ENVIRONMENTAL MANAGEMENT PLAN

1.1 OBJECTIVES OF THE EMP

Erongo Regional Electricity Distributer (Erongo RED) requires an Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP) for the proposed new Omburu-Omaruru 44 kV overhead line, that will be operated at 33 kV, starting from NamPower Omburu Station to Omaruru Intake station (hereafter referred to as The Development). The EMP provides management options to ensure impacts of the proposed construction activities and normal operations are minimised.

An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The EMP acts as a stand-alone document, which can be used during the various phases (planning, construction, operational and decommissioning) of any proposed activity or development. All contractors taking part in the construction of this facility should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of the various activities;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the construction and operations of The Development;
- to monitor and audit the performance of the construction and operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible construction and operational personnel.

The Proponent could implement an environmental management system like ISO 14001. At the heart of an Environmental Management System (EMS) is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.

1.2. THE EMP

1.2.1 Land Use, Planning, Design, Construction and Operations – Identified Impacts and Mitigation Measures

The following is the summary of the identified impacts and mitigation measures:

- The proposed powerline will be located on land currently under the ownership of the Omaruru Municipality. Erongo RED, as the project proponent and electricity distributor, is in the process of negotiating with the Municipality to secure the registration of a servitude for the development. Appropriate rezoning procedures will be undertaken thereafter to align with statutory land use requirements.
- The planned construction is in line with the Environmental Management Act of Namibia of 2007 that came into force on 6 February 2012 and requires The Applicant to apply for an Environmental Clearance Certificate with an EIA and EMP
- The Planned construction is in line with the Erongo REDs Master Plan and the other phases of the 33 kV power line have Environmental Clearance Certificate with an EIA and EMP
- The most significant risks identified were impacts to biodiversity: Physical/human disturbance of birds, fauna and flora including road mortalities and poaching; Direct and indirect modification/loss/destruction of bird habitat; Bird collisions with power line infrastructure; Bird electrocutions on power line infrastructure; Impacts on the power supply due to bird nesting activity or other activities.
- The new 44 kV power line should be monitored according to existing protocols for power line surveys (see ECC 2019). If possible, the power line surveys should include the new 44 kV line as well as the existing 22 kV line, for possible cumulative impacts. The surveys should also include the step-down/transformer structures. Ideally, regular, dedicated patrols specifically to monitor for power line incidents should be carried out once a month for at least the first year after construction, and thereafter at least once per quarter.
- Record all bird mortalities on a standardised form, with the GPS coordinates and power line structure and other details, and photographs of the carcass (especially the head of the bird), power line structure and general habitat. Both mortalities and live birds should be monitored; these would include any new species that appear to be attracted to the area. Monitor perching activities of live birds on power line structures, especially larger groups such as raptors. If there is a need, camera traps could be used to document the occurrence of sensitive species, such as terrestrial birds and/or raptors.
- The need for reporting any incidents should be stressed, and reporting procedures should be clarified. All bird mortalities should be recorded on a standardised form, with the GPS coordinates (or pole number, if present) and structure involved and other details, and photographs of the carcass (including head and beak), structure and point of impact if possible.
- Monitoring results should be reviewed on a quarterly basis, or more frequently if required, to direct further adaptive management.
- Monitor the effectiveness of mitigation measures; should repeat collision or electrocution incidents involving raptors/vultures, bustards, korhaans or any other group of birds, occur, consider the retro-fitting of further mitigation; replace mitigation devices as and when necessary.
- Bird nesting activities on power line infrastructure should be discouraged early in the

cycle, before any eggs are laid; the Ministry of Environment, Forestry and Tourism (MEFT) should be contacted for specific guidelines for dealing with such problems.

- Should any nesting or other activity by crows or Sociable Weavers on power supply structures cause disruptions of the power supply, consult with the MEFT for appropriate measures to discourage and manage such activities, e.g. by removing nests at a stage when this is acceptable.

1.2.2 Responsibilities and Implementation of the EMP

- The appointment of a reputable contractor for the construction of the power line will ensure that construction is carried out to industry specifications and that the best work practices are followed.
- Erongo RED has overall responsibility for environmental management during the construction, operations/maintenance and decommissioning phases of the proposed power line.
- The Erongo RED Environmental Department will be responsible for assisting Erongo RED Management to ensure that the commitments as set out in this EMP are implemented during the design, construction and operations/maintenance phases. The Environmental Department is responsible for ensuring that the contractors involved with the proposed project comply with the EMP and will conduct regular inspections.
- The Contractor Managers will be contractually required to comply with the various commitments in this EMP. The contractors will be formally audited on the implementation of the in order to determine compliance with EMP.

The EMP gives the environmental commitments, which will be implemented by Erongo RED and their Contractors. Table 10.1 to Table 10.3 outline the management of the environmental elements that may be affected by the different activities, grouped in each phase of the development. These groups are as follows:

- Construction Phase
- Operational Phase
- Decommissioning Phase

Contents of these tables should be incorporated into a HSEQ Management System.

