

**UPDATED ENVIRONMENTAL MANAGEMENT PLAN FOR RENEWAL OF  
ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE  
CONSTRUCTION AND  
OPERATION OF A PROPOSED FUEL SERVICE STATION AT ONDALAYE  
Yaelim Growth Point in Ekanda Village,  
OMUSATI REGION**

Prepared by: Omavi Geotechnical & Geo-environmental Consultants cc

P.O Box 1642

Windhoek

Mobile: +264 81 478 6303

Email: [info@omavi.com.na](mailto:info@omavi.com.na)

Prepared for: Namfocus Investments cc

Oshakati



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## EXECUTIVE SUMMARY

Namfocus Investments cc (CC/2011/6408) intends to construct and operate a fuel service station at Ondalaye yaElim growth point in Ekanda Village, Omusati Region at the junction between the Oshakati-Okahao C41 Highway and the newly constructed D3615 road to Oshikuku. The proposed development will entail the establishment of a convenience store, a fuel canopy with four (4) dispersive pumps, a small carwash bay, and the installation of two (2) underground fuel storage tanks, one for diesel and another for petrol. The tanks will each have a capacity of 30 000 litres and will be installed in a sealed tank farm adjacent to the canopy. The envisaged footprint of this development is approximately 3 000 m<sup>2</sup>, inclusive of access from the C41 highway.

A full Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) was already conducted in September 2016 and an Environmental Clearance Certificate (ECC) was granted by the Department of Environmental Affairs (DEA). However, due to delays in securing CAPEX for the establishment, commencement of the project was delayed and the ECC also expired in early 2020. The site has not changed since completion of the last assessment both in terms of land use and/ or the physical environment.

The proponent has now secured funding for the project and intends to renew the ECC for the planned development. Accordingly, Namfocus Investments cc has appointed Omavi Geotechnical & Geo-environmental Consultants cc to update the Environmental Management Plan (EMP) as required in terms of the Environmental Management Act No.7 of 2007 and the Environmental Impact Assessment Regulations (GN 30 in GG 4878 of 6 February 2012) in order to substantiate renewal of the expired ECC.

This report therefore documents the updated Environmental Management Plan (EMP) for the project, taking into account major changes at the site since completion of the full EIA in late 2016. A brief summary of the major impacts identified from the impact assessment done in 2016 and the proposed remedial/ mitigation measures is provided below.

### Major impacts identified

The main environmental impacts cited can be summarized as follows:

#### Potential negative impacts during construction phase

- Containment of surface water from site excavations
- Containment of fuel and oil leaks from construction vehicles
- Generation of suspended dust from earthworks, if construction is done during the dry season

- Loss or damage to topsoil due to compaction activities and increased traffic, with possible increase in runoff volumes
- Temporary loss of visual quality due to construction activities
- Generation of solid waste during construction
- Possible interruption to traffic flow and congestion during construction of access from the C41 highway
- Noise pollution and ground vibrations from construction vehicles
- Increased pressure on amenities like water and power supply
- Threat to human health and lives as a result of working in a high energy zone with persistent threats from moving vehicles and pollution from such vehicles.

#### Potential positive impacts during construction phase

- Increased opportunity for short-term casual employment
- Increased economic activities at the Ondalae growth point

#### Potential negative impacts during operational phase

- Oil/ fuel spillages from underground tanks
- Surface spillages by fuel attendants leading to exposure and possibly fires on site
- Ongoing generation of solid waste from the convenience store and associated business activities

#### Potential positive impacts during operational phase

- Increased private sector investment in the form of development and service delivery
- Increase in values of surrounding properties
- Increased economic activities at the Ondalae growth point due to increased traffic volumes
- Increase in permanent jobs and income opportunities, contributing to poverty eradication

Each of the above potential impacts were found to have varied degree of significance and magnitude and were assessed accordingly.

All major un-favourable impacts on the bio-physical, social and economic environment were deemed manageable through the prudent implementation of the proposed mitigation measures, which are clearly set out in this updated Environmental Management Plan (EMP). The updated EMP considers the potential negative impacts, viability of mitigation measures proposed, the responsible parties, monitoring indicators, frequency of monitoring and estimated costs of such measures.

## Conclusion

After assessing the project impacts, the previous Environment Assessment Practitioner's view was that the negative impacts anticipated from the proposed development can be managed and therefore the Proponent should be allowed to proceed with this development on condition that the proposed Environmental Management Plan is implemented and compliance to all the relevant governing laws, by-laws and regulations are met.

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## List of Abbreviations

TERMS	DEFINITION
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
COEMP	Construction and Operations Environmental Management Plan
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
MET: DEA	Ministry of Environment and Tourism's Directorate of Environmental Affairs
UTS	Underground Storage Tank

## 2 INTRODUCTION

This report is an update of the original Environmental Management Plan (EMP) that was drafted as part of the Impact/ Scoping Report which was compiled in terms of the Environmental Assessment for the proposed fuel service station development facility by Namfocus Investments in 2016. Because the project never kicked off as was initially planned due to financial constraints, this EMP report documents all significant changes to the site since late 2016 in so far as land use, the bio-physical environment and socio-economic circumstances are concerned. Based on a site reconnaissance visit conducted on 13<sup>th</sup> March 2020, the Environmental Assessment Practitioner firmly believes that the site has had little to no change since the last impact/ scoping assessment was done, and therefore, only minimal updates were done to the EMP. The report further aims to provide an update of the management measures to be implemented or enforced in order to address the various impacts identified in the impact/ scoping study report. The content thereof has been tailored according to the Regulations of the Environmental Management Act, 2007 (Act No 7 of 2007) Regulation No 30 of 2012 listing No 8(j) (aa) (bb) (cc).

As demonstrated in the impact/ scoping report the proposed service station establishment will impact the bio-physical and socio-economic environment. This update to the original EMP provides a clear outline of the management measures and programs that will be put in place to manage and reduce these impacts on the environment. The EMP further includes the organizational structure of the custodians responsible for the implementation of the EMP as well as monitoring programs required for environmental protection at the proposed development site. The aim is to ensure that the proponent maintains adequate control over the project during construction and operation in so far as ensuring protection of the natural environment is concerned. In short the EMP is geared towards:

- Preventing negative impacts where possible;
- Reducing or minimising the extent of impacts during the project life cycle and;
- Preventing long term environmental degradation.

