

ENVIRONMENTAL MANAGEMENT PLAN (EMP) OF BURROW PITS AND WASTEWATER EVAPORATION POND (KARIBIB TOWN COUNCIL), KARIBIB



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1.0 Introduction and background

Karibib Town Council (KTC) mandated, among other things, to plan, develop and maintain the town infrastructure. Good Infrastructure plays a major role in promoting growth and poverty reduction. For long, the Town's population has increased drastically resulting in the demand for improved infrastructure. These include adequate housing, improved sanitary conditions and good network. The ever-increasing demand for building materials for housing and construction of gravel roads led to the clearing of land, excavation of land which, consequently, leaves permanent scars on the earth's crust in the form of borrow pits. The Town Council is currently busy with the upgrading of the road infrastructure. With that there are several borrow pits created because of excavation in search for suitable materials that can be used to construct and or repair the road. To establish a site for borrow pits first one need clears the vegetation from the area before engaging in collecting suitable material. The borrow pits are constructed horizontally, which can attract and harvest rainwater. As we know borrow pits can be the source of storing water or it can act as recharge pond as especially if those areas happen to have a high groundwater borrow pits can also act as a seepage pond. During the dry season, borrow pits can serve as a storage of water from the rain. Both storing of rainwater and run-off or collecting seepage water they may serve as source of stock-water, irrigation, fishery including drinking water if its properly treated or contaminated water.

1.1 The layout of burrow pits

There are important factors to be considered when locating burrow pits. These include the availability of suitable materials in terms of engineering specification of gravels for road construction, the distance from the road as well as other business arrangement with respect to soil materials collection.

Other considerations include:

1. Ideally borrow pits should be near to the areas where the road is been constructed.
2. To investigate and consult with local community members on where to site borrow pits.
3. Regulate clients that are purchasing soil material from the burrow pits.

1.2 The purpose of Environmental Management Plan (EMP)

The general purpose of Environmental Management Plan (EMP) include:

- Prevent avoidable damage and/or minimise or mitigate unavoidable environmental damage associated with any construction, maintenance, or demolition work where there is a risk of environmental damage and to enhance positive benefits of the project.
- The EMP forms part of the contractual obligations to which all contractors/employees involved in construction, maintenance, or demolition work must be committed.
- It serves as a guideline and baseline information document for the construction and operational of the proposed project and aims to comply with Section 32 paragraph 1,2 and 33 (1) and (2) sub-paragraph (a) and (b) of the Environmental Management Act No. 7 of 2007.
- Give direction and guidance to all responsible parties, and binds all contractors, sub-contractors and other persons working on the sites e.g., burrow pits to adhere to the terms and conditions of the EMP during the operational phase of the life span of the pits.
- Any additional Site-Specific conditions decided and agreed upon during the “On Site Start-Up Meeting” shall be included and will become a part of the EMP.

The following EMP highlights were raised by the evaluating team:

1. Identification of project activities that could cause environmental damage (risks) and provides a summary of actions required.
2. Identification of persons responsible for ensuring compliance with the EMP and provides their contact information.
3. Provision of standard procedure to avoid and/or minimise the identified negative environmental impacts and to enhance the positive impact of the project on the environment.
4. Provision of site-specific recommendations with respect to:
 - areas where any unused soil material or waste may be stored.
 - allowed access and exit routes for soil materials collecting trucks.
5. EMP is a written record of procedures, responsibilities, requirements, and rules for clients, contractor/s, their staff, and any other person that must complied with.

6. Provision of a monitoring and auditing programme to track and record compliance and identify and respond to any potential or actual negative environmental impacts.
7. Provision of a monitoring system or programme for record keeping of any mitigation measures that are implemented.
8. The EMP is partly prescriptive (identifying specific people or organisations to undertake specific tasks, to ensure that impacts on the environment are minimised), but it is also an open-ended document in that information gained during the construction activities and/or monitoring of procedures on site could lead to changes in the EMP.

1.3 Terms of Reference

The Faculty of Health, Natural Resources and Applied Sciences at the Namibia University of Science and Technology was requested by the Karibib Town Council, as an independent Environmental Assessment Practitioner (EAP) to conduct EMP with the aim of obtaining Environmental Management Clearance Certificate for the maintenance of burrow pits and sewerage oxidation ponds as stipulated in the Environmental Management Act No. 7 of 2007.

1.4 The overall aim of the EMP

The overall aim of conducting the EMP for the burrow pits and wastewater evaporation ponds is comply with Environmental Management Act No. 7 of 2007.

