794141	7573098	UTM 33S
BAR-2	Monitoring	795708	7576265	UTM 33S
EN-1	Both	797458	7586215	UTM 33S
EN-2	Monitoring	797511	7582091	UTM 33S
EN_3	Sample	800687	7581991	UTM 33S
EN-4	Monitoring	800685	7581994	UTM 33S
OT-1	Both	807767	7584100	UTM 33S
OT-2	Both	805939	7586131	UTM 33S
OT-6	Both	807875	7590952	UTM 33S
GO-2	Monitoring	802406	7583263	UTM 33S
GO-4	Sample	801917	7588701	UTM 33S

Farmers will be contacted approximately two weeks in advance by email:

- to be informed when the farm visit will take place;
- to be given a date and approximate time;
- to be given names and borehole ID's of boreholes to be monitored and sampled;
- asked to switch off their pumps at least 12 hours before the visit;

- asked for an alternative appointment in case the proposed appointment does not suit;
- asked to confirm these arrangements in writing.

If farming procedures do not allow pumps to be switched off in time, the consultant conducting the monitoring has to be informed for how long the pumps have been running before measuring of the groundwater level has taken place. Such measures will be flagged, but can still be used for interpretation, as they represent the drawdown of the local groundwater table due to pumping. The same applies to a borehole with a wind pump if the wind is blowing during monitoring.

Besides the regional groundwater monitoring and sampling, regular groundwater monitoring is conducted on Farm Omitiomire. A total of 21 exploration boreholes are monitored on a monthly basis.

Compliance monitoring of groundwater quality on farm Groot Omitiomire (to fulfil the terms of the DWAF Abstraction Permit) will take place quarterly.

Additionally to the existing exploration boreholes, another 4 boreholes have been drilled solely for groundwater monitoring purposes. Two of these boreholes (see Figure 9-2) have been equipped with automatic data loggers, which store hourly values and need to be downloaded quarterly, while the other two have the water level monitored on a monthly basis. The borehole located in the Black Nossob River (WW202120) which has been fitted with a groundwater data logger has also been fitted with an ultrasonic surface water level sensor to record river flow. It is planned that downloading this would also be carried out when the groundwater loggers are downloaded. Figure 9-3 shows the recording site in the Black Nossob River with groundwater and surface water data loggers.

Three farm boreholes (OT-1, OT-2 and EN-4) and one exploration borehole in the area surrounding the proposed mine have also been fitted with loggers (‘Divers’).

FIGURE 9-3: BLACK NOSSOB SITE (WW202120) DATA LOGGERS.