This EMP has been divided into the following parts:

- Environmental Management Plan for the Construction and Operational Phases and the Environmental Monitoring Plan (EMP)

### 3 PROPOSED ADMINISTRATION OF THE EMP

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented and adhered to. There is also a need for the proponent to appoint an overall responsible person (project manager) to ensure the successful implementation of the EMP as highlighted in **Table 3-1** below.

**Table 3-1. Roles and Responsibilities in EMP Implementation**

CUSTODIAN	ROLES AND RESPONSIBILITIES
Namfocus Project Manager	Responsible to enforce EMP implementation to contractors, fuel attendants, workers and customers
Environmental Control Officer (ECO)	Implement, review and update the EMP. <ul style="list-style-type: none"> <li>• Ensure all reporting and monitoring required under EMP is undertaken, documented and distributed as needed</li> <li>• Conduct environmental site training (tool box talks) and inductions with the support of an environmental consultant.</li> <li>• Conducts regular environmental audit at site with the support of an environmental consultant.</li> <li>• Provide recommendations to site personnel to ensure compliance to the EMP and EMA</li> <li>• Close out all non-conformances.</li> <li>• Ensure materials being used on site are environmentally friendly and safe.</li> </ul>
The Department of Environmental Affairs	Approve the EMP and any amendments to the EMP. <ul style="list-style-type: none"> <li>• Review/ approve reports of environmental issues and non-conformances as issued.</li> <li>• Review and approve environmental reports submitted as part of EMP implementation</li> <li>• Site inspection to measure compliance to the EMP</li> </ul>
Environmental Consultant	Conduct and monitor actions required by the EMP if required <ul style="list-style-type: none"> <li>• Conduct environmental site training (tool box talks) and inductions if assistance is required</li> <li>• Conducts environmental audit at work site</li> <li>• Ensure materials being used on site are environmentally friendly and safe.</li> </ul>



Geotechnical & Geo-Environmental Consultants

+264 81 478 6303

info@omavi.com.na

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<p>Site/Project Engineers</p>	<p>Control and monitor actions required by the EMP.</p> <ul style="list-style-type: none"> <li>• Report all environmental issues to HSE Manager.</li> <li>• Ensure documented procedures are followed and records kept on site.</li> <li>• Ensure any complaints are passed onto the management within 24 hours of receiving the complaint.</li> </ul>
<p>Workers</p>	<ul style="list-style-type: none"> <li>• Follow requirements as directed by site engineers/ Namfocus Project Manager and ECO</li> <li>• Report any potential environmental issues to site engineer/project manager, indicating spilt oil, excess waste, excessive dust generation, dirty water running off the site and other possible non-conformances</li> <li>• Compliance with the environmental specifications and enforce adherence,</li> <li>• Communicate all environment related incidents with the EO and distribute internally to avoid repeats,</li> <li>• Maintain a record of activities relevant to environmental management</li> <li>• Continuously guide customers to comply with requirements of the EMP</li> </ul>



## 4 ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The following are management actions that should be adhered to by the proponent, Namfocus Investments cc, always. These management actions cover the construction, operational and decommissioning phases of the fuel service station. All activities should be carried out in line with this Environmental Management Plan (EMP), as may be applicable to the specific phase and activities being carried out.

This section of the EMP details the various management processes, from the status quo to when the filling station and its associated services are up and running. The reader/ reviewer is referred to Chapter 3 of the Scoping Report for legislative and permit requirements considered during this EMP.

## 5 SUMMARY OF THE POTENTIAL IMPACTS AND MITIGATION MEASURES

A complete summary of the potential impacts identified as well as their respective mitigation measures are documented in **Table 5-1**.

**Table 5-1. Summary of Potential Impacts and Mitigation Measures**

IMPACT No.	POTENTIAL IMPACT	PROPOSED MITIGATION MEASURE(S)
<b>CONSTRUCTION PHASE</b>		
1	Increased Dust and Gaseous Emission	<ul style="list-style-type: none"> <li>i. Dampening soil and excavations during work to reduce the likelihood of dust becoming suspended</li> <li>ii. Use of well-maintained vehicles and machinery to minimize gas emissions</li> <li>iii. Construction workers shall be provided with suitable PPE such as goggles, respirators, dust masks, etc. to filter out suspended dust particles</li> <li>iv. Limiting dust generating activities to times when winds are not strong.</li> <li>v. Fence off the construction site to minimize impact of dust generated on nearby road users and adjacent property</li> </ul>
2	Increased noise pollution	<ul style="list-style-type: none"> <li>i. Construction workers will be provided with appropriate PPEs;</li> <li>ii. Operations will be scheduled in such a way that noisy activities are carried out at the same time;</li> <li>iii. Machines not in use will always be switched off (Switch off approach)</li> <li>iv. Construction works will be done during the day (06h00-17h00);</li> <li>v. Regular maintenance and repair of machinery</li> <li>vi. The project site will be fenced off during construction.</li> </ul>
3	Vibrations	<ul style="list-style-type: none"> <li>i. Low vibration equipment will be used where applicable;</li> <li>ii. Vibration intensive operations will be carried out at times that are not sensitive to vibration (e.g. during day time when no one is asleep);</li> <li>iii. Vibration intensive operation will not be carried out in the same time to minimize intensity.</li> </ul>
4	Energy consumption	<ul style="list-style-type: none"> <li>i. Machines shall be regularly repaired and maintained to enhance their energy efficiency.</li> </ul>
5	Fire hazard	<ul style="list-style-type: none"> <li>i. The employees will be regularly trained.</li> <li>ii. Prohibition of smoking and the carrying of matches and lighters on the premises</li> <li>iii. Train some of the workers and set up a fire fighting team;</li> <li>iv. A fire detection and an alarm system shall be installed under the canopy and in the convenience store/ kitchen;</li> <li>v. A water tank(5 000Litres) reserved for firefighting shall be put up;</li> <li>vi. Fire extinguishers for the various classes of possible fire will be put in easily accessible area.</li> <li>vii. Establish a clearly demarcated fire assembling point in a place far from the fuel tanks and pumps</li> </ul>
6	Safety and Health Concerns	<ul style="list-style-type: none"> <li>i. All construction workers and visitors to sign a log book daily upon entry to and leaving site</li> <li>ii. All workers will be provided with the appropriate PPEs;</li> </ul>

