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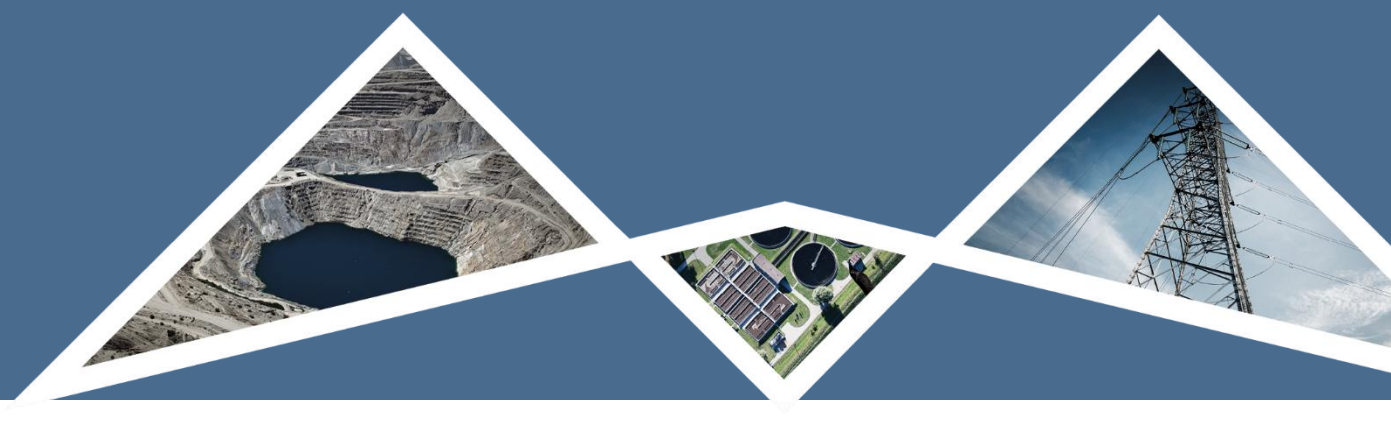
ENVIRONMENTAL MANAGEMENT PROGRAMME

PEMBROKE-POSEIDON 400 kV POWER LINE

DFFE REF. NO: 12/12/20/1439



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REVISION AND AMENDMENTS

REVISION DATE:	REV #	DESCRIPTION
2017/07/01	ORIGINAL DOCUMENT	EMPr compiled by Nemai Consulting C.C
2025/09/08	REVISION 1	EMPr Amendment for DFFE Approval – Amendments in blue text

[1] The content of this EMPr was copied from the 2011 EMPr compiled by Nemai Consulting C.C for Neptune-Poseidon 400 kV Power Line. EIMS was appointed in 2025 to revise and amend this EMPr based on the results of the site-specific specialist walk-through survey undertaken in 2025.

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ACKNOWLEDGEMENT

The format and style of this Environmental Management Programme (EMPr) document was developed by Nemai Consulting C.C who compiled the structure for the Draft EMPr of the Neptune-Poseidon 400 kV Power Line in 2011 and updated in 2017. Pertinent to condition 11 of the Environmental Authorisation (Ref: 12/12/20/1439) for the applicant to amend the EMP that was submitted as part of the application to DEA for written approval before construction can commence, this EMPr has been updated by Environmental Impact Management Services (Pty) Ltd. (EIMS) to include the results of the site-specific specialist walk-through survey of the powerline between Pembroke and Poseidon Substations. Changes to the original EMPr are reflected in blue text for ease of reference.

1 INTRODUCTION

An Environmental Authorisation (EA) was granted by the then Department of Environmental Affairs (DEA) now known as the Department of Forestry, Fisheries and the Environment (DFFE) for the proposed development on 11 July 2012 in terms of the 2010 Environmental Impact Assessment (EIA) Regulations. An amendment application was submitted to DEA, thus the EA was subsequently amended on 05 August 2013.

A second amendment application was submitted to DEA in April 2017 to apply for an extension of the EA as Eskom was unable to commence with construction before the current validity period of July 2017 ends. The second amendment extending the EA validity period to 11 July 2022 was granted on 11 May 2017. A third amendment was granted on 15 November 2021 further extending the validity period by another 5 years to 11 July 2027.

A condition of the EA was for Eskom to compile and submit a final Construction Environmental Management Programme (EMPr) to the Department for approval before construction can commence. The Department also stipulated, as a condition of the EA, that Specialists must walk the entire route to identify sensitive environments directly affected by the project. It is important to note that the Neptune-Poseidon 400kV Powerline is being constructed in phases by the National Transmission Company of South Africa (NTCSA). Environmental Impact Management Services (Pty) Ltd. (EIMS) has been appointed to conduct a walkdown survey for the proposed ±165 km 400 kV powerline from the Pembroke to the Poseidon Substation as part of the proposed Greater East London Phase 4 Project and to compile a site-specific EMPr which includes the results from the specialist walkdown survey.

This EMPr has been compiled, as a guideline, in accordance with the Environmental Impact Assessment (EIA) Regulations (GNR 982 of 2014 as amended) for the requirements of an EMPr (Appendix 4 of GNR 982), to establish the mitigation and management measures that need to be implemented to avoid, reduce, and minimise potential environmental impacts arising out of any of the phases applicable to the project.

It should be noted, however, that an EMPr is a working document that should be updated on a regular basis, as and when necessary, as outlined in Regulation 35 of the GN R 982. The EMPr thus supports an on-going proactive mitigation approach and duty of care to the environment. The EMPr shall allow for risk minimization and will ensure legal compliance. This EMPr will also allow the user to make minor amendments to ensure continual revision and improvement of risk mitigation through the continual re-assessment of risks associated with the activity.

This EMPr cannot be read in isolation of Appendix 1: Specialist WalkDown Survey Reports which provides a detailed description of the location of each tower in relation to sensitive environments affected by the project.

1.1 DOCUMENT STRUCTURE

Table 1 provides an overview of the EMPr, as stipulated in Appendix 4 of the GN R982.

Table 1: EMPr Structure.

Appendix 4 Reference	Description	Section in EMPr
Appendix 4(1)(1)	(1) An EMPr must comply with section 24N of the Act and include-	
Appendix 4(1)(1)(a):	(a) details of- (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae	Section 2 (Requirements of the EAP)
Appendix 4(1)(1)(b):	(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	Section 3 (Description of Proposed Project)
Appendix 4(1)(1)(c):	(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers	
Appendix 4(1)(1)(d):	(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and in the case of a closure activity, closure; and (v) where relevant, operation activities	Section 9 (Impact Management and Mitigation Measures)
Appendix 4(1)(1)(e):	*(e) Para. (e) deleted by GN 326/2017*	*N/A*
Appendix 4(1)(1)(f):	(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to- (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; and (iii) comply with any applicable provisions of the Act regarding closure, in the case of a closure activity. *(iv) Sub-para. (iv) deleted by GN 517/2021*	Section 9 (Impact Management and Mitigation Measures)
Appendix 4(1)(1)(g):	(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f)	
Appendix 4(1)(1)(h):	(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f)	
Appendix 4(1)(1)(i):	(i) an indication of the persons who will be responsible for the implementation of the impact management actions	Section 4 (Roles and Responsibilities) Section 9 (Impact Management and Mitigation Measures)
Appendix 4(1)(1)(j):	(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented	Section 9 (Impact Management
Appendix 4(1)(1)(k):	(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	

Appendix 4 Reference	Description	Section in EMPr
		and Mitigation Measures)
Appendix 4(1)(1)(l):	(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	Section **Error! Reference source not found.** (Monitoring and Auditing)
Appendix 4(1)(1)(m):	(m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment	Section 6 (Environmental Awareness and Training)
Appendix 4(1)(1)(n):	(n) any specific information that may be required by the competent authority.	N/A
Appendix 4(1)(2)	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply	

2 REQUIREMENTS OF AN EAP

In terms of Regulation 13 of the EIA Regulations, 2014, an independent Environmental Assessment Practitioner (EAP), must be appointed by the Applicant to manage the application. EIMS has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS:

- Is objective and independent;
- Has expertise in conducting Environmental Impact Assessments;
- Complies with the NEMA, the Regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the Applicant and the relevant environmental authority.

2.1 DETAILS OF THE EAP (ORIGINAL EMPR)

Nemai Consulting C.C was appointed by the Applicant to fulfil the role of the Independent EAP to draft the original EMPr together with the EIA documentation and submit to the Competent Authority. The contact details of the EAP are as follows:

Name of Practitioner: Samantha Gerber

Tel No: + 27 11 781 1730

Fax No: +27 11 781 1731

E-mail address: samanthag@nemai.co.za

2.2 DETAILS OF THE EAP (FOR AMENDMENT)

EIMS was appointed by the Applicant to fulfil the role of the Independent EAP to update the existing EMPr and submit to the Competent Authority. The contact details of the EAP are as follows:

Name of Practitioner: Sikhumbuzo Mahlangu

Tel No: + 27 11 789 7170

Fax No: +27 86 571 9047

E-mail address: sk@eims.co,za

2.3 EXPERTISE OF THE EAP

Mr Mahlangu is an environmental project manager and environmental auditor. He is a registered Environmental Assessment Practitioner (2022/4554) and a Professional Natural Scientist (Reg. no 400429/13) who holds a BSc. Master's degree in Zoology (Aquatic Health) from the University of Johannesburg. He is an aquatic and research scientist with 2 years' experience, and over 14 years' experience as an environmental scientist. He has completed certificate courses in Environmental Management Systems (ISO 14001: 2015) and Environmental Law with the North-West University. He has also completed an advanced course on Tools for Wetland Assessment. Mr Mahlangu is registered with the South African Auditor and Training Certification Authority (SAATCA) as a Provisional Auditor. His expertise lies mainly in environmental management, auditing, monitoring, surface and ground water quality assessments, biomonitoring, wetland assessments, reporting and project management. Mr. Mahlangu has played a vital role in providing advice on general environmental management issues on site to projects such as Transnet New Multi Product Pipeline (NMPP) and the Eskom Kusile Power Station Construction Project, among others. He has also been involved on numerous projects in the energy, mining, and infrastructure development sectors. He has also played a role in assisting and advising various contractors and clients on the practical implementation of Water Use Licences, Environmental Management Plans, and conditions of Environmental Authorisations.

3 DESCRIPTION AND SCOPE OF THE PROPOSED PROJECT

3.1 PROJECT BACKGROUND AND MOTIVATION

Increased demand for reliable electricity supply in the Southern Grid has necessitated that Eskom Transmission improves the reliability and capacity of the transmission network into the area. The supply to the East London area from the Pembroke and Neptune Main Transmission System (MTS) is presently unstable.

Subsequent to the network analysis based on regulatory standard the least economic cost network solution, which will mitigate existing Distribution voltage regulation problems and the Transmission network security in the East London Customer Load Network, was identified. This network solution meets the following minimum requirements:

- Improve reliability of the existing East London Transmission network;
- Improve East London network voltage regulation; and
- Create additional Transmission network capacity to supply the increasing electricity demand in the Southern Grid.

Based on the analysis of the possible Distribution and Transmission alternatives to mitigate existing and foreseen network constraints, the Neptune-Poseidon 400kV powerline project was identified as the preferred option as part of the greater East London Strengthening Scheme. This project will also improve reliability in the Eastern Grid. The phased-in approach of the greater East London Strengthening Scheme is proposed to ensure long-term sustainability of the Cape and Eastern Grid corridor reliability.

Further to the above, this project is part of the minimum strengthening requirements in the Eastern Cape Province in meeting the IRP 2019 renewable generation integration. It is crucial that all project development activities are prioritised to a point of execution readiness. There is high potential for wind generation around Poseidon Substation. The expected renewable energy generation to be evacuated from the Port Elizabeth power pool is approximately 5 GW as per the IRP 2019.

There has been minimal progress achieved on the Greater East London Strengthening phase 4 project thus far because of resource constraints as well as the relocations on the revised Greater East London strengthening phase 3 (Neptune – Pembroke 400 kV line and associated substation works) that were taking priority. The phase 4 project only recently became a priority project due to the IRP 2019.

This project also aims to address the following:

- There is high potential for wind generation around Poseidon Substation.
- The expected renewable energy generation to be evacuated from the Port Elizabeth power pool is approximately 5 GW as per the IRP 2019.
- This project forms part of the minimum strengthening requirements in the Eastern Cape Province to meet the IRP 2019 renewable generation integration.

Of the Neptune-Poseidon 400kV powerline route, the Construction EMPr focuses on the portion of the powerline to be constructed between the Pembroke Substation and the Poseidon Substation. The proposed ±165 km powerline starts near Qonce and ends near Cookhouse, traversing the Buffalo City Metropolitan, Raymond Mhlaba and Blue Crane Route Local Municipalities in the Eastern Cape (See Figure 1 for locality map).

3.2 PROJECT LOCATION

The study area is situated in the Eastern Cape Province in the Buffalo City Metropolitan Municipality (Figure 1).

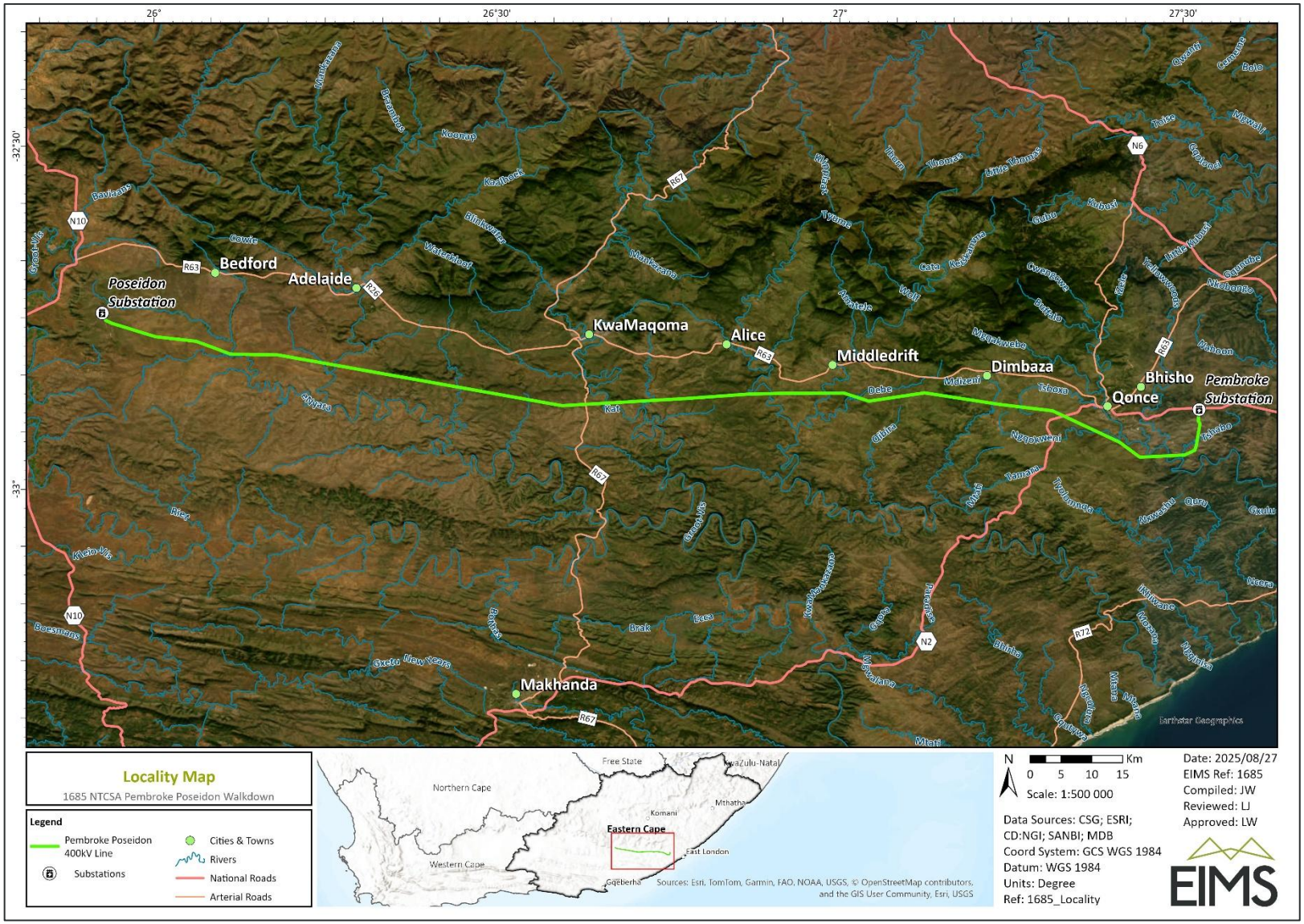


Figure 1: Map of proposed powerline

3.3 SPECIALISTS WALK-DOWN SURVEY

The site-specific EMPr is based on a tower-to-tower walkdown undertaken by the EAP and specialist team from the 7th of April to 17th April 2025. The specialist team encompassed the following environmental disciples:

Following the site visit, each specialist has provided appropriate additional mitigation measures applicable to the pylon positions as well as the cable spans (where relevant). These mitigation measures have been tabulated according to NTSCA's pylon position unique identifying numbering system and form part of the addendum to the existing EMPr (Appendix 2). The specialists that conducted the walk-down survey are provided in Table 2 below.

