SERJAHGE CONSULTANTS

Environmental & Social Impact Assessment (ESIA) Study: Scoping Report

The Proposed Rehabilitation and Dualisation of Road Sections: MR92: 5km from the traffic light intersection towards Oshikuku, MR92: 5km from the traffic light intersection towards Ruacana, and MR123: 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region

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Project Consulting Engineer:	**Tweya Consulting Engineers CC & Shield Force Consulting Engineers CC (Joint Venture)**

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Prepared by:

Author / Environmental Assessment Practitioner (EAP):	Fredrika N. Shagama
Qualifications:	Ph.D. Student: Civil Engineering (Geotechnics & Environmental Hydrogeology), VSB - Technical University of Ostrava, Czech Republic; Post Graduate Diploma in Environmental Studies, International University of Management (IUM), Namibia; MSc. Geological Engineering (*cum laude*) with a focus in Hydrogeology & BSc. Geological Engineering, VSB, VSB - Technical University of Ostrava, Czech Republic
Professional Affiliations:	Environmental Assessment Professionals of Namibia (EAPAN) - Practitioner (Membership No. 183); Geoscience Council of Namibia (GSCN) – Geoscientist, Registration No. GSCN/G-057; International Association of Hydrogeologists (IAH) - Full Member, Membership No.139790; Namibian Hydrogeological Association (NHA) – Member
Contact Details:	Mobile No.: +264 81 749 9223; eias.public@seriaconsultants.com Postal Address: P.O. Box 27318 Windhoek, Namibia
Signature:	F.N.Shagama
Date:	23/02/2026
THE PROPONENT / ECC APPLICANT'S DETAILS	
Proponent:	Outapi Town Council; P. O. Box 853 Outapi, Namibia
Name of Representative & Role:	HERMAN NEUMBO
Contact details:	0812919829
Signature:	
Date:	23-02-2026

SERJA'S STATEMENT OF INDEPENDENCE

As the Appointed Environmental Consultant to undertake the ESIA Study for the Proposed Rehabilitation and Dualisation of 5km Road Sections: MR92 towards Oshikuku, MR92 towards Ruacana, and MR123 towards Tsandi from Outapi Townlands, Serja Hydrogeo-Environmental Consultants declare that we:

- do not have, to our knowledge, any information or relationship with the Outapi Town Council (the Proponent) nor the Ministry of Environment, Forestry and Tourism (MEFT)'s Department of Environmental Affairs and Forestry (DEAF) that may reasonably have the potential to influence the outcome of this Environmental Assessment and the subsequent Environmental Clearance Certificate (ECC) applied for.
- have knowledge of and experience in conducting environmental assessments, the Environmental Management Act (EMA) No. 7 of 2007, and its 2012 Environmental Impact Assessment (EIA) Regulation, as well as other relevant national and international legislation, guidelines, policies, and standards that govern the project activities as presented herein.
- have performed work related to the ECC application in an objective manner, even if the results in views and findings, or some of these may not be favourable to the Proponent.
- have complied with the EMA and other relevant regulations, guidelines, and other applicable laws as listed in this document.
- declare that we do not have and will not have any involvement or financial interest in the undertaking/implementation of the project activities, other than remuneration (professional fees) for work performed to conduct the EIA and apply for the ECC in terms of the EIA Regulations' requirement as an Environmental Assessment Practitioner (EAP).

Disclaimer: Serja Hydrogeo-Environmental Consultants will not be held responsible for any omissions and inconsistencies that may result from information that was not available at the time this document was prepared and submitted for evaluation.

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Signature:

Fredrika N. Shagama: Principal Environmental Assessment Practitioner & Hydrogeologist

Date: February 2026

EXECUTIVE SUMMARY

Outapi Town Council (OUTC), herein referred to as the Proponent, intends to rehabilitate and dualise road sections: MR92 (C46): 5km from the traffic light intersection towards Oshikuku, MR92 (C46): 5km from the traffic light intersection towards Ruacana, and MR123 (D3612): 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region. The road rehabilitation works will commence upon completion of the project design by the appointed engineers (Tweya Consulting Engineers in a joint venture (JV) with Shield Force Consulting Engineers), who will administer the road rehabilitation contract and supervise the works. Furthermore, other activities associated with road rehabilitation include the abstraction of road construction materials from identified borrow pits and water supply for construction near the road routes. The three road sections are currently single-lane infrastructures. Thus, the rehabilitation and dualisation of roads are necessary to improve infrastructure and safety, enhance economic and regional development, accommodate growing traffic volumes, and align with long-term urban and transport planning goals for Outapi Town Council.

Project Need

Spanning approximately 45 km, the corridor links the town centre to regional routes toward Tsandi, Oshikuku, Ruacana, and surrounding settlements. The project aims to improve road safety, traffic flow, urban mobility, and long-term pavement performance while integrating with the urban environment. The road sections are planned for rehabilitation and dualisation owing to poor drainage and erosion that increase travel times in the area. Furthermore, Outapi is a rapidly growing town, and these roads serve as key links to the three nearby towns (Oshikuku, Ruacana, Tsandi). Thus, increased traffic volumes, especially during peak hours or events, may exceed current road capacity.

Added to that, the single-lane roads out of Outapi Town and proper separation between directions of traffic could lead to congestion in the town and chaotic traffic due to low road capacity to accommodate many vehicles (growing traffic volumes) coming to or leaving Outapi. Road rehabilitation and dualisation are also needed to address potential safety concerns. The single-laned road sections without proper shoulders or pedestrian infrastructure can contribute to higher accident rates (involving pedestrians and slow-moving vehicles into and from the Outapi Townlands).

The northern areas of Namibia are also prone to seasonal flooding, where flash floods can occur, and many roads have poor drainage to allow floodwater to flow away. Thus, a need to bring the road sections to standard and mitigate the poor drainage issue

Project Activities

The project will involve the rehabilitation and dualisation of 5km sections of three (3) roads, namely the MR92 from Outapi Townlands (from the traffic light intersection) towards Oshikuku, the MR92 towards Ruacana, and the MR123 (commonly known as D3612) towards Tsandi in the Omusati Region.

Road Planning and Design

The existing MR123–MR92 corridor is a two-lane single carriageway with narrow or no shoulders, frequent property accesses, intersections, and pedestrian crossings. Current travel speeds vary between 60 km/h in the CBD and 100km/h in peripheral areas. The proposed upgrade targets a 100km/h design speed along the corridor, with context-sensitive operating speeds of 40–60km/h in urban zones (Tweya Consulting Engineers & Shield Force Consulting Engineers, 2025).

In addition to the above, the road construction will also address the erosion aspects through the drainage systems to be designed. Road construction materials from one or two borrow pits with quality material sites, as well as sources of nearby raw and fresh water, will be determined.

Proposed Road Design Strategies

According to the Consulting Engineers, the following two design strategies are proposed for the roads:

1. Full dualisation: conversion of the entire corridor into a dual carriageway, improving capacity and safety, but requiring additional land acquisition and higher costs.
2. Targeted capacity improvements: dualisation around the Central Business District (CBD), with selective widening, intersection upgrades, passing lanes, paved shoulders, sidewalks, and access management along the remainder of the route

Design standards will follow the Roads Authority (RA) Geometric Manual (2014), Southern African Development Community (SADC), Southern African Transport and Communications Commission (SATCC), and Technical Recommendation for Highways (TRH) 17 (TRH 17) guidelines, ensuring safe horizontal and vertical alignment, adequate lane and shoulder widths, pedestrian and cyclist facilities, and access management. Typical cross-sections adopted include 3.5m lanes, 1.5–2m shoulders, sidewalks, cycle lanes, and integrated drainage channels. Urban facilities include formal parking, centralised bus/taxi ranks, informal trading areas, pedestrian crossings, rest areas, and road furniture such as signage, fencing, guard rails, and road studs.

Pavement Design

The pavement design targets a 20-year service life using the RA Pavement Manual, Materials Manual (2014), and TRH 4. Detailed centreline assessments, borrow pit assessments, and materials evaluations will inform design. A combination of catalogue and mechanistic design methods is to be used to ensure cost-effective and durable pavement structure. Rehabilitation strategies proposed include strengthening overlays, partial reconstruction, or full reconstruction where necessary. Surfacing will replicate the existing 19mm Cape Seal, offering a durable, low-maintenance, and economical solution (Tweya Consulting Engineers & Shield Force Consulting Engineers, 2025).

Drainage and Stormwater Management

Stormwater flows generally from the town centre to a large Oshana on the southwest periphery of the site. The design integrates new and existing open and closed drainage channels, ensuring capacity for a 1:50-year flood event and protecting adjacent properties. Forward actions include hydraulic assessments, channel and culvert design, flood modelling, and alignment with the town masterplan.

Services and Utilities

All existing utilities, including electricity, water, telecoms, and pipelines, will be identified and protected. The Etaka Water Canal crossing requires structural modification to accommodate the dual carriageway. Street lighting will be provided throughout, complying with RA and South African National Standards (SANS) standards. Forward actions include utility verification, relocation/sleeving planning, and integration into construction drawings.

Survey, Mapping, and Services

A high-accuracy Digital Terrain Model (DTM) of the road reserve will inform design and earthworks. Detailed surveys at bridges, intersections, and drainage structures will guide alignment and construction. Encroaching properties and informal structures are to be documented for Town Council engagement. Permanent benchmarks will support construction setting out.

Traffic Accommodation

During construction, traffic will be maintained on half-widths, utilising one lane and shoulder, with sequential programming to reduce disruption. Temporary detours will be provided where necessary. Formal traffic accommodation layouts will be presented to the Town Council for approval, and stakeholder engagement will ensure safe and efficient traffic flow throughout construction.

Bid Documentation and Cost Estimate

A detailed cost estimate, accurate to ±10%, will include construction, contract administration, and supervision costs. Bidding documents will follow Standard Bidding Document formats, supplemented with Committee of Land Transport Officials (COLTO) specifications, and include signed design drawings. Coordination with the Central Procurement Board and RA will ensure compliance with legal and contractual requirements.

Road furniture

The following road furnishings are considered for the proposed road upgrade:

- Fencing: New fences may be installed in areas impacted by construction and relocated to establish the boundaries of the road reserve. Borrow pit areas will also be fenced for the protection of the public and animals as a once-off, and provision for this will be made in the bill of quantities.

- Road signs: Upgrading of existing road signs and markings, as well as the installation of new signs and markings (traffic calming signs), will be done (where necessary) along the road. The bulk of these signs will be required at major community centres (such as settlements) and intersections. The positioning and the design of all road signs specified will comply with the stipulations contained in the Roads Authority Road Traffic Signs Policy.

Furthermore, community consultation and stakeholder engagement (as part of the ESIA) are also key components to ensure minimal disruption and sustainable development. It is also during this phase that the administrative documentation, including the tendering process for the construction phase, is prepared. Some of the key design aspects are as follows.

Construction Phase

The construction phase will include clearing of vegetation along the demarcated road route and reserves, particularly the road sections outside the town centre, stripping topsoil, and shaping the roadbed. The layers of gravel will be sourced from approved borrow pits in the area, transported, spread, and compacted in layers. Culverts and side drains will be installed to manage surface water, and signage and safety features will be added. The environmental management plans (this EMRP) will be implemented and monitored throughout to minimize ecological and social impacts.

Borrow Pits (BPs) for road (rehabilitation) construction works.

The road rehabilitation (construction) will require materials such as sand and gravel that will be sourced (extracted) from selected localities near the roads, but ultimately determined by the material that meets the quality requirements for constructing roads. Although the locality of borrow pits was not yet determined during consultation meetings held on the 13th and 14th of November 2025, the exploration, establishment, and utilisation of BP sites have been communicated to communities in these meetings. According to the information provided by the consulting engineers, the preferred borrow pit (BP) identified for the project will be the existing Outapi Town Council-operated Ontokolo BP. The BP is located in Ontokolo Village, near the MR92: Oshikuku-Outapi road (within a 2km distance of the road), and about 17km southeast of Outapi Town.

It should be noted that if it comes to light at a later stage (during construction) that a new BP or BPs would be required, this information will be communicated to the stakeholders and the respective communities in the affected area. Added to that, where additional BPs may be required, and they would fall within someone's fence, compensation guidelines, as per the Roads Authority and relevant government policies (National Compensation Policy), will be followed for implementation. This is to ensure that the affected landowners are compensated fairly and that the process and material extraction are done efficiently, safely, and amicably, and ensure environmental sustainability.

Anticipated Resources and Services Infrastructure

Human resources: The road rehabilitation (construction) works will potentially employ 250 people or more. The workforce will likely comprise safety officers, the resident engineer, the contracts manager, the land surveyor, quality control technicians, maintenance artisans, general foremen, operators, laborers, security guards, etc. Priority for employment (semi to unskilled labor) will be given to the locals.

Contractors' accommodation: The road sections are 5km each from Outapi Townlands; therefore, project workers (local laborers) will be commuting from their homes in Outapi and nearby villages to the respective sites by project-provided buses. Highly skilled workers, such as engineers who may not be from Outapi, will be accommodated in established accommodation facilities in Outapi. However, should it be more economical and necessary, consideration will be made for the project workforce to be accommodated in camps on-site. This is to ensure that workers commence work on time without the need to transport workers from and to their homes daily.

Vehicles and equipment: The project equipment, machinery, and vehicles will be stored at designated areas inside the contractor's campsites. Machinery and vehicles such as excavators, dump trucks, bulldozers, loaders, support vehicles (such as 4x4 wheel drive cars and other maintenance vehicles), etc., will also be parked at a designated site at the campsites.

Water supply: The water supply for the project will be assessed during the ESIA Study, i.e., surface water abstraction or tanked water to work sites along the road.

Given the short distance, the water will likely be stored in industry-standard water tanks along the sites (road sections). The water will be used for the actual road works (concrete) and human consumption (drinking water) on site.

Fuel supply: Diesel will be used for machinery and equipment, and a fuel generator will be used to ensure an uninterrupted fuel supply to the project. The fuel will be stored in a 23,000-litre or smaller temporary fuel tank at selected points on the road sections to ensure an uninterrupted supply during construction. Project vehicles will be refuelled and washed at the service stations and car wash in Outapi, respectively. Therefore, no on-site refuelling and washing of project vehicles.

Occupational health and safety: All project workers will be supplied with appropriate and adequate personal protective equipment (PPE) while carrying out project activities on-site. Each road section will be equipped with a fully furnished first aid kit, and at least 2 project workers will be trained on first aid administration.

Accidental fire outbreaks: The site vehicles, campsites, and machinery will be equipped with fire extinguishers in case of accidental fire outbreaks.

Waste management (solid waste): All waste generated from the project activities will be sorted, stored on-site in designated waste containers, and transported to an approved solid waste dumping site in Outapi (with the approval and consent of the Outapi Town Council.

Human waste/sanitation: The appointed contractor will establish portable toilets for the workers and project-related visitors. The toilets will be emptied according to the manufacturer's instructions and as regularly as deemed necessary. For the project personnel stationed along the road, portable toilets will be placed/erected at working sites along the road.

Hazardous waste (fuels): The hazardous waste (waste fuel, grease, and oils) will be properly captured, stored on site in designated waste containers, and transported to the appropriate hazardous waste management facility (in Windhoek). Therefore, no hazardous waste will be disposed of in the project area or any other unapproved waste management facility in the project area or the Omusati Region at large.

Decommissioning and Rehabilitation of Borrow Pits

After construction works are completed, temporary infrastructure like construction camps and detours will be dismantled. Borrow pits are rehabilitated according to environmental regulations, usually by reshaping and re-vegetating the land. Topsoil is replaced, and disturbed areas are stabilized to prevent erosion and encourage natural regrowth, ensuring long-term environmental sustainability.

Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental, and contingency aspects. Therefore, it is best practice for the Proponent through their contractor to ensure the project and associated activities, mainly the BP sites, are ceased in an environmentally friendly manner and sites are rehabilitated by carrying out the following:

- Dismantling and removal of campsites and associated infrastructures from the project site areas,
- Carrying away all project equipment and vehicles, and
- Clean up of site working areas and transporting the recently generated waste to the nearby approved waste management facility (as per agreement with the waste facility operator/owner),

Further decommissioning and rehabilitation practice at the BPs will include:

- Backfilling of pits and trenches associated with the construction materials sourcing in the area,
- Closing of holes to ensure that they do not pose a risk to both people and animals in the area, and
- Levelling of stockpiled topsoil. This will be done to ensure that the disturbed land sites are left as close to their original state as possible.

Operational and Maintenance Phase

This is the phase that succeeds the road rehabilitation phase, when the rehabilitated road sections will be operational with regular maintenance to ensure usability and safety. It is anticipated that maintenance of the road will be done through the Roads Authority of Namibia's Maintenance Department in the Region. The maintenance works will include, but not be limited to:

- Routine maintenance: pothole patching, crack sealing, edge repairs, surface cleaning, etc.
- Drainage Maintenance: clearing side drains, culvert cleaning, and repairing erosion
- Pavement surface Maintenance: surface seal replacement, overlaying, skid-resistance improvement.
- Structural repairs of the pavement layers.
- Roadside and safety infrastructure maintenance, and vegetation and shoulder management.

Communication with I&APs and Means of Consultation Employed

Communication with I&APs concerning the project activities was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the project activities was compiled, uploaded on the MEFT (ECC) Portal for project registration, and shared with registered stakeholders / Interested and Affected parties (I&APs).
- A Stakeholders (I&AP) List was developed and updated as new I&APs register for the EIA. The BID was shared with the pre-identified key stakeholders.
- Project EIA notices were published in the following newspapers and dates:
    - *New Era and Windhoek Observer*: The notice appeared in the newspaper on the 05th & 12th of November 2025.
    - The consultation period ran from the 05th of November 2025 to the 05th of December 2025.
- ESIA notices (posters) were prepared for printing and pasted at different places in Outapi, i.e., Omusati Regional Council, Outapi Town Council, Outapi District Hospital, Shoprite, Woerman Brock, Outapi Open Market, etc.
- ESIA consultation meetings were scheduled and held with the community and local stakeholders as follows. The meeting attendance included the environmental assessment practitioner from Serja HGE Consultants, one engineer from the project consulting engineering team (JV), and one representative from Proponent (Outapi Town Council)'s Infrastructure Department. The meetings were as follows (meeting minutes were taken and recorded):

- 1st consultation meeting (MR92 section towards Oshikuku): The meeting was held at the Marula Tree near the road in the Okapuku Village (at the 5km mark of the road section from the Outapi traffic light intersection in Town). The meeting was attended by fifty-eight (58) people.
- 2nd consultation meeting (MR123 section towards Tsandi): The meeting was held at the *Okamwandi kaNaifi* near the road in the Omunyele/Omukoko Village (at the 5km mark of the road section from the Outapi traffic light intersection in Town). The meeting was attended by thirty-nine (39) people.
- 3rd consultation meeting (in Outapi): The meeting was scheduled to take place at the Ombalantu Traditional Authority Hall in Outapi. Despite the meeting notices placed around town on the 07th of November 2025 and through radio notices by the Outapi Constituency Councillor, there was no attendance at this meeting. It was reported that the non-attendance was attributed to the market day in the Town. Given the potential impact on businesses (both formal and informal) and other activities along the road section, another consultation meeting with a more advanced approach is scheduled in the Town. This is to ensure that all affected parties are aware and understand the Town Council's plans to rehabilitate and dualise the road sections, potentially affecting their trading areas and business operations during construction.
- 4th Consultation meeting (MR92 section towards Ruacana): The meeting was held at *Omusati waaposi* near the road in the Ombandjele Village (at the 5km mark of the road section from the Outapi traffic light intersection in Town). The meeting was attended by forty (40) people.

Concluding remark on stakeholder and public consultation: A few key comments and issues raised during the consultation meetings were significant, but they did not object to the project. These are summarized below.

- Compliance with laws and conditions set in documents
- Rehabilitation of borrow pits for community livestock water holding (rainwater earth dams)
- Road signs and markings
- Design of the road
- Recruitment of project personnel (labourers) and people working without contracts and proper protective equipment
- Safety of people and livestock along the road sections
- Communication about the recruitment of locals
- The upgrading of existing small bridges and culverts on the road

- The displacement or shifting of existing properties (land, fences, trees, and structures/houses or businesses)
- Fair recruitment and agreements
- Gender balance during recruitment
- Benefits from funds paid to the Traditional Authority coffers through the establishment of borrow pits on communal land
- The installation of traffic lights at the Police station and Hospital area
- The possibility of covering an additional 2km from the end of the road sections (to add speed calming measures such as speed humps).

The above comments serve as significant suggestions to make the design better for both biological, physical, and social environments. Furthermore, stakeholders and I&APs would just like to see the project implemented as well as the implementation of management and mitigation measures to reduce the significance of the impacts during road rehabilitation works to improve the mobility and accessibility to economic and social services centers in the Town, these parts of the two Constituencies, and neighbouring constituencies and regions.

Feedback on the Draft ESIA Scoping Report Review

The draft ESIA Scoping Report and Environmental & Social Management & Rehabilitation Plan (ESMP/ESMRP) were circulated to registered stakeholders and I&APs for review and further comments. The review and comments period was fourteen (14) days, i.e., from the 04th to the 18th of February 2026. There were no further comments or issues received on the circulated draft documents between 04th and 20th February 2026 during the finalization of the ESIA documents.

Potential identified positive and adverse (negative) impacts of the proposed project.

Positive impacts (benefits) of the road rehabilitation and ultimate operations

- Socio-economic development through temporary job (employment) creation in the area during the road construction phase for 250 people or more.
- Improved accessibility: better road connections enhance accessibility between Outapi and Oshikuku/Ruacana/Tsandi, facilitating the transportation of goods, people, and services, and access to social services and other centres in the area.
- Economic development: better roads can stimulate economic growth by attracting investment, promoting tourism in this part of the Omusati Region, and facilitating the movement of goods and people.
- Safety: The new road with improved design and signage can enhance road safety.

