



# **ENVIRONMENTAL SCOPING REPORT**


**And**

# **ENVIRONMENTAL MANAGEMENT PLAN**

**FOR THE**

# **REHABILITATION OF TR10/2 BETWEEN THE ONHUNU INTERSECTION ON TR1- 12 AND EENHANA IN THE OHANGWENA REGION**

**2015**

Project Name:	REHABILITATION OF TR10/2 BETWEEN THE ONHUNU INTERSECTION ON TR1-12 AND EENHANA IN THE OHANGWENA REGION
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## 1. EXECUTIVE SUMMARY

The Roads Authority of Namibia appointed Element Consulting Engineers to perform consultancy services for the detail design, tender documentation, contract administration and site supervision for the rehabilitation of TR10/2 between the Onhunu Intersection on TR1-12 and Eenhana in the Ohangwena region, the total distance is 47km. Enviro Management Consultants Namibia has been appointed by Element Consulting Engineers to conduct the environmental investigation and conduct the environmental impacts assessment and compile the EMP for this project.

The objectives of this project can therefore be summarized as follows:

- Improve safety for the road user,
- Improve road transport efficiency,
- Reduce road user costs,
- Reduce road maintenance costs.

The rehabilitation will generally entail the following:

- The rework and reinstatement of the pavement layers, including vertical and horizontal alignment,
- The widening of the travelled way and shoulders to the current Roads Authority Standard,
- The strengthening, repair as well as widening of culverts to accommodate the increase in road width,
- The upgrading of all intersections in accordance with the relevant specifications,
- Improvement of the drainage facilities along the route where needed,
- The establishment of road furniture where required as well as the updating of current infrastructure.

This existing road has been investigated for defects and the testing of the in-situ materials in existing layers is currently in progress. The road is in a state of distress at present and rehabilitation options for: Short (5 Years); Medium (10 Years) and Long term (20 Years) pavement life will be investigated as part of the design.

The proposed new alignment will follow the existing alignment as far as possible to minimize the socio environmental impact and to save on construction costs, where the existing alignment do not conform to 120km/h geometric design standards or where road user safety can be improved, a revised alignment proposal will be submitted to the Roads Authority.

The following Environmental Scoping Assessment was conducted in accordance to the legislation mentioned above. Before construction will take place on the road, legal requirements pertaining to

the environmental assessment process and the proposed development were identified. The environment was taken in full consideration throughout the Environmental Scoping Assessment.

The study area is situated in the northern central part of Namibia. The land uses within the immediate vicinity of the proposed road upgrade development are predominately low density residential however various agricultural activities have been established in the area and large open spaces are visible between the different small towns. The majority of surrounding areas are covered with natural vegetation.

A direct possible positive impact that the road upgrade development will have is the creation of employment especially during the construction phase. Some negative impacts namely dust and noise generation are expected during the construction phase. Mitigation measures will be provided that can control the extent, intensity and frequency of these named impacts in order not to have substantial negative effects or results. The road upgrade development should not negatively affect the amenity of the locality and the activities should not adversely affect the environmental quality of the neighbouring zones. None of the potential impacts identified are regarded as having a significant impact to the extent that the proposed development should not be allowed. However, the construction further on needs to be controlled and monitored by the assigned engineers, contractors and workforce.

It is believed that the proposed road upgrade development will not pose any long lasting negative effects on the environment. Additional details will be presented in the following Environmental Scoping Assessment.

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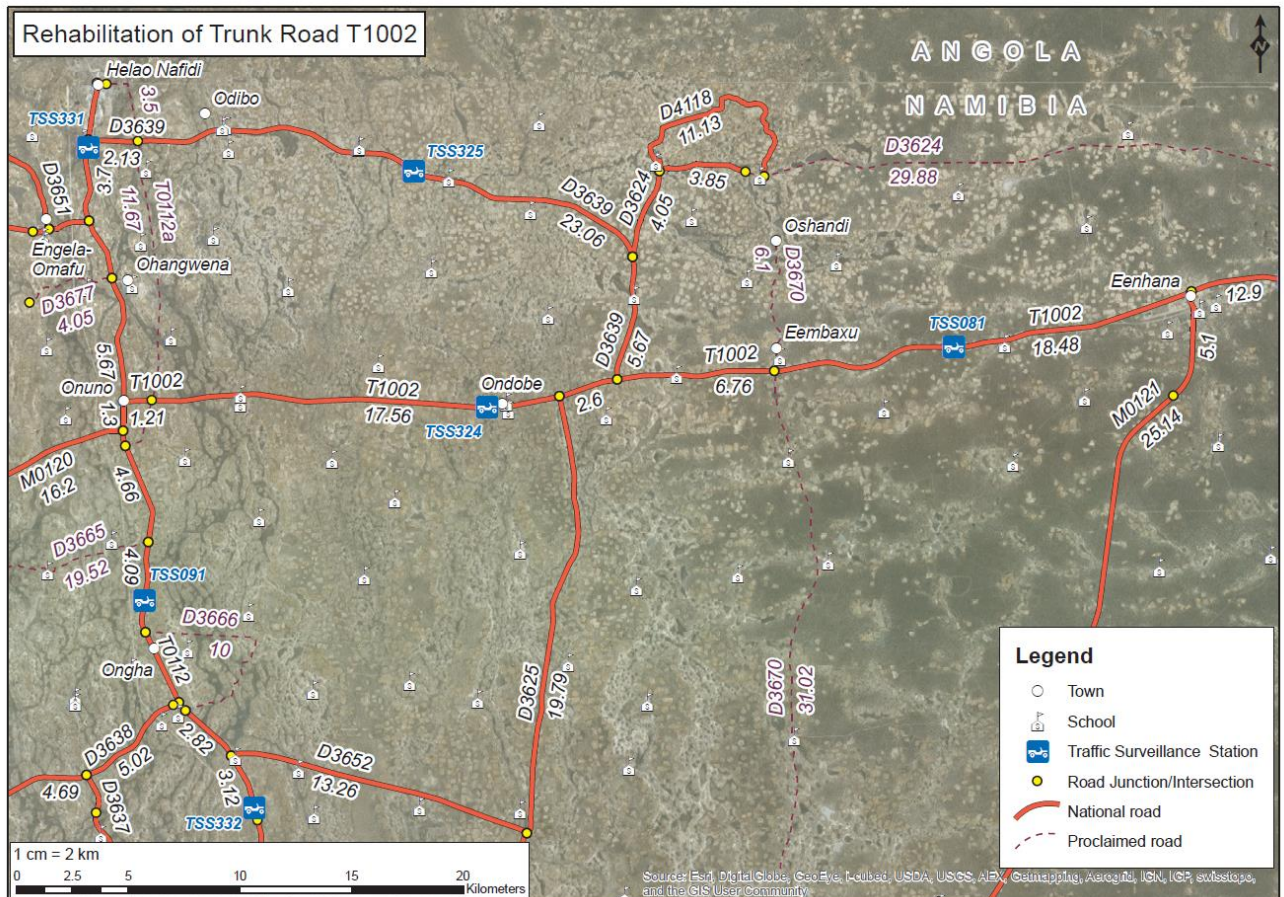
## **LIST OF ABBREVIATIONS**

BID	Background Information Document
EC	Environmental Clearance
ECO	Environment Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
I&APs	Interested and Affected Parties
IUCN	International Union for the Conservation of Nature
MET	Ministry of Environment and Tourism
NBRI	National Botanical Research Institute



# 1. INTRODUCTION

The section of TR10/02 to be rehabilitated starts at the TR1/12 intersection in Onhunu and follows an easterly direction towards Eenhana. The Project section is located in the Ohangwena region of Namibia and the section under consideration is 47km in length. The route links the Oshikango/Ondangwa Route in the west with Rundu in the east.



**Figure 1: Locality map**

The current bituminous road is in severe distress and therefore needs to be rehabilitated to the latest Roads Authority standards with regards to ride-ability, width and road user safety. The alignment of the rehabilitation project will keep as far as possible to the current alignment of TR 10/02 to minimize construction cost.

The Ohangwena Region of Namibia covers 1 0710 km<sup>2</sup> and has a population of 245 446 which gives the region a population density of 22.9 persons per km<sup>2</sup>. The Ohangwena region is the most densely populated area in Namibia as determined by the 2011 census.

## 1.1 Description of the Existing Road

TR10/02 starts at the intersection with TR1/12 (Onhunu) and ends at the intersection with TR10/01 (between Nkurunkuru and Katwitwi). The portion of interest starts at TR1/12 (Onhunu intersection) and ends at Eenhana with a total length of 47 km. A locality plan is included in Appendix B.

The following table shows the relevant section for rehabilitation of TR10/02 as registered in the Road Referencing System (RRS) of the Roads Authority:

**Table 1: Road Referencing System of the Roads Authority**

<b>Km</b>	<b>Feature ID</b>	<b>Description</b>
<b>0.00</b>	WE3325N	Intersection with T0112
<b>18.76</b>	WE3351N	Intersection with D3625
<b>21.36</b>	WE3393N	Intersection with D3639
<b>28.12</b>	WE3718N	Intersection with D3670 (Eembaxu Village)
<b>46.59</b>	WE3336N	Intersection with M0121

The existing road is currently designed for a 120km/h speed limit, but the existing geometric alignment will be verified to identify any possible geometric improvements.

There are no major structures on the road and storm water is currently accommodated by means of pipe- and box culverts.

## **1.2 Need and desirability for the project**

The whole of TR10/2 is situated in the northern part of the Ohangwena Region and runs parallel to the Namibian/Angolan border in a easterly direction. According to the 2011 census, the Ohangwena Region houses 11.6% of the total population of Namibia. The projected population figures for the Ohangwena region for the year 2020, at 0.7% growth per annum (from 2001 to 2011) is estimated at 261 349. The western third of the Ohangwena Region is home to most of its population, while the remaining eastern part has a much lower population density. Eenhana, the Regional Capital of the Ohangwena Region, has been reported to experience rapid population growth since it's proclamation as a town in 1999.

In terms of the national and regional road network, the rehabilitation can be regarded as essential, as it is the shortest link between the North Eastern Parts of Namibia and the Northern Central Parts of Namibia. The route is also a major link to the Border post at Oshikango, which facilitates a major portion of Namibia's exports to Angola.

The provision of roads is an important social component. The general settlement pattern in the rural areas can be described as uneven. People live in scattered homesteads but in some places it is possible to distinguish a grouping of homesteads known as 'Omikundas', which may function as a village.

Roads render services to the community by providing access to modern means of transport which can improve their quality of life significantly. Improved access to markets, health care services and

educational facilities benefit the society as a whole as it improves the potential for economic development. Social development in the project area is essentially marked by the progress made in the sectors of education and health.

In terms of education, one of the biggest problems is access to schools during the rainy season when water pans may be flooded. Learners are obliged to make long detours around the pans and in some cases are unable to reach schools completely until the water subsides.

Similarly, schools may become inaccessible to some teachers and education inspectors from the outside. It is customary that qualified teachers are unlikely to be found in remote and inaccessible areas and the proposed upgrading of the road may indirectly improve the quality of education.

Similarly, in terms of health care, many clinics cannot be accessed via roads, especially during the rainy season, limiting the efficiency of health services. It is believed that the upgrading of this road will provide reliable access to clinics throughout the year and subsequently improve the quality of life in these areas.

Roads also contribute to better administration of a region. This includes the establishment of magistrate's courts, police stations and other administrative facilities which further contribute to the general development of an area. Organizations such as church missions, which are well established in northern Namibia and which play a major role in the social upliftment of the population can also perform their activities more effectively.

Small scale and medium-sized enterprises form the basis of all trade and industry activities in Ohangwena Region. Eenhana is growing at a high rate with an industrial district. Eenhana accommodates a growing informal sector involved in small-scale manufacturing and trading activities. Many formal shops are now established and some of the major banks now also have a presence. Helao Nafidi also houses some of the major banks and further accommodates a wide variety of formalized traders which mainly trade with neighbouring Angola.

Most of the goods are however imported from elsewhere. About 65% of imported goods come from Windhoek or directly from South Africa. The remainder of the imported goods come from Angola and other neighbouring countries.