		<ul style="list-style-type: none"> <li>iii. Enclose the construction site;</li> <li>iv. The standard operating and emergency response procedures will be posted in the processing area;</li> <li>v. Clearly marked and obstruction free fire exits will be provided;</li> <li>vi. Fire extinguishers and first aid kits will be placed in easily accessible location;</li> <li>vii. Only competent staff will be employed to manage the company's operation;</li> <li>viii. Electrical installation shall be of high quality and sound construction;</li> <li>ix. Very high hygiene standards will be maintained;</li> <li>x. There shall be a changing room for the employees;</li> <li>xi. Good house keeping shall be maintained;</li> <li>xii. Hire an accredited cash-in-transit company to regularly collect money from site</li> <li>xiii. Fuel tankers should only allowed on site when there is daylight</li> </ul>
7	Solid Waste generation	<ul style="list-style-type: none"> <li>i. Collect, segregate and manage waste on site through provision of clearly labelled bins and warning signs</li> <li>ii. All general waste is to be removed from site by a designated in-house waste handler at least once a week or as and when the need arises</li> <li>iii. All construction workers should be made aware of their responsibility in waste management and of the correct means of disposing off waste</li> <li>iv. Inert building rubble shall be used for backfilling purposes provided it complies with accepted standards</li> <li>v. Adequate waste bins for temporary disposal of the various waste types will be provided;</li> <li>vi. Measures to reduce, recycle and reuse where appropriate will continuously be put in place during project operation;</li> <li>vii. Metal cuttings will be sold off to scrap metal dealers;</li> <li>viii. Good housekeeping will be practiced;</li> <li>ix. Reduce reuse and recycle where appropriate.</li> <li>x. All general waste shall be disposed of at a suitable landfill site as agreed with the relevant local authority</li> </ul>
8	Liquid Waste generation	<ul style="list-style-type: none"> <li>i. Use water sparingly;</li> <li>ii. Sanitary effluent will be discharged into septic tank/soak pit which will be emptied monthly by licensed waste disposal firm;</li> <li>iii. There shall be adequate sanitary and septic tank sewage facilities.</li> </ul>
9	Soil contamination: Oil and chemical spills	<ul style="list-style-type: none"> <li>i. Avoid oil and chemical spillages and leakages;</li> <li>ii. Machine and equipment to be used will be in good condition to avoid leakages;</li> <li>iii. Oil and chemicals e.g. solvents will be properly and responsibly handled stored and disposed.</li> </ul>
10	Runoff and water logging	<ul style="list-style-type: none"> <li>i. An adequate drainage system will be provided;</li> <li>ii. Site will be graded and compacted appropriately to avoid water logging.</li> </ul>
11	Loss of top soil due to compaction and	<ul style="list-style-type: none"> <li>iii. Construction activities will be restricted to the envisaged footprint of the site to minimize the area affected</li> </ul>

	possible erosion	iv. Compaction to appropriate levels will help manage erosion
12	Traffic Congestion during construction of access from C41 highway	v. Construction vehicles to be used should be as small as possible to avoid major road blockages vi. Care to be taken pertaining to the placement of construction works signage in the proximity of access points to the proposed service station vii. Access to service station from C41 road to be granted by the relevant authority of the respective road
13	Increased temporary employment opportunities, in particular, for local community members	viii. No mitigation measures proposed as impact is positive ix. It is however stressed that this should be enhanced by appointing local community members especially for vacancies within the reach of such members
14	Increased freshwater use for construction purposes	x. If construction is done whilst adjacent natural water ponds have water, use of water from natural sources shall be utilised as far as possible to minimize pressure on the Namwater line
<b>OPERATIONAL PHASE</b>		
1	Ongoing solid Waste generation	i. Same as for the construction phase
2	Liquid Waste generation	i. Use water sparingly ii. Sanitary effluent will be discharged into a sewer septic system iii. There shall be adequate sanitary facilities for staff and customers
3	Health and Safety Concerns for staff and customers	i. All worker will be provided with the appropriate PPEs; ii. The standard operating and emergency response procedures will be posted in all operating areas such as the convenience shop, kitchen and canopy iii. Clearly demarcated and obstruction free fire exits will be provided. iv. Fire extinguishers and first aid kits will be placed in easily accessible location v. At least two staff members shall be given appropriate first aid training and will act as safety representatives for the site vi. Only competent staff will be employed to manage the company's operation vii. Electrical installation shall be of high quality and sound construction viii. Very high hygiene standards will be maintained. There shall be a changing room for the employees ix. Hire an accredited cash-in-transit company to handle cash from site
4	Fire hazard	i. The employees will be regularly trained on ways of fighting fire ii. Prohibition of smoking and the carrying of matches and lighters in kitchen, canopy and tank areas iii. Install warning signs on the facility e.g. DO NOT SMOKE,

		<p>SWITCH ENGINE OFF</p> <ul style="list-style-type: none"> <li>iv. Set up a fire fighting team</li> <li>v. A fire detection and an alarm system shall be installed</li> <li>vi. A water tank (5,000Litres) reserved for firefighting shall be put up</li> <li>vii. Fire extinguishers for the various classes of possible fire will be put in easily accessible areas</li> <li>viii. Keep well serviced and working fire hydrants</li> <li>ix. Keep the ground dry of any fuel or oil spillages by cleaning with appropriate detergents daily</li> </ul>
5	Product spillages and runoff with potential for surface and groundwater pollution	<ul style="list-style-type: none"> <li>i. Sealing of forecourt areas where fuel products are handled to prevent infiltration of petroleum products into the soil underlying the site</li> <li>ii. Preventative measures should be installed to prevent the storm water or other liquids draining into the soil</li> <li>iii. Subsurface tanks shall be double walled, and installed in a lined system to prevent spilled fuel from entering the surrounding soil</li> <li>iv. Fuel dispensers shall be rendered leak-proof and it is recommended that they be placed in encasements</li> </ul>
6	General impacts from general operation of service station	<ul style="list-style-type: none"> <li>v. Storm water catchment and oil separators to be installed onsite to capture runoff and separate hydrocarbons</li> </ul>
7	Increased private sector investment in the form of local development, service delivery and empowerment/ improved buying power of previously disadvantaged personnel	<ul style="list-style-type: none"> <li>vi. No mitigation measures proposed as impact is positive</li> </ul>
8	Increase in value of adjacent immovable property	<ul style="list-style-type: none"> <li>vii. No mitigation measures proposed as impact is positive</li> </ul>
9	Possible spillages by attendants leading to safety hazards, and/or leakages from underground storage tanks leading to soil contamination	<ul style="list-style-type: none"> <li>viii. Ensure all fire-fighting equipment is readily available, accessible and functioning</li> <li>ix. Ensure that relevant signage e.g. no smoking is displayed in potentially dangerous areas and abided by</li> <li>x. Have a trained first aid and fire-fighting team on site that is equipped with the right set of tools</li> <li>xi. Underground tanks must be double walled and have leak detectors</li> <li>xii. Have a fuel filling procedure that all Namfocus employees shall be familiar with</li> <li>xiii. Fuel tanks and pumps must be installed and operated as per the procedures set out in the Fuel supplier's guidelines</li> </ul>
10	Possible soil erosion and flooding on adjacent areas due to	<ul style="list-style-type: none"> <li>xiv. Install surface drains and a water collection sump downstream of the direction of runoff flow</li> </ul>

