OKOMBAHE SERVICE STATION

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT

FOR A

PROPOSED CONSTRUCTION AND OPERATION OF OKOMBAHE SERVICE STATION IN OKOMBAHE, ERONGO REGION, NAMIBIA

19 DECEMBER 2025

This ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT

THIS ESIA REPORT IS PREPARED TO SUPPORT AN APPLICATION (APP. No: 006753) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) FOR THE PROPOSED OKOMBAHE SERVICE STATION

is prepared by:

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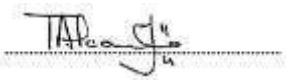
WINDHOEK

CONSTRUCTION AND OPERATION OF A FUEL RETAIL FACILITY		
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) COVER SHEET	**Total # of Pages**	59

Document Title: Environmental and Social Impact Assessment Report			**OKOMBAHE SERVICE STATION** **P. O. Box 25888** **Windhoek**
Approval	 **Twalinohamba Akawa** 19 December 2025	Lead Environmental Assessment Practitioner	**Envirodu Consulting & Training Solutions cc** **P. O. Box 4120** **Swakopmund** Website: www.ecutsnamibia.com

INDEPENDENCE

I **TWALINOHAMBA AKAWA** hereby declare that I have no interest in **OKOMBAHE SERVICE STATION**, financial, personal, or other interests in the proposed activity, application, or appeal in respect of which I was appointed other than fair remuneration for the work performed. Therefore, there were no circumstances that compromise the objectivity of this assessment and recommendations, thereof.

Document First release for internal review	8 December 2025	Mr. Ernst Stuurman _____
Feedback and Review date	11 December 2025	Mr. Twalinohamba Akawa
Last review date	18 November 2025	Approval

EXECUTIVE SUMMARY

1.1. Introduction and Project Proponent

Okombahe Service Station will be strategically located along the C36 Road, which connects Uis, Okombahe and Omatjete settlements to Omaruru town. In the near future, this route connecting these 3 settlements to the C33 and B2 Roads will become an extremely important tourism route connecting the central northwestern to the main road network. This is most likely to happen especially when upgrading of the C35 Road (connecting Uis to Henties Bay) into tarred road is completed in 2031.

1.2. Baseline Activities and Legal Compliance

The proposed Okombahe Service Station will be completed by undertaking several activities, starting with the upgrading of the water supply, construction of facilities. Other activities involved fall into categories related to ***legal compliance, planning, operations, and commerce****.*

The Proponent has undertaken critical preliminary steps to ensure the feasibility and legal groundwork for the Project:

- ***Ministry of Industries, Mines and Energy (MIME):*** *Letter of Intent secured.*
- ***Traditional Authorities:*** *Consent Letters obtained.*
- ***Erongo Communal Land Board:*** *Application initiated.*

1.3. Anticipated Impacts and Benefits

1.3.1.1. Positive Socio-Economic Impacts

The establishment of the Okombahe Service Station is expected to yield significant benefits for the local area:

- ***Job Creation:*** *Creation of employment opportunities for the local community.*
- ***Tourism Promotion:*** *Support and enhancement of the local and regional tourism industry by providing necessary infrastructure support.*
- ***Essential Services:*** *Provision of crucial fuel services to residents and travelers.*

1.3.1.2. Potential Negative Environmental Impacts

While socio-economic benefits are clear, the construction and operation of Okombahe Service Station will carry potential negative environmental impacts that need to be assessed and

managed through the EIA process.

1.4. Public Engagement

During the EIA process, the Proponent was committed to an open and inclusive Environmental Impact Assessment process.

- ***Objective:*** *To solicit inputs, comments, and concerns from* ***Interested and Affected Parties (IAPs)*** *and stakeholders regarding the potential impact (both positive and negative) of the proposed construction and operation of the Okombahe Service Station.*
- ***Action:*** *IAPs and stakeholders were invited to participate in the public engagement process to ensure all relevant issues were identified and addressed in this Environmental and Social Assessment (ESIA) Report.*

- ***Public meeting:*** *The public meeting was undertaken on* ***6 December 2025*** *at the site where the service station will be located.*

CHAPTER 1

1. INTRODUCTION AND BACKGROUND

The Proponent, Okombahe Service Station (OSS), intends to undertake the construction and subsequent operation of a new Fuel Retail Outlet. This facility will be situated on communal land within the area of Klaasen Camp in Okombahe village.

Okombahe Service Station currently maintains a commitment to providing essential services, which include food and lodging, for both the local community and visiting tourists in Okombahe.

Due to the demonstrable increase in tourism and general motorist traffic within the Okombahe area, the Proponent formally seeks to expand its service offering to strategically incorporate a dedicated fuel retail facility. This expansion is designed to meet the rising demand for refuelling services, thereby enhancing convenience and supporting the economic activity of the surrounding area.

1.1. Need and desirability

The establishment of the Okombahe Service Station is not merely a response to current local demand but represents a **strategic investment** aligned with the projected evolution of Namibia's national road network infrastructure. Its current and future positioning significantly bolsters the long-term viability and commercial resilience of this project.

1.1.1. Current Strategic Positioning

The Okombahe Service Station will be located along the **C36 Road**, a crucial component of the regional transport infrastructure. Currently, the C36 serves as a **vital secondary link**, providing the primary connection between the town of **Omaruru** (a regional hub) and the major mining and tourism settlement of **Uis**.

This positioning already captures existing traffic flows, including local commuters, commercial vehicles servicing the settlements, and tourists traveling through the Erongo Region's north-western interior.

1.1.2. Future Network Significance: The National Road Network Alignment

The commercial and national value of the OSS location is projected to increase substantially, transforming the C36 into a high-priority corridor within the national road framework. This transformation is predicated on anticipated infrastructural developments, primarily catalyzed by the completion of the C35 Road upgrade.

1.1.3. Elevated National Importance: The North-Western Corridor

The C36 route, which connects Uis to Omaruru and subsequently links to the **C33** and the nationally significant **B2 Roads** (Walvis Bay-Swakopmund-Karibib-Windhoek), is forecasted to become an **extremely important route** for connecting Namibia's central north-western regions (including areas like Khorixas and further north) to the main national logistics network.

1.1.4. The 2031 Infrastructure Catalyst (C35 Upgrade)

The substantial increase in traffic flow and corresponding route importance is primarily anticipated to be triggered by the projected **completion of the upgrading and tarring of the C35 Road**, which is currently forecast for completion around **2031**.

- **Impact:** The upgrade of the C35 will significantly improve road quality and travel times on the axis running north-south through the Erongo and Kunene Regions. This improved connectivity will inevitably draw traffic seeking the most efficient route between the coast (B2) and the northern regions.

1.1.5. Projected Outcome and Commercial Advantage

The completion of the C35 upgrade will effectively **funnel a greater volume of long-distance and heavier vehicle traffic** onto this central north-western axis.

This shift will establish the C36 and, by extension, the **Okombahe Service Station**, as a **necessary and highly valuable stopping point** for refuelling, rest, and logistical support. The increased traffic volume will dramatically amplify the catchment area and sales potential of the Service Station.

- By establishing the Okombahe Service Station at its proposed location now, the Proponent is **securing a prime commercial asset** ahead of the anticipated infrastructural upgrades. This foresight ensures the OSS will be fully operational and established to immediately capitalize on the projected surge in traffic flow and

commercial activity on the C36 route starting from 2031. This strategic timing mitigates future competition and secures a first-mover advantage.

1.2. Location and accessibility

The project location could be accessed via the C36 Road. The main geographical feature in the area is the T-junction where the C36 intersects the D3712 and the D2306 Roads. When approaching from Uis settlement from the site is on the left. The total area allocated is 5 ha and this will be divided into several facilities as per requirements fo a standard service station.

Figure 1: The main geographical feature in the area is the T-junction where the C36 intersects the D3712 and the D2306 Roads.

CHAPTER 2

2. LEGISLATIVE FRAMEWORK AND INTITUTIONAL ARRANGEMENTS

2.1. Legislative framework

The environmental impact assessment (EIA) procedure for this project was conducted in compliance with Namibia's environmental legislation, specifically the Environmental Management Act (Act No. 7 of 2007), and its 2012 regulations. The Act and its regulations guide the Environmental Impact Assessment (EIA) process.

The EIA process was inclusive and solicited inputs from community that may be impacted by the project. Therefore, the Proponent has prepared this ESIA Report to ensure that public opinions, especially those of interested and affected parties (IAPs), are taken into account during the EIA process to ensure maximum sustainable environmental management of the proposed development.

2.2. Public consultation

The EIA process necessitates the participation of IAPs for the proposed development. Because of this requirement, the proponent has placed notices in local newspapers. Furthermore, notices were distributed to line ministries, the general public, and IAPs. Notices were also be placed at the site and in the surrounding area to solicit input regarding the proposed development of the Okombahe Service Station.

2.3. Institutional arrangements

The Environmental Impact Assessment (EIA) process for the proposed Okombahe Service Station was regulated by the following institutions:

- ***Primary Legal Instrument***

The entire environmental assessment process was guided by the **Environmental Management Act (Act No. 7) of 2007** and its **Environmental Impact Assessment Regulations of 2012.**

- ***Primary Competent Authority***

The overall oversight and regulatory mandate for environmental laws in Namibia rests with the **Ministry of Environment, Forestry and Tourism (MEFT).**

  - **Role:** MEFT, through the Environmental Commissioner, was the designated

Competent Authority responsible for administering the EMA. This included reviewing the Environmental Assessment Report and ultimately issuing or refusing the **Environmental Clearance Certificate (ECC)** for the proposed Project.