From the main trading centers of Eenhana and Helao Nafidi goods are distributed throughout the region via a network of small traders. These small shops referred to locally as "cuca shops" sell common consumable goods, but the single most important article is beer.

The rehabilitation of TR10/02 will subsequently improve trade and industry on a regional, national and international level.

### 1.3 Typical Cross-Section

The Terms of Reference proposes the use of a 6.9m wide surfaced carriageway with two 0.75m wide surfaced shoulders on either side with 2.0m wide gravel shoulders. The formation is therefore 11.4m wide.

In accordance with the RA Standard Drawings, the consultant would like to propose a 12.4m wide formation with a 6.9m wide surfaced carriageway with two 0.75m wide surfaced shoulders on either side with 2.5m wide gravel shoulders.

For the purpose of adequate road surface drainage a camber of 2.5% to both sides will be provided. This configuration is likely to change in lieu of the section being rehabilitated by VKE Namibia between Eenhana and Elundu as these sections needs to be of the same standard for continuity.

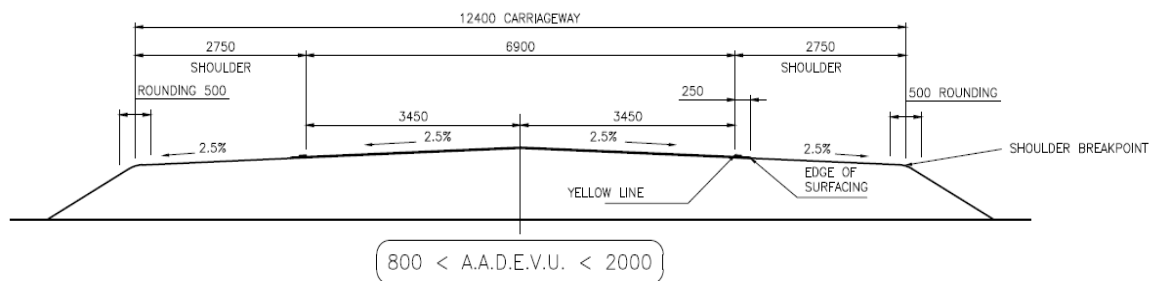


Figure 2: Proposed Typical Cross-Section

During detail design, the Consultant will carry out more detailed calculations with regard to expected future traffic volumes with the applicable manuals and confirm the suitability of the proposed typical cross section.

The Consultant will adequately motivate the necessary road width for approval by the Roads Authority.

### 1.4 Existing Culvert Structures

The capacity of existing culvert structures will be evaluated and areas where additional drainage structures will be required to allow water to flow below the road embankment will be identified. The vertical alignment will have to be adapted accordingly. The position of new culverts will be determined from the longitudinal survey and from orthographical images.

The existing drainage structures will be investigated for suitability. The structures will be evaluated using the latest design standards available and should the structures prove to be inadequate additional structures will be put in place.

During the community meetings constituents will be asked regarding previous road overtopping and problems with flooding to ensure that the problem areas are addressed adequately in the new design.

## **2. TERMS OF REFERENCE**

The following terms of reference will be followed. The tasks that are undertaken for the Environmental Scoping Assessment is the evaluation of the following: climate, water (hydrology), vegetation, geology, soils, cultural heritage, sedimentation, erosion, biodiversity, sense of place, socio-economic environment, health, safety and traffic. If any specialist studies in any field is required (geo-hydrological or ecological), the proponent/client will be notified and consulted.

The Environmental Commissioner needs to be consulted at the completion of the Environmental Scoping Assessment. Environmental Clearance will only be obtained (from the DEA) once the Environmental Scoping Assessment/EIA has been conducted for the known activity.

The public consultation process is usually characterized by letters that are sent to all neighbours, Interested and Affected Parties (I&APs) and relevant authorities. A Background Information Document (BID) is also sent to all persons requesting one. Notices are placed in two local newspapers stating the proposed project.

The methods that were used to assess the environmental issues and alternatives are the following: data about the area was collected, the site was visited and the stakeholders were consulted, specific impacts were identified and assessed for instance the bio-physical and socio-economic aspects. Impacts were rated to a degree of significance. Consequences of impacts were determined in four categories: expected duration of impact, geographical extent of the event, probability of occurring and the expected intensity.

All other permits, licenses or certificates that are further on required for the operation of the proposed road development still needs to be applied for by the proponent/client.

## **3. APPROACH TO THE STUDY**

As mentioned earlier in this report as well, it is required by the Environmental Management Act (No 7 of 2007) that an Environmental Scoping Assessment be compiled as part of the exercise that has to be undertaken for the proposed road upgrade development. The goal of this report is to give clearance on the project towards any members in the society and also to the Interested and Affected Parties (I&APs). The purpose of this report is to provide all necessary information regarding the project and the methodology that was followed.

The aim of this assessment is to provide the description of the affected environment and the reason for development, impacts assessed and findings of the study for both the construction and operational phases to registered I&APs and stakeholders and especially to provide all the registered I&APs and stakeholders an opportunity to comment on the study.

The public was given an opportunity to comment and any comments received have been included in this Environmental Scoping Assessment which will be submitted to the Directorate of the Environmental Affairs (DEA) for the final decision making and for final evaluation.

#### **4. ASSUMPTIONS AND LIMITATIONS**

It is assumed that the information provided by the proponent/client is accurate. One limitation is that no alternative site for assessment was provided. The assessment is based on the prevailing environmental conditions and not on future happenings in the area. However, it is assumed that there will be no significant changes to the proposed road development and the environment will not adversely be affected between the compilation of the assessment and the implementation of the proposed development. The EMP conducted will hold requirements and procedures that must be followed by the proponent and manager of the proposed project.

#### **5. ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS**

The administrative, legal and policy requirements are related to the methodology that needs to be followed when conducting an Environmental Scoping Assessment. When compiling and setting up an Environmental Scoping Assessment or an Environmental Impact Assessment (EIA), a few steps need to be followed in order for it to be in line with the law. As mentioned earlier in the report, first of all a notice about the development needs to be placed in two local Newspapers. Letters stating the development and the reasons for the development should be sent to the Ministry, the neighbours and to Interested and Affected Parties (I&AP's). Then a Background Information Document (BID) should be compiled and send to the persons requesting one.

The **Constitution of the Republic of Namibia (1990)** states that the State shall promote and maintain "ecosystems, essential ecological processes and biological diversity of Namibia and to utilize natural resources on a sustainable basis for the benefit of all Namibians both present and future".

The **Commenced Environmental Management Act (2012)** stipulates that when "construction (upgrade) of public roads" is done, a Scoping Assessment/EIA should be conducted. The Environmental Management Act contains guidelines, procedures and principles that should be followed when conducting a Scoping Assessment/EIA.

The **Water Resources Management Act (No 24 of 2004)** stipulates conditions that ensure effluent that is produced to be of a certain standard. There should also be controls on the disposal of sewage, the purification of effluent, measures should be taken to ensure the prevention of surface and groundwater pollution and water resources should be used in a sustainable manner.

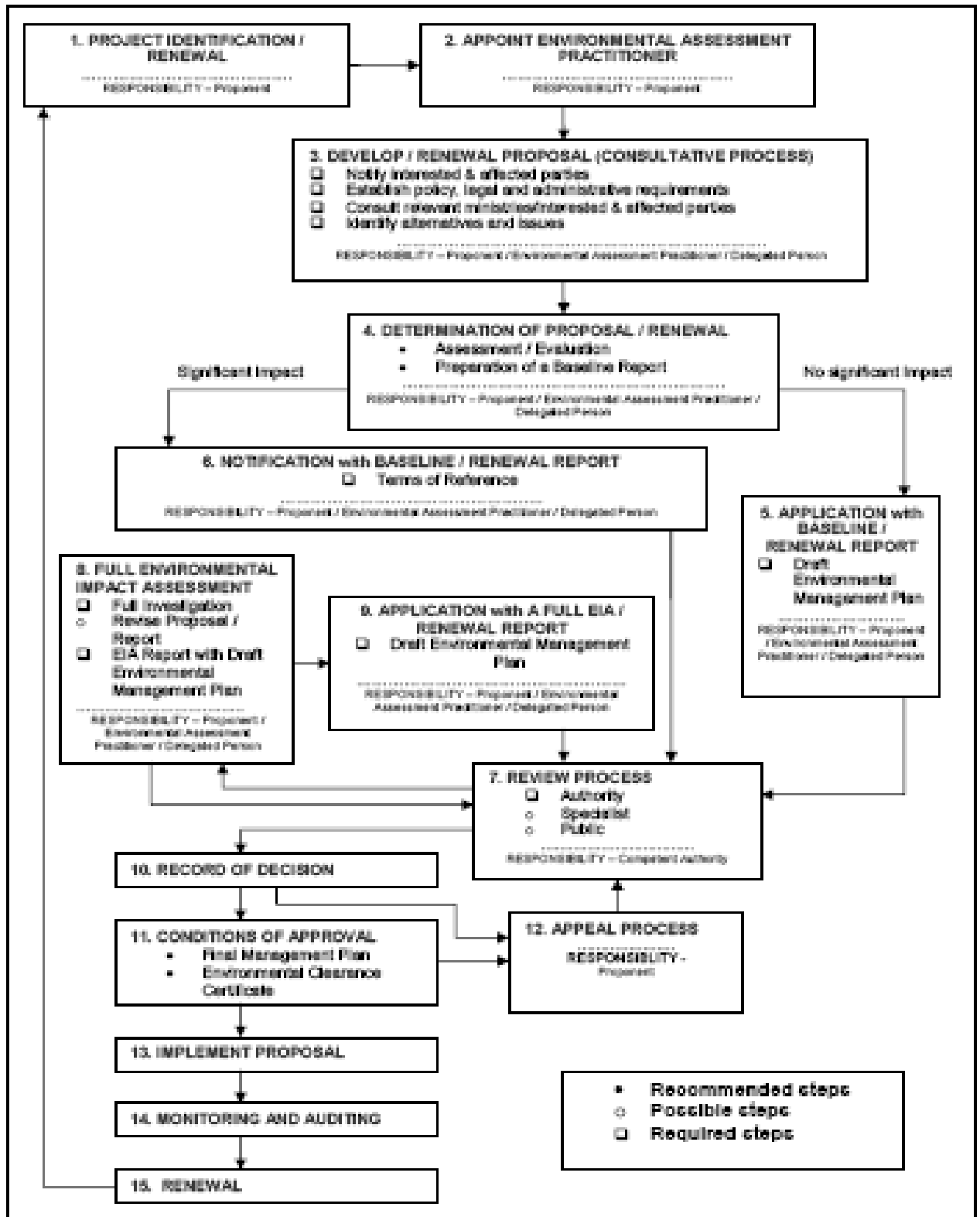
The **Nature Conservation Ordinance (No 4 of 1975)** covers game parks and nature reserves, the hunting and protection of wild animals, problem animals, fish and indigenous plant species. The Ministry of Environment and Tourism (MET) administer it and also provides for the establishment of the Nature Conservation Board.

The **Forestry Act (No 12 of 2001)** specifies that there be a general protection of the receiving and surrounding environment. The protection of natural vegetation is of great importance, the Forestry Act especially stipulates that no living tree, bush, shrub or indigenous plants within 100 m from any river, stream or watercourse, may be removed without the necessary license.

The **National Heritage Act (No 27 of 2004)** protects all archaeological remains – that is anything more than 50 years old. Any works such as excavation, removal of trees, vegetation or soil shall not disturb archaeological remains and should any such material be found on any site it must immediately be reported to the Heritage Council in Windhoek.

The **Soil Conservation Act (No 76 of 1969)** as amended in South Africa (March 1978), covers the prevention of soil erosion, conservation and manner of use of soil and vegetation, and the protection of water sources. This includes (of relevance to this project): the drainage of water, marshes, natural water sponges and water courses, the prevention of erosion, the denudation, disturbance or drainage of land, and any other disturbance of the soil which may create conditions which may cause any form of erosion or pollution of water by silt or sand.