Table 1.1 Planning Phase

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
Compliance	To comply with all legal requirements for the operations of the facility in Namibia.	Ensure that all the necessary permits from the various ministries, local authorities and any other bodies that govern the operations are available.	During Planning phase.	All contracts, permits, certificates and other legal documents on file.	Proponent
Appointments	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	Appoint a contractor and employees and enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractor, subcontractors, employees and all personnel who will be present on site.	Prior to construction phase.	Contracts on file.	Proponent, Contractor
Management	Establish a management system to implement and monitor Health, Safety and Environment.	Have the following emergency plans, equipment and personnel in place to deal with all emergencies: Risk Management / Mitigation / Environmental Management Plan/ Emergency Response Plan and HSE Manuals Adequate protection and indemnity insurance cover for incidents; Comply with the provisions of all relevant Health, Safety and Environment standards; Procedures, equipment and materials required for emergencies.	During Planning phase.	Documentation on file Personal Protection Equipment (PPE) on site. Document the operational procedures. Signage related to restricted areas, dangerous areas, and PPE requirements on site. Emergency response material on site.	Proponent
Restoration Fund/Insurance	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	To establish a fund for future ecological restoration of the site should operational activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.	During Planning phase.	Insurance or warranty statement of restoration fund/insurance	Proponent
Reporting	To establish a reporting	Establish a reporting system to report	Throughout all phases	Monitoring Reports.	Proponent;

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
	system to report on monitoring aspects of construction, operation and decommissioning as outlined in the EMP	on aspects of construction, operation and decommissioning as outlined in the EMP. Keep monitoring reports on file for submission with Environmental Clearance Certificate renewal applications where needed.			Contractor
Environmental Clearance Renewal	To renew the Environmental Clearance Certificate every three years	Appoint a specialist environmental consultant to update the EMP and apply for renewal of the Environmental Clearance Certificate.	Prior to expiry of Environmental Clearance Certificate	Renewed Environmental Clearance Certificate	Proponent; Independent Specialist Consultant

Table 1.2 Construction Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Physical/human disturbance of birds, including road mortalities and poaching	During the construction phase, vehicle and human activity on the site is at a peak, with high levels of disturbance. Birds may be disturbed while going about their daily activities such as feeding, roosting and, in particular, breeding. There is a potential for road mortalities, and for poaching of birds (including chicks) and eggs. The results of disturbance may be indirect or direct, and are likely to be cumulative. These could include: • Potential impacts of noise caused by construction activities on foraging or breeding birds • Displacement of birds from areas suitable for them before development, either temporarily or permanently; possible barrier effects to normal movements • A reduction in bird breeding success due to displacement (including of any territorial bird species, such as raptors) • Unnatural mortalities or injuries of birds (adults and chicks), caused by road collisions or poaching Indirectly, mortalities of adults	• Proactively reduce the chances of disturbance of birds, especially breeding birds; deter poaching; enforce safe driving and speed limits; promote environmental awareness. Much of the noise and other disturbance associated with construction is unavoidable. Impacts can, however, be kept to a minimum through responsible construction practices. *Avoidance:* • Before construction starts, the proposed power line route should be inspected for any signs of bird breeding/nesting activity. In particular, breeding activity of cavity-nesters in larger trees (including dead trees) should be noted. • Disturbance of nesting/chick-rearing birds should be avoided (breeding season for raptors is mainly spring). *Minimisation:* • Abatement controls to reduce noise disturbance created during construction. • Operational controls to manage and regulate contractor activity, such as: – A speed limit should be strictly enforced. – The construction activity should be restricted to the actual construction site and no	• The new 44 kV power line should be monitored according to existing protocols for power line surveys (see ECC 2019). If possible, the power line surveys should include the new 44 kV line as well as the existing 22 kV line, for possible cumulative impacts. The surveys should also include the step-down/transformer structures. Ideally, regular, dedicated patrols specifically to monitor for power line incidents should be carried out once a month for at least the first year after construction, and thereafter at least once per quarter.	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	could also lead to the mortalities of dependent chicks	unnecessary movement of vehicles or people should be allowed outside the construction zone. All vehicles should be fitted with silencers. – Exclusion fencing should be erected around identified sensitive areas, if required (e.g. pre-identified active nesting sites). – Anti-poaching measures should be strictly enforced, with zero tolerance, and this should be emphasised during induction to contractors; offenders should be prosecuted. • Ongoing awareness should be promoted about the value of biodiversity and the negative impacts of disturbance, especially to breeding birds, and of poaching and road mortality.		
Direct and indirect modification/loss/destruction of bird	Any removal or disturbance/ modification of natural vegetation will result in a change to the habitat available to the birds in the area. The vegetated drainage lines in the study area are particularly vulnerable to habitat destruction. The larger trees are an important resource for birds, including larger raptors, in terms of nesting, roosting and other activities. Both live and dead trees are particularly important to cavity nesters, and should not be damaged or destroyed	• Reduce the amount of habitat destruction to a minimum; restore disturbed habitats after construction. <u>Avoidance and minimisation:</u> •Where possible, the unnecessary destruction of habitat or degradation of the environment should be avoided, with special attention to water courses and drainage lines. •Large trees should not be damaged or destroyed unnecessarily. Before construction starts, the proposed power line route should be inspected for any signs of bird nesting activity; this includes cavity nesters in both live and dead trees. •The Omaruru River habitats are	• Record all bird mortalities on a standardised form, with the GPS coordinates and power line structure and other details, and photographs of the carcass (especially the head of the bird), power line structure and general habitat. Both mortalities and live birds should be monitored; these would include any new species that appear to be attracted to the area. Monitor perching activities of live birds on power line structures, especially larger groups such as raptors. If there is a need, camera traps could be	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	unnecessarily. Habitat modification/loss/ destruction is known to impact on bird species in different ways, both direct and indirect, resulting in displacement that may be either temporary or permanent. The impacts could include: • Displacement of birds from areas suitable for them before development, either temporarily or permanently; barrier effects to normal movements/ activities • A reduction in bird breeding success due to displacement (including of territorial bird species) • Permanent modification/ destruction of sensitive habitats, already subject to cumulative impacts • Loss of habitat could reduce breeding and feeding opportunities and result in stress/displacement for territorial species, including raptors	particularly sensitive, especially with regard to the destruction of taller trees and shrubs. <u>Restoration and rehabilitation:</u> •Repair of degradation or damage to biodiversity features and ecosystem services from project-related impacts that cannot be completely avoided and/or minimised, should this be necessary. <u>Minimisation:</u> •Abatement controls to reduce emissions and pollutants (erosion, dust, waste) created during construction. • Operational controls to manage and regulate contractor activity, such as exclusion fencing around sensitive areas (e.g. pre-identified active nest sites), designated machinery and lay-down areas, minimisation of vegetation loss and disturbance to soil. •Ongoing awareness should be promoted about the value of biodiversity and the negative impacts of habitat destruction.	used to document the occurrence of sensitive species, such as terrestrial birds and/or raptors.	
Bird collisions on power line infrastructure	A collision occurs when a bird in mid-flight does not see the overhead cables or structures (including conductors) until it is too late to take evasive action. These impacts could take place on any sections of the power line, but are more likely in areas where the line crosses flight paths/corridors or flyways, such as water courses/drainage lines or ridges. Collisions may also	•The primary mitigation is the choice of route options and alternatives for a power line; if possible, avoid areas where bird collisions are likely to take place •Burying the power line could be considered as an option in some cases •Marking of more sensitive sections of power line to increase visibility and prevent collisions <u>*Avoidance & minimisation:*</u>	The need for reporting any incidents should be stressed, and reporting procedures should be clarified. All bird mortalities should be recorded on a standardised form, with the GPS coordinates (or pole number, if present) and structure involved and other details, and photographs of the carcass (including head and beak), structure and point of impact if	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	take place on stay wires (which are usually present on strain poles/bend points), for instance when a bird is flushed from its position on the ground, and on other associated structures. The results of collisions may be indirect or direct, and could include: •As a direct impact, collisions could potentially result in bird injuries and/or mortalities. •Indirect impacts are also possible, e.g. loss of adults to chicks.	• The power line route will run along an existing servitude, rather than in new areas. No changes to the final proposed routing of the power line are recommended. • Due to the length of the power line and the costs involved, burying of the power line is not considered technically or economically feasible. • No sections of the power line are identified as "no-go" areas, to be avoided at all costs; however, some sections are regarded as being more sensitive to collision impacts (see below). *<u>Avoidance & minimisation:</u>* • To address the collision risk on the proposed 44 kV distribution line, the marking of the more sensitive sections of the line to increase visibility is recommended, with the minimum for each section as follows (A-B and C-D; Table 9.7.1; also see Figure 9.1 below for marking sections). • Should monitoring results indicate a need, further sections of the line should be retro-marked after construction, using an adaptive management approach. • The two outer (horizontally aligned) conductors should be marked, for the full length of each span, and alternating between the two lines in the design below. • Examples of appropriate marking devices (Figure 9.2) include the	possible.	