- ***Concerned Stakeholders and Secondary Competent Authorities***

Depending on the specific nature and location of the proposed project (a fuel retail facility on communal land), other **Government of the Republic of Namibia (GRN) entities** played a critical role either as secondary regulating bodies or concerned stakeholders:

Institution	**Role and Relevance to the Project**
Ministry of Industries, Mines and Energy (MIME)	**Primary licensing authority** for the construction and operation of the fuel retail facility. MME consent was mandatory prior to the ECC application.
Erongo Regional Council	Provides **permission and consent** for the use of communal land and has a vested interest in local development, infrastructure, and socio-economic planning.
Traditional Authorities	Provides **consent** for the utilization of communal land within their traditional jurisdiction, a prerequisite for the MME license and the ECC application.
Ministry of Health and Social Services	Concerned stakeholder regarding potential public health impacts (e.g., fuel storage and air quality).
Namibia Water Corporation (NamWater)	Concerned stakeholder regarding water supply and wastewater disposal.

The above institutional arrangement ensured that the Project was assessed not only for

environmental compliance but also for technical and socio-economic feasibility across all relevant sectors of government.

CHAPTER 3

3. METHODOLOGIES, APPROACHES, ASSUMPTIONS, AND LIMITATIONS

This section outlines the methodologies, approaches, assumptions, and limitations used to evaluate the environmental and social impacts of the proposed Okombahe Service Station.

Okombahe Service Station aims to ensure sustainability by identifying risks early, mitigating negative impacts, and enhancing positive outcomes through systematic assessment tools tailored to this specific project.

4.1. Description of Methods

The assessment of the proposed Okombahe Service Station employs the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP) as primary methods.

These ESIA and ESMP tools were selected for their ability to address the project's unique context. The ESIA proactively identifies potential impacts, such as ecological disruption or safety before implementation. It involved collecting baseline data and predicting outcomes using scientific methods like impact modelling. The ESMP report, in contrast, provides ongoing guidance to manage these impacts during construction and operations, ensuring long-term sustainability. Together, these methods form a robust framework to balance environmental protection with the project's economic and social goals.

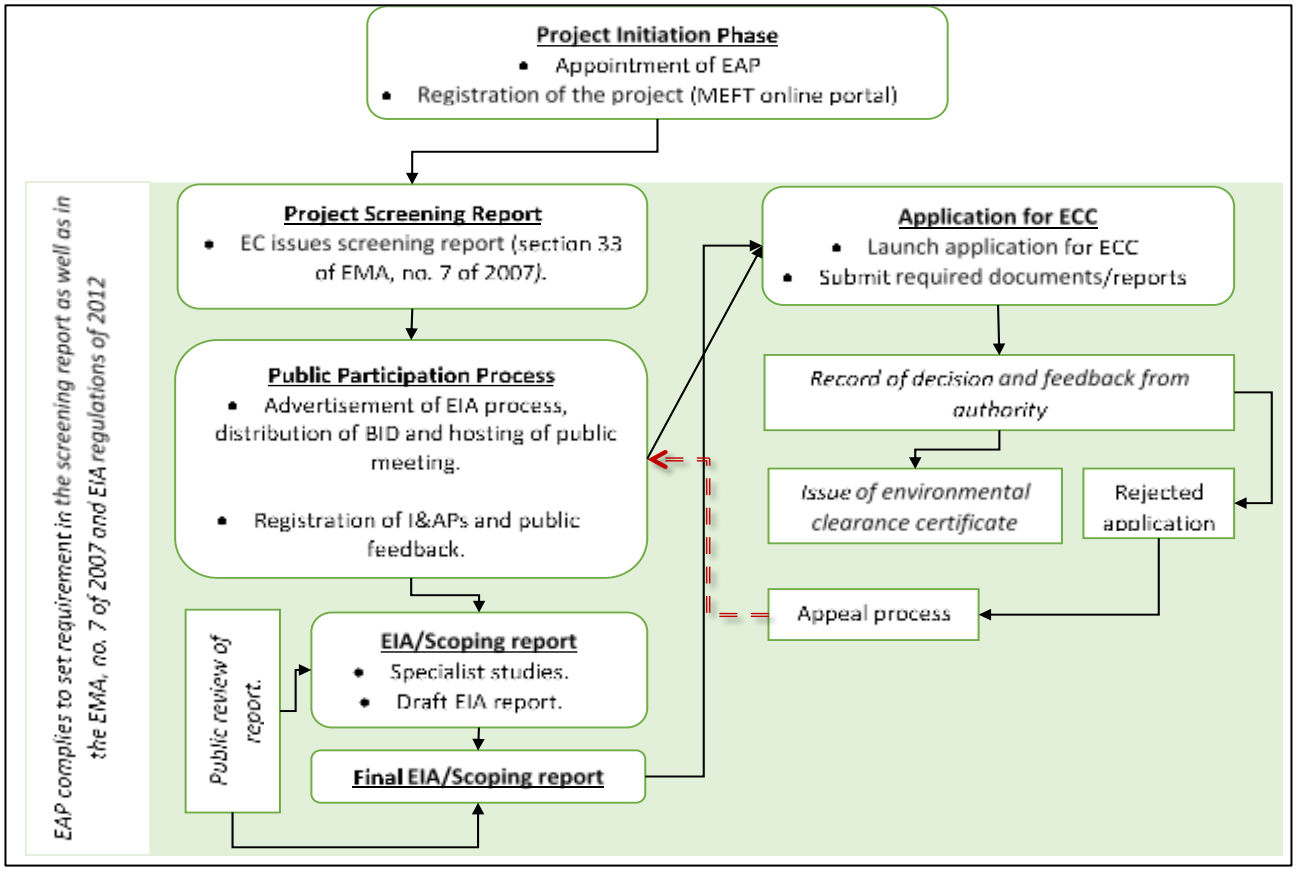


Figure 3: Illustration of the EIA process in Namibia.

4.2. Sustainable Development

Sustainable development underpins this project, aiming to enhance Okombahe's tourism potential while preserving its natural environment and meeting the needs of current and future generations. This involves screening for risks and amplify benefits (e.g., local job creation). Various sustainability methodologies exist, including Environmental Impact Assessment (EIA), Environmental Management Plan (EMP), Strategic Environmental and Social Assessment (SESA), Poverty Analysis (PA), Life Cycle Analysis (LCA), Monitoring and Evaluation (M&E), Cost-Benefit Analysis (CBA), Carbon Footprint, and Basic Sustainability Assessment Tools. For this project, the ESIA and ESMP tools were chosen for their comprehensive scope and legal alignment with Namibian requirements.

The ESIA is defined as a systematic process to identify, predict, and evaluate environmental and social impacts (MET, 2009), covering ecological effects, socio-economic outcomes (e.g., tourism revenue), and cultural values (e.g., community ties to the environment). The ESMP offers a practical framework to manage these impacts throughout the project's lifecycle (DEAT, 2004a), detailing monitoring actions. These methods ensure the proposed activities remain sustainable, supporting local and visitors while safeguarding environment for the future.

4.3 Description of Sustainability Approaches and Methods

The ESIA and ESMP were described in this report, detailing their processes, effectiveness, limitations, and underlying assumptions, with a focus on their application to the prposed Okombahe Service Station.

The ESIA shapes the project to suit local conditions by providing scientific recommendations e.g., optimal site selection, tank placement and alternatives to avoid ecological disruptions. Its process, governed by Namibia's Environmental Management Act (No. 7 of 2007), includes:

Submission and Registration: The proponent submits a Background Information Document (BID) to the Office of the Environmental Commissioner (OEC), receiving an application number.

- **Screening**: The OEC assesses the project's significance, issuing a notice with required reports.
- **Scoping**: Identifies key issues (e.g., marine impacts), spatial boundaries (Second Lagoon), and temporal scope (construction and events).
- **Impact Analysis**: Predicts impacts (e.g., water quality changes) using data like wind patterns and ecological surveys.
- **Mitigation Plan**: Proposes measures to reduce harm (e.g., silt curtains) and enhance benefits (e.g.,local vendor promotion).
- **Reporting**: Compiles findings for decision-making.
- **Review and Decision**: The OEC evaluates and approves/rejects the project, issuing an ECC if approved.
- **Follow-Up**: Monitors implementation via audits and compliance checks.
- **Public Involvement**: Engages stakeholders through consultations.

The ESIA promotes sustainability by integrating social, economic, and environmental factors, ensuring efficient resource use (e.g., minimizing waste), improving design (e.g., safer wave breaker), collecting baseline data, and fostering public learning.

4.4. Limitations

However, the ESIA has its limitations:

- Ambiguity in goals, procedural misuse, weak decision-making influence,

- Criticism as an economic delay or politically biased tool lacking scientific rigor, and
- It assumes limitations are addressed by Namibia's legal framework, but there might gaps e.g., incomplete data the precautionary approach recommends conservative measures like additional marine studies.

