

DR3446 – Official Groundbreaking



Roadhart CC

An Environmental Management Plan (EMP) Prepared in Support of an Application for the Environmental Clearance Certificate (ECC) for the Operation, Maintenance and Decommissioning of an Aboveground Fuel Storage Installed at Construction Site Camp, along DR3446, Harapembe Village, Kavango West Region

APP- 00133

PROJECT NAME	
An Environmental Management Plan (EMP) to Support an Application for an Environmental Clearance Certificate (ECC) for the Operation, Maintenance and Decommissioning of an Aboveground Fuel Storage Tank Erected at a Construction Camp Site along the DR3446, Harapembe Village, Kavango West Region	
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EXECUTIVE SUMMARY

DR3446 is a district road which branches off from the B8 highway (Rundu-Grootfontein) at the village of Alex Muranda, ±70 km south Rundu, proceeding in southwestern direction until it links onto D3600 (Tsintsabis-Katwitwi) at the village of Helavi. It is 138 km long and a vital route connecting and facilitating movements of people and goods in the regions of Kavango West, Kavango East, Oshikoto and Ohangwena. At present DR3446 is a sandy bush road (single lane) and is being upgraded to gravel standard road.

The upgrade of the first 40 km was awarded to Roadhart CC, a local civil construction engineering company. The execution of the road construction has provided for a broader participation involving a labour-based component reserved exclusively for SME contractors under the direct supervision and management of Roadhart, as the principal contractor.

Roadhart has a large fleet of diesel-powered construction machinery and has therefore installed an aboveground fuel storage tank (AFST) at its construction camp site, along the DR3446, at Harapembe Village. The tank has a safe fill and bund capacities of 21 000 litre and 24 200 litres respectively. The operation of the fuel tank is permitted via a Consumer Installation Certificate (CIC) granted by the Ministry of Mines and Energy (MME) to a consumer who is in possession of an Environmental Clearance Certificate (ECC) obtained in terms of the Environmental Management Act (EMA).

Given the capacity of the tank involved and for the fact that the installation has been made already, the requirement for a full EIA was waived by Ministry of Environment, Forestry and Tourism (MEFT). Ekwaio was advised to only prepare an Environmental Management Plan (EMP) which constitutes this report.

Generally, the activity as described in this report has a relatively small footprint and a low impact on the receiving environment. The mitigation measures provided in the EMP are therefore deemed adequate for operation, maintenance and decommissioning of the AFST. If the mitigation measures as recommended are complied with, the activity will be executed without causing any impacts to the natural environment.

It is recommended that the applicant be issued with an ECC for the operation, maintenance and decommissioning of its AFST erected on its construction camp site at the Harapembe Village, in the KWR.

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ABBREVIATIONS AND ACRONYMS

TERM	EXPANSION
AFST	Aboveground Fuel Storage Tank
CIC	Consumer Installation Certificate
EC	Environmental Commissioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
IAPs	Interested and Affected Parties
KWR	Kavango West Region
KER	Kavango East Region
LDC	Livestock Development Centre
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
NSI	Namibia Standards Institute
PPR	Petroleum Products Regulations
PPE	Personal Protective Equipment
SHE	Safety, Health & Environment
SABS	South Africa Bureau of Standards
SME	Small and Medium Enterprises
NAMES OF ROADS	
B8	The name of the route starting from B1 at Otavi up to the border post of Namibia and Zambia at Katima Mulilo via the towns of Grootfontein, Rundu and Divundu
DR3446	The name of the district road (single track) starting from the Helavi village on the D3600 (from Tsintsabis to Katwitwi) up to the Alex Muranda village where it connects to B8 highway (Mururani to Rundu).
D3600	The name of route starting from the Tsintsabis settlement connecting to C45 highway at Mpungu Settlement (Rundu to Eenhana) and proceeding to the border post at Katwitwi.

DEFINITIONS

TERM	EXPANSION
Assessment	The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making
Bulk quantity	In the Petroleum Products and Regulations, 'bulk quantity' is defined as a single quantity of fuel in excess of 200 litres.
Certificate	In terms of PPR a 'certificate' is defined as a Consumer Installation Certificate issued in terms of section 18 of the PPR.
Consumer Installation	Means a petrol or diesel installation, including any pump, storage tank and piping used in relation thereto, for the purpose of dispensing fuel into own or hired petrol or diesel consuming equipment or own hired vehicles.
Cumulative Impacts	In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Disposal	Means the discharge, depositing, dumping, spilling, leaking, placing of waste on or at any premises or place set aside by the Council for such purposes, and "dispose" shall have a similar meaning;
Environment	As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".
Environmental Clearance Certificate (ECC)	A certificate and associated conditions issued in terms of the Environmental Management Act, authorizing a listed activity to be undertaken
Environmental Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Environmental Management Plan (EMP)	A working document which contains site project specific plan developed to ensure that environmental management practices to eliminate and control environmental impacts are followed during the developmental phases of that site, project and or facility and would normally consist of construction phase, operational phase and decommissioning phases. Commissioning and Operation phases.
Non-compliance	Issues that are in direct non-compliance with the requirements, commitments and/or management measures as approved in the EMP.
Petroleum Product	Means any petroleum fuel and any lubricant whether used or used, and includes any other substance which may be used for a purpose for which petroleum fuel or lubricant may be used.
Waste Management Plan	Means a structured document that sets out to record/eliminate/reduce/reuse/recycle the amounts and the types of all waste that is generated in an area or facility

1. BACKGROUND INFORMATION

1.1 Introduction

Roadhart CC (Roadhart), is civil engineering construction company with its operational base in the town of Ondangwa. The company has been awarded the tender to upgrade the district road, DR3446 from a single track lane to a gravel standard road. D3446 is a vital route in the Kavango West Region (KWR) linking commercial and communal farm lands as well public institutions in the southern part of the region.

The road is executed using the labour-based construction methods involving multiple SME contractors under the direct supervision and management of the main contractor, Roadhart. The principal contractor has a fleet of diesel-powered construction machinery and equipment and has installed an aboveground fuel storage tank (AFST) on its construction camp site. Diesel which is procured in bulk is stored in such an AFST.

