ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR

2023

THE RECONSTRUCTION OF FAILING SECTION ON MR118, BETWEEN ROSH PINAH AND ORANJEMUND.

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1. INTRODUCTION

1.1 Background of the Project

Upgrading of a route from Rosh Pinah to Oranjemund has been considered since the early nineties and a pre-feasibility study was conducted in 1994. In 1998, the MOWTC supported by the Arab Bank for Economic Development in Africa (BADEA) appointed Loraus Consortium to conduct a feasibility study and preliminary engineering design on the link road from Aus through to Oranjemund. The consortium consisted of VKE (Namibia) Consulting Engineers and Bührmann and Partners Consulting Engineers as well as external experts.

The objective of the feasibility study was two-fold; firstly, to provide the MOWTC with engineering, socio-economic and environmental information of sufficient extent and accuracy to allow a confident decision to be made regarding the feasibility of linking Oranjemund to the national trunk road network. Secondly, to determine which of the two routes, coastal or inland would be most advantageous to upgrade.

The feasibility study which eventually covered 1400 km of road links for the economic analysis concluded that the inland route was the preferred route to be upgraded. At least the Aus – Rosh Pinah section of this the inland option was necessary for imports and exports of mine produce to Aus and Lüderitz for the then existing Rosh Pinah Mine and the new Skorpion Zinc Mine, while improving the overall road link to Oranjemund. It was found during the study that the alternative upgrading of the coastal route would still require an upgrade of the inland route, or alternatively the extension of railway network from Aus to Rosh Pinah. The latter was not economically viable mainly since it would have allowed primarily for heavy goods transport by rail, while normal transport by road would still continue for which the road would still have required upgrading. The inland route in addition would have more advantages from an environmental point of view as well as access to better distributed good quality road works materials and water for construction.

The Rosh Pinah-Oranjemund portion of the preliminary design study could unfortunately not be finalised due to the security demands by Namdeb regarding the sections of the road that traversed mining areas. That included permanent helicopter-supported security and a very high standard of tamper-proof security fencing along both sides of the road which proofed neither technically feasible, nor economically viable. The difference of opinion between the MOWTC and Namdeb regarding payment responsibilities for the additional security measures once the road was opened to traffic could also not be resolved, and no support from Namdeb could be obtained at the time for the proclamation of the road along the river. These unresolved matters prohibited further involvement by the Ministry since the private road belonged to Namdeb and was located on the soil of the legal

concessionaire, Namdeb, who at the time by implication opposed further development of the Rosh Pinah – Oranjemund road link.

Another problem experienced was that the road alignment through the mining areas could not be fixed. Namdeb was regularly moving the position of the road as a result of space problems between the river and the mountains where the road was crossing the diamond deposits. A more direct alignment between Rosh Pinah and Oranjemund away from the river subsequently was investigated and found not acceptable. This was mainly due to environmental concerns, but also for technical reasons related inter alia to problems with windblown sand dunes.

Construction of the preferred alignment road started in 2015 and was completed in 2017. Since then the road has been in use by both NAMDEB and commercial / private road users and formed a very important transport link between Oranjemund and the rest of Namibia.

During the rainy season of 2022/2023 the Orange River flooded partial sections of the newly constructed road. Furthermore, the river also destabilised portions of the embankment/shoulder of the newly constructed road. Please refer to the pictures below:

Figure 1: Recent pictures of the destabilised road shoulder and road surface.

The Roads Authority identified these areas need to be repaired immediately for the sake of safety related to the road user. Therefore, the reason for the application for environmental permission to the Ministry of Environment, Forestry and Tourism.

1.2 General Description of the Project

The road was proclaimed by the Roads Authority as a public road and then upgraded to bitumen standards which was completed in August 2017. The main sections that show defects are located close to Sendelingsdrift mine which is next to the Orange river with the following approximate project co-ordinates: S28.18546°, E16.83163° and S28.175667°, E16.826944°.

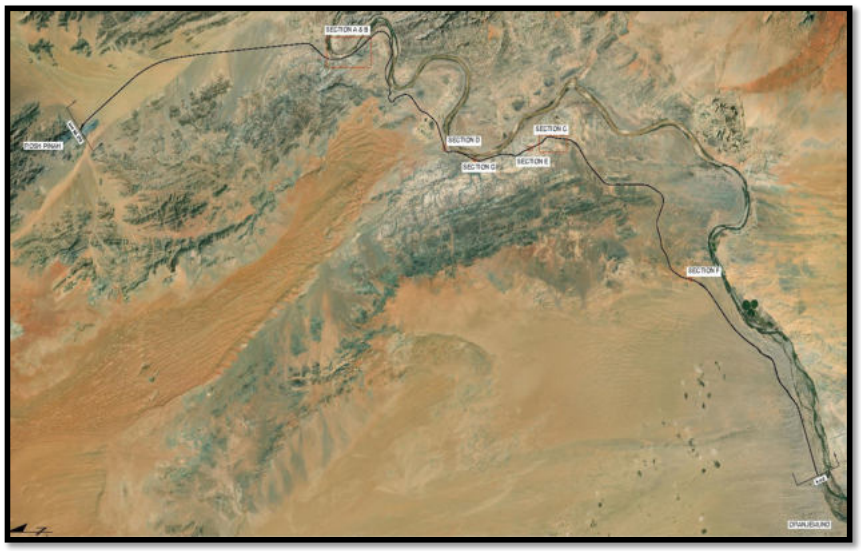

Figure 2: Locality plan of sections requiring repairs.

Figure 2 indicate all the sections that require works. Sections A and B have severely been affected, due to the occasional flooding of the Orange River which resulted in the failure of the road fill embankment between km 192 and km 194.5 (only 2.5 Km) coupled with the rock face instability within the road cuttings.