4.5. Precautionary approach

The ESMP complements the ESIA by managing impacts over time. Even with a robust ESIA, cumulative effects (e.g., long-term water flow changes) may emerge, requiring an ESMP to outline actions like underground water quality monitoring or spill response plans. Submitted with the ESIA, it requires bi-annual reports to the OEC. The ESMP's effectiveness lies in its adaptability, providing a baseline for continuous management e.g., tracking marine life post-construction surpassing the static ESIA. Its limitation is reliance on internal oversight, risking deviation without public pressure or strong enforcement. It assumes OEC scrutiny and resource availability, but precautionary measures include mandating independent bi-annual reports, public access to findings, and a limited-term ECC (e.g., 3-5 years) renewable only with compliance.

3.1. Socio-economic setting

Okombahe is a settlement located in the **Dâures Constituency** of the Erongo Region, serving as the traditional and cultural capital of the ǂNûkhoen (Damara) people.

The local economy is centered primarily on **extensive communal livestock farming** and the provision of basic government and social services (including schools and the Constituency office).

- **Agriculture**

The region, like much of Namibia's communal areas, faces challenges from recurring **drought conditions**, which have impacted agricultural productivity and led to low population density.

With regard to contributing to drought challenges, the construction of the Okombahe Service Station will provide a much-needed **economic catalyst**, supporting local employment and supplying essential fuel services to a community that otherwise relies on services from the distant towns of Omaruru and Usakos. Furthermore, the station is strategically positioned to capture **regional tourism traffic** that traverses the C36 and other district roads in the Dâures Constituency.

- **Tourism**

Tourism as a climate resilient solution allows rural farmers to supplement their agricultural activities by participating in ecotourism activities such as cultural village tours, gastronomy, and entertainment. More importantly, because the value of Namibia's landscapes and cultural diversity that does not depreciate, tourism is one of the few sectors in Namibia that can be sustainable.

Due to poor road infrastructure and other accessibility factors, Okombahe is one of Namibia's least explored places, despite its unique scenery and cultural diversity. Omaruru, the nearest town, is approximately 75 km from Okombahe. The road to Okombahe from Omaruru is a gravel road, and there is no fuel retail facilities to cater for the growing number of tourists and motorists. As a result, the proponent plans to construct a fuel retail facility to provide service to the local communities and boost the tourism sector, which is a significant economic activity for the local people.

3.2. Governance and administrative system

The Erongo Region, where Okombahe is located, is governed by a decentralized system representing the central government:

- **Political Head:** The **Governor of the Erongo Region**, appointed by the President of Namibia, serves as the political head and the link between the central government and the Regional Council.
- **Administrative Body:** The **Erongo Regional Council (ERC)** is the local government body established under the Regional Councils Act. Its primary mandate is to plan, coordinate, and implement socio-economic development activities, administer settlement areas (like Okombahe), and manage communal lands.
- **Constituency Level:** Okombahe falls within the **Dâures Constituency**. The Constituency Councillor is an elected representative on the Regional Council and is directly responsible for liaising with the community on service delivery and development. The **Dâures Constituency Office** is located in Okombahe.
- **Administration:** Okombahe is officially designated as a **Settlement** under the Ministry of Urban and Rural Development (MURD).

- Settlements are typically managed by the **Erongo Regional Council** through a dedicated **Settlement Office** (located in Okombahe). The Settlement Office is responsible for local administration, land allocation procedures on behalf of the Regional Council, and the provision of basic services.

The Damara Traditional Authority Structure: Okombahe is historically and culturally significant as it is regarded as the traditional capital of the ǂNûkhoen (Damara) people. Traditional authorities (TAs) run parallel to the state system and are recognized under the Traditional Authorities Act:

- **Overall Authority:** The Damara Nation is led by a **King (Gaob)**, who is the paramount traditional leader.
- **Local Governance (Okombahe):** The specific Traditional Authority with jurisdiction over Okombahe is the relevant **Damara Clan Traditional Authority** (often the **Dâuredaman** or another recognized clan in the area). This local TA, headed by a recognized Chief or Senior Traditional Councillor, manages and resolves local conflicts, preserves cultural identity, and crucially, has legal authority (under the Communal Land Reform Act) to **allocate communal land** and adjudicate minor disputes using customary law.

Project Relevance: For the Okombahe Service Station Project, both spheres of governance must be engaged:

- **Customary Requirement:** The relevant **Traditional Authority** must provide consent for the land usage in line with customary law, which is often a prerequisite for the Ministerial licenses and the Environmental Clearance Certificate.
- **Statutory Requirement:** The **Erongo Regional Council** must provide consent for the lease of the communal land.

CHAPTER 4

4. THE RECEIVING ENVIRONMENTAL SETTING AND SENSITIVITY

4.1. Physical environmental characteristics

4.1.1. Climate and Air Quality

Okombahe, situated in the Erongo Region of eastern-central Namibia, experiences a **Hot Desert Climate** typical of inland areas in the country, marked by extreme temperature variations between day and night, and between summer and winter.

This region is located far enough inland from the Atlantic coast (approximately 150-200 km) that it is not subject to the moderating influence and dense fog of the cold Benguela Upwelling Current, leading to more pronounced temperature swings.

4.2. Monthly Temperature Averages (Estimated for Okombahe)

Since Okombahe sits between the coastal areas and the central highlands, its profile is generally hotter than Windhoek in summer and can be colder than the coast in winter. The following table provides an estimated annual temperature rhythm:

4.2.1. Topography and Geology

4.2.1.1. **Topography:** The site is located in the Central-Western Plains, characterized by relatively flat to gently undulating terrain. The landscape is dominated by scattered mountain outcrops and inselbergs typical of the region, though the specific service station site has been selected on flatter land for ease of construction.

4.2.1.2. **Geology:** The area forms part of the **Damara Orogenic Belt**, which consists of

ancient metamorphic and granitic rocks. The local landscape is dominated by various geological features, with soils often being deposits of **sand and surface limestone**.

4.2.1.3. **Soils:** Soils in the area are shallow, gravelly, and highly susceptible to **wind and water erosion**, especially when the protective vegetation layer is removed.

4.2.2. Hydrology and Water Resources

4.2.2.1. **Surface Water:** The primary hydrological feature is the **Omaruru River**, an ephemeral (non-perennial) river on which the Okombahe settlement is situated (approximately 8 km away). Surface water flow is rare, occurring only after significant rainfall.

4.2.2.2. **Groundwater:** The region is highly dependent on groundwater. The Okombahe Water Supply Scheme taps into the subsurface water resources of the Omaruru River via boreholes. Groundwater resources are precious and vulnerable, making protection from pollution a critical concern.

4.2.2.3. **Water Source:** The Okombahe area is a **water-stressed environment**, meaning the service station's water demands must be carefully managed to avoid impacting community supplies.

4.3. Biological environment

4.3.1. Flora diversity

The Okombahe area falls within a **semi-arid transition zone** between the pure desert of the Namib to the west and the more diverse savanna lands to the east. This positioning, within the **Western Highlands** biome, results in a flora diversity characterized by hardy, drought-adapted species, including shrubs, grasses, and iconic Namibian plants.

Dominant Vegetation Type

The overall vegetation structure around Okombahe is classified as **varied shrubland and grasslands**. The sparse cover reflects the low and erratic annual rainfall, which typically ranges between 150mm and 200mm.

Shrubland: Dominated by low-lying, drought-resistant shrubs, often referred to as "fodder bushes."

Grasslands: Consist of sparse perennial grasses adapted to the arid climate, such as climax grasses like *Stipagrostis obtusa* and *Stipagrostis uniplumis*.

Drainage Lines: Larger woody species are typically confined to the ephemeral river courses (drainage lines) where subsurface moisture is more readily available.

Key and Iconic Plant Species

The Okombahe area is home to several iconic and economically significant plant species, many of which exhibit special adaptations to arid conditions.

Species Name (Latin)	Common Name	Significance/Adaptation
Welwitschia mirabilis	Welwitschia	A unique, iconic endemic plant often called a "living fossil." It has only two permanent leaves and can live for over 1,000 years, relying on coastal fog for moisture in areas closer to the coast/escarpment.
Aloe dichotoma	Quiver Tree (Kokerboom)	A large, slow-growing succulent tree, highly iconic of the dry landscapes. Historically used by the San people to make quivers for arrows.
Harpagophytum procumbens	Devil's Claw	A plant of high economic and medicinal importance, often sustainably harvested in this region for its anti-inflammatory properties.
Citrullus lanatus	Tsamma Melon	A crucial source of food and water for humans and animals, adapted to the semi-desert climate.
Acacia reficiens	Red-thorn	A common acacia species. In some parts of the wider region (between Karibib and Omaruru), *Acacia reficiens* is a known species involved in **bush encroachment**, a problematic form of vegetation thickening.
Boscia albitrunca	Shepherd's Tree	A resilient, drought-resistant tree whose leaves and roots provide

Species Name (Latin)	Common Name	Significance/Adaptation
		browse and food.
***Commiphora* species**	Corkwood Trees	A genus of trees adapted to dry areas, notable for their peeling bark and often confined to rocky areas or mountains.