- The roads will improve connectivity, thus enabling easier access to economic points (markets), schools, healthcare centres, and nearby communities.
- The rehabilitated road sections will support urban planning by guiding growth and allowing for better traffic management in the townlands. The dualisation will also fit into long-term infrastructure town plans, preparing for future population and traffic growth in Outapi Town and its immediate surroundings.

Potential environmental and social (adverse) impacts of road rehabilitation work

The potential negative (adverse) impacts of the proposed road rehabilitation (mainly during the construction) are listed below. The mitigation measures for these impacts are included in the borrow pits' EMRP.

- Soil and water pollution: improper handling of wastewater may lead to pollution of surrounding soils and eventually water resources systems (through wastewater runoff and infiltration).
- Water pollution: runoff from roads can carry pollutants such as oil, salt, and heavy metals into nearby streams and rivers, impacting aquatic ecosystems.
- Habitat destruction: excavation of road construction borrow pits can lead to the destruction of natural habitats for plants and animals. This can disrupt local biodiversity and reduce the availability of resources for animals and people.
- Displacement and loss of land: Dualisation of the roads will mean expansion/widening of the existing road routes. Thus, it may require land acquisition, which can result in the displacement of businesses, homes, fences, pipelines/cables, and or productive farming land near/along the roads (within the anticipated new road reserves). This could result in conflicts over compensation and land ownership.
- Risks of soil erosion: road construction activities could disturb the soil and lead to erosion, especially during the rainy season. The removal of large amounts of soil and vegetation from borrow pits can increase the risk of soil erosion.
- Depletion of local groundwater table: excavation of borrow pits may affect the local water table, leading to changes in groundwater levels. This can impact the availability of water for vegetation that relies on groundwater as a water source in the area.
- Deforestation: road construction may require the clearing of trees and vegetation along the route, leading to habitat loss.

- Impact on air quality: dust and particulate matter generated during the excavation of materials (sand and gravel), movement and operation of heavy vehicles and machinery on unpaved areas can compromise air quality.
- Displacement of existing properties and infrastructure (building structures and service infrastructure).
- Displacement of roadside vendors in Outapi Town and along the road sections, which leads to socio-economic disruption.
- Noise associated with the movement of heavy machinery and trucks can disturb locals and animals.
- Disruption of hydrological systems by borrow pits can alter natural drainage patterns, causing changes in surface water flow and potentially exacerbating flooding or drought conditions in the area.
- General environmental pollution through mishandling of project-related waste associated with the project.
- Occupational and community health and safety: improper handling of materials and equipment may cause health and safety risks to workers and locals (communities/residents and businesses). Community safety can also be compromised by unfenced borrow pits or abandoned borrow pits (that are not properly rehabilitated to safe conditions)
- Archaeological or cultural heritage impact: borrow pits may impact local cultural heritage sites or traditional land use practices, potentially leading to social tensions or conflicts between the construction contractor and communities.

Some key potential positive and negative impacts were identified by the Environmental Consultant and based on issues raised by I&APs during the consultation period. The issues raised by I&APs were addressed and incorporated into this Report, whereby mitigation measures have been provided in the Environmental Management & Rehabilitation Plant (EMRP) for implementation to avoid and/or minimize their significance on the environmental and social components.

Impact Assessment: The key negative impacts were described, assessed. The potential negative impacts indicated a medium rating of significance. To minimize the significance, appropriate management and mitigation measures are made for implementation by the Proponent, their contractors, and workers to avoid and/or minimize their significance on the environmental and social components. The effective implementation of the recommended management and mitigation measures, accompanied by monitoring, will particularly see a reduction in the significance of adverse impacts that cannot be avoided completely (from medium rating to low).

Recommendations and Conclusions

The ESIA Study was deemed sufficient and concluded that no further detailed assessments are required for the ECC application for the road rehabilitation and dualisation works and associated activities.

Serja Consultants are confident that the potential negative impacts associated with the project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures, and with more effort and commitment put on monitoring the implementation of these measures. It is therefore recommended that the project be granted an ECC, provided that:

- All the management and mitigation measures provided herein are effectively and progressively implemented.
- All required permits, licenses, and approvals for the activities are obtained as required. These include permits and licenses, and ensuring compliance with these specific legal requirements.
- Transparency in communication and continued engagement with the communities and or through their leaders (local leaders and constituency councillors), and stakeholders should be maintained throughout the project cycle.
- Feedback meetings with the communities, their leaders (and other local key stakeholders) should be continued throughout the planning and design phase for project awareness to reach most, if not all, potentially affected parties (property owners as well as business persons along the road sections) for inputs. A feedback meeting with the communities in Outapi and three road sections should be held before construction works commence (once the ECC is granted).
- The Proponent, their project workers and contractors comply with the legal requirements governing their project and its associated activities, and ensure that project permits and or approvals required to undertake specific site activities are obtained and renewed as stipulated by issuing authorities.
- Site areas where excavations were carried out and have ceased are rehabilitated, as far as practicable, to their pre-excavation state. This includes the levelling of stockpiled topsoil, backfilling trenches, and closing/capping of project-associated holes and borrow pits.
- The EMRP implementation should be checked and done by the responsible team member onsite (Environmental Control Officer / Safety Officer), and audited by an Independent Environmental Consultant on a bi-annual basis to compile Environmental Monitoring (audit) reports. These reports are to be submitted to the Environmental Commissioner at the DEAF This will be required by the Environmental Commissioner (as part of the ECC conditions).

In conclusion, although significant, the identified impacts would not hinder the project activities. However, the recommended measures should be effectively implemented and monitored to ensure that the significance of adverse impacts is reduced to a low level, where it is medium, and eventually to a negligible significance rating. The effectiveness of the implementation of the management and mitigation measures and EMP compliance will be done by an Environmental Control Officer (ECO) or Safety Officer and audited by an Independent Environmental Consultant on a bi-annual basis. This is to ensure that EMRP

implementation can be tracked via Bi-Annual Environmental Monitoring exercises and documented in the monitoring reports to the Environmental Commissioner. The monitoring of EMRP implementation will not only be done to ensure that the impact's significance is reducing and or maintaining a low significance rating, but also to ensure that all potential unforeseen impacts that might arise during implementation are properly identified in time and addressed immediately.

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Appendix C: Consent letters issued by the relevant authority (of affected villages)

Appendix D: The copy of the BID circulation (email) to the EIA registered Stakeholders / Interested & Affected Parties (I&APs)

Appendix E: ESIA Notification in the newspapers (*New Era* and *Windhoek Observer*)

Appendix F: Original Copy of the site notification/poster placed in Outapi for the ESIA Study

Appendix G: Minutes from the consultation meetings with stakeholders / interested & affected parties

LIST OF ABBREVIATIONS

Abbreviation	Meaning
BID	Background Information Document
BP	Borrow Pit
CEB	Cuvelai-Etosha Basin
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COLTO	Committee of Land Transport Officials
DEAF	Department of Environmental Affairs and Forestry
DR	District road
DTM	Digital Terrain Model
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESMP/ESMRP	Environmental & Social Management Plan / Rehabilitation Plan
GG	Government Gazette
GN	Government Notice
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
MAFWLR	Ministry of Agriculture, Fisheries, Water, and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MIME	Ministry of Industries, Mines, and Energy
NHC	National Heritage Council (NHC) of Namibia
NORED	Northern Regional Electricity Distributor Company
OUTC	Outapi Town Council

Abbreviation	Meaning
PPE	Personal Protective Equipment
Reg, S	Regulation, Section
SADC	Southern African Development Community
SANS	South African National Standards
SATCC	Southern African Transport and Communications Commission
TRH 17	Technical Recommendation for Highways
UNCCD	The United Nations Convention to Combat Desertification

GLOSSARY (KEY TERMS)

Term	Definition
Alternative	A possible course of action, in place of another that would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	The part of the environment that does not originate with human activities (e.g., biological, physical, and chemical processes).
Borrow Pit	Literal pits are dug to provide fill material, such as sand and gravel, for construction projects.
Cumulative Impacts / Effects Assessment	Concerning an activity, it means the impact of an activity that may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decision-maker	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal
Ecological Processes	Processes that play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy, and biological diversity (as an expression of evolution).

Term	Definition
Environment	As defined in Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Management Plan (Draft EMP)	As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environmental effects are to be mitigated, controlled, and monitored.
Interested and Affected Party (I&AP)	Concerning the assessment of a listed activity includes - (a) any person, group of persons, or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity.
Fauna and Flora	The animals and plants found in an area.
Mitigate	Practical measures to reduce adverse impacts.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of an action on the affected environment
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Proponent	Organization (private or public sector) or individual intending to implement a development proposal. As defined in the Environmental Management Act, the Proponent is a person who proposes to undertake a listed activity. The Proponent in this case is the Outapi Town Council (OUTC).
Public Consultation/Involvement	A range of techniques that can be used to inform, consult, or interact with stakeholders affected by the proposed/project activities.
Protected Area	Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended.
Scoping	An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the ESIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of the site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into a full ESIA.

Term	Definition
Significant impact	Means an impact that, by its magnitude, duration, intensity, or probability of occurrence, may have a notable effect on one or more aspects of the environment

1 INTRODUCTION

1.1 Project Background and Location

Outapi Town Council (OUTC), herein referred to as the Proponent, intends to rehabilitate and dualise road sections: MR92 (C46): 5km from the traffic light intersection towards Oshikuku, MR92 (C46): 5km from the traffic light intersection towards Ruacana, and MR123 (D3612): 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region (see maps in Figure 1-1 and Figure 1-2). The road rehabilitation works will commence upon completion of the project design by the appointed engineers (Tweya Consulting Engineers in a joint venture (JV) with Shield Force Consulting Engineers), who will administer the road rehabilitation contract and supervise the works. Furthermore, other activities associated with road rehabilitation include the abstraction of road construction materials from identified borrow pits and water supply for construction near the road routes. The three road sections are currently single-lane infrastructures. Thus, the rehabilitation and dualisation of roads are necessary to improve infrastructure and safety, enhance economic and regional development, accommodate growing traffic volumes, and align with long-term urban and transport planning goals for Outapi Town Council.

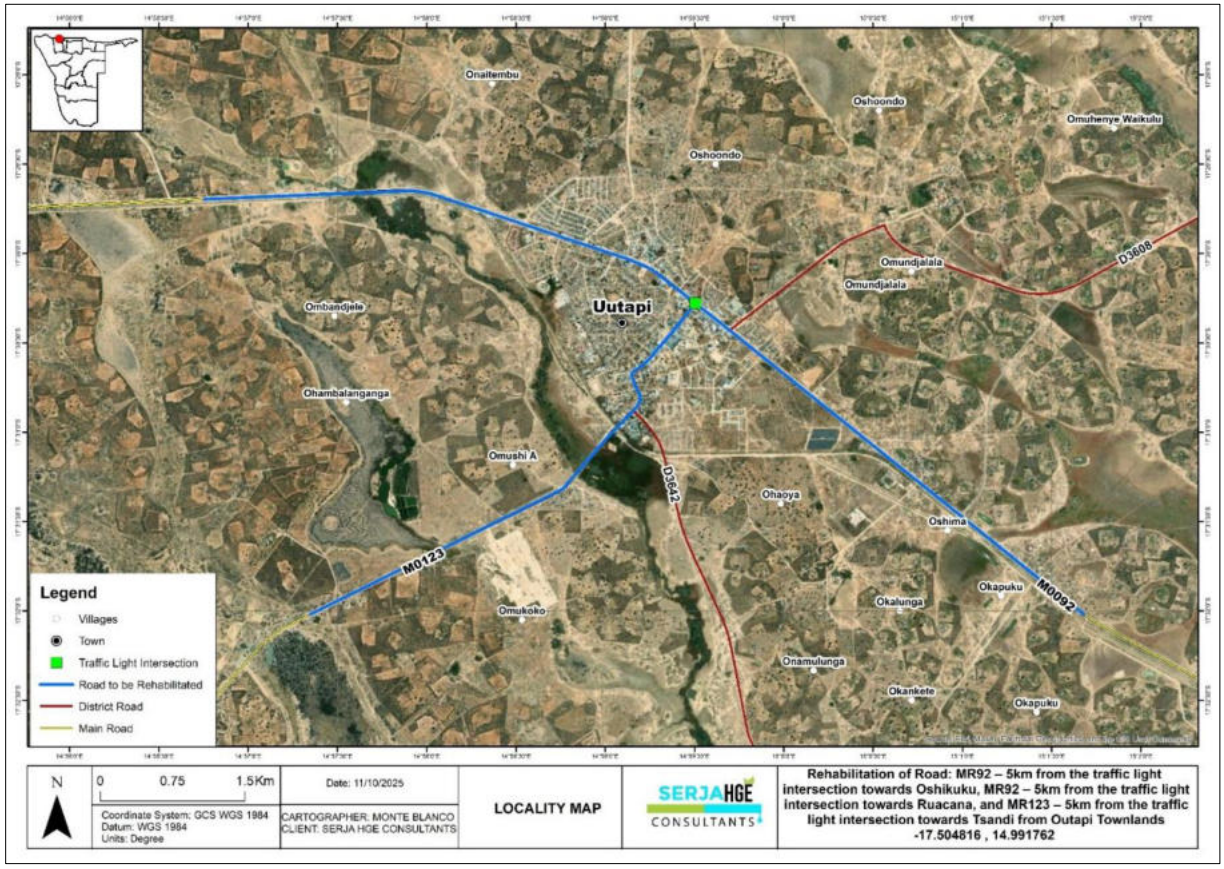

Figure 1-1: Locality map of the three road sections proposed for rehabilitation and dualisation from Outapi Townlands towards Oshikuku (MR92), Ruacana (MR92), and Tsandi (MR123) in the Omusati Region

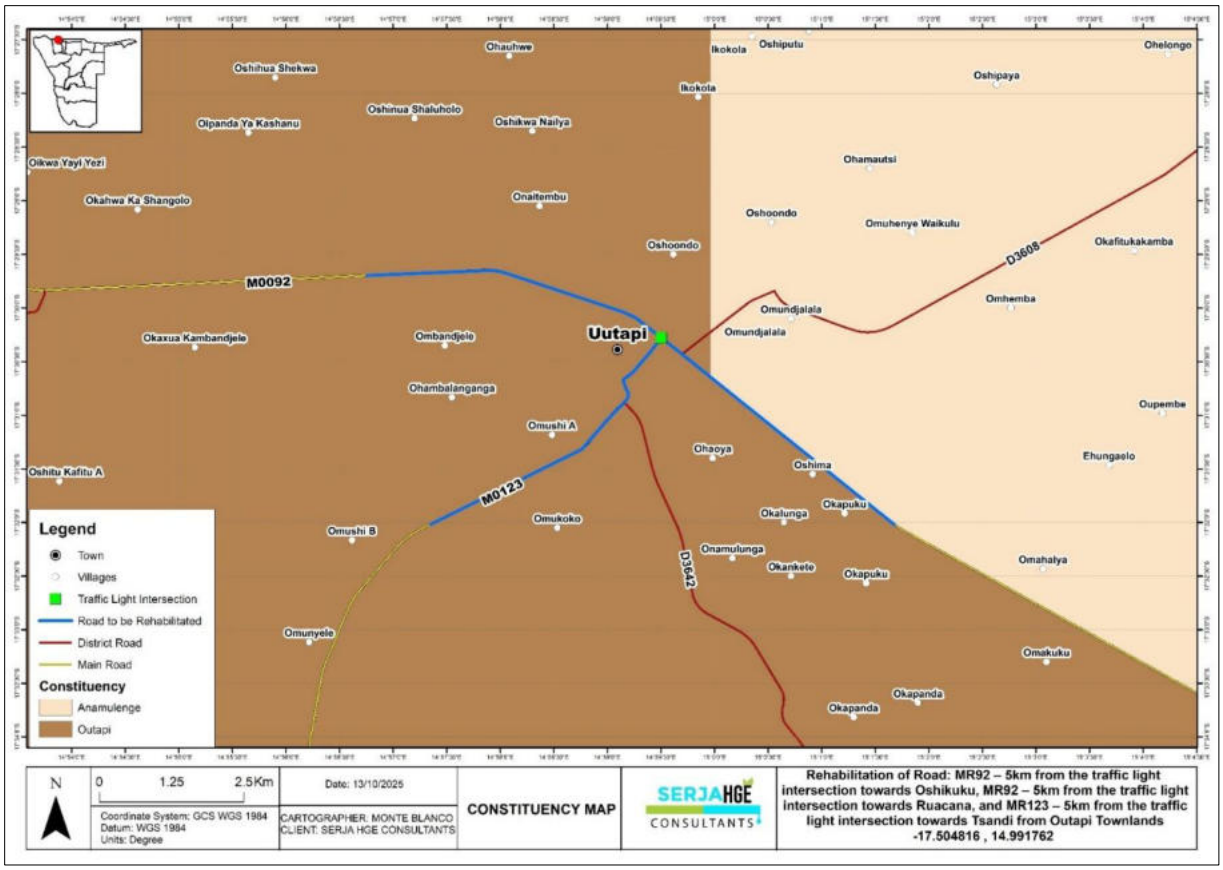

Figure 1-2: The three road sections proposed for rehabilitation and dualisation from Outapi Townlands towards Oshikuku (MR92), Ruacana (MR92), and Tsandi (MR123), with the electoral constituencies

1.2 The Need and Desirability of the Project Activities

1.2.1 Project Need

Spanning approximately 45km, the corridor links the town centre to regional routes toward Tsandi, Oshikuku, Ruacana, and surrounding settlements. The project aims to improve road safety, traffic flow, urban mobility, and long-term pavement performance while integrating with the urban environment.

The road sections are planned for rehabilitation and dualisation owing to poor drainage and erosion that increase travel times in the area. Furthermore, Outapi is a rapidly growing town, and these roads serve as key links to the three nearby towns (Oshikuku, Ruacana, Tsandi). Thus, increased traffic volumes, especially during peak hours or events, may exceed current road capacity.

Added to that, the single-lane roads out of Outapi Town and proper separation between directions of traffic could lead to congestion in the town and chaotic traffic due to low road capacity to accommodate many vehicles (growing traffic volumes) coming to or leaving Outapi. Road rehabilitation and dualisation are also needed to address potential safety concerns. The single-laned road sections without proper shoulders or pedestrian infrastructure can contribute to higher accident rates (involving pedestrians and slow-moving vehicles into and from the Outapi Townlands).

The northern areas of Namibia are also prone to seasonal flooding, where flash floods can occur, and many roads have poor drainage to allow floodwater to flow away. Thus, a need to bring the road sections to standard and mitigate the poor drainage issue.

1.2.2 Project Desirability

The proposed road sections' rehabilitation and dualisation aim to improve the roads in and around the Town, which further encourages investment and business growth by reducing transport costs and travel times. This also enhances access to local and regional markets, health care, education, and government services with ease.

In addition to the above, the improved road sections will potentially stimulate the growth in agriculture by connecting rural agricultural producers to urban markets and tourist destinations such as the Ruacana Water Falls via the MR92 (commonly known as the C46) from Outapi. The rehabilitated and dualised roads with proper signage and drainage at these sections of the town towards Oshikuku, Ruacana, and Tsandi will increase road user safety. The improved road sections will also reduce travel times for both commuters and transporters to and from Outapi.

It is important to note that Outapi Town is growing in terms of population and economy. Therefore, these rehabilitated roads will support urban planning by guiding growth and allowing for better traffic management in the townlands. These roads (MR92 and MR123) are renowned strategic connectors in the Omusati Region and serve as arteries between towns. The dualisation will also fit into long-term infrastructure town plans, preparing for future population and traffic growth.

The desirability of the project (rehabilitating and dualising the three road sections) will help to boost regional integration, leading to better movement of goods and people between these three towns and other areas further.

1.3 Need for an Environmental Clearance Certificate (ECC)

The rehabilitation (construction) of roads and associated works, such as the abstraction of construction materials and water to supply the road construction works, are listed activities in the Environmental Impact Assessment (EIA) Regulations (2012) of the Environmental Management Act (EMA) No. 7 of 2007 that may not be undertaken without an Environmental Clearance Certificate (ECC). The listed activities that are relevant to the proposed project activities are as follows:

- *Listed Activity 10.2: the construction of the route determination of roads and the design of associated physical infrastructure, where –*
    - (a) It is a public road
    - (b) The road reserve is wider than 30 meters; or
    - (c) The road caters for more than one lane of traffic in both directions

Associated activities

Mining and quarrying activities for sand and gravel from borrow pits

- *Listed Activity 3.1 The construction of facilities for any process or activities that require a license, right, or other forms of authorization, and the renewal of a license, right, or other forms of authorization, in terms of the Minerals (Prospecting and Mining Act), 1992.*
- *Listed Activity 3.2 Other forms of mining or extraction of any natural resources, whether regulated by law or not.*

Water resources development – to supply the road construction

- *Listed Activity 8.1: The abstraction of ground or surface water for industrial or commercial purposes.*

The purpose of the EIA Study and subsequent issuance of the ECC is therefore to ensure that the project activities are undertaken in an environmentally & socially friendly and sustainable manner, through the effective implementation of recommended environmental management measures to minimize the adverse identified impacts while maximizing the positive impacts.

To comply with the EMA and its EIA Regulations and ensure environmental sustainability, the Proponent, through the consulting engineers who will supervise the road rehabilitation/construction contractor, has appointed Serja Hydrogeo-Environmental Consultants CC (Serja HGE Consultants), independent environmental consultants, to apply for the ECC on their behalf.

An application for the ECC is being launched with the Ministry of Environment, Forestry and Tourism (MEFT)'s Department of Environmental Affairs and Forestry (DEAF) by Serja HGE Consultants. Upon screening of this Background Information Document (BID), Serja Consultants has been required to prepare an Environmental Scoping Report and Environmental Management Plan (EMP), which, for this specific project, is referred to as the *Environmental & Social Management & Rehabilitation Plan* (ESMP/ESMRP) in an application for the ECC. The required documents (Scoping Report and EMP/EMRP) will be submitted to the MEFTs for evaluation and consideration of the ECC.