Continuous rock falls were experienced to date over these sections in the cuttings. Even though they were rock bolted with the initial project, continuous weathering took place with ad hoc rock falls. The kilometre points, identify the main section of road, experiencing major instabilities within the road prism and are visible by, propagating cracks and differential settlement (Figure 1).

The instabilities are caused by fluctuating water levels in the Orange River, which saturate the substrate materials and cause settlement of the road pavement layers. When the water levels rise, the flow velocity increase and erodes the constructed rockfill toe of the existing embankment. This cause slipping and toppling failures to occur within the embankment as demonstrated by figure 3:

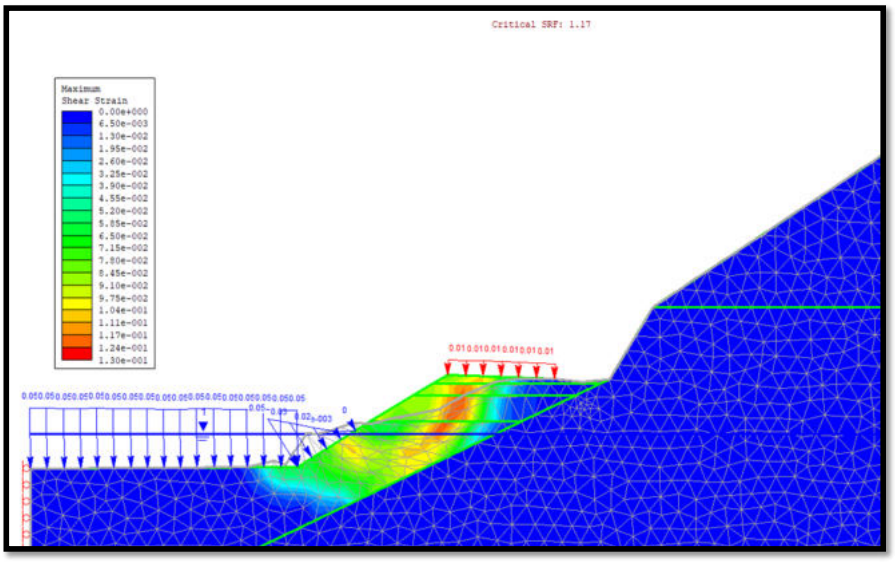

Figure 3: Finite element analysis on the mode of failure of the road embankment

After construction of the road, the nearby mine started blasting activities (Figure 4) in close vicinity to the road. It is suspected that the blasting activity contributed to the frequent rock falls along the highly weathered rock face or road cutting (Figure 5).

Figure 4: Blasting activities.

Figure 5: Rock showers – Dislodged boulder.

The current state of the road poses a hazard to road users due to the high risk of the road collapsing along the unstable sections (Figure 2) and the continuous rock falls (Figure 5).

The contract aims to implementing the proposed remedial measures to stabilize the road fill embankment and the rock face as well reconstructing the road pavement layers to acceptable standards, whilst ensuring and supporting the national safety endeavours. A sequential list is provided for the proposed remedial works:

- Comply with all environmental obligations;
- The establishment on Site of the Contractor's construction camp and the moving of plant, materials and personnel to the Site; and removal of all these items on completion of the Contract, and removal on completion of the Contract of the Engineer's offices,
- Clearing of stockpile area and widening of embankment;
- Accommodation of traffic;
- Benching of existing embankment along section A and B and widening of embankment 1:1.5 to 1:2 with rock fill material. Additional erosion protection measures in the form of packed rip rap to be constructed on the widened embankment;
- Scalping and barring the rock face along section A & B, removal of hazards from rock face, stabilise the rock face;
- Installation of Rock anchors, rock bolting and meshing with shotcrete;

- Opening and reinstatement of borrow areas and the provision of certain haul roads, as well as the reinstatement of old borrow areas and old haul roads where so instructed by the Engineer;
- Excavation and stockpiling of pavement layers, fill and rockfill layers until specified depth, for each section;
- Remove and stack existing drainage structures;
- Reconstruct and stabilise alluvium substrate materials by constructing jet grouted columns in road formation along section A, B, reconstruct and stabilise road formation along section C;
- Construct a pioneering layer with rock fill material over jet grouted columns;
- Increase the vertical alignment of part of Section A by 500mm to ensure accessibility;
- Reconstruction of drainage structures and erosion protection with grouted stone pitching at outlets;
- Reconstruction of the selected subgrade layers, construction of subbase layers, shoulders and base layers;
- Application of prime coat and construction of a bituminous surfacing consisting of a 20,0 mm stone and slurry in two layers, with penetration grade bitumen;
- Construct stone catch in form of a ditch and rock catch fences along section A and B;
- Protection and relocation of Telecommunication services on section A & B;
- Trimming and cleaning of Site to high standards, with emphasis on strict environmental requirements.

2. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Environmental and Social Management Program (ESMP) will be implemented during construction phase of the project. It includes mitigation measures mentioned in the Feasibility Study Report of 1998 – 2000, the Flora Specialist Report done by C. Mannheimer, and a generic ESMP applicable to the construction of roads. The ESMP will form part of the contractual agreement between the Roads Authority and the Contractor responsible for the construction of the road.

The ESMP is intended to bridge the gap between the Environmental Impact Assessment (EIA) and the implementation of the project, particularly with regard to implementing the mitigation measures recommended in the Environmental Impact Assessment (EIA). Monitoring, auditing and taking corrective actions during implementation are crucial interventions to successfully implement the ESMP.

The ESMP detail actions to ensure compliance with regulatory bodies and that environmental performance is verified through information on impacts as they occur.