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		following, both made in South Africa: BIRD-FLIGHT Diverter (BFD); and RAPTOR-CLAMP Diverter (also known as the Viper Live Bird Flapper ["Viper"]). • The marking distance between devices on each line should be 10 m, with at least 4-5 BFDs on each span and alternating with the Vipers; the colours should be offset where possible (e.g. black and white/yellow). • At this stage, no nocturnally visible marking is recommended, but it should become mandatory should monitoring results indicate the necessity (e.g. repeat collisions of any nocturnal fliers such as owls on power lines), using an adaptive management approach		
Bird electrocutions on power line infrastructure	An electrocution occurs when a bird is perched or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. An electrocution could also be caused should a large bird perch on top of a horizontal pole and send down a "streamer" of excrement that could hit a conductor, thereby bridging the gap between an earthed and a live component. The use of power line pole structures as perches by raptors and other larger birds in the area	• "Gapping" of pole earth wires to reduce contact of the wire with the ground, except during lightning strikes • Insulation of selected live components on transformer/switchgear pole structures. <u>Minimisation:</u> • A standard mitigation for electrocutions on wooden power line poles is to "gap" the earth wire near the top of the pole, i.e. the earth wire on each power line pole should stop at least 300 mm below the lowest phase to provide an air space safety gap, in order to reduce the electrocution risk (Figure 22). • Transformer/switchgear structures should be designed in such a way that they are not attractive as bird perches/nesting sites; selected /all live components should be	•Monitor the effectiveness of mitigation measures; should repeat collision or electrocution incidents involving raptors/vultures, bustards, korhaans or any other group of birds, occur, consider the retro-fitting of further mitigation; replace mitigation devices as and when necessary.	Proponent

