# ENVIRONMENTAL MANAGEMENT PLAN

FOR THE PROPOSED DOLOSTONE
INDUSTRIAL MINERALS SMALL-SCALE
MINING ACTIVITIES WITHIN
MINING CLAIMS 72090, 72091 & 72109

NEAR AOMAKANGE

## Omusati Region

Alliance
ENVIRONMENTAL CONSULTANCY

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# 1. INTRODUCTION

Alliance Environmental Consultancy CC (AEC) has been appointed by Mr. Martin Demufawo Shaanika to act on their behalf in obtaining an Environmental Clearance Certificate (ECC) for the proposed small scale mining activities within Mining Claims (MCs) 72090, 72091 & 72109. The mining activities will be assessed in the scoping report and an Environmental Management Plan will be provided (This document). The project area is located approximately 7km northeast of Omakange settlement which is north of Namibia. The site is accessible via existing small roads and tracks from the C41 road from Omakange. The claims cover approximately an area of 48.34 hectares in total. Figure 1 shows the locality of the area. The claims lie within the Uukwaluudhi communal conservancy which fall under the Ruacana constituency. The people living in the area are led by headmen who in turn grant stewardship and authority to junior headmen. Figure 1 renders a map of the mining claim relative to the nearest communities of Okeendjibi, Okakango and Okumumba.

The mining claims are under the ownership of Mr. Martin Demufawo Shaanika who pegged the area through the Ministry of Mines and Energy (MME) on 12 August 2020. The mining claims are still at the application stage (pending approval) as it is subject to an environmental clearance certificate (ECC) by the Ministry of Environment, Forestry and Tourism (MEFT) which is the reason for conducting this environmental scoping and impact assessment.

The corner coordinates of the claims are provided in the table below.

TABLE 1 - CORNER COORDINATES FOR THE MINING CLAIMS

| | LATITUDE | LONGITUDE |
|---|---|---|
| **MC - 72090** | -18.071031 | 14.388367 |
| | -18.068746 | 14.382570 |
| | -18.066611 | 14.383582 |
| | -18.068997 | 14.389500 |
| **MC - 72091** | -18.073684 | 14.394964 |
| | -18.07138 | 14.38917 |
| | -18.069259 | 14.390158 |
| | -18.071602 | 14.396091 |
| **MC - 72109** | -18.077944 | 14.390912 |
| | -18.073888 | 14.386342 |
| | -18.072532 | 14.388255 |
| | -18.076543 | 14.392011 |

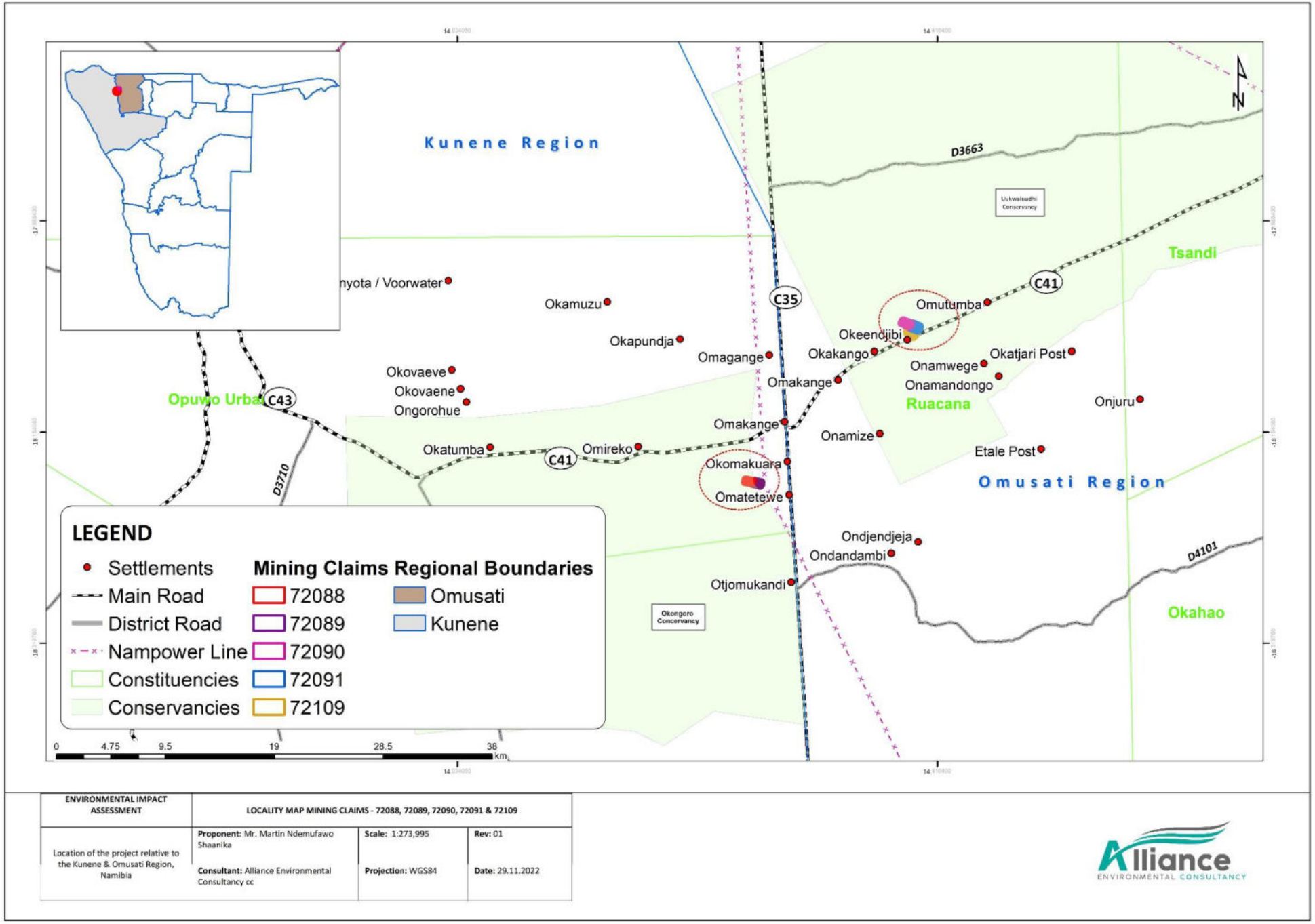


FIGURE 1 – REGIONAL LOCATION OF THE MINING CLAIMS AND SURROUNDING INFRASTRUCTURE.

## 1.1. PROJECT ACTIVITIES

Operations are currently in the Planning Phase for the quarry and associated operations. This phase will aim at finalizing designs, agreements and permissions which are all related to the development of the quarry and processing infrastructure. The quarry and accessory works area are planned to be developed and operated simultaneously with the Construction Phase commencing upon receipt of the ECC should it be granted and secure funding. During this phase, all infrastructure required for operations will be established on site. All construction activities are planned to be completed within 12 months from initiation.

Once operational, the life of mine of the quarry is absolutely dependent on the demand requirements and capability of meeting such demands. However, in terms of feasibility some timeframe may be estimated based on expected demand requirements. The current estimate for the life of mine of the quarry is 10 - 17 years. Rehabilitation during the Decommissioning Phase is crucial for all proposed operations. It will mainly focus on making excavated areas safe by re-shaping the pit walls. Quarry operations will include blasting, crushing, milling and bagging together with the subsequent stockpiling for haulage.

**PLANNING PHASE ACTIVITIES**

This will incorporate the procurement of all required permits and of the mining/operational plans for the quarry and processing of the product. Contractual agreements such as the appointment of sub-contractors especially mine engineers and surveyors are dealt with in the latter part of the planning phase. Various state and parastatal agencies will be engaged regarding the various project component and permitting. These discussions will result in various agreements. Agencies that will be/are being consulted include the following:

- Ministry of Mines and Energy (MME)
- Ministry of Environment Forestry & Tourism (MEFT, this application)
- Omusati Regional Council
- NamWater
- Ministry of Agriculture, Water & Land Reform (MAWLR)
- Ministry of Lands Resettlement and Rehabilitation (MLRR)

Furthermore, Small-scale mining activities include a desktop review of existing data as well as past area studies. This is conducted to understand the commodities in the area for extraction. This can be done by purchasing high-resolution data from the Government and interpreting it as part of the initial mineral study. Regional reconnaissance assessment, which includes field-based activities such as regional mapping and sampling in order to identify and validate prospective targeted areas identified during stage 1.