To store fuel in an AFST facility, a Consumer Installation Certificate (CIC) is required from the Ministry of Mines and Energy (MME) which is granted upon submission of an application accompanied by an Environmental Clearance Certificate (ECC). The ECC is granted by the Ministry of Environment, Forestry and Tourism (MEFT), after an Environmental Impact Assessment (EIA) has been conducted.

Ekwao Consulting was appointed by Roadhart to handle its ECC authorisation process with MEFT. Since the AFST has been installed already and the tank has a safe fill capacity of 21 000 litres, the need for a full EIA was waived by MEFT. Ekwao was advised to only prepare an Environmental Management Plan (EMP) to mitigate the environmental impacts associated with the operation, general maintenance and decommissioning of the aforesaid AFST.

1.2 Activity Location

The district road, D3446 is a single track sandy road (one-lane) which does not allow two vehicles travelling in opposed direction to pass each. It is 137 km long and one of the essential rural roads in the KWE. The bush roads starts at the village of Helavi on the main road, D3600 (Tsintsabis to Katwitwi) and follows in an south-eastern direction towards Alex Muranda (Charlie Cutline) where it joins the B8 highway (Grootfontein-Rundu) (**Figures 1 & 2**). The upgrading to gravel standard would widen the road allowing for movements of medium sized trucks (**Fig. 5**).

The road is constructed in phases with the first and current phase covering a distance of 40 km. The first phase starts at the B8 highway towards the Alex Muranda LDC. The construction camp site is about 3 km from B8 (**Fig. 2**). This is where the aboveground fuel storage tank is located. The construction duration for the first phase has been set at six months. The second phase will be 57 km and will follow soon after completion the first phase.

1.3 The EMP

This document represents the EMP and is intended to serve as a standalone plan to manage and to ensure that the environmental impacts associated with the operation, maintenance and decommissioning of the AFST are reduced, minimized, or eliminated altogether.

The EMP is indented to serve as a tool that helps Roadhart to take proactive actions aimed at addressing problems before they occur. In the event that a problem or an emergency does indeed occur, i.e. fire breaks out, the EMP is there to provide the necessary protocols and guidelines on how, in the first instance, the fire should have been prevented. When the fire does occur, the EMP is there to provide guidelines on the required equipment that should be readily available to combat the fire, and finally to provide measures for ensuring that the fire does not re-occur.

It is also incumbent upon Roadhart to ensure that its personal and staff are trained and acquainted with the provisions of the EMP. This can effectively be done during toolbox talks at the beginning of the shift.

1.4 EMP Objectives

This EMP has the following objectives:

- To outline the functions and responsibilities of persons involved in the project.
- To state the standards and guidelines which are required to be achieved in terms of EMA.
- To outline mitigation measures and environmental specifications which are required to be implemented during the operational, maintenance and decommissioning of the AFST in order to minimise the extent of the environmental impacts and to manage the environmental impacts.
- To protect the soils and groundwater resources through the implementation of measures for spill prevention and an effective clean-up in the event that a spill does occur.
- To protect human health, public assets including the safety of the workers and the general public, by ensuring that a high standard of housekeeping is maintained and upheld throughout the duration of road construction.
- To prevent long-term or permanent environmental degradation.

1.5 Legal Obligation

The acceptance of the EMP by the EC will confer a legal obligation to Roadhart to comply with the recommendations contained in the EMP. Should Roadhart fail to comply with such recommendations, it is deemed to be a contravention in terms of Environmental Management Act (Act No. 2 of 2007) and as such is criminally prosecutable.

The EMP is binding on Roadhart, to all its employees and to all SME contractors working on certain aspects of the road building under the direct supervision of Roadhart with respect to refueling activities, spills or leaks.

2. ACTIVITY DESCRIPTION

The AFST has a safe fill capacity of 21 000 litres and a bund capacity of 24 200 litres (**Fig. 4**). The EMP is limited to these key activities – operational, maintenance and decommissioning of the AFST. Since the installation has been carried out already, environmental aspects related to site selection, setting up and site establishment are considered to have been taken into account and are not covered in this EMP.

With respect to the operation of the AFST, mitigation measures have been proposed for those impacts associated with the following aspects related to:

- Delivery of fuel and transferring from the fuel carrier truck to the tank;
- Dispensing of fuel into various construction vehicles and equipment;
- Handling of fuel required to refuel field-based construction machinery;
- Maintenance of the AFST and associated equipment, dispensing pump, piping, and
- General safety and security of the AFST including good housekeeping.

For the decommissioning of the AFST, mitigation measures have been suggested with respect to the following activities:

- Fuel tank handling including completely emptying of any remaining fuel;
- Waste management including soil soaked materials;
- Site assessment activities to ascertain if any leaks had occurred, and
- Rehabilitation of the site.

2.1 Need for the Activity

The core activity which initiated the installation of an AFST on the construction camp site is the upgrading to gravel standard of DR3446, a vital road facilitating movements of goods and services to the rural areas of KWR - one of the least developed regions in the country. The upgrading will improve mobility which ultimately leads to improved service delivery to the populace in the remote rural area of the region.

The upgrading will also improve accessibility to commercial and communal farms including public institutions, i.e. the Mankumpi Constituency Office and the Alex Muranda LDC. The construction work is carried out using earthmoving machinery and equipment which need fuel to operate.

An AFST is therefore an absolute requirement and necessity for the road construction to be delivered on time.

2.2 Alternative to the Activity

The tender for the road upgrading has been awarded already with a performance period of six months for the first phase. The tank has therefore been installed and commissioned and as such consideration for alternatives was not possible. In fact, the alternative would be to source fuel from Rundu which is about 70 km away.

3. FUNCTIONS AND RESPONSIBILITIES

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the various parties for this project are as listed in **Table 1**, below. Given the scale and scope of activity footprint, it is not justifiable to appoint an in-house Environmental Control Officer for the project.