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	is possible, for example as hunting perches at the cleared servitudes. This could attract birds to potentially unsafe sections of the structures. The wingspan of a Lappet-faced Vulture is 2.8 m, and of a White-backed Vulture 2.0 m. The results of electrocutions may be indirect or direct, and could include: As a direct impact, electrocutions could potentially result in • Bird injuries and/or mortalities • Outages/disruptions to the power supply Indirect impacts are also possible, e.g. loss of adults to chicks.	insulated (e.g. using PVC piping or LDPE pipe; Figure 23). • On strain structures where "jumper" wires are used, at least the centre jumper (but preferably all three jumpers) should be insulated, using PVC piping or LPDE pipe. Jumpers should be offset where possible, to reduce the clearance between these wires. • The stay wires should also be "gapped" by the use of an insulator.		
Impacts on the power supply due to bird nesting and/or other activities	The construction of power lines and related infrastructure has the potential to attract bird species to novel habitats, by providing perching, nesting or foraging sites. This could result in negative impacts on birds. The provision of artificial habitats/resources such as power line poles, transformers and other structures could also result in negative impacts on the power supply (i.e. flash-overs) caused by bird activities. Distribution lines are more at risk to such impacts, given the smaller	• Insulate live components that could be bridged by nesting activities • Discourage bird nesting activities as soon as they start <u>Avoidance:</u> • Insulate live components that could be bridged (see Section for mitigations for electrocution). • Ensure strict and effective waste management (including of food) during construction activities, to discourage an unnatural increase in scavenging species such as Pied Crow. • Avoid creating new habitats with open water, e.g. accumulations of storm water or pipe leakages/open water/run-off, that	•Monitoring results should be reviewed on a quarterly basis, or more frequently if required, to direct further adaptive management.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	clearances. Crow nests on power line structures may contain pieces of wire, which could cause outages. The attraction of birds to novel habitats through the artificial provision of scarce resources may impact on bird species in different ways that may be potentially positive or negative, with direct and indirect impacts. The impact is related to other impacts (e.g. electrocution, collisions; see above). • The impact could be positive for birds, in terms of providing nesting and other opportunities. • The impact could also be negative, in that bird nesting and other activities may cause short circuits and power supply outages on power line structures.	may attract birds.		
Physical/human disturbance of fauna and flora, including road mortalities and poaching	During the construction phase, the highest levels of human presence and vehicle activity will occur, resulting in elevated disturbance to fauna and flora. Terrestrial fauna may be displaced from their natural habitats or disturbed in their daily activities, with potential risks of road mortalities from construction vehicles. The increased human presence may also heighten the risk of opportunistic poaching of small and medium-sized fauna. Vegetation clearance will be	<u>Minimise habitat disturbance:</u> Restrict construction activities to the designated servitude and approved access routes to avoid unnecessary trampling and disturbance of surrounding vegetation and fauna habitats. <u>Vegetation management:</u> • Clearly demarcate "no-go" areas, especially those containing endemic, protected, or ecologically sensitive plant species. • Avoid removal of endemic/protected trees wherever possible. Where removal cannot be avoided, replant or relocate within the project area under the guidance of an ecologist.	<u>Controlled site footprint:</u> • Limit construction activities strictly to the approved servitude and access routes to minimise unnecessary habitat loss and fragmentation. <u>Vegetation clearance and rehabilitation:</u> • Carefully clear only the minimum vegetation required for the powerline and access roads. • Rehabilitate disturbed areas after construction by reseeding or planting indigenous species adapted to the local environment. • Replace endemic or protected	Contractor Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	required for the establishment of the new 44 kV overhead line and associated access roads. This may result in the loss of natural vegetation cover and potential damage to sensitive or slow-growing species. The removal of protected or endemic flora should be strictly avoided where possible; if unavoidable, replanting or suitable mitigation in close proximity to the site should be undertaken. Noise and vibration generated during construction are expected to cause only temporary disturbance and are not anticipated to result in long-term impacts, as activities will be limited to daytime hours. Once operational, the intensity of disturbance will significantly reduce, limited mainly to occasional maintenance activities along the servitude and access road.	• Implement erosion control and rehabilitation measures, including reseeding or replanting disturbed areas with indigenous species after construction. <u>Fauna protection:</u> • Conduct pre-construction walk-through surveys to identify and relocate fauna (e.g., reptiles, small mammals) that may be at risk. • Prohibit hunting, poaching, or collecting of any fauna by workers; enforce this through induction training and regular monitoring. • Install speed limits and warning signage on construction and maintenance access roads to reduce the risk of road mortalities. • Noise and activity control: Limit construction activities to daylight hours to reduce disturbance to nocturnal fauna. • Contractor awareness: Provide environmental awareness training to all contractors and workers, emphasising the importance of protecting flora and fauna, as well as strict adherence to no-poaching policies. <u>Monitoring and enforcement:</u> •Appoint an Environmental Control Officer (ECO) to monitor compliance with environmental requirements and report any incidents. • Conduct regular site inspections to ensure that mitigation measures are properly implemented and effective.	tree species if removal is unavoidable, planting them in suitable nearby areas under the guidance of an ecologist. <u>Protection of fauna:</u> • Relocate small mammals, reptiles, and other vulnerable species found within the construction area before clearing begins. • Enforce a strict prohibition on poaching, hunting, or capturing of fauna by construction personnel. • Provide adequate waste management to avoid attracting opportunistic species or scavengers that could alter the ecological balance. <u>Traffic and access management:</u> • Enforce speed limits on access and construction roads. • Install signage in areas where fauna movement is expected to reduce the likelihood of road mortalities. • Restrict off-road driving by construction vehicles. <u>Noise and vibration management</u>: • Restrict noisy activities to daytime hours and ensure machinery is well maintained to minimise unnecessary noise. <u>Awareness and supervision:</u> • Train construction workers on environmental protection	