Initial field-based activities such as widely distributed geological mapping, sampling, surveying, and maybe widely spaced trenching and drilling. Thereafter, detailed local field-based operations such as localized site-specific detailed geology mapping, trenching, bulk sample and surveying are carried out. When explorations and planning yields positive results, the construction phase follows and operations thereafter.

**CONSTRUCTION PHASE ACTIVITIES**

This will aim at establishing new infrastructure to accommodate the operational activities of the quarry and material processing like the crusher and screening plant (with a capacity of approximately 50 000 cubic meters per day) . An accessory works area will provide the ground and Licence for the establishment of a works yard. This area will be demarcated so as to limit the movement of equipment and personnel beyond the footprint of the quarry and accessory works area, and also to limit the movement of animals onto the site from the surrounding. When lateral expansion is required the removal of trees will be done in association with the Directorate of Forestry that issues such permits.

All office buildings will be prefabricated structures and of temporary nature. A mobile crushing unit and mill will be used on site. Existing access roads will be utilized and if need be, upgraded to accommodate heavy motor vehicles and operational machines. Digging of foundations and trenches, as well as drilling and blasting are expected in the construction phase activities as well as for the development of a quarry pit. The construction of facilities to divert storm water from the open quarries will be planned and actioned.

Temporary handling and storage areas for construction materials, explosives etc.is planned. Security will be supplied on a 24-hour basis with temporary accommodation for the staff. A fence surrounding the quarry site will be constructed to ensure people and domestic animals are not put at risk. The support services and facilities constructed during this phase will either be removed at the end of the construction phase or incorporated into the further phases of the project. Once quarry development and associated activities are completed, mining commences soon after as per the following section.

**OPERATIONAL PHASE ACTIVITIES**

Main equipment types to be used will include 4X4 bakkies, drill rigs, excavators, crushers, mills, dump trucks, water tankers, explosives transport and magazine unit, bull dozers and front-end loaders. Mining is scheduled to operate 12 hours a day, Monday to Saturday. The mine work force will operate using conventional workplace arrangements that are expected of industry operations in the region and will be transported to and from the quarry site by company transport.

Below is a summary of the projected activities that will occur within the Mining Claims.

1. Mining and extraction
    - Commencing with the mining operations, the topsoil is removed by excavation works and deploying of heavy earth moving machineries.
    - Clearing of vegetation at the planned drill sites will be necessary. Larger trees should be retained so that the bush can restore itself. Permits from the forestry directorate will be required for this purpose.
    - The method of mining operations is of mechanized opencast mining by deep holes drilling and blasting practice, using heavy explosives.
    - A blasting expert (certified blasting operator) will be responsible for operation as well as the explosives storage site.
    - Blasting will only occur during day light hours so as to reduce any noise nuisance for nearby neighbors.
    - Blasting will occur at nominated times to align with periods of low production (such as lunch breaks) so that safe distances are maintained.
    - Blasting frequency is expected on an average of twice every month. Excavation of the blasted rock will be completed using excavators.
    - Dust suppression will be applied for access roads and crusher units so as to reduce any potential visual and air quality nuisance in accordance with local guidelines.
    - Depending on plant availability, ore will either be tipped directly into the crusher for crushing and sent to the mill or alternatively hauled and dumped on stockpiles for later crushing. Waste rock will be deposited in areas designated for waste dumping.
    - In summary there will be diverse stockpiles on site ranging from uncrushed rock to varieties of crushed material.
2. Crushing and screening dolomite rock
    - After mining, dolomite rock is sent to a jaw crusher for coarse crushing into blocks with a certain particle size to achieve sufficient dissociation of the useful material of the ore.
    - The dolomite blocks are sent to a vibrating screen for screening. Qualified materials are directly used in the construction industry as sand and gravel aggregates or continue to be processed.
    - Unqualified dolomite will return to the cone crusher for further crushing.
    - Crushing operations may occur on 12-hour basis seven days a week. A static crushing unit will be used on site.
3. Final Product/output

The annual production is currently predicted to be 50 thousand cubic meters per annum; however, this is not based on any actual factual resource defined facts through exploration and drilling. The product will be stockpiled at site for a period not longer than 1 year.

A review and update of the ESA Report and EMP will be done, once the deposit/reserves evaluation is confirmed. All this information (deposit reserves, annual production planned for mining and ESA/EMP updates) will be communicated to all the registered interested and affected parties of this project. Once mined, the dolostone will be transported by trucks to consumers in the construction and other industries.

The figure 2 below depicts the process flow for the dolostone production.

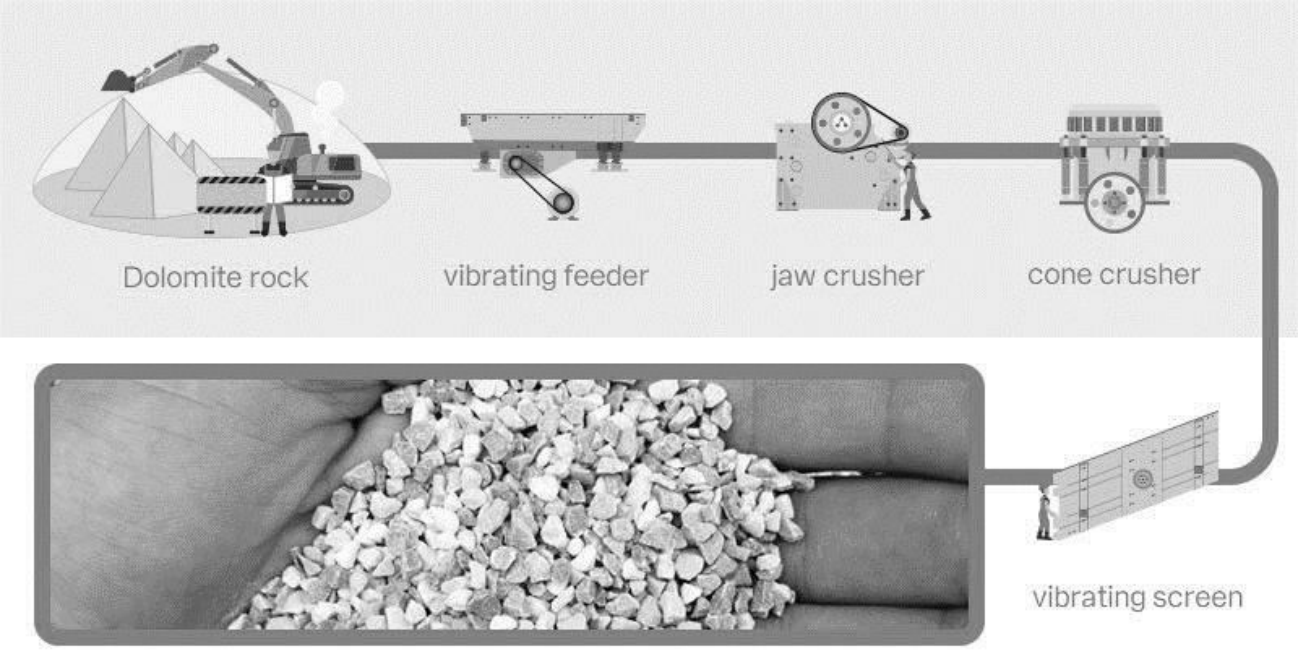


FIGURE 2 - PROCESS FLOW FOR THE PRODUCTION OF DOLOSTONE AGGREGATES

**DECOMMISSIONING AND FINAL REHABILITATION**

The life of mine for the quarry will be based on the expected demand typically 10 to 17 years. However, this may vary significantly as the demand may fluctuate. Life of operations are therefore very subjective. However, ongoing rehabilitation and landscaping should be conducted as the open pit proceeds. Shaping of the excavated area not only to accommodate rehabilitation efforts, but also in terms of safety, this should be conducted according to a mine plan. In accordance with the EMA, the proponent is required to make funds accessible which will specifically be available and allocated for

rehabilitation efforts. This fund should continually be available during the life of mine yet also be sufficient to cover all decommissioning activities when required.