1.5 Project Description and Location

Karibib Town, which is the project place is located on the latitude: 560 50' 0", and longitude:150 50' 0". The EMP of the burrow pits and evaporation ponds were conducted with the intention of obtaining Environmental Clearance Certificate from the Ministry of Environment and Tourism (MoET) as part of the due diligence and in compliance with legislation. These burrow pits, which are located behind the hillocks are for reference purposes referred to as (Site 1, Camp 3) where gravels for road constructions are collected and (Site 2, Camp 6) where soil materials for building purpose are collected.

Excavations of soil materials occur on the higher side of the hillock, not visible from the road, and extend as far as the existing low point. There is an untarred access route to the sites from Karibib main road.

2. BURROW PITS MANAGEMENT PLAN

2.1 Site 1 (Camp 3): BURROW PIT

CATEGORIES	ENVIRONMENTAL MANAGEMENT PROPOSITIONS
Report/Narratives	<p>Borrow pits can generally be described as holes, dug into the ground with the purpose of using the soil material for other purposes or activities. Usually, the earthen material is removed and used for activities such as building, layering during road construction etc.</p> <p>Nature/type of soil: Site 1 soil type can be said to be lithosols, i.e., calcareous which is rocky and may also contain limestone.</p> <p>Observation</p> <ul style="list-style-type: none"> ➤ Indiscriminate excavation and collection of soil material. ➤ Destruction of soil topography ➤ Destruction of the flora diversity.
Outcome(s):	Visible and uncontrolled/unregulated collection of soil materials by clients.
Proposed Mitigation Measures:	Proposed Mitigation Measures: Need for the council to provide oversight and control during the excavation, collection and loading of soil materials.
Recommendation(s)	<ol style="list-style-type: none"> 1. Monitoring activity: Designation of personnel to always follow clients during excavation and collection of soil materials in order to prevent indiscriminate excavation which may aggravate destruction of topography of the area. 2. From (1) it is important not allowing clients to proceed to the site alone for collecting soil materials. 3. With availability of budget, there is need to demarcate the area of excavation using (hard wood or iron material fencing with wiring and pillars). 4. Re-vegetation project of the area to prevent surface soil erosion and avoid long-term damage of soil topography. 5. Restoration of soil topography: Council may restore area topography using caterpillar for level correction. 6. Controlled excavation: Council may excavate and sort the gravel materials into different common and commercially prominent grades

	<p>or aggregates e.g., #11, #57, #67 of soil itself, packed into heaps while designated personnel monitor the collection and loading.</p> <p>7. Possible future use of site as sanitary landfill: For possible use of site as sanitary landfill of solid wastes, a detailed and scientific investigation of EIA exercise will be required.</p>
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SELECTED PICTURES OF OBSERVABLE EXCAVATION PROCESS OF SOIL AT SITE 1
(Pictures taken on 13 June 2022)



Picture 1: Unrestrained excavation resulting in gullies



Picture 2: Unregulated excavation with damage to soil topography and plant diversity



Picture 3: Scattered heaps due to uncontrolled excavation with damage to soil topography



Picture 4: Further scattered heaps due to unrestrained excavation



Picture 5: Indiscriminate excavation resulting in damage to vegetative diversity



Picture 6: Further scattered heaps due to uncontrolled excavation

2.2 Site 2 (Camp 6): BURROW PIT

CATEGORIES	ENVIRONMENTAL MANAGEMENT PROPOSITIONS
Report/Narratives	<p>Site 2 (Camp 6):</p> <p>Nature/type of soil: At site 2, the soil can be said to be more of Arenosols/sandy and incapable to support farming or agricultural activities.</p> <p>Observation</p> <ul style="list-style-type: none"> ➤ Indiscriminate excavation and collection of soil ➤ Destruction of soil topography ➤ Destruction of the flora diversity may aggravate surface soil erosion. ➤ Uncoordinated soil excavation is endangering power transmission poles. ➤ Uncoordinated excavation is too close to the road, endangering passing vehicle.
Outcome(s)	Visible and uncontrolled/unregulated collection of soil materials by clients.
Proposed Mitigation Measures:	Proposed Mitigation Measures: Need for the council to provide oversight and control during the excavation, collection and loading of soil materials.
Recommendation(s)	As proposed for the process at Site 1.