TABLE 1 : Functions and Responsibilities

Parties	Responsibilities
The Environmental Commissioner	<ul style="list-style-type: none"> • Reviewing of this EMP and to grant or to refuse the award of an ECC. • Enforcing compliance with the terms of the EMP once an ECC is granted. • Reviewing of the EMP and any revisions that may be made in the future. • Undertaking inspection and/or audits of the AFST at their discretion. • Enforcing of legal mechanism for contraventions to the EMP and ECC.
Roadhart or its formally appointed Site Manager (SM)	<ul style="list-style-type: none"> • Overall implementation of the EMP. • Day-to-day management of the AFST. • Training of supervisor(s) or pump attendant(s), etc. • Record keeping and reporting. • Adequate light around the tank. • Limiting access to fuel tank by a well trained staff member. • Liaising with stakeholders, i.e. MME, MEFT, etc. • Technical maintenance of the tank. • Daily inspections and ongoing maintenance of fuel dispensing equipment. • Provision of spill kits and firefighting equipment.
The Ministry of Mines and Energy	<ul style="list-style-type: none"> • Granting of the CIC • Enforce compliance with PPRs • Undertake site inspections at their discretion • Review reports submitted by CIC holders in terms of PPRs, • Regulate fuel prices in the country • Withdraw CIC when conditions are violated