Furthermore, the proponent will ensure that the part of the quarry initially created will be made secure for public safety's sake at mine closure. This specific responsibility should be incorporated into the rehabilitation plan and incorporated into the financial requirements thereof.

Decommissioning activities will include the removal of infrastructure, preparation of final landforms for closure and encouraging vegetation growth in order to reduce the effects of soil erosion and to re-establish normal ecosystem functionality so as to rehabilitate the environment.

**ACCESS AND TRANSPORT**

The location will be accessible through existing small roads and tracks from the C41 road from Omakange as practically possible (Figure 3). If the need to create new tracks arises, this will be assessed for any environmental sensitivity.

It is the Proponents responsibility to negotiate access agreements with landowner's interests are always observed and as may be agreed upon with the landowners individually. Permission from landowners and appropriate authorities is required for any new tracks.

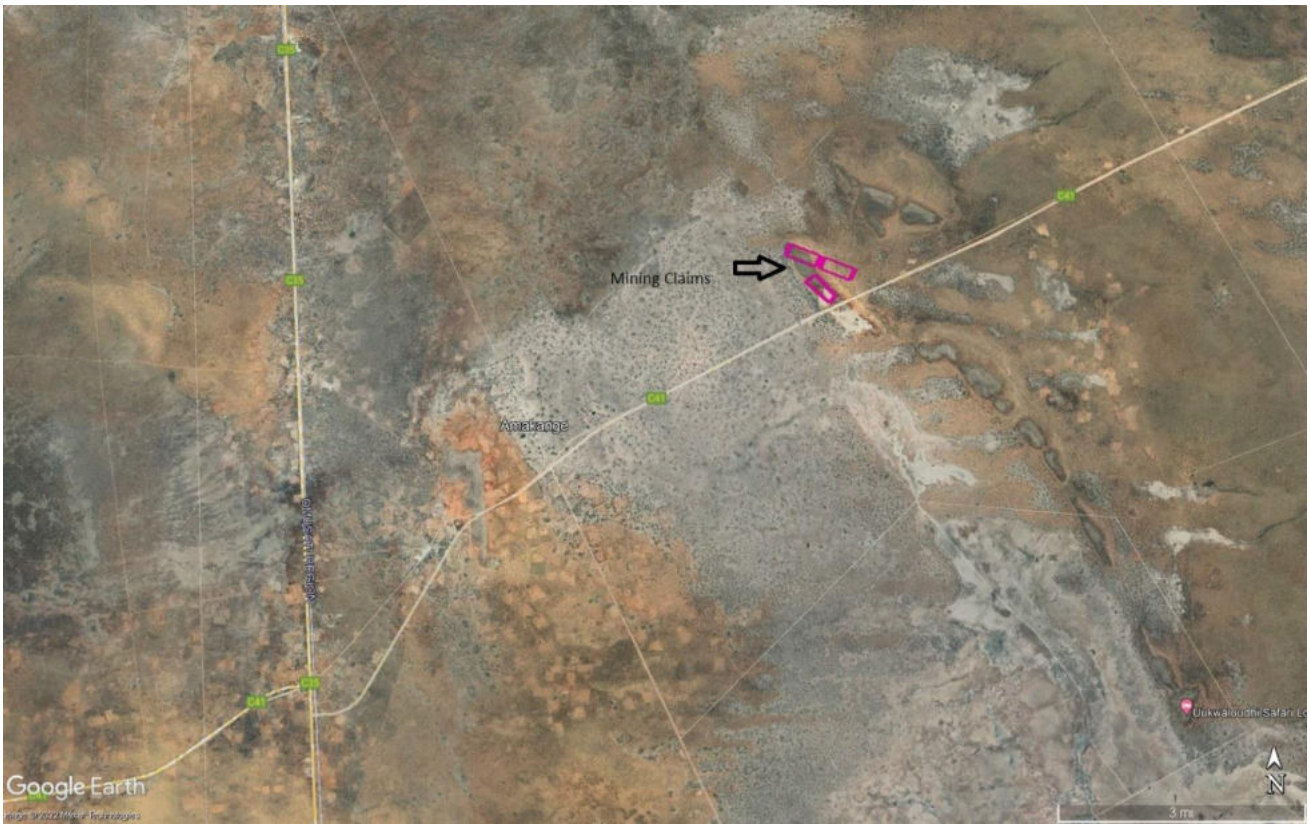


FIGURE 3 - ACCESS ROUTES TO THE SITE

**RESOURCES (WATER AND ELECTRICITY)**

Mining activities usually needs a supply of water which will be brought to the site. In addition, there is a burrow pit next to the site, which will reserve water (during the rainy season for use).

Should the company find suitable groundwater during the development of the site, a borehole may be used as a water source, provided the permission of the community is given and the necessary abstraction permit is attained from the Department of Water Affairs. A hydrological study shall be conducted in support and only sustainable yields may be abstracted. A diesel-powered generator and means of solar energy will be used as needed for small-scale mining equipment and lighting for the project.

**ACCOMODATION AND SUPPORTING INFRASTRCTURE**

- The team will either be commuting from nearby settlements or will establish camp sites within the license area and with the permission of the community. The team is envisioned to consist of three skilled and 15 non-skilled workers.
- Portable toilets will be installed on-site ad regularly serviced.
- Vehicles (especially pick up bakkies) and heavy machinery including excavators, haul trucks, hammer crushers, screens, conveyers etc will be used during the life of the project.
- Waste will be collected and deposited to the nearest municipal dumpsite.
- Hydrocarbon tanks will be appropriately stored and bunded to hold 110% of the capacity of the tanks and all relevant permits should be applied for by the proponent as required (MME).

## 1.2. PURPOSE OF THE DOCUMENT

Alliance Environmental Consultancy CC (AEC) has prepared this document as part of the Environmental Scoping and Impact Assessment for proposed prospecting and quarrying which was conducted in terms of the Environmental Management Act, 2007 (Act No 7 of 2007). This Environmental Management Plan is a live document that has been prepared based on the environmental effects identified in Environmental Scoping and Impact Assessment and should be read in conjunction with the Environmental Scoping and Impact Assessment Report.

The aim of this document is to provide management measures to address the environmental effects that have been identified in the Environmental Scoping and Impact Assessment report and to give possible mitigation measures/recommendations to address these effects. It is essential for personnel involved to fully be aware of the possible environmental issues and the means to avoid or minimize the potential impacts of activities on site.

Furthermore, the proponent fully understands the legal and policy requirements as a holder of the Mining Claims. Impacts identified in the EIA form the basis of a set of environmental specifications that will be implemented on-site. These environmental specifications act as an agreement between the proponent and the Ministry of Environment, Forestry, and Tourism (MEFT).

## 1.3. SUMMARY OF THE RECEIVING ENVIRONMENT

The vegetation within the study site was found to be dominated by mopane (Colophospermum mopane) and purple pod terminalia (Terminalia prunioides). Various Commiphora species, Moringa ovalifolia, Sterculia africana and Sesamothamnus guerichii are also found on the mid-slopes and/or higher slopes of the surrounding area which is considered to be of medium sensitivity. Some species of conservation concern which may potentially occur in the area are Commiphora multijuga and Moringa ovalifolia and they are expected in low numbers. Mopane trees are prevalent in all the habitats, and it is protected due to its high value to humans and their livestock. Although several protected species occur in this habitat, with the exception of Colophospermum mopane they are present in very low numbers.

According to the Atlas of Namibia, the study area is considered a high reptile diversity area and 51 to 60 species may potentially occur in the study area of which two are classified as Vulnerable, i.e., the African rock python (Pythonnatalensis) and the leopard tortoise (Geochelone pardalis).
The mammal's diversity in the study area ranges from 61 to 75 species and endemism ranging from 9 to 10 species. Those that could potentially occur in the study area include.

- Species considered Near Threatened, (Griffin, 2003): Brown hyaena (Parahyaena brunnea), Commerson's Leafnosed Bat (Hipposideros vittatus), Angolan epauletted fruit bat (Epomophorus angolensis) and white rhinoceros (improbable in study area, Ceratotherium simum).
- Endemic or near-endemic to Namibia, (Griffin, 2003): Hartmann's mountain zebra (Equus zebra hartmannae), Black-faced impala (Aepyceros melampus petersi), black mongoose (Herpestes flavescens), bushveld sengi (Elephantulus intufi) and the mountain ground squirrel (Xerus princeps).
- Giraffe (Giraffa Camelopardalis) and savanna pangolin (Smutsia temminckii) are among the other mammals' species that are expected in the surrounding area.