ESMP implementation is a cyclical process that converts mitigation measures into actions and through cyclical monitoring, auditing, review and corrective action, ensures conformance with stated ESMP aims and objectives. Through monitoring and auditing, feedback for continual improvement in environmental performance must be provided and corrective action taken to ensure that the ESMP remains effective.

2.1 ESMP Administration

Copies of the ESMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of this document.

2.2 Roles and Responsibilities

The implementation of the ESMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase.

Engineer's Representative (ER)

The Engineer will delegate powers to the Engineer's Representative (ER) on site who would act as the Employer's implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the ESMP. The Engineer also has the responsibility to approve the appointment of the Environmental Control Officer (ECO).

Any on-site decisions regarding environmental management are ultimately the responsibility of the ER. The ER will have the following responsibilities in terms of the implementation of this ESMP:

- Controlling that the necessary environmental authorizations and permits have been obtained by the Contractor.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO (Environmental Control Officer) where necessary.
- Taking appropriate action if the specifications are not followed.
- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Recommending and issuing fines for transgressions of site rules and penalties for contravention of the ESMP.
- Advising on the removal of person(s) and/or equipment not complying with the specifications.
- Receive and record any complaints (concerning environmental matters) from landowners or the public.
- Auditing the implementation of the ESMP and compliance with authorization on a monthly basis.
- Undertaking a continual review of the ESMP and recommending additions and/or changes to the document after completion of the contract.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) will be a competent person from the staff of the Contractor to implement the on-site environmental management of this ESMP by the Contractor. The ECO shall be on site daily and the ECO's duties will include the following:

- Assisting the ER in ensuring that the necessary environmental authorizations and permits have been obtained.
- Maintaining open and direct lines of communication between the ER, Contractor and interested and effected parties (I&APs) with regard to environmental matters.
- Convening and facilitating public meetings.
- Regular site inspections of all construction areas with regard to compliance with the ESMP.

- Monitoring and verifying adherence to the ESMP, monitoring and verifying that environmental impacts are kept to a minimum.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.

The Contractor

The duties of the Contractor are as follows:

- The Contractor shall be familiar with the contents of the ESMP in order to understand the mitigation measures and the reasons for the measures.
- The Contractor's site agent and his Safety Health and Environmental Offices shall at all times be in possession of this ESMP.
- Attend lectures / training that deals with environmental issues and the content of the ESMP.
- The Contractor shall ensure that he complies fully with the Environmental Specifications. This includes all plant operators, transport vehicles, and sub-contractors.
- The Contractor should also notify the ER of any activity that could or did impact negatively on the environment.
- The Contractor is responsible for any rectification measures needed to rectify, mitigate or avoid environmental degradation or impact during the construction phase of the project.

2.3 Environmental Awareness and Training

Before any work is commenced on the Site, the Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the ESMP. The Contractor shall liaise with the Engineer during the establishment phase to fix a date and venue for the training and to agree on the training content.

The Contractor shall provide a suitable venue and ensure that the specified employees attend the course. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the ER with a copy of the attendance register. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of complying with the ESMP.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this ESMP and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the ESMP.
- A HIV/AIDS awareness programme as part of Health and Safety issues.

- The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

2.4 Public Participation

An on-going process of public participation and consultation shall be maintained during construction to ensure the continued involvement of interested and affected parties (I&APs) in a meaningful way (especially NAMDEB). Public meetings to discuss progress and any construction issues that may arise shall be held at least every three months and more regularly if deemed necessary by the ER. These meetings shall be arranged by the ECO but shall be facilitated by the ER. The Contractor shall present a progress report at each meeting. All I&APs that participated in or were informed during the EIA shall be invited to each of the public meetings.

2.5 Specific Environmental Mitigation Measures - Flora

The following mitigation measures are required by the Specialist Flora Assessment done by Coleen Mannheimer and include the following:

Recommendations for Zone A:

The Swartkop Nature Reserve and the ridges near Hohenfels should not be disturbed under any circumstance.

Recommendations for Zone B:

Damage in the Skilpad area must be restricted to the road reserve and the direct vicinity of the existing active gravel pit. The extension of the gravel pit should be kept to a minimum and away from the koppies.

In the two damage restriction areas impacts outside the road reserve must be held to a minimum, and the four *Cheiridopsis* no-go areas should be avoided. Staff should not be permitted any access whatsoever to any no-go areas.

Recommendations for Zone C:

The proposed route past the Lithops no-go area must be assessed and reconsidered to ensure that the site is not damaged. It must be an absolute no access area, and be protected from careless incursion by workers and heavy machinery during construction.

Damage restriction area 3 should be observed, and staff must be disallowed access to the ridges in the area for relaxation or any other use, such as informal latrine use. The substrate is very fragile on the western slopes, and will be damaged by human traffic as well as construction activity. Once the route is fixed and the midline marked the National Botanic Garden should be given the opportunity to do, or to request, plant rescue on the western faces that will definitely be destroyed.

Although considerable damage will be done by blasting in Damage restriction area 4 (Niklaas Pass) other collateral damage should be kept to a minimum. As with Auchas, the National Botanic Garden should be given the opportunity to rescue plants well before construction begins.

Recommendations for Zone D:

If possible the construction activities should impinge as little as possible on the ridges on the incline near Obib (Damage restriction area 5).

Unnecessary damage to the riverine fringe should be minimised. Legally one should apply for a permit to destroy protected tree species along the river bank.

If possible, alien vegetation along the river section should be cleared.