1.4 Appointed Independent Environmental Consultant

To comply with the EMA and its Regulations and ensure environmental management, protection, and sustainability, the Proponent through the project design engineer (Tweya Consulting Engineers CC in a joint venture with Shield Force Consulting Engineers, who will administer the construction contract and supervise the construction works) appointed Serja Hydrogeo-Environmental Consultants CC, Independent Environmental Consultants to apply for the ECC and conduct the required Environmental Assessment Process, which includes Public Consultation and prepare the EIA Report and EMP – Appendix A.

The EIA process (stakeholder / public consultation and engagement, including consultation meeting facilitation) and reporting were done by Ms. Fredrika Shagama. Ms. Shagama is a qualified and experienced Hydrogeologist and Environmental Assessment Practitioner by training and experienced with over 10 years of experience in Groundwater and Environmental Management Consulting. Ms. Shagama's is attached to this Report as Appendix B.

1.5 Application for the Environmental Clearance Certificate

The application for the ECC process was done as follows:

- Preparation of the Background Information Document (BID) for the project activities,
- Launching of the ECC application on the ECC Portal of the Ministry of Environment, Forestry and Tourism (MEFT) with the Proponent details (accompanied by the BID) for project registration purposes and obtaining a MEFT application/reference number (APP-006638),
- Completion of the ECC Form 1 (Section 32) of the EIA Regulations with the required project and Proponent information,
- Submission of the printed hard copy of the ECC application (with affixed NAD300 revenue stamps as application fees attached hereto) is submitted to the MEFT. The MEFT's date-stamped copy of the ECC application is uploaded to the ECC Portal as proof of application and payment.

The next component of the ECC application was to undertake an EIA process, which entails a Baseline Assessment of the Biophysical and Social environments, as well as public consultation and engagement. The findings of the EIA process are then incorporated into an EIA Report, and an EMP is also developed for the mitigation of potential adverse impacts anticipated from the project activities. The two documents and associated documents (appendices) are then submitted to the Environmental Commissioner at MEFT's Department of Environmental Affairs and Forestry (DEAF) for evaluation and consideration of the ECC.

1.6 Scope of Work and Report Contents

This Study has been conducted according to the EMA No. 7 of 2007, and its 2012 EIA Regulations, as mentioned in the preceding subsections, i.e., the project requires an ECC. Therefore, the process has been undertaken as required and guided by the Regulations.

This Report has been compiled as a required output of an environmental assessment process after the ECC application has been launched with MEFT. The Scoping Report, together with the EMRP and all its appendices, will be submitted to the DEAF.

The document (report) covers the following chapters or sections, in addition to the introductory chapter:

- Project description and associated activities - (Chapter 2).
- Project alternatives considered (that were found to be environmentally friendly and technically feasible) - Chapter 3.
- The Legal requirements governing the project and its related activities, i.e., the legislation that the project activities must comply with (Chapter 4).
- The Environmental and Social Baseline of the project area - Chapter 5.
- The Public Consultation & Engagement Process undertaken to inform, invite, and engage the public (stakeholders and interested & affected parties) on the project activities - Chapter 6.
- The Assessment of identified potential impacts associated with the project activities (Chapter 7) - This chapter presents both the positive and negative (adverse) as well as cumulative impacts, assessment methodology, and the assessment of the negative impacts. The mitigation measures in the form of management action plans, with a timeframe and implementation responsibilities, are given in the EMP.
- The recommendations and conclusions of the environmental assessment are presented under Chapter 8. The data sources (literature/references) consulted for the assessment are listed under Chapter 9.

Based on the information provided by the Proponent and the EAP’s experience, a description of the project activities is presented in the next chapter.

2 DESCRIPTION OF THE PROJECT ACTIVITIES

The planning and design phase of the proposed gravel road is guided by national standards and environmental regulations. This phase involves route selection, topographical surveys, the ESIA Study, and the design of road alignment, drainage systems, and gravel layer thickness. Community consultation and stakeholder engagement (as part of the ESIA) are also key components to ensure minimal disruption and sustainable development. It is also during this phase that the administrative documentation, including the tendering process for the construction phase, is prepared.

The project will involve the rehabilitation and dualisation of 5km sections of three (3) roads, namely the MR92 from Outapi Townlands (from the traffic light intersection) towards Oshikuku, the MR92 towards Ruacana, and the MR123 (commonly known as D3612) towards Tsandi in the Omusati Region. Some photos of the Town's traffic light intersection and some areas of the road sections are shown in Figure 2-1.

Figure 2-1: Photos of some areas of the three proposed road sections for rehabilitation and dualisation from the Traffic light intersection towards Oshikuku (MR92), Ruacana (MR92), and Tsandi (MR123)

The existing MR123–MR92 corridor is a two-lane single carriageway with narrow or no shoulders, frequent property accesses, intersections, and pedestrian crossings. Current travel speeds vary between 60 km/h in the CBD and 100km/h in peripheral areas. The proposed upgrade targets a 100km/h design speed along the corridor, with context-sensitive operating speeds of 40–60km/h in urban zones (Tweya Consulting Engineers & Shield Force Consulting Engineers, 2025).

In addition to the above, the road construction will also address the erosion aspects through the drainage systems to be designed. Road construction materials from one or two borrow pits with quality material sites (to be identified and sited by materials personnel), as well as sources of nearby raw and fresh water, will be determined.

2.1 Road Planning and Design

2.1.1 Proposed Road Design Strategies

According to the Consulting Engineers, the following two design strategies are proposed for the roads:

1. Full dualisation: conversion of the entire corridor into a dual carriageway, improving capacity and safety, but requiring additional land acquisition and higher costs.
2. Targeted capacity improvements: dualisation around the Central Business District (CBD), with selective widening, intersection upgrades, passing lanes, paved shoulders, sidewalks, and access management along the remainder of the route

Design standards will follow the Roads Authority (RA) Geometric Manual (2014), Southern African Development Community (SADC), Southern African Transport and Communications Commission (SATCC), and Technical Recommendation for Highways (TRH) 17 (TRH 17) guidelines, ensuring safe horizontal and vertical alignment, adequate lane and shoulder widths, pedestrian and cyclist facilities, and access management. Typical cross-sections adopted include 3.5m lanes, 1.5–2m shoulders, sidewalks, cycle lanes, and integrated drainage channels. Urban facilities include formal parking, centralised bus/taxi ranks, informal trading areas, pedestrian crossings, rest areas, and road furniture such as signage, fencing, guard rails, and road studs.

2.1.2 Pavement Design

The pavement design targets a 20-year service life using the RA Pavement Manual, Materials Manual (2014), and TRH 4. Detailed centreline assessments, borrow pit assessments, and materials evaluations will inform design. A combination of catalogue and mechanistic design methods is to be used to ensure cost-effective and durable pavement structure. Rehabilitation strategies proposed include strengthening overlays, partial reconstruction, or full reconstruction where necessary. Surfacing will replicate the existing 19mm Cape Seal, offering a durable, low-maintenance, and economical solution (Tweya Consulting Engineers & Shield Force Consulting Engineers, 2025).

2.1.3 Drainage and Stormwater Management

Stormwater flows generally from the town centre to a large Oshana on the southwest periphery of the site. The design integrates new and existing open and closed drainage channels, ensuring capacity for a 1:50-year flood event and protecting adjacent properties. Forward actions include hydraulic assessments, channel and culvert design, flood modelling, and alignment with the town masterplan.

2.1.4 Services and Utilities

All existing utilities, including electricity, water, telecoms, and pipelines, will be identified and protected. The Etaka Water Canal crossing requires structural modification to accommodate the dual carriageway. Street lighting will be provided throughout, complying with RA and South African National Standards (SANS) standards. Forward actions include utility verification, relocation/sleeving planning, and integration into construction drawings.

2.1.5 Survey, Mapping, and Services

A high-accuracy Digital Terrain Model (DTM) of the road reserve will inform design and earthworks. Detailed surveys at bridges, intersections, and drainage structures will guide alignment and construction. Encroaching properties and informal structures are to be documented for Town Council engagement. Permanent benchmarks will support construction setting out.

2.1.6 Traffic Accommodation

During construction, traffic will be maintained on half-widths, utilising one lane and shoulder, with sequential programming to reduce disruption. Temporary detours will be provided where necessary. Formal traffic accommodation layouts will be presented to the Town Council for approval, and stakeholder engagement will ensure safe and efficient traffic flow throughout construction.

2.1.7 Bid Documentation and Cost Estimate

A detailed cost estimate, accurate to ±10%, will include construction, contract administration, and supervision costs. Bidding documents will follow Standard Bidding Document formats, supplemented with Committee of Land Transport Officials (COLTO) specifications, and include signed design drawings. Coordination with the Central Procurement Board and RA will ensure compliance with legal and contractual requirements.

2.2 Road furniture

The following road furnishings are considered for the proposed road upgrade:

- Fencing: New fences may be installed in areas impacted by construction and relocated to establish the boundaries of the road reserve. Borrow pit areas will also be fenced for the protection of the public and animals as a once-off, and provision for this will be made in the bill of quantities.

- Road signs: Upgrading of existing road signs and markings, as well as the installation of new signs and markings (traffic calming signs), will be done (where necessary) along the road. The bulk of these signs will be required at major community centres (such as settlements) and intersections. The positioning and the design of all road signs specified will comply with the stipulations contained in the Roads Authority Road Traffic Signs Policy.

Furthermore, community consultation and stakeholder engagement (as part of the ESIA) are also key components to ensure minimal disruption and sustainable development. It is also during this phase that the administrative documentation, including the tendering process for the construction phase, is prepared. Some of the key design aspects are as follows.

2.3 Construction Phase

The construction phase will include clearing of vegetation along the demarcated road route and reserves, particularly the road sections outside the town centre, stripping topsoil, and shaping the roadbed. The layers of gravel will be sourced from approved borrow pits in the area, transported, spread, and compacted in layers. Culverts and side drains will be installed to manage surface water, and signage and safety features will be added. The environmental management plans (this EMRP) will be implemented and monitored throughout to minimize ecological and social impacts.

2.3.1 Borrow Pits (BPs) for road rehabilitation (construction) works

The road rehabilitation (construction) will require materials such as sand and gravel that will be sourced (extracted) from selected localities near the roads, but ultimately determined by the material that meets the quality requirements for constructing roads. Although the locality of borrow pits was not yet determined during consultation meetings held on the 13th and 14th of November 2025, the exploration, establishment, and utilisation of BP sites have been communicated to communities in these meetings. According to the information provided by the consulting engineers, the preferred borrow pit (BP) identified for the project will be the existing Outapi Town Council-operated Ontokolo BP. The BP is located in Ontokolo Village, near the MR92: Oshikuku-Outapi road (within a 2km distance of the road), and about 17km southeast of Outapi Town. The locality map of the project BP (Ontokolo BP) is shown in Figure 2-2.

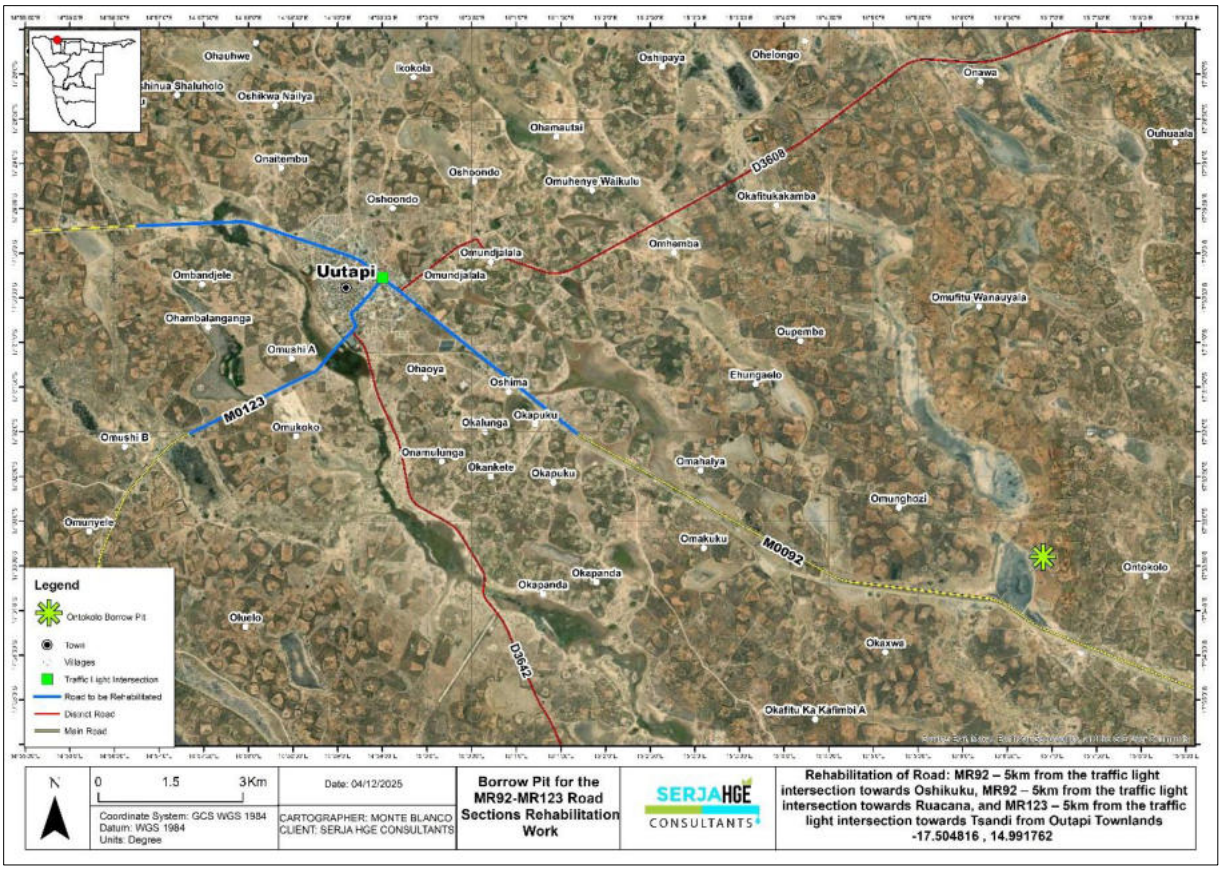

Figure 2-2: The location of the Ontokolo BP site for the rehabilitation of the three road sections: MR92 towards Ruacana, MR92 towards Oshikuku, and MR123 towards Tsandi

It should be noted that if it comes to light at a later stage **during construction that a new BP or BPs would be required, this information will be communicated to the stakeholders and the respective communities in the affected area.**

Added to that, where additional BPs may be required, and they would fall within someone's fence, compensation guidelines, as per the Roads Authority and relevant government policies (National Compensation Policy), will be followed for implementation. This is to ensure that the affected landowners are compensated fairly and that the process and material extraction are done efficiently, safely, and amicably, and ensure environmental sustainability.

2.3.2 Anticipated Resources and Services Infrastructure

2.3.3 Human resources

The road rehabilitation (construction) works will potentially employ 250 people or more. The workforce will likely comprise safety officers, the resident engineer, the contracts manager, the land surveyor, quality control technicians, maintenance artisans, general foremen, operators, laborers, security guards, etc. Priority for employment (semi to unskilled labor) will be given to the locals.

2.3.4 Contractors' accommodation

The road sections are 5km each from Outapi Townlands; therefore, project workers (local laborers) will be commuting from their homes in Outapi and nearby villages to the respective sites by project-provided buses.

Highly skilled workers, such as engineers who may not be from Outapi, will be accommodated in established accommodation facilities in Outapi. However, should it be more economical and necessary, consideration will be made for the project workforce to be accommodated in camps on-site. This is to ensure that workers commence work on time without the need to transport workers from and to their homes daily.

2.3.5 Vehicles and equipment

The project equipment, machinery, and vehicles will be stored at designated areas inside the contractor's campsites. Machinery and vehicles such as excavators, dump trucks, bulldozers, loaders, support vehicles (such as 4x4 wheel drive cars and other maintenance vehicles), etc., will also be parked at a designated site at the campsites.

2.3.6 Water supply

The water supply for the project will be assessed during the ESIA Study, i.e., surface water abstraction or tanked water to work sites along the road.

Given the short distance, the water will likely be stored in industry-standard water tanks along the sites (road sections). The water will be used for the actual road works (concrete) and human consumption (drinking water) on site.

2.3.7 Fuel supply

Diesel will be used for machinery and equipment, and a fuel generator to ensure an uninterrupted fuel supply to the project. The fuel will be stored in a 23,000-litre or smaller temporary fuel tank at selected points on the road sections to ensure an uninterrupted supply during construction. Project vehicles will be refuelled and washed at the service stations and car wash in Outapi, respectively. Therefore, no on-site refuelling and washing of project vehicles.

2.3.8 Occupational health and safety

All project workers will be supplied with appropriate and adequate personal protective equipment (PPE) while carrying out project activities on-site. Each road section will be equipped with a fully furnished first aid kit, and at least 2 project workers will be trained on first aid administration.

2.3.9 Accidental fire outbreaks

The site vehicles, campsites, and machinery will be equipped with fire extinguishers in case of accidental fire outbreaks.

2.3.10 Waste management (solid waste)

All waste generated from the project activities will be sorted, stored on-site in designated waste containers, and transported to an approved solid waste dumping site in Outapi (with the approval and consent of the Outapi Town Council.

2.3.11 Human waste/sanitation

The appointed contractor will establish portable toilets for the workers and project-related visitors. The toilets will be emptied according to the manufacturer's instructions and as regularly as deemed necessary. For the project personnel stationed along the road, portable toilets will be placed/erected at working sites along the road.

2.3.12 Hazardous waste (fuels)

The hazardous waste (waste fuel, grease, and oils) will be properly captured, stored on site in designated waste containers, and transported to the appropriate hazardous waste management facility (in Windhoek). Therefore, no hazardous waste will be disposed of in the project area or any other unapproved waste management facility in the project area or the Omusati Region at large.

2.4 Decommissioning and Rehabilitation of Construction Works and Disturbed Sites

After construction works are completed, temporary infrastructure like construction camps and detours will be dismantled. Borrow pits are rehabilitated according to environmental regulations, usually by reshaping and re-vegetating the land. Topsoil is replaced, and disturbed areas are stabilized to prevent erosion and encourage natural regrowth, ensuring long-term environmental sustainability.

Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental, and contingency aspects. Therefore, it is best practice for the Proponent through their contractor to ensure the project and associated activities, mainly the BP sites, are ceased in an environmentally friendly manner, and sites are rehabilitated by:

- Dismantling and removal of campsites and associated infrastructures from the project site areas,
- Carrying away all project equipment and vehicles, and
- Cleaning up of site working areas and transporting the recently generated waste to the nearby approved waste management facility (as per agreement with the waste facility operator/owner),

Further decommissioning and rehabilitation practice at the BPs will include:

- Backfilling of pits and trenches associated with the construction materials sourcing in the area,
- Closing of holes to ensure that they do not pose a risk to both people and animals in the area, and
- Levelling of stockpiled topsoil. This will be done to ensure that the disturbed land sites are left as close to their original state as possible.

2.5 Operational and Maintenance Phase

This is the phase that succeeds the road rehabilitation phase, when the rehabilitated road sections will be operational with regular maintenance to ensure usability and safety. It is anticipated that maintenance of the road will be done through the Roads Authority of Namibia's Maintenance Department in the Region. The maintenance works will include, but not be limited to:

- Routine maintenance: pothole patching, crack sealing, edge repairs, surface cleaning, etc.
- Drainage Maintenance: clearing side drains, culvert cleaning, and repairing erosion
- Pavement surface Maintenance: surface seal replacement, overlaying, skid-resistance improvement.
- Structural repairs of the pavement layers.
- Roadside and safety infrastructure maintenance, and vegetation and shoulder management.

The next chapter presents different and relevant alternatives considered for the project activities.

3 PROJECT ALTERNATIVES

Alternatives are defined as the “different means of meeting the general purpose and requirements of the activity” (EMA, 2007). This section will highlight the different ways in which the project can be undertaken and identify the alternative that will be the most practical, but least damaging to the environment.

Once the alternatives have been established, these are examined by asking the following three questions:

- *What alternatives are technically and economically feasible?*
- *What are the environmental effects associated with the feasible alternatives?*
- *What is the rationale for selecting the preferred alternative?*

The alternatives considered for the project activities are presented below.

3.1 The "No-Go" Alternative

The “no action” alternative implies that the status quo remains, and nothing happens. Should the proposed road construction be discontinued, the current road conditions and traffic congestion in the Town would remain as they are (single-lane roads). Consequently, there will be no 5 km stretch road rehabilitation and dualisation from single-lane to double-lane in the Outapi Townlands towards Oshikuku, Tsandi, and Ruacane. Moreover, none of the potential impacts (positive and negative) identified would occur. If the project activities are to be discontinued, the status quo of the Townland would remain unchanged. This option was considered, and a comparative assessment of the environmental and socio-economic impacts of the “no action” alternative was undertaken to establish what benefits might be lost if the project is not completed.

Considering the above losses, the “no-action/go” alternative was not considered a viable option for this project.

3.2 Road Route (Location)

The road route is site-specific from the Traffic lights intersection in Town towards Oshikuku, Ruacana, and Tsandi, which needs to be rehabilitated and dualised to improve accessibility in Town. Therefore, finding alternative locations for the road sections is not feasible from an environmental, social, and economic perspective.

3.3 Services Infrastructure

Alternatives were considered for different supporting infrastructures to ensure that the most feasible options were selected. The technological, economic, and environmental limitations were considered to select the most feasible option. The alternative considered in this regard is presented in Table 3-1 below.