The deeper parts of this area are characterized by unfertile deep Kalahari sands and spontaneously patches of clayey sodic sands dominating in the hilly parts and oshanas, with sodic sands occurring on the surrounding higher grounds. The claims fall within the Kalahari, Namib Sands and. This area most probably has Pan-African Damara Sequence resting on a gneissic and granitic basement containing mid-Protezoric cover rocks that are intruded by granites justifying the quarrying venture by the project proponent. The area falls within the Owambo basin.

The entire area is dependent on groundwater resources for domestic purposes and stock watering. Water for this project will be brought to site by truck, no boreholes as a source of water is envisioned at this stage. The underlying granitic rock stretching from the Namib Desert allows the water table to retain more water due to the flat terrain of the area.

Figures 4 to 7 provides some baseline maps of the project area.

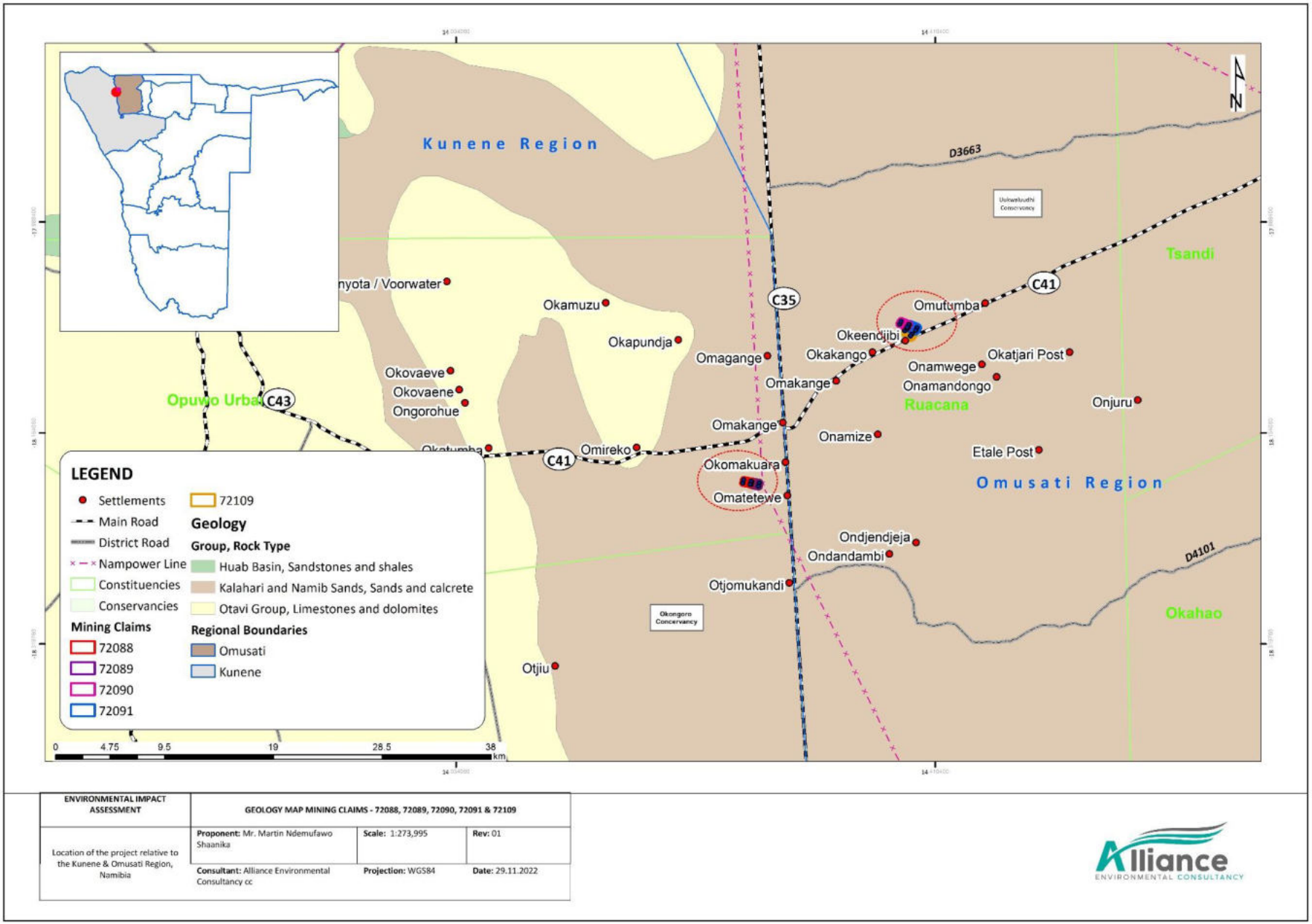


FIGURE 4 - GEOLOGY OF THE PROPOSED PROJECT AREA

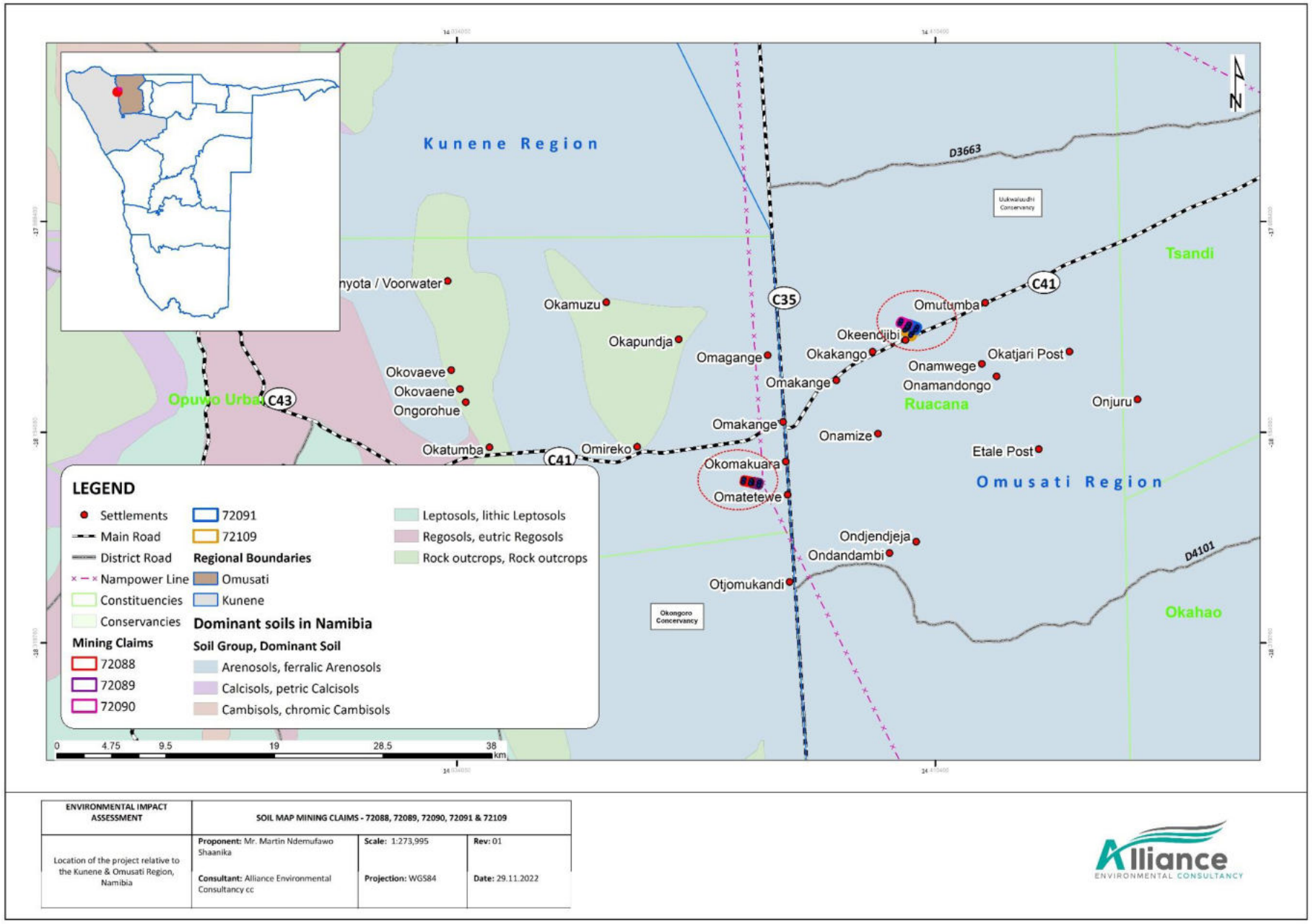


FIGURE 5 - DOMINANT SOIL TYPE SURROUNDING THE PROJECT AREA