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
1. MANAGEMENT AND MONITORING	To ensure that the provisions of the ESMP are implemented during construction.	a. The Environmental and Social Consultants shall ensure that all aspects of the ESMP are implemented during construction. b. The Environmental and Social Consultants shall attend regular site inspections and meetings and minutes shall make provision for reporting on every aspect of the ESMP.	Environmental and Social Consultants together with the ECO.
2. COMMUNICATION AND STAKEHOLDER CONSULTATION	To ensure that all stakeholders are adequately informed throughout construction and that there is effective communication with and feedback to the Consultant and Client.	a. The Contractor shall appoint an ECO from the construction team to take responsibility for the implementation for all provisions of this ESMP and to liaise between the Contractor, Community, Client and Consultants. The ECO must be appointed within 14 days after the site-handover. b. The Contractor shall at every site meeting report on the status of the implementation of all provisions of the ESMP. c. The Contractor shall implement the environmental awareness training as stipulated in Section 8.3 above. d. The Contractor shall liaise with the Social and Environmental consultants regarding all issues related to community consultation and negotiation as soon as possible after construction commences.	Contractor/ Environmental and Social Consultants to monitor.

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
3. HEALTH AND SAFETY	To ensure health and safety of workers and the public at all times during construction	a. The Contractor shall submit a strategy to ensure the least possible disruption to traffic and potential safety hazards during construction. b. The strategy should include a schedule of work indicating when and how road crossings (construction at existing intersections) will be made. The schedule will be updated and distributed to all stakeholders. c. The Contractor shall also liaise with the Traffic Authorities in this regard. d. Proper traffic and safety warning signs will be placed at the construction site to the satisfaction of the Engineer and the Roads Authority. e. The Contractor will adhere to the regulations pertaining to Health and Safety, including the provision of protective clothing, failing which the Contract may be temporarily suspended until corrective actions were taken. f. PPE shall be issued to all workers applicable to their specific activities. g. Surface dust will be contained by wetting dry surfaces periodically with a water bowser, sprinkler system or any suitable method. This applies for the construction site as well as all the roads.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
		h. Potable water shall be available to workers to avoid dehydration. This water shall be of acceptable standards to avoid any illness. At least 5 litters of drinking water per person per day shall be made available during construction. i. The Contractor shall enforce relevant Health and Safety Regulations for these specific activities. j. The Contractor shall also comply with relevant Labour Laws as stipulated by the Labour Act. k. The Contractor shall implement a HIV/AIDS and Covid 19 awareness programme as part of Health and Safety. l. Blasting may only be conducted by a qualified person and all laws and regulations will be enforced before and during blasting.	
4. CONSERVATION OF THE NATURAL AND HISTORICAL ENVIRONMENT	To minimise damage to soil, vegetation and historical resources during the construction phase. This includes soil crusting, soil erosion and unnecessary vegetation destruction.	a. At the outset of construction (or during construction as may be applicable), the ECO and the Contractor shall visit all proposed borrow pits, haul roads, access roads, camp sites, and other areas to be disturbed outside the road reserve. Areas to be disturbed shall be clearly demarcated, and no land outside these areas shall be disturbed or used for construction activities. Detailed	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
	Management of water (domestic and construction). Management of other sensitive areas.	instructions and final arrangements for protection of sensitive areas, keeping of topsoil and rehabilitation of disturbed areas shall be made, in line with the guidelines in this document. The ECO shall be consulted before any new areas are disturbed which have not yet been visited. b. No off-road driving shall be allowed, except on the agreed haul and access roads. c. Vegetation shall be cleared within the road reserve as necessary for the construction of the road. The area on either side of this corridor may not be cleared of vegetation, unless permission is given to do so for detours or access roads. This measure is subject to the Roads Authority of Namibia's specifications with regard to the road reserve. d. A prescribed penalty will be deducted from the Contractor's payment certificate for every mature tree removed without approval. e. Where compaction has taken place in disturbed areas, these areas will be ripped and covered with topsoil kept separate for this purpose.	

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
		f. Poaching or collecting of wild animals is prohibited. g. The killing of any animal (reptile, bird or mammal) is prohibited. h. A prescribed penalty will be deducted from the Contractor's payment certificate if it is shown that any of his staff or sub-contractors is involved in trapping, hunting or any kind of collecting of wild animals in the vicinity of the work sites. Offenders will be handed to the authorities for prosecution. i. Pipelines for the pumping of construction water shall as far possible run within the road reserve and along existing tracks and other roads. j. Water will not be allowed to be wasted. This includes water required for construction and domestic purposes. k. Collection of plants or parts of plants (including firewood of any size or description) is forbidden. l. As far as possible existing tracks alongside the existing road and within the present servitudes should be utilised for both construction and maintenance. These should be clearly indicated, together with designated turning points and construction laydown areas. The	

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
		area used should be constrained as far as possible.	
5. BORROW PIT MANAGEMENT AND REHABILITATION	To ensure proper soil management (combat soil erosion and promote biological activities). Preserve and manage natural vegetation. To ensure health and safety around the borrow pits (decommissioning phase). To stimulate ecological processes after decommissioning (to stimulate vegetation and other biological activities). To establish borrow pits which are aesthetically pleasing after decommissioning.	a. Rocky outcrops and surface water drainage lines are the most sensitive areas associated along the route. Borrow pits should not be placed / opened in these highly sensitive areas. b. The removal of construction material shall be focused where the least significant vegetation exists and where suitable materials are available. c. The Engineers and Surveyors must draft a plan for approval before commencement of a borrow pit. This plan must indicate the required resources and sensitive areas that may not be mined d. All borrow pits must be rehabilitated. e. The borrow pits shall be rehabilitated by trimming the sides to a slope not steeper than 18° (1:3) and evenly spreading the topsoil over the slopes to allow for the growth of new vegetation. f. All spoil material at the borrow pits shall be neatly shaped and no oversize loose material must be left inside the borrow pits, before spreading of topsoil.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