Picture 1: Unrestrained excavation resulting in gullies



Pic 2: Uncontrolled excavation resulting in gullies and damage to trees



Pic 3: As above, uncontrolled excavation resulting in undulating heaps and gullies



Pic 4: Uncontrolled excavation very close to electric pole (a big gully after the pole)



Pic 5: Uncontrolled excavation across road path

2.3 OTHER POSSIBLE IMPACTS AND MANAGEMENT PLAN

I: GROUNDWATER AND OTHER WATER RESOURCES

CATEGORIES	ENVIRONMENTAL MANAGEMENT PROPOSITIONS
Report/Narratives	<p>Conservation of water resources, especially groundwater is very crucial to Namibia. The country has been classified as an arid nation due to low level of precipitation with less than 10 mm (0.39 in) of rain annually which is also highly unpredictable. In addition, it is very vulnerable to land degradation (UNEP, 2022).</p> <p>Water resources of the country include surface waters (Orange, Kunene, Kavango and Zambezi Rivers). These are not anywhere within the vicinity of the evaluated sites in Karibib within the Erongo region. However, groundwater resource does not have regional boundary and availability is influenced by geological formation/foundation of the area.</p> <p>Namibia relies on groundwater resource in addition to others as part of the need to meet constitutional requirement. However, this resource is vulnerable to contamination. This can occur mostly through the deposition of soil wastes containing toxic substances. It can also occur through advertent or inadvertent deposition of toxic hydrocarbon substances such as lubricating oils, petroleum products and others.</p> <p>Evaluated Sites: Sites 1 and 2 (Camp 3 and 6): After extensive assessment and surveillance of the site, no deposition of possible contaminants of soil was observe.</p> <p>Outcome: No threat to or possible contamination of groundwater.</p>
Proposed Mitigation Measures:	No threat to or possible contamination of groundwater.
Outcome	Monitoring Activity: None since there were no observable threat(s).
Recommendation(s)	Not required

II: FLORA AND FAUNA

CATEGORIES	ENVIRONMENTAL MANAGEMENT PROPOSITIONS
Report/Narratives	<p>In broad term, Flora and Fauna denote plants and animals. For any country, preservation and conservation of the flora and fauna diversity is very crucial for sustainability. It is particularly more important due to the need to preserve indigenous plants and animal population.</p> <p>Destruction of the flora population may lead to environmental degradation which manifest in the form of surface soil erosion, weakness of the root structure of plants, loss of animal population that inhabits the soil and other.</p> <p>Evaluated Sites:</p> <p>Sites 1 and 2 (Camp 3 and 6): It was clearly evident, after thorough visual observation and plants root tracking process that there had been destruction/damage to flora (plant) population within the two sites.</p> <p>This might be as a result of selective excavation /scooping of soil materials for specific intended usage e.g., need for finer grade soil material as opposed to harder coarse material and vice versa.</p>
Proposed Mitigation Measures	<ol style="list-style-type: none"> 1. Demarcation of areas of soil collection to preserve the remaining existing plants on the sites. 2. Need to monitor the excavation or collection process of soil materials by clients. 3. Not allowing clients to proceed to the site alone for collecting soil materials.
Outcome (s)	<p>Monitoring Activity: Damage to the Flora diversity need to be monitored.</p> <p>No animals were observed or found during the investigation period, although, footprints, possibly of cattle were noticed. Hence, there was no visible threat(s) to Fauna diversity.</p>
Recommendation	<ol style="list-style-type: none"> 1. Flora may be cut/cleared ONLY if it is absolutely necessary and if it not an indigenous plant. 2. Carry out identification of the flora diversity in the area/sites to account for and label indigenous and non-indigenous plants. 3. Embark on re-planting project of the sites to prevent soil erosion.

III: AIR POLLUTION

CATEGORIES	ENVIRONMENTAL MANAGEMENT PROPOSITIONS
Report/Narratives	<p>Air pollution can be regarded as the presence of substances in the atmosphere that can pose serious problems to human health, wildlife, and the environment (Muresan et al., 2022). Air pollution has been known to be responsible for causing many allergies, diseases, especially respiratory tract, heart diseases and lung infection. In severe cases, it may lead to death. Common air pollutants include gases such as Nitrogen Oxides (NOx), Sulphur Oxides (SOx), Carbon Oxides (COx), Hydrocarbons, particulate matter (PMs) and others.</p> <p>It is expected that dust will be generated during the excavation and loading of soil materials. However, this could be minimised by putting in place some mitigation measures as proposed below.</p> <p>Evaluated Sites:</p> <p>Sites 1 and 2 (Camp 3 and 6): With respect to these sites, the only possible air pollutant observable is dust/particulate matter (PM) pollution. At site 1, air pollution might not be as aggravated or pronounced as in site 2 mainly due to the nature/type of soil. Site 1 soil type can be said to be lithosols, i.e., calcareous which is rocky and may also contain limestone. At site 2, the soil can be said to be more of Arenosols/sandy and incapable to support farming or agricultural activities. This is more prone to atmospheric dispersion of soil particles which can be transported and deposited at nearby community (~500m) away from this site and far beyond.</p>
Proposed Mitigation Measures:	<ol style="list-style-type: none"> 1. The cutting and destruction of few trees and vegetation at the sites should be prevented. 2. Ensure the monitoring of excavation of soils process by clients in order to prevent the cutting and destruction of vegetation. 3. Use water may be used as dust suppressor before excavation and loading of soil materials onto the truck. This will minimise the volume of PMs to be released into the atmosphere.