Table 2: Details of the walk-down survey specialists

Discipline	Specialist	Company
Terrestrial Biodiversity (Fauna and Flora)	Igi Jacobs	The Biodiversity Company
Wetlands and Aquatics	Namitha Singh	
Avifauna	Dr Ryno Kemp	
Heritage and Archaeology	Dr. Lucien James	EIMS (Pty) Ltd

The surveys identified sensitive features and made recommendation to minimise the impact of the proposed powerline development on the receiving environment. Based on the recommendations of the walk-down survey, NTCSA re-aligned some of the affected tower positions to avoid the certain sensitive environmental features identified.

4 ROLES AND RESPONSIBILITIES

4.1 DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA)

DEA are the mandated authority in terms of NEMA that determine whether authorisation can be issued for the project, following a decision-making process.

DEA also fulfils a compliance and enforcement role with regards to the authorisation. The Department may perform random inspections to checks compliance. DEA will review the monitoring and auditing reports compiled by the Environmental Control Officer (ECO).

4.2 PROJECT PROPONENT

NTCSA is the applicant in terms of NEMA. NTCSA is also the Project Proponent for all components of the work related to the development and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are satisfied. The liability associated with environmental non-compliance rests with the Project Proponent.

4.3 PROJECT MANAGER

The Project Manager has overall responsibility for managing the project and for ensuring that the environmental management requirements are met with regards to the EMPr, EA, and other environmental licenses or permits. During the operational phase, it is expected that this role will be fulfilled by the Operations Manager.

The Project Manager's responsibilities will include the following (amongst others):

- Management of environmental matters and compliance with environmental licenses, permits and authorisations; and
- Management of the project team including the ECO, the Contractor and the other project role players.

4.4 ENVIRONMENTAL CONTROL OFFICER (ECO)

The ECO is a competent and independent representative. The ECO will undertake inspections of the site and full compliance auditing against the EMPr and EA. The audit reports will be submitted to the project manager and also be made available to the relevant authorities, on their request.

The ECO will check the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (air, noise, water quality).

Further duties of the ECO will be the following:

- Monitoring of compliance with the EA, EMPr and the Project Specification.
- Make recommendations on how to best apply the environmental requirements on site and advise the Contractor on the site instructions required to facilitate effective environmental compliance.
- Participate in the quality management system by issuing non-conformances when there are areas of the project environmental requirements that are not being met.

4.5 PROJECT TEAM

A summary of the proposed project team members and their associated responsibilities for the Pembroke-Poseidon 400 kV powerline is presented in Table 2: Details of the walk-down survey specialistsTable 3.

Table 3: Environmental responsibilities of project team

Role / Function	Responsibility
Project Manager (PM)	Overall management of project and EMPr, EA, license and permit compliance.
Site Supervisor	Implementation of site works, liaison with Contractor, PM and ECO.
Environmental Control Officer (ECO)	Compliance monitoring of the implementation of EMPr.
Contractor	• Sign Pro Forma Agreement, as commitment to environmental responsibility. • Supply method statements for all works required. • Implementation and compliance with recommendations and conditions of EMPr, the EA, permits and licenses. • Appoints an Environmental Officer to ensure implementation of the EMPr

Environmental Officer	• Appointed by the Contractor to ensure implementation of the EMPr on behalf of the Contractor
NTCSA Environmental Advisor	Environmental advice and auditing.

5 MONITORING AND AUDITING

Monitoring is required to ensure that the receiving environment at the study area is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

The project is to be implemented in accordance with NTCSA's Environmental Management Policy and ISO 14001 based Environmental Management System (EMS).

The standard NTCSA site documentation shall be used to keep records on site. All documents shall be kept on site and be made available for monitoring purposes. Site inspections by an Environmental Audit Team may require access to this documentation for auditing purposes. The documentation shall be signed by all parties to ensure that such documents are legal. Regular monitoring of site works by the ECO is imperative to ensure that all problems encountered are solved punctually and amicably. When the ECO is not available, the Site Supervisor shall keep abreast of all works to ensure no problems arise.

Weekly environmental compliance reports shall be forwarded to the NTCSA PM with all information relating to environmental matters. The following Key Performance Indicators must be reported on a two-weekly basis by the ECO:

- Environmental incidents (e.g. fuel spills) and actions taken;
- Incidents that can lead to legal contraventions and litigation;
- Complaints from Interested and Affected Parties, which should be recorded and kept on file; and
- Environmental damage that needs rehabilitation.

The following documentation shall be kept on site:

- Access negotiations and physical access plan;
- Complaints register;
- Site daily diary;
- Records of all remediation / rehabilitation activities;
- Copies of two-weekly reports to the Environmental Advisor;
- Copy of the EMPr and EA; and
- Minutes of site meetings (including discussions related to environmental matters).

Environmental Audits will be carried out during and upon completion of construction.

A document handling system must be established to ensure accurate updating of Construction EMPr documents, and availability of all documents required for the effective functioning of the Construction EMPr. Supplementary Construction EMPr documentation could include:

- Method Statements;
- Site instructions;
- Emergency preparedness and response procedures;

- Record of environmental incidents;
- Non-conformance register
- Training records;
- Site inspection reports;
- Monitoring reports;
- Auditing reports; and
- Public complaints register (single register for maintained for overall site).

6 ENVIRONMENTAL TRAINING AND AWARENESS

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project.

Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The various means of creating environmental awareness during the construction phase of the project may include:

- Induction course for all workers before commencing work on site;
- Refresher courses (as and when required);
- Daily toolbox talks, focusing on particular environmental issues (task- and area specific);
- Courses must be provided by suitably qualified persons and in a language and medium understood by the workers;
- Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features (e.g. grave sites, protected trees); and
- Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees.

7 ENVIRONMENTAL ACTIVITIES, ASPECTS AND IMPACTS

7.1 PROJECT LIFECYCLE APPROACH

The entire lifecycle for the Pembroke-Poseidon 400kV Powerline project includes the following phases:

- Feasibility phase – This includes selecting a suitable corridor for the route of the proposed transmission line following the execution of an EIA process. Servitude negotiations are also initiated during this phase.
- Planning and design phase – This phase, which is only undertaken should environmental authorisation be obtained, includes the following –
    - Aerial survey of the route;
    - Selection of the most appropriate structures;

- NTCSA and environmental specialists (e.g. ecologist, heritage) conduct a walkdown survey to determine the exact locations of the towers, based on sensitive environmental features and technical criteria.
- Preparation of relevant planning documentation, including technical and design documentation.

- Construction phase – During the implementation of the project, the construction activities related to the installation of the necessary infrastructure and equipment is undertaken.
- Operational phase – This includes operational activities associated with the maintenance and control of the transmission line.
- Decommissioning - This phase will include measures for complying with regulatory requirements, rehabilitation and managing environmental impacts in order to render the affected area suitable for future desirable use.

This EMPr focusses on the Construction phase of the project.

In order to establish best management practices and prescribe mitigation measures, the following project-related information needs to be adequately understood:

- **Activities** associated with the proposed project;
- **Environmental aspects** associated with the project activities;
- **Environmental impacts** resulting from the environmental aspects; and
- The nature of the surrounding **receiving environment**.

7.2 PROJECT AND ENVIRONMENTAL ACTIVITIES

The main project components include the installation of a 400kV transmission line (including concrete foundations, towers, conductors and anchors).

For the purposes of effective and efficient monitoring, the aspects of the construction phase are outlined below. In order to understand the impacts related to the project, it is necessary to unpack the activities associated with the construction phase of the project, as shown below:

Table 4: Activities associated with the construction phase

CONSTRUCTION PHASE
Project Activities
1. Site establishment (including site camp and labour camp)
2. Fencing of the construction area
3. Plant and animal search and rescue
4. Environmental awareness training
5. Grading of site (where necessary)
6. Upgrade existing access roads / build new access roads (where necessary)
7. Site clearing

CONSTRUCTION PHASE
8. Stormwater control mechanisms
9. Delivery of construction material
10. Transportation of equipment, materials and personnel
11. Storage and handling of material
12. Excavations for foundations and anchors of towers
13. Position premade foundation structures into excavations
14. Erection of steel structures
15. Stringing of transmission cables
16. Management of topsoil and spoil
17. Control of invasive plant species
18. Concrete works (filling of foundations)
19. Mechanical and electrical works
20. Electrical supply
21. Cut and cover activities
22. Stockpiling (sand, crushed stone, aggregate, etc.)
23. Waste and wastewater management
24. Bulk earthworks
25. Site security
26. Construction of powerlines and towers
27. Landscaping
28. Reinstatement and rehabilitation
29. Signing off by landowners
30. Handing and taking over of the servitude
Environmental Activities
1. Diligent compliance monitoring of the EMPr, EA and other relevant environmental legislation
2. Conduct environmental awareness training

CONSTRUCTION PHASE
3. Ongoing search, rescue and relocation of red data, protected and endangered species, medicinal plants, heritage resources and graves (based on area of influence of the construction activities) – permits to be in place
4. Implement EMPr
5. Reinstatement and rehabilitation of construction domain (outside of inundation areas, as necessary)
6. Ongoing consultation with affected parties and landowners

7.3 ENVIRONMENTAL ASPECTS

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact. The following environmental aspects have been identified for the Pembroke-Poseidon 400kV Powerline project, which are linked to the project activities (note that only high-level aspects are provided):

Table 5: Environmental aspects associated with the Pembroke-Poseidon 400kV powerline

ENVIRONMENTAL ASPECTS Construction Phase
1. Poor consultation with landowners and affected parties
2. Inaccurate walk-down survey
3. Inadequate environmental and compliance monitoring
4. Lack of environmental awareness creation
5. Construction starting without or inadequate search and rescue
6. Indiscriminate site clearing
7. Poor site establishment
8. Poor management of access and use of access roads
9. Inadequate provisions for working on steep slopes
10. Poor transportation practices
11. Poor traffic management
12. Disturbance of topsoil

ENVIRONMENTAL ASPECTS **Construction Phase**
13. Disruptions to existing services
14. Inadequate storage and handling of material
15. Inadequate storage and handling of hazardous material
16. Erosion
17. Poor maintenance of equipment and plant
18. Poor management of labour force
19. Pollution from ablution facilities
20. Inadequate management of construction camp
21. Poor waste management practices – hazardous and general solid, liquid
22. Poor management of pollution generation potential
23. Poor management of water
24. Damage to significant fauna and flora
25. Environmental damage of sensitive areas
26. Disruption of archaeological and culturally significant features (if encountered)
27. Dust and emissions
28. Noise nuisance due to construction activities
29. Influence to resource quality of the affected rivers from river diversions
30. Poor reinstatement and rehabilitation

7.4 POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Refer to Table 6 for the potential significant impacts associated with the preceding activities and environmental aspects for the construction phase.

Table 6: Potential significant environmental impacts for construction phase

Feature	Impact
Geology and Soil	• Impacts associated with the sourcing of construction material and loss of topsoil • Soil erosion (land clearance and construction activities) • Soil pollution e.g. hydrocarbon and cement spillages
Topography	• Visual impacts during construction Erosion of affected areas
Water	• Increased stormwater runoff Water leakages and wastage
Flora	• Damage and loss of vegetation of conservation significance Proliferation of exotic vegetation in disturbed areas • Damage to vegetation in surrounding areas
Fauna	• Damage / clearance of habitat of conservation importance Loss of fauna species of conservation significance • Obstruction to animal movement corridors
Air Quality	• Dust generation and emissions
Transportation	• Construction-related traffic • Damage to roads by heavy construction vehicles
Noise	• Localised noise increase Noise nuisance
Aesthetics	• Reduction in visual quality of area
Safety and Security	• Safety risk to surrounding communities and landowners
Waste Management	• Waste generated from site preparations (e.g. plant material) • Domestic waste • Surplus and used building material • Hazardous waste (e.g. chemicals, oils, soil contaminated by spillages, diesel rags) • Disposal of excess spoil material (soil and rock) generated as part of the bulk earthworks • Land, air and water pollution through poor waste management practices
Socio – Economic	• Generation of employment opportunities for local community (positive) • Contribution to local economy (positive) • Damage to property • Nuisance from noise and dust • Safety and security

Feature	Impact
Agricultural Potential	• Loss of agricultural land Impacts to livestock
Heritage Resources	• Damage to heritage resources
Riparian Habitat	• Wetland/aquatic habitat unit destruction Soil erosion
Aquatic Ecology	• Disruptions to aquatic biota community due to water contamination, alteration of flow and disturbance to habitat during construction (particularly relevant to construction activities that take place instream or in close proximity to watercourses) • Alteration of habitat • Loss of aquatic-dependent biodiversity
Water Quality	• Sedimentation from runoff from cleared areas and dewatering • Inflow of contaminated storm water • Release of contaminants from equipment and concreting activities • Water quality impacts due to spillages and poor construction practices • Water quality impacts due to siltation and pollution
Flow Regime	• Affect aquatic biodiversity

8 SENSITIVE ENVIRONMENTAL FEATURES

Analyses of the nature and profile of the receiving environment identified several potential sensitive environmental features as indicated in the sensitivity maps below. Cognisance must be taken of the following sensitive environmental features that should be afforded additional care and protection. The following sensitive features were identified:

- All traffic and pedestrians on the public roads are regarded as sensitive and measures need to be implemented to safeguard these road users;
- Existing communication channels need to be duly respected and adhered to when engaging with landowners and the community;
- Private land may not be accessed unless consent has been granted by the landowner, or a servitude has been registered;
- Directly affected landowners, human settlements, and agricultural land is impacted by the powerline route and tower placement;
- Livestock farming along the powerline route;
- Roads and railway lines are crossed by the powerline route;
- Rugged terrain, extensive rock outcrops;
- Wetlands located within 500m of the towers;
- Avifauna migratory routes; and
- Informal cemeteries and possible grave sites located near the tower positions.

The sensitivity maps shown in the figures below need to be made available to the implementation team (including the Project Manager, ECO and Contractor) in a readable format to allow for further consideration and adequate interpretation at an appropriate scale.