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COMPONENT	**OBJECTIVE**	**MANAGEMENT MEASURES**	**RESPONSIBILITY/ PARTNERSHIPS**
		g. Individual trees within the borrow pit area shall be removed and not left on a topographical high point. These trees normally perish over time and the high point remains. Trees at the outskirts of the BP shall be retained. h. Vegetation that has been removed during BP activities shall be placed on the outer slopes of the BP as to prevent soil erosion and serve as a "seedbed" for regrowth. i. Berms (overburden or topsoil) shall be flattened or managed in cooperation with the environmental consultant, landowner, ECO and RE. j. Access to borrow pits shall be controlled (using gates or manned positions). k. The borrow pit floor shall be levelled evenly as part of rehabilitation. l. The disturbed areas shall, where trimming cannot be done neatly by machine, be raked by hand after sloping rehabilitation to limit possible visual impacts. m. A Borrow Pit Rehabilitation Plan will be compiled indicating the rehabilitation schedule (timeframes) for the various borrow pits to be rehabilitated. n. Once the pits are scheduled for rehabilitation, the pit should be	

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		rehabilitated according to this ESMP. Once rehabilitation is complete, the Borrow Pit Rehabilitation Checklist will be completed (attached to this document). After signing of the Checklist, the borrow pit is closed and NO more activities will be allowed in or around the areas. o. These rehabilitation requirements are in line with the Roads Authority Borrow Pit Rehabilitation Guidelines.	
6. WASTE (SOLID / LIQUID) AND POLLUTION MANAGEMENT	To avoid contribution to potential surface and groundwater pollution. To avoid contribution to potential soil pollution.	a. Construction rubble and other waste generated during construction will be disposed of on a regular basis at an approved waste disposal site, which could be mined out borrow pits deep enough to properly bury construction waste such as concrete and oversize	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

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	To ensure that sound waste management practices are adhered to during construction.	gravel and cover it with at least 1m of overburden material. b. A temporary waste site may be demarcated for temporary storage of waste, but this area will be identified and clearly marked. c. The temporary domestic waste site will be fenced off with access control to the area. d. Adequate separate containers for hazardous and domestic waste will be provided on site and at the construction camp. e. The workforce will be sensitized to dispose of waste in a responsible manner and not to litter. f. Waste bins will be placed in and around the construction site to facilitate proper waste management. These waste bins shall be emptied at a regular basis. g. No waste may remain on site after completion of the project. h. Toilet facilities will be available in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males. The toilets should be such that it can be transported for various site selections and to be emptied at an approved sewage site. No person	

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		should have to walk more than 1km for the use of a toilet. i. A penalty will be issued for any sewage overflow or spill. It is the responsibility of the contractor to ensure proper sewage management at the camp(s) and alongside the road being constructed. j. A demarcated vehicle service area will be provided at the contractor camp. This area will have an impermeable floor (lining or concrete), oil trap and dedicated wash bay area. All used water will first run through the oil trap before the effluent is allowed to exit. The oil trap will be cleaned on a regular basis to ensure its efficiency. k. Servicing of vehicles is only permitted in the demarcated vehicle service area, except for large immobile vehicles which may be serviced on site, on condition that oils and lubricants are prevented from spilling using drip trays or other suitable containers. l. Drip trays will be available for all vehicles that are intended to be used during construction. These trays will be placed underneath each vehicle while the vehicles are parked. The drip trays will be cleaned every morning and the spillage handled as hazardous waste.	

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		m. Machines operating during the day that shows signs of excess leaking (verified by ECO or ER) should be withdrawn from the task and repaired by the Contractor. n. Accidental spills will be cleaned immediately. The contaminated soil will be suitably disposed of in a container suitable for hazardous waste.	
		o. Oil, lubricants, polluted soils and other hazardous materials will be stored in separate containers and disposed of at an approved waste disposal site or temporary stored for collection by an oil recycling company. These used oils and polluted soils shall temporary be stored within a bunded area with an impermeable floor. p. The cleaning of the bitumen tanks (spray nozzles) may only be done at an approved area which is a pit with acceptable quality floor lining. This area will not be used as a general waste disposal area. This pit will be rehabilitated by removing the bitumen and linings. The pit will NOT be covered before it is cleaned. q. Bitumen tanks will be placed on an impermeable floor (concrete or plastic lining) and the area will be bunded.	

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		r. Fuel tanks on site will be properly bunded. The volume of the bunded area will be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area will be impermeable (either lining or concrete) and the sides high enough to achieve the 1.5 times holding capacity. There will be a valve installed in the bunded area to allow rainwater drainage. s. There will be an impermeable floor (concrete or plastic) where re-fuelling is taking place. This is applicable to the bulk fuel area as well as any mobile re-fuelling stations. t. Foam fire extinguishers will be in close proximity to fuel kept on site. There will be trained personnel to handle this equipment. At least two extinguishers will be placed at every fuel storage area.	
7. REHABILITATION OF CONSTRUCTION SITE, SERVITUDES AND CLEARED AREAS (WHICH INCLUDES STOCKPILES)	To rehabilitate the site office, work sites, servitude areas, tracks and other areas disturbed during construction as close to their original state as reasonably possible.	a. A decommissioning plan will be drafted for the contractor's camp(s). This plan will indicate the actions required to decommission all buildings, water services, power services, and other facilities at the various contractor camps(s).	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

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		b. All bunded areas, equipment, waste, temporary structures, stockpiles etc. must be removed from the camp and work sites. Any material used for the road construction, or which remain due to construction shall be removed alongside the road (stone chips, windrows, stockpiles, large rocks, etc) c. All disturbed areas shall be reshaped to their original contours; as close as possible to the natural conditions before construction commenced, including the road reserve, detours, construction camps, and temporary access routes. d. All cuttings must be shaped with a slope to provide a natural appearance, without having to destroy significant vegetation on top of the slope. e. Existing borrow pits adjacent to main roads need also be rehabilitated during rehabilitation phase.	