A flowchart indicating the entire Scoping/EIA process is shown in *Figure 3*:



**Figure 3: Flowchart of the Environmental Assessment Process**



## 6. GENERAL DESCRIPTION OF THE ENVIRONMENT

The following information was obtained using secondary information sources available and this information was applied to the current situation and the specific project. Only minor changes have been made since the projects are fairly similar. This will relate mainly to the borrow pits and quarry sites, and proposed minor changes to the alignment at certain intersections.

The affected environment is not known to be particularly sensitive, and it also has a history of some degree of disturbance. Moreover, the fact that construction will affect only places close to the existing gravel road will further limit the environmental impacts.

The EIA will assess the relative sensitivity of the borrow pit sites identified by Element Consulting Engineers (Pty) Ltd. If more borrow areas are identified than are needed, the EIA will therefore help to assist in selecting the least-impact sites. However, it is understood that suitable construction material may only be found at a limited number of candidate sites, and that the cost of haulage will represent a constraint on the borrow areas sites to be selected.

### 6.1. CLIMATE AND TEMPERATURE

This area has a tropical climate with an annual mean temperature of more than 22 °C. The mean maximum temperatures for the hottest months are 34-36 °C. The mean minimum temperature for the coldest months (usually July) is 4-6 °C. Frost occurs on less than five days per year on average.

### 6.2. RAINFALL

The mean annual rainfall varies from over 600mm in the east near of Nkurenkuru, decreasing westwards to about 450mm or 500mm near Eenhana. The number of rain days per year is 45-50 (i.e. the number of days in a year with more than 1mm of rain falling). The mean annual rainfall is variable, with a coefficient variation of 30-40% in the east and less than 30% in the west of the study area. Most of the annual rain falls between November and March (with a peak in January), but light falls can sometimes occur in the winter months.

<b>Month</b>	<b>Average monthly rainfall (mm)</b>	<b>Average number of days with rainfall exceeding 10mm</b>
January	120.0	10
February	135.0	13
March	107.0	9
April	37.0	4
May	5.0	0
June	0.0	0
July	0.0	0

August	0.0	0
September	1.0	0
October	14.0	1
November	54.0	4
December	90.0	9

**Table 2: Annual rainfall figures**

### 6.3. RELATIVE HUMIDITY AND EVAPORATION

Humidity varies from an average of more 80-90% in the most humid month (February or March) to 10-20% in the driest month (September). The average annual evaporation rate is in the range 1,800 – 1,960mm. Potential evaporation exceeds rainfall by 1,300 – 1,500mm.

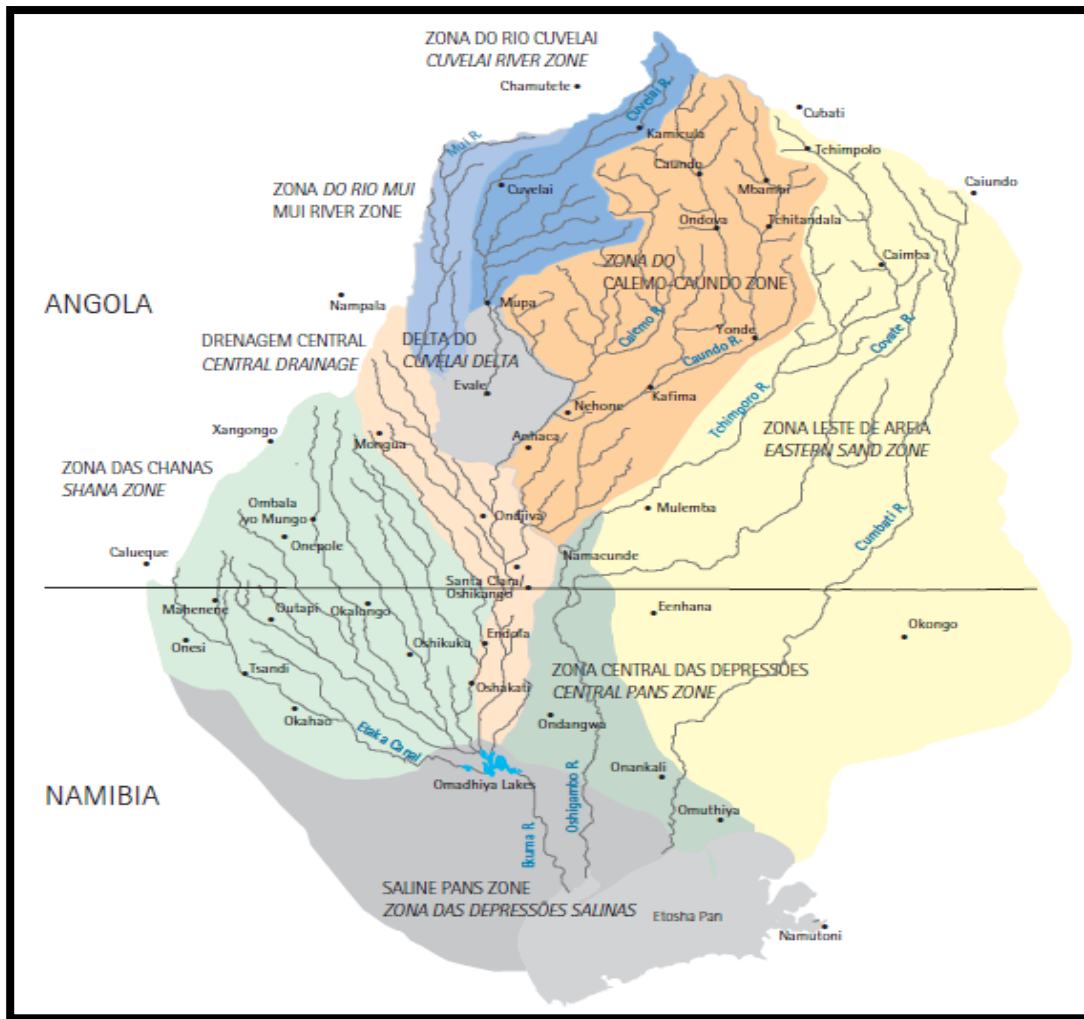
### 6.4. WINDS

Wind may blow from any direction, but winds in the area have a more commonly easterly component. Wind speeds are usually below 10km/hour. In general wind speeds increase in summer early afternoons.

### 6.5 TOPOGRAPHY AND SURFACE WATER

TR10/02 is located on an extremely flat plain, which forms part of the Etosha Depression. The topography descends gradually as a shallow trough towards the Etosha Pan in a southerly direction. The elevation in the vicinity of the road varies between 1100m and 1116m above mean sea level (AMSL).

A combination of factors, such as the flat topography, sandy soils and the ephemeral flow of the watercourses, produced a poorly developed drainage system draining from Angola to Namibia (the Cunene river valley system being the exception to this). Five drainage patterns can be distinguished crossing the border into Namibia as indicated by **Error! Reference source not found.** below:



**Figure 4: Drainage systems in the Northern part of Namibia**

- In the east the water courses flow from east to west and then turn southwards towards the Etosha Pan (eastern sand zone).
- In the central-east a few flow paths are traceable on the sandy surface, but their definition is poor and they cannot really be regarded as water courses (central pans zone).
- Two drainage patterns can be distinguished in the central area, i.e. the central drainage and oshana zone. These are numerous interconnected ephemeral pans and shallow water courses which run from the north in a south-easterly direction towards the Etosha Pan. The western portion of TR10/02 is situated within the eastern extremities of the Cuvelai delta.
- In the west, despite the steeper gradient of the land between the border with the Kunene Region and the Oshana Etaka, no continuous watercourses are found and the runoff disappears into the sand or collects in numerous small pans (saline pans zone).

The principal drainage system that crosses TR10/02 is that of the Oshigambo Drainage System, which forms the eastern sub-system of the Cuvelai Delta. This system carries water from Angola through the road location to Lake Oponono. The Cuvelai rises south of the Sierra Encoco mountain range in Angola where it is perennial. Approximately 26 450 km<sup>2</sup> of the catchment is situated in

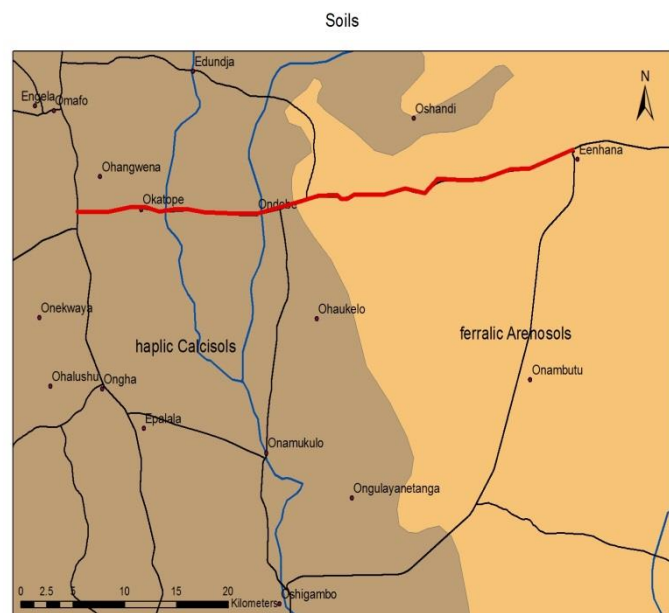
Angola. The headwaters of the Cuvelai consist of well-defined watercourses but these later become the flat channels called oshanas.

In some cases, continuous flow paths can be traced over long distances and they form major oshanas, e.g. the Oshana Oshigambo. Rains in Angola cause the Cuvelai system to flood, the volumes of water depending on the rains received upstream. From time to time, eg. from 2007 to 2010, exceptional floods originated in Angola, which caused developments and infrastructure to get damaged and people were displaced by the extent of the floods.

The described topography has a significant effect on the cost of roads. The costs of roads constructed in an east-west direction are much higher as many oshanas need to be crossed, necessitating costly drainage structures sometimes amounting to over 50% of the total cost. Roads following a north-south direction cross far fewer oshanas.

## 6.5. GEOLOGY, GEOHYDROLOGY AND SOILS

The study area is covered by aeolian (wind-deposited) Kalahari sand as paleo dunes, which have been stabilized for thousands of years by natural vegetation. Only occasional outcrops of hard material such as calcretes occur. The road is remarkably flat, with an elevation usually between 1,100 – 1,150m above sea level. The geology is classified as Kalahari Sandveld over the entire study area. Due to the deep sands, drainage is poorly developed. The rest of the area is almost devoid of well-developed drainage lines as the rainfall is able to sink straight into the deep sand.



In the inter-dune slacks between the low paleo dune formations, pedogenic processes have resulted in the accumulation of calcareous deposits (calcrete) as a result of the highly seasonal rainfall and high evaporation rates. The calcrete usually forms a layer starting a meter or two below the surface of the soil. In unusual circumstances, notably at Kasoro, the landscape appears to have been inverted – with calcrete now occupying higher levels in the landscape following an erosion cycle that removed the unconsolidated dune sand so that the harder calcrete deposits were left in slightly elevated areas.

Silcretes, with some iron content, have also formed in places where the rainfall is higher. Both the calcrete and silcrete deposits are often good for road construction. The soils derived from the Kalahari sands are classified as Ferralic Arenosols. These consist of fine quartzitic sand of uniform grain size, which are typically low in silt and clay-sized particles. They are therefore well drained, with poor moisture retention properties and low nutrient status. However, where these soils contain sufficient clay levels and a sufficient organic content, they are suitable for cultivation, at least for a limited number of years. It was observed in the field that the calcrete deposits are mostly associated with cultivated areas (past or present). The calcrete is always overlain by good sandy loam soil. It appears that the layer of calcrete impedes deep infiltration of rainfall and therefore enhances the conditions for cultivation of crops.

Lower lying areas are usually (though not exclusively) preferred for cultivation – presumably due to higher soil moisture, and higher clay and organic content. In the occasional drainage lines, the soils are classified as Eutric Fluvisols. These have higher clay and organic content. However, in some places the soil becomes waterlogged, probably due to presence of calcrete and impermeable clays, which inhibit penetration of water to deeper levels.

There is no permanent surface water in the study area. For this reason the local people often appreciate the opportunity for a borrow pit to become a seasonal water hole for watering their livestock. The deep Kalahari sands comprise a porous aquifer over most of the study area, which is the source of domestic water supply. Boreholes in these sandy deposits provide water for the local people and their livestock.