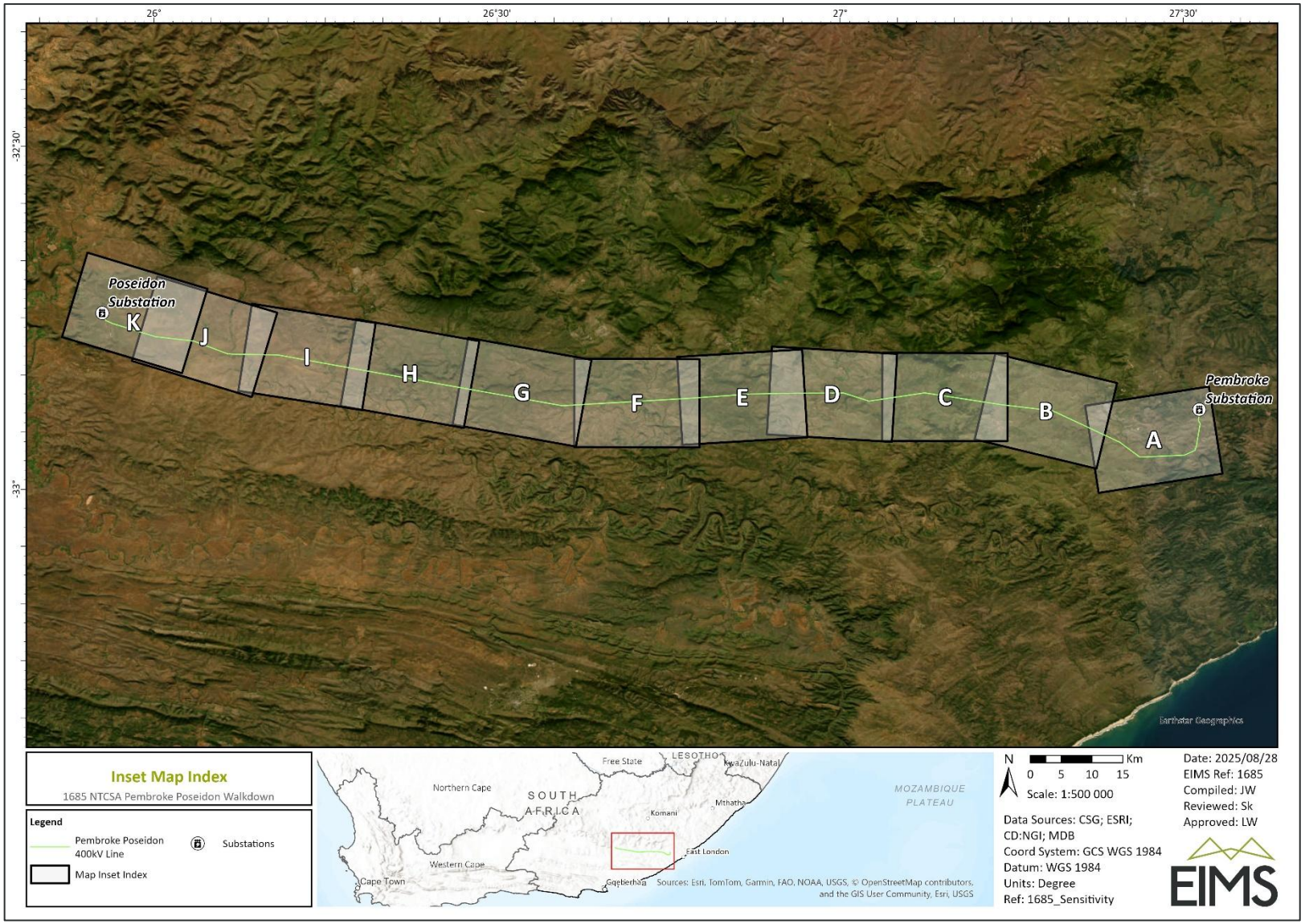


Figure 2: Sensitivity Map Index

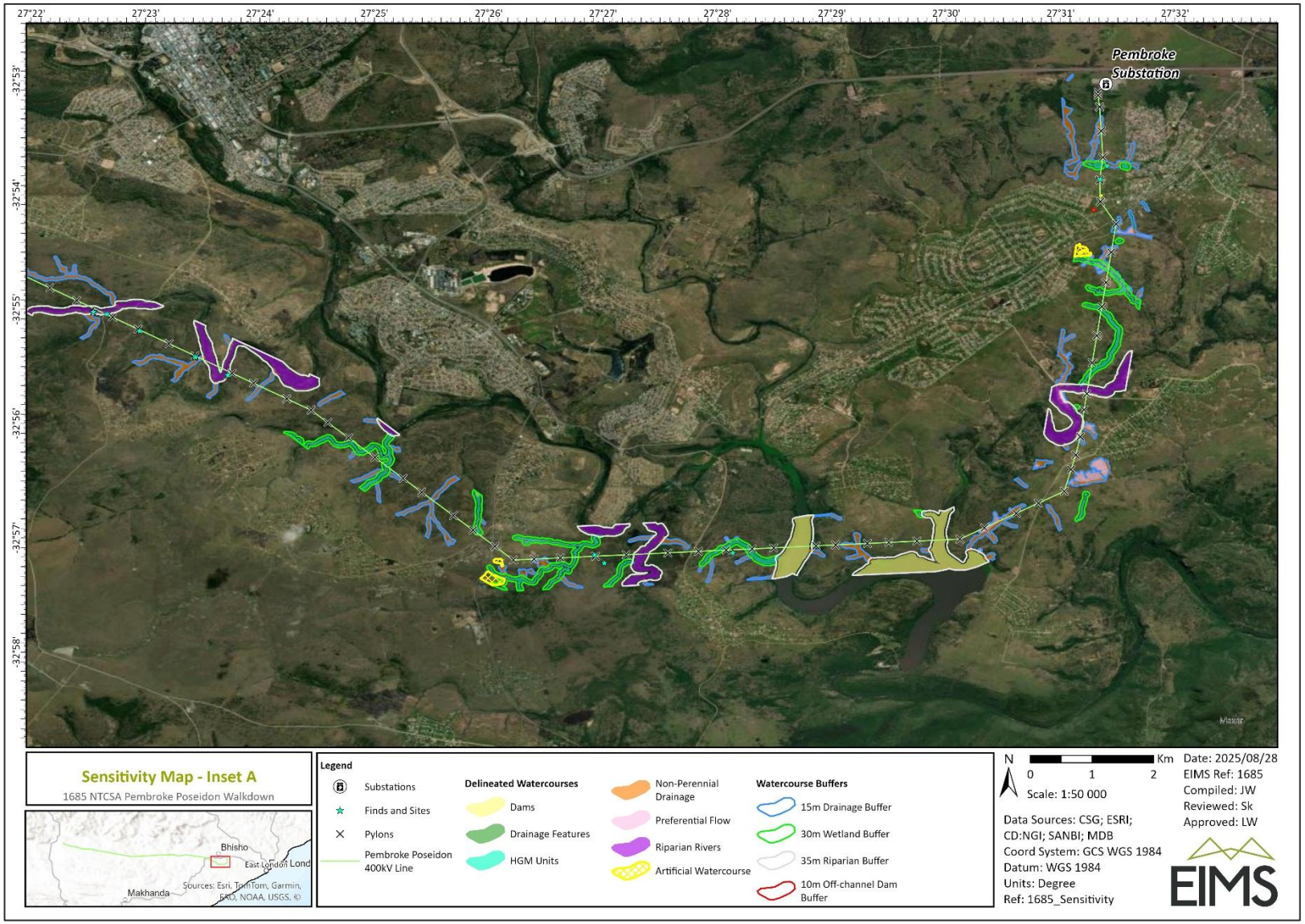


Figure 3: Sensitivity Map Insert A

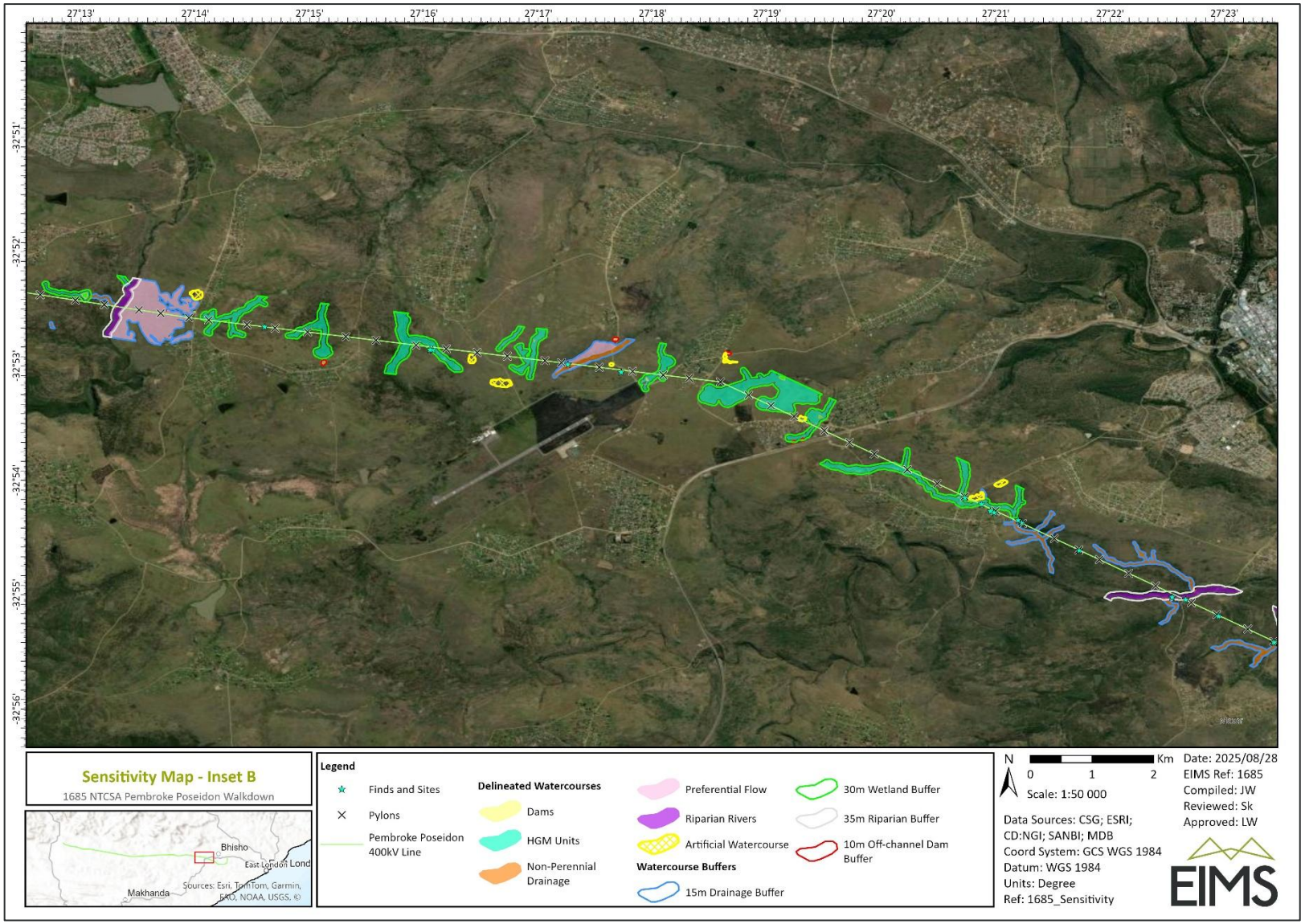


Figure 4: Sensitivity Map Insert B

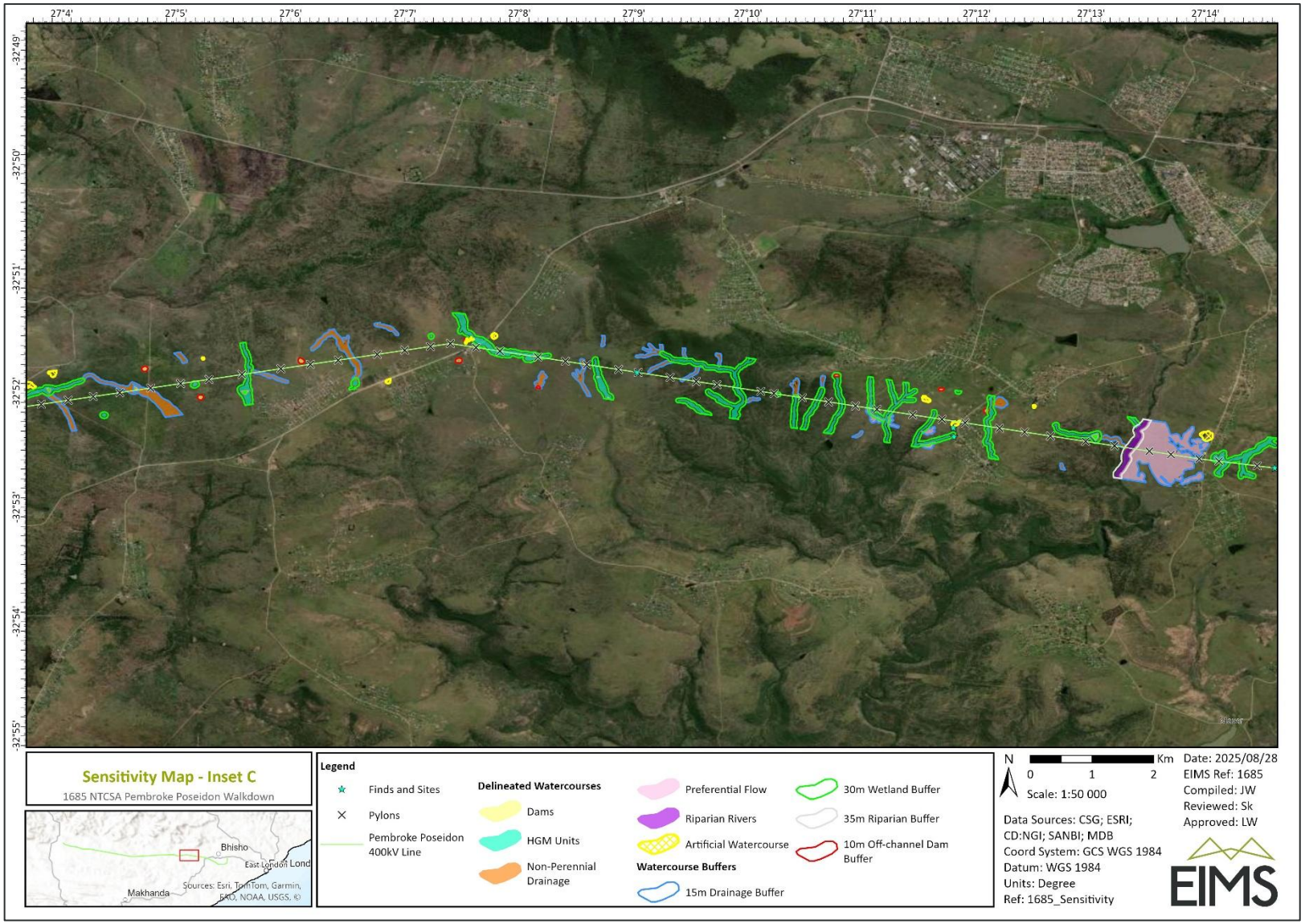


Figure 5: Sensitivity Map Insert C