Table 3-1: The presentation of service infrastructure alternatives considered for the project activities

Category of Infrastructure	Alternatives Considered	Justification for the selected option
Ablution facilities	-Install a fixed facility with a septic tank -Portable facilities with a septic tank	-To minimize rehabilitation costs and ensure good hygiene onsite, establishing portable toilets was selected as the best option.
Water supply	-Bring water from elsewhere -Abstract from site boreholes	-The project will be sourced from the water supply scheme in the area (the Calueque–Oshakati Canal), but not from boreholes due to very poor water quality – refer to Chapter 5 (groundwater quality map).
Fuel storage	-Trailer-mounted diesel tank -Fixed bunded fuel tank	-A fixed bunded fuel tank will be installed at the construction campsite near the road at each road section. The fuel will be dispensed under controlled conditions from one dedicated site for the project.
Power supply	-Diesel generator set, and if considered, solar power. -Powerline (grid) supply	-The actual road works will use generators. A campsite can be established in Town, where there is already a power grid.
Offices, accommodation	-Erect dismantable prefabricated units -Fixed structures	-Disassemblable prefabricated units are favored due to: (a) Ease of installation, (b) Low installation costs, and (c) Ease of dismantling and moving.
Accommodation site	-Setting up a campsite -Commuting from towns -Commuting from home (villages) in the area	-Set up a temporary campsite or rent established accommodation facilities in Outapi Town for out-of-area specialized personnel. -Other personnel, such as some casual laborers and operators from the communities, will commute from their homes to the site, where possible.

The following chapter presents the national and international legal requirements that are applicable and relevant to the project.

4 APPLICABLE LEGAL FRAMEWORK

The project's activities, or some of them, may be regulated and governed by certain legal policies. Therefore, it is necessary to review and consider this legislation and these legal requirements. These legal requirements are either on a local (institutional), national (Namibian), or international legislation, policies, guidelines, etc. The review of the relevant legal framework serves to inform the project Proponent, interested and affected parties, and the decision-makers at the DEAF of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled to establish the project activities.

4.1 National Legal Framework: Laws, Policies, and Regulations

The national applicable legal framework and policies relevant to the project are presented in Table 4-1.

Table 4-1: List of applicable legislation for the project activities

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
The Constitution of the Republic of Namibia, 1990, as amended	The Constitution of the Republic of Namibia (1990 as amended) addresses matters relating to environmental protection and sustainable development. Article 91(c) defines the functions of the Ombudsman to include: "…the duty to investigate complaints concerning the over-utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia…" Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at: "…Natural resources situated in the soil and on the subsoil, the internal waters, in the sea, in the continental shelf, and in the exclusive economic zone are property of the State."	By implementing the environmental management plan, the establishment will comply with the constitution in terms of environmental management and sustainability. Ecological sustainability will be the main priority for the project.
Environmental Assessment Policy of Namibia 1994	The policy provides a definition of the term "Environment" broadly interpreted to include biophysical, social, economic, cultural, historical, and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes, and plans.	This EIA outlines the environmental consequences of this project and considers the definition of the Environment.

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
Environmental Management Act No. 7 of 2007 and its 2012 EIA Regulations	The Act aims to ensure that the potential impacts of the development on the environment are considered carefully and in good time; that all interested and affected parties have a chance to participate in the environmental assessments, and that the findings of the environmental assessments are fully considered before any decisions are made about activities which might affect the environment.	The Act aims at promoting sustainable management of the environment and the use of natural resources. The EMA is broad; it regulates land use development through environmental clearance certification and/or Environmental Impact Assessments. The Act provides for the clearance certification for quarrying activities associated with borrow pits.
Traditional Authority Act (Act No. 25 of 2000):	The Act also stipulates that Traditional Authorities (TAs) should ensure that natural resources are used on a sustainable basis that conserves the ecosystem. This Act implies that TAs must be fully involved in the planning of land use and development for their area. It is the responsibility of the TAs' customary leadership, the Chiefs, to exercise control on behalf of the state and the residents in their designated area.	The road falls within the Ombandjele Village (towards Ruacana), Okapuku and other villages (towards Oshikuku), and Omukoko/Omunyele Villages (towards Tsandi), under the local traditional representatives (headmen and women) of Ombalantu Traditional Authority. Therefore, they should be consulted for the land use consent, and engagement should continue throughout the project.
Communal Land Reform Act 5 of 2002	To provide for the allocation of rights in respect of communal land; to establish Communal Land Boards; to provide for the powers of Chiefs and Traditional Authorities and boards concerning communal land; and to make provision for incidental matters.	The Proponent should ensure that the project complies with the regulations provided therein for road reserve, furniture, and borrow pits.
Roads Authority Environmental Manual (October 2014)	The manual seeks to inform practitioners regarding the legal and contractual framework within which roads must be designed and built. It also seeks to guide the requirements of the Roads Authority in respect of environmental issues	The EIA and resultant road upgrade design and activities should be conducted in line with the guidelines within the document.
Roads Ordinance No. 17 of 1972	The Ordinance consolidates the laws relating to roads: Section 3.1 deals with the width of proclaimed roads and road reserve boundaries. Section 27.1 is concerned with the control of traffic on urban trunk and main roads.	The road upgrade must adhere to all applicable provisions in the Roads Ordinance.

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
	Section 36.1 regulates rails, tracks, bridges, wires, cables, subways, or culverts across or under proclaimed roads. Section 37.1 deals with infringements/obstructions on and interference with proclaimed roads.	
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that "No person shall possess [sic] or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area."	The Proponent, through their construction contractor, should obtain the necessary authorisation from the MIME for the storage of fuel on-site. This entails the application of a consumer installation certificate.
Road Traffic Ordinance 30 of 1967	The Ordinance governs road traffic comprehensively.	The project should consider the impact it will have on road traffic in the subject area.
Roads Authority Act No. 17 of 1999	The Act establishes a Roads Authority to manage the national road network of Namibia.	Although not the Proponent for the project, the Roads Authority is ultimately responsible for the operational phase of the project activities (road maintenance).
National Road Safety Act No. 9 of 1972	The Act establishes the National Road Safety Council and includes provisions intended to promote road safety.	The project should consider the impact it will have on road safety in the subject area.
Hazardous Substance Ordinance, No. 14 of 1974	The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal, and dumping, as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.	The Proponent should handle and manage the storage and use of hazardous substances on site so that they do not harm or compromise the site environment.
National Solid Waste Management Strategy	The Strategy ensures that the future directions, regulations, funding, and action plans to improve solid waste management are properly coordinated and consistent with national policy, and to facilitate co-operation between stakeholders. Waste disposal is the main problem with the current solid waste management in Namibia. The top priority is to reduce risks to the environment and public health from current waste disposal sites and illegal dumping in many areas of Namibia.	The road upgrade can potentially generate a significant amount of solid waste (stockpiles, soil remains, rubble) that might need proper management by contractors to avoid pollution. Waste management plans should be generated and implemented before the commencement of civil works and during project operations.

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
		Contractors operating borrow pits and actual road works should reduce the risk of solid waste to the environment and the surroundings of the project area.
The Regional Councils Act (No. 22 of 1992)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 "to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.	The Omusati Regional Council is the key regional stakeholder and must be consulted during the Environmental Assessment (EA) process. The project site falls under the Omusati Regional Council (Outapi and Anamulenge Constituency); therefore, they should be consulted.
Local Authorities Act 23 of 1992	To provide for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties, and functions of local authority councils; and to provide for incidental matters.	Although the Outapi Town Council, which hosts the project site, is the project Proponent should implement the project according to the Act.
Water Resources Management Act (No 11 of 2013) and its 2023 Water Regulations	The Act provides for the management, protection, development, use, and conservation of water resources; provides for the regulation and monitoring of water services; and provides for incidental matters. The objects of this Act are to: Ensure that the water resources of Namibia are managed, developed, used, conserved, and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provides for preventing the contamination of the aquifer and water pollution control (Section 68).	The protection (both quality and quantity/abstraction) of water resources should be a priority. Relevant consent and or agreement should be obtained from NamWater/Rural Water Supply to supply water for construction.
National Heritage Act No. 27 of 2004	To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.	

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological sites.	The Proponent (through the construction contractor) should ensure compliance with these Acts' requirements. The necessary management measures and related permitting requirements must be taken. This is done by consulting with the National Heritage Council of Namibia. A Chance Finds Procedure provided to the Draft EMP should be implemented upon discovery of archaeological and heritage resources.
Soil Conservation Act (No 76 of 1969)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement, and conservation of soil, vegetation, and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied to soil conservation, and management measures must be included in the EMP.
Forestry Act (Act No. 12 of 2001	The Act provides for the management and use of forests and forest products. Section 22. (1) provides: “Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a dune or drifting sand or a gully unless the cutting, destruction or removal is done to stabilise the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse.”	The proponent will apply for the relevant permit under this Act if it becomes necessary to remove protected trees along the road.
Public Health Act (No. 36 of 1919)	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The Proponent and all its employees should ensure compliance with the provisions of these legal instruments.
Public and Environmental Health Act No. 1 of 2015	The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.	

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding the health and safety of labourers.	
Atmospheric Pollution Prevention Ordinance (1976)	This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for section 4(1) (a) of the ordinance.	The project and related activities should be undertaken in such a way that they do not pollute or compromise the surrounding air quality. Mitigation measures should be put in place and implemented.
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto.	Mitigation measures should be provided if the roads and traffic impact cannot be avoided.
Labour Act (No. 6 of 1992)	The Ministry of Labour, Industrial Relations and Employment Creation is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety, and enhanced labour market services for the benefit of all Namibians. This ministry ensures the effective implementation of the Labour Act No. 6 of 1992.	The Proponent should ensure that the project activities do not compromise the safety and welfare of workers.

4.2 International Policies, Principles, Standards, Treaties, and Conventions

4.2.1 Applicable International statutes (treaties and conventions) and policies

The other international statutes, such as policies, standards, and conventions that may govern the project activities, are provided under Table 4-2 below.

Table 4-2: Other international treaties and conventions governing the project activities

Statue	Relevant Provisions	Implications for the project / Requirements
The United Nations Convention to Combat Desertification (UNCCD) 1992	Addresses land degradation in arid regions with the purpose of contributing to the conservation and sustainable use of biodiversity and the mitigation of climate change.	The project activities should not be undertaken in such a way that contributes to desertification.

Statue	Relevant Provisions	Implications for the project / Requirements
	The convention objective is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability.	
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the conservation of biological diversity, whether within or outside protected areas, to ensure their conservation and sustainable use. Promote the protection of ecosystems, natural habitats, and the maintenance of viable populations of species in their natural surroundings.	The removal of vegetation cover and destruction of natural habitats should be avoided, and where not possible, minimised.
Stockholm Declaration on the Human Environment, Stockholm (1972)	It recognizes the need for "a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.	Protection of natural resources and prevention of any form of pollution.

Other relevant international Treaties and Protocols ratified by the Namibian Government are:

- Convention on International Trade and Endangered Species of Wild Fauna and Flora (CITES), 1973.
- Convention on Biological Diversity, 1992, and
- World Heritage Convention, 1972.

In addition to the project description, alternatives, and legal framework, it is also important to note that the project activities are undertaken in a specific environment, in terms of biophysical and social factors. Therefore, understanding these existing environmental features before the project activities is crucial for the assessment of the potential impacts stemming from the project activities on the features.

5 BIOPHYSICAL AND SOCIAL BASELINE

The road works and associated activities are undertaken in specific environmental and social conditions. Therefore, understanding the pre-project environmental conditions helps describe the status quo versus future projections of environmental conditions once the project is implemented. The baseline information also helps identify sensitive environmental features and recommend the most suitable management and mitigation measures for implementation. The summary of selected biophysical and social baseline information about the project area is given below.

The baseline information presented below is sourced from a site visit (done from the 12th to the 14th of November 2025), online sources ranging from old reports, books, and publications, as well as other relevant research information in the broader area. The project baseline that is deemed necessary for the project activities is as follows.

5.1 Biological Environment

5.1.1 Fauna

The road sections start from the Townlands and the area through which the road sections pass, and end in a communal area with livestock farming in the villages. The common livestock kept in these villages are goats, sheep, donkeys, cattle, and pigs. Some photos of goats, cattle, and donkeys observed during site visits in the project area along the road sections are shown in Figure 5-1.

Figure 5-1: Photos of livestock (cattle, donkeys, and goats) observed along the road sections

5.1.2 Flora

In terms of vegetation structure, the project area falls within both the grassland and woodland - Figure 5-2.

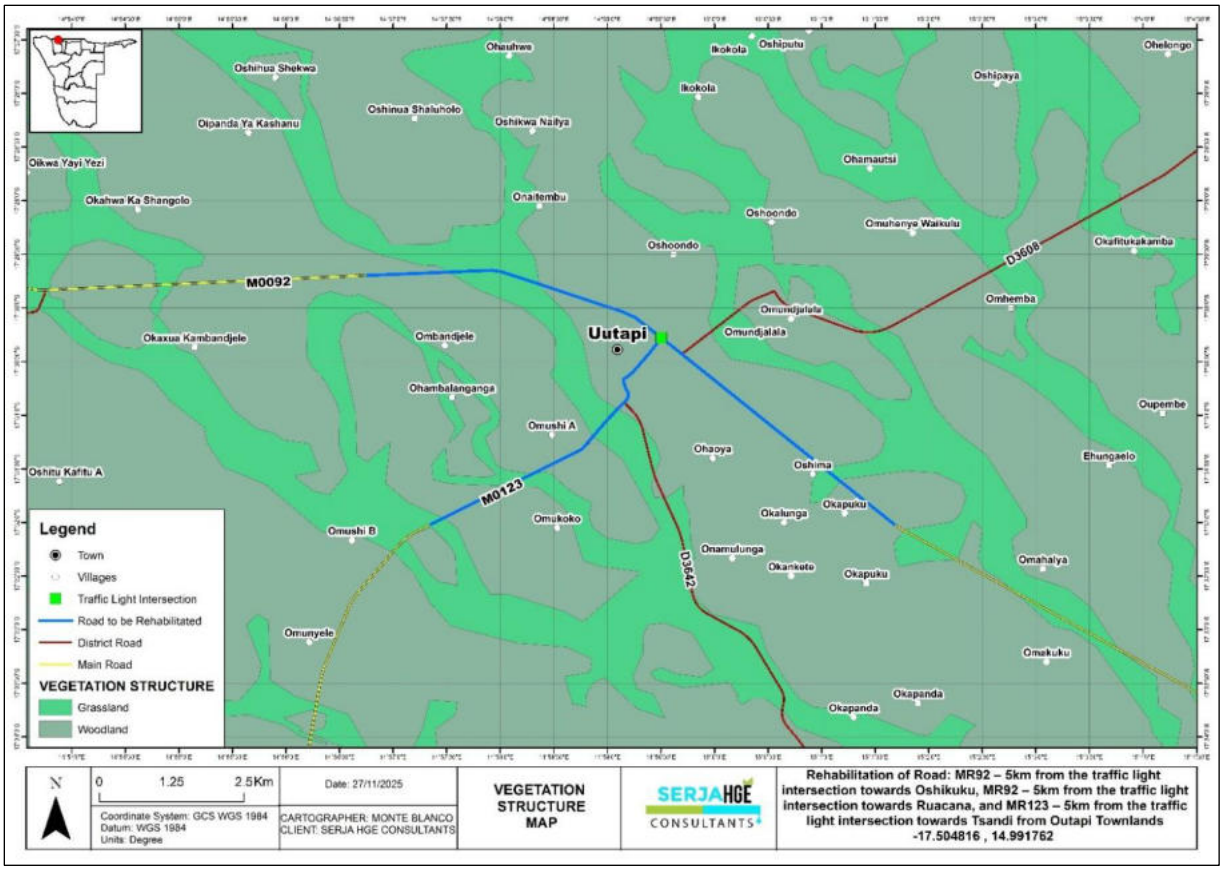

Figure 5-2: The vegetation structure map in the project area

The areas along the proposed road sections are dominated by short grass, shrubs, and trees comprising the following (alongside their protection status or listed in the Protected Plant Species of the Forestry Act):

- Mopane trees (*Colophospermum mopane*) – protected.
- Baobab trees (*Adansonia digitata*) – protected.
- Jackalberry trees (*Diospyros mespiliformis*) – not protected.
- Marula trees (*Sclerocarya birrea*) – protected.
- Red-bark acacia (*Vachellia reficiens and erioloba*) shrubs and trees – not protected.
- Stinkbush (*Pechuel-loeschea*) – not protected.
- Bird Plum (*Phyllogeiton discolor*) trees – not protected.
- Makalani Palm trees and shrubs (*Hyphaene petersiana*) – protected.
- Silver cluster-leaf (Terminalia sericea) – protected.
- Leadwood (*Combretum collinum*) – protected.

Some of the vegetation species observed during the site visit are shown in Figure 5-3 and Figure 5-4.

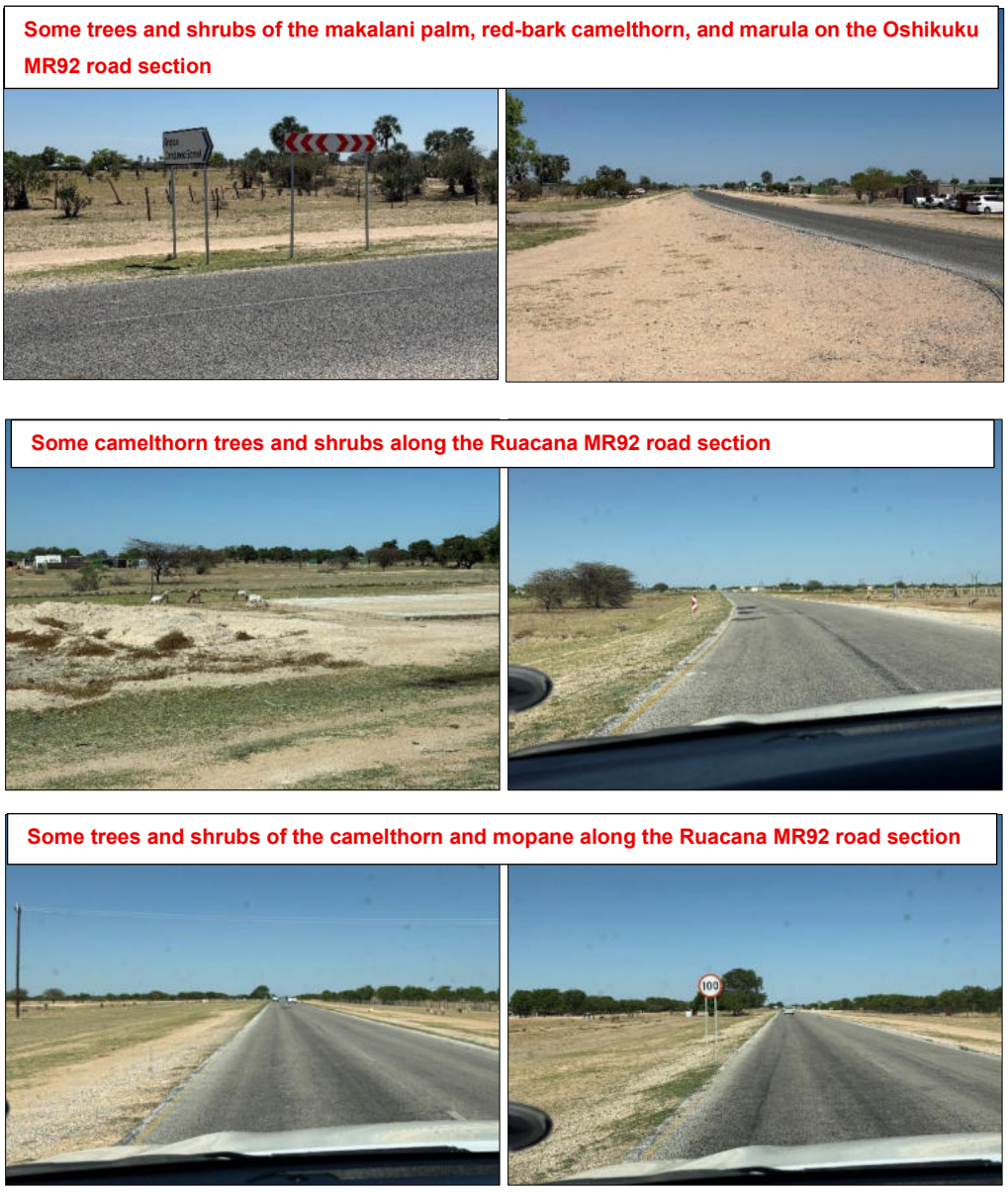

Figure 5-3: Photos of some vegetation observed along the MR92 road sections (towards Oshikuku and Ruacana)

Some makalani palm, camelthorn trees along the MR123 road section (at the Outapi Hospital and at the end of the MR123 towards Tsandi)

Some baobab and camelthorn trees along the MR123 road section (MR123 towards Tsandi)

The jackal berry with some camelthorn shrubs and the jackal berry tree, where the consultation meeting was held on the MR123 road section (towards Tsandi)

Figure 5-4: Photos of some vegetation observed along the MR123 road section (towards Tsandi)

5.2 Physical Environment

5.2.1 Climate

The climatic conditions of Outapi are classified as semi-arid. The brief climatic conditions of the Outapi are as follows:

- Rainfall and Precipitation: The average rainfall in the area is between 350 and 400mm per year. The variation I rainfall is averaged to be between 40-50% per year. The high summer rains are

experienced in February. The storm events occur between October and April, and they are irregular, unpredictable, high intensity, and highly localised.

- Evaporation: The average evaporation is between 2,800-3,200 mm per year.
- Temperatures: Outapi's highest temperatures are measured in December with an average daily maximum of 31°C and a minimum of 17.3°C. The coldest temperatures are measured in July with an average daily maximum of 20.4°C and a minimum of 6.4°C (Serja HGE Consultants, 2024).