Groundwater in the project area occurs as:

- Discontinuous perched water table that is seasonal. This forms in areas where water is trapped temporarily above the clay and calcrete at shallow depth.
- Permanent water table known as the Main Shallow Aquifer. It is approximately 20-40m deep, and the water is saline over most of the region.

Both sources of water may be utilized during construction. Use of water from the former source will need to be agreed with the local population whereas use of water from the latter source will require the necessary consideration given its high saline content.

Additional water sources will be investigated during the design stage and the findings will form part of the final design report.

## **6.6. AFFECTED HUMAN ACTIVITIES**

Some of the study area is on communal land, with land being allocated by traditional leaders for residential and agricultural use. The woodlands are used for communal grazing. Fields have been cultivated on a “slash-and-burn” basis. The natural woodlands are cut down and burned, which returns minerals and nutrients to the soil. In the natural woodland conditions, the soil fertility is maintained as the woodlands continually recycle the nutrients. However, once the woodlands are

cleared for cultivation, the fertility starts to decline. Farmers do not use artificial fertilizers to maintain soil fertility. They simply abandon a field that no longer produces and clear a new one or an old field where the natural vegetation has partially regenerated. Most of the sites used for sand pits lie partially or completely within cultivated lands. Where this is not the case, the affected areas are old abandoned fields where the natural vegetation is in various stages of regeneration – as grassland, bush, or open woodland. However, even in fields that is currently cultivated, large trees such as Usivi (*Guibourtia coleosperma*) and Leadwood (*Combretum imberbe*) are often left standing to provide shade, and in some cases, fruit trees such as Monkey orange (*Strychnos* species) or the Maroela. Since the calcrete is usually beneath a meter or two of soil, the overburden must be removed before the required materials can be quarried. It is proposed to stockpile and replace the soil. However, some adverse impacts can arise due to the removal of the soil and calcrete:

- Firstly, the soil profile can be disturbed – the topsoil being mixed with the subsoil so that the properties that are important for cultivation of crops can be degraded,
- Secondly, if the underlying calcrete is removed, the rainfall may be permitted to penetrate to deeper levels so that the soil is drier than before,
- Thirdly, if the soil is replaced in the worked out borrow pit in circumstances that impede drainage, the soil could become waterlogged during the growing season, such that it can no longer be used for cultivation.

All these factors could be detrimental to crop production. Therefore the correct management of soil and the appropriate rehabilitation of the borrow pit will be extremely important.

## 6.7. NATURAL VEGETATION AND WILDLIFE

The original vegetation over most of the study area is classified as North-eastern Kalahari Woodland. This vegetation comprises broadleaved woodlands on Kalahari sandveld. These are fairly open woodlands with a ground cover of herbs and grasses that provide grazing for wildlife and domestic livestock.



The diversity of plants, birds and animals all follow the same pattern, being highest in the Okavango River Valley (which is little affected by the project) and decreasing westwards. The areas of natural habitat affected by the project are too small to have any significant impact on birds and animals, which are able to move away from the disturbance. Given the fact that all the borrow pit and sand pit sites are in areas that are previously disturbed, no detailed botanical survey was considered necessary.

Six types of trees stand out as being particularly valuable: Mopane, Silver terminalia (*Terminalia sericea*), Purple-pod terminalia (*Terminalia prunioides*), Marula (*Sclerocarya birrea*), Makalani

palms (*Hyphaene petersiana*) and Berchemia (*Berchemia discolor*). The combination of these provide for building and fencing materials, firewood, medicine, baskets and hat materials, beer, etc.

Certain trees produce large volumes of fruit, which provide a welcome dietary supplement. These are consumed from the trees or sold at the markets. These trees include Marula (*Sclerocarya birrea*), Jackal berries (*Diospyros mespiliformis*), Wild figs (*Ficus species*), and Baobabs (*Adansonia digitata*).

The natural vegetation is of high value to the population and must be conserved at all cost. Sustainable compensation and replacement options for lost fruit trees and other vegetation must be considered. In terms of Namibian Legislation, a number of trees are protected due to their value to the local population. A list of such trees is included in Table 3:

**Table 3: List of trees species commonly occurring in the project area**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Conservation Status</b>
<b>Manketti</b>	<i>Schinziophyton rautanenii</i>	Protected
<b>Makalani Palm</b>	<i>Hyphaene petersiana</i>	Protected
<b>Variable combretum</b>	<i>Combretum collinum</i>	-----
<b>Lavender croton</b>	<i>Croton gratissimus</i>	-----
<b>Silver cluster leaf</b>	<i>Terminalia sericea</i>	-----
<b>Jackal berry</b>	<i>Diospyros mespiliformis</i>	Protected
<b>Wild seringa</b>	<i>Burkea africana</i>	Protected
<b>Sycamore fig</b>	<i>Ficus sycomorus</i>	Protected
<b>Candlepod acacia</b>	<i>Acacia hebeclada</i>	-----
<b>Sickle bush</b>	<i>Dichrostachys cineria</i>	-----

Habitat destruction, caused by the high rates at which trees have been removed as well as over-grazing by livestock, leads to severe bareness. Habitat destruction due to the construction of the roads may be direct or indirect. Direct destruction occurs when areas are cleared to make way for the new road, detours or the development of a borrow-pit area. Indirect destruction occurs, for example, when sand and gravel materials, which house certain plant species, are removed. The prevention of spread of alien vegetation during the construction process should also receive attention.

As the rehabilitation project will follow the alignment of the current road as closely as possible, direct destruction will be minimal. Indirect destruction will be kept to a minimum during execution of the works.

The following photos depict the vegetation commonly found alongside the current road.

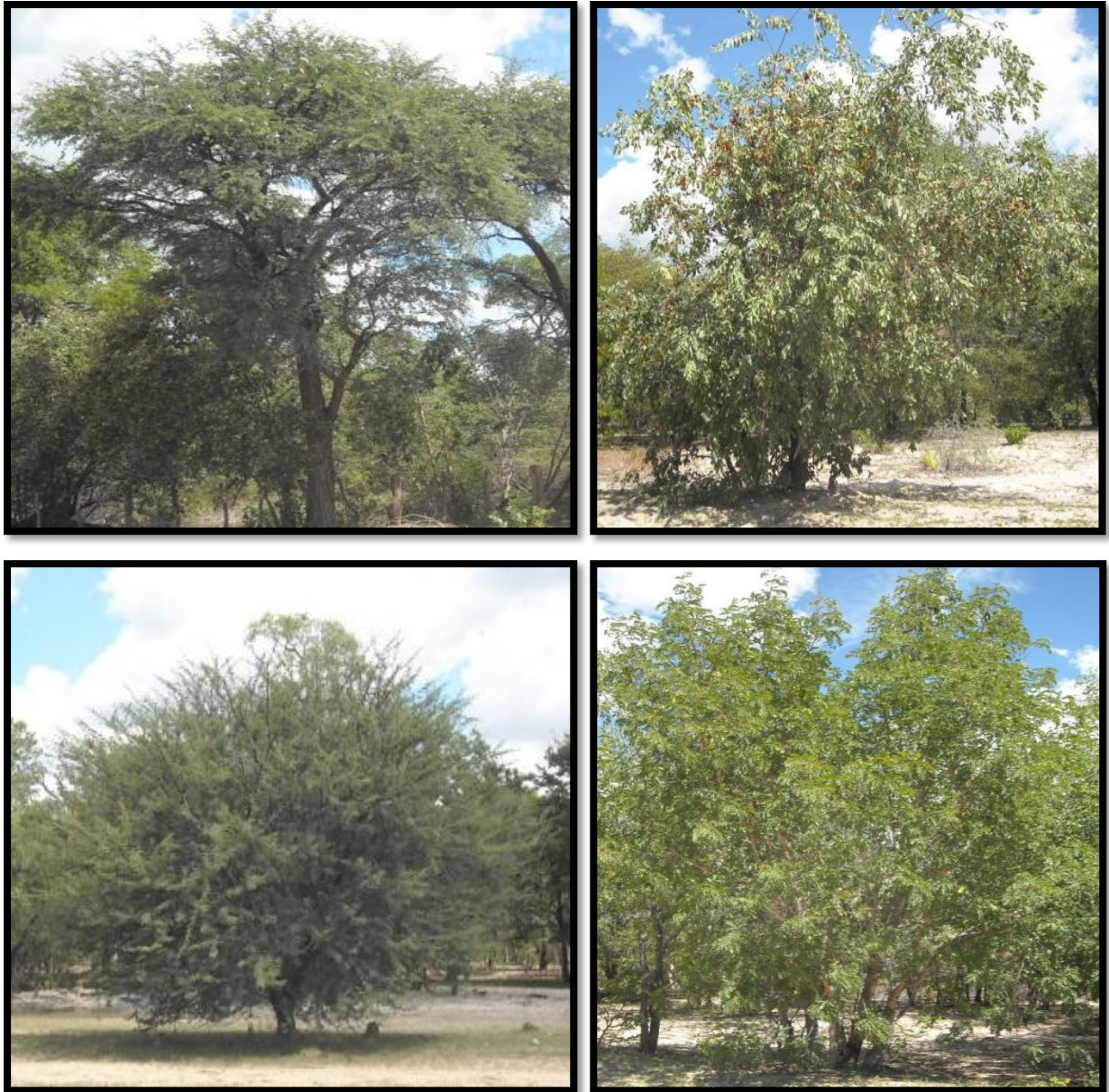


Figure 5: Trees in the Eenhana/Onhunu area includes the common *Combretum*, *Colophospermum mopane* and *Acacia* species of which only the *erioloba* subspecies are protected.



## 7. PUBLIC PARTICIPATION PROCESS

This project focuses on the road from Eenhana to Onhuno. This road is well known to many people and is travelled extensively by people living in Eenhana due to business connections between Eenhana and Oshakati / Ondangwa. The deterioration of this road has caused some vehicle damage and is currently unsafe to the road user. These comments were mentioned during the public consultation meetings. Therefore, this project is very positively perceived by the local community and is regarded as an asset to the Region.

The public participation process was undertaken in accordance with the principles and requirements of the Namibian Environmental Management Act, No 7 of 2007 and associated Regulations.

The approach to the public participation process was open and participatory with the full involvement of Interested and Affected Parties (IAPs). This approach ensured that reasonable measures were taken to identify stakeholder issues and concerns.

The Methodology for the Public Participation was as follows:

The proposed rehabilitation of the road was advertised twice in three different newspapers as to comply with the Environmental Management act No.7 of 2007 and the applicable Environmental Regulations.

The advertisements were placed as follows;

The New Era:                Wednesday 23<sup>rd</sup> September 2015

   Thursday 5<sup>th</sup> November 2015

The Republikein:        Wednesday 23<sup>rd</sup> September 2015

The Namibian:            Thursday 5<sup>th</sup> November 2015

There were no comments received after the notifications placed in the newspapers.

A Stakeholders meeting was held on the 28<sup>th</sup> September 2015 at Eenhana as to inform the Regional Council and the relevant Councillors of the proposed project.

A Public meeting was further held on the 24<sup>th</sup> November 2015 as to inform the community of Onhuno of the proposed project. This meeting was well attended and the community was very positive towards the rehabilitation of the road.

The following comments and questions arose during the various meetings:

1. Is the road going to be wider? A: Yes the road will link up with the Eenhana – Elundu road which is wider than the existing road.

2. Flooding is always a problem, is the road going to be designed as to rectify the flooding problem? A: Yes, the Governor was also consulted with regards to this issue and the design team will ensure that the road will not be flooded during the rainy season.
3. Appointment of labour, are you going to employ local people? A: Yes, Local labourers will be managed through the Regional Office.
4. Is the quality of the road going to be of high standard? A: Yes, the design and construction standard will ensure that the road will last for at least 20 years.
5. Should there be any compensation that needs to be paid, how are you dealing with that? A: There is a compensation policy of Namibia that will be used in this regard.
6. When will the project start and for how long is it scheduled? A: The contract will probably start April 2016 and the contract length is for 18 months.
7. There is a concern with regards to people crossing the road that will be constructed and built structures that are very close to the road. How are you dealing with this? A: Human behaviour is very difficult to control, but proper warning signs will be erected to warn people of the construction activities.
8. The T-junction at Onhuno is very dangerous, what can you do about that? A: We will look at various design alternatives that will make the junction safer for the road user and pedestrians.