Endemism and Ecological Importance

While the overall terrestrial species diversity in the central-western part of Namibia, including the Okombahe general area, is considered "relatively low to moderate," the area exhibits **moderate to high endemism**.

Endemic Focus: Pockets of high endemism are often associated with unique habitats like mountains and inselbergs (granite domes). The nearby **Erongo Mountains**, for example, are a known hot-spot for local endemic plant species.

Resource Use: Many indigenous plants in the region are used by local communities for traditional purposes, including construction, food, craft, and medicine, highlighting the ecological and social importance of conserving the flora.

4.3.2. Fauna diversity

The Okombahe area is characterized by its location in the transitional zone between the arid Namib Desert and the central Namibian highlands, particularly in proximity to the dramatic **Erongo Mountains**. This diverse landscape, featuring rocky outcrops, gravel plains, and ephemeral river courses, supports a rich and unique fauna, particularly species adapted to arid and semi-arid conditions.

The fauna diversity in and around Okombahe is generally considered **moderate to high** in terms of overall species richness, and notably **high in endemism** (species unique to this region).

Key Mammal Species

The area, particularly the communal lands and conservancies around Okombahe, is known to host a variety of large and small mammals.

Desert-Adapted Species: The broader north-western Erongo and Damaraland areas are internationally renowned for the presence of **desert-adapted Black Rhino** (*Diceros bicornis bicornis*) and **African Elephant** (*Loxodonta africana*), although their presence near the immediate settlement of Okombahe would be transient and linked to seasonal movements along dry riverbeds.

Larger Herbivores (Antelope): Common plains and rocky outcrop species include:

Gemsbok/Oryx (*Oryx gazella*): Namibia's national animal, highly adapted to arid conditions.

Greater Kudu (*Tragelaphus strepsiceros*): Found in areas with denser bush and in proximity to water sources.

Springbok (*Antidorcas marsupialis*): Common in the open plains.

Hartmann's Mountain Zebra (*Equus zebra hartmannae*): Often found utilizing the mountainous and hilly areas of the Erongo range.

Steenbok and **Klipspringer** (in rocky areas).

Predators: Large predators are present, often moving across vast communal and conservancy land.

Leopard (*Panthera pardus*)

Cheetah (*Acinonyx jubatus*)

Black-backed Jackal (*Canis mesomelas*)

Spotted Hyena (*Crocuta crocuta*) and **Brown Hyena** (*Parahyaena brunnea*) are also expected.

Avian Diversity (Birds)

The Erongo Mountain area, a short distance from Okombahe, is particularly recognized for its birding, hosting over 200 species and several near-endemics specific to the central arid zone.

Near-Endemic and Endemic Species: Birdlife is a major highlight, with species that are highly specialized to the rocky and dry habitats:

Damara Rockrunner (*Achaetops pycnopygius*)

Hartlaub's Francolin (*Pternistis hartlaubi*)

Rosy-faced Lovebird (*Agapornis roseicollis*)

Rüppell's Parrot (*Poicephalus rueppellii*) (found in dry riverine woodlands)

Monteiro's Hornbill (*Tockus monteiri*): Adapted to the driest habitats globally.

Other Common Species: The plains and open bushveld support various larks, sandgrouse, bustards, and raptors, including:

Namaqua Sandgrouse

Rüppell's Korhaan/Bustard

Bradfield's Swift

Various **Hornbills** (e.g., Damara Hornbill).

Reptiles and Smaller Fauna

The warm, dry environment is ideal for a high diversity of reptiles, many of which exhibit moderate to high endemism in the central Namibian landscape.

Reptiles: Species diversity is high, with up to an estimated 75 species, including various geckos, lizards, and snakes adapted for cryptic living in rocks and sand.

Small Mammals

The ecosystem is home to numerous small mammals, including various species of **shrews, bats, rodents** (e.g., Dassie Rat, gerbils), and **mongoose** (e.g., Yellow Mongoose).

Invertebrates: The micro-fauna, including insects, arachnids, and beetles, is extensive and plays a critical role in nutrient cycling in the dry environment.

The general area around Okombahe is characterized by communal land management and conservancy initiatives, which promote the sustained presence and movement of these wildlife populations, particularly the larger, more valuable game species.

CHAPTER 5

5. TECHNICAL DETAILS AND CONCEPT DESIGN

5.1. Location

Okombahe Service Station will be located on the left side of the C36 Road when approaching from Uis.

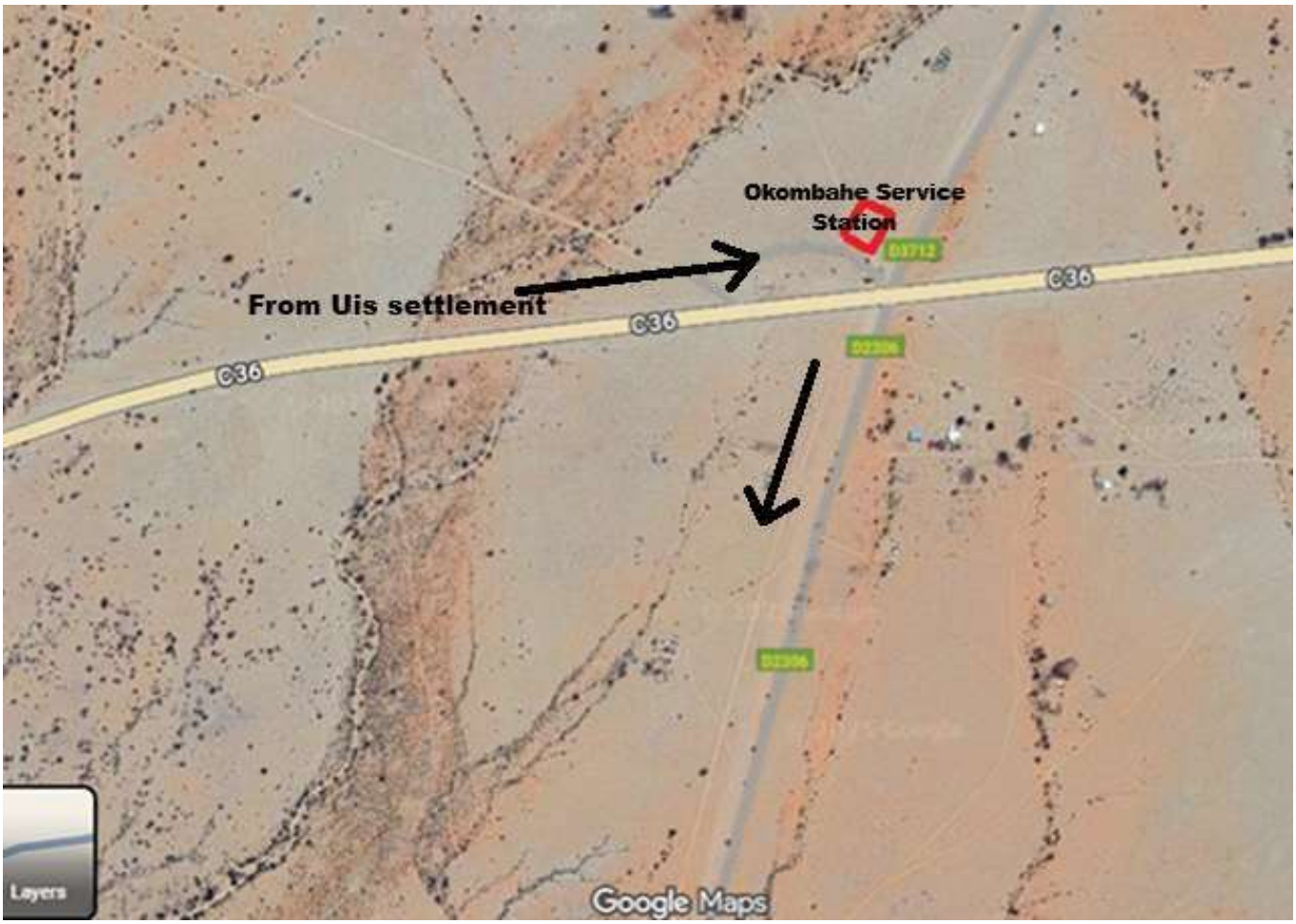


Figure 2: Location of the Proposed Okombahe Service Station.

Okombahe Service Station will be located near Okombahe settlement. The site where the allocated is located falls under a Traditional Authority and is governed by Okombahe Headman.

5.2. Concept design

During the design of the project concept, it was advised that the Okombahe Service Station should be environmental sensitive:

Maximum Solar Integration (The Core Strategy)

The primary energy source for the entire facility will be photovoltaic (PV) solar generation.

- **The Solar Canopy:** The main forecourt canopy will be significantly oversized to maximize solar surface area. It will be constructed using an array of high-efficiency **monocrystalline solar panels**. This canopy serves a dual purpose: generating power and providing extensive shade to reduce heat load on the forecourt and vehicles.
- **Net Metering/Battery Storage:** The system will be connected to a robust **lithium-ion battery bank** for energy storage. This allows the station to operate fully off-grid at night and during overcast periods, ensuring reliable 24/7 service without relying heavily on a diesel generator.
- **Building Integration:** Additional solar panels can be installed on the flat roof of the convenience store (C-Store) and support buildings to supplement the power from the main canopy.