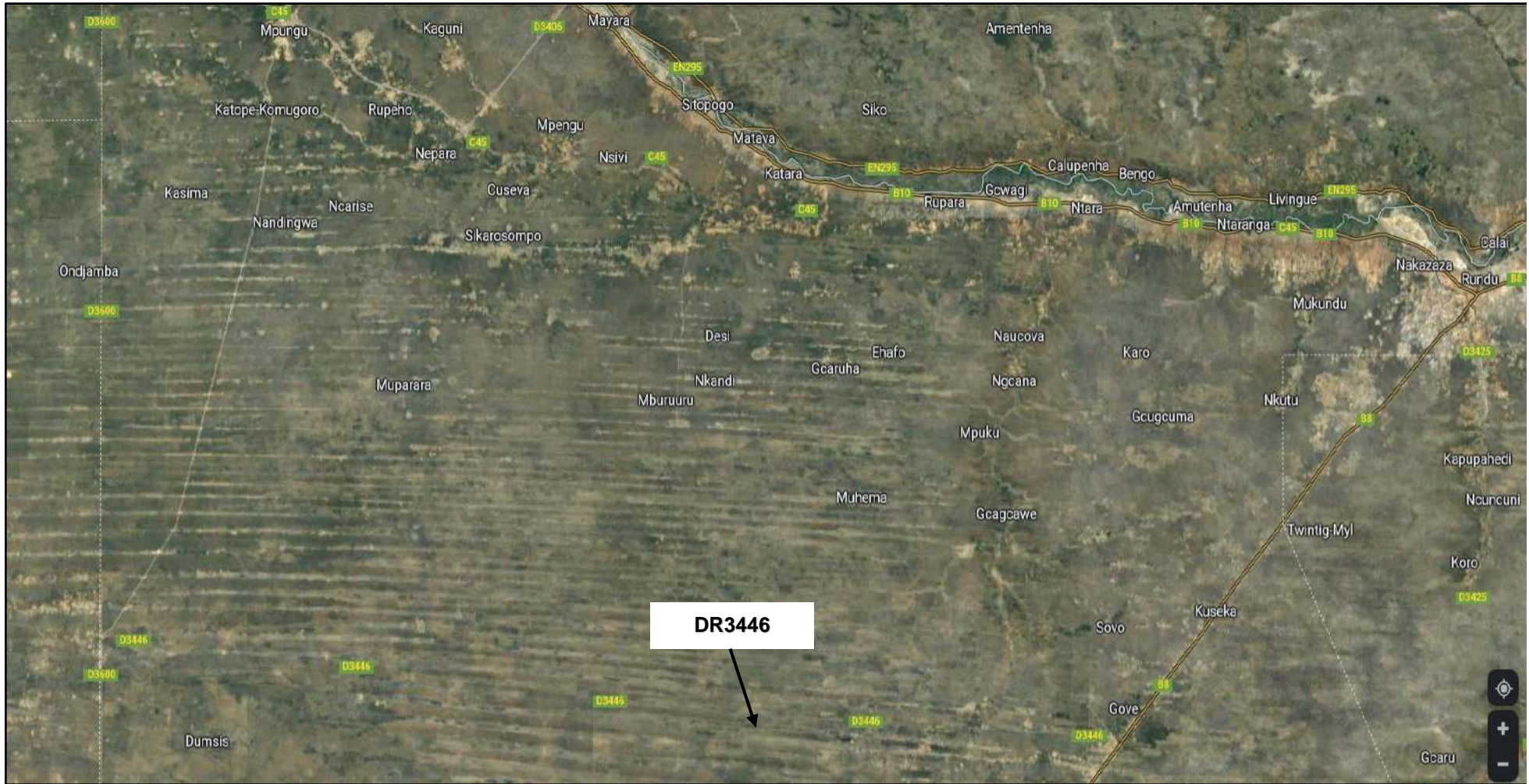


Figure 1: Project Location

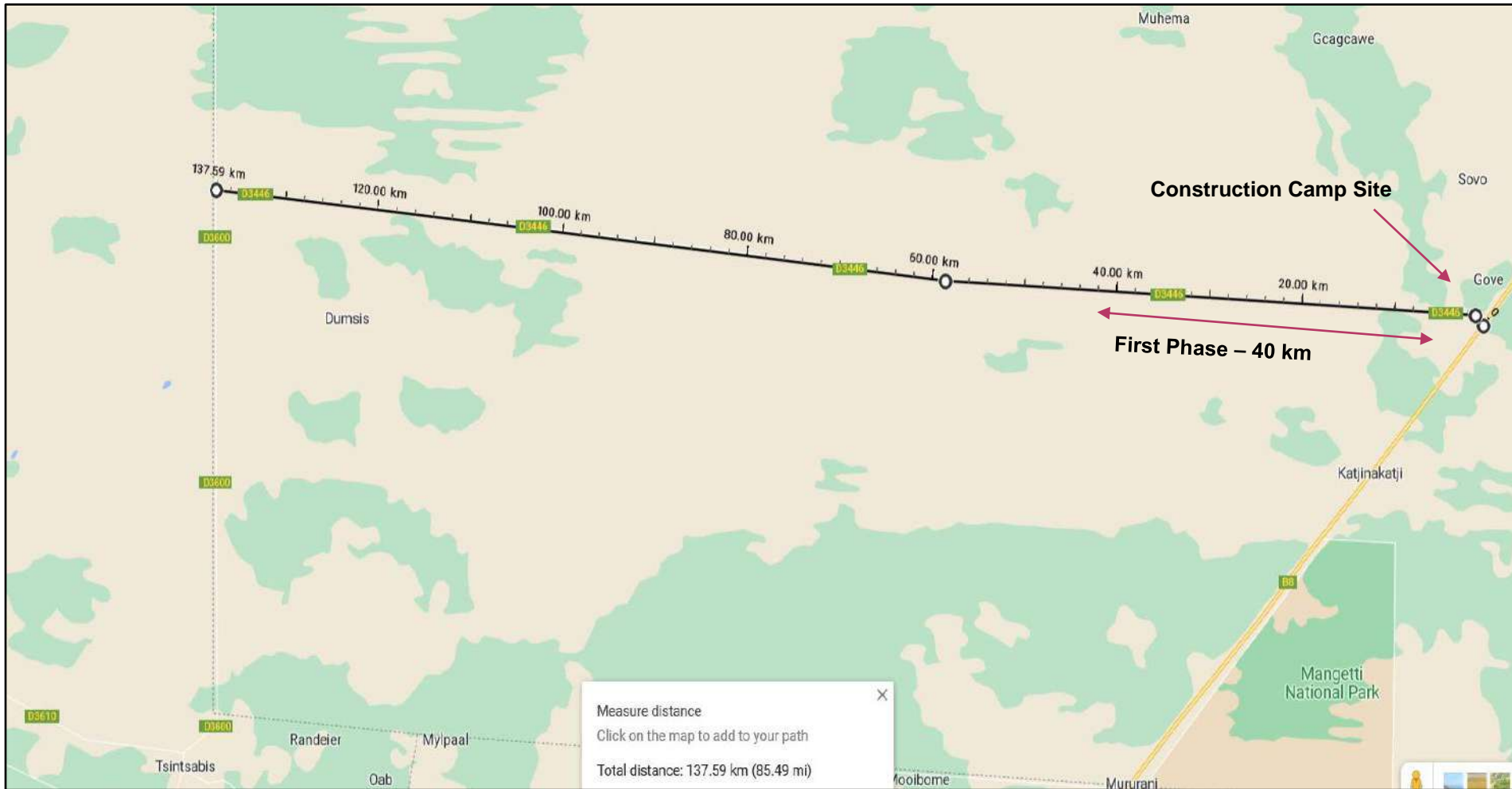


Figure 2: Location – Construction Camp Site

4. THE REGULATIVE FRAMEWORK

For development to take place on a sustainable basis, the Namibian Government has formulated laws, rules and regulations that require that all those projects which are considered to have an adverse impact on the environment, should be preceded by an environmental assessment. Some of the laws that are applicable to the activity conducted by Roadhart CC are as listed in **Table 1**, below.

Table 1 : Regulatory Framework

Legislation	Main Aspects
Environmental Management Act (Act. No. 7 of 2007)	a) It defines what the environment is and encourages sustainable management of the environment when natural resources are being exploited/extracted for the benefit of the residents/citizens. b) It also provides for a process of assessment and control of activities that are likely to pose significant effects on the receiving environment.
Environmental Management Regulations (Gazetted on 12 February 2012)	a) Heralded the implementation of the Environmental Management Act almost five years after the Act was approved by the legislature. b) Presents a list of activities that require an ECC prior to commencement. c) Regulates and provides guidelines on how EIAs must be conducted.
Petroleum Products and Energy Act (No. 13 of 1990)	The act provides for amongst others: (a) The various licensing and certifications required for those wishing to participate in the petroleum sector. (b) Consumer installation.....' No person shall operate a consumer installation unless authorized to do under a certificate issued in terms of section 18 of the PPR. (c) No person shall possess or store any fuel except under authority of a license or certificate (PPR:section3(1)(b). (d) PPR 44(a) states that the Minister may grant approval of specifications and standards including the South African Bureau of Standards or equivalent. (e) Each certificate holder shall with regard to any replacement or installation of a storage tank or a remaining storage tank....annually not later than 28 February to complete Form PP/10 as set out in Annex B of PPR section 46(2) for submission to the Minister. (f) In Sections 47 and 48 of the PPR, general duties with regard to fires and explosives are outlined as well as the required fire precaution and emergency measures. (g) Measures for product spill are provided for in section 49 while the cost recovery for any spill are contained in section 50 of the PPR.
Public and Environmental Health Act (Act No. 1 of 2015)	a) The Act provides for a legal framework for a structured more uniform public and environmental health system and for matters incidental thereto. b) It deals and provides guidelines on noise generation and control thereof within an urban environment. c) Also deals with waste management, handling or collection, waste disposal, waste recycling, sanitation, etc.
Hazardous Substances Ordinance (No. 14 of 1974)	a) Provides for the control of hazardous substances with potential to cause harm, injuries and even death. b) Also provides for the manufacture, handling, storage, sale, use, disposal, etc. of hazardous substances.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)	a) Provides control of noxious or offensive gases and matters incidental thereto.

Legislation	Main Aspects
	b) Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Water Resource Management Act (2004)	The following permits are required in terms of the Water Act: <ul style="list-style-type: none"> o water abstraction permits; o domestic effluent discharge permits (site offices, construction camp); industrial effluent discharge permits; o water use for dust suppression; and water reticulation permits (pipelines). Will be superseded by Water Resources Management Act 2013 once the regulations are implemented in the future.
Namibia Standard Act (Act No. 18 of 2005)	Responsible for the promotion of standardization and quality assurance in the industry, commerce and the public sector in Namibia, with the aim of improving product quality, industrial efficiency and productivity and promoting trade so as to achieve optimum benefit for the people of Namibia.