	compaction over footprint of service station	
<b>DECOMMISSIONING PHASE</b>		
1	Planned and unplanned closing of the business and ceasing of all activities onsite	<ul style="list-style-type: none"> <li>i. It is envisaged that the Namfocus Service Station will rather be upgraded than demolished or decommissioned</li> <li>ii. Accordingly, a feasibility study will be conducted every 10 years to determine whether the facility still serves its intended purpose</li> <li>iii. If it is found that the facility no longer serves its purpose, an assessment should be carried out to probe what infrastructural and/ or operational changes are required to ensure that the facility serves its intended purpose</li> <li>iv. If determined that complete demolition of the facility is required, a clear demolition plan of action shall first be devised and submitted to the relevant authorities for review. Such a plan shall also address all environmental and socio-economic impact that may arise from complete demolition of the facility</li> </ul>

In light of the mitigation measures documented above, the EAP firmly believes that all unfavourable impacts on the natural environment are manageable and therefore it is recommended that an Environmental Clearance Certificate can be issued, subject to the implementation of the various measures documented herein.

## 5.1 MONITORING PLAN

Monitoring will be required for the operational life span of the proposed Namfocus Investments Fuel Service Station and should include the Site Preparation, Construction and Operational Phases, as outlined in **Table 5-2** below:

**Table 5-2. Matrix Summary of Environmental Impacts of each phase, impact type and mitigation, responsibility and the monitoring plan**

TYPE	POTENTIAL MITIGATION MEASURE	RESPONSIBILITY	MONITORING TOOL	FREQUENCY
<b>CONSTRUCTION PHASE</b>				
Dust and Gaseous emission	Dampening soil and excavations during work to reduce the likelihood of dust becoming suspended	Contractor	Inspection	Daily
	Construction workers shall be provided with suitable PPE such as goggles, respirators, dust masks, etc. to filter out suspended dust particles	Contractor	Inspection	Daily
	Use of well-maintained vehicles and machinery workers shall wear nose masks/respirators when and where necessary	Contractor & Proponent	Inspection/ maintenance	Daily
	Fence off the construction site to minimize impact of dust generated on nearby road users and adjacent property	Contractor & Proponent	Inspection	Once off



Noise Pollution	Construction workers will be provided with appropriate PPEs	Contractor	Inspection	Daily
	"Switch off" approach (machines not in use will always be switched off)	Contractor	Inspection	Daily
	Operations will be scheduled in such a way that noisy operations are carried out at the same time	Contractor	Inspection/Daily Work Plans	Daily
	Regular maintenance and repair of machinery	Contractor	Inspection and service	Once
	Construction works will be done during the Day (06h00 – 18h00)	Contractor	Inspection and service	Daily (except Sunday & Public holidays)
Vibrations	Low vibration equipment will be used where applicable	Contractor	Inspection	Daily
	Vibration intensive operations will be carried out at times that are not sensitive vibration(day time)	Contractor	Inspection	Daily
	Vibration intensive operation will not be carried out in the same time	Contractor	Inspection	Daily
Fire Hazard	Regular safety meetings will be held to serve as constant reminders.	Contractor	Meeting minutes	Once a week
	Prohibition of smoking and the carrying of matches and lighters on the premises through prohibition sign boards	Contractor	Inspection for presence of such sign boards at all appropriate places	Twice weekly

	Train some of the workers and set up a fire fighting team	Contractor and Proponent	Presence of a trained Fire Fighting Team on site at all times	Monthly
	A fire detection and an alarm system shall be installed under the canopy and in the convenience store/ kitchen	Proponent	Inspection and Maintenance	Monthly
	Establish a clearly demarcated fire assembling point in a place far from the fuel tanks and pumps	Proponent	Inspection for presence and condition of labels of assembly point	Quarterly
	Fire extinguishers for the various classes of possible fire will be put in easily accessible area	Proponent	Inspection for presence and condition of extinguishers	Quarterly
Safety and Health Concerns	All worker will be provided with the appropriate PPEs	Contractor	Inspection	Daily
	Enclose the construction site;	Contractor	Observations	Once off
	Clearly marked and obstruction free fire exits will be provided	Contractor	Observations	Daily
	Fire extinguishers and first aid kits will be placed in easily accessible location	Contractor	Observations	Daily
	Good house keeping shall be maintained	Contractor	Observations	Daily
	Only competent staff will conduct special technical jobs	Contractor	SLAM to be completed per technical job	Per special Technical job
Runoff & water	An adequate drainage system will be provided	Contractor	Inspection	Once

logging	Site will be graded and compacted appropriately to avoid water logging	Contractor	Inspection	Once
Soil contamination: Oil and chemical spills	Avoid oil and chemical leakages	Contractor	Inspection	Daily
	Machine and equipment to be used will be in good condition to avoid leakages.	Contractor	Maintenance Reports	Monthly
	Oil and chemicals e.g. solvents will be properly and responsibly handled, stored and disposed	Contractor	Inspection	Daily
Solid Waste Generation	Waste (general and rubble) would be collected and then segregated by an in-house designate waste handler	Contractor	Contract	Weekly and At end of construction
	Metal cuttings would be collected and sold to scrap metal dealers.	Contractor	Receipts	Monthly
	Reduce reuse and recycle where appropriate	Contractor	Observations	Daily
Traffic Congestion during construction of access from C41 highway	Construction vehicles to be used should be as small as possible to avoid major road blockages	Contractor	Inspection	Once off
	Care to be taken pertaining to the placement of construction works signage in the proximity of access points to the proposed service station	Contractor	Inspection	Weekly
	Access to service station from C41 road to be granted	Proponent	Valid access permit	Once off