Energy Efficiency & Consumption Reduction

To ensure the solar system is sufficient, consumption must be minimized:

- **Lighting:** Exclusive use of **high-efficiency LED lighting** (low-wattage) for the forecourt, building interior, and security perimeter. Lights will be managed by **photocell sensors** (to activate at dusk) and **motion sensors** (in non-public areas) to save power.
- **HVAC:** Use of modern, **high-efficiency air conditioning units** (Inverter Technology) for the C-Store and offices.
- **Insulation:** The service station building will be constructed with thick, high-quality wall and roof insulation to dramatically reduce the need for cooling during the hot summer months.

Water Conservation (Crucial for Okombahe)

Given the water-stressed environment, water use must be minimized:

- **Rainwater Harvesting:** The large solar canopy and building roofs will be designed to channel all captured rainwater into dedicated, sealed storage tanks for non-potable uses (e.g., cleaning, irrigation).
- **Water Fixtures:** Installation of **low-flow fixtures** and **dual-flush toilets** in all ablution facilities.
- **Landscaping:** Exclusive use of **xeriscaping** (drought-resistant plants, like local succulents and gravel) to eliminate the need for irrigation.

Waste and Pollution Control

- **Hazardous Waste:** Adherence to the highest standards (SANS 10089) for **double-walled storage tanks** and secondary contained piping to prevent fuel leaks.
- **Oil-Water Separation:** Installation of a well-sized, functional **three-stage oil/water separator** to treat all forecourt run-off before release, protecting the precious local groundwater resources.

Given the strategic location on the C36 gravel road, the arid, rocky landscape of the Erongo Region, and the proximity to the Damara cultural heartland, the concept design for the Okombahe Service Station should blend **modern functionality** with **cultural sensitivity and environmental resilience**.

Here are three proposed designs; focusing on **aesthetics**, **sustainability**, and **functionality**:

7.21. Potential concept design themes

Concept 1: The Desert Oasis (Sustainable & Modern)

This concept prioritizes environmental responsibility and visibility, positioning the station as a welcome, high-tech stop in the arid environment.

Key Design Elements

- **Aesthetics:** Clean, minimalist lines with a low-profile structure that echoes the smooth, sweeping forms of the surrounding rocky outcrops.

- **Roof/Canopy:** A large, cantilevered canopy entirely covered in **solar panels** (photovoltaic cells). This generates power and provides maximum shade for the forecourt.
- **Materials:** Use of local, durable, light-colored materials such as **sand-colored plaster, exposed concrete, and natural stone cladding** (matching the local granite and gneiss) to blend into the landscape and reduce heat absorption.
- **Water Management:** Integrated rainwater harvesting from the large canopy and a highly efficient greywater recycling system to minimize demand on local groundwater resources.
- **Branding:** The name "Okombahe Service Station" is featured on a prominent, high-tech digital display board integrated into the canopy structure for visibility from the C36.

Concept 2: The Damara Heritage Hub (Cultural & Earthy)

This concept emphasizes the cultural significance of Okombahe as the traditional capital of the Damara people, making the station a unique destination, not just a fuel stop.

Key Design Elements

- **Aesthetics:** The structure incorporates **rounded edges and natural forms** reminiscent of traditional Damara communal buildings or kraals. The design uses natural stone walls (gabions) and exposed timber elements.
- **Forecourt:** The canopy is supported by **massive, rough-hewn timber or stone columns** that symbolize stability and natural permanence.
- **Materials:** Predominant use of **natural rock, dark wood, and earth-tone** plasters.
- **Ancillary Facilities:** A designated area for a **local craft market** or a **small cultural exhibit** showcasing Damara history and art, providing a direct economic benefit to the community.
- **Lighting:** Warm, soft lighting that highlights the stone textures at night, avoiding harsh glare that might detract from the dark skies (promoting astro-tourism).

Concept 3: The C36 Roadhouse (Durable & Functional)

This practical concept focuses on durability and catering specifically to long-haul travelers and the tough conditions of the C36 gravel road.

Key Design Elements

- **Aesthetics:** A robust, single-story, elongated structure built to withstand high winds and dust. The design is practical and emphasizes ease of access and maintenance.
- **Parking & Access:** Features a highly demarcated and durable gravel or concrete entrance/exit with **wide turning radii** specifically for large trucks and trailers.
- **Amenities:** Focus on heavy-duty facilities: large, clean public restrooms and showers; a dedicated, sheltered rest area for drivers; and a separate, high-volume **diesel truck-stop bay**.
- **Dust Mitigation:** The design incorporates windbreaks (low walls or vegetation barriers) and uses hard-surfaced paving (e.g., concrete or brick pavers) in high-traffic areas to minimize dust generation.
- **Security:** High-visibility lighting and secure fencing around the entire perimeter, essential for remote locations.

Proposed "Final Concept": ***Recommended Fusion***

A strong recommendation for the **Okombahe Service Station** would be:

- ***Fusion of Concept 1 (Solar Sustainability)*** and
- ***Concept 2 (Cultural Heritage)***.

This will create a visually distinctive, low-impact structure that both meets the modern needs of travelers and honors the traditional significance of the Okombahe community as illustrated in ***Figure 4***.

***Figure 4*:** Proposed Okombahe Service Station concept design.

5.3. Technical details

5.3.1. Project Overview and Scope

Aspect	Detail to Include
Location & Site Area	GPS coordinates: -21.286729S and 15.394792 Distance: Approximately 8 Km from Okombahe Physical address: Klaasen Camp, Okombahe Village, Daures Constituency Total size of the plot: 5 ha
Phases	State clearly that the project involves **Planning and Design, Construction, Operation, and Decommissioning** phases.
Applicable Standards	Confirmation that the design adheres to the relevant Namibian legislation (Petroleum Products and Energy Act) and **SANS 10089 Parts 1-3** standards.

5.3.2. Fuel Storage and Dispensing Infrastructure

This section is the most critical for environmental risk assessment and licensing.

Aspect	Detail to Include
Underground Storage Tanks (USTs)	**Type:** This will be **Double-Walled Composite USTs** (Fibre-reinforced resin coated steel tanks) as required by SANS standards for maximum leak protection.
Capacity and Product	Specify the number of tanks: N/A.
Forecourt Area	**Canopy:** Description of the canopy and the forecourt area, including the overhead **canopy** will be provided in the ESIA report. **Dispensing Islands:** Number of islands and types of pumps will be provided in the ESIA report.
Truck Stop Facility	Given the location on the C36, details on a **dedicated truck diesel island** for heavy-duty vehicles will be provided, separate from the main forecourt.
Piping	The use of **double-skinned (or secondary contained)** piping for all product lines running from the USTs to the dispensers will be specified in the will be provided in the ESIA report.

5.3.3. Safety, Security, and Environmental Controls

Compliance with safety and environmental standards will be clearly detailed.

Aspect	Detail to Include
Contamination Control	**Impervious Surface:** Confirmation that all fuel handling areas (forecourt, tank fill points) will be sealed with **impervious concrete slabs** to prevent seepage.
Spill Containment	**Filler Point Containment:** Use of **spill catchment sumps/pits** at all tank filler points. **Oil/Water Separator:** Installation of a **three-stage oil/water separator (interceptor)** to treat all potentially contaminated storm water run-off and wash bay effluent before discharge.
Leak Detection	Installation of an **electronic leak detection system** for both the USTs and the piping, with continuous monitoring.
Fire Safety	**Fire Control:** Provision of appropriate **firefighting equipment** (e.g., foam systems, multiple fire extinguishers) and clearly marked **Emergency Shut-Off Valves (ESOV)** at dispensers and near the tanks.
Vapour Management	Use of **venting systems** to safely disperse fuel vapours as per SANS codes.

5.3.4. Ancillary Facilities and Utility Services

Details on non-fuel infrastructure that supports the station's operation and services the public.

Aspect	Detail to Include
Building Structure	Description of the main building: **Convenience Store (C-Store)**, administration office, and staff areas.
Ablution Facilities	Provision of separate, maintained **public and staff ablution facilities**.
Water Supply	Source of water (e.g., connection to NamWater bulk supply or a new dedicated borehole, if permitted).
Sewerage	Due to the location in a communal area, specify a **conservancy tank** or a modern, sealed **septic system** designed to prevent groundwater contamination.
Power Supply	Source of electricity (e.g., Erongo RED grid connection and/or a **back-up generator**).
Waste Management	Provision of designated, sealed areas for the temporary storage of hazardous and general waste prior to collection by the Regional Council or a licensed contractor.

CHAPTER 6

6. STAKEHOLDER ENGAGEMENT

6.1. Introduction

This section details the comprehensive public consultation process conducted for the proposed Okombahe Service Station, fulfilling the requirements of the Environmental Management Act (No. 7 of 2007) and the Environmental Impact Assessment (EIA) Regulations of February 2012.

The goal of conducting a comprehensive stakeholder was to ensure all Interested & Affected Parties (IAPs) and stakeholders were informed about the project, had an opportunity to participate, and that their concerns were captured and addressed in the Environmental and Social Impact (ESIA) Report.

6.2. Public Notification and Advertisements

Public notification of the proposed development was carried out through formal advertisements placed in two different widely circulated national newspapers, in accordance with the EIA Regulations:

- The initial notice regarding the proposed **Okombahe Service Station** was published in the **New Era** and **Confidente** newspapers on **21 November 2025**.
- A subsequent advertisement was published in the **New Era** and **Confidente** newspapers on **28 November 2025**.