Figure 3: Tank & Related Equipment



Figure 4: Tank Safe Fill and Bund Capacities



Figure 5: Tank Bund View



Figure 6: DR3446 Upgrade Underway

5. THE BASELINE ENVIRONMENT

It is understood that an EIA for the upgrading of the entire DR3446 to gravel standard has been carried out already and an ECC for the activity granted. A brief description on the receiving environment is therefore provided here but is limited to the footprint of the AFST and its immediate surrounds.

The information provided in this section is sourced from various sources including the work done (*B J Strolbach & A Petersen, 2007*) on vegetation around Mile 46 Livestock Development Centre or the Alex Muranda LDC where DR3446 actually starts.

Only those elements of the environment that have a direct bearing on the impact assessment process of the AFST are highlighted. The severity of the potential impacts is largely determined by the state of the receiving environment.

5.1 Topography, Geology and Soils

The project site falls within the extensive Kalahari Sand basin with the depth of sand cover varying between 10 m and 40 m while the deepest point of Kalahari Sequence itself is approximately 150 meters. The topography has been flattened through the action of erosions with relief mostly at about 50 m. The remnants of the dunes fields could still be observed from satellite images.

Geologically, the Alex Muranda LDC is crossed by the upper Mpungu Omuramba which incises deeply into the sand plateau (*Graz, 1999 & De Sousa 1986*). The soils are deep, pure sands with poor nutrients. Heavier textured soils are encountered along the banks of Omuramba. There are no Omuramba or watercourses in the vicinity of the project site.

Potential Environmental Impact

The topography and geological aspects of the site have no bearing on the activity undertaken, i.e. the operation of an AFST. However, the characteristics of soil lack the necessary mechanism to retain and contain any fuel leaks or spills on its surface. Any major spill or leak from the AFST has therefore the potential to filtrate through the soil profile and reach the groundwater aquifer.

5.2 Vegetation

According to the study, the project site is located within the Zambesian *Baikiaea* woodlands ecoregion as delineated by the World Wide Fund (WWF) (*Vettel 2001,*).

The site is dominated by open woodlands with numerous hardwood species that include several high use-value and protected species such as *Acacia erioloba* (Camel thorn), *Philenoptera nelsii* (Kalahari Apple leaf) and the *Baikiaea plurijuga* (Afrikan Teak). The Afrikan Teak is fire-sensitive and used extensively for timber hence becoming a threatened tree species. These species have been observed in the area surrounding the project site, but the site itself (camp site) is totally devoid of vegetation.

Potential Environmental Impact

Fire could be a serious hazard and management measures should be taken to ensure that no open fire is made without direct human supervision. Adequate firefighting equipment should also be provided and kept in functional states and workers properly trained, firstly on fire prevention measures and, secondly, on firefighting methods including fire drills.

5.3 Surface Water and Drainage

There were no sources of standing or surface waterbodies observed in close proximity of the project site. Based on the soil structures as described in the preceding paragraph, rainwater is quickly absorbed into the soil. The direction of the natural drainage is from west to east.

Potential Environmental Impact

Poor handling of any fuel spill or leaks could result in hydrocarbons being washed away into the natural drainage system contaminating the soil and ultimately filtering through to the groundwater table.

5.4 Groundwater

The site is located within the Omatoko groundwater basin outside any state controlled Water Control Area. According to available studies (Christelis and Struckmeier, 2001), the groundwater in the study area is hosted in the Kalahari Group aquifers which are porous hence holding water in intergranular pore spaces which, essentially behave like a sponge allowing water to enter such aquifers effortlessly and in a rapid manner. The porous nature of the soil, would make the groundwater vulnerable to impacts associated with pollution.

The water hosted in the porous aquifer is of Class A quality and therefore serves the needs of the community including the livestock on both communal and commercial farms in the area.

Potential Environmental Impact

Groundwater pollution and contamination is a real possibility given the porous nature of the water aquifer. In the event of a major fuel spill or leak, any chemicals and waste stored on site have the potential to pollute the groundwater aquifer hence compromising the community water source.

5.5 Waste Management

Poor handling and management of waste, especially hazardous waste from the workshop section on the camp site (oil, filters, grease, used batteries, etc.) and grey water resulting from the onsite ablution facilities have the potential to impact the receiving environment.

Potential Environmental Impact

Pollution and contamination of groundwater from spills and leaks of hazardous waste are potential risks likely to impact the environment. This can be mitigated by ensuring that employees are well trained in the handling of such waste. Hazardous waste should be placed in leak-proof containers until disposed of at a designated offsite disposal site.

It should be noted that any fuel spill in excess of 200 litres is a reportable incident.

6. THE ENVIRONMENTAL MANAGEMENT PLAN

Understanding the operational activities conducted by Roadhart is the first step in understanding the potential risks involved and possible environmental impacts associated with the operation and maintenance of an AFST. The next and possibly more important step is to identify the environmental aspects that are likely to give rise to such impacts.

The EMP has been presented in a table format where applicable and where it is not applicable to use a table, a simplified description of the environmental aspect has been provided. For each potential impact, an environmental objective has been defined followed by suggested mitigation measures. The monitoring and the party responsible for such monitoring are also provided.

The EMP proposed for the AFST has been divided into two segments covering aspects related to:

- Construction & Maintenance, and
- Decommissioning

6.1 Operation and Maintenance Activities

For the operation and maintenance of the AFST, the EMP or management measures have been recommended for these aspects:

- EMP for access to the fuel tank
- EMP for environmental awareness training and housekeeping
- EMP for spills and leaks
- EMP for waste management (general and hazardous)
- EMP for surface water, drainage and groundwater
- EMP for fire, health and safety

6.1.1 EMP – ACCESS TO THE TANK

It is important that access to the tank site is free of obstructions and wide enough to accommodate entry by any heavy earthmoving machinery and equipment for refueling. It was also observed that the AFST was sited away from any natural water streams or drainage.

The management measures recommended for access to the site are provided in **Table 2**, below.