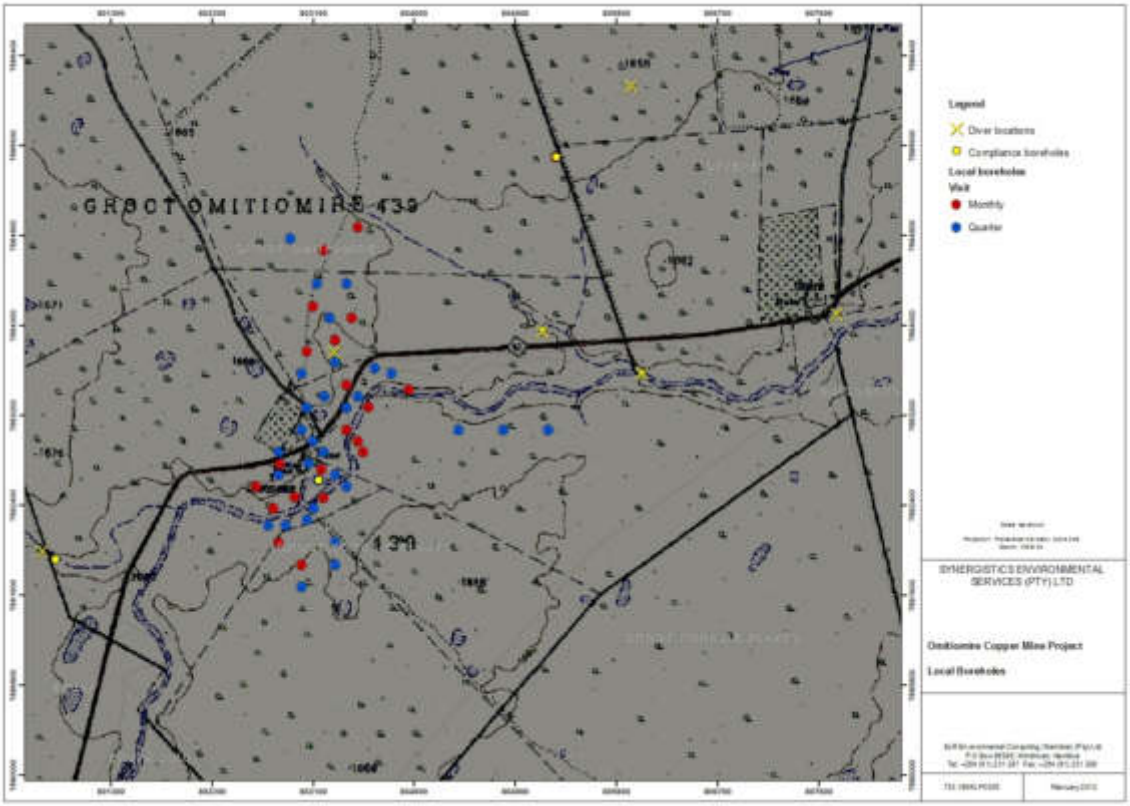

FIGURE 9-4: LOCATION OF LOCAL EXPLORATION, COMPLIANCE AND DIVER MONITORING POINTS

9.1.2 GROUNDWATER DATA COLLECTION

Groundwater data collection involves:

- Monthly water levels of exploration boreholes on Omitiomire;
- Annual groundwater sampling of exploration boreholes on Omitiomire;
- Bi-annual monitoring of boreholes and wells on surrounding farms; and
- Quarterly data downloads of 'divers' and surface water sensor.

9.1.3 LABORATORY ANALYSIS

The annual groundwater samples (22 samples plus 2 duplicates for quality control), and the quarterly compliance samples (6 samples plus 1 duplicate), will be sent to accredited laboratories for major ions analysis and total metals analysis by ICP-MS. A list of the parameters analysed is shown in Table 9-2 below.

TABLE 9-2: PARAMETERS FOR ANALYSIS: GROUNDWATER SAMPLING

Groundwater Sampling	
Total Metals	Major Ions
Aluminium as Al	p H
Arsenic as As	Electrical Conductivity
Boron as B	Turbidity
Cadmium as Cd	Total Dissolved Solids (calc.)
Chromium as Cr	P-Alkalinity as $CaCO_3$
Cobalt as Co	Total Alkalinity as $CaCO_3$
Copper as Cu	Total Hardness as $CaCO_3$
Iron as Fe	Ca-Hardness as $CaCO_3$
Lead as Pb	Mg-Hardness as $CaCO_3$
Manganese as Mn	Chloride as Cl^-
Molybdenum as Mo	Fluoride as F^-
Nickel as Ni	Sulphate as SO_4^{2-}
Selenium as Se	Nitrate as N
Tin as Sn	Nitrite as N
Zinc as Zn	Sodium as Na
	Potassium as K
	Magnesium as Mg
	Calcium as Ca
	Stability pH, at 25°C
	Langelier Index
	Ryznar Index
	Corrosivity ratio

9.1.4 SURFACE WATER/SEDIMENT ANALYSIS

It is recommended that a repeat of the surface water and sediment sampling at the five dams that were sampled for the Surface Water EIA Study be undertaken to provide a comparison of results. It is proposed that at each of the five sites a water sample is taken and three soil samples from around the dam are taken to give a broader sampling coverage. It is also recommended that in future this sampling is repeated on an annual basis as part of the continuous environmental monitoring programme.