Outcome(s)	Proposed Monitoring Activity: Due to size of the two sites, monitoring of or prevention of tree cutting by community members for energy generation will be quite challenging. However, regular education and awareness campaign can be conducted to residents on the importance of trees in the reduction of PMs and prevention of respiratory tract diseases.
Recommendations	In terms of reduction of air pollution from PM emission, it is recommended that: 1. Re-vegetation/tree planting project is considered for the two sites. Vegetations are known to prevent/reduce soil atmospheric dispersion and erosion process.

2.4 WASTEWATER EVAPORATION POND MANAGEMENT PLAN

Categories	Environmental Management Proposition
Report/Narratives	Evaporation ponds are artificial ponds with very large surface areas that are designed to efficiently evaporate water by sunlight and expose water to the ambient temperatures. Observation <ul style="list-style-type: none"> ➤ Accumulation of algal on pond surfaces. ➤ Presence of fallen trees in the ponds. ➤ Integrity of pond compromise due to growing trees.
Outcome(s)	<ul style="list-style-type: none"> ➤ Wastewater Evaporation Pond is in poor state and potential health risks as animals such as goats have access to the wastewater. ➤ Possible human health risk since children may fall into the pond due to open access.
Proposed Mitigation Measures	Repair, maintenance, and removal of algal and tress. Complete fencing of the wastewater ponds
Recommendation(s)	<ul style="list-style-type: none"> ➤ Treatment of wastewater and possible use for irrigation purpose.

- Periodic collection/removal of sludges from the wastewater ponds with the view of selling to farmers as soil enrichment material for possible income generation to the Council.
- Fencing of the wastewater pond area is highly recommended for prevention of access to animals and unauthorized people.



Pic 6: Accumulation of algal on pond surfaces



Pic 7: Presence of fallen trees in the ponds



Pic 8: Integrity of pond compromise due to growing trees

Conclusion

Observation of the current state of activities at the sites revealed uncontrolled excavation of soil materials at the two sites. These activities result in damage to the topography of soil and vegetation/ diversity of plants. Generation of income through the sale of soil materials for building and road construction is important to the council, however, it is equally important to ensure preservation of the natural environment. In order to prevent this long-term environmental impact, it is essential that due consideration is given to the implementation of recommendations to prevent and forestall further damage to soil topography. Of crucial note is the monitoring of excavation and soil collection process.

The EMP should be used and implemented to achieve desired objective(s) with respect to income generation on one hand and ensuring proper environmental management on the other. The appointment of implementation officer with reporting channel for the provision of oversight is highly recommended. This officer will be responsible for the provision of progress report/update after obtaining Environmental Clearance Certificate and expiration of the EMP as specified by the Ministry.

2.5 FURTHER/ADDITIONAL RECOMMENDATIONS DURING EMP IMPLEMENTATION

2.5.1 Environmental Management Plan

Karibib Town Council or its representative(s) shall take ownership of the implementation of the EMP. This should be done with due cognisance to applicable Environmental laws.

2.5.2 Environmental monitoring

Regular environmental monitoring of operational activities of the sites in compliance with all aspect of EMP principles, regulations and guidelines should be adhered to by the Council or its representative(s) during the implementation of recommendations.

2.5.3 Non-Compliance of the EMP

Should there be any challenges or problems occurs during mitigation measure, and or during monitoring procedures that could results in non-compliance of the EMP, the responsible officer must address that non-compliance immediately and execute penalties as deemed necessary.

2.5.4 Site Management

Designated burrow pits areas shall be considered no go zone without authorization from the Karibib Town Council. Demarcation of areas of soil collection to preserve the remaining existing plants on the sites. Need to monitor the excavation or collection process of soil materials by clients.

2.5.5 Access route and work site

Vehicular movements in and around those excavation site must be always monitored. There should only a single entry into the area to avoid uncontrolled entry into the designated area. Strict control measures must be implemented to ensure trucks movement in the designated area do not deviate off the access route.

References

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UNEP (2022). Namibia- Biodiversity Facts. Status and trends of biodiversity, including benefits from biodiversity and ecosystem services. Secretariat of the Convention on Biological Diversity, www.cbd.int/countries/profiles (accessed 22-06-22)