Table 2 : EMP- Access to tank site

Potential impacts	Having uncontrolled access to the fuel tank could have serious implications including the following: <ul style="list-style-type: none"> • Theft • Vandalism • Sabotage • Incidents/accidents
Environmental Objective	Ensure that access to the fuel tank site is strictly controlled with premises fenced in and preferably kept under lock and key.
Management Measures	<ul style="list-style-type: none"> a) Declare and retain the ASFT and related infrastructure and equipment off-limit to the public and personnel of the company. b) Plan and have one access leading in and out of the ASFT site to ensure minimal environmental impact. c) Display adequate signage indicating speed limits that would effectively mitigate potential environmental impacts such as dust, noise, spill, accidents or injuries. d) The ASFT should be fenced in with access strictly controlled and restricted to limited key personnel who are well trained and experienced in handling fuel.
Monitoring	Access road and facilities must be monitored daily and records kept on file.
Responsible Party	Site Manager has the overall responsibility but activity can be delegated to a key staff member who is well trained.

6.1.2 EMP - ENVIRONMENTAL AWARENESS TRAINING & HOUSEKEEPING

Training of employees on the EMP will enhance and improve their knowledge, skills as well as their appreciation of the importance required from of them to protect and safeguard the environment. Training is particularly found lacking in construction companies in which employees are often hired when a tender has been secured and let go when the work is complete or the site handed back to the client.

It is still important that on-the-job- training is provided to new employees to help them understand what is expected from them.

Table 3: EMP – Environmental Awareness Training & Housekeeping

Potential impacts	<p>Training of employees will have positive impacts in the form of:</p> <ul style="list-style-type: none"> • Improved safety, • High productivity, • Reduced wastage, • Positive attitude and motivation, and • Value – trained employees are valuable assets to any business.
Environmental Objective	<p>Provide training on the importance of the EMP to the employees and in so doing inculcate responsibility towards the protection of the natural environment.</p>
Management Measures	<p><u>Environmental Awareness Training</u></p> <ol style="list-style-type: none"> a) Ensure that the key personnel entrusted to attend to the AFST have the appropriate level of environmental awareness and necessary competencies a required to operate associated equipment without causing harm to the environment. b) Ensure that machine operators who present machinery for refueling are made aware of and adhere to the environmental requirements. Leaking vehicles and machinery must be reported to the workshop for the leaks to be repaired. c) Ensure that visitors entering the premises are acquainted with the provisions of the EMP and are provided with suitable PPEs. d) Awareness of the EMP should form an integral part of the daily ‘tool box’ talks of all personnel especially machine operators. e) Third parties delivering bulk fuel to the AFST should be well acquainted with the EMP and their trucks should meet the road regulations: licensed, roadworthy, driven by operators in possession of public open permits, etc. <p><u>Housekeeping</u></p> <ol style="list-style-type: none"> a) A high standard of housekeeping must be maintained at the fuel tank and throughout the construction camp site. b) Employees should adhere to and practice good housekeeping such that the premises is kept litter-free, materials neatly stacked away and waste regularly removed. c) Storage areas should be kept in an orderly manner and any spill cleaned up immediately d) Ablution facilities should be kept tidy and clean at all times and any leaks reported and repairs effected.
Monitoring	<p>Daily with reports submitted to Management weekly.</p>
Responsible Party	<p>Site Manager has the overall responsibility.</p>

6.1.3 EMP - SPILLS AND LEAKS

Preventing spills and leaks during fuel delivery and when dispensing into machines and equipment is the best solution, both from an environmental perspective and cost implications that could be involved. In the **Table 4**, below, management measures have been provided on how to handle any spills and leaks that may occur during the operation and maintenance of the fuel tank.

Table 4: EMP - Spills and Leaks

Potential impacts	<ul style="list-style-type: none"> • Soil pollution • Contamination of natural drainage channels • Potential contamination of groundwater resource • Clean up costs
Environmental Objective	Protect amenity values by ensuring that spills and leaks do not occur.
Management Measures	<p>a) A site specific <u>Contingence Spill and Leak Plan</u> must be developed by management to deal with any spills and leaks which may occur during the operation of the AFST.</p> <p>b) The contingence spill and leak plan must take the following prevention measures into account:</p> <ul style="list-style-type: none"> • Any hydrocarbon spill or leak must be immediately contained. • The source of leak should be identified and immediately repaired. • Leaking pipes must preferably be replaced and not welded. • Any leaking machine which reports at the tank for re-fueling must have its leak effectively repaired before refueling can be done. <p>c) Visual inspection of the fuel tank and associated piping and pump should be carried out on a daily basis.</p> <p>d) Any fuel spill around the tank area should be contained and cleaned up. This is done by scooping out the entire fuel soaked soil.</p> <p>e) Any contaminated soil so cleaned up must be kept in a leak-proof container until disposed of at an approved offsite disposal site.</p> <p>f) Personnel entrusted to attend to any spills and leaks should be adequately trained and provided with suitable PPEs. The best solution is always to prevent spills and leaks from occurring.</p> <p>g) Under no circumstances should fuel soaked soil be buried or burned on the construction camp site.</p> <p>h) A spill-kit which is adequately stocked should be kept in close proximity of the tank and easily accessible.</p> <p>i) Any spill of fuel or oil in excess of 200 litres must be reported to MME including an incident reported detailing the circumstances that caused the spill/leak and what mechanism have been put in place to prevent re-occurrence .</p>
Monitoring	Every day before, during and after refueling
Responsible Party	Site Manager has the overall responsibility.

6.1.4 EMP - WASTE MANAGEMENT (GENERAL AND HAZARDOUS)

It is important that a high level of cleanliness is maintain around the fuel storage tank premises. While little waste may be generated at the tank, there is a likelihood that most drivers would probably prefer to do their normal daily pre-start checks at the facility when refueling. This, inevitably, will result in waste being dumped around the tank site.

Contaminated soil at the facility will also be expected from trucks that are leaking, etc. The management measures recommended for waste management and handling are tabulated in **Table 5**, below.