TABLE 9-3: PARAMETERS FOR ANALYSIS: SURFACE WATER AND SEDIMENT SAMPLING

Surface Water Sampling		Sediment Sampling
Major Ions	Total Metals	Analysis
p H	Aluminium as Al	Water Soluble Chlorides
Electrical Conductivity	Arsenic as As	Organic Carbon
Total Dissolved Solids (calc.)	Boron as B	Particle Size Analysis
P-Alkalinity as $CaCO_3$	Cadmium as Cd	Acid Soluble Sulphates
Total Alkalinity as $CaCO_3$	Chromium as Cr	Total Nitrogen
Total Hardness as $CaCO_3$	Cobalt as Co	Total Phosphate
Ca-Hardness as $CaCO_3$	Copper as Cu	Total Na
Mg-Hardness as $CaCO_3$	Iron as Fe	Total K
Chloride as Cl^-	Lead as Pb	Total Ca
Fluoride as F^-	Manganese as Mn	Total Mg
Sulphate as SO_4^{2-}	Molybdenum as Mo	Total Fe
Nitrate as N	Nickel as Ni	Total Mn
Nitrite as N	Selenium as Se	EPA Digestion : As
Sodium as Na	Tin as Sn	EPA Digestion : Cd
Potassium as K	Zinc as Zn	EPA Digestion : Co
Magnesium as Mg		EPA Digestion : Cr
Calcium as Ca		EPA Digestion : Cu
Free & saline ammonium as N		EPA Digestion : Pb
Stability pH, at 25℃		EPA Digestion : Se
Langelier Index		EPA Digestion : Ni
Ryznar Index		EPA Digestion : Zn
Corrosivity ratio		

9.1.5 AIR MONITORING

Key performance indicators against which progress may be assessed from the basis for all effective environmental management practices. Performance indicators are usually selected to reflect both the source of the emission directly and the impact on the receiving environment. Ensuring that no visible evidence of windblown dust exists represents an example of a source-based indicator, whereas

maintaining off-site dustfall levels to below 1 200 mg/m^2/day represents an impact- or receptor-based performance indicator.

Recommended source based performance indicators for the proposed Omitiomire Copper Oxide Project:

- No visible dust when trucks/vehicles drive on the roads. It is recommended that dust fallout in the immediate vicinity of the road perimeter be less than 1 200 mg/m^2/day.
- The absence of visible dust plume at all tipping points and outside the primary crusher would be the best indicator of effective control equipment in place. In addition the dust fallout in the immediate vicinity of the tipping and crushing sources should be less than 1 200 mg/m^2/day.
- From all activities associated with the proposed Omitiomire Copper Oxide Project, dust fallout levels should not exceed 1 200 mg/m^2/day outside the project boundary and not above 600 mg/m2/day at any of the receptors.

9.1.5.1 Proposed operational phase dust fallout monitoring network

A dust fallout network provides management with an indication of what the reduction in fugitive dust levels are once mitigation measures are implemented. In addition, a dust fallout network can serve to meet various objectives, such as:

- Compliance monitoring;
- Validate dispersion model results;
- Use as input for health risk assessment;
- Assist in source apportionment;
- Temporal trend analysis;
- Spatial trend analysis;
- Source quantification; and,
- Tracking progress made by control measures

It is recommended that a dust fallout monitoring network, consisting of single dust buckets be implemented for the proposed Omitiomire Copper Oxide Project, taking into consideration the predicted impacts and prevalent wind direction in the area. Since there are no sensitive receptors located relatively close to the proposed mining operations, the dust buckets are mainly recommended as indicators for management.

Single dust bucket 1 can be placed downwind of the processing plant and primary crushing operations for potential impacts from these sources (Figure 9-5). It is also recommended that single dust bucket 2 be located at the Groot Omitiomire Farm House as representative of the impacts experienced here. Single dust bucket 3 can be placed downwind of Palm pit and its associated WRD, preferably in the Groot Korasie Plaats land, as indicative of dust impacts experienced here. The intersection of the haul roads for

the Pan and BT pits with the M53 road is recommended for the purposes of monitoring potential impacts from these areas, identified by bucket 4 and 5. It is recommended that dust fallout in the immediate vicinity of these single dust buckets be less than 1 200 mg/m^2/day.