## PICTURES TAKEN DURING THE PUBLIC and STAKEHOLDER MEETINGS



Letter written to the Governor's Office – Ohangwena Regional Council inviting the Council to the Stakeholders meeting held on the 28<sup>th</sup> September 2015.



A FIFTH DIMENSION TO ENGINEERING

WINDHOEK ONGWEDIVA

6 Otto Nitzsche Street, Klein Windhoek, NAMIBIA  
P O Box 11598, Klein Windhoek, NAMIBIA  
Tel. +26 461 309 416  
Fax. +26 461 309 412  
E-mail: [element@element.com.na](mailto:element@element.com.na)  
Website: [www.element.com.na](http://www.element.com.na)

**Our Ref.: TR10-2: Stakeholders Meeting**

**DATE: 17 September 2015**

The Governor  
Ohangwena Regional Council  
P.O Box 88011  
Eenhana  
Namibia

**Attention: Hon U. Nghaamwa**

**RE: STAKEHOLDERS MEETING TRUNK ROAD 10 SECTION 2**

The letter dated on 17 September 2015 regarding TR10-2: Introduction Meeting has reference:

The project team would further to this letter like to set up a stakeholders meeting at the Ohangwena Regional Council for all stakeholders effected by the project, including the councilors and interested constituents.

We will therefore place an advertisement in relevant papers to request attendance by the stakeholder through our sub-consultant Enviro Management Consultants Namibia who will be facilitating the meeting.

Myself, Mr Sikanda, Mr Kotze and Mr du Toit (Enviro Management Consultants Namibia) will be attending on our behalf.

Your favorable response is awaited.

Yours sincerely.

A handwritten signature in black ink, appearing to read "L. Viljoen".

Louwrens Viljoen

A FIFTH DIMENSION TO ENGINEERING

**DIRECTORS:** P MBUTU AB LOFTS-EATON (MANAGING) Po Eng B Eng JA CILLIERS Po Eng M Eng B Com (LAW) HUD KOTZE Po Tech  
GR COETZEE Inc Eng MFR VAN ROOYEN Inc Eng

**ASSOCIATES:** CG PAYNE Po Eng B Eng RJ BEZUIDENHOUT Po Eng B Eng

Prv Ltd (Reg. No. 2002/444)



# PROOF OF PLACEMENT OF ADVERTISEMENTS

22 | AFRICA

Wednesday, September 23 2015 | NEW ERA

### NOTICE OF AN ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Enviro Management Consultants Namibia has been appointed by Element Consulting Engineers (Pty) Ltd (on behalf of the Roads Authority of Namibia) to conduct an Environmental Impact Assessment and develop an Environmental Management Plan as required by the Environmental Management Act No 7 (2007) and the associated Environmental Regulations for the following project:

**ROADS PROJECT: DETAIL DESIGN, TENDER DOCUMENTATION, CONTRACT ADMINISTRATION AND SITE SUPERVISION FOR THE REHABILITATION OF TR10/2: ONHUNO TO EENHANA IN THE OHANGWENA REGION**

This project sets out to rehabilitate the 47km section road from Eenhana to Onhuno in the Ohangwena Region. The existing road (TR10/2) is currently a bitumen standard road.

A scheduled Stakeholder Meetings will be held to inform any Interested and Affected Party of the proposed project.

The scheduled meeting will be held at the Ohangwena Regional Offices (Eenhana) at 10:00 on the 28th September 2015.

Take note that all Interested and Affected Parties (I&APs) are hereby invited to attend this meeting or to register in terms of the environmental assessment process and to give input, comments or opinions regarding the intended road rehabilitation.

**Enviro Management Consultants Namibia**  
 Contact: Rian du Toit  
 Fax: 068 626968  
 Email: enviro@wayna

### RESEARCH SUPPORT SERVICES

Pinmore Institute Of Technology in conjunction with Outrun Investments will be offering technical support in research at honors, masters and phd level.

**Areas Of Focus:** Guidance on research proposal development, conceptualizing the study, contextualizing the study, research paradigm and research methods, literature review, data analysis and interpretation, theory building etc etc.

**CONTACT JOSIAH - 0814 391 104**  
 E-Mail: outruninvest@hotmail.com



### ENVIRONMENTAL IMPACT ASSESSMENT MINERAL EXPLORATION: EPL NO. 3218

**DIAMOND MINING (PTY) LTD AND BOOM RIVER DIAMOND MINING (PTY) LTD** hereby gives notice for their plans to carry out exploration work and as required under the Environmental Management Act No 7 (2007) and Regulation 21 of the Environmental Impact Assessment (EIA) Regulations (January 2012). This notice marks the beginning of public consultation process which Interested and Affected Parties are invited to register with the Consultants whose contact details are given below.

**PROJECT ACTIVITIES: Mineral Exploration Work on EPL 3218**

**PROJECT LOCATION: ORANGE RIVER KARAS REGION. MAP IS PROVIDED IN THE BD.**

**PUBLIC PARTICIPATION: I&APs ARE INVITED TO REGISTER WITH THE CONSULTANT AND A PUBLIC MEETING WILL ONLY BE HELD IF WE GET ENOUGH I&APs.**

**CONSULTANT'S CONTACT DETAILS:**  
 Josiah - 0814 391 104  
 E-Mail: outruninvest@hotmail.com

## SA police FIFA bribe

**JOHANNESBURG**

South African police are expected to launch criminal investigation into two senior football officials connected with the 2010 World Cup, following a request from main opposition party officials Monday.

The Democratic Alliance Monday laid corruption charges against the South African Football Association (SAFA) president Danny Jordaan and his predecessor Molefi Oliphant. The probe is in an alleged bribe paid to secure the rights to host the World Cup.

The charges arise from letters, one written by Jordaan who was in charge of the 2010 World Cup bid chief, to FIFA at South Africa's plan to donate for a Caribbean football development programme, and another by Molefi to South Africa then paid US\$1 million through FIFA into account controlled by Jack War a disgraced former FIFA president from the Caribbean accused by US authorities accepting bribes.

US investigators believe money was a bribe to secure South Africa's selection as host of 2010 competition.

Woensdag 23 September 2015

### Besoek ons op Twitter by

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**Enviro Management Consultants Namibia**  
 Contact: Rian du Toit  
 Fax: 068 626968  
 Email: enviro@wayna

DM0201500153283 JE



Thursday, November 5 2015 | NEW ERA

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 Contact: Rian du Toit  
 Fax: 068 626968  
 Email: enviro@wayna



Thursday 5 November 2015 29

beleva niifuta ya gwedhwa po... ko notawu ka mona oobhityona... Oshikondo shumalutenda

Katjijaka na Brenda Mbali oye li momushondondondo gwaalik-sa yo-WRP mOkatarara, mangu Nudo e ta omushondondondo gwaalikwa mOkatarara, onkene okuza ena, oyi itidha mo yo ene moNudo notatu hi kolleke. Jahanika ta omhwele ikundaneke nEiyali.

Jahanika okwa ti jitavi Kamhausuka, Theobald Karua nako Katjijako oya alu taya yambidhidha muutikwa gwo-DTA.

Okwa holola kutya lyo mbyoka ya tidwa ooyi ota etepoko iongundu natayi itegele ongandu yo-ITA moshitopolwa. Paye, ekuhombinga itanyangadhalwa yo-ITA otali kwashilile deke kutya ota yi oshipala oshikonga.

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 Contact: Rian du Toit  
 Fax: 068 626968  
 Email: enviro@wayna



this participation process the Oranjemund Town Council would like to invite the Oranjemund community, local and national stakeholders to the presentation on the Draft Structure Plan for Oranjemund town. The presentation on the Draft Structure Plan will give stakeholders an overview into the future plans for the town of Oranjemund.

The public meeting will be held as follows:  
**Date: Thursday 19 November 2015**  
**Time: 18:00**  
**Venue: Zachariah Lewala Hall, Oranjemund**

After the presentation the draft document will be available for review and comments at the office of the Chief Executive Officer of the Oranjemund Town Council for a period of two (2) months. Stakeholders not able to attend the presentation are invited to view the document at the office of the CEO or online at [www.spc.com.na](http://www.spc.com.na) and provide feedback and comments on the draft document. Comment forms will be available at the office of the CEO and online. Comments are to be submitted to Stuenkel Planning Consultants at the following address, no later than 15 January 2016.

**Email: daleen@spc.com.na**  
**Postal: P.O. Box 41404**  
**Ausspanplatz, Windhoek**  
**Fax: 061-252157**



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## 8. ENVIRONMENTAL IMPACTS ASSESSMENT PROCESS

It is important to understand the gist of any project as to understand the possible environmental impacts associated with such a project. The following activities are generically associated with the construction of a bitumen standard road. These activities are kept in mind during the environmental impact assessment process.

- **Site establishment**
  - Demarcation of the site
  - Protection of vegetation and natural features
  - Protection of fauna
  - Protection of cultural historical aspects
  - Topsoil conservation
  - De-bushing and de-stumping
- **Site infrastructure**
  - Structures and accommodation
  - Contractors camp and lay-down areas
  - Batching plants
  - Crusher plants
  - Sand washing plants
  - Nurseries
  - Roads and access
  - Gates and fences
- **Site management**
  - Rubble and waste rock
  - Solid waste
  - Liquid waste
  - Hazardous waste
  - Pollution control
  - Implements and equipment
  - Blasting
  - Air quality
  - Noise control
  - Fire control
  - Health and Safety
- **Borrow pits and quarries**
- **Earthworks**
  - Prospecting boreholes and test pits
  - Excavations and trenches
  - Cut and fill
  - Shaping and trimming
- **Stockpiles, storage and handling**
  - Topsoil
  - Spoil
  - Vehicles and equipment
  - Fuel
  - Hazardous substances
- **Erosion control**
  - Surface water management
  - Erosion protection
- **Control of alien plants**

## 8.1. Environmental Impact Assessment Process

A checklist is designed to help users identify the likely significant environmental effects of proposed projects during scoping. It is to be used in conjunction with the Checklist of Criteria for Evaluating the Significance of Impacts.

There are two stages:

- **First**, identifying the potential impacts of projects;
- **Second** selecting those which are likely to be significant and therefore require most attention in the assessment.

A useful way of identifying the potential impacts of a project is to identify all the activities or sources of impact that could arise from construction, operation or decommissioning of the project, and to consider these alongside the characteristics of the project environment that could be affected, to identify where there could be interactions between them. The two parts of the Scoping Checklist have been developed to assist in this process.

Start with the checklist of questions set out below. Complete Column 2 by answering:

- yes - if the activity is likely to occur during implementation of the project;
- no - if it is not expected to occur;
- ? - if it is uncertain at this stage whether it will occur or not.

For each activity for which the answer in Column 2 is "Yes" or "?", refer to the second part of the Scoping Checklist which lists characteristics of the project environment which could be affected, and identify any which could be affected by that activity. Information will be used about the surrounding environment in order to complete this stage. Note the characteristics of the project environment that could be affected, and the nature of the potential effects in Column 3.

Finally, use Checklist of Criteria for Evaluating the Significance of Impacts to help complete Column 4.

This will identify those impacts which are expected to be significant. The questions are designed so that a "yes" answer will point towards a significant impact. It is often difficult to decide what is or is not significant but a useful simple check is to ask whether the effect is one that is of sufficient importance that it ought to be considered and have an influence on the development consent decision.