	by the relevant authority of the respective road			
Employment for locals	Increased temporary employment opportunities, in particular, for local community members	Contractor and Proponent	Keep log book of origin of workers through construction phase	Once off
Pressure on freshwater source	Increased freshwater use for construction purposes	Contractor	Monitor source of construction water	Daily
<b>OPERATIONAL PHASE</b>				
Liquid Waste Generation	Water will be used sparingly	Proponent/Management	Observation	Daily
	Sanitary effluent will be discharged into a Septic tank/Soak-pit. The latter will be emptied monthly by an experienced waste disposal entity.	Proponent.	Inspection.	When tank is full
	There shall be adequate sanitary facilities	Management	Inspection	Weekly
Safety and Health Concerns	All workers will be provided with the appropriate PPEs.	Proponent	Observation	Daily
	The standard operating and emergency response procedures will be posted in the processing area.	Proponent	Observation	Daily
	Clearly marked and obstruction free fire exits will be provided.	Proponent	Inspection	Once
	Fire extinguishers and first aid kits will be placed in easily accessible location.	Proponent	Inspection	Once

	Only competent staff will be employed to manage the company's operation	Management	Inspection	Periodically as and when necessary
	At least two staff members shall be given appropriate first aid training and will act as safety representatives for the site	Management	Inspection	Monthly
	Hire an accredited cash-in-transit company to handle cash from site. No cash shall be stored on site	Proponent		Daily
Fire Hazard	The employees will be regularly trained	Proponent	Certificates	Annually
	Prohibition of smoking and the carrying of matches and lighters	Proponent	Warning signs/Notices	Once
	Set up a fire fighting team.	Proponent	List of team members	Once
	Fire detection and an alarm system shall be installed.	Proponent	Inspection	Once
	A water tank(10,000Litres) reserved for firefighting shall be put up	Proponent	Inspection	Once
	Fire extinguishers for the various classes of possible fire will be put in easily accessible areas	Proponent	Inspection	Once
	Keep the ground dry of any fuel or oil spillages by cleaning with appropriate detergents daily	Management	Inspection	Daily
Noise pollution	Regular repair & maintenance of machines	Proponent	Repair reports	Monthly

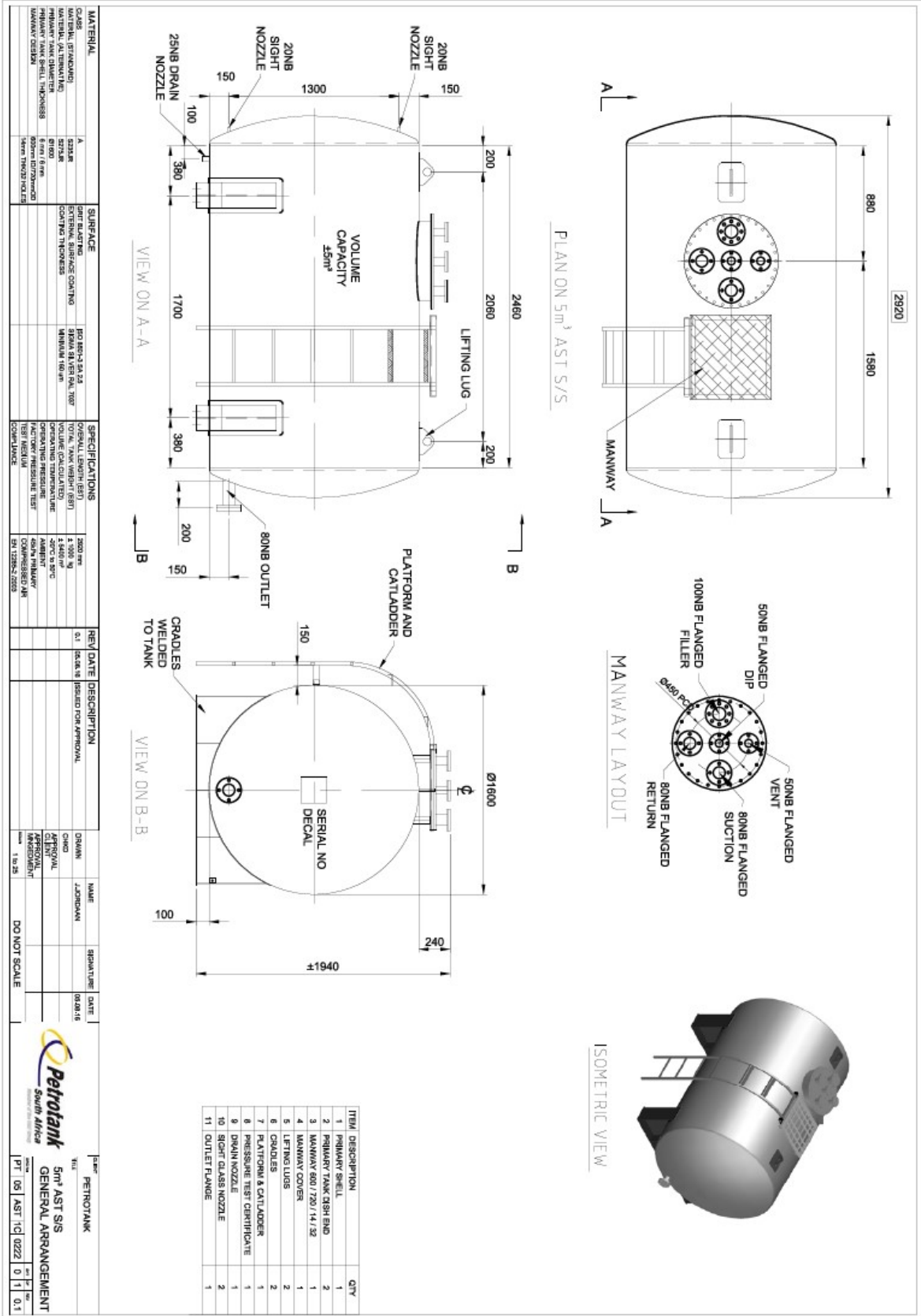
	Noise mapping and adoption of the arising report will be conducted	Proponent	Noise survey report	Annually
	Machines fitted with mufflers and/or quieter ones shall be used where applicable	Proponent	Observation	Quarterly
Product spillages and runoff with potential for surface and groundwater pollution	Sealing of forecourt areas where fuel products are handled to prevent infiltration of petroleum products into the soil underlying the site	Proponent	Inspection	Monthly
	Preventative measures should be installed to prevent the storm water or other liquids draining into the soil	Proponent	Inspection	Monthly
	Subsurface tanks shall be double walled, and installed in a lined system to prevent spilled fuel from entering the surrounding soil	Proponent	Signed off certificates prior to installation	Once off
	Fuel dispensers shall be rendered leak-proof and it is recommended that they be placed in encasements	Proponent	Inspection	Once off
Energy consumption	Machines shall be regularly repaired and maintained to enhance their energy efficiency	Proponent	Maintenance reports	Monthly
<b>DECOMMISSIONING PHASE</b>				
Planned and unplanned closing of the business and ceasing of all activities onsite	a feasibility study will be conducted every 10 years to determine whether the facility still serves its intended purpose	Proponent	Project viability assessment criteria to be developed	Every 10 years
	If determined that complete demolition of the facility is required, a clear closure and demolition plan of action shall first be devised and submitted to the	Proponent	Closure and Demolition Plan	Once off