Criteria	Nature	Mitigation	Monitoring	Responsible Body
			requirements, focusing on flora conservation, anti-poaching rules, and fauna safety. • Appoint an Environmental Officer to oversee compliance and enforce corrective actions where required. <u>Post-construction management:</u> • Maintain vegetation control along the servitude using environmentally sensitive methods (manual or selective clearing instead of herbicide use). • Ensure access roads are maintained to reduce erosion and habitat degradation. • Monitor fauna and flora conditions during the operational phase, with adaptive management if unexpected impacts are detected.	
Fire and explosion hazard	During construction and operation, fire hazards may arise from welding, grinding, smoking, campfires, faulty machinery, fuel storage, or accidental sparks. In the Omaruru district, where dry wooded veld and grasslands are highly combustible, fires could spread rapidly, causing destruction of natural habitats, loss of biodiversity, soil degradation, and potential property damage. Uncontrolled fires also pose risks to human health and safety, with possible injuries, fatalities, or	• Develop and implement a **Fire Management Plan** as part of the EMP. • Prohibit open fires, burning of waste, or uncontrolled cooking activities on-site. • Designate smoking areas away from vegetation, with fireproof containers for cigarette disposal. • Maintain firefighting equipment (e.g., extinguishers, beaters, water tanks) at all construction sites, camps, and fuel storage areas. • Store fuels, oils, and chemicals in clearly marked, bunded, and fire-resistant areas, away from ignition	The Environmental Officer must conduct regular inspections of construction sites, camps, and storage areas to ensure compliance with fire safety requirements. Keep records of fire incidents, near-misses, and response actions. Conduct quarterly fire drills and refresher training for all site personnel. Monitor surrounding vegetation during high-risk periods (dry	