Table 5: EMP – Waste Management (General & Hazardous)

Potential impacts	<ul style="list-style-type: none"> • Risk to human health • Soil contamination • Visual nuisance • Odour nuisance • Source of rats, rodents if food items are involved.
Environmental Objective	Enhance and protect amenity values by ensuring a hygienic and waste-free fuel tank site and the construction camp site.
Management Measures	<p><u>General Waste:</u></p> <p>a) Litter or solid waste (plastics, papers, food items, packaging, cans, bottles, etc.) must be picked up on a regular basis during the operation of the AFST - around the tank site and all around the construction camp site.</p> <p>b) Adequate and suitable waste disposal bins should be made available both at the tank site and around the construction camp site. Such bins should be properly secured and covered in order to prevent scavengers from tipping them over.</p> <p>c) Solid waste must be disposed of in a responsible manner at offsite designated disposal sites.</p> <p>d) Under no circumstances should any waste be buried or burned on site.</p> <p><u>Hazardous Waste</u></p> <p>a) Hazardous waste (oil filters, greasy, car batteries, paints, etc.) must be stored in leak-proof containers and disposed of at an approved, offsite disposal site.</p> <p>b) Washing of machinery and equipment should be done at a designated area and any effluent from washing of such equipment considered as hazardous waste and directed at a silting pond which is suitably bunded and had an impervious floor.</p> <p>c) Storm water that may be contaminated with hydrocarbon should drain to the sump collection points where this water will need to be treated or removed.</p> <p>d) Ensure that hazardous waste is handled by well-trained employees who are provided with suitable PPEs.</p>
Monitoring	Daily with reports submitted to management on a weekly basis.
Responsible Party	Site Manager has the overall responsibility.

6.1.5 EMP – SURFACE WATER, DRAINAGE AND GROUNDWATER

Incorrect disposal of substances and materials and polluted run-off can cause serious negative impacts on the natural drainage and groundwater resources. There are no surface waterbodies in the vicinity of the AFST, however, the following measures are recommended.

It is expected that some spillage and leaks would likely occur from the tank during refueling of construction vehicles and equipment. Continuous spillage and or leaks which go on unattended for a long time could result in soil contamination which could ultimately impact surface water and natural drainage.

Table 6: EMP – Surface Water, Drainage & Groundwater

Potential impacts	<ul style="list-style-type: none"> • Soil pollution • Contamination of groundwater • Potential leaking of hazardous products
Environmental Objective	Ensure that the operation and maintenance of the facility are done in a way that does not lead to pollution of groundwater resources.
Management Measures	<ol style="list-style-type: none"> a) Ensure that regular inspection of all tank vital points and associated piping is carried out and results recorded. b) Regular maintenance of key components of the tank must be done in order to prevent any leaks from occurring. c) Refueling of field-based earthmoving machines (bulldozers, excavators, graders, etc.) must be done from a suitable diesel bowser which is licensed and suitably sign-posted. d) Drip trays should be used when field-based construction machines are refueled. Re-fueling should be done by a trained personnel. e) Equipment and machinery must be in good operating conditions, kept clean, free of leaks, excess oil and grease. f) Ensure that machinery is operated by a skilled driver and that pre-start check inspections are carried out at the start of the shift. The driver must be able to correctly monitor the functions of the machine and to report any malfunctions and defects timeously to the foreman. g) Ensure that any stormwater drains or water channels around the tank site are kept clean of litter and items that could be of obstruction. h) A high standard of housekeeping should be maintained around the fuel tank.
Monitoring	Daily with reports submitted to Management weekly.
Responsible Party	Site Manager has the overall responsibility.

6.1.6 EMP - FIRE, HEALTH AND SAFETY

Fire and explosion risks exist due to the storage, handling and transportation of fuel which is potentially dangerous to humans and properties. Unlike filling stations which are visited by thousands of patrons causing all kinds of safety problems from theft, crimes, informal trading and increased vagrants, there are no potential safety issues of such nature associated with the AFST.

Occupational exposure is normally related to inhalation of hydrocarbon vapour or when one comes into physical contact with fuel.

Table 7: EMP – Fire, Health and Safety Aspects

Potential impacts	<ul style="list-style-type: none"> • Fire hazard • Explosion hazard • Health hazard • Injuries • Asset destruction
Environmental Objective	Protect amenity values by ensuring that a high standard of housekeeping is maintained with respect to fire, health and safety.
Management Measures	<ol style="list-style-type: none"> a) Ensure that a high standard of safety and security is maintained at the AFST by a dedicated tank attendant. b) There must be adequate lighting all around the AFST site. c) The fuel tank must be locked at all times and keys kept in the office. d) All persons using the tank (attendant & truck drivers) must be well trained, acquainted with the EMP, safety and health aspects of fuel. e) Firefighting equipment must be available at all times, in a functional state and serviced regularly. f) Adequate signage must be provided around the fuel tank – ‘No Smoking’, ‘Danger’, No Fire, ‘No use of cellphone’ etc. g) Overfill and spillage during the re-fueling should be prevented by the installation of automatic cut off devices. h) Suitable PPEs should be provided to personnel handling fuel. i) A First Aid Kit, which is adequately stocked must be available in close proximity to the tank.
Monitoring	Daily with reports submitted to Management weekly.
Responsible Party	Site Manager has the overall responsibility.

6.2 Decommissioning Activities

The performance period for the first phase of DR3446 upgrading to gravel standard has been set at six months. The fuel tank is therefore expected to be decommissioned and removed from the construction camp site on completion of the work. Management measures to carry out the decommissioning of the tank and rehabilitated of the site are provided in this section.

The site where the tank was installed should be rehabilitated to, as near as possible pre-construction conditions. Decommissioning is best achieved when a Site Rehabilitation Plan has been drawn up to serve as a roadmap outlining what needs to be done, by who and by when.

A checklist is also a good tool to have where completed items are ticked off from the checklist.

The management measures recommended for decommissioning are as listed below:

- EMP for site rehabilitation
- EMP for tank dismantling, cleanup and disposal
- EMP for post rehabilitation, inspection, monitoring and compliance report

6.2.1 EMP - SITE REHABILITATION

The site where the tank has been installed is expected to be rehabilitated and restored to pre-construction conditions. It should be remembered that rehabilitation is associated with its own set of environmental challenges which need to be carefully managed and mitigated against.

In some instances, the soil directly beneath the AFST footprint may have been completely sterilized requiring special care like tilling the sterilized soil and bringing in new topsoil to encourage revegetation. In some instances the addition of soil supplements such as compost may be required in order to improve the nutrient content of the soil.