5.2.2 Landscape and topography

According to Lohe et al. (2021), Outapi and most areas in northern Namibia are situated in the Cuvelai Basin, whereby most of the land surface is very flat, dipping from 1,150m above sea level in the northeast to 1,080m above sea level in the Etosha Pan to the south. Mendelsohn et al. (2002) further stated that, concerning topography, the Omusati Region is generally flat with an altitude ranging from 800 to 1,200m above sea level. The landscape of the project area falls under the Cuvelai System. The topography and landscape map of the project site and its immediate surrounding area are shown in Figure 5-5. The map indicates that the elevation of the project area ranges between 951 and 1,216 meters above sea level, as shown on the topographic map below.

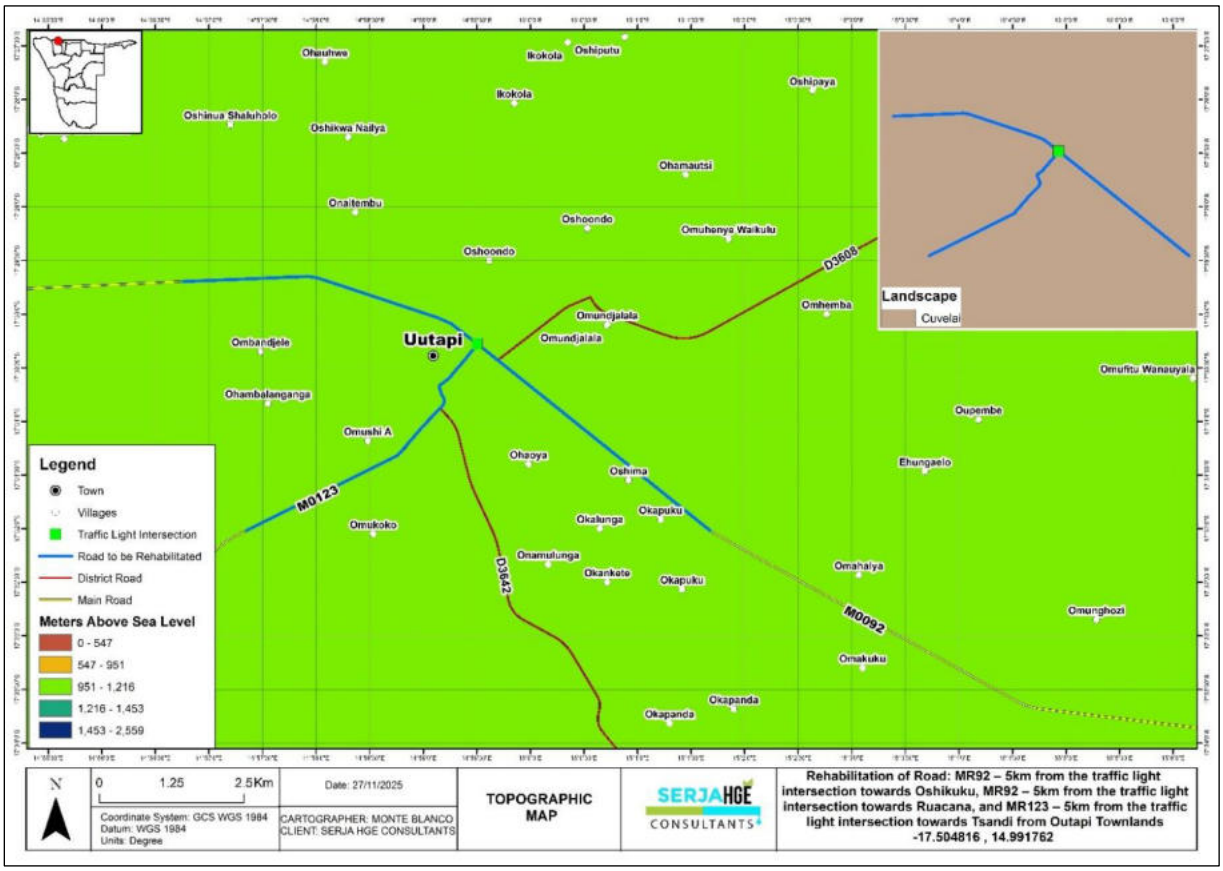

Figure 5-5: The topography and landscape of the area

5.2.3 Geology

The geology of areas surrounding Outapi is characterized by the unconsolidated to semi-consolidated sands, calcrete, and gravel sediments of the Quaternary and Tertiary age of the Kalahari Group. Much of the areas in the northern part of Namibia, including the Omusati Region, fall within the Cuvelai landscape, which lies on silt, clay, limestone, and sandstone sediments. According to Serja HGE Consultants (2024), the area is distinguished by a myriad of drainage channels locally known as *oshanas*. These *oshanas* are often filled with water during heavy rainy seasons and cut into the underlying sediments.

> ***According to Lohe et al, (2021), Oshanas*** *are shallow, often vegetated and poorly defined but are interconnected flood channels and pans. These surface water channels flow slowly or may form ponds depending on the intensity of the floods (known locally as "Efundja").*

The geology of and around the dumpsite is shown in Figure 5-6 which indicates that the project site area lies over unconsolidated alluvium, sand, gravel, and calcrete. These unconsolidated sediments are underlain by the rock units of red mudstone, siltstone, sandstone, grit, and conglomerate.

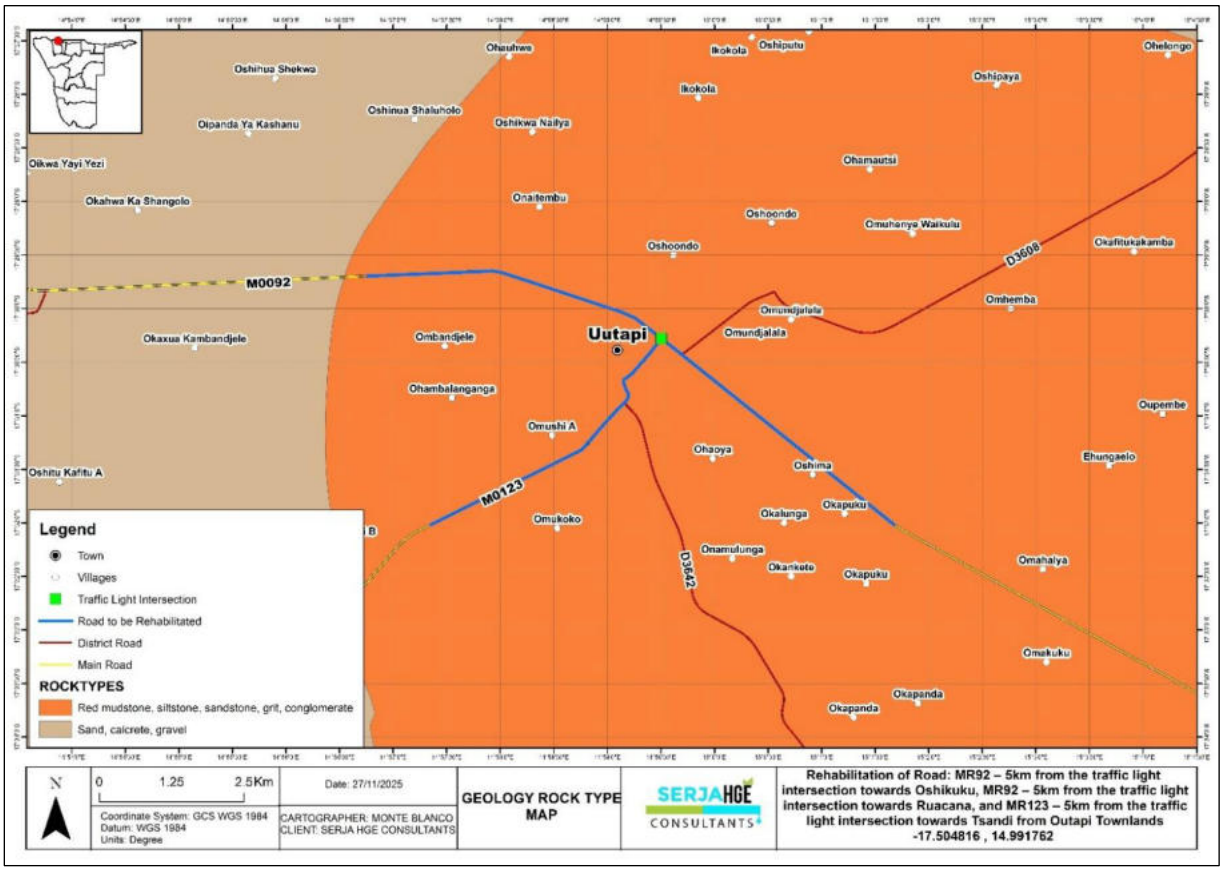

Figure 5-6: The geology of the project routes and surroundings

5.2.4 Soils

The Omusati Region is dominated by cambic arenosols and some areas eutric cambisols as per the Soil Map by Mendelsohn et al. (2021). The soil types in the Omusati Region vary considerably, and for the most part, the soil consists of volatile sand mixed with a small percentage of silt and clay (arenosols). In the north-east, there are also soils deriving from oshana deposits, and in the south, the soils are mainly clayey (luvisols), deposits (cambisols), or rocky outcrops. The soils in this area are categorized as sands and loams, where wind and water have repeatedly reworked the soil to create a mixture of deposits. The soils are generally saline, hence the dominance of mopane vegetation, which can grow on these soils. However, some areas of sand and loam that are not as saline provide good soil for crop growth in the area (Serja HGE Consultants, 2024).

The soil type in Outapi Town is eutric cambisols, as shown in Figure 5-7. According to the Atlas of Namibia Team (2022), these are young soils that show the first signs of differentiating into distinct horizons. They form in recently deposited or exposed colluvial, alluvial, and aeolian parent materials, or where aridity or low temperatures slow down processes of soil formation. Cambisols are found in a variety of climates, but are particularly prevalent in arid and semiarid areas.

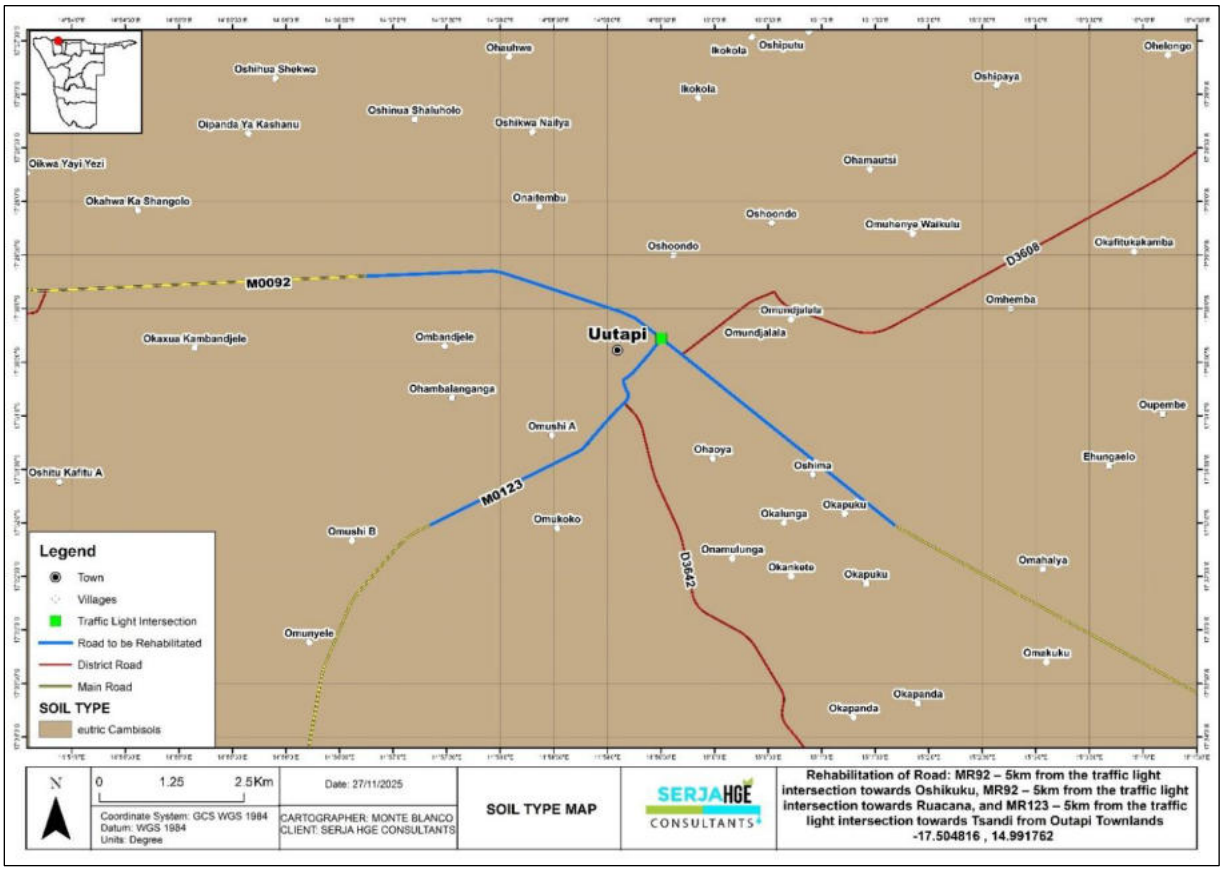

Figure 5-7: The dominant soil types along the road sections

5.2.5 Water resources: groundwater (hydrogeology) and surface water (hydrology)

The project area and the Omusati Region at large fall under the Cuvelai-Etosha Basin (CEB), which is defined as the Namibian part of the Cuvelai River catchment. The hydrogeology of the CEB comprises, in addition to Omusati, the Oshana, Ohangwena, Oshikoto Regions, and parts of the Kunene Region (Lohe et al., 2021).

Furthermore, Lohe et al. (2021) state that groundwater flow is mostly through primary porosity in the Kalahari cover, but flow along secondary structures known as fractures, faults. The flow can also be influenced by the presence of other geological structures underlying formations, such as contact rock unit zones. Furthermore, recharge from rainfall is an important parameter determining the groundwater potential, but the degree of metamorphism also affects the groundwater potential. The groundwater potential of the rocks decreases as the degree of metamorphism increases.

Groundwater in the project site area is hosted in the porous Kalahari sediments (primary aquifers), as shown on the site-specific geohydrology map in Figure 5-8. According to the national groundwater database, there are several records of boreholes along and within proximity to the road sections, as shown on the map below.

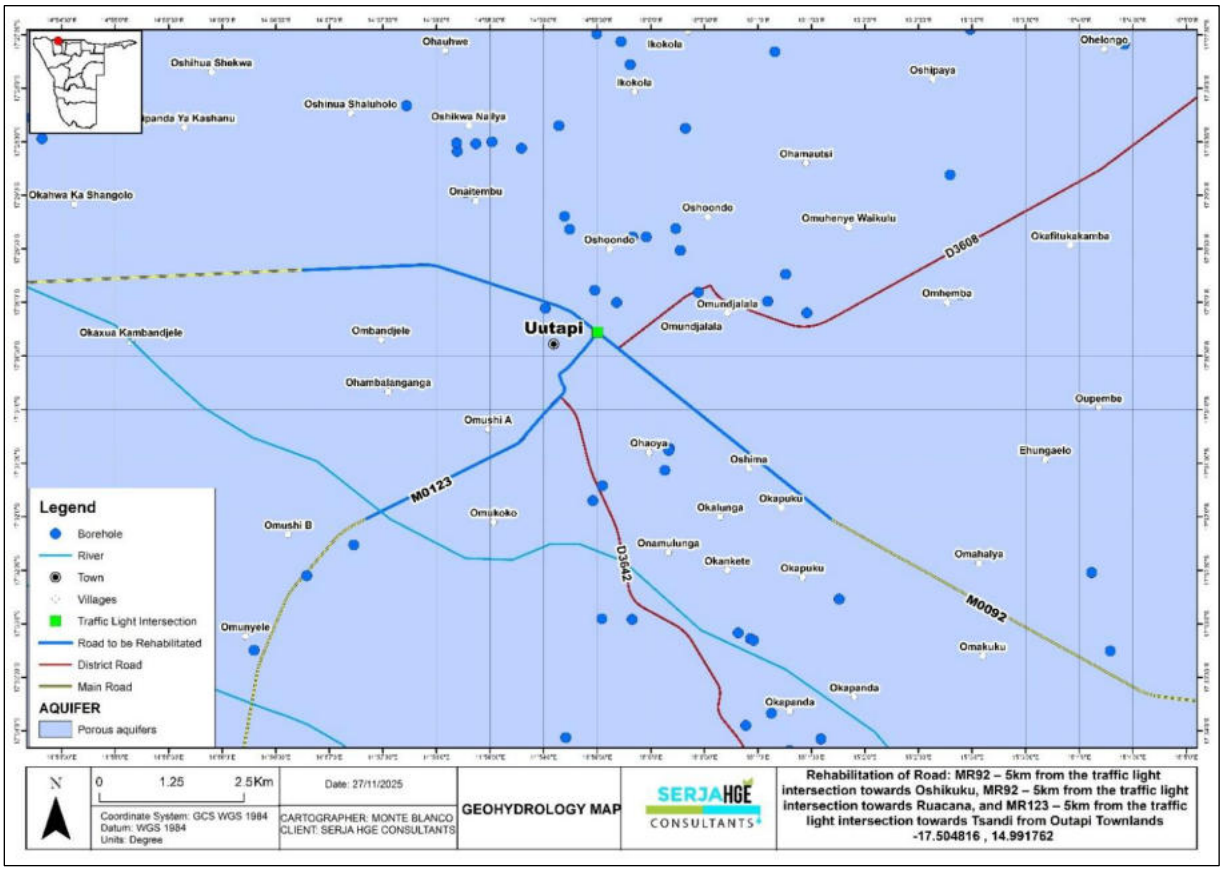

Figure 5-8: The surface and groundwater (geohydrology) map of the project area

5.2.6 Hydrology, Catchments and Water Flow Direction

There is not much water on the surface in Namibia, as the little rain that falls either evaporates, seeps into the ground, or is rapidly drained by ephemeral rivers that dominate natural surface water systems inside the country. The only perennial water systems (rivers) that can hold surface water are extremely varied, ranging from great rivers that define the country's borders to a host of smaller rivers and channels that flow at varying frequencies (Mendelson et al., 2009). The nearest perennial river to the project area in the Omusati Region is the Kunene River at the borders of Namibia and Angola. This River is 344km long with a catchment of 107,000 km^2 and an annual average water volume of 5,100 million m^3.

During the time of the site visit on the 12th of November 2025, Outapi Town and the project sites had wet marshes (*oshanas*) that dry up at the end of the rainy season, i.e., the *oshanas* do not hold water throughout the year or longer periods. Apart from the Calueque–Oshakati Water Canal that runs near the Town, there are no rivers observed within proximity of Outapi Town. The project area's surface water system is dominated by oshanas, as shown on the map in Figure 5-9.

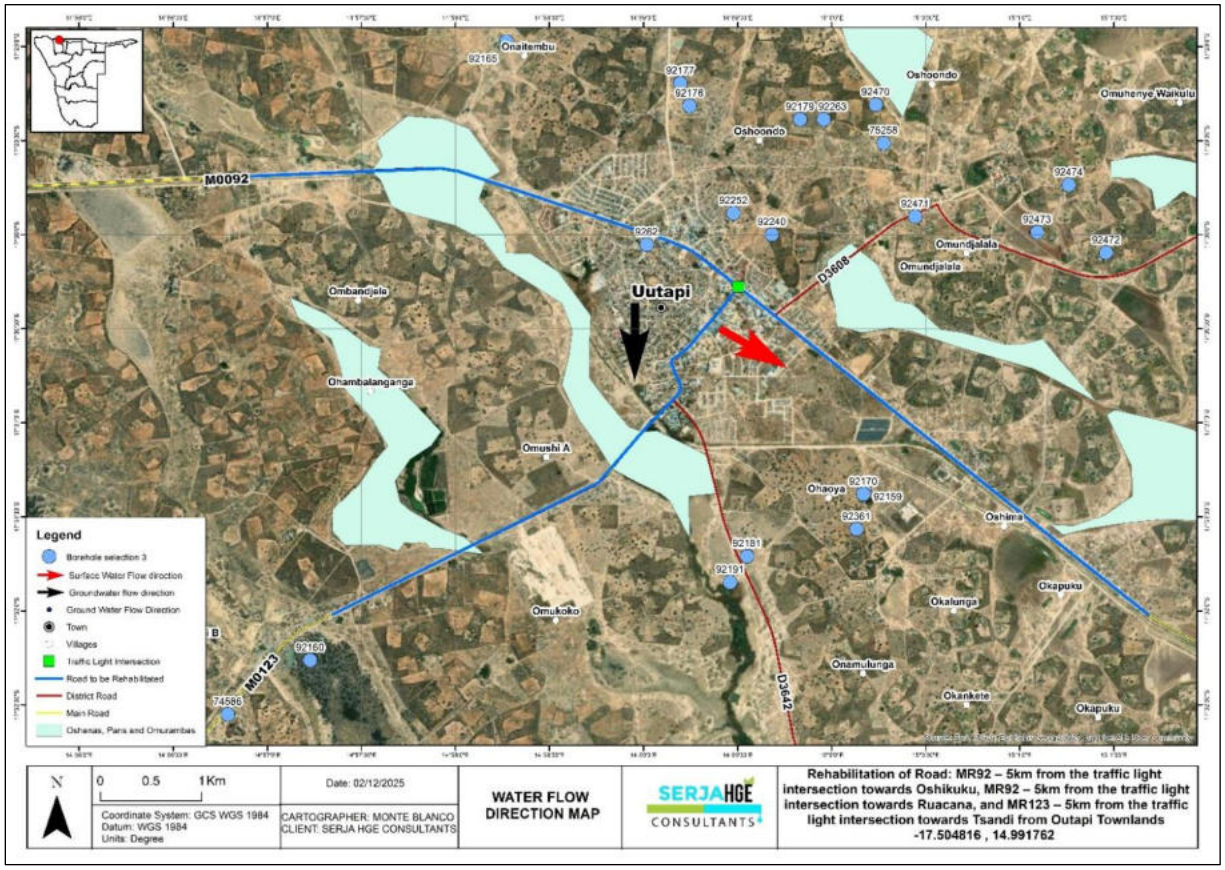

Figure 5-9: The map of water flow direction within the project area

5.2.7 Groundwater Quality

The groundwater quality around the project area is not suitable for drinking (human consumption), as shown on the groundwater quality map (Figure 5-10). Thus, this water cannot be used for road construction works.