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	displacement of local communities. Although the risk of explosion is low, the storage and handling of fuels and chemicals at construction sites represent a potential hazard.	sources. • Ensure vehicles and machinery are regularly maintained to prevent sparks or fuel leaks. • Train all workers in fire prevention, firefighting techniques, and emergency response procedures. • Coordinate with the Omaruru Municipality and local fire brigade on fire preparedness and response. In the event of a fire: • Immediately alert all personnel and activate emergency response procedures. • Use on-site firefighting equipment to contain small fires; for larger fires, contact the local fire brigade and relevant authorities. • Evacuate personnel if the fire cannot be controlled, prioritising human safety. • Contain the affected area by creating firebreaks to prevent further spread. • Rehabilitate fire-damaged areas through reseeding or replanting with indigenous vegetation to prevent erosion and promote ecosystem recovery. • Conduct incident reporting and root-cause analysis to prevent recurrence.	season, high winds) and adjust activities accordingly (e.g., suspend welding or grinding during extreme fire danger days). Review the Fire Management Plan annually and update based on lessons learned and consultation with local authorities.	
Health, Safety and Security	During construction phase, construction workers and heavy equipment will be onsite. Heavy machinery, electricity and working at height, increases the risk of injuries. However, due to	All Health and Safety standards specified in the Labour Act should be complied with. The responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. The Contractor should be obliged to	A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat itself.	Proponent and Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	the relatively small scale of the project, the risk can be well managed. A temporary laydown site will be established for safe storage of equipment, fuels, solvents, paints and construction materials.	comply to the following: ➢ Compliance to Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. ➢ Equipment must be locked away on site to discourage criminal activities. ➢ Ensure suitable personal protective equipment is in place for workers as well as permit to work systems ➢ Install proper safety barricades and signs at the perimeter of the site to warn and direct pedestrians and vehicle traffic away from construction site ➢ Induction training for all who enter the site is required. ➢ Security personnel to prevent unauthorised entry of the construction site. ➢ The contractor must ensure that suitable emergency facilities, including first aid kits are available on site. ➢ The contractor should select personnel to be trained in first aid. A notice with the numbers of all emergency services must be readily available.	Consult with the Traffic department and implement a traffic management plan for sections of the roads to be closed or traffic diverted when necessary during the delivery of equipment and excavations. The contractor should inform the proponent with a weekly work schedule. All HSE information and reporting to be included in a final report once construction finishes and the site is handed over to the Municipality of Omaruru.	
Noise Pollution from construction activities	Noise pollution will exist due to heavy vehicles accessing the sites with building materials. Cement mixing, drilling and excavating will be some additional noise producing activities. There may be an increase in the ambient noise levels because of large traffic volumes on the C33 and C36	The Omaruru Municipality has no regulations with regard to noise levels. The World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment can be followed during the construction phase. This limits noise levels to an average of 70 db over a 24 hour period with maximum noise levels not exceeding 110 db during	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and if appropriate, acted upon.	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	roads and other smaller roads that are creating noise. But this is not expected to be significant due to the smallscale of the project. The closest receptors are the residents in farmers which is more than 5 km from the proposed power line.	the period. It is recommended that any complaints regarding noise be registered. Construction activities must be during daytime from 7h00 to 17h00.		
Dust Pollution from construction activities	Dust may be generated during excavations and due to increased traffic to and from the site for deliveries and removals. This might be aggravated during periods of strong winds. However, the limited nature of the construction activities will not result in significant dust generation.	➢ Vehicles and machinery will be maintained in good working order ➢ There will be a new track created to access the new powerline the is 50 m distance from the existing powerline and existing maintenance track. However, construction team must avoid creating new tracks where possible. ➢ Speed limits on gravel roads will be limited to a maximum speed consistent with the minimisation of dust generation. Nominal speed limit of 40 km/h applies on the C36 gravel road ➢ Vehicle speeds will be limited to 30km/h on site	Complaints regarding dust to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure	Contractor
Waste Production and Ablution facilities	The ability of products and building rubble to act as a waste which must be cleaned up or removed off-site. Ablution facilities must be made available to construction personnel.	The contractor must ensure that adequate temporary disposal facilities are available at the construction site. Products that can be re-used or re-cycled should be kept separate. Waste should be disposed of regularly and at appropriate disposal facilities. Due to the nature of some hazardous materials they should be disposed of in an appropriate way at an appropriately classified waste disposal facility.	Regular visual inspection. Waste from this mentioned ablution facility needs to be appropriately disposed of at such a dedicated local authority facility regularly. Hazardous waste disposal receipts should be kept on file.	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		Make use of the Material Safety Data Sheets available from suppliers if the user is not sure how to dispose of the substance. Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained. A mobile chemical ablution facility should be made available to anybody working at the site. The ratio of the number of these ablution facilities to the number of employee's onsite should be discussed and agreed upon with the Local Authority in terms of the Labour Act as well as Environmental Health Act. .		
Soil and groundwater contamination	Porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep down to the water table either at the site of spill or after being washed away by surface flow. Leakages from construction vehicles, accidental spills of fuel, paints and other chemicals might occur. Groundwater might spread pollutants to neighbouring receptors and may create an impact on underground infrastructure. However, due to the small scale of the project and the scarcity of surface water in the area, the risk of hazardous spills can be effectively	Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring. All vehicles and machinery to be used on site should be inspected regularly for oil leaks. Under no circumstances should any hydrocarbon product in access of 30 cubic meters be kept on site. Any such advancement should be done with a review of this Scoping Report and Environmental Management Plan. Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained.	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and offsite. Should any spills occur, contaminated soil is to be removed and rehabilitated or replaced with uncontaminated soil and a spill report form must be completed by the contractor. The spill report form must include the nature, extent and location of the hazardous spill and the actions taken to contain it.	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	managed.			
Heritage Impact	Sites with archaeologically or culturally important significance might be uncovered during the construction phase. These can include graves, stone walls or cultural artefacts. However, the project area have been largely previously disturbed and there are no known sites of heritage significance.	Construction personnel must be informed of the possibility of finding historical artefacts and be instructed to report any such findings without delay. If such a site is found during the construction activities the construction process must be halted and the relevant authorities must be informed. Construction may only continue at that location once permission has been given. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed.	Report any irregularities to the authorities as stipulated.	Contractor, Proponent
Employment	The magnitude of the proposed new sewage pump station and rising main is on a small scale. A maximum of ±20 temporary job opportunities will be created to unskilled, semi-skilled and skilled workers during the construction phase.	Employ local residents of Omaruru as far reasonably possible.	A summary report of employment created during the project.	Contractor
Cumulative Impacts	These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions	The clustering of existing infrastructure in the area, including existing powerlines and new powerline, as well as other developments would increase the cumulative effect of any impacts associated with the present development. With increased development and the cumulative effects associated with it, it becomes increasingly important to adhere to all mitigation measures as	Summary report based on all other impacts and monitoring must be created to give an overall assessment of the impact of this construction phase. This will assist in future applications for clearance certificates the new Omburu-Omaruru 44 kV OHL.	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.	stipulated in the EMP.		

Table 1.3 Operational Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Electrocution of birds on the power line structure	Bird mortalities/injuries as a result of the electrocution. The proposed H-pole structure has large clearances, which reduces the likelihood of electrocutions on these structures.	"Gapping" of pole earth wires to reduce contact of the wire with the ground, except during lightning strikes. Insulation of selected live components on transformer/switchgear pole structures The earth wire on each power line pole should be "gapped", i.e. an air space safety gap should be included in the earth wire running along the pole (Figure 9.3). The gap should be wide enough to avoid being permanently active, but close enough to allow lightning strikes to bridge it. This mitigation also applies to poles used for transformer and switchgear structures. • The stay wires on power line poles should be "gapped" similarly, by means of an insulator (Figure 9.3). • Transformer structures should be designed in such a way that they are not attractive as bird perches/nesting sites. Selected live components (e.g. central jumpers/droppers running to transformers or switchgears) should be insulated (e.g. using black PVC piping or low density polyethylene pipe [LDPE]) Figure. 9.4	• Monitoring is essential. The need for reporting power line incidents should be stressed, and reporting procedures clarified. • Should monitoring results indicate any sections that subsequently still prove to be problematic in terms of electrocutions, mitigation should be retro-mitigated, by way of adaptive management. • Should electrocutions prove to be problematic on a specific structure, a steel perching bar for birds is proposed as a mitigation for electrocutions (Figure 9.5). This horizontal bar should be >500 mm long, and fitted onto the top of each pole, 220 mm above the pole top or any related structure.	Proponent
Collisions of birds on power line structures	A collision occurs when a bird in mid-flight does not see the overhead cables or structures until it is too late to take evasive action. These impacts could take place on any parts of the power line, but are more likely in sections where the line crosses flight corridors,	<u>Avoidance & minimisation:</u> The power line route will run along an existing servitude, rather than in new areas. No changes to the final proposed routing of the power line are recommended. Due to the length of the power line and the costs involved, burying of the power line is not considered technically or economically feasible. No sections of the power line are identified as	Minimisation: • Monitoring is essential; the need for reporting power line incidents should be stressed. Set up a reporting channel, and clarify monitoring and reporting procedures to all partners. • Should monitoring results indicate that collisions are still taking place	Proponent, Contractor