	relevant authorities for review. Such a plan shall also address all environmental and socio-economic impact that may arise from complete demolition of the facility			
	Inform the relevant authorities.	Proponent	Approval letters.	Regularly



## APPENDIX A: CONCEPTUAL TECHNICAL DRAWINGS OF TANKS





## APPENDIX B: CVs FOT THE EAP

## ETUNA KANIME

**Designation:** Environmental/ Geotechnical Engineer and Project Manager

**Key Skills/ Qualifications:**

- Collection, collation and validation of any type of Geotechnical and Geological data
- Data entry control, data management and data change management control
- Data quality control and assurance (QC/QA) of geotechnical and geological data
- Statistical and probabilistic processing, manipulation, analysis and reporting of big geotechnical and geological data
- All aspects of a geotechnical site investigation from planning an appropriate scoped investigation through to execution and ultimately impactful reporting
- Geotechnical design of foundations, slopes, embankments

**Education:**

<b>Institution</b>	Rhodes University, South Africa
<b>Degree(s) obtained</b>	BSc. (Geology & Environmental Science) – conferred in April 2011
	BSc Hons (Structural Geology) - conferred in April 2012

<b>Institution</b>	Stellenbosch University, South Africa
<b>Degree(s) obtained</b>	MEng (Geotechnical Engineering) - conferred in December 2018
<b>Other courses (CPD courses)</b>	Pavement Materials 1 Course on characterization and performance of soils, unbound and bound material in rigid and flexible pavements

<b>Continuous Personal Development (CPD) short course attended</b>	<b>Overview of course</b>	<b>Institution &amp; Year</b>
Geological sampling and sampling QA/QC	<ul style="list-style-type: none"> <li>• Optimized and representative geological sampling,</li> <li>• sampling QA/QC,</li> <li>• data validation and processing</li> </ul>	SNOWDEN Consultants - 2013
Advanced Slope, Seepage and Structural Foundation Analysis	<ul style="list-style-type: none"> <li>• Elasticity &amp; plasticity in Geotechnical Engineering</li> <li>• Lower and Upper bound design methods in Geotechnical Engineering</li> <li>• Limit Equilibrium methods in Geotechnical Engineering</li> <li>• Finite difference seepage and consolidation analysis</li> </ul>	University of Pretoria
Risk and Reliability Analysis in Geotechnical Engineering	<ul style="list-style-type: none"> <li>• Statistical principles and reliability</li> <li>• Monte Carlo Analysis in Geotechnical Engineering</li> <li>• FORM optimization in geotechnical reliability analysis</li> <li>• Determination of probabilities of ground failures for slopes, retaining walls and foundations</li> </ul>	University of Pretoria
Pavement Materials 1	Characterization and performance of soils, unbound and bound material in rigid and flexible pavements	Stellenbosch University - 2019

Conferences Attended	Papers presented and published by Consultant	Location & Year
Southern Coastal Mine Accretion Conference	1 presentation give  <b>Title:</b> Probabilities of failure and design confirmation of seawalls in NAMDEB's Southern Coastal Mine	Oranjemund, 22 – 25 July 2019
African Young Geotechnical Engineers Conference	None (Attendance only)	Cape Town, 5 – 6 Oct 2019
African Regional Conference on Soil Mechanics and Geotechnical Engineering	1 paper presented and published in conference proceedings  <b>Title:</b> Implementation of response surface FORM in slope stability: Case study of seawalls facilitating coastal mining at NAMDEB's Southern Coastal Mine	Cape Town, 7 – 9 Oct 2019

**Relevant Employment Record:**

<b>From - To</b>	Jan 2019 to Present
<b>Position Held</b>	Consulting Engineering Geologist
<b>Location of Assignment(s)</b>	Namibia
<b>Projects performed</b>	<p>Presently involved in providing specialized ongoing geotechnical support, stability assessments and geotechnical design reviews for mine waste residue facilities (mainly tailings dams and heap leach pads). Also involved in the planning and implementation of geotechnical site investigations for new tailings dams and extensions. Projects recently undertaken include:</p> <ul style="list-style-type: none"> <li>• Geotechnical site investigation for additional deposition areas for the Rossing Uranium Mine Tailings Storage Facility</li> <li>• Geotechnical investigation for new leach pad lifts, review of the heap leach pad stability, design confirmation and reporting</li> <li>• Supervision of Cone Penetration Testing (CPTu) program at Skorpion Zinc Mine Tailings Storage Facility</li> <li>• Basic geotechnical investigation for new seawalls as well as installation, commissioning and monitoring of vibrating wire piezometers at Southern Coastal Mine (SCM) - NAMDEB</li> </ul>
<b>Client Reference(s)</b>	<p>Mr. Shiweda, Tailings Storage Facility Foreman, Rossing Uranium Mine</p> <p>E: <a href="mailto:shiweda@Rossing.com.na">shiweda@Rossing.com.na</a></p>