**PART 1 OF THE SCOPING CHECKLIST: QUESTIONS ON PROJECT**

**CHARACTERISTICS**

**1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in water bodies, etc)?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?	Yes	The quarry operations will temporarily alter the land use, land cover and, for the borrow pits - topography of the area.	Medium significance because of the possibility that the borrow pits might be in some crop producing areas.
1.2	Clearance of existing land, vegetation and buildings?	Yes	Clearing of vegetation for construction operations influencing the vegetation, soils and topography.	Clearing of vegetation is always regarded as significant when it comes to road construction. However, mitigation measures can reduce the significance of the impact.
1.3	Creation of new land uses?	No	The new road will be built mostly on the existing alignment.	Low significance.
1.4	Pre-construction investigators egg boreholes, soil testing?	Yes	Excavation of tests sites will impact on the vegetation, soils and land use of the area.	Low significance due to the extent of the testing holes and samples.
1.5	Construction works?	Yes	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	Flooding in the area is a real risk for road construction. The change in water bodies might be significant if proper planning during the design phase of the road is neglected. The other aspects will not be significantly impacted.
1.6	Demolition works?	Yes	The possible removal of old culverts.	Very low or no significance if the materials be removed and spoiled.
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	A temporary construction camp will probably be constructed where water and waste management are the most important activities that need to be mitigated.	Should these activities not be managed, it might have a negative impact on the soils, water and health and safety of the contractor workers. No permanent changes to the area are predicted.
1.8	Above ground buildings, structures or earthworks including linear structures cut and fill or excavations?	Yes	The above ground earthworks will be regarded as primarily for the road construction.	It is anticipated that the impact will not be significant due to the flat topography of the area.
1.9	Underground works including mining or tunnelling?	No		
1.10	Reclamation works?	No		
1.11	Dredging?	No		
1.12	Coastal structures egg seawalls, piers?	No		
1.13	Offshore structures?	No		



1.14	Production and manufacturing processes?	No		
1.15	Facilities for storage of goods or materials?	Yes	Possible storage of machines and bulk fuel.	The storage of goods or materials can be mitigated therefore limiting the significance.
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	Yes	The temporary storage of domestic waste is probable which might impact on water and soil as well as Health and Safety issues.	Waste is always a concern when it comes to camp sites and could pose negative impacts on the environment. - Medium
1.17	Facilities for long term housing of operational workers?	No		
1.18	New road, rail or sea traffic during construction or operation?	Yes	Construction of a bypass and limited traffic increase due to movement of construction vehicles.	Low significance.
1.19	New road, rail, air, water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	The current alignment will be followed.	The significance will be low due to the scale and current alignment to be used.
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	Yes	There will be temporary bypasses constructed.	The significance is likely to be low due to the temporary nature of the activities.
1.21	New or diverted transmission lines or pipelines?	No		
1.22	Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers?	Yes	There are existing culverts and drainage lines which will be enlarged.	Should proper planning and consultation with local communities be applied, negative impacts on the hydrology of the flood plain should be limited therefore reducing the significance.
1.23	Stream crossings?	Yes	Various streams and rivers will be crossed.	The significance is low because off their current existence.
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	Water will be extracted for the construction phase of the project.	Water from the rivers and boreholes will be used but the significance will be low.
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The road will not impact on the surface patterns.	The significance will be low due to existing culverts that will only be replaced or upgraded.
1.26	Transport of personnel or materials for construction, operation or commissioning?	Yes	Surface characteristics.	No significance.
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area in either temporarily or permanently?	No		
1.30	Introduction of alien species?	No		

1.31	Loss of native species or genetic diversity?	Yes	Surface disturbances always impact on the bio-diversity of an area.	There might be low significant impact on the genetic diversity.
1.32	Any other actions?	No		

**2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
2.1	Land especially undeveloped or agricultural land?	Yes	During construction, geological materials will be used for the filling. Soils will be affected and might therefore impact negatively on the agricultural land.	The significance is low. The existing alignment will be followed with some small adjustments.
2.2	Water?	Yes	Water is used for domestic and construction purposes.	The available water will be used but the significance might be low due to the volumes available.

**3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water supplies)?	Yes	Hydrocarbons always pose a risk to the environment.	Water and soils are normally affected by spillages of hydrocarbons. The significance might be high without mitigation measures.
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (eg insect or water borne diseases)?	No		
3.3	Will the project affect the welfare of people eg by changing living conditions?	?	There is always a risk of altered quality with regards to living conditions of the adjacent people and the environment. This is with reference to road safety and HIV/AIDS.	The significance of such risks can be mitigated, ensuring low impact significance.
3.4	Are there especially vulnerable groups of people who could be affected by the project eg hospital patients, the elderly?	Yes	The proposed route will impact positively on the vulnerable groups due to improved mobility network and increased safety.	Positive medium significance.
3.5	Any other causes?	No		

**4. Will the Project produce solid wastes during construction or operation or decommissioning?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
4.1	Spoil, overburden or mine wastes?	Yes	Spoils will be generated during construction affecting the aesthetics appeal of the area.	No. This activity can be mitigated very successfully. Low significance.
4.2	Municipal waste (household and or commercial wastes)?	Yes	Domestic waste will be generated.	The domestic waste can be managed but does pose a negative impact.
4.3	Hazardous or toxic wastes (including radioactive wastes)?	Yes	Used oils and old batteries.	Mitigation measures are important to manage the handling and disposal of used oils and old batteries.
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludge from effluent treatment?	Yes	Sewage is produced at the construction camp.	Sewage is always a very important impact that might have a negative impact on soils, water and health and safety.
4.7	Construction or demolition wastes?	No		
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	Yes	There is always a possibility that contamination of soils can occur during operation due to spillage of oils / diesel.	No. The scale of contamination is very limited and can be mitigated.
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		

**5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	Yes	Gasses such as Nox and Sox are deposited in the air from the machines.	Low significance. The quantity and exposure duration of these gasses will not impact significantly negatively on the environment.
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	No		

5.4	Emissions from construction activities including plant and equipment?	Yes	The movement from vehicles will generate dust and gaseous emissions as well as the crusher plant.	The impacts might be significant if not managed properly.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Dust from mineral handling and transport.	Yes. Dust might be a nuisance to receptors.
5.6	Emissions from incineration of waste?	No		
5.7	Emissions from burning of waste in open air (eg slash material, construction debris)?	No		
5.8	Emissions from any other sources?	No		

**6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
6.1	From operation of equipment eg engines, ventilation plant, crushers?	Yes	The mining of borrow pits and production equipment produces noise and vibrations	No. The ambient receptors are minimal. The Health and Safety within close distance must be noted.
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	Construction might produce noise.	Low significance.
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	The hauling trucks will produce noise and vibration.	No. The impact is very local and is not significant.
6.6	From lighting or cooling systems?	No		
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?	No		

**7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	Yes	Spillage of oils and other hydrocarbon may affect the water and soil.	No. Mitigation measures will limit the risk and therefore the significance.
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?	Yes	Effluent at the construction site might impact negatively on the surface water, soils and health and safety of the workforce.	Should the sewage not be properly managed the negative impact might be significant.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	Gasses from the machines.	No. The volumes of emissions are limited.
7.4	From any other sources?	No		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No		

**8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?	No		
8.2	From events beyond the limits of normal environmental protection eg failure of pollution control systems?	No		
8.3	From any other causes?	No		
8.4	Could the project be affected by natural disasters causing environmental damage (eg floods, earthquakes, landslip, etc)?	Yes	Floods are a real treat in this region and could affect the human environment.	The significance might be low due to proper warning systems. The floods are usually not associated with flash flooding.

**9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
9.1	Changes in population size, age, structure, social groups etc?	No		
9.2	By resettlement of people or demolition of homes or communities or community facilities eg schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or creation of new communities?	?	In-migration of people might be a possibility.	The significance is unsure.
9.4	By placing increased demands on local facilities or services eg housing, education, health?	No		
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	The local and larger community will benefit from the construction phase.	The significance might be positive medium due job creation and increased mobility.
9.6	Any other causes?	No		

**10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?**

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	Yes	New road will be constructed which will benefit the communities.  Lower vehicle operating costs will contribute to the National economy.	The significance will be positive but the extent uncertain.
10.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment eg: <ul style="list-style-type: none"> <li>• supporting infrastructure</li> <li>• housing development</li> <li>• extractive industries</li> <li>• supply industries</li> <li>• other?</li> </ul>	Yes	No.	

10.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
10.4	Will the project set a precedent for later developments?	?	Unlikely	
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

## PART TWO OF THE SCOPING CHECKLIST: CHARACTERISTICS OF THE PROJECT ENVIRONMENT

For each project characteristic identified in Part 1 consider whether any of the following environmental components could be affected.

<p><b>Question - Are there features of the local environment on or around the Project location which could be affected by the Project?</b></p> <ul style="list-style-type: none"> <li>• There are no areas protected by law in the vicinity of the proposed site.</li> <li>• No areas were identified that could be regarded as sensitive with reference to bio-diversity or historic importance.</li> <li>• There is a low possibility of features of high historic or cultural importance.</li> <li>• Surface drainage patterns will be addressed through proper engineering design.</li> </ul>
<p><b>Question - Is the Project in a location where it is likely to be highly visible to many people?</b></p> <p>This road is travelled substantially so it will be seen and used by a large amount of people.</p>
<p><b>Question - Is the Project located in a previously undeveloped area where there will be loss of Greenfield land?</b></p> <p>No, the road will be constructed on the existing alignment.</p>
<p><b>Question - Are there existing land uses on or around the Project location which could be affected by the Project?</b></p> <p>There will be a few borrow pits that will be opened but will not affect the existing land uses significantly. Some small villages exist alongside the road that might be affected by the construction activities.</p>
<p><b>Question - Are there any plans for future land uses on or around the location which could be affected by the Project?</b></p> <p>No. The area will probably remain agricultural and rural residential.</p>
<p><b>Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?</b></p> <p>Yes there are some towns alongside the existing road that will be affected during the construction phase of the project.</p>
<p><b>Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project?</b></p> <p>No.</p>
<p><b>Question - Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project?</b></p> <p>There are no scarce resources found around the project that could be influenced by the construction or operational phases of these projects, but there are some flora species (trees) that are protected by Forestry Legislation.</p>
<p><b>Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?</b></p> <p>No. The area has been subject to agricultural and semi-urban activities.</p>
<p><b>Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?</b></p> <p>Yes, Flooding is a real possibility during the rainy season. No other environmental problems are envisaged.</p>
<p><b>Question - Is the Project likely to affect the physical condition of any environmental media?</b></p> <p>No, the proposed project will be constructed on the existing alignment.</p>



**Question - Are releases from the Project likely to have effects on the quality of any environmental media?**

- The air quality might deteriorate due to dust generation during construction but will improve during operation.
- The quality of soil might deteriorate without proper management.
- Acidification of soils or waters will probably not occur.
- There will be some noise generated during the construction and operational phase of the road, but will be limited to the site.

**Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally?**

- The project will use fossil fuels in liquid (diesel).
- Water will be used for dust suppression, construction and domestic use.
- The quarrying activity extracts minerals on a non-renewable basis.

**Question - Is the Project likely to affect human or community health or welfare?**

- The quality of air will be affected due to construction activities and hauling. Even though this is the case, human health might not be problematic.
- Increased movement of construction vehicles might pose a road safety risk.
- No mortality or morbidity might be experienced by human receptors.
- The project will have a positive impact on the social economic welfare of the region.

In the Scoping checklist, the significance must be indicated. To facilitate this procedure, the following questions were considered during the rating:

**Questions that were considered to determine significance:**

1. Will there be a large change in environmental conditions?
2. Will new features be out-of-scale with the existing environment?
3. Will the effect be unusual in the area or particularly complex?
4. Will the effect extend over a large area?
5. Will there be any potential for trans frontier impact?
6. Will many people be affected?
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
8. Will valuable or scarce features or resources be affected?
9. Is there a risk that environmental standards will be breached?
10. Is there a risk that protected sites, areas, features will be affected?
11. Is there a high probability of the effect occurring?
12. Will the effect continue for a long time?
13. Will the effect be permanent rather than temporary?
14. Will the impact be continuous rather than intermittent?
15. If it is intermittent will it be frequent rather than rare?
16. Will the impact be irreversible?
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

## 8.2 Environmental Impact Assessment Summary

The following environmental impacts were identified during the assessment procedure as described above. The impacts are classified as either positive or negative and the significance ratings as low, medium and high.