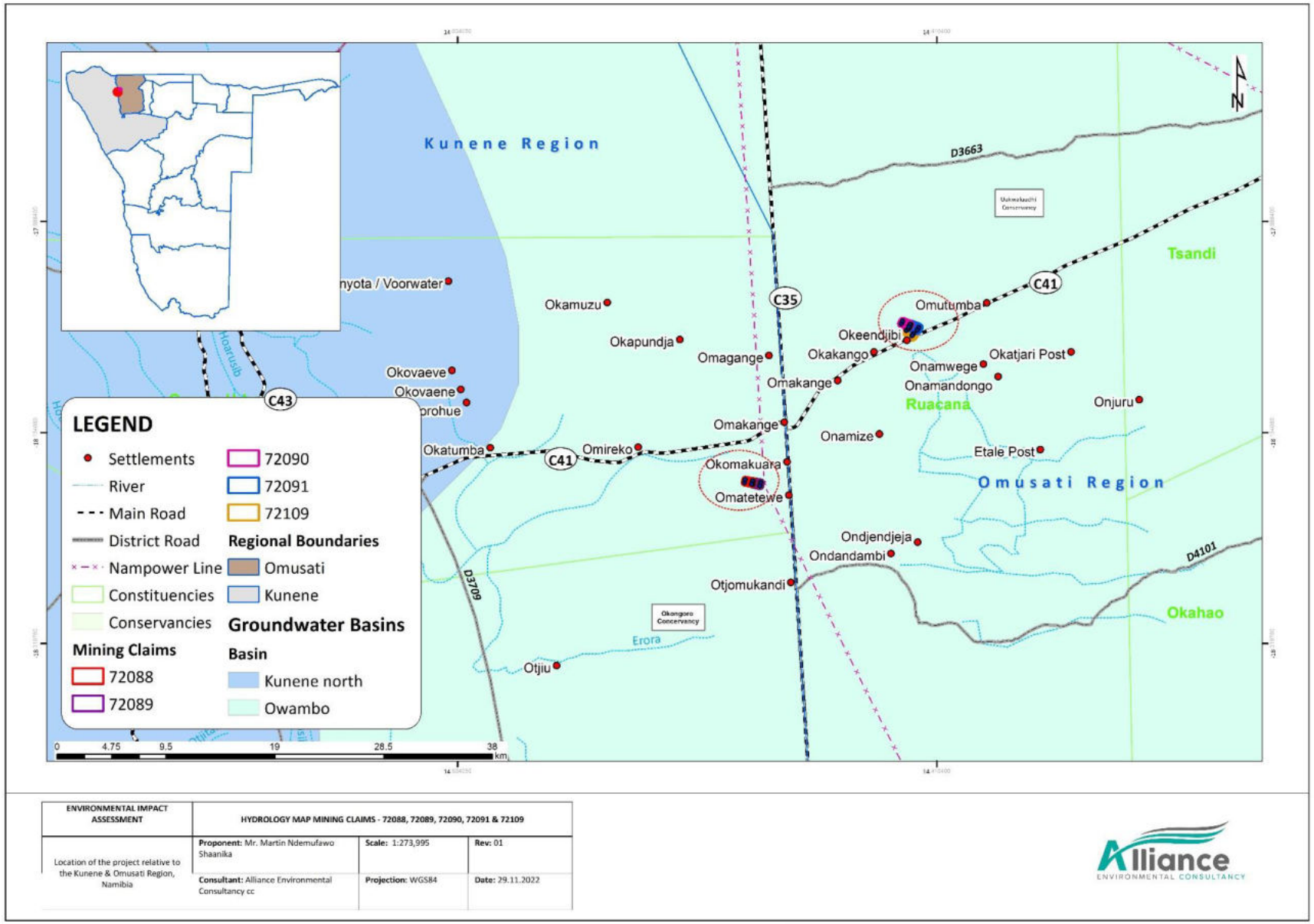


FIGURE 6 - GROUNDWATER BASINS AND HYDROLOGY OF THE PROJECT SITE

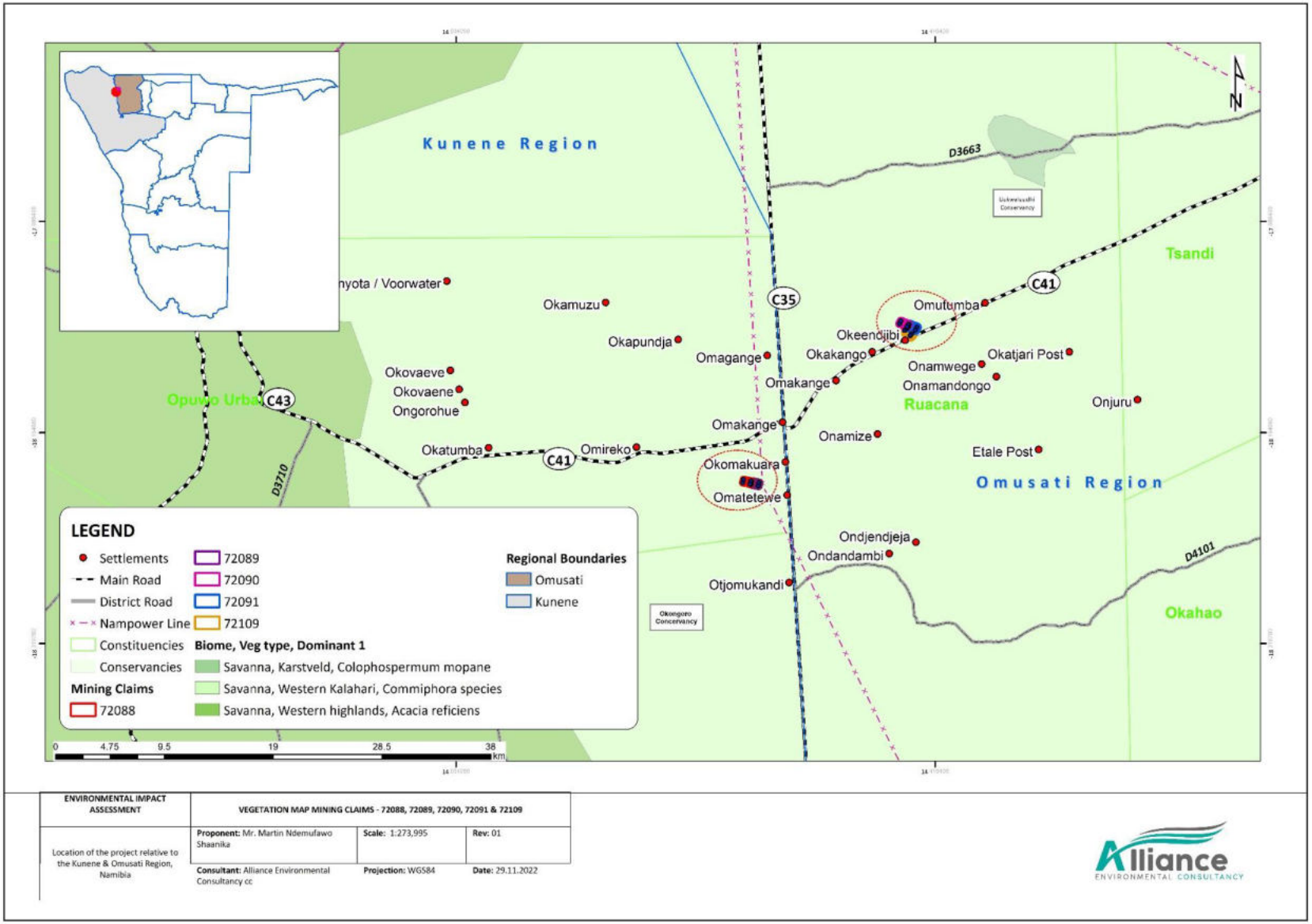


FIGURE 7 - VEGETATION OF THE PROJECT SITE

# 2. ENVIRONMENTAL MANAGEMENT PRINCIPLES

The Proponent will ensure that all project participants adhere to the following company goals:

i. All employees will be obliged to undertake activities in an ecologically and socially responsible way. This applies to all consultants, workers, contractors, and subcontractors, as well as transporters, visitors, and anyone else who enters the premises.
ii. Safeguard the health and safety of project personnel and the public against potential impacts of the project. This includes issues of road safety, precautions against dangers on site, potential hazards; and,
iii. Promote good relationships with the surrounding settlements and other stakeholders.
iv. Biophysical Environment
v. Wise use and conservation of environmental resources, giving due consideration to the use of resources by present and future generations;
    a. Prevent or minimize environmental impacts;
    b. Minimize air, water, and soil pollution; and
    c. Conserve Biodiversity.