	<p>Mr. Brodrick Munyungano and Mr. Likoze Simenda, Tailings Storage Facility, Skorpion Zinc Mine</p> <p>E: <a href="mailto:LSimenda@vedantaresources.co.na">LSimenda@vedantaresources.co.na</a></p> <p>Mr. Edmund Nel, Mine Planning Manager, NAMDEB (responsible for overseeing geotechnical aspects of NAMDEB operations)</p> <p>E: <a href="mailto:Edmund.Nel@namdeb.com">Edmund.Nel@namdeb.com</a></p>
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<b>From - To</b>	2017 to 2018
<b>Project Stakeholders</b>	Geotechnical Engineering Divisions of Enterprise University of Pretoria & Stellenbosch University, for NAMDEB
<b>Position Held</b>	Post-graduate Geotechnical Engineering Researcher (part of the Geotechnical Consulting Team)
<b>Location of Assignment(s)</b>	Pretoria & Stellenbosch (South Africa) Oranjemund (Namibia)
<b>Activities performed</b>	<ul style="list-style-type: none"> <li>• Overall planning of geotechnical site investigation for NAMDEB's Southern Coastal Mine (SCM) Seawalls/ sand embankments;</li> <li>• Geotechnical drilling and logging of ± 25 BH;</li> <li>• Strategic sampling and collection of soil samples for lab testing;</li> <li>• Installation, commissioning and interpretation of vibrating wire piezometer (VWP) monitoring data;</li> <li>• Lab testing (foundation indicators, direct shear, Proctor density, CU triaxial testing and suction measurements with tensiometer);</li> <li>• Construction of 2D geotechnical models for SCM seawalls based on drilling, lab test and VWP data;</li> <li>• Statistical processing, manipulation, interpretation and reporting of big data on seawall pore water pressures from vibrating wire piezometers;</li> <li>• Limit equilibrium and probabilistic slope stability modelling of seawalls;</li> <li>• Provision of recommendations to management on de-risking stability of seawalls during construction and operation</li> </ul>
<b>Reference(s)</b>	<p>Mr. Leon Croukamp, Senior Geotechnical Lecturer &amp; Project Co-supervisor- Stellenbosch University</p> <p>E: <a href="mailto:lcroukamp@sun.ac.za">lcroukamp@sun.ac.za</a></p> <p>Prof. SW Jacobsz, Principal Geotechnical Consultant and Project Lead, Enterprise University of Pretoria</p> <p>E: <a href="mailto:Sw.Jacobsz@up.ac.za">Sw.Jacobsz@up.ac.za</a></p> <p>Mr. Edmund Nel, Mine Planning Manager, NAMDEB (responsible for overseeing geotechnical aspects of NAMDEB operations)</p> <p>E: <a href="mailto:Edmund.Nel@namdeb.com">Edmund.Nel@namdeb.com</a></p>

<b>From - To</b>	2015 to 2016 (on ad hoc project basis)
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<b>Employer</b>	GeoLogic Solutions cc
<b>Position Held</b>	Freelancing Engineering Geologist
<b>Location of Assignment(s)</b>	Oshakati, Swakopmund, Walvis Bay and Windhoek - Namibia
<b>Activities performed</b>	<p>Geotechnical site investigation of the Oshakati PV solar Power Plant (2016). Activities performed included:</p> <ul style="list-style-type: none"> <li>• Layout planning of Insitu tests</li> <li>• Insitu subgrade characterization through test pitting and soil profiling, DPSH testing and earth resistivity testing;</li> <li>• Soil sampling (both disturbed &amp; undisturbed sampling) and provide instructions for lab testing;</li> <li>• QA/ QC during soil sampling and for Insitu and lab testing;</li> <li>• Assessment of subgrade bearing capacity;</li> <li>• Material investigation to assess suitability of onsite material for reuse as backfill and construction material</li> </ul> <p>Geotechnical investigation of the Unam Veterinary Hospital in Windhoek (2016)</p> <p>Activities performed included:</p> <ul style="list-style-type: none"> <li>• Layout planning of Insitu tests</li> <li>• Insitu subgrade characterization through test pitting and soil profiling;</li> <li>• Soil sampling and provide instructions for lab testing;</li> <li>• QA/ QC during soil sampling and for Insitu and lab testing;</li> <li>• Assessment of subgrade bearing capacity and excavatability conditions;</li> <li>• Material investigation to assess suitability of onsite material for reuse as backfill and construction material</li> </ul> <p>Geotechnical site investigation of a 4 storey office block and a hotel with basement levels in Swakopmund (2015). Activities performed included:</p> <ul style="list-style-type: none"> <li>• Insitu subgrade characterization through test pitting, core drilling, soil profiling and core logging;</li> <li>• Groundwater level monitoring from standpipes to provide guidance for seepage control during earthworks and for design of retaining system during construction;</li> <li>• Soil sampling;</li> <li>• QA/ QC during soil sampling, logging and groundwater level monitoring</li> </ul> <p>Geotechnical site investigation of the Walvis Bay harbour gas pipeline (2015). Activities performed included:</p> <ul style="list-style-type: none"> <li>• Insitu characterization of seafloor subsurface through offshore drilling, core logging, soil profiling and sampling;</li> <li>• Identification of problematic fine-grained soil horizons</li> </ul>
<b>Reference(s)</b>	Mr. H. Labuschagne, Lead Engineering Geologist, GeoLogic Solutions E: <a href="mailto:henk@geo-spectra.net">henk@geo-spectra.net</a>
<b>From - To</b>	Late 2013 to Oct 2016

<b>Employer</b>	Debmarine Namibia
<b>Position Held</b>	Exploration and Sampling Project Geologist
<b>Location of Assignment(s)</b>	Atlantic 1 Mining Concession, West Coast - Namibia
<b>Activities performed</b>	<p>Key Activities performed included:</p> <ul style="list-style-type: none"> <li>• Strategic planning, identification and delineation of target areas for offshore exploration drilling with the mv. Explorer vessel;</li> <li>• Drilling and sampling supervision – with focus on: <ul style="list-style-type: none"> <li>- grid drilling and sampling rate optimization;</li> <li>- drilling and sampling QA/QC;</li> <li>- management of the sampling database (including systematic data validation, data entry, change management and reporting to Head office)</li> </ul> </li> <li>• Development of 2D geological models for selected areas in Atlantic 1 based on a holistic interpretation of geophysical, exploration sampling and mining data;</li> <li>• Layout planning for regional-scale and in-fill seafloor geophysical data acquisition;</li> </ul>
<b>Reference(s)</b>	<p>Ms. Zenzi Awases, Senior Exploration Geologist (then), Debmarine Namibia</p> <p>E: <a href="mailto:Zenzi.Awases@debeersgroup.com">Zenzi.Awases@debeersgroup.com</a></p> <p>Mr. Martin Shiimi, Section Head – Geophysics, Debmarine Namibia</p> <p>E: <a href="mailto:Martin.Shiimi@debeersgroup.com">Martin.Shiimi@debeersgroup.com</a></p>