These advertisements served to formally notify the public of the intended activity, its location, and the ongoing EIA process, inviting stakeholders to register as IAPs and provide initial comments or concerns to the Environmental Assessment Practitioner (EAP).

6.3. Issue of screening notice

A screening notice was issued by the MEFT listing 12 documents required to support application of the ECC. These documents are summarised below.

Document required	Authority	Responsible	
1. Scoping Report	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
2. EMP	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
3. Confirmation of screening notice received (through email) in terms of assessment procedures (Section 35 (1)(a)(b) of the Environmental Management Act, No 7 of 2007)	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
4. Preliminary Site Map (Project boundaries) with coordinates (decimal degrees) and a Legend	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
5. CV of Environmental Assessment Practitioner (EAP)	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
6. Declaration for the Submission of Assessment Reports and other Support Documents (upload Declaration Form from www.eia.meft.gov.na (downloads)	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
7. List of all persons, organisations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
8. Proof of Newspaper advertisement, once a week for two consecutive weeks in at least two newspapers circulated widely in Namibia	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
9. Proof of written notice to the owners and occupiers of land adjacent to the	MAFWLR (Directorate Land Reform and Resettlement)	Linda Ruben	Envirodu Consulting & Training Solutions cc

site where the activity is or is to be undertaken or to any alternative site			
10. Proof of written notice to the local authority council, regional council and traditional authority, in which the site or alternative site is situated; and consent obtained	Klaasen Camp Okombahe	Mr. Josef Lemmy !Gaoseb	Mr. Ernst Stuurman (Okombahe Service Station)
11. Copies of the minutes of any meetings held by the proponent with interested and affected parties and other role players which record the views of the participants	MEFT	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc
12. Copies of any representations, objections and comments received in connection with the application or the scoping report	Envirodu Consulting & Training Solutions cc	Mr. Twalinohamba Akawa	Envirodu Consulting & Training Solutions cc

6.4. Public Meeting

The proposed land falls within a communal land. Matters relating to the use of land in communal areas mainly relates to community members and traditional authorities; therefore, it was necessary to have a public meeting at the site to capture views and opinions of the public.

A **public meeting** was formally convened and held at the site on **6 December 2025**. This meeting was conducted to provide a platform for direct engagement between Okombahe Service Station and the EAP to present the proposed development and address questions from local residents, traditional leaders, and other registered stakeholders.

- The meeting was guided by the stipulated procedures set out in the **EIA Regulations of February 2012**.
- **Minutes of the Public Meeting**, detailing the attendance register, presentations, questions, and responses, were meticulously recorded and have been included as an **Appendix** to this ESIA Report.

6.5. Consultation with other organs of state

The **Ministry of Industrialisation, Mines and Energy** (MIME) is the competent authority in regulations of petroleum products and establishment of refuelling facilities in Namibia and without their involvement this project may not take place:

- Letter of intent (copy attached) was obtained from the **Ministry of Industrialisation, Mines and Energy** (MIME) on **8 October 2025**.
- This letter informed Okombahe Service Station to submit to the MIME technical drawings of the proposed site as well as application for ECC within 6 months, counting from **8 October 2025**.

Furthermore, the **Ministry of Agriculture, Fisheries, Water and Land Reform** (MAFWLR) was another state organ which was critical in this consultation process. The application for leasehold was submitted to the MAFWLR (Swakopmund Office) and received on **7 November 2025** (copy of waybill attached):

- On 9 December 2025, Envirodu Consulting & Training Solutions cc consulted the MAFWLR (Swakopmund Office). They responded on 15 December 2025 (see attached response) that their role in communal land-use is secondary and the primary concerns/issues of the proposed project should be registered with the Traditional authority.
- Furthermore, to the above, the MAFWLR updated on status of the application for leasehold and that it was incomplete pending the ECC and other documents.

6.6. Summary of Issues and Response Report (IRR)

During the public meeting, a number of diverse **issues and concerns** were raised by IAPs and stakeholders regarding the proposed Okombahe Service Station.

These issues and concerns were systematically captured, summarised, and then grouped into **four broad, distinct categories** for a structured response and mitigation planning:

1. **Environmental Issues:** Concerns relating to potential impacts on the physical and biological environment (e.g., groundwater contamination from potential fuel leaks, waste management, noise pollution, visual impacts).
2. **Social Economic Issues:** Concerns relating to the project's effect on the community's well-being and economy (e.g., job creation, local procurement, safety risks, traffic impacts, potential price effects).
3. **Governance Issues:** Concerns relating to regulatory compliance, local authority involvement, and permit processes (e.g., zoning, fire safety compliance, and monitoring).
4. **Sustainability Issues:** Concerns relating to the long-term viability and resource use of the service station (e.g., water usage, energy efficiency, and long-term site rehabilitation).

🌎 Environmental Issues

These concerns focused on the **physical and biological environment** of the Okombahe area.

- **Groundwater Contamination:** This is the most critical environmental risk. Concerns centered on the potential for **leakage from the Underground Storage Tanks (USTs)** or piping systems, leading to the pollution of the local aquifer, which is often the primary water source in arid areas.

- *Issue:* What is the depth to the water table, and what monitoring system will be installed to detect leaks immediately?
- **Soil Contamination:** Spills during refuelling or tank filling operations contaminating surface soil.
- **Waste Management:** Concerns over the proper disposal of hazardous waste (e.g., used oil, oil filters, contaminated rags) and general solid waste generated by the convenience store and car wash (if applicable).
- **Air Quality:** Emissions from fuel vapours (Volatile Organic Compounds or VOCs) and increased vehicle idling.
- **Noise Pollution:** Increased noise during the **construction phase** (heavy machinery) and the **operational phase** (vehicles, compressors, and pump operation), impacting nearby residences or sensitive receptors.

👥 Social Economic Issues

These concerns related to the project's impact on the **community, economy, and public safety**.

- **Safety Risks (Fire/Explosion):** Anxiety among nearby residents regarding the inherent risk of a fuel facility and the need for rigorous fire prevention and emergency response plans.
- **Traffic Impacts:** Concerns about **increased traffic volume** on local roads, potential congestion at the site entrance/exit, and risk to pedestrians and children.
- **Job Creation and Local Benefit:**
    - *Positive:* How many **permanent jobs** will be created, and what mechanism ensures **local Okombahe residents** are prioritized for employment?
    - *Concern:* Will the project use local suppliers and services during construction and operation to maximize the economic benefit for the community?
- **Visual Impact/Aesthetics:** The service station's appearance, lighting (especially at night), and signage potentially conflicting with the local aesthetic or disrupting the night sky.
- **Land Use Conflict:** Whether the site's proximity to sensitive land uses (e.g., schools, hospitals, residential areas) is appropriate.

📜 Governance Issues

These concerns addressed the **regulatory oversight, legal compliance,** and **involvement of competent authorities**.

- **Zoning and Land Use Permits:** Confirmation that the site is properly zoned for a commercial activity like a service station by the local authority.
- **Compliance with ECC Conditions:** Concerns that the proponent may fail to implement the conditions stipulated in the final Environmental Clearance Certificate (ECC).
- **Emergency Services Readiness:** Assurance that local emergency services (Fire Department, Police) are aware of the facility and trained to handle petroleum product incidents.
- **Monitoring and Reporting:** Who will be responsible for **long-term monitoring** (e.g., groundwater testing, air quality checks) and to whom will they report the results? Transparency in reporting is a key governance issue.
- **Local Authority Involvement:** The extent to which the Okombahe local council will be involved in the ongoing management and oversight of the facility.

🌱 Sustainability Issues

These concerns look at the **long-term environmental stewardship and resource efficiency** of the service station.

- **Water Usage:** The volume of water required for operations (especially if a car wash is included) and the impact on **local water resources** in an arid or semi-arid environment.
- *Issue:* Are water-efficient technologies (e.g., recycled water for car wash) being used?
- **Energy Efficiency:** Use of renewable energy (e.g., solar power for lighting/pumps) and energy-efficient building design to reduce reliance on the national grid.
- **Decommissioning Plan:** What is the **long-term plan** for the site? Assurance that the proponent has a clear strategy, including financial provisions, to safely remove

USTs, remediate any contamination, and return the site to a safe state if the service station ever ceases operation.

- **Climate Change Resilience:** How the facility plans to manage future climate-related risks, such as potential changes in rainfall or extreme heat.

Issues and response report

A comprehensive **Issues and Response Report (IRR)** was subsequently developed for each of these categories. The IRR provided a formal, detailed **response** to every issue raised, indicating how the concern was either incorporated into the project design, addressed through the Environmental and Social Management Plan (ESMP), or deemed outside the scope of the assessment. The complete IRR is provided below.