In order to achieve the project's goal, the following principles must be followed:

| TERM | DESCRIPTION |
|---|---|
| Accountability and Commitment | The Company Senior Executives and Line managers will be held responsible and accountable for:<br>a. Health and safety of site personnel while on duty,<br>b. Environmental impacts caused by exploration and quarrying activities or by personnel engaged in the daily operations of the site. |
| Competence | The company will ensure a competent workforce through appropriate selection, training, and awareness of all safety, health, and environmental matters. |
| Risk Assessment, Prevention, and Control | Identify, assess and prioritize potential environmental risks. Prevent or minimize risks |

| TERM | DESCRIPTION |
|---|---|
| | through careful planning and design, allocation of financial resources, management, and workplace procedures. Intervene promptly in the event of adverse impacts arising. |
| Performance and Evaluation | Set appropriate objectives and performance indicators. Comply with all laws, regulations, policies, and environmental specifications. Implement regular monitoring and reporting of compliance with these requirements. |
| Stakeholder Consultation | Create and maintain opportunities for constructive consultations with employees, authorities, and other interested or affected parties. Seek to achieve an open exchange of information and mutual understanding in matters of common concern. |
| Continual Improvement | Through continual evaluation, reports, and innovation, seek to improve performance with regard to social health and well-being as well as environmental management throughout the lifespan of the project. |
| Financial Provisions for retail activities | In line with the internationally recognised "polluter pays principle" the company will make the necessary financial provision for compliance with the EMP. |

# 3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT

## 3.1. COMMUNICATION BETWEEN PARTIES

Emphasis will be put towards open communication between all parties, in order to reach a proactive approach towards potential environmental issues deriving from the project. This approach should guarantee that environmental impacts are anticipated and prevented, or minimized, rather than adopting a negative "policing" approach after negative impacts have already occurred.

The importance of a proactive approach cannot be over-emphasized, particularly in relation to preventing unnecessary tracks, and damage to vegetation (i.e., protected and endemic species) as these impacts cannot easily be remedied.

## 3.2. THE MINING/QUARRYING OPERATING COMPANY

The company is ultimately responsible for all stages of the project and the impacts resulting from those activities. The responsible persons will be the company's Environmental Control Officer (ECO) and Managing Director to ensure that:

- The EMP and its environmental specifications are included in contractual documents and it is required that contractors, and subcontractors, consultants etc. do meet the EMP requirements;
- The company and all its subcontractors, consultants etc. comply with all Namibian legislation and policies and any relevant International Conventions;
- Compliance with the environmental specifications is enforced on a day-to-day basis;
- Environmental audits are conducted periodically by a suitably qualified ECO to confirm that the environmental requirements are properly understood and effectively implemented;
- Sufficient budget is provided to implement those measures that have cost implications;
- The Site Manager must commission tree surveys well in advance of planned road construction so that the necessary site visits by forestry personnel and forestry permits are acquired; and,
- Open and effective communication is maintained between all parties concerning environmental management on the project.

## 3.3. SITE MANAGERS

Day-to-day responsibility for environmental management will be assigned to the (Environmental Control Officer (ECO) and Manager Field Operations (MFO) for the duration of the project to:

- Be familiar with the contents of the EMP and applicable sections of the EIA and the measures recommended therein;
- Monitor compliance with the environmental specifications on a daily basis and enforce the environmental compliance on-site by communicating the ECO's directions to all personnel involved; In the event of any infringements leading to environmental damage, personnel need to consult with the ECO and seek advice on any remedial measures to limit or rectify the damage;
- Maintain a record (photographic and written) of "before-and-after" conditions on site;
- Facilitate communication between all role players in the interests of effective environmental management; and,

## 3.4. ENVIRONMENTAL CONTROL OFFICER (ECO)

The proponent must appoint a suitably qualified ECO who is responsible to:

- Undertake environmental audits of overall compliance with the environmental specifications. This should be done at least bi-annually for the project area,
- Submit a site inspection report to the Managing Director and MFO;
- Advise the MFO on interpretation and implementation of the environmental specifications as required; and,
- Make recommendations for remedial action in cases of non-compliance with the environmental specifications.
- The report should be submitted to the MEFT periodically at the time interval stipulated by law.

## 3.5. CONTRACTORS

The contractors will have the responsibility to:

- Familiarize themselves with the requirements of the EMP and comply with the environmental specifications within;
- Notify the ECO through the MFO timeously in advance of any actions that might have significant negative impacts. Mitigatory measures should be discussed and implemented before negative impacts arise; Conduct or arrange for environmental training for employees and sub-contractors;
- Undertake rehabilitation measures where required as far as possible, rehabilitation measures should be carried out progressively and not left till the end of the project.

# 4. ENVIRONMENTAL SPECIFICATIONS

## 4.1. COMPLIANCE WITH THE ENVIRONMENTAL SPECIFICATIONS

The activities will be conducted in an environmentally and socially responsible manner. The contractor and all personnel on-site will comply with the environmental specifications contained in this section.

## 4.2. TRAINING AND AWARENESS

All site personnel and site contractors will receive the training to equip them with the necessary knowledge to comply with the environmental specifications. The MFO will ensure that an appropriate level of training is provided at all levels of site personnel.

## 4.3. STAKEHOLDER RELATIONS

All site personnel will maintain good relations with the landowners and members of the public. Any complaints received by the ECO should be recorded and will be addressed.

## 4.4. PERMITS

All relevant permits shall be obtained from relevant authorities.
The removal or relocation of rare and endangered plants will be conserved and should it be removed or relocated it shall be done with the required permits from the Directorate of Forestry.

## 4.5. ROAD SAFETY

The access roads can be dangerous at times due to dust from passing vehicles, poor camber, patches of loose sand, careless drivers and other external factors. All drivers must be aware of these hazards and take precautions to avoid them. Such precautions will include, but not be limited to:

- Complying with speed limits;
- Reducing speed considerably when visibility is poor;
- Being wary of other vehicles
- Travelling with lights on even in daylight;
- Slowing down for animals and birds on the road; and,
- Being cautious of other road users– taking into account reduced visibility due to dust.

## 4.6. ACCESS TRACKS

- No new tracks will be made unless there are no pre-existing tracks, any new tracks or extensions should be established with the permission of the Municipality and other landowners.
- The selected access and site roads will be clearly marked. A single road only will be used to and from each destination. Turning points for vehicles will also be pre-selected and marked. Particular care will be taken to avoid damage to plants.
- Any elevated sites, or sites away from existing tracks, will be accessed on foot rather than by a vehicle.

## 4.7. CONSERVATION OF BIODIVERSITY

- Damage to protected species will be avoided at all costs.

## 4.8. WILDLIFE POACHING

**NB: It is an offence to poach wildlife.**

No animal or bird is to be captured, killed or harmed in any way. Anyone caught violating this law will face suspension from the project and could be liable for prosecution. In a likewise manner, domestic livestock on farms may also not be harmed.