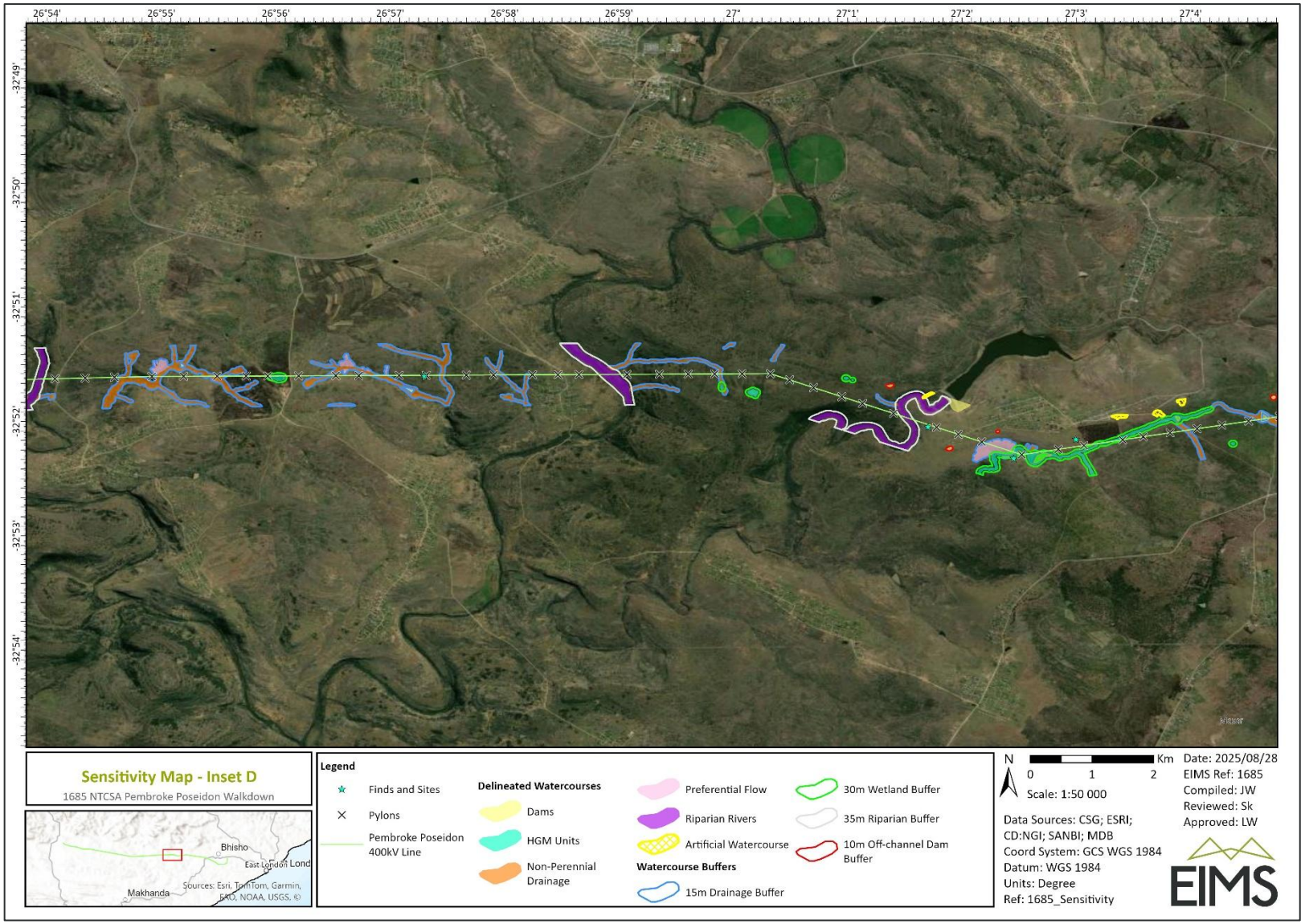


Figure 6: Sensitivity Map Insert D

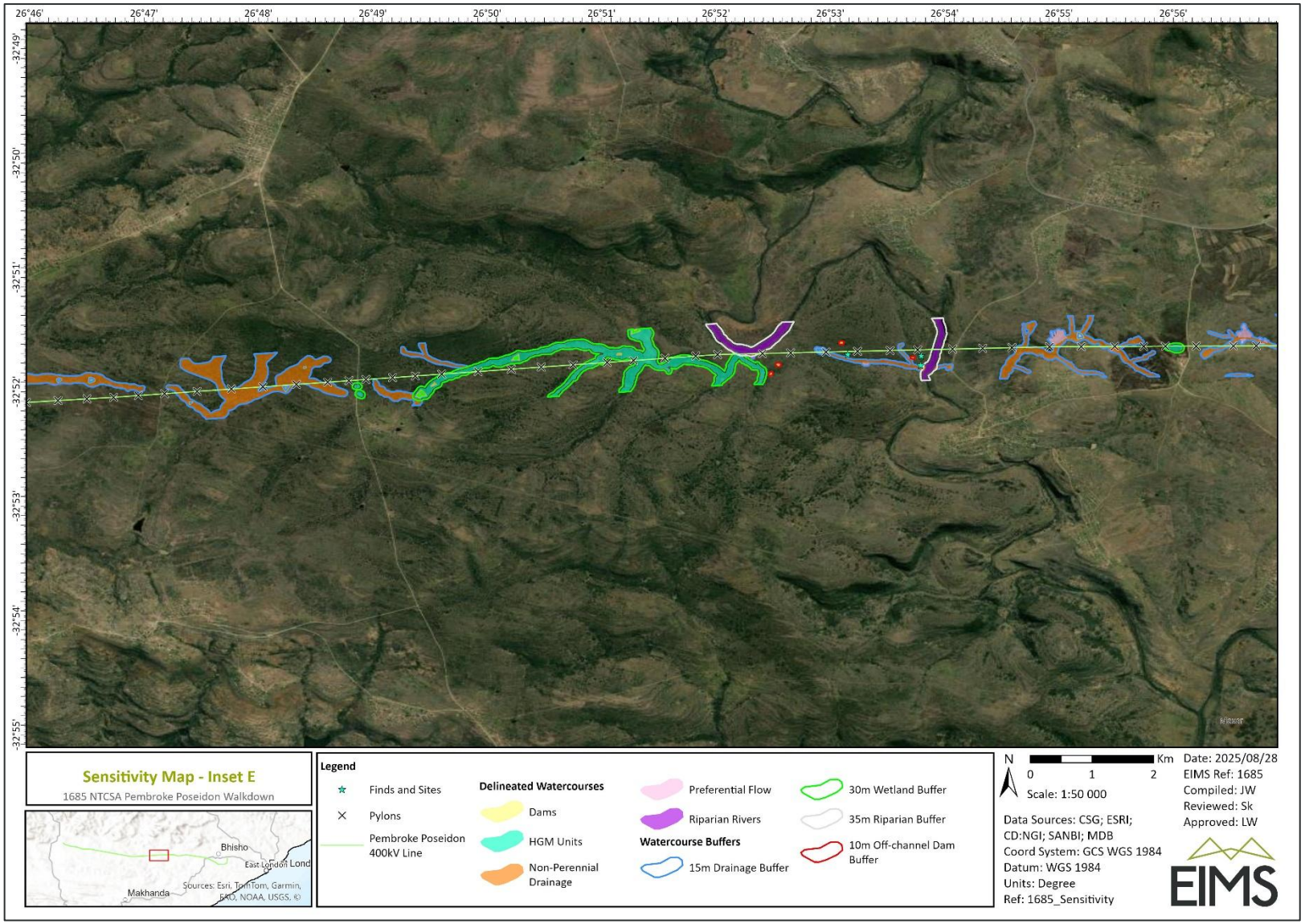


Figure 7: Sensitivity Map Insert E

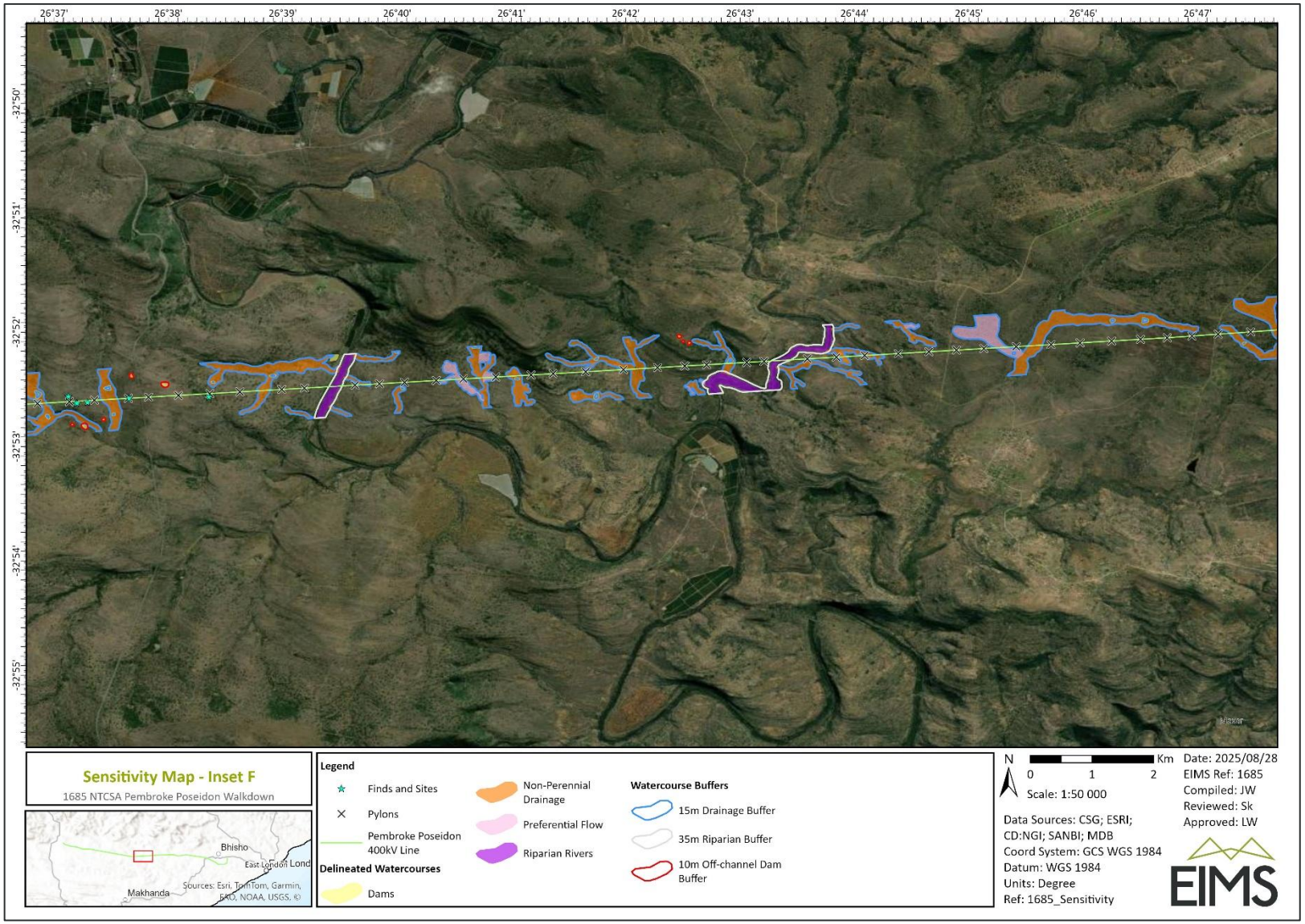


Figure 8: Sensitivity Map Insert F

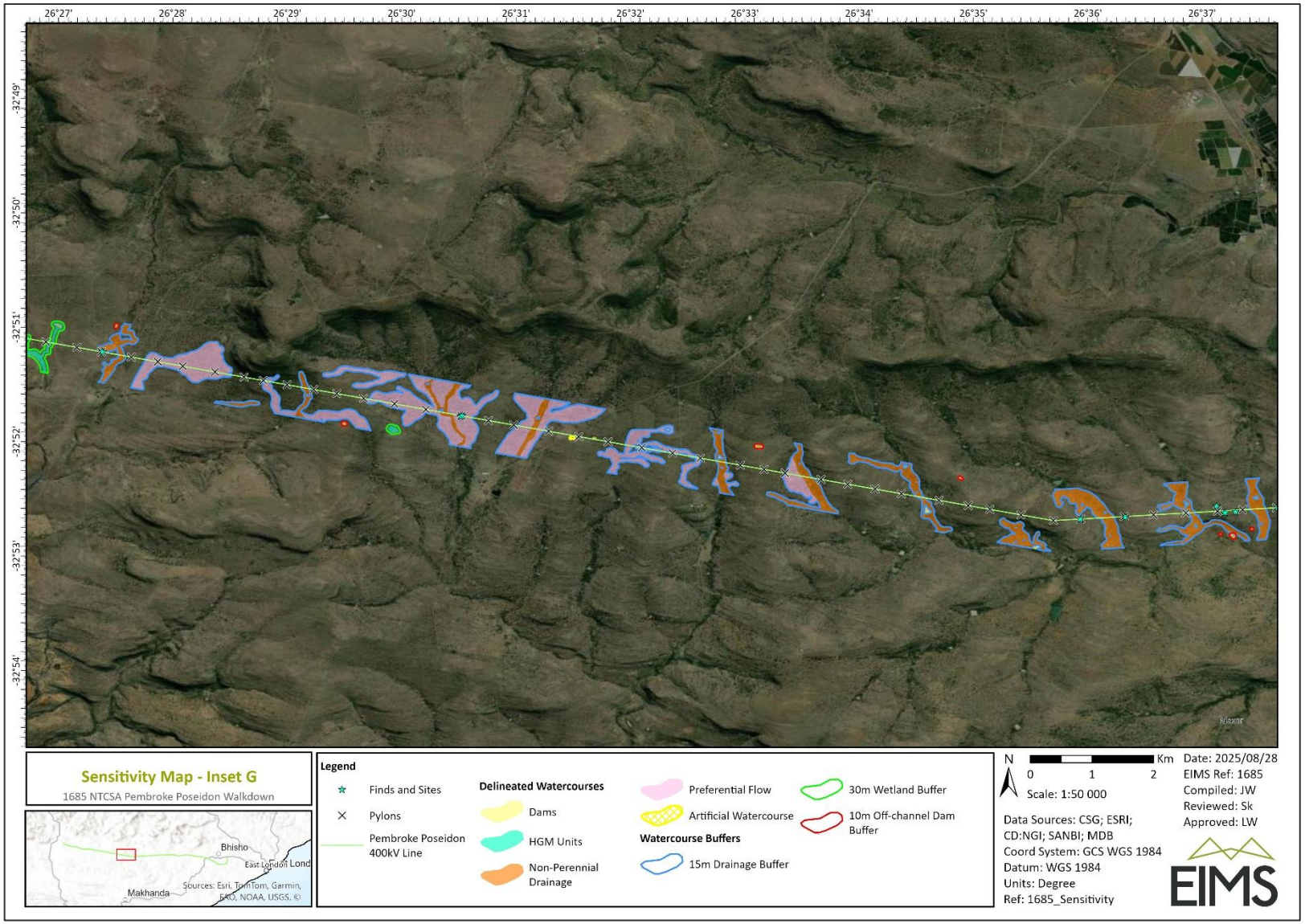
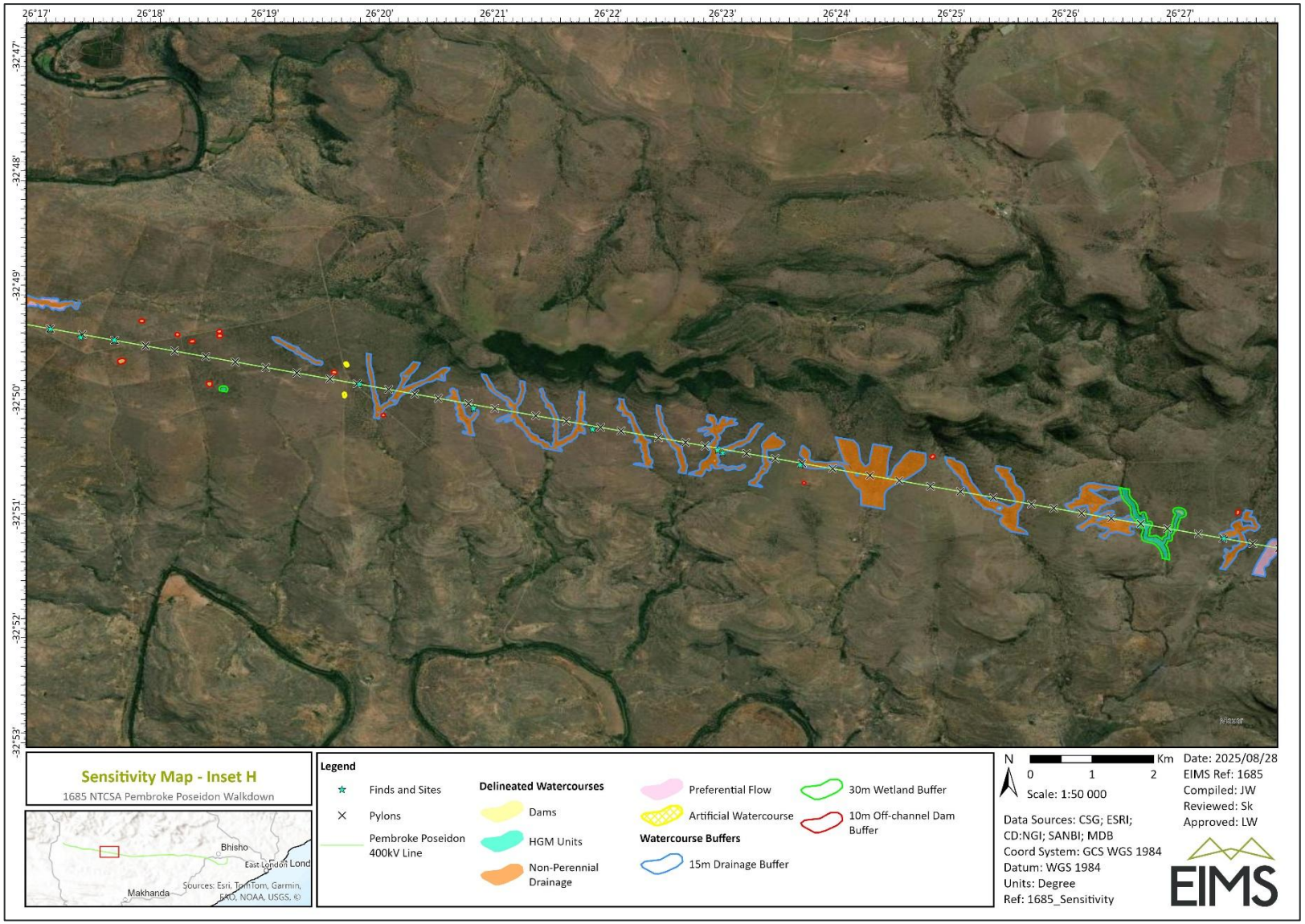