The groundwater quality map indicates that the quality of water along the road has a concentration of total dissolved solids (TDS) more than 5,000 milligrams per litre (mg/l), and Sulphate (SO_4) concentration more than 1,200mg/l. Furthermore, the nitrate (NO_3) concentration of the groundwater is more than 110mg/l, and Fluoride (F) is more than 2mg/l. Therefore, the water quality is classified as category D: Not suitable for any drinking water.

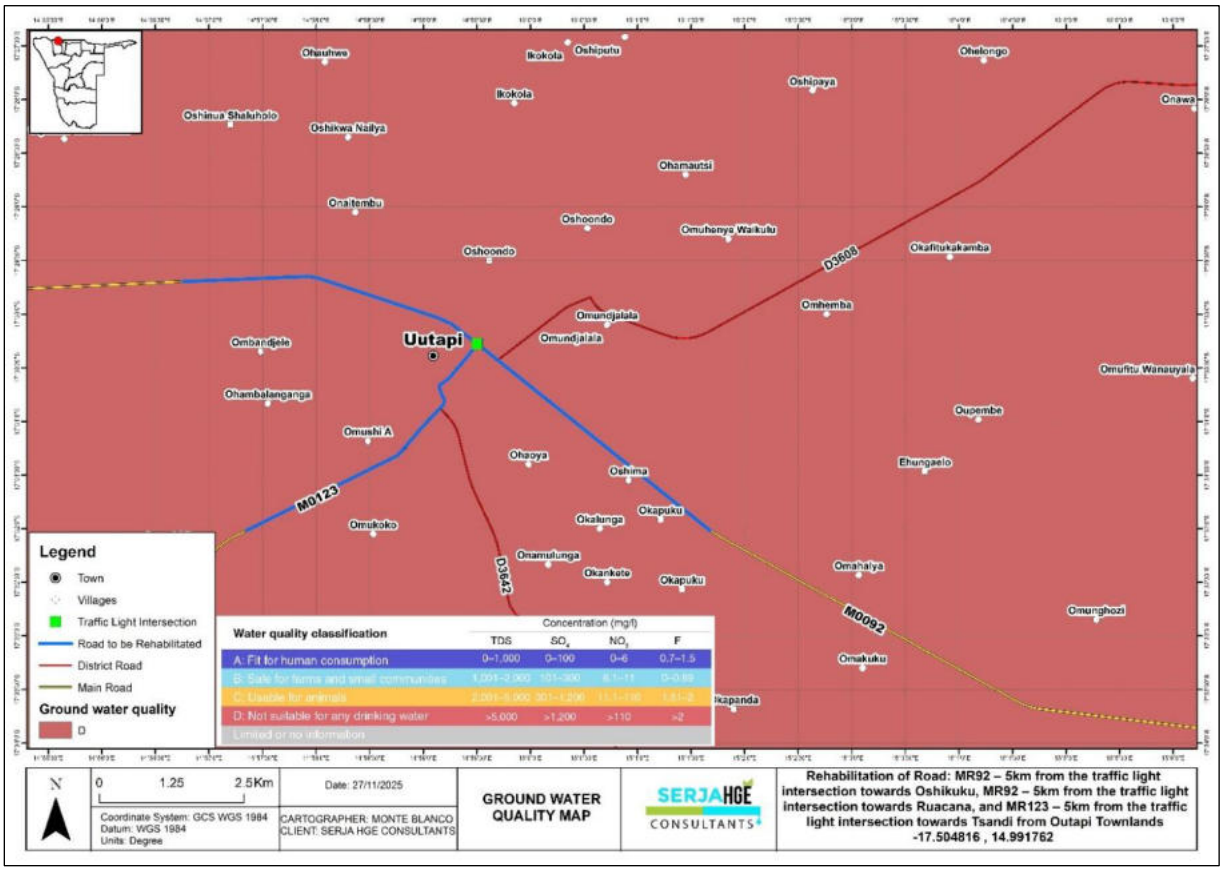

Figure 5-10: Groundwater quality map of the area

5.2.8 Surface and Groundwater Vulnerability to Pollution

With regards to surface water, potential pollution is likely if construction works are undertaken during the heavy rain seasons. i.e., between October and April, particularly where the highest rainfalls are recorded, there would be a high risk of accidental spills of hydrocarbons (oils or fuels) and effluent (wastewater) washed off into nearby surface water bodies.

In the case where road rehabilitation (construction) works are carried out during the dry season (dry months of the year, i.e., April to November/December), then the risk of surface water pollution will be low to none

because accidental wet waste spills would be easy to control and manage compared to the rainy season with surface runoff. In terms of groundwater vulnerability, the project route area has a moderate vulnerability to pollution - Figure 5-11.

The moderate vulnerability of groundwater to pollution in the area could be explained by the unconsolidated Kalahari sediments overlying the project site, where the nature of such rock units could provide ready and easy pathways for polluted water to flow in case of a significant pollution event.

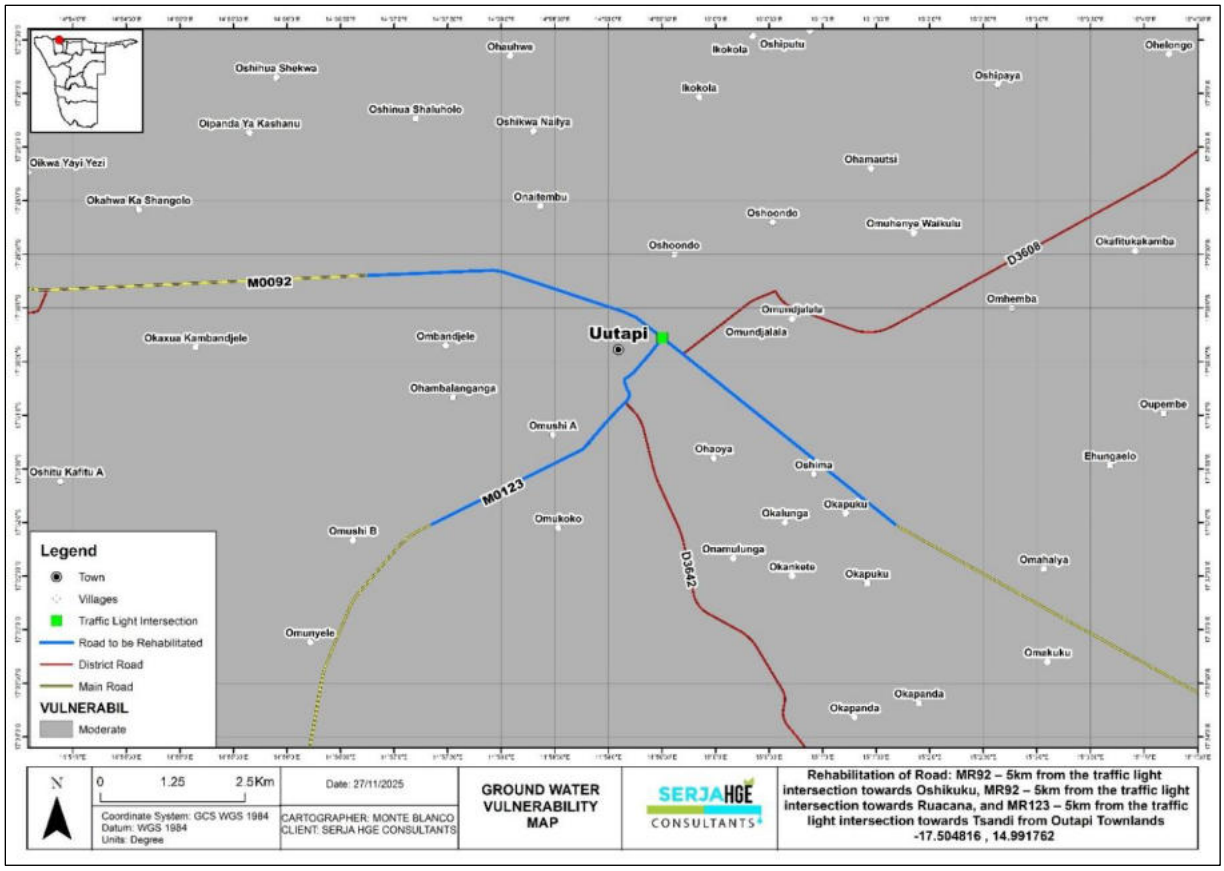

Figure 5-11: Groundwater vulnerability to Pollution map of the area

5.3 Social and Economic Environment

5.3.1 Demography

According to the 2023 Population and Housing Census data, the Omusati Region has a total population of 316,671 as per the 2023 National Population and Housing Census. Of the total population, 147,265 were males and 169,406 females (Namibia Statistics Agency (NSA), 2024a), with a population density of 11.9 persons per square kilometer (km^2). The MR92 (towards Ruacana) and MR123 (towards Tsandi) road sections are in the Outapi Constituency, which has a population of 53,594 and a population density of 56.4

persons/km^2, respectively (NSA, 2024b). Furthermore, the MR92 section towards Oshikuku falls within the boundaries of the Outapi and Anamulenge Constituency. The Anamulenge Constituency has a population of 20,344 and a population density of 51.6 persons/km^2.

Omusati Region has a high literacy rate of 84.1%. The early childhood development (age 0 to 5) stands at 22.0%, while for the population of 15+ years of age, 12.3% have never attended school, 21.1% is the population that is currently in school, and 63.2% have left school (NSA, 2024a). Furthermore, NSA (2024a) indicates that the population of 3 years and above has access to the internet (15.3%), and the population that owns cellphones is at 46.4%.

5.3.2 Economic activities

According to the NSA (2024a), the main sources of income in households in the Omusati Region are farming (9.3%), wages and salaries (50.4%), old age pension (13.9%), as well as business, non-farming (5.0%).

The Outapi (the rural part) and Anamulenge Constituencies thrive on both livestock (cattle, goats, and sheep) and crop farming, as well as small-scale businesses at settlements and villages. The Outapi Constituency urban area thrives on both formal and informal trading (businesses) in Outapi Town – see Figure 5-12.

Figure 5-12: Some of the mixed formal and informal businesses in Outapi – A: along the MR123 section from the traffic lights towards Tsandi, and B: the formal Outapi Open Market near the MR123 in Town; and C, D, and E local settlements (mini shops and bars) along the MR92 and MR123

From a local perspective, Outapi is the capital town of the Omusati Region, and most of the region's economic activities take place in the Town. The livelihoods of Outapi Town and the surrounding areas rely

on subsistence farming, comprising cattle farming as well as crop production (mahangu, maize, beans, sorghum, etc.). Subsistence farming, wages & salaries, as well as pensions, are the main sources of income with 22%, 25% and 31% of households in the Region, respectively.

Furthermore, the Omusati Region has some tourist destinations such as the Omugulugombashe Monument, about 20km southwest of Tsandi Village (about 30km southwest of Outapi), and the Ruacana Waterfalls in Ruacana Town. On a local level, the Outapi area is home to the Ombalantu Baobab Tree Heritage Centre.

Outapi Town has health centres such as hospitals and clinics, as well as schools that form the major attraction of the formal workforce, supplemented by several Ministries and Departments that were established in the town through decentralisation programs/initiatives (Outapi Town Council, 2024). The services form a collective source of buying/purchasing power for Outapi Town. Furthermore, residents of the Omusati Region, and the Town itself, thrive on a mainstay culture of 'capital transfer' from family members who work elsewhere in Namibia and abroad. This is an open secret behind a mysterious-constant buying/purchasing power for the region and for the Outapi Town in particular.

The buying/purchasing power in the Town has attracted the mushrooming of commercial banks in the magnetically fast-growing Town. In this regard, there are cases of one bank operating more than three ATMs in a single town. Moreover, Agriculture is a common activity among the regional inhabitants (Outapi Town Council, 2024).

5.4 Infrastructure and Services

Omusati West Region is well equipped with good infrastructure and services such as roads (tarred and gravel), water supply, powerlines, and telecommunications. In terms of the site area, this is a rural area with quite some good infrastructure, such as access roads and single-track roads, solar energy, and water supply.

The Outapi Town is strategically located, and can be easily reached from Windhoek via the Kamanjab-Omakange road (C35) and the Otjiwarongo-Tsumeb Road (B1), and the C46/MR92 (from Oshakati). It is also the Gateway to the famous tourist attraction, Ruacana Waterfalls, which is just 80km away. The proximity of Outapi town to southern Angola renders it one of Namibia's few strategic towns from a business point of view. This is another source of its" perpetual" buying/purchasing power. Thus, the authorities of Outapi continue to invite potential investors to exploit endless untapped opportunities across industries and/or sectors, including infrastructures and services (Outapi Town Council, 2024).

The map of services and infrastructures at the proposed site route and the broader area is shown in Figure 5-13.

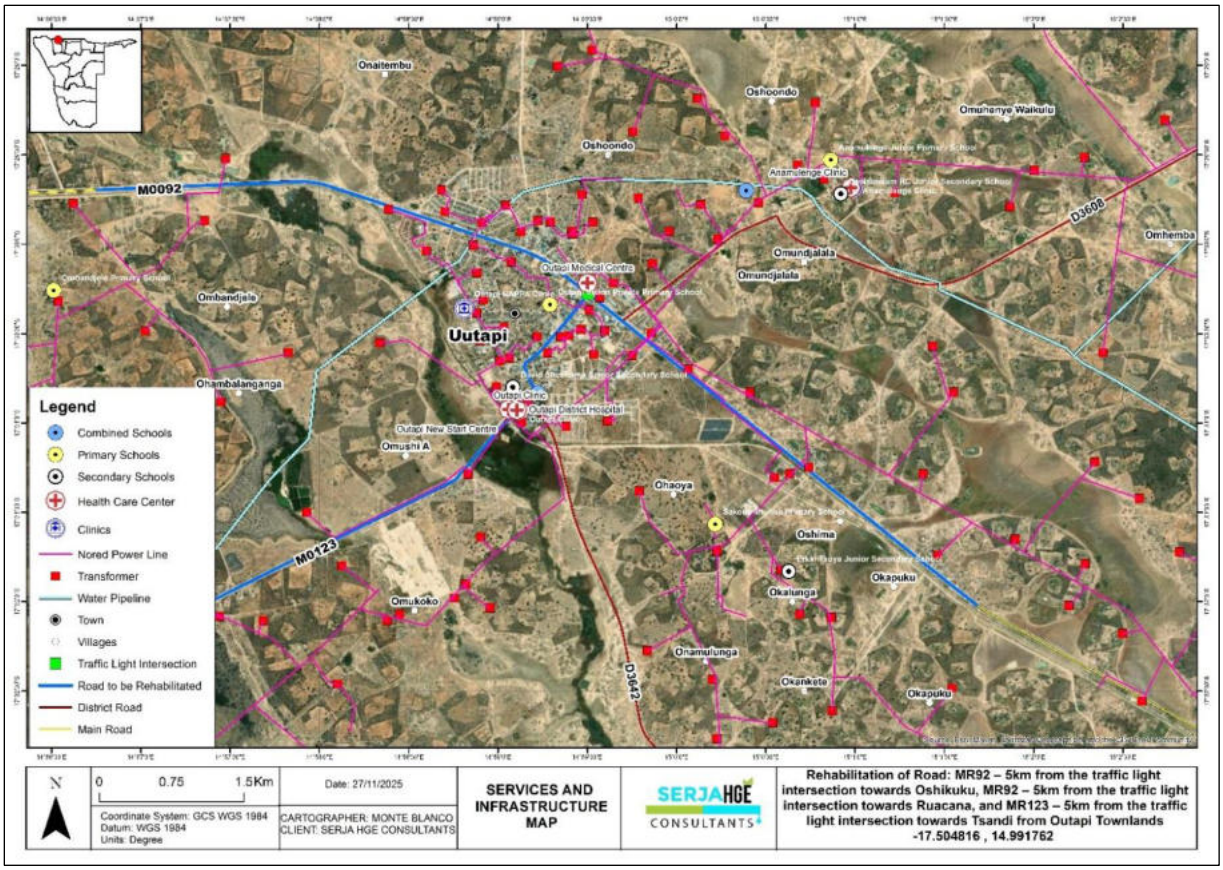

Figure 5-13:The infrastructure map of the project area

The summary of the current services infrastructure in the project area includes:

- Road network: The project sections are accessed from the traffic light intersections by the current single-lane tarred roads, which provide access to nearby villages and settlements that are further accessed via local access single-track roads (sandy and gravel roads).
- Electricity supply: The Outapi Town is connected to Northern Namibia's Regional Electricity Distributor (NORED) power grid, which powers the Town's businesses, offices, public services (schools and hospitals), and most houses. Some communities (homes) and settlements within proximity of the Town and that can afford electricity are also connected to the NORED grid, while some use solar energy for power supply. Most houses outside the Town centre, but within the boundaries of the current undeveloped townlands, use firewood to cook, light, and heat water.
- Water supply: The Outapi Town and community rely on surface water from the Calueque–Oshakati Canal that runs through Outapi from Calueque towards Oshakati. The water is supplied to the Town through a NamWater-operated and maintained supply scheme. The rural area water supply is facilitated through the MAFWLR's Rural Water Supply Division, whereby communal water taps are

established in villages and settlements, and some communities have taken private supply to their homes.

- Waste management: Solid and domestic waste (general waste): stored on a household level and disposed of at the existing dumping site (by the six external waste removal contractors).
  Sewage: in formal houses, the sewage is managed through the municipal sewer reticulation line to a sewage management facility (oxidation ponds on the western edge of the Town).
  Hazardous waste: the waste is managed and stored in the Town at a designated temporary facility before it is transported to Windhoek at the approved and capable hazardous waste facility.
- Telecommunication services: The area has good network coverage for MTC and Telecom Namibia. In terms of internet connection services, this is covered by MTC, Telecom, and Paratus coming into play. Therefore, the Town and surrounding areas are well connected to the telecommunications world.
- Education services: The project area (Anamulenge and Outapi Constituencies) has numerous primary schools, combined schools, and a senior secondary school (David Sheehama in Outapi Town). In terms of tertiary institutions, there is Nakayale Vocational Training Centre (NVTC), DAPP Vocational Training School (under Development Aid from People to People), Welwitchia University, and Namibia University of Science and Technology (NUST) centre.
- Health services: The constituency has clinics and the major health centre (Outapi District Hospital) in Outapi.

5.5 Archaeology and Heritage Aspect

There are some known and documented archaeological and heritage resources (sites) in and around Outapi. These include:

- Ombalantu (Outapi) Baobab — Ombalantu Baobab Tree Heritage Centre (on the Outapi–Tsandi road, MR123). According to the Omusati Regional Council (2024), there are so many Baobab Trees in Ombalantu, but this one *Omukwa waNakafingo* Na Temba (Figure 5-14), as local people affectionately know it, has a very significant history. This famous, hollow baobab has served as a church/post office/shelter and is now a heritage centre and campsite.

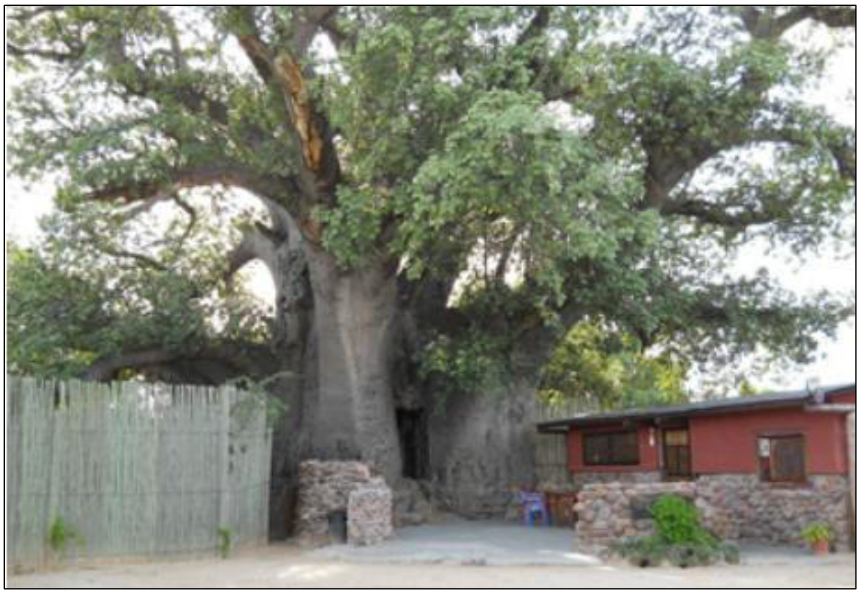

Figure 5-14: The famous Ombalantu Baobab Tree Heritage Centre in Outapi (Omusati Regional Council, 2024)

- Outapi War Museum / PLAN memorial sites - Figure 5-15: The museum is on the MR92 road towards Ruacana Waterfalls. This non-political and privately-owned initiative was created to preserve and exhibit artifacts, posters, photographs, and weapons of war used during the conflict by all sides, consolidating history for visitors and younger generations (Namibia Tourism Board, 2024[1]).

Figure 5-15: The Outapi War Museum in Outapi (source: Namibia Tourism Board, 2024)

[1] https://www.facebook.com/photo/?fbid=808897537936645&set=a.221595053333566

- Onelungo Ponds (culturally significant ponds just outside Outapi): The site is culturally important to the Aambalantu and associated with ritual histories.