## 4.9. SOIL MANAGEMENT AND EROSION CONTROL

- During any excavating and clearing the Contractor shall take care to remove as little topsoil as possible. All soil within 100mm of the cleared surface level shall be regarded as topsoil.
- Remove and separately stockpile any subsoil material that can be used for site backfilling.
- Topsoil shall be stockpiled (and seeded) in areas within the site boundary and approved by the Project Engineer in conjunction with the Environmental Consultant, for reuse and restoration.
- Avoid handling soil when wet as this may result in the loss of soil structure and compaction. Soils should not be handled during windy conditions, which may lead to the loss of soil through wind erosion.
- Soil erosion must be prevented at all times. Where evidence of soil erosion can and/or is taking place, this should be reported by the Contractor to the Project Engineer or Environmental Consultant.
- Unnecessary compaction of construction areas must be prevented, to reduce runoff velocity.

- Suitable erosion measures should be implemented in areas sensitive to erosion such as near water supply points, edges of slopes, etc. These measures could include the use of sandbags, hessian sheets, retention or replacement of vegetation.
- All the necessary precautions in terms of design and construction of earthworks, cuts, and fills must be taken.

## 4.10. POLLUTION CONTROL

Should any incidence occur in terms of spilling, the shall report it immediately to the Developer and the Contractor shall be responsible for containing and cleaning up the spillage. The Contractor (Developer) shall ensure that correct mitigation of the pollution is undertaken.

4.10.1. Air pollution / Dust emission

- Excavations and other clearing activities should only be done during permissible weather conditions to avoid drifting of sand and dust into neighboring areas.
- Soil and sand stockpiles shall be located in sheltered areas not exposed to the wind.
- Retention of vegetation where possible will reduce dust travel.
- Exposed surfaces must be re-vegetated as soon as possible.
- The movement of vehicles and other vehicles should be strictly controlled in order to reduce the impact of increased air pollution.
- Adherence to speed limits shall be enforced.
- Sensible and responsible use of equipment which generates dust.
- It is recommended to practice dust monitoring per month in order to take note of the dust emitted at different distances and directions around the project area during operations.

4.10.2. Noise pollution

- Noise levels shall be kept within acceptable limits. All noise and sounds generated shall adhere to SABS 0103 specifications for maximum allowable noise levels for industrial areas.
- Noisy activities must be limited to between 06h00 to 18h00 to avoid disturbance of adjacent landowners.
- Noisy activities should not be allowed on weekends and public holidays unless specific arrangements have been made with the proponent and provided that neighbors have been timeously notified
- Vehicles and operating equipment must be regularly serviced.

## 4.11. WASTE MANAGEMENT

- The area needs to be kept clean, neat, and tidy to the satisfaction of the proponent and ECO. The proponent will provide bins at the worksites and will be responsible for the collection and containment of daily refuse and waste generated by his staff. Bins will be secured in such a way that wind cannot remove papers and plastics. Bins will also be secured against animals around the vicinity.
- No waste will be buried on site. All waste will regularly be removed to an approved waste disposal facility.

## 4.12. HAZARDOUS SUBSTANCES

- All containers of fuel, oil, and any other hazardous substances will be kept sealed, and clearly labeled for identification.
- Tanks for fuels, oils, and any other hazardous substances need to be bunded to hold 110% of the capacity of the tank to contain any possible spills.
- If any spills occur, clean–up shall occur immediately and disposed of appropriately.

## 4.13. FIRE PREVENTION

- Ensure an Emergency Response Plan
- No fires are to be left unattended
- Charcoal sourced from the surrounding should be 100% cured to avoid combustion

## 4.14. ARCHAEOLOGICAL SITES

- All archaeological remains are protected under the National Heritage Act (2004) and are not to be destroyed, disturbed, or removed. The Act also requires that any archaeological finds, be reported to the Heritage Council Windhoek (**Tel. 061-244375**). The same applies to rock art sites.
- The ECO will be notified without delay of any archaeological finds.

## 4.15. HEALTH AND SAFETY

All company personnel will receive a detailed induction upon joining the project and on a regular basis thereafter.

- ***Dust:*** All staff will receive dust masks and proper PPE to prevent inhalation of potentially dust while carrying out any dust-producing activities associated with the project

- Eating, drinking, and **smoking** while working with any materials that may contain radioactive or hazardous substances is forbidden. Good personal hygiene is encouraged (e.g., washing hands before eating) to prevent ingestion of potentially hazardous or radioactive materials.
- **Bees:** Bee stings are potentially dangerous to persons who are allergic to them. Bees are attracted to water, so water / liquid should not be left standing.
- **Snakes & Scorpions:** A number of poisonous snake and scorpion species may occur in the area. Therefore, precautions are required which include: -
  - Exercising caution when picking up rocks or equipment from the ground;
  - Looking at the ground when walking; and,
  - Wearing closed shoes and not walking barefoot.

In case of emergency Aspivenin (suction syringe) is permanently available at all workstations for the first aid treatment of snake bites, scorpion stings and bee stings. Antihistamine tablets should also be available for the first aid treatment of allergic reactions to bee stings.

## 4.16. WORK STOPPAGE

The MFO will have the right to order work to stop in the event of environmental specification infringements that could result in damage to plants, wildlife, or personnel. Work will continue once the situation is rectified and brought to a state of compliance.

In the event of such work stoppage, the Contractor will not be entitled to claim for delays or standing time.

## 4.17. COMPLIANCE MONITORING

During exploration and quarrying activities, the company ECO will conduct site compliance inspections at least once a month. After each inspection the ECO will compile an EMP compliance report for regular submission to the MFO and biannually to the MEFT or as required.

# 5. MITIGATION MEASURES

The purpose of the Environmental Management Plan is to provide a detailed plan to mitigate the negative and positive impacts identified in the environmental scoping and assessment report. Furthermore, it aims to provide actions with roles and responsibilities to implement the environmental specifications provided for to the proponent, contractors, subcontractors who will undertake exploration and mining activities.

The following table provides a large-scale summary overview of all the major environmental management aspects. The scoping study submitted with this EMP also provide mitigation measures for impacts identified therein under chapter 9