Figure 9: Sensitivity Map Insert G



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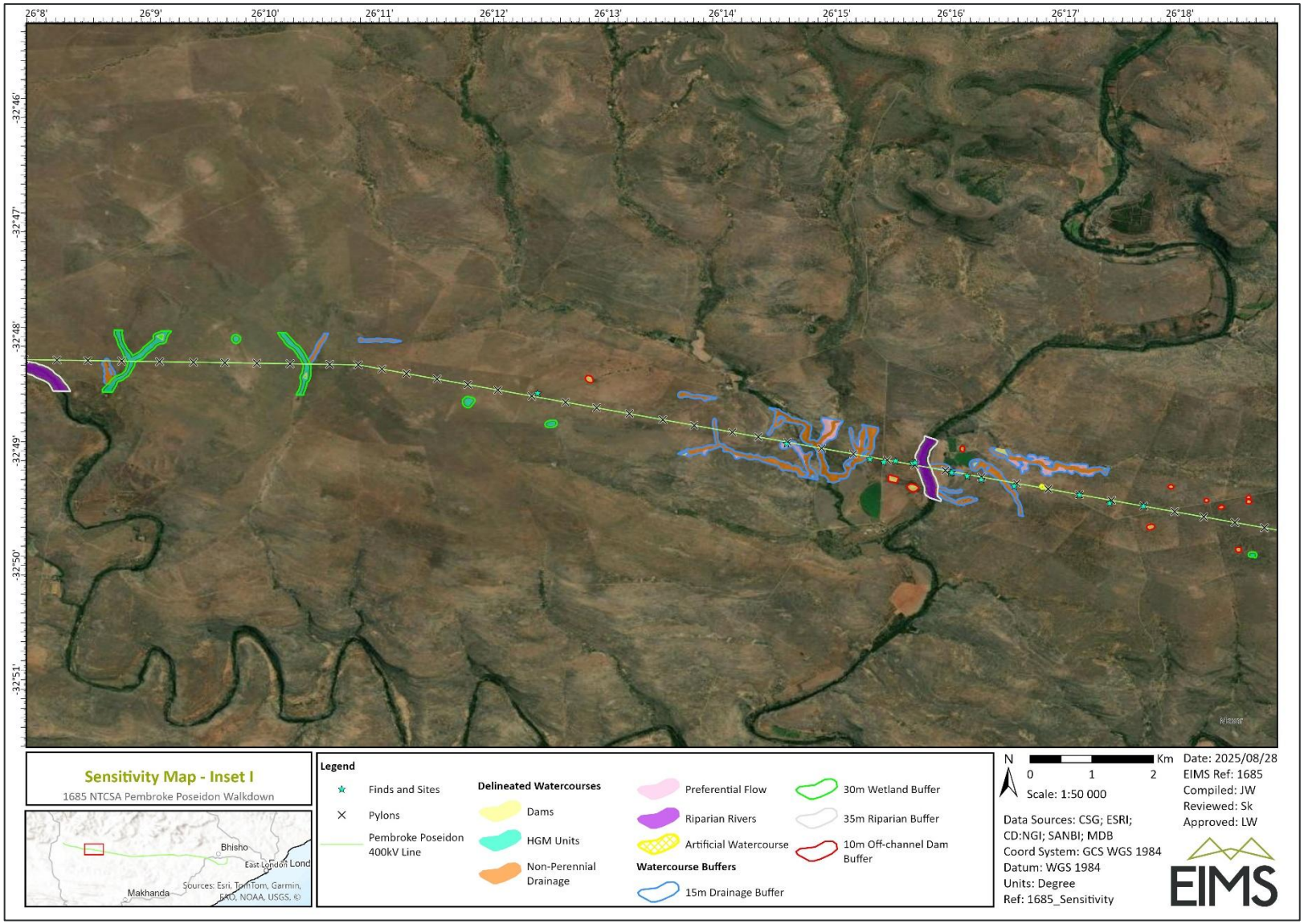