The following checklist can be used by the contractor to monitor environmental compliance to the ESMP. Completed checklist shall be filed in the Environmental File on site and be available for inspection.

DAILY QUESTIONS

CONSTRUCTION SITE MONITORING CHECKLIST

Construction site name_____

Environmental/Safety/Health Site Officer Name_____

Date_____

CHECK THE FOLLOWING DAILY ON THE CONSTRUCTION SITE AND AT THE CONTRACTOR'S CAMP				
Category 1: Personal Protective Equipment (PPE), construction site safety, access control and hazardous substance handling				
	Question	**Yes**	**No**	**If no, describe action taken**
1	Have all labourers working today, including sub-contractors, been fully trained in proper health and safety procedures?			
2	Have you conducted a hazard assessment of the worksite and the planned construction activities for today with the Site Foreman and reviewed the EMP/PHPSAP to identify any new issues that might come up during the day?			
3	Are all labourers and staff wearing the required Personal Protective Equipment (PPE)? Minimum PPE includes: □ Hard hat □ Safety shoes □ Overalls Certain operations require additional PPE, such as: □ Eye protection/goggles/visors □ Face masks □ Gloves □ Ear plugs /ear muffs □ Harnesses			
7	Are all hazardous substances (eg fuel, paint, oil containers, cement etc) stored in an area marked by danger tape or in a locked room away from public access?			
8	Are any visitors or suppliers expected to visit the construction site today? If so, ensure sufficient PPE is available for their use and that the visitors register is signed when they arrive.			

9	Are labourers and equipment a safe distance away from power lines?			
10	Are extension cords and portable tools in good condition?			
11	Is the first aid kit fully stocked and accessible in case of emergency?			
Category 2: Excavations, stockpiles, storage areas and general housekeeping				
	Question	**Yes**	**No**	**If no, describe action taken**
12	Have all excavations been demarcated with barrier tape (minimum requirement) or fencing if the excavation is deeper than 2m?			
13	If a trench is more than 2m deep, is there a form of protection, such as: □ Sloping or benching □ Trench box or shield □ Shoring			
14	Is any stockpiling taking place today? If so, ensure the stockpile is placed in an area approved by the Site Foreman and that the height does not exceed 2m and that the slopes are not steep. Is the area demarcated with barrier tape?			
15	Are all storage areas neat and tidy with no machinery, vehicles, poles, materials or nails sticking out which may cause an injury or cause someone to trip up? Have the storage areas been demarcated with barrier tape?			
16	Is the construction site in general safe and neat with no waste lying around?			
Category 3: Solid waste management				
	Question	**Yes**	**No**	**If no, describe action taken**
17	Are there sufficient covered waste containers in place on the construction site and in the Contractor's camp in which to store waste material?			
18	Is waste (including construction waste) being disposed of in a designated disposal area and secured to prevent soil contamination (eg plastic lining underneath the waste pile) or covered to prevent it being blown off site?			
19	Have you checked to ensure waste is not being burnt or disposed of in pits on the site?			

20	Are there any signs of accidental/negligent spills of bitumen, fuel, oil, cement, paint etc visible on the site? If so, ensure spillages are cleared and the waste is containerised for subsequent disposal. Such waste should be treated as hazardous and be appropriately sealed prior to disposal.			
21	Is waste being disposed of off-site today and is it being sent to an approved site? Note the name of the site and keep a record of approximate waste volumes or bags taken for disposal. Waste may be separated for later recycling if this is taking place at the disposal site.			
Category 4: Water management				
	Question	**Yes**	**No**	**If no, describe action taken**
22	Are all water taps and points functioning properly and has a paved surface been provided beneath the tap/water point to prevent erosion and channel water to a catch pit?			
23	Is cement mixing taking place within a bunded area, where excess water drains to a lined pit? Are cement mixing trays being used in confined areas?			
24	Are there any flooded areas at the site? If so, have stormwater systems been installed to manage the water drains? If groundwater is encountered in an excavation or pit, ensure the Site Foreman, RE and Environmental Consultant in the Consulting team are consulted about remedial action.			
Category 5: Social aspects				
	Question	**Yes**	**No**	**If no, describe action taken**
25	Have community representatives been consulted about any concerns related to the construction?			
26	Are HIV/AIDs and other health posters/leaflets being displayed at the work site and have sufficient condoms (male and female) been made available? Does any new material need to be ordered?			
27	Is the general hygiene and waste management at the Contractor's camp acceptable?			
28	Is all potable water and wastewater systems working properly on the construction site and in the Contractor's camp?			

29	Have any records been kept of accidents, work related illnesses or injuries that may have occurred today?			
Category 6: Other (e.g. access roads, borrow pits, dust and noise pollution)				
	Question	**Yes**	**No**	**If no, describe action taken**
30	Are any construction/delivery vehicles using the access roads to the construction site or the borrow pits today? If yes, ensure no impacts have occurred at these locations as a result.			
31	Are construction activities causing any dust pollution? If so, ensure mitigation measures are implemented as per the EMP.			
32	Is construction or Contractor's camp activities causing any noise pollution? If so, ensure mitigation measures are implemented as per the EMP.			
33	Did any training (including for HIV/AIDS) or "toolbox talks" take place today? If so, has a record of attendance and the training provided been kept?			
34	Are there any other environmental aspects not mentioned above that should be mentioned for the record – eg tree/vegetation removal, rehabilitation etc?			
35	Are all records pertaining to environmental management updated and on file?			