	such as drainage lines. Collisions may also take place on stay wires (e.g. on poles at bend points or transformer poles), for instance when a bird is flushed from its position on the ground. Collisions may take place even during the construction phase, once the conductors have been strung but not energised, but occur mainly during the operational phase.	"no-go" areas, to be avoided at all costs; however, some sections are regarded as being more sensitive to collision impacts (see below). •	despite the above marking, further sections of the line should be (retro-marked), using an adaptive management approach. • The need for retro-fitting any mitigation for collisions on stay wires (e.g. marking with vibration dampers or other markers) should also be based on monitoring results, using an adaptive management approach.	
Disruptions to power supply caused by bird nesting activity	The provision of artificial habitats/resources such as power line poles, transformers and other structures could also result in negative impacts on the power supply (i.e. flash-overs) caused by bird activities. Distribution lines are more at risk to such impacts, given the smaller clearances. Crow nests on power line structures may contain pieces of wire, which could cause outages. Pied Crow has been recorded in the study area in relatively high numbers; Cape Crow is also likely. Crows are attracted to food sources in areas with human activity and may similarly be attracted to new food sources, e.g. food waste associated with construction workers. Numbers of Pied Crow may	Bird nesting activities on power line infrastructure should be discouraged early in the cycle, before any eggs are laid; the Ministry of Environment, Forestry and Tourism (MEFT) should be contacted for specific guidelines for dealing with such problems. • Anti-perch devices could be investigated in problem areas; or supply a perch higher than the PL structure	Minimisation: • Monitoring is essential to identify (potential) problem areas any movement of hitherto unrecorded species onto power line infrastructure should be monitored; and any resulting negative impacts (e.g. electrocutions or power outages), should be addressed accordingly. • Should any nesting or other activity by crows or Sociable Weavers on power supply structures cause disruptions of the power supply, consult with the MEFT for appropriate measures to discourage and manage such activities, e.g. by removing nests at a stage when this is acceptable. • During operations to remove large Sociable Weaver nests from power line structures, special care should be taken not to destroy any active Pygmy Falcon nests, which breed within these structures (breeding	Proponent

	easily increase in this way. Sociable Weavers nest readily on power line infrastructure. These nesting activities are known to cause disruptions to the power supply in Namibia, especially during the rainy season. This species has been recorded in the study site, in low numbers. Red-billed Buffalo-weaver has also been recorded; this species is more likely to nest inside lattice structures/towers.		season August-March, mainly October-November).	
Visual Impact	There is existing infrastructure (several NamPower powerlines) in the vicinity of the proposed power line. The proposed power line and the existing infrastructure contribute to the visual impact of the area. When considering the potential change to the visual landscape, the key issues are: visual exposure, visual intrusion, and sensitivity of receptors. The potential visual impacts associated with proposed power line and associated infrastructures are linked to both the construction and operations phase of the project.	Wooded pylons should be used as they reflect natural colours of the surrounding landscape. The power line and substations should be positioned in such a way to limit any visual impact as far as practically possible. Rehabilitation of areas is to be done as soon as possible after the temporary and permanent infrastructure is no longer in use.	Avoid littering and ensure good housekeeping through keeping the area neat and tidy. Rehabilitation of areas is to be done as soon as possible after the temporary and permanent infrastructure is no longer in use.	Proponent

Cumulative Impacts	These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.	Mitigation and monitoring of bird impacts as proposed by the bird specialist study must be conducted and its effectiveness monitored. Results of such monitoring must be used to adapt or modify mitigation measures or replace devices to reduce bird mortalities incidents due to electrocution and collisions if deemed necessary	**Annual** summary report based on all other impacts must be created to give an overall assessment of the impact of the Operational Phase. This will assist in future applications for clearance certificates for electricity supply operations.	Proponent