The expected archaeological and cultural heritage resources in the broader area of the site are graves (marked and unmarked), artefacts, etc. There are no known graves along the road route that would be affected by the road works. Regardless, it is recommended that the National Heritage Act, No. 27 of 2004, should be strictly enforced, and concurrently, the archaeological management and precautionary measures during excavation should be strictly adhered to. Furthermore, if a heritage site or items of heritage significance are found in the course of the excavation, then a chance finds procedure should be followed as per the National Heritage Act, No. 27 of 2004.

The public consultation and engagement process and means employed for the EIA Study are presented under Chapter 6.

6 PUBLIC CONSULTATION AND PARTICIPATION PROCESS

Public consultation and participation form an important component of an EIA process. It provides potential Interested and Affected Parties (I&APs) and stakeholders with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process. This greatly assists the EAP (Environmental Consultant) in thoroughly identifying and recording potential impacts and to what extent further investigations are necessary. Public consultation can also aid in the process of identifying possible mitigation measures. The consultation for this project has been done under the EMA and its EIA Regulations, and as per the following subsections.

6.1 Pre-identified and Registered Interested and Affected Parties (I&APs)

Relevant and applicable national, regional, and local authorities, and other interested members of the public were identified. Pre-identified I&APs were contacted directly, while other parties who contacted the Consultant after project advertisement notices in the newspapers were registered as I&APs upon their request.

6.2 Communication with I&APs and Means of Consultation Employed

Regulation 21 of the EIA Regulations details the steps to be taken during a public consultation process, and these have been used in guiding this process. Communication with I&APs with regard to the project was facilitated through the following means and in this order. Local community input is essential for the EIA and ultimately the project to ensure the road serves both local and regional development goals.

- A Background Information Document (BID) containing brief information about the project activities was compiled, uploaded on the MEFT (ECC) Portal for project registration, and shared with registered stakeholders / Interested and Affected parties (I&APs).
- A Stakeholders (I&AP) List was developed and updated as new I&APs register for the EIA. The BID was shared with the pre-identified key stakeholders (Appendix D).
- Project EIA notices were published in the following newspapers - Appendix E:
    - *New Era*: The notice appeared in the newspaper on the 05th and 12th of November 2025.
    - *Windhoek Observer*: The notice appeared in the newspaper on the 05th and 12th of November 2025. The consultation period ran from the 05th of November 2025 to the 05th of December 2025.
- ESIA notices (posters) were prepared for printing and pasted at different places in Outapi, i.e., Omusati Regional Council, Outapi Town Council, Outapi District Hospital, Shoprite, Woerman

Brock, Outapi Open Market, etc., as shown in Figure 6-1. The original copy of the notice is attached as Appendix F.

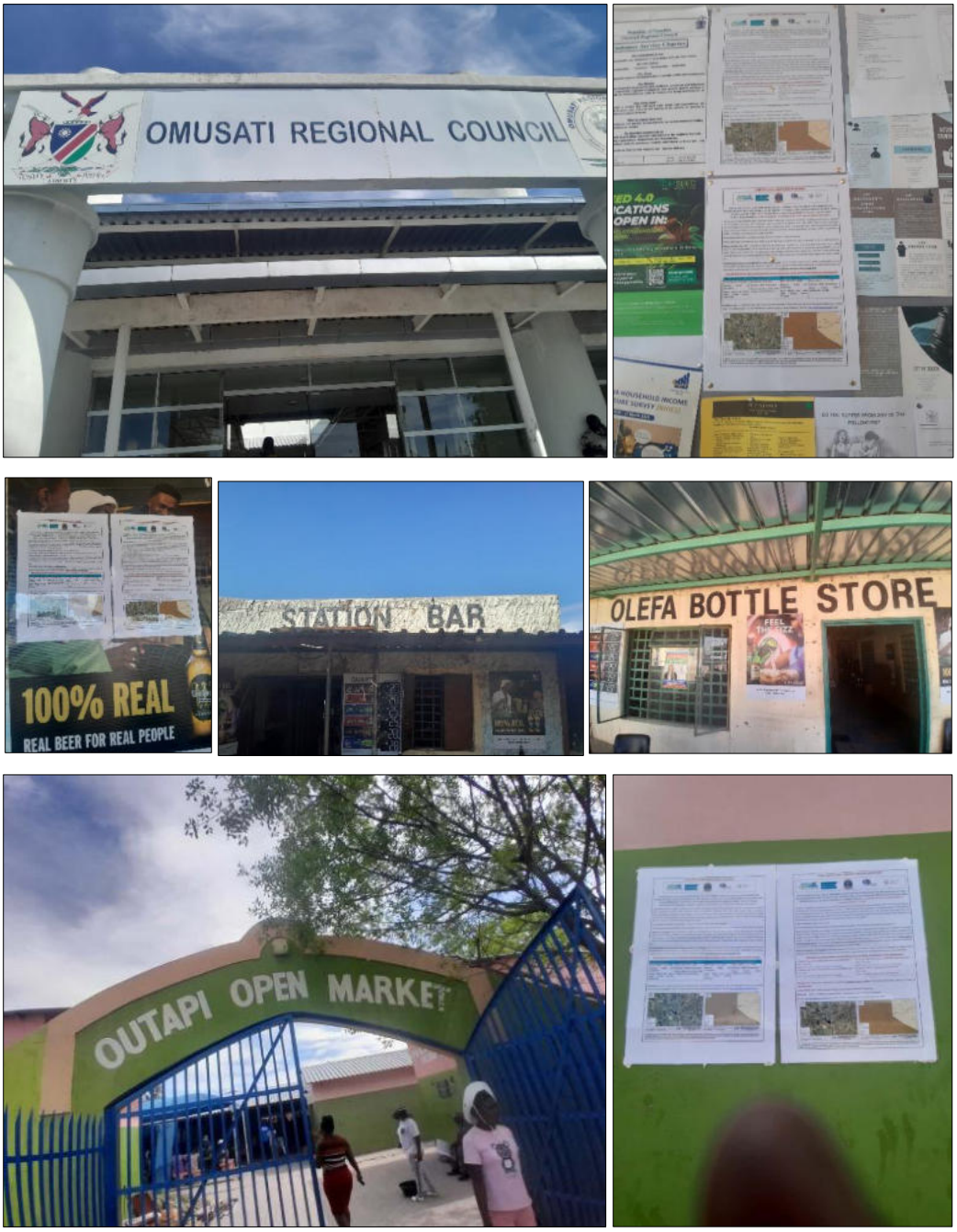

Figure 6-1: The ESIA public notice posters were pasted at different places in Outapi Town

- ESIA consultation meetings were scheduled and held with the community and local stakeholders as follows. The meeting attendance included the environmental assessment practitioner from Serja HGE Consultants, one engineer from the project consulting engineering team (JV), and one representative from Proponent (Outapi Town Council)'s Infrastructure Department.

    - 1st Consultation meeting (MR92 section towards Oshikuku): The meeting was held at the Marula Tree near the road in the Okapuku Village (at the 5km mark of the road section from the Outapi traffic light intersection in Town). The meeting was attended by fifty-eight (58) people (see Figure 6-2).

Figure 6-2: Consultation meeting in progress at Okapuku Village on the 13th of November 2025

    - 2nd Consultation meeting (MR123 section towards Tsandi): The meeting was held at the *Okamwandi kaNaifi* near the road in the Omunyele/Omukoko Village (at the 5km mark of the road section from the Outapi traffic light intersection in Town). The meeting was attended by thirty-nine (39) people (see Figure 6-3).

Figure 6-3: Consultation meeting in progress at Omunyele/Omukoko Village on the 13th of November 2025

    - 3rd Consultation meeting (in Outapi): The meeting was scheduled to take place at the Ombalantu Traditional Authority Hall in Outapi. Despite the meeting notices

placed around town on the 07th of November 2025 and through radio notices by the Outapi Constituency Councillor, there was no attendance at this meeting. It was reported that the non-attendance was attributed to the market day in the Town. A photo of the venue was taken with the environmental consultant, the Outapi Town Council representative, and the consulting engineering representative, and is shown in Figure 6-4. Given the potential impact on businesses (both formal and informal) and other activities along the road section, another consultation meeting with a more advanced approach is scheduled in the Town. This is to ensure that all affected parties are aware and understand the Town Council's plans to rehabilitate and dualise the road sections, potentially affecting their trading areas and business operations during construction.

Figure 6-4: Consultation meeting venue with no attendance in Outapi on the 14th of November 2025

- 4th Consultation meeting (MR92 section towards Ruacana): The meeting was held at the *Omusati waaposi* near the road in the Ombandjele Village (at the 5km mark of the road section from the Outapi traffic light intersection in Town). The meeting was attended by forty (40) people (see Figure 6-5).

Figure 6-5: Consultation meeting in progress at Ombandjele Village on the 14th of November 2025

Minutes were taken from all meetings, and these are attached hereto as Appendix G, alongside their signed attendance registers.

6.3 Feedback and Issues Raised by the Stakeholders (I&APs)

Some issues were raised by I&APs during the consultation period (consultation meetings). These issues have been recorded and incorporated into the ESIA Report and EMP. The summary of these few key issues is presented in Table 6-1.

Table 6-1: Summary of main issues and comments received throughout the consultation period

The environmental and social aspect	Summary of impact or concern
Comments and Issues received or noted during the consultation period (in the meeting)	
Compliance with laws and conditions set in documents	The contractors should comply with the rules and regulations of the project.
Rehabilitation of borrow pits for community livestock water holding (rainwater earth dams)	The contractor should consider leaving the borrow pit or some pits rehabilitated to hold water for community livestock, because right now, rainwater just disappears, which is a waste.
Road signs and markings	Road signs and markings (especially livestock and people/children crossing signs should be incorporated into the roadworks. There is also a need for speed humps at major settlement crossings (an example of settlements given is Okapuku (towards Oshikuku), and Okakutu (towards Ruacana), as well as Shaduka (towards Tsandi). -The road signs with village names need direction arrows or distance on the roads.
Design of the road	The road should be properly designed so that it can last a long time, even for future generations.
Recruitment of project personnel (labourers) and people working without contracts and proper protective equipment	The community requested fairness and transparency during the recruitment process for the local communities along the roads. The workers should have contracts in place and proper PPE.
Safety of people and livestock along the road sections	The safety of both people and livestock should be addressed (owing to the lack of appropriate road signs and markings).
Communication about the recruitment of locals	The recruitment of locals should go through not only the constituency offices (notices), but also through headmen (and village secretaries), location owners/leadership, to help disseminate the information faster.
The upgrading of existing small bridges and culverts on the road	There are some either clogged culverts or too small or low that rainwater goes over the roads instead of under them.
The displacement or shifting of existing properties (land, fences, trees, and structures/houses or businesses)	The concern of compensation and agreements on properties that need to be displaced or shifted backward to allow sufficient road reserve. This will

The environmental and social aspect	Summary of impact or concern
	need one-on-one engagements with affected people, and they will need to be fairly compensated according to the compensation policy.
Fair recruitment and agreements	The subcontractors and employees should sign agreements in black and white, and there should be a fair and transparent process to avoid future conflicts.
Gender balance during recruitment	There should be fairness (gender balance) in gender during recruitment.
Benefits from funds paid to the Traditional Authority coffers through the establishment of borrow pits on communal land	The funds paid from such projects should benefit affected communities directly through local leadership (village headmen/women) to pay for community projects (such as a transformer or water abstraction machinery from the Calueque–Oshakati Canal for the community projects).
The installation of traffic lights at the Police station and Hospital area	The road junction at the Police Station, NamPost, and Hospital area is currently unsafe with just a STOP and yield sign. Perhaps adding traffic lights would improve the situation.
The possibility of covering an additional 2km from the end of the road sections (to add speed humps)	The request to extend some of the road rehabilitation works to at least 2km from the intended end points to install speed humps, if possible.

The consultation period ran from the 05th of November 2025 to the 05th of December 2025 to allow the submission of comments after consultation meetings. Comments received during the consultation meeting and email were summarized as above and indicated in the meeting minutes.

6.3.1 Circulation of the Draft ESIA Documents for Review and Comments

The Draft ESIA Scoping Report, ESMP (EMP), and its appendices will be circulated to the registered stakeholders/I&APs for review and further comments, if any, for twelve (12) days. The comments raised on the documents review will be incorporated into the Scoping Report and EMP that will be finalized and submitted to the Environmental Commissioner at the MEFT for evaluation and consideration of the ECC.

6.4 Feedback on the Draft ESIA Scoping Report Review

After the compilation of the draft Scoping Report and Environmental & Social Management Plan (ESMP), the two documents and consultation meeting minutes were circulated to registered stakeholders and I&APs for review and further comments before finalizing for submission to the MEFT for evaluation. The review and comments period was fourteen (14) days, i.e., from the 04th to the 18th of February 2026. The email circulation is shown in Figure 6-6. There were no further comments or issues received on the circulated draft documents between 04th and 20th February 2026 during the finalization of the ESIA documents.

RE: ESIA Study - Rehabilitation and Dualization of Road Sections: MR92 - 5km from traffic lights towards ...

Reply | Reply All | Forward | ...

Serja EIA Consultations & Public Engagements <eias.public@serjaconsultants

To 'Serja EIA Consultations & Public Engagements'

Wed 04/02/2026 12:35 pm

Cc 'Fredrika Shagama - Serja HGE Consultants'

Bcc [redacted]; [redacted]; [redacted]; +40 others

ESIA_Scoping_Report_OUTC-MR92-MR123_Draft_for_Review-04Feb2026_compressed.pdf
4 MB

Good day Stakeholder/Interested & Affected Party (I&AP),
As per the email communication below, this email serves to inform you that the **Draft ESIA Scoping Report** and its **Environmental & Social Management and Rehabilitation Plan (ESMP)/Environmental Management Plan (EMP)** are ready for your review and comments. The compressed version of the merged/combined document is attached hereto (the quality of images/maps has been slightly affected by the compression to reduce the size from 10MB to 4MB). Therefore, due to the combined file size of the Report and the EMRP (of 10MB), which may be a problem for some mail inboxes, we have uploaded the document (file) on the Dropbox **link below**, where you can download it for viewing. Alternatively, if you have restrictions on accessing files from links but your inbox allows you to receive a direct email attachment of 10MB, please let us know to send it directly to you.
https://www.dropbox.com/scl/fi/iwae2047pm5kyvgq451vc/ESIA_Scoping_Report_OUTC-MR92-MR123_Draft_for_Review-04Feb2026.pdf?rlkey=osmdm9dg2ttbusr6c5y42478a&st=yqxqge5n&dl=0
Should you have any comments on the documents, please send them to us by **Wednesday, 18 February 2026, by 17:00 (5 pm)** so that we can include the comments in the Final ESIA documents for submission to the Environmental Commissioner.

Kind regards
Ms. Fredrika Shagama: Project Environmental Assessment Practitioner
Mobile No. +264 81 407 5536 / +264 81 749 9223

From: Serja EIA Consultations & Public Engagements <eias.public@serjaconsultants.com>
Sent: Thursday, 4 December 2025 2:29 pm
To: 'Serja EIA Consultations & Public Engagements' <eias.public@serjaconsultants.com>
Cc: 'Fredrika Shagama - Serja HGE Consultants' [redacted]
Subject: RE: ESIA Study - Rehabilitation and Dualization of Road Sections: MR92 - 5km from traffic lights towards Oshikuku and Ruacana, and MR123 - 5km towards Tsandi from Outapi Townlands, Omusati Region: Consultation Meeting Minutes

Dear Stakeholder
Following the communication below, and as promised during the consultation meetings (for those who attended), please find attached the file containing the minutes from the meetings held on the 13th and 14th of November for the proposed project.

Figure 6-6: Proof of circulation of the draft ESIA Scoping Report and ESMP to registered I&APs on the 04th of February 2026

6.5 Concluding remark on the overall ESIA Consultation process and Feedback

The comments and issues raised during the consultation period were significant; however, they were not objections that would hinder, halt, or terminate the project activities. The stakeholders and I&APs would just like to see the implementation of management and mitigation measures to reduce the significance of the impacts during the road rehabilitation works. This is because I&APs and stakeholders need the roads to improve their mobility and easy accessibility to economic and social services centers in the Town and its immediate surroundings.

The next chapter (Chapter 7) is the presentation of potential impacts identified, the impact assessment methodology, description of impacts, and their assessment.

7 IMPACTS IDENTIFICATION, ASSESSMENT, AND MEASURES

7.1 Identification of Potential Impacts

Road rehabilitation and associated activities, such as borrow pits establishment, water usage, are usually associated with different potential positive and negative impacts. For an environmental assessment, the focus is placed mainly on the negative impacts that are likely to affect the host environment and social features. The assessment is done to ensure that these impacts are sufficiently addressed, and adequate mitigation measures are recommended thereto for implementation so that the impact's significance is brought under control, while maximizing the positive impacts. The potential positive and negative impacts that have been identified from the project activities are listed as follows:

7.1.1 Positive impacts (benefits) of the proposed project

The positive impacts (benefits) of the proposed construction of the road sections are listed below.

- Socio-economic development through temporary job (employment) creation in the area during the road construction phase for 250 people or more.
- Improved accessibility: better road connections enhance accessibility between Outapi and Oshikuku/Ruacana/Tsandi, facilitating the transportation of goods, people, and services, and access to social services and other centres in the area.
- Economic development: better roads can stimulate economic growth by attracting investment, promoting tourism in this part of the Omusati Region, and facilitating the movement of goods and people.
- Safety: The new road with improved design and signage can enhance road safety.
- The roads will improve connectivity, thus enabling easier access to economic points (markets), schools, healthcare centres, and nearby communities.
- The rehabilitated road sections will support urban planning by guiding growth and allowing for better traffic management in the townlands. The dualisation will also fit into long-term infrastructure town plans, preparing for future population and traffic growth in Outapi Town and its immediate surroundings.

7.1.2 Potential environmental and social (adverse) impacts of road construction work

The potential negative (adverse) impacts of the proposed road works (mainly during the rehabilitation/construction) are listed below. The mitigation measures for these impacts are included in the EMRP.

- Soil and water pollution: improper handling of wastewater may lead to pollution of surrounding soils and eventually water resources systems (through wastewater runoff and infiltration).
- Water pollution: runoff from roads can carry pollutants such as oil, salt, and heavy metals into nearby streams and rivers, impacting aquatic ecosystems.
- Habitat destruction: excavation of road construction borrow pits can lead to the destruction of natural habitats for plants and animals. This can disrupt local biodiversity and reduce the availability of resources for animals and people.
- Displacement and loss of land: Dualisation of the roads will mean expansion/widening of the existing road routes. Thus, it may require land acquisition, which can result in the displacement of businesses, homes, fences, pipelines/cables, and or productive farming land near/along the roads (within the anticipated new road reserves). This could result in conflicts over compensation and land ownership.
- Risks of soil erosion: road construction activities could disturb the soil and lead to erosion, especially during the rainy season. The removal of large amounts of soil and vegetation from borrow pits can increase the risk of soil erosion.
- Depletion of local groundwater table: excavation of borrow pits may affect the local water table, leading to changes in groundwater levels. This can impact the availability of water for vegetation that relies on groundwater as a water source in the area.
- Deforestation: road construction may require the clearing of trees and vegetation along the route, leading to habitat loss.
- Impact on air quality: dust and particulate matter generated during the excavation of materials (sand and gravel), movement and operation of heavy vehicles and machinery on unpaved areas can compromise air quality.
- Displacement of existing properties and infrastructure (building structures and service infrastructure).
- Displacement of roadside vendors in Outapi Town and along the road sections, which leads to socio-economic disruption.
- Noise associated with the movement of heavy machinery and trucks can disturb locals and animals.
- Disruption of hydrological systems by borrow pits can alter natural drainage patterns, causing changes in surface water flow and potentially exacerbating flooding or drought conditions in the area.

- General environmental pollution through mishandling of project-related waste associated with the project.
- Occupational and community health and safety: improper handling of materials and equipment may cause health and safety risks to workers and locals (communities/residents and businesses). Community safety can also be compromised by unfenced borrow pits or abandoned borrow pits (that are not properly rehabilitated to safe conditions).
- Archaeological or cultural heritage impact: borrow pits may impact local cultural heritage sites or traditional land use practices, potentially leading to social tensions or conflicts between the construction contractor and communities.

The impacts are briefly described and assessed under the next subheadings. The management and mitigation measures are provided in the EMRP for implementation.

7.2 Impact Assessment Methodology

The Environmental Assessment process primarily ensures that potential impacts that may occur from project activity are identified and addressed with environmentally cautious approaches and legal compliance. The impact assessment method used for this project follows Namibia's Environmental Management Act (No. 7 of 2007) and its Regulations of 2012, as well as the International Finance Corporation (IFC) Performance Standards.

The identified impacts were assessed in terms of scale/extent (spatial scale), duration (temporal scale), magnitude (severity), and probability (likelihood of occurring), as presented in Table 7-1.

To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable. It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact,
- Assessment of the pre-mitigation significance of the impact, and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment. The following criteria (in Table 7-1) were applied in this impact assessment:

Table 7-1: Criteria used for impact assessment (extent, duration, intensity, and probability)

The Criteria used to assess the potential negative impacts.				
Extent or (spatial scale) - extent is an indication of the physical and spatial scale of the impact.				
Low (1)	**Low/Medium (2)**	**Medium (3)**	**Medium/High (4)**	**High (5)**
Impact is localised within the site boundary: Site only	Impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond the site boundary: Regional	Impact extends beyond National or international boundaries
Duration- Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project				
Low (1)	**Low/Medium (2)**	**Medium (3)**	**Medium/High (4)**	**High (5)**
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short-term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long-term	Long term, beyond closure, permanent, irreplaceable, or irretrievable commitment of resources
Intensity, Magnitude/severity - Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. This is a qualitative type of criterion.on				
H-(10)	**M/H-(8)**	**M-(6)**	**M/L-(4)**	**L-(2)**
Very high deterioration, high quantity of deaths, injury or illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration, or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat/biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.
Probability of occurrence - Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment.				
Low (1)	**Medium/Low (2)**	**Medium (3)**	**Medium/High (4)**	**High (5)**
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.