ISSUES AND RESPONSE REPORT (IRR)

Category 1: Environmental Issues

Issue/Concern Raised	EAP Response and Action Taken	Cross-Reference to ESIA/EMP
Groundwater Contamination from potential fuel leaks, given the proximity to local water supply points.	**The risk is acknowledged as High.** The design specifies **double-walled Underground Storage Tanks (USTs)** and piping, equipped with an **interstitial leak detection monitoring system**. A dedicated **groundwater monitoring borehole network** will be installed and monitored quarterly.	**EMP Section 4.1:** *Fuel Storage and Leak Detection* **ESIA Section 8.1.1:** *Groundwater Impact Assessment*
Noise Pollution during the construction phase (especially early morning) and operation (delivery trucks, pump motors).	Construction hours will be restricted to **07:00 to 18:00** on weekdays to minimize disturbance. Delivery schedules will be planned outside peak residential quiet hours. The generator (if any) will be housed in an acoustic enclosure.	**EMP Section 3.3:** *Noise and Vibration Management*
Improper Disposal of Hazardous Waste (e.g., used oil, oil filters, contaminated soil/rags).	Dedicated, bunded storage area will be established for hazardous waste. A certified contractor will be appointed to collect and transport all hazardous waste to a **licensed disposal facility** (e.g., in Windhoek). **No on-site burning or burial** is permitted.	**EMP Section 4.3:** *Hazardous Waste Management*
Increased Air Pollution from fuel vapours and construction dust.	Dust suppression measures (e.g., watering haul roads) will be implemented during construction. The facility will be equipped with **Vapour Recovery Phase I systems** at the offloading points to minimize VOC emissions.	**EMP Section 3.4:** *Air Quality and Dust Control* **EMP Section 4.2:** *Vapour Management*

Category 2: Social Economic Issues

Issue/Concern Raised	EAP Response and Action Taken	Cross-Reference to ESIA/EMP
Traffic Congestion and Safety Risks at the access and egress points onto the main road.	A formal **Traffic Impact Assessment (TIA)** was conducted. Access points will be designed in consultation with the relevant roads authority, including designated acceleration/deceleration lanes to minimize disruption to passing traffic.	**ESIA Section 8.2.3:** *Traffic Impact Assessment* **EMP Section 5.3:** *Traffic Management Plan*
Lack of Local Employment Opportunities for Okombahe residents during construction and operation.	The proponent has committed to a **Local Recruitment Policy**. The contractor will be required to prioritize skilled and unskilled labour from the Okombahe community where possible. A skills audit will be performed before hiring.	**EMP Section 5.1:** *Local Employment and Skills Transfer*
Health and Safety Risk to the public due to the storage of large volumes of flammable liquids.	The facility will strictly adhere to the **National Fire Safety Regulations** and the Petroleum Products Act. A **Fire Management Plan** is mandatory, including appropriate signage, emergency shut-offs, and strategically located fire-fighting equipment.	**EMP Section 5.2:** *Emergency Preparedness Plan*
Visual Impact of the large canopy and signage on the surrounding landscape.	The design will utilize materials and colours that are sympathetic to the local environment where possible. Lighting will be directed downwards (**dark-sky compliant**) to minimize light pollution and glare.	**EMP Section 3.5:** *Visual and Aesthetic Management*

Category 3: Governance Issues

Issue/Concern Raised	EAP Response and Action Taken	Cross-Reference to ESIA/EMP
Compliance Monitoring and how the community can ensure the	The proponent is required to submit **annual compliance monitoring reports** to the MEFT for the duration of the ECC. These reports will be	**EMP Section 6.0:** *Monitoring and*

Issue/Concern Raised	EAP Response and Action Taken	Cross-Reference to ESIA/EMP
EMP conditions are followed.	made available to the local authority and I&APs upon request.	*Reporting*
Assurance that the land use is **appropriately zoned** for a fuel retail operation.	The proponent obtained a formal confirmation of the land use zoning from the **Okombahe Local Authority** prior to the start of the EIA process. This documentation is included in the ESIA Appendix.	**ESIA Section 4.2:** *Local Authority Compliance*
Emergency Response Coordination with local police, health services, and fire fighters.	The Emergency Preparedness Plan includes the **contact details and communication protocols** for all local emergency services. An initial briefing and site walk-through will be conducted with these services prior to the start of operations.	**EMP Section 5.2:** *Emergency Preparedness Plan*

Category 4: Sustainability Issues

Issue/Concern Raised	EAP Response and Action Taken	Cross-Reference to ESIA/EMP
Excessive Water Consumption for the facility and car wash (if included) in a water-scarce area.	The design incorporates **water-saving fixtures** (low-flow toilets, taps). If a car wash is included, it will utilize a **water recycling system** to significantly reduce fresh water demand.	**EMP Section 4.4:** *Water Conservation and Efficiency*
Long-Term Site Decommissioning and responsibility for clean-up after the operational lifespan.	A **Preliminary Decommissioning Plan** is provided, outlining the future safe removal of all infrastructure, including tank extraction and soil testing. The proponent is responsible for allocating funds towards eventual site remediation.	**EMP Section 7.0:** *Decommissioning and Site Closure*
Potential to use **renewable energy**	The proponent will investigate the installation of a **solar photovoltaic (PV) system** on the canopy and building roof to offset	**EMP Section 4.5:** *Energy Efficiency and*

Issue/Concern Raised	EAP Response and Action Taken	Cross-Reference to ESIA/EMP
to reduce carbon footprint.	daytime electricity demand, thereby improving energy sustainability.	*Renewables*

CHAPTER 7

7. PREDICTION OF ENVIRONMENTAL AND SOCIAL IMPACTS

7.1. Potential Environmental Impacts and Mitigation Measures

Focus of the Environmental and Social Impact Report was mainly on negative impacts.

The proposed Okombahe Service Station project has potential negative impacts that will be managed through committed mitigation strategies to comply with the Environmental Management Act (EMA) and obtain the Environmental Clearance Certificate (ECC).

Construction Phase Impacts (Short-Term)

The primary impacts during the construction phase relate to site preparation and temporary activities.

Potential Impact	**Description & Concern**	**Mitigation Measures**
Dust and Air Quality	Clearing vegetation and excavation of gravelly soils can generate significant dust, impacting workers, nearby residents, and local air quality, particularly on windy days.	Implement frequent **dust suppression techniques** (e.g., light watering) on exposed surfaces and active construction areas. **Restrict vehicle speeds** on site and surrounding gravel roads.
Soil Erosion	Removal of existing sparse vegetation exposes the fragile, sandy soils to wind and water erosion, especially before the construction of impervious surfaces.	**Limit the construction footprint** to the approved site boundaries. Immediately **rehabilitate** disturbed areas with local grasses upon completion.
Noise Pollution	Noise from heavy machinery (excavators, cement mixers, compactors) will temporarily disturb the local environment, potentially impacting residents and wildlife.	Restrict high-noise activities to standard **daytime working hours** (e.g., 07:00 to 18:00). Ensure all machinery is fitted with **effective mufflers**.

Potential Impact	Description & Concern	Mitigation Measures
Waste Generation	Generation of general domestic waste (packaging) and construction waste (rubble, excess material).	Implement a **Construction Waste Management Plan** requiring sorting and storage in designated, sealed skips. Waste must be removed by a licensed contractor to an approved disposal facility.
Traffic and Safety	Increased traffic congestion, dust, and safety risks from construction vehicles accessing the C36 and D-roads.	Clearly **signpost** the construction entrance and site hazards. **Manage and coordinate** deliveries during off-peak hours where possible.

Operational Phase Impacts (Long-Term)

The long-term risks are primarily associated with hazardous substance handling, resource consumption, and the station's permanent presence.

Potential Impact	Description & Concern	Mitigation Measures
Groundwater Contamination	**High Risk.** Leakage from Underground Storage Tanks (USTs), piping, or forecourt spills can severely contaminate the shallow and vital local groundwater aquifer, impacting Okombahe's water supply.	Use **double-walled USTs and piping** with continuous **electronic leak detection systems**. Implement impervious concrete forecourt surfaces and install a functioning **three-stage oil/water separator (interceptor)**.
Water Scarcity	The service station's demand for water (ablution, cleaning) in a highly **water-stressed environment** can place	Implement the **Solar Sentinel Concept** water conservation measures: Install **low-flow fixtures** and **dual-flush toilets**.

Potential Impact	Description & Concern	Mitigation Measures
	pressure on the community's water sources.	Maximize **rainwater harvesting** from the canopy for non-potable use.
Soil Contamination	Routine spills of fuel or lubricants during dispensing, tank filling, or vehicle maintenance activities.	Ensure all fuel handling takes place over **impervious concrete containment areas**. Train staff in **immediate spill response procedures** and provide accessible spill kits.
Visual/Aesthetic Impact	The modern design and associated lighting may contrast sharply with the natural, remote desert landscape.	Use **earth-tone colors** and natural stone cladding to harmonize with the surroundings. Implement **low-glare, downward-facing lighting** to minimize light pollution and maintain dark skies.
Socio-Economic Impact	Increased pressure on local social infrastructure (e.g., housing, health) due to the influx of new workers.	Prioritize **local employment and procurement** where skills are available. Implement a **local skills training program** to enhance community benefits.

Decommissioning Phase Impacts

- **Risk:** Safe removal of fuel infrastructure (USTs, piping, separators) and potential soil contamination at the end of the project life.
- **Mitigation:** The operator must submit a comprehensive **Decommissioning Plan** to MEFT. This plan must include soil testing, tank removal, and bioremediation of any contaminated soil before the site is rehabilitated and handed back to the Regional Council.