The single dust fallout buckets should be designed according to the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739-98). The ASTM method employs a simple device consisting of a cylindrical container (not less than 150 m in diameter) exposed for one calendar month (30 ±2 days). The bucket is placed at a height of 2m above the ground.

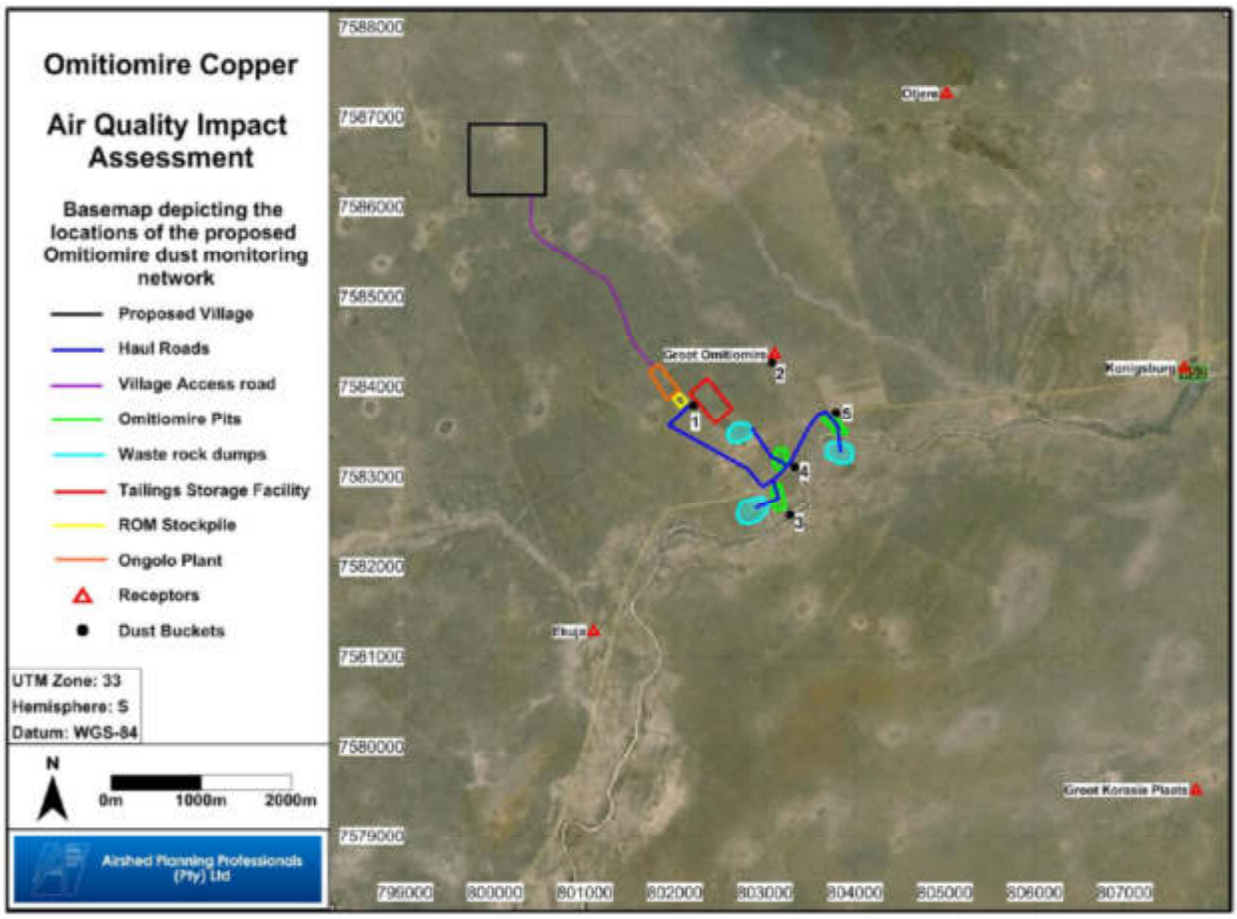

FIGURE 9-5: DUST FALLOUT MONITORING NETWORK

A detailed Dust Fallout Monitoring Procedure is included in Appendix C of the Air Quality Assessment appended to the EIA Report (Appendix F of the EIA Report).