<b>From - To</b>	Late 2012 to late 2013
<b>Employer</b>	Debmarine Namibia (but on secondment at NAMDEB)
<b>Position Held</b>	Exploration and Sampling Project Geologist
<b>Location of Assignment(s)</b>	Southern Coastal Mine, Oranjemund Namibia
<b>Activities performed</b>	<p>Activities performed included:</p> <ul style="list-style-type: none"> <li>• Layout planning, identification and delineation of target areas for coastal exploration drilling with BG36 and Sonic Drill rigs and sea walker;</li> <li>• Drilling and sampling supervision – with focus on: <ul style="list-style-type: none"> <li>- grid drilling and sampling rate optimization;</li> <li>- drilling and sampling QA/QC;</li> <li>- Geological mode</li> <li>- management of the sampling database (including systematic data validation, data entry, change management and reporting to Exploration Manager)</li> </ul> </li> <li>• Development of 2D geological models for selected areas in Southern Coastal Mine based on a holistic interpretation of geophysical, exploration sampling and mining data</li> </ul>
<b>Reference(s)</b>	<p>Mr. Marais Loubser, Former Exploration Manager, NAMDEB</p> <p>E: <a href="mailto:marais.loubser@namdeb.com">marais.loubser@namdeb.com</a></p> <p>Mr. Ileni Mbangula, Section Geologist, Southern Coastal Mine – NAMDEB</p>

E: [ileni.Mbangula@namdeb.com](mailto:ileni.Mbangula@namdeb.com)

**Languages:**

Language	Speaking	Reading	Writing
Oshiwambo	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent
Afrikaans	Fair	Good	Worst

**Certification:**

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and experience.

**Date:** 07/01/2020



**Full name of Sub-Consultant:** Etuna Kanime



## LUCKSON ZVOBGO

**Designation** – Environmental Assessment Practitioner

**Professional Summary:** A seasoned physical scientist with experience in Environmental Assessment and Management in the energy, mining, construction and manufacturing sectors with projects in Zimbabwe, Mozambique and Namibia, 4.5 years' experience in Natural Resources (Water) Development and Environmental Management.

**Special techniques and softwares:** ArcGIS, ENVI, Idrisi, ERDAS IMAGINE, Surpac, Google Earth, statistical software i.e. SPSS, AutoCAD, Microsoft, Corel, Cropwat, Budget models, AquaCrop, ETo Calculator.

**Nationality:** Zimbabwean

**Emails:** [luckson.zvobgo@st-annes.ox.ac.uk](mailto:luckson.zvobgo@st-annes.ox.ac.uk) ; [zvobgoluckson@gmail.com](mailto:zvobgoluckson@gmail.com)

### Qualifications

- ❖ MSc Water Science Policy and Management Candidate (Oxford University, UK)
- ❖ BSc Land and Water Resources Management Honours Degree (Midlands State University, Zimbabwe)- First Class

### Key field of Experience

- ❖ GIS and Water Management
- ❖ Hydrology and Hydrogeology
- ❖ Climate change Modelling
- ❖ Environmental Impact Assessment and Environmental Management Plan
- ❖ Air Quality Emission Testing
- ❖ Irrigation (System designing, Management, Monitoring and Evaluation)

### Employment History

- ❖ Groot Environmental Engineers (Groot Management Systems) April 2016 - Current; Namibia and Mafuta Environmental Consultants
- ❖ Camtron Consultants, June 2014-March 2016; Zimbabwe
- ❖ Government of Zimbabwe (Ministry of Agriculture, Mechanisation and Irrigation Development- Department of Irrigation Development | Planning and Environmental Affairs); Zimbabwe, June 2012 – May 2014

### Projects Completed:

- ❖ EIA and feasibility study for the Establishment of Ngezi A Mamina Sprinkler irrigation Scheme (Zimbabwe)
- ❖ EIA and feasibility study for the Establishment of Mazoe Veterinary College (MVC) drip irrigation system (Zimbabwe)



- ❖ Pilot Engineer for the Feasibility study of the Establishment of Osborne - Old Mutare 72km long surface unlined canal (Zimbabwe)
- ❖ EIA for the Rehabilitation and irrigation system change from surface to sprinkler system for Mushandike Communal Irrigation Scheme (Zimbabwe)
- ❖ EIA for the Rehabilitation of Grazely Farm (Zimbabwe)
- ❖ EIA and Irrigation System designing for Malleny farm (Zimbabwe)
- ❖ EIA for the Establishment of Petro Trade Warren Park Service Station (Zimbabwe)
- ❖ EIA for the ECC Renewal for the Exploration of Platinum and associated minerals by ZIMPLATS (Zimbabwe)
- ❖ EIA for the Establishment of Fashu Petroleum Service Station (Zimbabwe)
- ❖ EIA for the Construction of 66kV power line from Odzi Sub-station to Quaga Gold Mining and milling plant (Zimbabwe)
- ❖ EIA for Sand Mining by Stantoll Properties (Namibia); Recent
- ❖ EIA for the Sand Mining by Wanamukwaya Investments (Namibia); Recent
- ❖ EIA for the Establishment of Acacia Park Township in Rehoboth (Namibia); Recent
- ❖ EIA for the Construction and Operation of Tses Glass Manufacturing Factories (Namibia); Recent
- ❖ EIA for land FKB development project by FKB Legacy Estate (Namibia); Recent
- ❖ EIA for the Construction and Operation of Namfocus Investments fuel service station (Namibia); Current

**Publications:** Assessing the extent of deforestation and land cover changes for Upper Manyame Sub-Catchment using Remote Sensing and GIS technologies. Authors- Zvobgo L.; Mupfiga E.T.; Shoko B

Impacts of poor water governance on water utilisation, distribution, access, quality and development in Harare, Zimbabwe. Authors; L. Zvobgo, Prof M. Rouse (Oxford University)