Table 1.4 Decommissioning Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Waste Production and Ablution Facilities	Upon decommissioning, waste will be produced in the form of building rubble, obsolete equipment and structures, obsolete or residual products and equipment or structures that can be used elsewhere or sold as scrap. Ablution facilities must be made available to deconstruction personnel.	To reduce the amount of waste, all re-usable pipelines, and other equipment must be removed to another site or sold as scrap.	Waste Production and Ablution Facilities	Upon decommissioning, waste will be produced in the form of building rubble, obsolete equipment and structures, obsolete or residual products and equipment or structures that can be used elsewhere or sold as scrap. Ablution facilities must be made available to deconstruction personnel.
Ecological Impact	Operations spanning many years may create new habitat for fauna and flora. Upon decommissioning these habitats will be destroyed	The Applicant would have to take into consideration any new flora and fauna habitats created. Before decommissioning, the (Ministry of Mines and Energy (MME) would need to inspect the power line to ensure that the dismantling and removal of any structure would not affect any organism that has become dependent on those structures for survival, shelter or breeding. Where new habitats were created and occupied by fauna or flora, The Applicant must contact MET or other appropriate organizations to establish the conservation status.	A report should be compiled of any fauna and flora that established itself on the premises. The report should include all actions taken to relocate or deal with the situation**.**	Proponent, Contractor
Dust	Dust will be generated during the Decommissioning Phase and might be aggravated	Dust Pollution from decommissioning activities is improbable even with the closest neighbours to the project area are at least 5 km away. However, mitigation measures must be	Speed limits on gravel roads will be limited to a maximum speed consistent with the minimisation of dust generation. Nominal speed limit	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	during periods of strong winds. This occurs regularly in the area of the proposed power line during the winter months when easterly winds occur.	recommended. Vehicles and machinery must be maintained in good working order Avoid new access route development where possible.	of 40 km/h applies Vehicle speeds will be limited to 30km/h on site Complaints regarding dust to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure	
Noise	Noise pollution will exist due to heavy vehicles accessing the site to collect redundant poles, line, and conductor from demolished power line.	The Omaruru Municipality does not have any guidelines with respect to noise levels but the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment is followed. This limits noise levels in industrial areas to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period. At the residential areas nearby the daytime noise levels must not exceed 55 dB while at night it should be less than 45 dB. During decommissioning noise levels might be higher. This will however be short lived. All personnel must be issued with hearing protectors and neighbours must be notified of the time and duration of decommissioning. Notice of the start of the decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the noise impact.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and if appropriate, acted upon.	Proponent, Contractor
Groundwater, and Soil Contamination	Porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep down to the water table either at the site of spill or after being washed away by	Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring. All vehicles and machinery to be used on site should be inspected regularly for oil leaks	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and offsite. Should any spills occur, contaminated soil is to be removed	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	surface flow. Leakages from construction vehicles, accidental spills of fuel, paints and other chemicals might occur. Groundwater might spread pollutants to neighbouring receptors and may create an impact on underground infrastructure. However, due to the small scale of the project and the scarcity of surface water and groundwater in the area, the risk of hazardous spills can be effectively managed.		and rehabilitated or replaced with uncontaminated soil and a spill report form must be completed by the contractor. The spill report form must include the nature, extent and location of the hazardous spill and the actions taken to contain it.	
Health, Safety and Security	During decommissioning phase, construction workers and heavy equipment will be onsite. Heavy machinery, electricity and working at height, increases the risk of injuries. However, due to the relatively small scale of the project, the risk can be well managed.	All Health and Safety standards specified in the Labour Act should be complied with. The responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. The Contractor should be obliged to adhere to the following: ➢ Adhere to Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. ➢ Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities ➢ Ensure suitable personal protective equipment is in place for workers as well as permit to work systems	A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat itself. The contractor must ensure that adequate emergency facilities, including first aid kits are available on site. Selected personnel should be trained in first aid. The numbers of all emergency services must be readily available.	Proponent, Contractor

Rehabilitation	Should the power line ever be decommissioned the entire length of the power line, specifically the poles excavations must be rehabilitated to its original condition.	Removal of all infrastructure and waste produced after decommissioning is crucial. Any residual hydrocarbon polluted soil must be removed to a classified waste disposal site.	During normal operations a rehabilitation fund must be established to prepare for possible decommissioning	Proponent

CONCLUSION AND RECOMMENDATION

Electricity supply is one of the most critical infrastructure components and a key enabler of economic development in Namibia. To enhance the secure and reliable provision of electricity to residents of Omaruru, it has become necessary to replace the existing 22 kV overhead line with a new Omburu-Omaruru 44 kV overhead line capable of meeting the town's increasing electricity demand.

The impact assessment has demonstrated that all potential negative environmental impacts associated with the proposed development can be mitigated to acceptable levels. The most significant potential impacts identified include:

- Impacts on biodiversity (fauna and flora), particularly the destruction or disturbance of habitats;
- Bird collisions with the power line structures;
- Bird electrocutions on the power line; and
- Impacts on the power supply due to bird nesting activity or other activities.

An Environmental Management Plan (EMP) has been developed to guide the construction, operation, and eventual decommissioning of the project. The EMP serves as a practical on-site reference to ensure that environmental risks are effectively managed. All parties found to be in contravention of the EMP should be held accountable for rehabilitation measures, where necessary. Furthermore, the development and implementation of a Health, Safety, Security, and Environmental (HSSE) Management System, used in conjunction with the EMP, will further demonstrate the Applicant's commitment to responsible and sustainable operating practices. Operators and responsible personnel will be required to undergo training on the contents of these documents to ensure full compliance.

It is further recommended that continuous monitoring of the power line structures for bird incidents be undertaken, with additional mitigation implemented where required. The precautionary principle should guide management of collision risks. Specifically, proactive marking of power line sections intersecting the large drainage system in the western part of the study area—where collision risk is elevated—should be undertaken as a preventative measure.

Provided that the recommended mitigation measures are effectively implemented, there are no environmental grounds to withhold the issuance of an Environmental Clearance Certificate for the proposed power line upgrade and associated substation development

GEA Source Investment cc
Faye Brinkman PhD
Project Manager

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Appendix A: Environmental Practitioners CV's

Appendix B: Proof of public notices & adverts

Appendix C: I&APs

Appendix D: Issues/Comments Summary

Appendix E: Public presentation

Appendix F: New 44 kV OHL design plans

Appendix G: Avifauna Specialist Study