CHAPTER 8

8. ENVIRONMENTAL AND SOCIAL IMPACT EVALUATION

8.1. Introduction

This evaluation formalizes the impacts of the proposed Okombahe Service Station by assessing the **Significance, Duration, Extent, and Status** (managed or unmitigated) of the identified negative environmental and social effects. The focus is strictly on the negative impacts and the effectiveness of the proposed mitigation measures.

Impact Assessment Criteria

Criterion	Definition
Significance (Pre-Mitigation)	A qualitative measure of the impact's severity before mitigation (Low, Medium, High).
Significance (Post-Mitigation)	The expected severity remaining after mitigation (Low, Medium, High).
Duration	The time frame of the impact (Short-Term: Construction phase only; Long-Term: Life of the project; Permanent: Irreversible change).
Extent	The spatial area affected (Local: Site only; Regional: Okombahe village and immediate surroundings; National: Broader Namibian context).
Status	The remaining nature of the impact (Residual: Some impact remains; Fully Mitigated: Impact is reduced to negligible levels).

🚧 Construction Phase Impacts (Short-Term)

Potential Impact	Significance (Pre)	Significance (Post)	Duration	Extent	Status	Detailed Evaluation
Dust and Air Quality	Medium	Low	Short-Term	Local/Regional	Residual	Highly noticeable during dry, windy conditions. **Mitigation (watering, speed control)** is effective but requires constant

Potential Impact	Significance (Pre)	Significance (Post)	Duration	Extent	Status	Detailed Evaluation
						management. Residual impact remains due to inevitable earth moving.
Soil Erosion	Medium	Low	Short-Term	Local	Residual	The sparse vegetation offers little natural protection. Limiting the footprint and **immediate rehabilitation** (seeding) significantly reduces the risk, but the initial exposure is unavoidable.
Noise Pollution	Medium	Low	Short-Term	Local/Regional	Fully Mitigated	Noise from heavy equipment is a nuisance to nearby residents. **Restricting activities to daytime hours** and maintaining mufflers are standard, highly effective measures that manage the impact successfully.
Waste Generation	Medium	Low	Short-Term	Local	Fully Mitigated	Uncontrolled construction and domestic waste can lead to litter and attraction of pests. **A formal Waste Management Plan (sorting, licensed disposal)** makes this impact easily controllable

Potential Impact	Significance (Pre)	Significance (Post)	Duration	Extent	Status	Detailed Evaluation
						and negligible.
Traffic and Safety	Medium	Low	Short-Term	Local	Fully Mitigated	Increased heavy vehicle movement poses a safety risk on the C36. **Signage, managed access, and coordinating deliveries** effectively reduce the risk to an acceptable level.

Operational Phase Impacts (Long-Term)

Potential Impact	Significance (Pre)	Significance (Post)	Duration	Extent	Status	Detailed Evaluation
Groundwater Contamination	**High**	Medium	Permanent	Regional	Residual	This is the single **highest risk**. A spill or tank breach can **permanently** ruin the local, shallow aquifer. Mitigation (double-walled USTs, leak detection, interceptors) reduces the *probability* but, given the severity of the consequence, a **residual high-risk potential** remains, requiring continuous monitoring.
Water Scarcity	Medium	Low	Long-Term	Regional	Fully Mitigated	Okombahe is water-stressed. The station's demand adds pressure. **Mitigation (low-flow fixtures, rainwater harvesting)** is critical and highly effective in reducing consumption, making the residual

Potential Impact	Significance (Pre)	Significance (Post)	Duration	Extent	Status	Detailed Evaluation
						impact negligible compared to the general regional scarcity.
Soil Contamination (Surface)	Medium	Low	Long-Term	Local	Fully Mitigated	Routine small spills are likely. **Impervious forecourt containment** and **staff training with immediate spill kits** effectively localize, contain, and clean up spills, preventing long-term contamination migration.
Visual/Aesthetic Impact	Medium	Low	Permanent	Local/Regional	Fully Mitigated	A modern structure can clash with the natural desert aesthetic. **Mitigation (earth-tone colors, natural cladding)** and **downward-facing, low-glare lighting** integrates the station better and prevent major light pollution on the dark skies.
Socio-Economic Pressure	Low	Low	Long-Term	Local	Fully Mitigated	The influx of a few non-local workers could place minor pressure on services. **Prioritizing local employment and skills training** transforms this potential negative into a social **benefit**, fully mitigating the negative pressure.

🗑️ Decommissioning Phase Impacts

Potential Impact	Significance (Pre)	Significance (Post)	Duration	Extent	Status	Detailed Evaluation
Fuel Infrastructure Removal & Contamination	High	Low	Short-Term	Local	Fully Mitigated	The end-of-life process risks excavating old, contaminated soil. **Requiring a comprehensive, statutory Decommissioning Plan (including soil testing and bioremediation)** Ensures that the site is fully cleaned, restored, and handed back without residual environmental liability.

CHAPTER 9

9. DISCUSSIONS, CONCLUSIONS AND INTRODUCTION TO ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1. Introduction

In this report, the assessment of the proposed Okombahe Service Station employed the ESIA as a tool for sustainable development.

This ESIA Report for the proposed Okombahe Service Station was prepared taking into consideration limitation of ESIA:

- ✓ In order to mitigate limitations of the ESIA, the **precautionary approach** taken should be to develop the **ESMP**.

The following section summarizes the key findings, the effectiveness of mitigation strategies, and the overall environmental and social acceptability of the proposed Okombahe Service Station (OSS) project.

9.2. Discussions

The Environmental and Social Impact Assessment (ESIA) identified several **potential negative impacts**, predominantly during the construction phase (dust, noise, erosion) and the operational phase (groundwater contamination, water use). However, the implementation of the detailed

mitigation measures outlined in the ESMP was designed to reduce the significance of these negative impacts to **acceptable and manageable levels (Low to Medium-Low Residual Significance)**.

Groundwater Contamination: This remains the single most critical environmental risk. The discussion confirms that while using **double-walled tanks, continuous electronic leak detection, and oil/water separators** reduces the *probability* of contamination, the potential *severity* necessitates continuous, rigorous monitoring. The Proponent's commitment to quarterly soil and water testing is non-negotiable for maintaining the Environmental Clearance Certificate (ECC).

Socio-Economic Benefits: The establishment of the OSS introduces significant **positive impacts** that outweigh the managed negative risks. These include the provision of essential refuelling services along the C36 corridor, **local job creation** (both during construction and operation), and the enhancement of regional economic activity, particularly in anticipation of future road upgrades.

9.3. Strategic and Future Alignment

The location of the OSS is strategically aligned with the future development of Namibia's national road network. The anticipated upgrading and tarring of the C35 Road (projected around 2031) will significantly increase traffic flow through Okombahe, transforming the C36 into a high-priority corridor. Establishing the service station now secures a **first-mover commercial advantage** and ensures that critical refuelling infrastructure is in place to support the impending logistical demand.

9.4. Conclusions

Based on the findings of the ESIA and the main recommendation that an ESMP should be developed, the following conclusions were reached:

Environmental Acceptability: The proposed Okombahe Service Station project was considered **environmentally acceptable**, provided that all specified mitigation measures are strictly implemented and monitored throughout the project life cycle (construction, operation, and decommissioning). The potentially high-risk impacts, particularly groundwater contamination, could be minimized through mandatory engineering controls and a robust monitoring schedule.

Social Justification: The project is **socially justified** due to its role in providing essential infrastructure (fuel and retail) to the local community and passing motorists, directly

supporting economic development and creating sustainable employment opportunities in the Okombahe area.

Recommendation for Approval: It is recommended that the Ministry of Environment, Forestry, and Tourism (MEFT) grant the **Environmental Clearance Certificate (ECC)** for the construction and operation of the Okombahe Service Station, subject to the explicit condition that the Proponent adheres to all stipulations detailed within the ESMP.

Monitoring Obligation: The Proponent is required to appoint an independent **Environmental Control Officer (ECO)** to oversee the construction phase and provide regular, stipulated monitoring reports to the Environmental Commissioner during the operational phase to confirm compliance, especially regarding hazardous substance management and water consumption.

9.5. Introduction to Environmental and Social Management Plan

The ESMP complements the ESIA by managing impacts over time. Even with a robust ESIA, cumulative effects (e.g., long-term water flow changes) may emerge, requiring an ESMP to outline actions like underground water quality monitoring or spill response plans. Submitted with the ESIA, it requires bi-annual reports to the OEC.

The ESMP's effectiveness lies in its adaptability, providing a baseline for continuous management e.g., tracking marine life post-construction surpassing the static ESIA. Its limitation is reliance on internal oversight, risking deviation without public pressure or strong enforcement. It assumes OEC scrutiny and resource availability, but precautionary measures include mandating independent bi-annual reports, public access to findings, and a limited-term ECC (e.g., 3-5 years) renewable only with compliance.

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APPENDICES

Registration form for IAPs.

Envirodu Consulting & Training Solutions cc	
Title:	
First name(s):	
Surname:	
Organization/Affiliation:	
Profession:	
Contact number:	
Email:	
I would like to attend the public meeting	
Comments:	Please list and explain issues of concerns here (attach extra sheet for more space. …… …… …… …… …… …… ……