9.1.6 NOISE MONITORING

The frequency of noise monitoring as well as the parameters that should be determined are summarised in Table 9-4. In addition to the measurement of sound pressure levels, the 3rd octave band frequency spectra should also be recorded. Frequency spectrum data can provide useful insight into the nature of

recorded sound pressure levels and assist with distinguishing between potential sources of noise that contribute to noise levels at a certain location. Source noise measurements could be conducted to confirm equipment manufacturer sound power data and assumed sound power data used in the current study.

TABLE 9-4: NOISE MONITORING PROGRAMME

Proposed Monitoring Plan	
Parameters to be Measured	**Frequency**
L_{Aeq}(1 hour) between 07:00 and 22:00	One campaign during the construction phase One campaign per year of operation
L_{Aeq}(1 hour) between 22:00 and 07:00	One campaign during the construction phase One campaign per year of operation
3rd Octave band frequency spectrum	During every campaign

9.1.7 BIODIVERSITY MONITORING

The biodiversity monitoring will include the following:

- An ecological management plan that includes recommendations on best rangeland management practises including a fire management plan, suitable game species and stocking rates, drinking water placement and vegetation monitoring.
- The loss of large *V. erioloba* specimens is inevitable. An offset strategy would be to physically protect some juvenile *V. erioloba* in certain areas as replacements for lost trees and by following good rangeland management practises in general.
- Monitor the occurrence and spread of invasive species so as to instigate steps for their control, following expert advice.
- Enforce speed limits, including using speed-reducing methods and speed-monitoring devices.

9.1.8 SOIL MANAGEMENT MONITORING

Regular inspections of soil stockpiles and rehabilitated areas will be undertaken to ensure that the soil conservation procedure is being implemented.

9.1.9 MINERALISED WASTE FACILITIES

The following issues will, where relevant, be monitored on a quarterly basis and reported as required by relevant permits and authorisations issued to the Omitiomire Copper Oxide Mine by the authorities:

- Slope stability, integrity of walls and liner in the tailings facility, presence of seepage, capacity of dirty water system, and functioning of drains.

- The volume of mineralised waste generated as well as the disposal area, height and footprint of mineralised waste disposal/storage facilities will be monitored and recorded as required. The results will be reported bi-annually.

9.1.10 NON-MINERALISED SOLID AND LIQUID WASTE

Weekly inspections of non-mineralised waste handling and management facilities will be undertaken to ensure that the waste management procedures are being implemented. The volume and type of non-mineralised waste, and the disposal destination, will be monitored and recorded as required. The results will be reported annually.

9.2 AUDITING COMPLIANCE OF THE EMP

The commitments contained in this EMP will, once an environmental clearance and the Mining Licence has been obtained, be Craton's contractual agreement with the Namibian authorities for sound environmental management. All employees, contractors and sub-contractors and any visitors to site will be expected to comply with the commitments contained herein.

9.2.1 AUDITS AND INSPECTIONS

The Environmental Officer will conduct internal management audits against the commitments in the EMP. During the construction phase, these audits will be conducted every month. In the operational phase, these audits will be conducted on a quarterly basis. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

In addition, an independent professional will conduct an EMP performance assessment at least once a year for the Bi-Annual Report. The mine's compliance with the provisions of the EMP and the adequacy of the EMP relative to the on-site activities will be assessed in this report.

The Environmental Officer will furthermore conduct daily inspections during construction and weekly inspections during mining operations.

9.2.2 SUBMISSION OF INFORMATION

As a minimum, the following documents will be submitted to the relevant authorities on an ongoing basis:

- The bi-annual report required by the MET will be submitted every six months.
- Other monitoring reports will be provided to the relevant authorities as per the permit and other agreements.

Simon Charter	**Alex Pheiffer**	**Kerry Fairley**
(Project Manager)	**(Project Reviewer)**	**(Project Reviewer)**

RECORD OF REPORT DISTRIBUTION

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Proponent:	Craton

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