Figure 11: Sensitivity Map Insert I

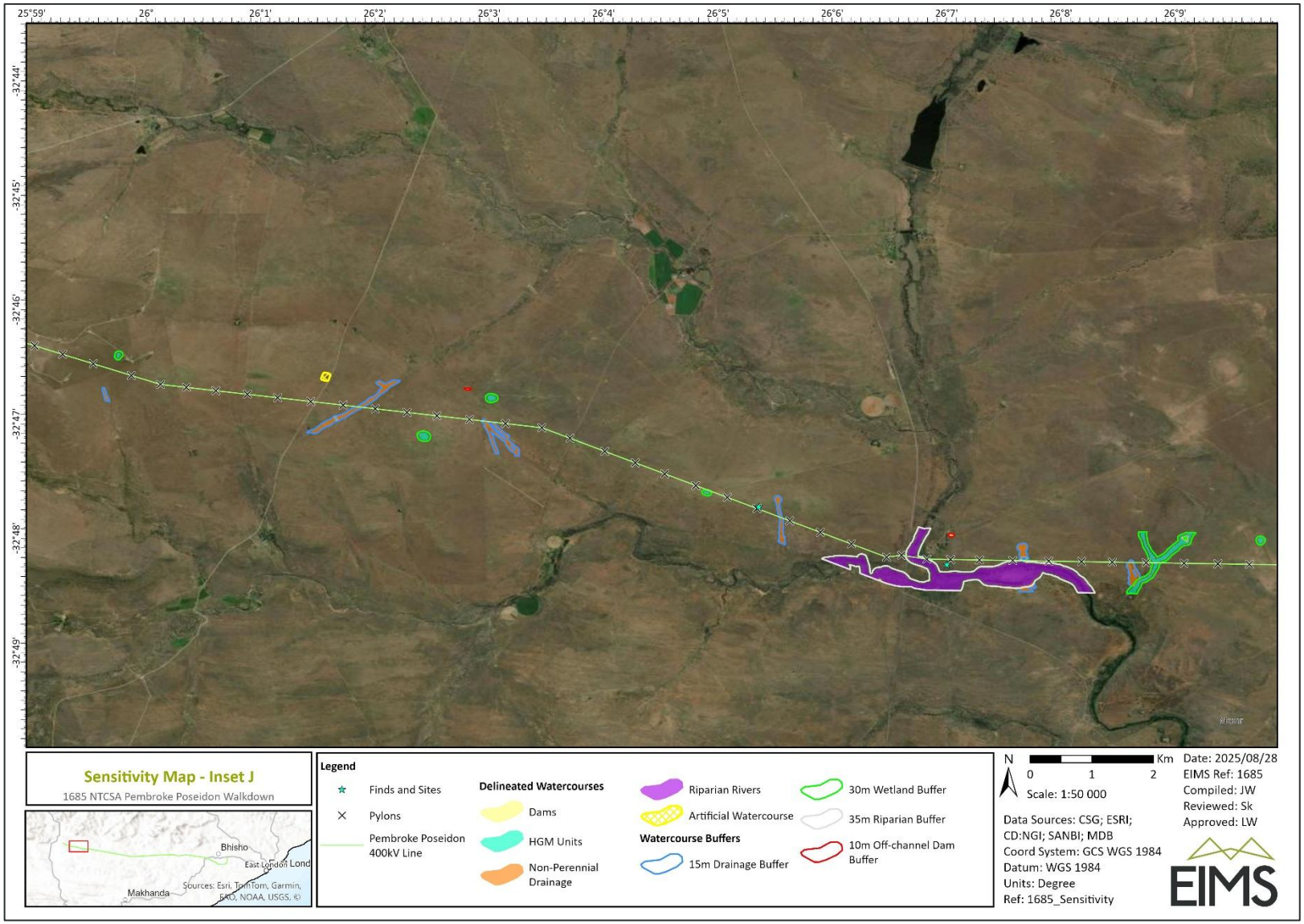

Figure 12: Sensitivity Map Insert J

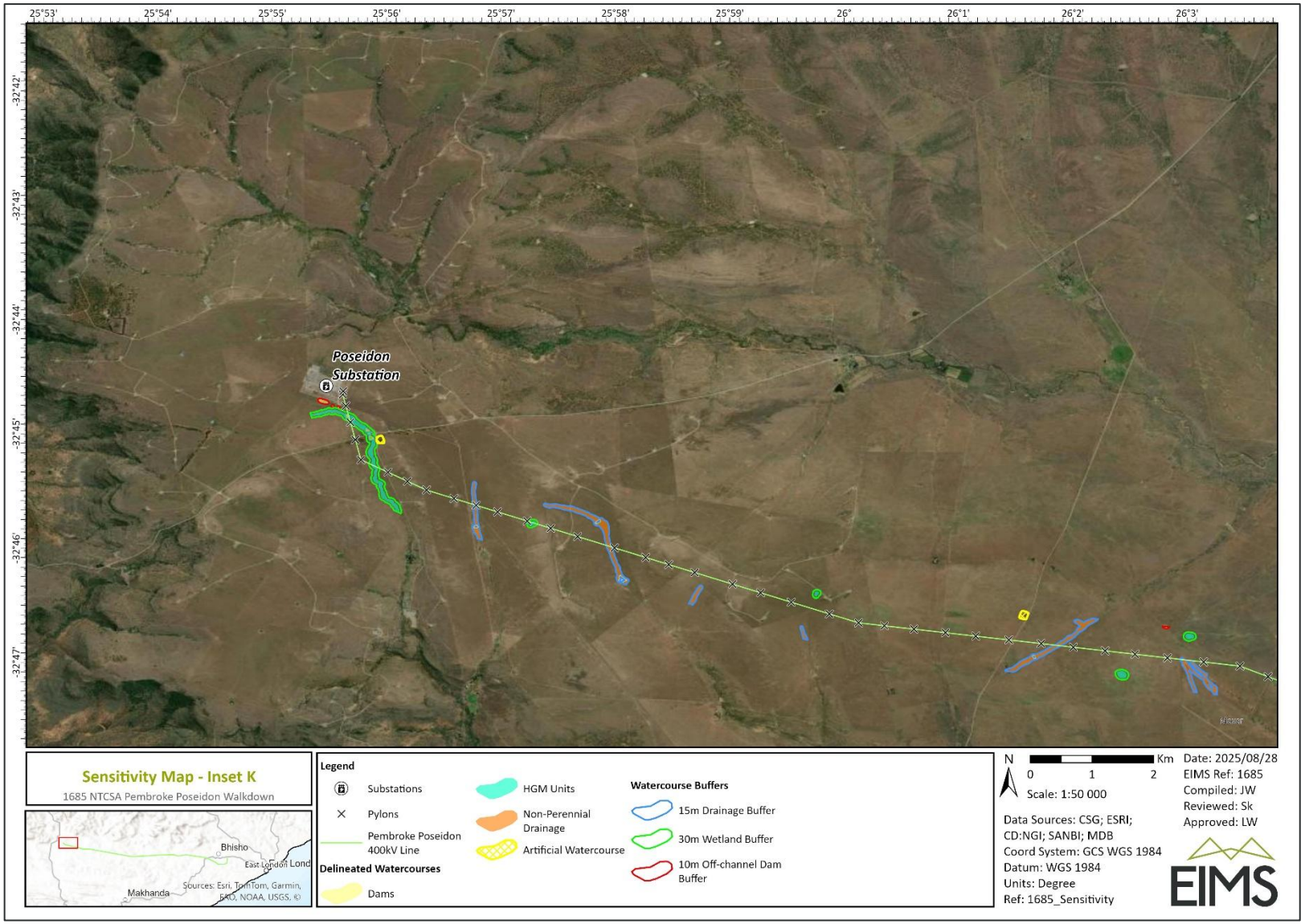

Figure 13: Sensitivity Map Insert K

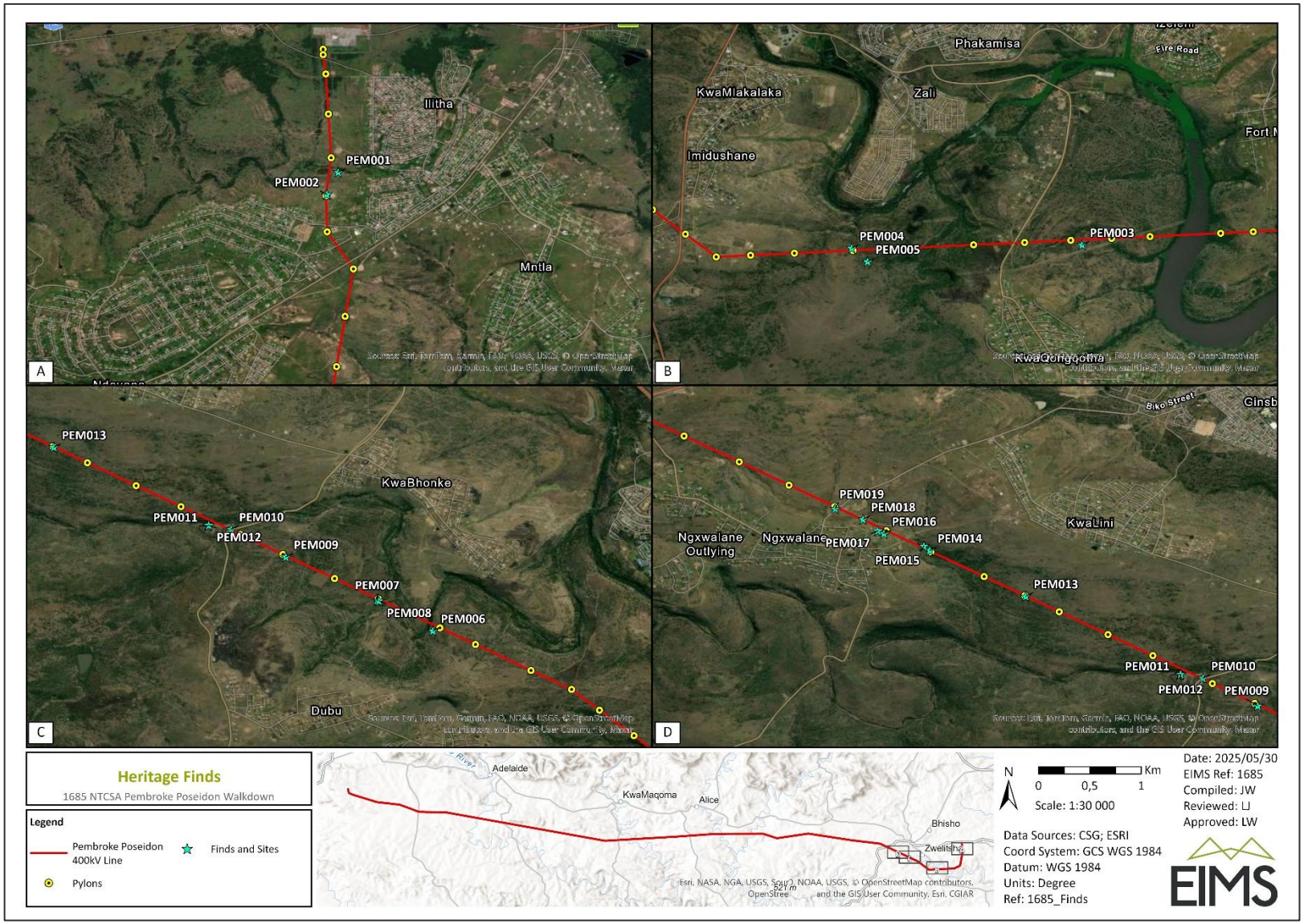

Figure 14: Heritage Finds Insert A

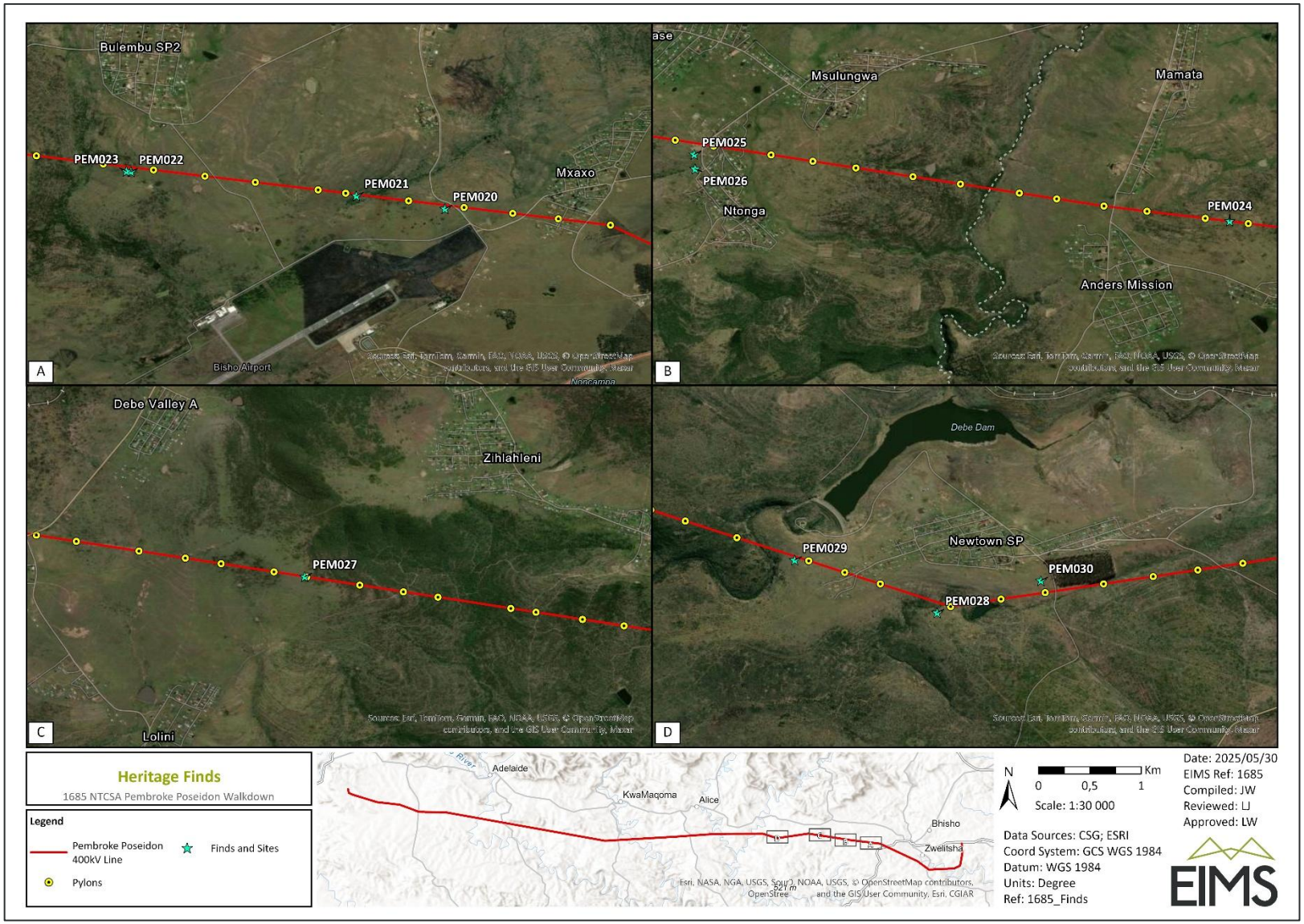

Figure 15: Heritage Finds Insert B

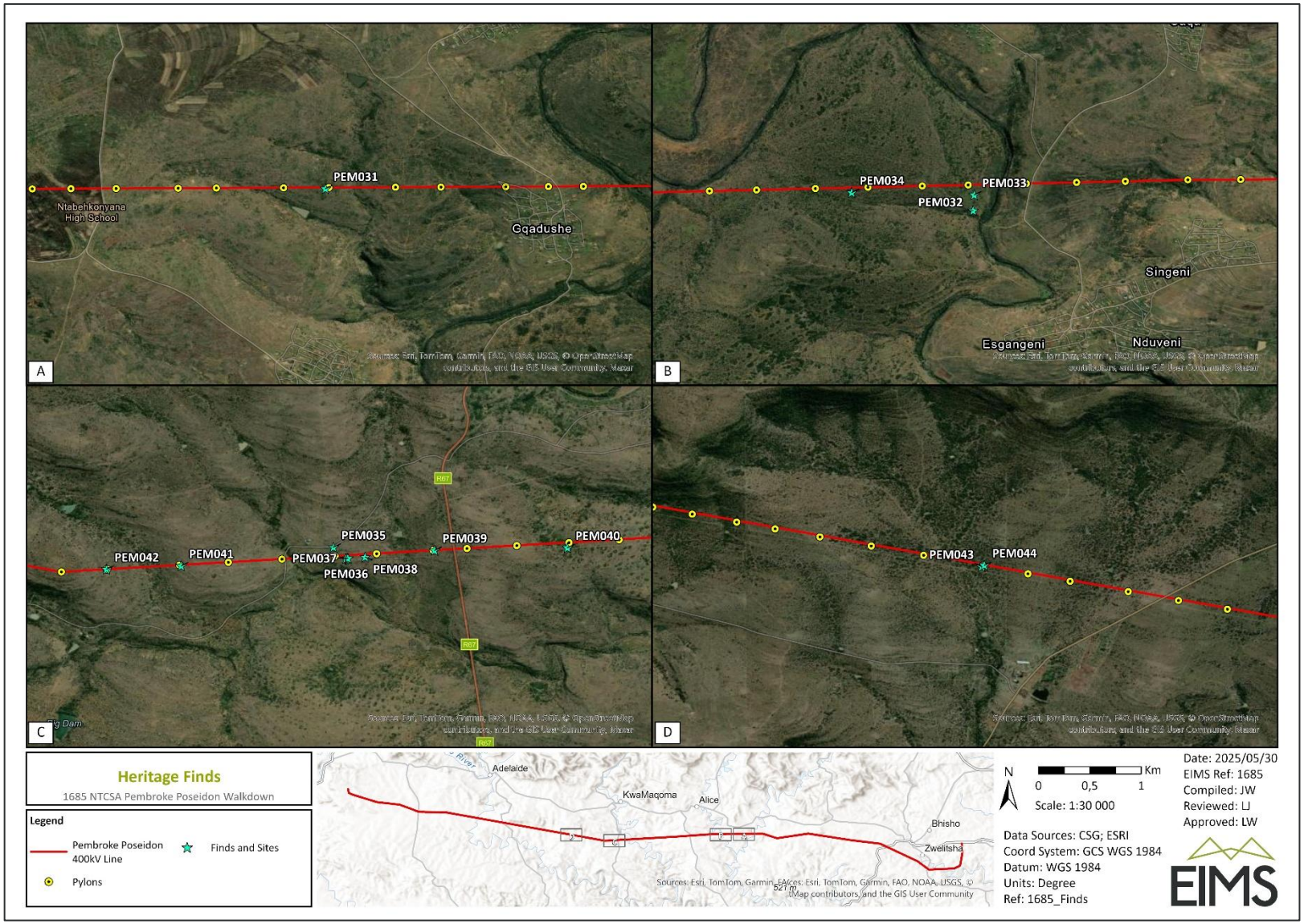

Figure 16: Heritage Finds Insert C

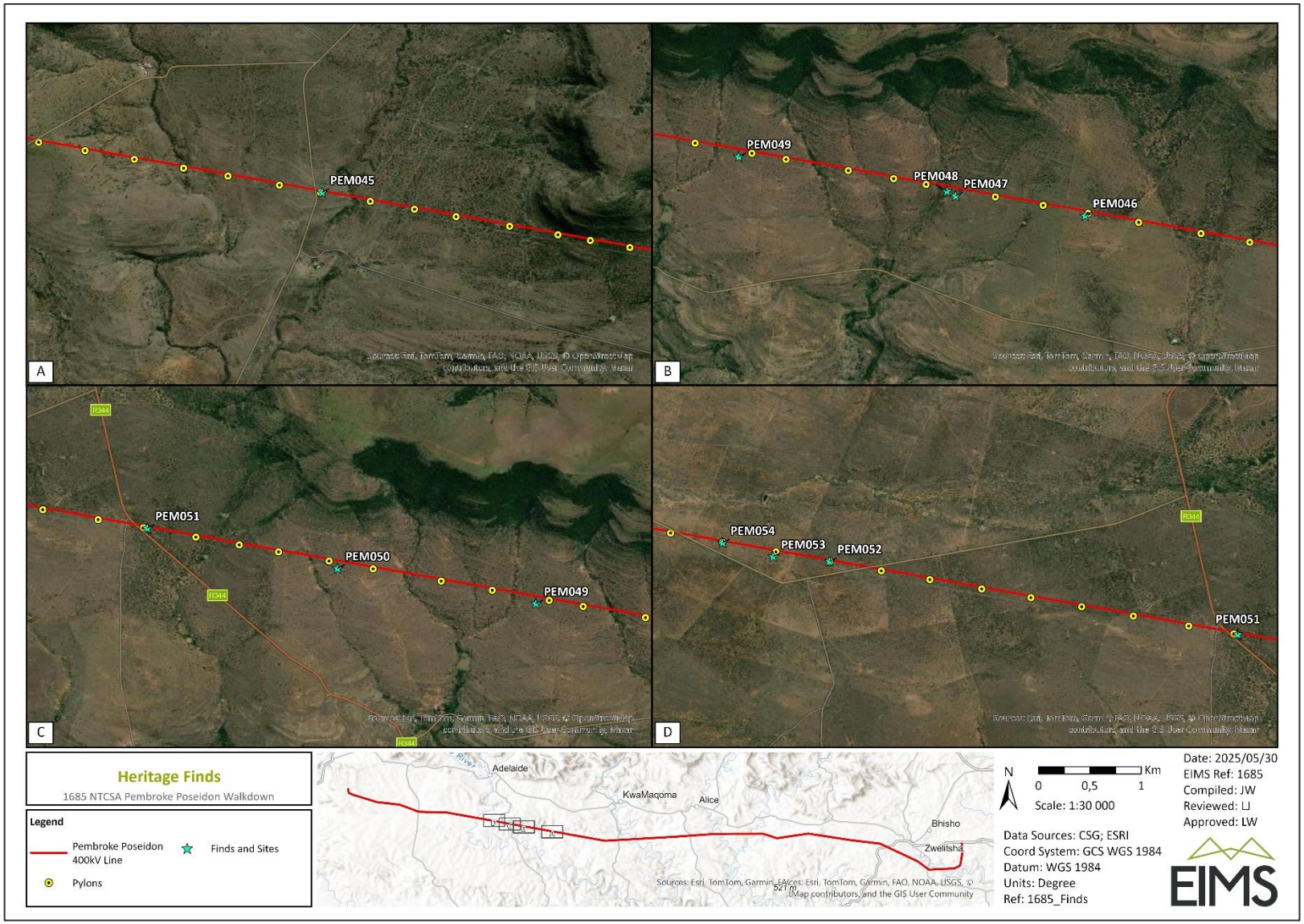

Figure 17: Heritage Finds Insert D

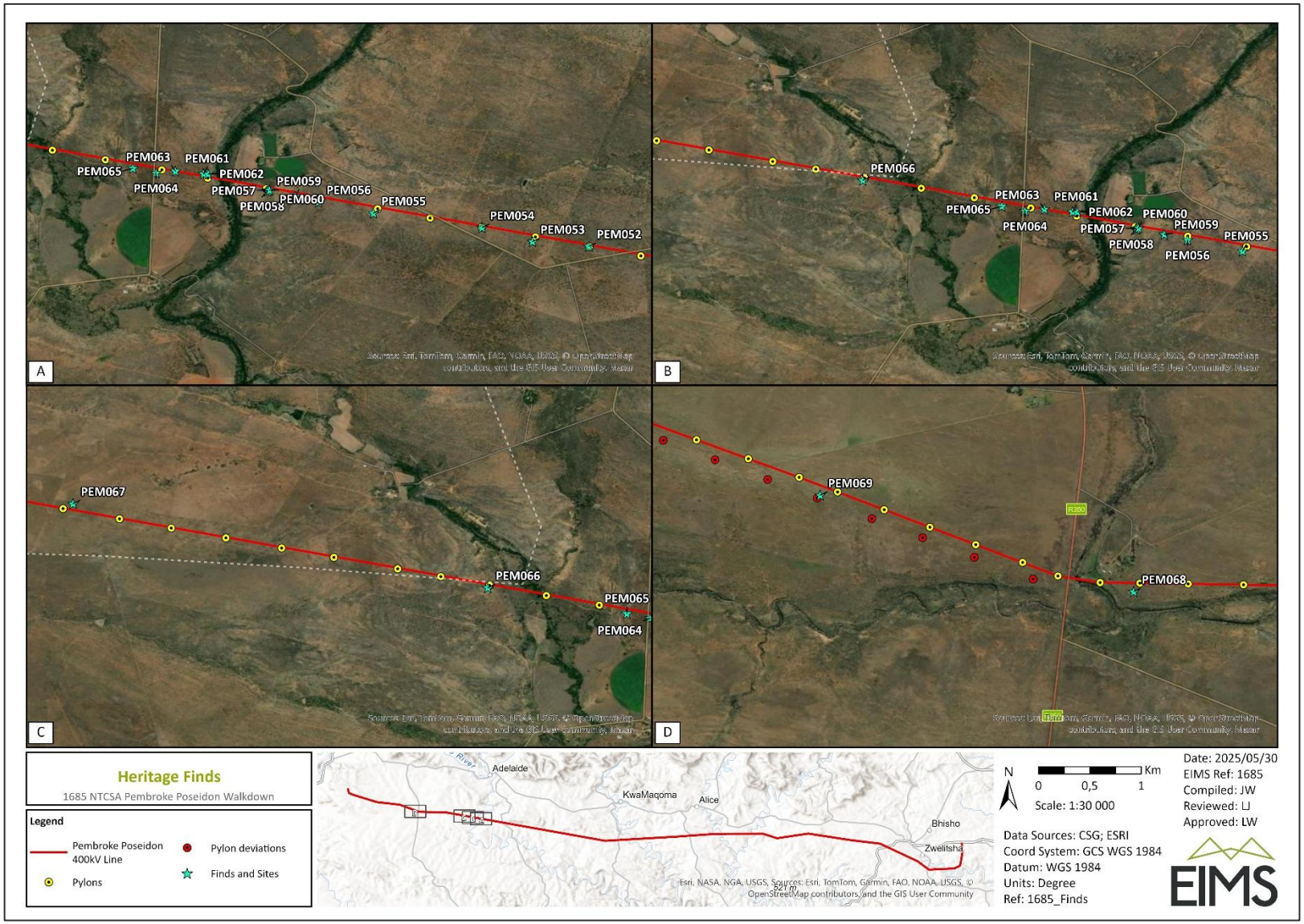

Figure 18: Heritage Finds Insert E

9 IMPACT MANAGEMENT

The impact assessment carried out for each environmental impact that may result from the proposed project, forms the basis for determining which management measures are required to prevent or minimise these impacts. The management measures are furthermore a means by which the mitigation measures, determined in the impact assessment are translated to action items required to prevent or keep those impacts that cannot be prevented within acceptable levels.

Mitigation should strive to abide by the following hierarchy (1) prevent; (2) reduce; (3) rehabilitate; and/or (4) compensate for the environmental impacts.

Figure 19: Mitigation Hierarchy

The basis for the management measures which follow below comprise of the following:

- **Management objectives** – i.e. desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources);
- **Targets** – i.e. level of performance to accomplish management objectives;
- **Management actions**– i.e. practical actions aimed at achieving management objectives and targets;
- **Responsibilities**; and
- **Monitoring requirements**.

In the EA granted by DEA on 11 July 2012 and subsequent amendments, conditions and recommendations were stipulated by the Department. These conditions are included in the Construction EMPr and are written in Blue and *italicised*.

9.1 ENVIRONMENTAL PRINCIPLES

The following principles should be considered at all times during the construction and operational phase activities.

The environment is considered to be composed of both biophysical and social components.

- Construction is a disruptive activity and all due consideration must be given to the environment, including the social environment, during the execution of a project to minimise the impact on affected parties.
- Minimisation of areas disturbed by construction activities (i.e. the footprint of the construction area) should minimise many of the construction related environmental impacts of the project and reduce rehabilitation requirements and costs.
- As minimum requirements, all relevant standards relating to international, national, provincial and local legislation, as applicable, shall be adhered to. This includes requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinances, etc.
- Every effort should be made to minimise, reclaim and/or recycle “waste” material.

9.2 CONSTRUCTION PHASE

9.2.1.1 CONSTRUCTION SITE PLANNING AND LAYOUT

Management Objective:

- Appropriate planning and layout of construction site to ensure environmental protection.

Target:

- No impacts to sensitive environmental features as a result of construction site planning and layout.

Management Actions:

- *All sensitive areas adjacent to working areas must be protected by a visible marking, either by marking the working area or the sensitive area and the sensitive area must be demarcated as a no-go area.*
- During site preparation, special care must be taken during the clearing of the works area where organic material will be stored separately from the topsoil and spoil material to ensure for the protection thereof. This topsoil must be re-used during the rehabilitation phase.
- During site preparation, topsoil and subsoil are stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater.
- Records of all environmental incidents must be maintained, and a copy of these records must be made available to authorities on request throughout the project execution.
- During site preparation, special care must be taken during the clearing of the works area to minimise damage or disturbance of roosting and nesting sites.
- No access to no-go areas without the permission of the Project Manager.
- The Contractor to develop method statements to be approved by the Project Manager prior to construction taking place. The plan must show the following (as relevant), as a minimum:
    - Buildings and structures;
    - Contractors' camp and lay down areas;
    - Site offices;
    - Roads and access routes;
    - Gates and fences;
    - Essential services (permanent and temporary water, electricity and sewage);
    - Rubble and waste rock storage and disposal sites;
    - Solid waste storage and disposal sites;
    - Site toilets and ablutions;
    - Topsoil stockpiles;
    - Construction materials stores;
    - Vehicle and equipment stores;
    - Sensitive environmental features; and
    - Any other activities, facilities and structures deemed relevant.
- Develop and implement an environmental awareness plan.
- *The applicant must appoint a suitably experienced Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations referred to in this authorisation are implemented and to ensure compliance with the provisions of the EMP.*
- *The ECO shall be appointed before commencement of any authorised activity.*

- *Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department.*
- *The ECO shall keep record of all activities, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.*
- *The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.*
- *Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.*
- *All documentation e.g. audit / compliance reports and notifications, required to be submitted to the Department in terms of this authorisation, must be submitted to the Director: Compliance Monitoring at the Department.*
- *The holder of the authorisation must submit and environmental audit report to the Department within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.*
- *The environmental audit report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions as well as requirements of the EMP.*
- *Should the activity ever cease or become redundant, the applicant shall undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time.*

Responsibilities:

- NTCSA – acquire permits.
- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Approved site plan.
- Barricading and signage.
- Records of awareness creation.
- Plant rescue and protection.