Table 8: EMP - Site Rehabilitation

Potential impacts	<ul style="list-style-type: none"> • Topsoil soil sterilized • Loss of topsoil due to erosion • Seed decay • Desiccation of soil • Land degradation
Environmental Objective	Ensure that the site is rehabilitated and restored to its pre-construction state.
Management Measures	<ol style="list-style-type: none"> a) Start with the rehabilitation of the site as soon as the upgrading of the road to gravel standard has been completed. b) Rehabilitation should include cleanup, soil de-compaction, topsoil replacement, surface grading, contouring, installation of soil erosion and revegetation. c) Adequate budget for site rehabilitation post construction should be provided. d) Ensure that all disturbed areas are landscaped and made to blend in well with the surrounding natural environment. e) Provide for and arrange for safe removal and formal disposal of any and all hazardous substances from the site to be rehabilitated. f) The rehabilitated site should be monitored over a period of time to evaluate and assess the effectiveness of rehabilitation as well as the level of revegetation. g) Any alien plants and vegetation observed during the monitoring period should be removed and replaced with indigenous vegetation.
Responsible Party	Site Manager has the overall responsibility.

6.2.2 EMP - TANK DISMANTLING, CLEAN-UP AND DISPOSAL

It is important that the site be cleaned up and all waste generated during the decommissioning process removed and disposed in a responsible manner. Management measures to be implemented are described in **Table 9**, below.

Table 9: EMP - Dismantling, Clean-up and Disposal

Environmental Objective	Ensure that a site rehabilitation plan is developed and adhered to during the decommissioning
Management Measures	<p><u>Dismantling</u></p> <ul style="list-style-type: none"> a) Dismantle and remove all infrastructure, equipment and any items fitted on the tank (pipes, pumps, wiring cables, etc.) for use during the operational activities of the AFST. b) Waste material of any description including receptacles, scrap, rubble, etc. must be entirely removed from the construction camp site and disposed of at a recognized offsite disposal site or offered for sale to scrap dealers. c) The personnel assigned to dismantle the tank site must be well trained, skilled and experienced to perform the functions without causing any further harm to the natural environment. d) Under no circumstances should any items be buried or burned down on site. e) Final dismantling and rehabilitation of the site should be completed within the period specified by the client, i.e. the Road Fund Administration or the Principal agent. <p><u>Cleanup and Disposal</u></p> <ul style="list-style-type: none"> a) Remove all waste products generated during the rehabilitation process from the site. b) All waste products must be disposed of at an offsite facility approved to receive such waste stream. c) Minimise additional disturbance by limiting the use of heavy equipment and personnel during the clean-up and site decommissioning operations. d) Concerted effort must be made to avoid spills of hazardous materials during the decommissioning activities. e) Provide stock and maintain appropriate emergency spill kits during the decommissioning process for cleaning up any spill of hazardous substance that may occur. f) Personnel involved in the cleanup activities must be properly trained to execute the cleanup activities effectively and diligently without causing any further harm to the natural environment. g) Contain and clean-up any spills as soon as possible after the incident and thereafter remediate the affected area effectively including any spills caused on unbunded hard surfaces and stormwater drains that may have occurred. h) Dispose of spilled material recovered from banded areas by either appropriate re-use, recycling or disposal to suitably licensed offsite disposal facility. i) Ensure that the decommissioning activities are supervised by an experienced staff member who is well acquainted with the EMP.
Responsible Party	Site Manager has the overall responsibility.

6.2.3 EMP - POST REHABILITATION INSPECTION, MONITORING AND COMPLIANCE REPORT

It is important that the site be subjected to inspections and monitoring post rehabilitation to assess the effectiveness of the restoration of the site. Where shortcomings are observed the team should be called back to attend to the identified issues.

Table 10: EMP for Post Rehabilitation Inspection, Monitoring & Compliance Report

Environmental Objective	Ensure that inspections and monitoring of rehabilitated areas are done to the highest standard possible.
Management Measures	<p><u>Inspections and Monitoring</u></p> <ul style="list-style-type: none"> a) Inspections of the rehabilitated site should be carried out on a regular basis and findings documented. Ideally, photos should be taken during each inspection to facilitate monitoring of rehabilitation progress. b) Regular monitoring of the environmental management measures implemented during the rehabilitation should be carried out in order to ensure that the provisions of the rehabilitation objectives are achieved. c) Various points of compliance should be identified with regard to the various impacts that the operation had had on the environment. d) Inspections and monitoring should be carried out on the rehabilitated site so as to gauge the effectiveness of the rehabilitation measures including assessing the level of revegetation. <p><u>Compliance Report</u></p> <ul style="list-style-type: none"> a) A report confirming compliance with the various points identified in the EMP should be prepared and submitted to the line ministry. b) Any emergency or unforeseen impact which occurred during the implementation of rehabilitation process should be reported and rectified as soon as practically possible. c) An assessment of environmental impacts that were not properly addressed or were unknown during the implementation of the restoration activities of the site should be compiled and carried out and added as a corrective action.
Responsible Party	Site Manager has the overall responsibility.

7. CONCLUSIONS & RECOMMENDATION

Roadhart, the applicant of the ECC has been awarded a tender to upgrade the DR3446 to gravel standard. DR3446 is a vital road, but its current state as a sandy bush road with a single lane is hampering the delivery of services and commercial activities to the residents in the southern rural areas of the KWR. To ensure smooth execution of the project, Roadhart has installed an aboveground fuel storage tank with a storage capacity of 21 000 litres. The tank is installed on the construction camp site.

This EMP has been prepared to assist Roadhart in the operation, maintenance and decommissioning of the fuel storage facility which has a relatively small footprint and a low impact on the receiving environment. The mitigation measures provided in this EMP are deemed appropriate and adequate for the scope and scale of the listed activity. If the recommended management measures are properly implemented, it is predicted that the activities related to the operation, maintenance and decommissioning of the fuel tank will be executed without causing any impacts to the natural environment.

It is recommended that Roadhart be issued with an ECC for its AFST.