Activity	Aspect / Impact	Positive / Negative	Significance
Land use / topography, and land use cover.	The quarry operations will permanently alter the land use, land cover and, for the borrow pits - topography of the area.	Negative	Medium
	Areas zoned as undetermined or agricultural will change to transport (land use).	Negative	Low
Pre-construction investigators egg boreholes, soil testing?	Excavation of tests sites will impact on the vegetation, soils and land use of the area.	Negative	Low
Clearance of existing land, vegetation and buildings.	Clearing of vegetation for construction operations influencing the vegetation, soils and topography.	Negative	Low
Creation of new land uses.	The existing land use will change from agricultural to road (land use).	Negative	Low
Construction activities.	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	Negative	Low
Temporary sites used for construction works or housing of construction workers?	A temporary construction camp will probably be constructed where water and waste management are the most important activities that need to be mitigated.	Negative	Low
Above ground buildings, structures or earthworks including linear structures cut and fill or excavations.	The above ground earthworks will be regarded as primarily for the road construction. Permanent changes will take place (land use).	Negative	Low
Facilities for storage of goods or materials.	Pollution of soils and water.	Negative	Medium
Facilities for treatment or disposal of solid wastes or liquid effluents?	The temporary storage of domestic waste is probable which might impact on water and soil as well as Health and Safety issues.	Negative	Medium
New road, rail or sea traffic during construction or operation?	Limited traffic increase due to movement of construction vehicles.	Negative	Low
Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers.	This aspect is probably of greatest concern for this project. The road will be built on a flood plain to the east.	Negative	Low

Stream crossings?	Various streams on the flood plain will be crossed.	Negative	Low
Changes in water bodies or the land surface affecting drainage or run-off?	The road will impact on the surface patterns.	Negative	Low
Loss of native species or genetic diversity?	Surface disturbances always impact on the bio-diversity of an area.	Negative	Low
Resources such as land and water.	Very limited agricultural land will be affected due to the construction of the road.	Negative	Low
	Water is used for domestic and construction purposes.	Negative	Low
Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water supplies)?	Hydrocarbons always pose a risk to the environment.	Negative	Medium
Will the project affect the welfare of people eg by changing living conditions?	The proposed route will impact positively on the vulnerable groups due to improved mobility network	Positive	Medium
Pollution on site (domestic and construction waste).	Pollution of the natural environment (soil and water).	Negative	Low
Sewage sludge or other sludge from effluent treatment?	Sewage is produced at the construction camp.	Negative	Medium
Contaminated soils or other material.	There is always a possibility that contamination of soils can occur during operation due to spillage of oils / diesel.	Negative	Medium
Emissions from combustion of fossil fuels from stationary or mobile sources	Gasses such as Nox and Sox are deposited in the air from the machines.	Negative	Low
	The movement from vehicles will generate dust and gaseous emissions.	Negative	Medium
Could the project be affected by natural disasters causing environmental damage (eg floods, earthquakes, landslip, etc)?	Floods are a real treat in this region and could affect the human environment.	Negative	Medium
By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	The local community will benefit from the construction phase through additional employment opportunities.	Positive	Medium
Will the project lead to pressure for consequential development which could have significant	New road will be constructed which will benefit the communities by improving access to schools, clinics	Positive	Medium

impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	and churches.		
	New economic nodes might be established along the routes stimulating the local economy.	Positive	Medium
Will the project lead to development	Access improvement to facilities in the region will benefit the local and regional communities.	Positive	Medium

## 9. ANALYSIS OF ALTERNATIVES

The following alternatives were considered during the planning phase of the proposed project:

### 9.1 Horizontal alignment of the roads:

It was decided for this project that the existing horizontal alignment will be followed. By deciding this, the following impacts will be limited associated with the construction of a new road:

- Minimal impact on the natural environment (trees, soils, rivers, etc);
- Expanding existing culverts accommodating the surface water drainage patterns;
- Minimal impact on socio-economic activities (agricultural fields, graves, etc);
- Avoidance of structures (houses, power lines, etc).

### 9.2 Construction Method

The use of heavy duty machines were the only considered means of construction.

### 9.3 Construction Materials

Various areas were prospected to identify suitable materials for the construction of this road. The availability of suitable material is very important and various alternative sites have been identified for these materials.

### 9.4 The “No-Go” Option

If this option is executed the status quo of the environment will prevail. The current road will deteriorate to such an extent that it will not be usable.

## **10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

The Environmental and Social Management Program (ESMP) will be implemented during construction. 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 implant 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.

### **10.1 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.

### **10.2 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.
- 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 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, Employer, Contractor and interested and affected 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.

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

### **10.4 Public Participation**

An on-going process of public participation shall be maintained during construction to ensure the continued involvement of interested and affected parties (I&APs) in a meaningful way. Public meetings to discuss progress and any construction issues that may arise shall be held at least every two 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 public meeting. All I&APs that participated in or were informed during the EIA shall be invited to each of the public meetings.



## 10.5 Environmental Mitigation Measures

The following mitigation measures are sufficient to reduce or avoid negative impacts associated with the construction of a road. It is based on the activities mentioned in this report that will occur during the construction phase of the project:

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
<b>10.5.1 MANAGEMENT AND MONITORING</b>	To ensure that the provisions of the ESMP are implemented during construction.	<ul style="list-style-type: none"> <li>a. The environmental and social consultant shall ensure that all aspects of the ESMP are implemented during construction.</li> <li>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.</li> </ul>	Environmental and social consultant together with the ECO.
<b>10.5.2 COMMUNICATION AND STAKEHOLDER CONSULTATION</b>	To ensure that all stakeholders are adequately informed throughout construction and that there is effective communication with and feedback to the consultant and client.	<ul style="list-style-type: none"> <li>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 at least 14 days after the site-handover.</li> <li>b. The Contractor shall at every site meeting report on the status of the implementation of all provisions of the ESMP.</li> <li>c. The contractor shall implement the environmental awareness training as stipulated in Section 10.3 above.</li> <li>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.</li> </ul>	Contractor/ Environmental and Social Consultant to monitor.
<b>10.5.3 HEALTH AND SAFETY</b>	To ensure health and safety of workers and the public at all times during construction	<ul style="list-style-type: none"> <li>a. The Contractor shall submit a strategy to ensure the least possible disruption to traffic and potential safety hazards during construction.</li> <li>b. The strategy should include a schedule of work indicating when and how road crossings (construction at existing intersections) will be made. The schedule should be updated and distributed to all stakeholders.</li> <li>c. The Contractor shall also liaise with the Traffic Authorities in this regard.</li> <li>d. Proper traffic and safety warning signs must be placed at the construction site to the satisfaction of the Engineer and the Roads Authority.</li> </ul>	Contractor will ensure the mitigation measures are enforced at his own expense.  The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<ul style="list-style-type: none"> <li>e. The Contractor must 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.</li> <li>f. Dust protection masks shall be provided to task workers if they complain about dust.</li> <li>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.</li> <li>h. Potable water shall be available to workers to avoid dehydration. This water shall be of acceptable standards to avoid any illness. At least 3 litres of drinking water per person per day shall be made available during construction.</li> <li>i. The contractor shall enforce relevant Health and Safety Regulations for these specific activities.</li> <li>j. The contractor shall also comply with relevant Labour Laws as stipulated by the Labour Act.</li> <li>k. The Contractor shall implement a HIV/AIDS awareness programme as part of Health and Safety.</li> <li>l. Blasting may only be conducted by a qualified person and all laws and regulations will be enforced before and during blasting. Blasting must be done in accordance with Clause 1222 of the Standard Specification of the Roads Authority of Namibia.</li> </ul>	
<b>10.5.4 CONSERVATION OF THE NATURAL AND HISTORICAL ENVIRONMENT</b>	<p>To minimise damage to soil, vegetation and historical resources during the construction phase. This includes soil crusting, soil erosion and unnecessary vegetation destruction.</p> <p>Management of water (domestic</p>	<ul style="list-style-type: none"> <li>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.</li> <li>b. Detailed 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.</li> </ul>	<p>Contractor will ensure the mitigation measures are enforced at his own expense.</p> <p>The ECO will monitor.</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
	and construction).	<ul style="list-style-type: none"> <li>c. No off-road driving shall be allowed, except on the agreed haul and access roads.</li> <li>d. Vegetation shall be cleared within the road reserve as necessary for the construction of the road, while trees with a trunk diameter exceeding 500 mm (1 meter above ground) shall be left intact. The reserves on either sides of this corridor may not be cleared of vegetation, unless permission is given to do so for detours or access roads. This measure is subjected to the Roads Authority of Namibia specifications with regards to the road reserve.</li> <li>e. A prescribed penalty will be deducted from the Contractors payment certificate for every mature tree removed without approval.</li> <li>f. No trees may be felled or live wood in the project area removed by any member of the construction team, including sub-contractors. Contravention of this arrangement is liable for a prescribed penalty.</li> <li>g. A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that trees and/or branches have been broken down willfully and unnecessarily, or that any plants have been collected illegally, by any of the staff or sub- contractors.</li> <li>h. Trees that need to be trimmed should be done so with the right equipment and aesthetical acceptable. The use of any type of saw is obligatory and the branches of trees will not be broken off by the use of other machinery.</li> <li>i. Where topsoil is available, this must be stockpiled separately in 1,00 m high piles and this used to cover the damaged areas outside the road reserve such as access roads to borrow pits, and clearing and grubbing areas.</li> <li>j. Where compaction has taken place in disturbed areas, these areas must be ripped and covered with topsoil separately kept for this purpose.</li> <li>k. Poaching or collecting of wild animals is prohibited unless a permit has been obtained for legal hunting purposes.</li> <li>l. The killing of any animal (reptile, bird or mammal) is prohibited, unless for legal hunting purposes.</li> <li>m. A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that any of his staff or sub-contractors are involved in trapping, hunting or any kind of collecting of wild animals in the vicinity of the work sites.</li> </ul>	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<p>Offenders will be handed to the authorities for prosecution.</p> <p>n. Pipelines for the pumping of construction water shall as far possible run within the road reserve and along existing tracks and other roads.</p> <p>o. Water will not be allowed to be wasted. This includes water required for construction and domestic purposes.</p>	
<p><b>10.5.5 BORROW PIT MANAGEMENT AND REHABILITATION</b></p>	<p>To ensure proper soil management (combat soil erosion and promote biological activities).</p> <p>Preserve and manage natural vegetation.</p> <p>To ensure health and safety around the borrow pits (decommissioning phase).</p> <p>To stimulate ecological processes after decommissioning (to stimulate vegetation and other biological activities).</p> <p>To establish borrow pits which is aesthetically pleasing after decommissioning.</p>	<p>a. The removal of material at borrow-pit sites shall be focused where the least significant vegetation exists. If material is only available around significant mature trees (more than 500 cm circumference – 1 meter above ground), clusters of trees should be preserved while suitable material is excavated around them. A 3 meter buffer must be conserved around the cluster of mature trees. The ER shall visit all proposed borrow-pit areas and indicate where and how material may be removed, before works commence. A <b>cluster constitutes 5 or more trees in close proximity (within 20m radius)</b>.</p> <p>b. The Contractor shall use safety tape to mark these tree clusters as to avoid confusion or miss-understandings.</p> <p>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 (indication of the mature trees).</p> <p>d. The borrow pit areas will be clearly marked by using brightly painted markers. These markers will demarcate the area where materials might be removed and stored.</p> <p>e. All borrow-pits must be rehabilitated.</p> <p>f. The contractor shall liaise with the applicable local headmen OR residents regarding whether their borrow-pits shall be shaped as water reservoirs during rehabilitation.</p> <p>g. At those borrow-pits not to be shaped as reservoirs, topsoil (the top layer of organic material, even if the topsoil is non-existent, the top layer of organic material) at borrow pits shall be stockpiled separately and the stockpile maintained for use at the end of the contract to rehabilitate the borrow pits.</p> <p>h. The top soil shall be marked as to inform the machine operators that the material</p>	<p>Contractor will ensure the mitigation measures are enforced at his own expense.</p> <p>The ECO will monitor.</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<p>is top soil and should be left alone for rehabilitation purposes.</p> <ul style="list-style-type: none"> <li>i. The borrow pits shall be rehabilitated by trimming the sides to a slope not steeper than 30° (1:3) and evenly spreading the top soil over the slopes to allow for the growth of new vegetation.</li> <li>j. All spoil material at the borrow pits shall be neatly shaped and no loose material (oversized) will be left inside the borrow pits.</li> <li>k. Access to borrow pits shall be controlled (using gates or manned positions).</li> <li>l. The borrow pit floor shall be levelled evenly as part of rehabilitation.</li> <li>m. A Borrow Pit Rehabilitation Plan will be compiled indicating the rehabilitation schedule (time-frames) for the various borrow pits to be rehabilitated.</li> <li>n. After the borrow pit has been rehabilitated, the Rehabilitation Checklist will be completed and signed by the relevant parties (See Appendix B).</li> </ul>	
<p><b>10.5.6 WASTE AND POLLUTION MANAGEMENT</b></p>	<p>To avoid contribution to potential surface and groundwater pollution.</p> <p>To avoid contribution to potential soil pollution.</p> <p>To ensure that sound waste management practices are adhered to during construction.</p>	<ul style="list-style-type: none"> <li>a. Construction rubble and other waste generated during construction will be disposed of on a regular basis at an approved waste disposal site. A temporary waste site may be demarcated for temporary storage of waste, but this area will be identified and clearly marked.</li> <li>b. The temporary domestic waste site will be fenced off with access control to the area.</li> <li>c. Adequate separate containers for hazardous and domestic waste will be provided on site and at the construction camp.</li> <li>d. The workforce will be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>e. Waste bins will be placed in and around the construction site to facilitate proper waste management.</li> <li>f. No waste may remain on site after completion of the project.</li> <li>g. 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 should have to walk more than 1km for the use of a toilet.</li> <li>h. The construction of a sewage system at the camp sites is imperative. This</li> </ul>	<p>Contractor will ensure the mitigation measures are enforced at his own expense.</p> <p>The ECO will monitor.</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<p>system should be big enough as to accommodate the volume of sewage waste that will be generated at the construction camp site. The detail of this system should be discussed with the RE.</p> <ul style="list-style-type: none"> <li>i. A demarcated vehicle service area will be provided. This area will have an impermeable floor, 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.</li> <li>j. 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 through the use of drip trays or other suitable containers.</li> <li>k. 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.</li> <li>l. 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.</li> <li>m. Accidental spills will be cleaned immediately. The contaminated soil will be suitably disposed of in a container suitable for hazardous waste.</li> </ul>	
		<ul style="list-style-type: none"> <li>n. Oil, lubricants, and other hazardous materials will be stored in separate containers (concrete liner, container, or metal or plastic drip tray) and stored for transport and disposal at an approved waste disposal site or for collection by an oil recycling company such as WESCO Salvage (this company collects significant quantities of oil from central locations throughout the country).</li> <li>o. 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 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 rain water drainage.</li> <li>p. 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</li> </ul>	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<p>placed at every fuel storage area.</p> <p>q. Bitumen batching areas will make use of drip trays to prevent unnecessary spillage of any bitumen products. Cleaning of spray nozzles should be done on the bypass (if it is gravel) or any other section of the road that is in use. This serves as a dust suppressor.</p> <p>r. Should large quantities of bitumen needs to be disposed, it can be done at a borrow pit with the following mitigation measures: (i) the borrow pits area should not be in the road reserve; (ii) The aquifer should not be near the borrow pit floor and the borrow pit must not be situated less than 100m from any stream or river; (iii) a plastic lining will be laid underneath the proposed dumping area and the spoiled bitumen needs to be covered with the same plastic lining as to prevent leaching; (iv) at least three meters of material will be placed on top of the plastic lining.</p>	
<b>10.5.7 REHABILITATION OF CONSTRUCTION SITE, SERVITUDES AND CLEARED AREAS (WHICH INCLUDES STOCKPILES)</b>	<p>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.</p>	<p>a. All bunded areas, equipment, waste, temporary structures, stockpiles etc. must be removed from the camp and work sites.</p> <p>b. 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.</p> <p>c. All cuttings must be shaped with a slope to provide a natural appearance, without having to destroy significant vegetation on top of the slope (this applies to big trees as mentioned in the ESMP only).</p> <p>d. Existing borrow pits adjacent to main roads need also be rehabilitated during rehabilitation phase.</p>	<p>Contractor will ensure the mitigation measures are enforced at his own expense.</p> <p>The ECO will monitor.</p>