Notes in Respect of Category 1

- Ensure all excavations are secure by being sealed off with barrier tape. Should access to the excavation be required by staff, or for vehicles, machinery, building supplies or equipment, then the barrier tape should be erected nearby to prevent access to the wider construction area where the excavation is located. If the excavation is deeper than 1.5m, then consideration should be given to installing fencing or a more secure and permanent barrier to prevent access.
- All materials, machinery and equipment should also be stored in secure areas, which as a minimum have been sealed off with barrier tape. Hazardous substances (such as fuel, cement, paints etc) should be stored in structures which can be either locked or to which general access can be prevented. Adequate safety signage should be in place (and on notice-boards) to warn about use of hazardous substances or equipment.
- No poles, planks or building/waste materials should be left outside of secure/safe storage areas unless in use. Such materials should not be placed where they can be tripped over or stacked such that they could jab passers-by. Sharp ends and nails should not be protruding. Stockpiles should not exceed 2m in height.

- Vehicles and machinery should be inspected daily to check they are not spilling any fuel or oils. Where leaks are detected, they should either be sealed or drip trays placed under the point where leaks are occurring.
- At the end of the working day, the construction site should be inspected to ensure all the above mentioned matters are addressed.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 2

- Ensure all labourers and staff are wearing the required Personal Protective Equipment (PPE). The minimum requirement is a hard hat and safety shoes. Safety glasses, visors, dust masks and gloves should be worn for activities such as welding and grinding. Scaffolding should be in place where labourers are working at a height of greater than 2m. Should gloves or a hard hat be difficult to wear for more intricate jobs (eg painting above head height), then they should still be kept at hand for use when such a task is complete. A standard overall should be worn by all employees for easy identification. Site Foremen and Team Leaders should set an example with the wearing of PPE.
- All sub-contractors should be inducted and trained regarding the EMP and they should also wear PPE.
- All visitors to the construction site should sign-in in a register, be issued with PPE and be inducted on safety matters. A record of such activity should be kept.
- No open fires should be allowed except where this is permitted for cooking and warmth purposes. Firewood should not be sourced from the environment next to the construction site.
- Ensure any fire-fighting extinguishers and first aid kits are accessible and fully operational. Emergency services contact numbers (police, ambulance, fire brigade etc) should be on hand.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 3

- Adequate waste containers should be placed on site to prevent littering. The construction sites should be regularly checked to ensure waste has not been left to blow around the site. Waste containers should also be capable of being closed or sealed off to prevent waste from being blown around.
- If waste can be recycled or reused in the region, then waste on site can be separated into different containers to assist in this regard. At some waste disposal sites, recyclers may be present who retrieve certain wastes for reuse. If this is noted, then separation of waste on the construction site may be warranted.
- When waste is taken to a landfill site for final disposal, if the site does not issue a record of the waste disposed, then keep a record at the construction site of the amount/volume of waste taken to the disposal site.
- No waste should be burned on site or in the waste containers, except in the case of paper and wood which can be safely burnt for fires used for cooking or warmth.
- Any spills of fuel, paint or other potentially hazardous substances should be cleaned up immediately and the waste containerised. This waste should ideally be taken to a hazardous waste site if one is available; alternatively, it should be adequately sealed for disposal at a general waste disposal site. Maintenance and washing of vehicles and equipment should take place on a hard impermeable (and preferably bunded) surface.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 4

- Potable water should be seen as a scarce resource and not wasted. Taps should not be left open. Leaking taps should be repaired. Water should not be allowed to run away from the ground beneath the tap and erode the soil. A hard surface should be installed beneath taps and any flow of water from the area beneath the tap should be safely channelled to plants or to an area where it does not present a hazard.
- Stormwater needs to be managed during the wet season. It should not be allowed to drain into excavations, nor should it be allowed to flood areas where materials and equipment are stored. A plan should be in place to manage stormwater and this must be approved by the RE and the environmental specialists in the Consulting Team.
- Should groundwater be intercepted during excavation work or during construction activities in the wet season, the Site Foreman and RE should be informed and a plan to protect the groundwater table must be approved by the RE and the environmental specialists in the Consulting Team. Any water pumped out from excavations or construction areas must be safely disposed of with the approval of the Site Foreman and RE.
- All wastewater from construction activities and the Contractor's camp must be channelled to lined pits. This includes wastewater from vehicle wash-down and maintenance areas, from areas used to wash tools and brushes used in concrete mixing and painting and from showers and cooking areas.
- Toilets and sanitation facilities should be checked daily for health reasons and records kept of when such facilities are emptied or replaced. Soap, toilet paper and other cleansing materials should be kept in stock.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 5

- Records should be kept of all complaints received from members of the public or local community. Key stakeholders such as headmasters of schools and community representatives should be consulted on a regular (preferably daily) basis to confirm there are no problems as a result of construction activities. The nature of any complaints should be noted together with the action taken to address the problem, including action to prevent a recurrence of the problem.
- Any observations where local community members' (or schoolchildren at school construction sites) behaviour interferes with construction staff and construction activities, or where construction staff behaviour affects community members/schoolchildren, should be noted and brought to the attention of the Site Foreman. Local livestock and wild animals should be left undisturbed.
- A supply of male and female condoms should be kept on site and records kept of when they are issued or supplies are replaced.
- Ensure posters, pamphlets and information about HIV/AIDS, STDs, TB and general health are readily available on site and placed on notice-boards.
- Records should also be kept of the number of women employed on site and any incidents where they feel they are being discriminated against in terms of access to facilities etc.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 6

- Access roads should not be allowed to become seriously damaged or unusable as a result of construction activities.
- Borrow pits (sand mining) and the access roads to them should be restored and left safe after use.