9.2.2 DESIGN STANDARDS OF TOWERS

Management Objective:

- Ensure that the towers are constructed within a safe distance from the national roads.
- Ensure appropriate and standard design of towers.

Target:

- To provide guidance to the project team involved in the detailed planning of the Pembroke-Poseidon 400kV Powerline.

Management Actions:

- *No tower pole or stay must be reached within 60 metres, measured from the national road reserve boundary.*

- *A vertical clearance of not less than 6.5 metres, measured from the crown of the national road to the lowest wire shall be observed.*

Responsibilities:

- NTCSA – acquire permits.
- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Approved standard tower design.

9.2.3 ONGOING CONSULTATION WITH LANDOWNERS, AND AFFECTED PARTIES AND COMMUNITIES

Management Objective:

- Establish and maintain a record of all complaints and claims against the project and ensure that these are timeously and effectively verified and responded to.
- Adhere to agreements made with affected parties, landowners, human settlements, and community members regarding communication.

Target:

- All complaints and claims are to be acknowledged within five (5) working days and are to be responded to within 10 working days of receipt, unless additional information and / or clarification are required.
- No deviations from agreements made with affected parties, landowners, human settlements, and community members.
- Adhere to servitude agreements.

Management Actions:

- Establish lines of communications with affected parties, landowners, human settlements, and community members.
- Establish processes and procedures to effectively verify and address complaints and claims received.
- Complaints or liaison with affected parties, landowners, human settlements, and community members with regard to environmental aspects, compensation or disturbance to activities or animals, must be recorded, reported to the correct person and a record of the response is to be entered in the complaints register.
- Provide the relevant contact details to affected parties, adjacent landowners, and community members for queries / raising of issues or complaints.
- Provide all information, especially technical findings, in a language that is understandable to the general public.
- Continued liaison with authorities with regards to compliance with the EA.
- *Access points to construction site, especially in areas where landowners will be affected must be communicated with the affected landowners and an agreement must be reached with them in terms of access roads.*
- *Liaison with landowners/farm managers is to be done prior to construction in order to provide sufficient time for them to plan agricultural activities. If possible, construction should be scheduled to take place within the post-harvest, pre-planting season when fields are lying fallow.*

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.

9.2.4 SITE CLEARING

Management Objective:

- Manage environmental impacts associated with site clearing.
- Ensure that only areas that are specifically required for the construction purposes are cleared.

Target:

- No damage is caused to sensitive environmental features outside of the demarcated construction areas, including marked and barricaded heritage resources, protected trees, structures and infrastructure.

Management Actions:

- Restrict site clearing activities to construction area / domain.
- Clearing of vegetation to be conducted in a phased manner (where possible), with due consideration of the search and rescue activities.
- Method Statement to be developed, which will provide the details of how site clearing will be executed. Where possible, clearing by hand is recommended in order to create employment opportunities.
- Maintain barricading around sensitive environmental features.
- Avoid any disturbance to demarcated sensitive environmental features.
- Suitably experienced personnel (relevant to the potentially affected environmental features) to monitor the clearing activities, with particular focus on heritage resources, as well as protected fauna and flora species.
- The contractor has to clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates.
- The site shall be cleared of all litter/waste prior to any construction related activities and the waste shall be disposed of at a registered waste disposal facility.
- During site preparation, topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater.
- *Vegetation clearing must be kept to an absolute minimum, and must be within footprints of the servitude, laydown area, construction camp or roads to be used.*
- *Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.*

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- No clearing outside of construction domain.
- Intact barricading.
- Public complaints register.
- Contractor's method statement.

9.2.5 SITE ESTABLISHMENT

Management Objective:

- Minimise environmental impacts associated with site establishment.

Target:

- No damage to the environment outside construction area during site establishment.
- No access or encroachment into no-go areas.
- No justifiable complaints regarding general disturbance and nuisance received from the affected parties and community members.

Management Actions:

- The Contractor is to produce a site plan for the approval by the Project Manager / Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features.
- Locate construction and labour camps in areas where sensitive environmental features will not be impacted on.
- Facilities and structures shall be located with due cognisance of the terrain and geographical features of the project site.
- Positioning of the storage and laydown areas should aim to minimise visual impacts.
- Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes and comply with relevant agreements.
- Maintain barricading around sensitive environmental features until the cessation of construction works.
- Barricading should be established around the electrical powerlines present on site in order to prevent damage to the powerlines and to prevent people on site from possible harm.
- Appoint security personnel.
- Ensure noise levels are within their lawfully acceptable limits as per SANS 10103.
- Minimise disturbance from lighting of the construction camp and site.
- The extent of the site should by all means be limited, to avoid any additional clearance of vegetation.
- The Contractor shall ensure that the Contractors camp and working areas are kept clean and tidy at all times. The Engineer or / and the ECO shall inspect these areas on a regular basis.
- The Contractor shall comply with all safety requirements enforced; these include emergency evacuation procedures, fire preventative measures, etc.
- The Contractor shall supply firefighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities, etc.
- The contractor is to provide designated safe smoking areas.
- Every precaution should be taken, to prevent pollution of air, soil, ground and surface water as a result of construction or associated activities at the construction site.

- Fuel, lubricants, transmission and hydraulic fluids shall only be stored in the designated areas that comply with the OHS Act.
- Restrict development footprint to absolute minimum area necessary.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Contractor's method statement.
- Public complaints register.

9.2.6 MANAGEMENT OF CONSTRUCTION CAMP AND EATING AREAS

Management Objective:

- Minimise environmental impacts associated with the construction camp and eating areas.

Target:

- No environmental contamination associated with the construction camp.
- Minimise visual impact associated with the construction camp.
- No complaints regarding the construction camp.

Management Actions:

- Construction camp to be screened to minimise the visual impact, where practicable.
- Labour camp to be screened to minimise the visual impact, where practicable.
- The Contractor shall provide eating areas for all staff. Eating areas are to be cleaned on a daily basis and shall provide adequate temporary shade.
- Open uncontrolled fires will be forbidden at the site camp. Rather, 'contained' cooking mechanisms will be used (e.g. gas stoves or an enclosed braai facility).
- Eating areas will be designated and demarcated.
- Refuse bins must be placed at all eating areas.
- The feeding, or leaving of food for animals, is strictly prohibited.
- Sufficient vermin / weatherproof bins will be present in this area for all waste material.
- Dishwashing facilities will be provided to ensure that wastewater is disposed of appropriately.
- Failure to comply with the general code of conduct, or the rules and procedures implemented at the construction camp will result in disciplinary actions.
- Provide safe potable water for food preparation, drinking and bathing.
- Prohibit the felling of trees for firewood.
- Provide medical and first aid facilities at the camp area.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.

- Contractor's method statement.
- Disposal certificates.

9.2.7 MANAGEMENT OF ABLUTION FACILITIES

Management Objective:

- Minimise environmental impacts associated with ablution facilities.

Target:

- No environmental contamination associated with ablution facilities.
- Minimise visual impact associated with ablution facilities.

Management Actions:

- Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets) at the construction camp and along construction sites, which conform to all relevant health and safety standards and codes.
- No pit latrines, french drain systems or soak away systems shall be allowed. Install and maintain conservancy tanks for any residential labour camp and site offices. The location of conservancy tanks is to be approved by the Project Manager / Engineer.
- A sufficient number of toilets shall be provided to accommodate the number of personnel working in any given area. Toilets may not be further than 100 m from any working area. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers.
- All staff to use the provided toilets at all times.
- All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.
- Some form of screened off changing facility must be provided separately for each sex.
- All sanitary fees that may be payable to any local authority shall be paid by the Contractor.
- Ablutions are to be cleaned / emptied on a regular basis, before they are full and contaminate the environment.
- Ensure that no spillages occur when ablution facilities are emptied.
- Informal ablutions within all riparian areas must be prohibited.
- The entrances to the toilets will be adequately screened from public view.
- Sanitary hygiene bins will be provided for female staff.
- Toilet paper shall be provided.
- The Contractor will ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. Disposal of such waste is only acceptable at a licensed waste disposal facility.
- Should shower facilities be provided for use by staff staying on site, the following controls must be imposed:
    - Positioning of the shower, and specifically its discharge point, will be carried out to ensure that erosion and build-up of detergents does not occur.
    - All discharge from the shower and other washing facilities must be managed to prevent environmental contamination.
    - Use of the shower facilities must be limited to staff or authorised persons only.

Responsibilities:

- Project Manager and ECO - to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Maintenance register for ablution facilities.
- Disposal certificates.
- Contractor's method statement.

9.2.8 MANAGEMENT OF WORKSHOP AND EQUIPMENT

Management Objective:

- Minimise environmental impacts associated with workshops and equipment use**.**

Target:

- No environmental contamination associated with workshops and equipment use**.**

Management Actions:

- Vehicles must be maintained and serviced according to the manufacturers' standards
- Daily checklists must be completed by drivers and operators before the vehicles and equipment are used.
- Vehicles and equipment must be turned off when not in use.
- Maintenance of equipment and vehicles will be performed in such a manner so as to avoid any environmental contamination (e.g. use of drip trays).
- All vehicles and equipment will be kept in good working order and serviced regularly.
- Leaking equipment will be repaired immediately or removed from the site.
- Suitable storage and disposal of hydraulic fluids and other vehicle oils.
- All diesel powered equipment and vehicles used in construction activities must be suitably serviced, maintained and repaired in order to minimise the emission of diesel particulate matter and reduce subsequent worker exposure to this carcinogenic substance.
- All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.
- Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.
- No washing of plant may occur on the construction site. Plant to be washed in dedicated areas.
- Drip trays will be provided for the stationary plant and for the "parked" plant.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Recorded evidence of spillages.
- Vehicle and equipment checklists
- Training register.
- Contractor's method statement.

9.2.9 FENCING AND BARRICADES

Management Objective:

- To ensure and assist with controlled fencing and barricades in the working environment.
- Minimise disturbance to animals.

Target:

- Provide a clearly demarcated and safe working area.
- No direct harm to fauna due to inadequate fencing arrangements.

Management Actions:

- No pedestrian or vehicular access shall be allowed to such fenced areas.
- In places where temporary fencing is required, the Contractor shall erect such fencing when and where required and re-erect and maintain temporary fencing as necessary. Temporary fencing shall remain in position either until it is replaced by permanent fencing or until completion of the works.
- Any fences damaged by the Contractor shall be repaired as soon as possible at his/her cost, and shall be of the standard of the original fence.
- Fences should be constructed to meet the following requirements: o The fence should be straight and vertical;
    - All the straining posts should be firmly and vertically anchored;
    - All the posts should extend to the same height above ground level by corresponding to the terrain form;
    - The straining posts and droppers should not be too far apart – the closer they are, the firmer the fence;
    - Each wire strand should be firmly attached to the standards or line posts at a specific height above ground level and should be a certain distance apart from each other;
    - The droppers should be neatly and evenly spaced between the standards. The wire strands should be firmly attached to maintain the proper space between the strands and to prevent vertical movement;
    - Fences should never be constructed of inferior quality material. Therefore, fencing material with the SABS mark should be used; and
    - Comply with Nature and Environmental Conservation Ordinance (Act No. 19 of 1974) with regards to the accommodation of relevant large mammal species.
- All fences erected for construction purposes (e.g. fences around camp sites, fencing around trenches, etc.) should be inspected on a daily basis to detect whether any damage has occurred. Damaged fences / barricading to be repaired immediately.

Responsibilities:

- Project Manager/Engineer and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Agreements with landowners.

- Fencing register

9.2.10 MANAGEMENT OF LABOUR FORCE

Management Objective:

- Ensure suitable management of labour force to prevent security-related issues.
- Optimise the use of local labour.
- Provide a work environment that is conducive to effective labour relations.

Target:

- No complaints from adjacent landowners and community members regarding trespassing or misconduct by construction workers.
- All unskilled labour to be sourced from local communities.

Management Actions:

- Prevent trespassing of construction workers onto private property.
- Workers should be provided with identity cards and should wear identifiable clothing.
- Make suitable provision for transport and/or accommodation of workforce.
- Creating nuisances and disturbances in or near communities shall be prohibited.
- Machine / vehicle operators shall receive clear instructions to remain within demarcated access routes and construction areas.
- Designated and demarcated smoking areas should be provided, with special bins for discarding of cigarette butts.
- Create opportunities for the employment of women.
- Use local labour as far as possible, where necessary (e.g. unskilled labour).
- Develop a community labour agreement with targets for employment and for progression.
- Training of labour to benefit individuals beyond completion of the project.
- Local people should be employed to increase support for the project and reduce the potential for criminal activities.
- No unauthorised entry other than the designated construction areas.

Responsibilities:

- Proponent – employment targets.
- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Labour-related targets.

9.2.11 MANAGEMENT OF HEALTH AND SAFETY

Management Objective:

- Provide a safe and healthy working environment to construction workers and the public.

Target:

- Approved Health and Safety Plan.
- No incidents.
- Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2003) and other relevant regulations.

Management Actions:

- The Contractor must submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work. These requirements are aligned with the Construction Regulations (2003).

9.2.11.1 HEALTH

- The Construction Regulations (OHS Act 85 of 1993) require that all contractors conduct an initial health risk assessment of their workers activities prior to initiating any work on site.
- All construction workers should be subject to baseline (pre-employment) medical examinations. In addition, members of the community should be encouraged to undergo voluntary examination/testing. The structure of these examinations should be at the discretion of a registered Occupational Medical Practitioner but should include but is not limited to the following testing:
    - Covid.
    - Tuberculosis.
    - HIV (voluntary consent but strongly encouraged).
    - Syphilis.
    - Other STI.
- Workers must be made familiar with the routes of exposure to STI and TB as well as ways to reduce the risks and/or prevent infection.
- Ensure all workers are medically fit to conduct their activities, with priority being given to those workers required to engage in manual physical labour activities – pre-employment medical examinations are recommended.
- Ensure that all workers are suitably informed and trained in the signs and symptoms of heat stress which they may be exposed in the course of their work.
- Ensure that all workers are trained in appropriate measures to prevent heat stress related injuries or illnesses. Informing workers of the need to drink regular quantities of water should be prioritised. Ready access to drinking water must be provided at all work locations.
- Issuing of appropriate protective wear (jackets, hats and gloves) should suffice in preventing workers from developing any adverse health effects following exposure to cold working conditions.
- Drafting of a formal malaria control plan for the construction sites is recommended. Consideration could be given to initiating an appropriate chemical control programme at worker accommodation sites. Spraying of effective insecticides to control mosquito populations is an effective way of reducing the risk of malaria and advice on residual spray methods should be obtained from the relevant authority.
- Educating workers in ways and means of preventing malaria is also recommended.
- The incidence of Schistosomiasis should be confirmed in the study area by appropriate specialists, preferably before construction begins. Education and training of workers in ways and means of reducing their risks of infection.

9.2.11.2 SAFETY

- First aid officers should be trained on site (levels 1 to 3) to deal with construction related injuries.
- When working in the area of encroachment is prevalent all open excavated trenches and foundations should be clearly marked and secured to keep people and fauna from falling in.

- Storage areas, assembling areas where construction material is stored on site should similarly be secured. No stacking and storing of material will be allowed underneath any operational power lines.
- The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that non-employees will not be allowed on site unaccompanied.
- Access by non - construction staff into any construction related sites should be restricted and clearly indicated as such by signposts.
- Maintain access control to prevent access of the public to the construction areas.
- The requirements of the Occupational Health and Safety Act (Act 85 of 1993) and related regulations shall be adhered to.
- Speed limits shall be enforced in all areas, including public roads and private properties. All drivers of the construction teams shall be sensitised to this effect and courteous behaviour is expected from everybody in this regard.
- Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993).
- Comply with the provisions of the Fencing Act (Act No. 31 of 1963).
- Applicable notice boards and hazard warning notices will be put in place and secured.
- Night hazards will be indicated suitably (e.g. reflectors, lighting, and traffic signage).
- Emergency contact details will be prominently displayed.
- All construction personnel must be clearly identifiable. All employees must also be issued with employee cards for identification purposes.
- All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993).
- Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times. All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.
- The integrity of property fences must be maintained.
- No telephone lines must be dropped during the construction operations, except were prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary.
- All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.