TABLE 2 – EMP MITIGATION MEASURES

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| **Access Control** | • Make use of existing tracks/roads as much as possible throughout the area.<br>• Only drive along the existing tracks and avoid unnecessary drives around the area as it may harm vertebrate fauna and unique flora and may also cause erosion related problems, etc.).<br>• Avoid off-road driving at night as this increases mortality of nocturnal species.<br>• Implement and maintain off-road track discipline with maximum speed limits (30km/h)<br>• Where tracks must be made to potential quarrying sites off the main routes, the routes should be selected along already disturbed areas or where there is minimal biodiversity expected to occur.<br>• Avoid placing tracks within drainage lines. Avoid collateral damage (i.e. select routes that do not require the unnecessary removal of trees/shrubs, especially protected species).<br>• Rehabilitate all new tracks created. | Contractor, Project Manager | On-going |
| **Establishing Storage Areas** | • Establishment of the supporting project infrastructure should be done on an area with the least disturbance to the environment and within the non-sensitive areas.<br>• Choice of location for storage areas must take into consideration prevailing winds, distance to water bodies and general on-site topography.<br>• Storage areas must be designated, demarcated, and fenced if necessary.<br>• Storage areas should be secure to minimize the risk of crime.<br>• They should be safe from access by children and animals etc. | Contractor, Project Manager | On-going |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | • Fire prevention facilities must be present at all storage facilities. | | |
| **Establishing Storage Areas** | **Hazardous Material Storage**<br>• Hazardous substances are those that are potentially poisonous, flammable, carcinogenic, or toxic. Some examples are diesel, petroleum, oil, bitumen, cement,solvent-based paints, lubricants, explosives, drilling fluids.<br>• Material safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts andmeasures to minimize negative environmental impacts during accidental releases or escapes.<br>• Hazardous storage areas must be 110% bunded with an impermeable liner to protect groundwater and soil from contamination. The Contractor shall submit a methodstatement to the Project Manager for approval.<br>• Storage areas containing hazardous substance materials must be clearly signposted. | Environmental Control Officer (ECO), Proponent | |
| **Education Of Site Staff on General Environmental Conduct** | **Environmental Education and Awareness**<br>• Ensure that all site personnel have a basic level of environmental awareness training. The proponent must submit a proposal for this training to the ECO for approval. Topics to be covered should include:<br>o What is meant by "environment";<br>o Why the environment needs to be protected and conserved | Environmental Control Officer (ECO), Proponent | During staff induction and ongoing |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | ○ How construction activities can impact on the environment;<br>○ What can be done to mitigate against such impacts;<br>○ Awareness of emergency and spills response provisions;<br>○ Social responsibility during operations, e.g., being considerate to local residents.<br>• It is the proponent's responsibility to provide the site with no less than 1 hour's environmental training and to ensure that there is sufficient understanding to pass this information onto the anyone operating at the site.<br>• The need for a 'clean site' policy also needs to be explained to all workers. | | |
| **Education Of Site Staff on General Environmental Conduct** | **<u>Workers Conduct on site</u>**<br>• A general regard for the social and ecological wellbeing of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:<br>• No alcohol / drugs to be present on site.<br>• No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel).<br>• Prevent excessive noise.<br>• Prevent unsocial behaviour.<br>• Bringing pets onto the site is forbidden.<br>• No harvesting of firewood from the site or from the adjacent areas. | Proponent, Employees, Environmental Control Officer (ECO) | During staff induction and ongoing |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | • Staff are to make use of the facilities provided for them, asopposed to ad-hoc alternatives, (e.g., fires for cooking, the use of surrounding areas / bush as a toilet is forbidden).<br>• Trespassing on private / commercial properties adjoining the site is forbidden.<br>• Driving under the influence of alcohol is prohibited.<br>• Other than the pre-approved security staff, no workers shall be permitted to live on site. | | |
| **Social Impacts** | • Avoid exacerbating the influx of unemployed people to the area and address the unrealistic expectations about large numbers of jobs would be created.<br>• Develop a standardized recruitment method for sub-contractor and field workers<br>• The employment of local residents and local companies should be a priority.<br>• Camp if required should be established in close consultation with the landowners.<br>• Accommodation camp should consider provision of basic services.<br>• Contract companies could submit a code of conduct, stipulating disciplinary actions where employees are guilty of criminal activities in and around the vicinity of the claims. Disciplinary actions should be in accordance with Namibian legislation.<br>• Contract companies could implement a no-tolerance policy regarding the use of alcohol and workers should submit to a breathalyser test upon reporting for duty daily. | Contractor, Project Manager | During staff induction and ongoing |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | • Request that the Roads Authority erect warning signs of heavy operation vehicles on affected public roads.<br>• Ensure that drivers adhere to speed limits and that speed limits are strictly enforced.<br>• Ensure that vehicles are road worthy, and drivers are qualified.<br>• Train drivers in potential safety issues. | | |
| **Fauna And Flora** | **Fauna and Flora**<br>• No protected vegetation may be cleared without prior permission from the forestry department.<br>• Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.<br>• Disturbance to birds, animals and reptiles and their habitats should be minimized Wherever possible.<br>• Avoid unnecessary affecting areas viewed as important habitat<br>• Avoid off-road driving at night as this increases mortality of nocturnal species.<br>• Implement and maintain off-road track discipline with maximum speed limits (e.g.30km/h). | Contractor, Project Manager | Ongoing |
| **Visual** | • Consider the landscape character and the visual impacts of the area including camp site from all relevant viewing angles, particularly from public roads.<br>• Use vegetation screening where applicable. Do not cut down vegetation unnecessary around the site and use it for site screening. | Contractor, Project Manager | Ongoing |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | • Avoid the use of very high fencing.<br>• Minimise access roads and no off-road that could result in land scarring is allowed.<br>• Minimise the presence of secondary structures: remove inoperative support structures.<br>• Remove all infrastructure and reclaim or rehabilitate the project site after project activities are completed. | | |
| **Air Quality** | • Dust suppression techniques should be employed if the specific operation activity is likely to create dusty atmospheric conditions in excess of the periodic extremes.<br>• Avoid activities that create excessive dust on extremely windy days.<br>• Personnel are required to wear personal protection equipment if excessive dust is created for prolonged working periods. | Contractor, Project Manager | Ongoing |
| **Noise** | • A grievance procedure will be established whereby noise complaints can be received, recorded, and responded to appropriately.<br>• Machineries and vehicles (moving and stationed) should be serviced regularly.<br>• A noise management standard operating procedure (SOP) for the activities happening on-site should be developed<br>• Avoid creating unnecessary noise by making sure that equipment that are not in used are always turned off and by avoiding operations during odd hours.<br>• Fit sound mufflers on all machinery where applicable. | Contractor, Project Manager | Ongoing |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | • Equip employees with proper PPE (noise reduction earmuffs)<br>• Employees should work in shifts to avoid prolonged working hours and consequently prolonged exposure to noise. | | |
| **Soil And Groundwater Contamination** | • Accidental spills that occur outside of the bund area must be contained and preventedfrom entering the stormwater system.<br>• Spills must be treated with the appropriate spill absorbent.<br>• Any significant spills or leak incidents must be reported in terms of the National Environmental Management Act and the Water Act. | Contractor, Project Manager | Ongoing |
| **Waste** | • The domestic waste, which is separated from all paper and organic materials, is taken to the nearest official dumpsite.<br>• Oil from the servicing of the vehicles and machines is collected in drums and is taken together with all other industrial waste that is generated on site to the nearest hazardous waste site.<br>• Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.<br>• Bins and / or skips shall be provided at convenient intervals for disposal of waste within the project site.<br>• Bins should have liner bags for efficient control and safe disposal of waste.<br>• Recycling and the provision of separate waste receptacles for different types of waste should be encouraged<br>• Ensure good housekeeping | All personnel | Ongoing |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | **Ablutions**<br>• Waterless toilets are to be maintained in a clean state and should be moved to ensure that they adequately service the work areas.<br>• The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility. | | |
| **Heritage sites destruction during exploration and quarrying activities** | • In addition, where possible, construction and operational activities are to be aligned along previously disturbed areas. Habitats surrounding the washes (rivers) host sensitive plant species which require permits for removal to avoid destruction. No wandering around the site, collecting of plant species or hunting should be allowed.<br>• A 'chance find' of any potential heritage site should be communicated to the police and the National Heritage Council of Namibia.<br>• If activities occur at the location where a 'chance find' has been made, then the activities should cease until the necessary authorities have visited the site and provided the go ahead to proceed with activities | Contractor, Project Manager | Ongoing |
| **Rehabilitation** | • Small samples are preferably removed from site to avoid additional scars in the landscape.<br>• Litter from the site has been taken to the appropriate disposal site.<br>• Debris, scrap metal, etc is removed before moving to a new site or closure of the mine.<br>• Water / Fuel tanks are dismantled and removed if not need for after use.<br>• Tracks on site and the access road are rehabilitated by smoothing the 'middle mannetjie'(middle ridge between the tracks) and raking the surface. | Contractor, Project Manager | Progressively and prior ceasing project activities |

| Aspect | MANAGEMENT DETAILS | RESPONSIBLE PERSONS | FREQUENCY |
|---|---|---|---|
| | • if applicable the stockpiled subsoil to be replaced (spread) and/or the site is neatly contoured to establish effective wind supported landscape patterns.<br>• Replace the stored topsoil seed bank layer. | | |

# 6. MONITORING PLAN

The project monitoring is conducted under the EMP includes:

(i) **Project readiness monitoring** - Monitoring to check progress on project readiness and close gaps through corrective actions.

(ii) **Environmental quality monitoring** - To be conducted by a competent authority or person appointed by the proponent, involving the collection and analyses of air quality, noise and water quality data at designated monitoring locations for assessing compliance with applicable environmental quality and emission standards.

(iii) **EMP compliance monitoring -** To be conducted by the Project Management Consultants to verify EMP compliance during project implementation.

(iv) **Operational monitoring** - This is required as part of the operations of the subproject and will be undertaken by the relevant government department or a nominated private sector operator.

# 7. CONCLUSION

This Environmental Management Plan highlights the management measures that will be implemented to mitigate the environmental impacts of the proposed activities. Additionally, it highlights the need / requirements for the Environmental Emergency Preparedness and Response procedure.

The EMP is a legal document, which commits the applicant to comply with all management measures, monitoring programmes and other plans as presented herein. As part of the EMP, monitoring programmes have been provided to manage and control critical components of the environment. This is a live document which may be amended if project activities alter.

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