7.3 Impact Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact "without mitigation" is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this chapter, for this assessment, the significance of the impact without prescribed mitigation actions was measured.

Once the above factors (Table 7-1) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate, or low significance, based on the following significance rating scale (Table 7-2).

Table 7-2: Impact significance rating scale

Significance	Environmental Significance Points	Colour Code
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	>-60	H

For an impact with a significance rating of high, mitigation measures are recommended to reduce the impact to a low or medium significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation measures. To maintain a low or medium significance rating, monitoring is recommended for a period to enable the confirmation of the significance of the impact as low or medium and under control.

The assessment of the project phases is done for both pre-mitigation (before implementing any mitigation) and post-mitigation (after mitigations are implemented). The objective of the mitigation measures is to firstly avoid the risk, and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once the mitigation measures have been applied, the identified risk will be of low significance.

7.1 Description and Assessment of Potential Impacts

The potential impacts of the project activities are described and assessed in Table 7-3, Table 7-4 and Table 7-5. The cumulative impacts of the project are presented in Table 7-6.

The management and mitigation measures in the form of management action plans are provided in the Environmental & Social Management & Rehabilitation Plan (ESMRP) or, as simply referred to in the EIA Regulations (Regulation 8(j)), the Environmental Management Plan (EMP).

Table 7-3: The description and assessment of the potential positive impacts of the proposed road rehabilitation works and associated activities

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Positive Impacts											
Employment creation	Socio-economic development through temporary job (employment) creation in the area during the road construction phase for 250 people or more.	L / M- 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75
Empowerment of local businesses	Procurement of local goods and services for the project activities by small and medium businesses in the area and Region will promote local entrepreneurship empowerment and local economic development (income generation).	L / M- 2	L / M - 2	L / M - 4	L / M - 2	L - 16	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44
Improved accessibility:	Improved accessibility road connections enhance accessibility between Outapi and Oshikuku/Ruacana/Tsandi, facilitating the transportation of goods, people, and services, and access to social services and other centres in the area.	L / M- 2	L / M - 2	L / M - 4	L - 1	L - 8	M - 3	M / H - 4	L / M - 4	M / H - 4	H - 75
Economic development	Better roads can stimulate economic growth by attracting investment, promoting tourism in this part of the Omusati Region,	L / M- 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	and facilitating the movement of goods and people.										
Community safety and social cohesion	The rehabilitated roads with improved design, conditions, and signage can enhance road safety, thus reducing the risk of accidents and fatalities as well as relieving congestion on the current Town roads. Roads will improve connectivity that can strengthen social ties within the Townlands and with neighbouring rural communities by enabling easier access to economic points (markets), schools, healthcare centers, and other social services, as well as nearby communities.	L / M- 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75
Future urban growth and improved economic growth	The rehabilitated road sections will support urban planning by guiding growth and allowing for better traffic management in the townlands. The dualisation supports long-term infrastructure town plans and prepares for future population and traffic growth in Outapi Town and its immediate surroundings.	L / M- 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75

Table 7-4: The description and assessment of the potential negative impacts of the road rehabilitation and associated activities on the biophysical and social environment

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Negative (Adverse) Impacts associated with road construction activities											
Unfair recruitment and procurement process	The employment of outsiders at the expense of capable local communities (villages) would create tensions and conflicts between the construction contractor and communities. Similarly, the outsourcing of the procurement of goods and services that are locally available may create conflicts and loss of income to local communities and businesses.	M - 3	M - 3	M/H - 8	M/H - 4	M – 56	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Soil and Water Resources Pollution	Project activities are associated with a variety of potential pollution sources (i.e., lubricants and fuel) that may contaminate/pollute soils and eventually groundwater and surface water (such as nearby streams), if not handled properly. The anticipated potential source of pollution to water resources from the project activities would be accidental spills of fuels and oil from project vehicles and machinery. Runoff from road	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	construction works can carry pollutants such as oil, salt, and heavy metals into nearby streams and rivers, impacting aquatic ecosystems. This impact would occur during the heavy rainy season, when surface runoff would be inevitable. However, it should be noted that the scale and footprints of the activities where potential sources of pollution will be handled are small. Therefore, the impact will be moderately low and manageable.										
Habitat destruction and deforestation	Excavation for road construction to make provision for road reserves and erecting supporting infrastructure can lead to the destruction of natural habitats for plants and animals. This can disrupt local biodiversity and reduce the availability of resources for animals and people. Added to that, road construction may require significant clearing of trees and vegetation along the route, leading to habitat loss.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Soil erosion	The removal of large amounts of soil and vegetation to allow road works can leave soils exposed to erosion, especially during heavy rainfall events. It is important to note that the road routes, particularly outside the currently developed areas of the Town, are already cleared, and it is anticipated that smaller additional areas will be cleared to accommodate the additional 2 lanes. Therefore, the impact is manageable.	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Displacement of existing properties and infrastructure (building structures and service infrastructure)	There is a potential impact of disturbance owing to the displacement of current buildings (service supply lines) located close to the current road reserve, from the traffic lights intersection all the way to the planned 5km endpoint. The affected structures will include shops, houses, small businesses, boundary walls, and productive farming land, informal structures near/along the roads (within the anticipated new road reserves). This could result in conflicts over compensation and	M - 3	M - 3	M/H - 8	M/H - 4	M – 56	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	land ownership, which may be partially encroached upon or fully affected. The loss of structures may lead to economic disruption, temporary or permanent loss of business premises, and relocation costs for affected owners. In cases where a portion of land may be taken to make provision for the road reserve, property functionality may be compromised, thus reducing usability and value. Despite this, a compensation process will be implemented. However, this may cause delays, administrative challenges, and community dissatisfaction if not handled transparently.										
Displacement of roadside vendors in Outapi Town and along the road sections	Some informal and semi-formal vendors operate along the road (selling food, produce, or goods) who may lose their trading spaces due to clearance of the corridor for road rehabilitation and subsequent dualisation. As it is common in urban setups, vendors rely on high-traffic	M - 3	M - 3	M/H - 8	M/H - 4	M – 56	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	visibility. Hence, relocation or alternative trading areas to invisible areas (from their customers) during construction may lead to a loss of income. There is also a potential conflict if vendors perceive the relocation plan as unfair or if new sites are insufficient or too far from customer flows. Moreover, vulnerable groups (women, youth, and low-income households) who mainly depend on roadside trading may be disproportionately affected.										
Air pollution	There is potential for the impact on air quality: dust and particulate matter generated during the excavation of materials (sand and gravel), movement and operation of heavy vehicles and machinery on unpaved areas can compromise air quality.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Noise	The nuisance associated with the movement of heavy machinery and trucks in the area can disturb locals and animals.	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Waste Generation (Environmental pollution)	Waste types such as solid, wastewater, sewage, and hazardous (waste fuels and oils) will be produced during project activities. If the generated waste is not disposed of in a responsible way, land pollution may occur at or around the borrow pit sites. If solid waste, such as papers and plastics, is not properly stored or just thrown into the environment (littering), it may be consumed by animals, which could be detrimental to their health.	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L - 1	L - 1	L - 2	L / M - 2	L - 8
Occupational and community health and safety	Occupational and community health and safety: improper handling of materials and equipment may cause health and safety risks to workers and locals (communities/residents and businesses). Community safety can also be compromised by unfenced borrow pits or abandoned borrow pits (that are not properly rehabilitated to safe conditions).	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Accidental fire outbreaks	The use of heavy equipment, especially if there is a presence of hydrocarbons at borrow pit sites, may result in accidental fire outbreaks. This could pose a safety risk to the project personnel (workers) and locals.	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Archaeological or cultural heritage impact	Excavation for site preparation may result in inadvertent unearthing of archaeological cultural heritage resources.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Table 7-5: The description and assessment of the potential negative impacts of borrow pit establishment and utilisation on the biophysical and social environment

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Negative (Adverse) Impacts from the establishment of borrow pit(s)											
Physical disturbance to the site soils results in erosion.	The removal of large amounts of soil and vegetation from borrow pits can increase the risk of soil erosion, especially during rainfall events. This erosion can result in sedimentation of nearby water bodies, leading to water quality issues and habitat degradation. Furthermore, the movement of	M - 3	M / H - 4	L / M - 4	M / H - 4	M – 44	L / M - 2	L / M - 2	L / M - 4	L / M - 2	L - 16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	heavy vehicles and equipment may lead to compaction of soils.										
Property displacement and land loss	The excavation of borrow pits potentially results in the loss of useful communal land. Borrow pits within private land would result in the loss of productive land and the displacement of fences, pipelines, to allow for sufficient materials extraction and the movement of heavy vehicles to and from the BP site. This impact is low owing to the fact that the project plans to use the existing Ontokolo Village BP that belongs to the Outapi Town Council. Therefore, the impact will be limited to this Village only. However, if new BP or BP sites were to be considered in the future, then the impact significance will change to medium as assessed here.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Habitat destruction	Excavation of borrow pits can destroy natural habitats for plants and animals. Thus, disrupting local biodiversity and reducing the availability of	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	resources for animals and people at the site of extraction.										
Impact on flora biodiversity	The clearing of sites to establish borrow pits and associated access roads can potentially affect vegetation and the loss of species, especially protected tree species. The sites will be strategically located mainly in areas with minimal vegetation or at already disturbed sites where no further vegetation removal is required. Hence, the impact will be localized, site-specific, and therefore manageable.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Impact on groundwater table: Lowering of the local groundwater table	The borrow pit excavations may affect the local water table, leading to changes in groundwater levels. This can impact the availability of water for vegetation and communities that rely on groundwater as a water source in the area.	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Air Quality: Dust Generation	There is a potential impact of dust (and particulate matter) emanating from excavation activities, heavy vehicles moving on site access and haul roads when transporting materials from	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	borrow pit sites and travelling to the site. This may contribute to the dust level and compromise air quality in the area. The impact is considered short-term and localized as borrow pit activities are carried out over a specified duration and distance at selected sites only. Therefore, manageable with mitigation measures.										
Noise	Noise associated with borrow pits (from heavy machinery and trucks, and excavation activities) can disturb local communities and animals (livestock) in the area. Excessive noise to project personnel without any protective measures in place can also be a health risk. The activities are considered small to medium scale, and the noise level is bound to be limited to the site and some distance from nearby homes. Thus, the impact likelihood is manageable.	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Disruption of hydrological systems	Borrow pits can alter natural drainage patterns, causing changes in surface water flow	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	and potentially exacerbating flooding or drought conditions in the area.										
Occupational and Community Health and Safety Risks	The mishandling of machinery and equipment by workers at the borrow pits may result in injuries, and if worse, can lead to fatalities on duty. The curiosity of local children may force them to go and play with unattended heavy trucks and big machinery at borrow pit sites near their homes. The unfenced, unrehabilitated, deep, and steep-sided borrow pits can be a hazard to the communities (people) and their animals. The deep and steep-sided borrow pits can cause accidents such as drowning, especially for children or animals, if they fall in. If not properly managed, borrow pits can fill with water, creating stagnant pools. These pools can become breeding grounds for mosquitoes and other vectors of diseases like malaria and dengue fever, increasing health	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	risks for nearby communities and animals.										
Vehicular Traffic Safety	The three road sections planned for rehabilitation are the main transportation routes for all vehicular movement in the area. There would be a potential increase in traffic flow owing to the transportation of construction materials from the borrow pit. Not only materials transport, but also the delivery of supplies, goods, and services to the sites and the road itself. Depending on the project needs, trucks, medium, and small vehicles will be frequenting the borrow pit site areas. This would potentially increase slow-moving heavy vehicular traffic along these roads, which could result in road accidents.	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Impact on local road use	The movement of heavy trucks on the community roads (single-track sandy routes) would result in the deterioration of these roads, making it difficult for community small vehicles to use them, due to worsened road	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L - 1	L - 1	M / L - 4	M / L -2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	conditions. This is a concern if maintenance or leveling of these ''haul'' roads is not done.										
Land use change	The conversion of natural landscapes into borrow pits can permanently alter landscapes, affecting the aesthetic value of the area.	M - 3	M - 3	M - 6	M / H - 4	M – 48	L - 1	L / M - 2	L - 2	L / M -2	L - 10
Archaeological or cultural heritage impact	The excavation of borrow pits may result in the inadvertent destruction of local cultural heritage sites or traditional land use practices. This would also include the unintentional unearthing of unknown and unmarked graves in the area, potentially leading to social tensions or conflicts between the construction contractor and communities, if there are any at the BP or any future BP sites.	M / H - 4	M - 3	M - 6	M - 3	M – 39	L - 1	L / M - 2	L - 2	L / M -2	L - 10

7.2 Cumulative Impacts Associated with the Project Activities

According to the International Finance Corporation (2013), cumulative impacts are defined as “those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as 'developments') when added to other existing, planned, and/or reasonably anticipated future ones”. The main cumulative impact that the project and associated activities potentially contribute to is as follows:

- Economic benefits (jobs, reduced transport costs, market access): positive cumulative effect.
- Impact of unrehabilitated borrow pits on the community and animals (livestock).
- Vegetation loss and biodiversity fragmentation.
- Loss/damage to protected and culturally important trees (baobab, marula, makalani, etc.).
- Increased traffic, noise, and air quality impacts.
- Surface water, drainage, and hydrology changes (erosion, altered flows).
- Heritage and archaeology impacts (known and chance finds).
- Social and livelihood impacts (access, safety, land take).
- Induced development and urbanisation pressure.
- Noise, visual, and landscape character change (loss of rural character).
- Cumulative traffic safety and accident risk.

The cumulative impacts of the project are described and assessed, and their mitigation measures are provided in Table 7-6.

Table 7-6: The description and assessment of the project's cumulative impacts on the biophysical and social environment

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Positive Cumulative impacts associated with road rehabilitation and dualisation											
Economic benefits (jobs, reduced transport costs, market access): positive cumulative effect	The road rehabilitation reduces vehicle operating costs, travel time, and improves reliability. Combined with other regional investments, stimulates economic activity. There is a potential for regional development, increased trade, easier access to services and schools, and a potential rise in land values.	L / M- 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75
Negative Cumulative impacts associated with road rehabilitation and dualisation											
Vegetation loss and biodiversity fragmentation	The clearing for carriageway widening, shoulders, drains, service strips, and removal of mature trees (baobab, marula, mopane, makalani). There is a potential incremental loss of large, often protected trees and linear habitat, a reduction in habitat connectivity for fauna, and edge effects that extend into the adjacent vegetation.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Loss/damage to	The direct felling or root damage during excavation, construction,	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
protected and culturally important trees (baobab, marula, makalani)	compound siting, borrow pits, and material haul routes. The permanent loss of legally protected species and culturally valuable trees, community opposition, and legal complications.										
Increased traffic, noise, and air quality impacts	The capacity increase attracts more vehicles, including heavy trucks; faster speeds increase noise footprint; dust is reduced if paved, but increases during construction. The impact on degraded residential amenity in Outapi and roadside settlements; health impacts (respiratory) for sensitive groups; cumulative noise along long stretches.	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Surface water, drainage, and hydrology changes (erosion, altered flows)	The new/improved drainage (culverts and drains) can change local runoff patterns; loss of permeable surface increases runoff; and sediment generation during construction. The increased erosion downstream, siltation of ponds and channels (such as culturally	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	important Onelungo ponds), impacts on local water-dependent habitats, and potential flood-path changes.										
Heritage and archaeology impacts (known and chance finds)	Earthworks, borrow pits, and service trenching may damage undocumented cultural artefacts, burial sites, or sacred landscapes (e.g., baobab heritage sites). The loss of cultural heritage sites and social conflict; the loss magnified is expected, if multiple projects remove remaining intact sites.	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Social and livelihood impacts (access, safety, land take)	The additional land required for right-of-way and junctions; temporary loss of access during works; changed road safety patterns; improved access to markets and services post-works. The short-term disruption to farming, grazing, and property access; longer-term benefits (reduced travel time), but also potential for land-use change, loss of grazing, and pressure on social services.	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Induced development and urbanisation pressure	The improved roads attract commercial development, settlement expansion, roadside informal trading, and service stations. The conversion of agricultural/communal land to urban uses, pressure on water, sanitation, waste management, and local ecosystems. Over time can lead to cumulative loss of habitat and higher demand for resources.	M - 3	M - 3	M - 6	M / H - 4	M – 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Noise, visual, and landscape character change (loss of rural character)	The wider, faster road is visually more prominent; new signage, lighting, and commercial nodes change the rural landscape. There is an incremental loss of rural/heritage landscape character when combined with town expansion and other linear infrastructure.	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Cumulative traffic safety and accident risk	High speeds and mixed road users (pedestrians, community livestock, cyclists), and increased freight movements. There is a cumulative impact of more severe road traffic	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L - 1	L - 1	M / L - 4	M / L -2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	accidents if safety measures are not integrated, particularly where roads pass settlements or schools.										
Impact of unrehabilitated borrow pits on the community and animals (livestock)	An unrehabilitated BP can pose threats to the community, especially children who may play around the site during rainy seasons and drown when the pits are filled with water. Furthermore, deep and steep-sided borrow pits can cause accidents such as drowning, especially for children or animals, if they fall into the BPs in the future. The BP that are not rehabilitated or not rehabilitated properly can cause conflicts and disputes in communities over their post-activity land uses. For instance, some community members may opt to have the borrow pits left for community rainwater storage, and some may opt to have them completely backfilled because they consider it unsafe or risky. These community conflicts over borrow pits can strain or damage	M - 3	M / H - 4	L / M - 4	M / H - 4	M – 44	L / M - 2	L / M - 2	L / M - 4	L / M - 2	L - 16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	community relations and local governance over a long time if they remain unresolved. In some cases, community members tend to gang up against their leaders over issues in their villages. Therefore, traditional authorities, communities, and project contractors need to come together and correctly decide on the way forward regarding the end use of borrow pits in their areas.										

The recommendations and conclusions made for the ESIA Study are presented in the next chapter.

8 RECOMMENDATIONS AND CONCLUSIONS

The ESIA Study for the proposed rehabilitation and dualisation of the three road sections was done per the EMA No. 7 of 2007, and its 2012 EIA Regulations, and all the due processes were followed.

Some key potential positive and negative impacts were identified by the Environmental Consultant and based on issues raised by I&APs during the consultation period. The issues raised by I&APs were addressed and incorporated into this Report, whereby mitigation measures have been provided in the Environmental Management & Rehabilitation Plant (EMRP) for implementation to avoid and/or minimize their significance on the environmental and social components.

Impact Assessment: The key negative impacts were described, assessed. The potential negative impacts indicated a medium rating of significance. To minimize the significance, appropriate management and mitigation measures are made for implementation by the Proponent, their contractors, and workers to avoid and/or minimize their significance on the environmental and social components. The effective implementation of the recommended management and mitigation measures, accompanied by monitoring, will particularly see a reduction in the significance of adverse impacts that cannot be avoided completely (from medium rating to low).

8.1 Recommendations

The ESIA Study was deemed sufficient and concluded that no further detailed assessments are required for the ECC application for the road rehabilitation and dualisation works and associated activities.

Serja Consultants are confident that the potential negative impacts associated with the project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures, and with more effort and commitment put on monitoring the implementation of these measures. It is therefore recommended that the project be granted an ECC, provided that:

- All the management and mitigation measures provided herein are effectively and progressively implemented.
- All required permits, licenses, and approvals for the activities are obtained as required. These include permits and licenses, and ensuring compliance with these specific legal requirements.
- Feedback meetings with the communities, their leaders (and other local key stakeholders) should be continued throughout the planning and design phase for project awareness to reach most, if not all, potentially affected parties (property owners as well as business persons along the road sections) for inputs. A feedback meeting with the communities in Outapi and three road sections should be held before construction works commence (once the ECC is granted).

- Transparency in communication and continued engagement with the communities and or through their leaders (local leaders and constituency councillors), and stakeholders should be maintained throughout the project cycle.
- The Proponent, their project workers and contractors comply with the legal requirements governing their project and its associated activities, and ensure that project permits and or approvals required to undertake specific site activities are obtained and renewed as stipulated by issuing authorities.
- Site areas where excavations were carried out and have ceased are rehabilitated, as far as practicable, to their pre-excavation state. This includes the levelling of stockpiled topsoil, backfilling trenches, and closing/capping of project-associated holes and borrow pits.
- The EMRP implementation should be checked and done by the responsible team member onsite (Environmental Control Officer / Safety Officer), and audited by an Independent Environmental Consultant on a bi-annual basis to compile Environmental Monitoring (audit) reports. These reports are to be submitted to the Environmental Commissioner at the DEAF This will be required by the Environmental Commissioner (as part of the ECC conditions).

8.2 Recommendations and Conclusions

In conclusion, although significant, the identified impacts would not hinder the project activities. However, the recommended measures should be effectively implemented and monitored to ensure that the significance of adverse impacts is reduced to a low level, where it is medium, and eventually to a negligible significance rating. The effectiveness of the implementation of the management and mitigation measures and EMP compliance will be done by an Environmental Control Officer (ECO) or Safety Officer and audited by an Independent Environmental Consultant on a bi-annual basis. This is to ensure that EMRP implementation can be tracked via Bi-Annual Environmental Monitoring exercises and documented in the monitoring reports to the Environmental Commissioner. The monitoring of EMRP implementation will not only be done to ensure that the impact's significance is reducing and or maintaining a low significance rating, but also to ensure that all potential unforeseen impacts that might arise during implementation are properly identified in time and addressed immediately.

9 LIST OF REFERENCES

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