- Any disturbances resulting in excessive dust or noise generated as a result of construction activities should be noted and mitigation measures implemented as per the EMP.
- Ensure sensitive areas (eg watercourses, boreholes, oshanas, graveyards, neighbouring land uses, mature trees and areas of undisturbed vegetation) are taped off from the construction areas and educate the staff that such areas are off-limits.
- Ensure all safety, health and environmental awareness/training records are up to date.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

NB. Note that completion of the checklist each day does not absolve the on-site safety, health and environmental representative(s) from ensuring all conditions in the EMP/PHPSAPs are adhered to. If in doubt about actions to take, consult the full EMP/PHPSAP documents which should be kept on site.

2.6 Non-Compliance Procedures

The Contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty. In the event of non-compliance the following recommended process shall be followed:

- The ER shall issue a notice of non-compliance to the Contractor through the ECO, stating the nature and magnitude of the contravention.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor, through the ECO, shall provide the ER with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the Engineer shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the Engineer shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc. between any parties with regard to or arising from interpretation of the conditions of the ESMP, disagreement regarding the implementation or method of implementation of conditions of the ESMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- The Engineer shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remedial measures.

2.7 Offences and Penalties

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence.

The Contractor is deemed NOT to have complied with this Specification if:

a. within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the Specification;

b. environmental damage due to negligence;

c. the Contractor fails to comply with corrective or other instructions issued by the ER within a specific time;

d. the Contractor fails to respond adequately to complaints from the public.

Penalties for the activities detailed below, might be imposed on discretion of the ER should the Contractor and/or his Subcontractors are found to be Non-Compliant (Section 8.6):

a.	Actions leading to major erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%.
b.	Oil spills due to negligence and/or reluctance towards mitigation measures mentioned in the ESMP.	A penalty equivalent in value to the cost of clean-up operation plus N$ 4000.
c.	Damage to indigenous vegetation due to reluctance towards the ESMP.	A penalty equivalent in value to the cost of restoration plus N$ 6 500.
d.	Damage to demarcated sensitive environments	A penalty equivalent in value to the cost of restoration plus N$ 6 500.
e.	Damage to demarcated cultural sites	A penalty to a maximum of N$132 000 shall be paid for any damage to any cultural/ historical sites.
f.	Damage to trees	A penalty to a maximum of N$20 000 shall be paid for each tree removed without prior permission, or a maximum of N$20 000 for damage to any tree, which is to be retained on site.
g.	Damage to natural fauna (due to negligence and/or reluctance towards the mitigation measures mentioned in the ESMP).	A penalty to a maximum of N$6 500 for damages to any natural occurring animal.
h.	Any persons, vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a "no-go" area.	N$5,000
j.	Litter on site.	N$ 1,500
k.	Deliberate lighting of illegal fires on site.	N$ 1,000
l.	Individuals not making use of the site toilet facilities.	N$ 500

Commented [MS1]: Riaan Please consider the following rates as specified in current BoQ. This item 26%

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m.	Any person, vehicle, item of plant, or anything related to the Contractors operations causing a public nuisance outside the demarcated construction areas.	N$1,000

- Penalties may be issued per incident at the discretion of the Engineer. The Engineer will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract.
- For each subsequent similar offence the fine may, at the discretion of the ER, be doubled in value to a maximum value of N$10, 000.
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.
- In the case of a dispute in terms of this section, the Engineer shall determine as to what constitutes a transgression in terms of this document.

2.8 Environmental Monitoring and Auditing

Environmental monitoring should be conducted at least once every six months during construction. Benefits derived from the monitoring and final audit process might include:

- identification of environmental risk;
- development or improvement of the environmental management system;
- avoidance of financial loss;
- avoidance of legal sanctions;
- increase in staff awareness;
- identify potential cost savings;
- improve dealings with employees, environmental groups, the community, regulators, media, shareholders, or insurance & finance institutions; and
- establish a history of environmentally responsible operations, e.g. through environmental incident reports, environmental monitoring & recording, & reporting to committees or Authorities.

Commonly, the environmental monitoring or audit of a site will cover all management procedures, operational activities & systems, and environmental issues. The environmental monitoring and final audit will be compiled objectively and be conducted by an independent, competent entity.

2.9 Documentation, Record Keeping and Reporting Procedures

It is vital that an appropriate document handling and retrieval system be developed for all EMP documentation. This will ensure that there is adequate EMP documentation control and will facilitate easy document access and evaluation. EMP documentation should include:

- EMP implementation activity specifications;
- training records;
- site inspection reports;
- monitoring reports; and
- Performance Assessment reports.

Responsibilities must be assigned to relevant personnel for ensuring that the EMP documentation system is maintained and that document control is ensured through access by and distribution to, identified personnel.

Document control is important for the effective functioning of an EMP. A document handling system must be established to ensure adequate control of updating and availability of all documents required for the effective functioning of the EMP. This procedure applies to the EMP as well as procedures and policies relating to the EMP, which must be controlled (i.e. identified, registered and changes recorded).

The Environmental Officer is responsible for ensuring that the registration and updating of all relevant EMP documentation is carried out. It is the responsibility of the Project Manager to ensure that all personnel are performing according to the requirements of this procedure and to initiate the revision of controlled documents, when required by changes in process, operating procedures, legislation, specifications, monitoring or audit findings or any other circumstances, by informing the Environmental Officer of the changes. A controlled document is official only if the issue/revision has been approved. The Environmental Officer and Project Manager are responsible for ensuring that the latest versions of documents are used to conduct tasks which may impact on the project environment.