## **10.6 Non-Compliance**

### **A) 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 out of 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.

### **B) 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, will be imposed by the ER on the Contractor and/or his Subcontractors:

- |  |   |
|--|---|
| a. Actions leading to erosion  | A penalty equivalent in value to the cost of rehabilitation plus 20%  |
| b. Oil spills  | A penalty equivalent in value to the cost of clean-up operation plus a N\$ 3000 fine.   |
| c. Damage to indigenous vegetation   | A penalty equivalent in value to the cost of restoration plus N\$ 5 000   |
| d. Damage to sensitive environments  | A penalty equivalent in value to the cost of restoration plus N\$ 5 000   |
| e. Damage to cultural sites  | A penalty to a maximum of N\$100 000 shall be paid for any damage to any cultural/ historical sites   |
| f. Damage to trees   | A penalty to a maximum of N\$15 000 shall be paid for each tree removed without prior permission, or a maximum of N\$5 000 for damage to any tree, which is to be retained on site. |
| g. Damage to natural fauna   | A penalty to a maximum of N\$5 000 for damages to any natural occurring animals.  |
| h. Any persons, vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a "no-go" area | N\$4,000  |
| j. Litter on site  | N\$ 1,000   |
| k. Deliberate lighting of illegal fires on site  | N\$ 1,000   |
| l. Sewage overflow or leaks at the contractor or any SME camp site.  | N\$ 5, 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.

### **10.7 Environmental Monitoring and Auditing**

Environmental audits should be conducted at least once every three months during construction. Benefits derived from the 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 audit of a site will cover all management procedures, operational activities & systems, and environmental issues. The environmental audit will be compiled objectively and be conducted by an independent, competent entity.

## **11. CONCLUSION AND RECOMMENDATIONS**

This project does not pose significant environmental risks due to the fact that the existing alignment will be followed. The various negative impacts associated with the construction of roads can be mitigated through effective implementation of the Environmental and Social Management Plan.

Waste management, pollution prevention and control as well as effective borrow pit rehabilitation will prevent any significant long term negative effects associated with this project.

Rehabilitation of this road will increase the safety of road user's limit the patched rehabilitation efforts currently underway on this section of road between Eenhana and Onhuno.

Vehicle operating cost will be reduced due to the new road surface therefore having a positive financial effect on the road users from Namibia and the surrounding countries.

## 12. References

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- Strohbach, B.J. 2001. *Vegetation Survey of Namibia. Namibia*. Wissenschaftliche Gesellschaft / Namibia Scientific Society. Windhoek. ISSN: 1018-7677
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- Other citations were done in the document with references.

**APPENDIX A**  
**DAILY QUESTIONS**

**CONSTRUCTION SITE MONITORING CHECKLIST**

Construction site name \_\_\_\_\_

Environmental/Safety/Health Site Officer Name \_\_\_\_\_

Date \_\_\_\_\_

<b>CHECK THE FOLLOWING DAILY ON THE CONSTRUCTION SITE <u>AND</u> AT THE CONTRACTOR'S CAMP</b>				
<b>Category 1: Personal Protective Equipment (PPE), construction site safety, access control and hazardous substance handling</b>				
	<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>If no, describe action taken</b>
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: <input type="checkbox"/> Hard hat <input type="checkbox"/> Safety shoes <input type="checkbox"/> Overalls Certain operations require additional PPE, such as: <input type="checkbox"/> Eye protection/goggles/visors <input type="checkbox"/> Face masks <input type="checkbox"/> Gloves <input type="checkbox"/> Ear plugs /ear muffs <input type="checkbox"/> 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?			
<b>Category 2: Excavations, stockpiles, storage areas and general housekeeping</b>				
	<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>If no, describe action taken</b>
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: <ul style="list-style-type: none"> <li><input type="checkbox"/> Sloping or benching</li> <li><input type="checkbox"/> Trench box or shield</li> <li><input type="checkbox"/> Shoring</li> </ul>			
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?			
<b>Category 3: Solid waste management</b>				
	<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>If no, describe action taken</b>
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.			
<b>Category 4: Water management</b>				

	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.			
<b>Category 5: Social aspects</b>				
	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?			
<b>Category 6: Other (e.g. access roads, borrow pits, dust and noise pollution)</b>				
	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.**

## APPENDIX B

### Borrow Pit Rehabilitation Checklist

Date: \_\_\_\_\_

Borrow Pit Name and Number: \_\_\_\_\_

Location (road-km / GPS coordinates): \_\_\_\_\_

The above borrow pit shall only be handed over once all of the listed criteria have been met by the contractor.

Item No.	Description	Comments	Complies
			Yes / No
1.	The floor is level and no man made topographical high or low points are present in the borrow pit		
2.	The site in and around the pit is clear of any illegal dumping of foreign material, spoils and construction waste		
3.	Gradients of the pit slopes are less than 18 degrees (1:3) and are finished perpendicular to the slopes to prevent water erosion		
4.	The slopes are covered with overburden/top soil, if available, with a thickness of not more than 300 mm		
5.	Available dead vegetation is placed on the slopes of the borrow pits		
6.	The berm of excess soil outside the pit is not higher than 1.0 m, sloped 1:3 and min. 3.0 m away from the edge of the pit and min. 9.0 m away from any structure		
7.	There are no walls or steps present in or around the borrow pit, if so, then the pit has been fenced off according to spec.		
8.	All alien vegetation has been removed from the floor, the slopes and berms of the pit		

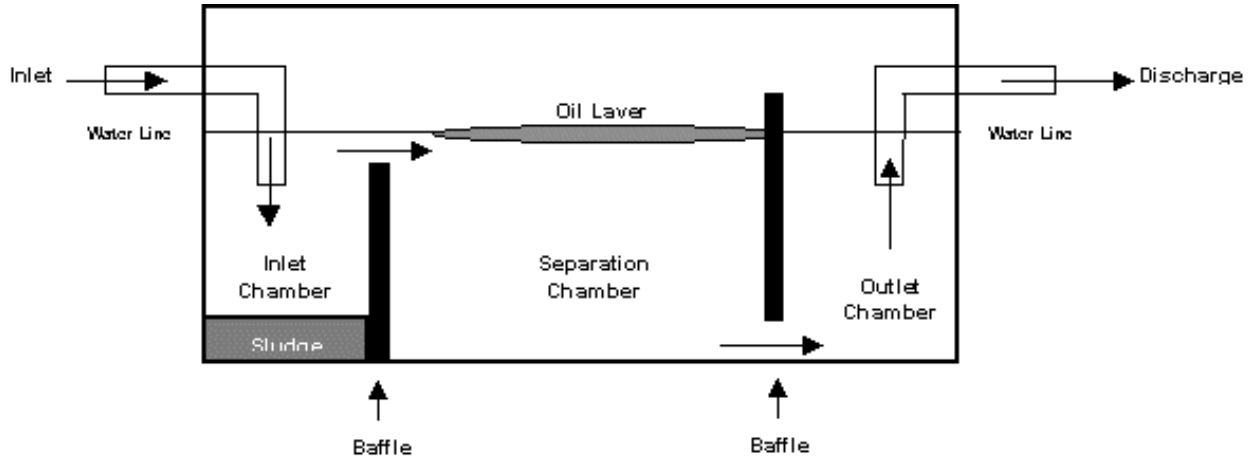
Land Owner: \_\_\_\_\_  
                   (Name)                    (Signature)

Contractor: \_\_\_\_\_  
                   (Name)                    (Signature)

Consultant: \_\_\_\_\_  
                   (Name)                    (Signature)

Client: \_\_\_\_\_ (Name)  
                   (Signature)

**APPENDIX C**  
**Oil – Water separator**



This is an example of a very simple but effective silt / oil water separator that should be constructed at the wash bays of all the construction sites. It should be noted that **REGULAR** cleaning is required to ensure effectiveness. Sludge removal and oil skimming is two maintenance actions required to ensure effectiveness.

**APPENDIX D**  
**Curriculum Vitae of the Compiler**