Responsibilities:

- NTCSA.
- ECO – to check environmental related impacts.
- Dedicated Occupational Health and Safety system to be implemented by Contractor's
- Safety Officer. To be monitored and audited by the Client's Safety Agent, in terms of the Construction Regulations (2003).
- Contractor to implement management actions.

Monitoring Requirements:

- Occupational Health and Safety system – checked by Safety Agent.

9.2.12 MANAGEMENT OF EMERGENCY PROCEDURES

Management Objective:

- Minimise environmental impacts associated with emergency procedures.

Target:

- No site fires to be caused by construction activities and workers.
- Approved emergency response procedures, where relevant.

Management Actions:

9.2.12.1 FIRE

- Comply with the National Veld and Forest Fire Act (No. 101 of 1998).
- Proper emergency response procedure to be in place for dealing with fires.
- Burning of waste is not permitted.
- Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment.
- All fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services.
- All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.
- No fires are allowed on site, unless in dedicated areas approved by the Project Manager.
- Dedicated smoking areas to be provided. Cigarette butts may not be disposed of onsite.

9.2.12.2 ACCIDENTAL LEAKS AND SPILLAGES

- Proper emergency response procedure to be in place for dealing with spills and leaks.
- Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site, where practicable.
- Remediation of the spill areas will be undertaken to the satisfaction of the Project Manager and ECO.
- In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured. The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage.
- All staff on site will be made aware of actions to be taken in case of a spillage.
- Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers).

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Approved Emergency Response Plan.
- Training and awareness creation records.
- Signage displayed.
- Contractor's method statement.

9.2.13 MANAGEMENT OF ACCESS AND TRAFFIC

Management Objective:

- Ensure that all construction vehicles use only dedicated access routes to construction sites.
- Ensure that the community have reasonable access to the land during construction.
- Ensure proper access control.
- Prevent unlawful access to construction domain.
- Adhere to agreements made with individual landowners and community members regarding access.
- Ensure the safety of all road users by implementing proper signage and traffic control measures.
- Limit construction-related nuisance to service nodes.

Target:

- No reports of construction vehicles using other unauthorised routes.
- No transporting of unsafe loads. Permits are to be obtained for abnormal loads.
- No speeding.
- No accidents.

Management Actions:

- *Access points to construction site, especially in areas where landowners will be affected must be communicated with the affected landowners and an agreement must be reached with them in terms of access roads.*
- *The applicant must obtain a wayleave from the Department of Public Transport Roads and Works prior to construction.*
- Undertake negotiations and confirm arrangements with the adjacent landowners regarding the use of traffic arrangements.
- Site access should be controlled and no unauthorised persons should be allowed onto the site.
- Any clearing for access or haul roads outside the demarcated works area shall only be undertaken after approval from the Project Manager.
- Ensure appropriate traffic safety measures are implemented.
- The Contractor must comply with all driving, vehicle, licensing and driver ability requirements.
- Permission required from the Project Manager for the movement of any vehicles and/or personnel outside of designated working areas.
- Existing roads shall be used as far as possible for construction purposes.
- Contractor to ensure safe access for adjacent landowners on all roads.
- Wet suppression of unpaved areas should be applied during dry windy periods, using a water cart and/or fixed sprinklers.
- Chemical suppression can also be used in conjunction with wet suppression. This involves the use of chemical additives in the water, which help to form a crust on the surface and bind the dust particles together. Chemical stabilisation reduces watering requirements, but any savings can be offset by the cost of the additives. Repeat treatments are usually required at intervals of 1-4 weeks. The method is best suited to permanent site roads and usually not cost-effective on temporary roads, which are common in construction sites.
- Provide hard-standing areas for vehicles and regularly inspect and clean these areas.
- The Contractor shall organise the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.

- Access roads to be maintained in a suitable condition.
- Suitable erosion protective measures to be implemented for access roads during the construction phase.
- Traffic safety measures (e.g. traffic warning signs, flagmen) to be implemented.
- Consult with adjacent landowners, local authorities and communities to ensure that all affected parties are informed of the timing and extent of any disruptions.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Signage displayed and maintained.
- Public complaints register.
- Contractor's method statement.

9.2.14 MANAGEMENT OF WASTE

Management Objective:

- Minimise environmental impacts associated with waste.
- Apply waste management principles of prevent, minimise, recycle or re-use, with disposal as a last option.

Target:

- No littering on construction site.
- Maintain a clean and tidy construction site.
- 100% record of all waste generated and disposed at waste disposal facilities.
- Valid disposal certificates for all waste disposed.
- Provision of adequate waste containers that are easily accessible and maintained.
- Waste bins to be removed and cleaned weekly.

Management Actions:

- Waste management activities must comply with the National Environmental Management: Waste Act (Act No. 59 of 2008).
- *An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Any solid waste shall be disposed of at a landfill licensed in terms of section 20 (b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).*
- Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Where possible, waste must be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).
- Provide waste skips at the construction areas. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs.

- Ensure daily site clean-ups to prevent the build-up of litter
- The Contractor will ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Ensure that solid waste is transported so as to avoid waste spills en-route.
- The following requirements shall be incorporated into the waste management programme:
    - Solid Waste:
        - Littering on site and the surrounding areas is prohibited.
        - Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite.
        - All bins must be cleaned of litter regularly.
        - All waste removed from site must be disposed at a municipal/permitted waste disposal site.
        - Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.
        - The entire works area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.
        - Contaminated soil must be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.
        - Waste must be recycled wherever possible.
    - Liquid Waste
        - The Principal Contractor must install and maintain mobile toilets at work sites.
        - The Principal Contractor must provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities must be designed and sited with the intention of preventing pollution of the surrounding area and environment.
        - All vehicles must be regularly serviced in designated area within the Contractors camp such that they do not drip oil. Where required, vehicles will be serviced in bunded areas and drip trays will be provided.
        - All chemical spills must be contained and cleaned up by the responsible party or professional pollution control personnel. Run-off from wash bays must be intercepted.
    - Hazardous Waste:
        - No hazardous materials must be disposed of in the veld or any place other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for.
        - The Principal Contractor must maintain a hazardous material register.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.

- Waste register.
- Recycling targets.
- Disposal certificates.
- Contractor's method statement.
- Hazardous material register.

9.2.15 MANAGEMENT OF STORAGE AND HANDLING OF NON-HAZARDOUS MATERIAL

Management Objective:

- Effective and safe management of materials on site, in order to minimise the impact of non-hazardous materials on the environment.

Target:

- No pollution due to handling, use and storage of non-hazardous material.

Management Actions:

- Materials to be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS).
- Where required, stored material to be protected from rain and run-off to avoid environmental contamination.
- Materials to be appropriately transported to avoid environmental contamination. Loose loads (e.g. sand, stone chip, refuse, paper and cement) to be covered.
- Suitable remedial measures, depending on the nature of the contaminant and the receiving environment, to be instituted for spillages.
- Materials to be suitably used to prevent environmental contamination.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Evidence of spillages.
- MSDS register.
- Contractor's method statement.

9.2.16 MANAGEMENT OF STORAGE AND HANDLING OF HAZARDOUS MATERIAL

Management Objective:

- Ensure the protection of the natural environment and the safety of personnel on site, by the correct management and handling of hazardous substances.

Target:

- No pollution due to handling, use and storage of hazardous material.
- In the event of a spill, appropriate containment, clean up and disposal of contaminated material. Spills to be cleaned within 24 hours.

Management Actions:

- Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (Act No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards.
- Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination, and must adhere to the requirements stipulated on the MSDS.
- Where flammable liquids are being used, applied or stored the workplace must be effectively ventilated.
- No person may smoke in any place in which flammable liquid is used or stored.
- Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store.
- Where flammable liquids are decanted, the metal containers must be bonded or earthed.
- No flammable material (e.g. paper, cleaning rags or similar material) may be stored together with flammable liquids.
- Staff that will be handling hazardous materials must be trained to do so.
- Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided.
- All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.
- MSDSs, which contain the necessary information pertaining to a specific hazardous substance, must be present for all hazardous materials stored on the site.
- Spill kits must be available for the clean-up of hazardous material spillages.
- Provide secondary containment where a risk of spillage exists.
- Drip trays to be placed under parked heavy vehicles, equipment and other receptacles of hazardous material to prevent spillages.
- In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented.
- Spill reporting procedures to be displayed at all locations where hazardous substances are being stored.
- Hazardous materials will be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling.
- Proper and timeous notification of any pollution incidents associated with hazardous materials.
- Hazardous chemical substances containers must be clearly marked with the contents and main hazardous category e.g. “Flammable” or “Corrosive”.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Evidence of spillages.
- MSDS register.
- Training register.
- Disposal certificates.
- Contractor’s method statement.
- Hazardous material register.

9.2.17 MANAGEMENT OF POLLUTION GENERATION POTENTIAL

Management Objective:

- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.

Target:

- No complaints regarding pollution.
- No measurable signs of pollution.
- Noise – Comply with SANS 10103:2008.

Management Actions:

9.2.17.1 **GENERAL –**

- No waste of a solid, liquid or gaseous nature shall be emitted from the site without approval by the Engineer.
- Accidental pollution incidents shall be reported to the ECO immediately they occur and shall be cleaned-up (to the satisfaction of the Co-ordinator Environmental Rehabilitation or ECO) by the Contractor or a nominated clean-up organization at the expense of the Contractor.

9.2.17.2 **SOIL –**

The following requirements for soil pollution management shall apply:

- Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.
- All cut and fill surfaces need to be stabilized with appropriate material or measures when major civil works are complete.
- All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.
- Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods but can only be done by a service provider that's appropriately accredited.
- Appropriate measures should be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person.

9.2.17.3 **NOISE –**

- Noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.
- The provisions of SANS 10103:2008 will apply to all areas at the perimeter of the site, within audible distance of residents.
- Working hours to be agreed upon with Project Manager, so as to minimise disturbance to adjacent landowners and community members.
- No amplified music will be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. will not be permitted unless at a level that does not serve as an intrusion to adjacent land-owners.
- Construction activities generating output levels of 85 dB or more will be confined to normal working hours.

- The Contractor will take preventative measures (e.g. screening, muffling, timing, prenotification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools.
- With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor should liaise with local residents on how best to minimise impact, and the local population should be kept informed of the nature and duration of intended activities.

9.2.17.4 **DUST –**

- Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area, access roads, site yard, etc.
- Fine materials must be covered during transportation.
- Set speed limits of 35 km/hr or less for site traffic on paved roads and 10-15 km/hr on unpaved surfaces. Speed controls on vehicles have an approximately linear effect on dust emissions. Thus, by reducing the speed from 30 km/hr to 15 km/hr, dust emissions can be reduced by 50%.
- Speed limits to be strictly adhered to.
- The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, and pre-notification of affected parties).

9.2.17.5 **LIGHTS –**

- Prior to construction the position and type of lighting will be planned to ensure unnecessary light pollution will be eliminated.
- All lighting installed on site must not lead to unacceptable light pollution to the surrounding community and natural environment (e.g. use of down-lighters).

9.2.17.6 **EROSION –**

- Protect areas of the construction site that are susceptible to erosion through suitable measures (e.g. watering, planting, retaining structures, commercial anti-erosion compounds).
- Particular care must be taken to prevent carrying of sediment onto roadways.
- Any erosion channels caused by construction activities to be suitably stabilised and rehabilitated.
- All efforts to prohibit ponding on surface and ensure stormwater runoff is channelled from the site must be made. The method used will be appropriate to the expected stormwater flows and the topography and geology of the site.
- Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized.

9.2.17.7 **CEMENT AND CONCRETE BATCHING –**

- Cement mixing to take place on an impervious surface (e.g. cement mixing pit).
- Batching operations to take place in a designated area, which will be kept clean at all times.
- Location of batching plant to be approved by the Project Manager, with due consideration of the relevant management measures.
- Ensure separation of clean and dirty water from batching plant.
- Wastewater from batching operations to be suitably disposed of.
- Waste concrete and cement sludge to be removed on a regular basis (to prevent overflowing) and to be disposed of at a suitable facility.
- Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.
- Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately at a licenced waste disposal facility.

- Limit concrete batching to single sites where possible.
- Concrete transportation must not result in spillage.
- Cleaning of equipment and flushing of mixers must not result in pollution, with all contaminated wash water entering the waste water collection system.
- To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site.
- Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations.
- All contaminated water and fines from exposed aggregate finishes will be collected and stored in sumps and will be adequately disposed of.
- All visible remains of excess concrete will be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner.
- Any spilled concrete to be cleaned up immediately.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.
- Contractor to conduct environmental monitoring for air quality (dust), noise and water quality.

Monitoring Requirements:

- Public complaints register.
- Evidence of pollution.
- Contractor's method statement.

9.2.18 MANAGEMENT OF TOPSOIL

Management Objective:

- Ensure suitable removal, storage, transportation of topsoil for reuse during rehabilitation.

Target:

- >95% of recovered topsoil from disturbed areas to be stored for future use.
- No visual evidence of erosion from topsoil stockpiles.
- No visual evidence of erosion from areas where topsoil has been reinstated.

Management Actions:

- Topsoil from the construction camp should be stored for post-construction rehabilitation work and should not be disturbed more than is absolutely necessary.
- Topsoil should also be stored in such a way that does not compromise its plant-support capacity.
- Determine the average depth of the topsoil prior to excavations.
- Identify suitable areas to store topsoil.
- Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.
- Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season.
- Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. Topsoil obtained from sites with different soil types must not be mixed.
- Remove topsoil from areas to be affected by construction activities.

- Topsoil to be adequately protected from contamination from construction activities and by aggregate, cement, concrete, fuels, litter, oils, domestic and industrial waste.
- Protect stored topsoil from compaction.
- Wind and water erosion-control measures to be implemented to prevent loss of topsoil.
- Do not store topsoil in drainage lines or areas exposed to strong winds or heavy rain.
- Following the construction phase, the topsoil should be used in rehabilitation of affected areas and landscaping around the development.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Topsoil stockpiles.
- Dust monitoring.
- Rehabilitated areas.
- Contractor's method statement.

9.2.19 MANAGEMENT OF EXCAVATIONS

Management Objective:

- Minimise environmental impacts associated with excavations.

Target:

- No damage to sensitive environmental features outside construction area during excavations.

Management Actions:

- Construction activities to remain within the designated construction areas.
- Subsoil and overburden should be stockpiled separately to be returned for backfilling in the correct soil horizon order.
- Suitable barricading to be erected around open excavations/trenches, as per the Construction Regulations (2003). Provide signage as a warning of open excavations.
- Divert runoff away from excavations, where necessary.
- Trench lengths will be kept as short as practically possible.
- Trench walls are to be stabilised using battering, shoring and bracing or similar techniques depending on the stability of the trench sides (where relevant).
- Inspect open trenches at least daily basis to ensure that animals have not become trapped. Such animals will be safely removed and released, where possible. Special equipment for handling of venomous snakes should be available on site to ensure safe removal.
- Filing of trenches to make provision for subsidence.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Barricading of excavations.

- Excavation register.
- Contractor's method statement.

9.2.20 MANAGEMENT OF VISUAL ASPECTS

Management Objective:

- Minimise impacts to the aesthetics / visual quality.
- Ensure that the visual appearance of the construction site is not an eyesore the adjacent areas.

Target:

- No complaints regarding impacts to visual quality.

Management Actions:

- Advertising and lighting will be in accordance with relevant standards.
- Lighting must not constitute an eyesore / hazard to users of the road and the surrounding communities.
- Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas.
- The site will be shielded / screened to minimise the visual impact, where practicable.
- Where practicable, development designs to compliment the natural surroundings in order to preserve a sense of place.
- On-going housekeeping to maintain a tidy construction area.
- Discourage the unnecessary usage of high voltage lights during through-night construction. Lighting should be kept to an acceptable minimum and designed in position and height to minimise negative impact on surrounding inhabitants.
- The extent of unnecessary damage to natural surrounds must be kept to a minimum.

Responsibilities:

- Project Manager/Engineer and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Contractor's method statement.

9.2.21 MANAGEMENT OF FLORA

Management Objective:

- Preserve protected flora species outside of construction areas.
- Control alien plants and noxious weeds.

Target:

- No unpermitted disturbance to protected flora species.
- Ongoing eradication of alien plants and noxious weeds.

Management Actions:

- Comply with the requirements of the National Environmental Management: Biodiversity Act (No. 10 of 2004), National Forests Act (No. 84 of 1998) and National Veld and Forest Fire Act (No. 101 of 1998).
- Promote awareness of all personnel.
- Require the suitable establishment of erosion control mechanisms.
- The recorded species of conservation concern (SCC) must be relocated to a safer enabling environment, just outside of their respective tower construction activities. The replanting must be in such a way that the plants are securely supported to prevent tall trees from falling over. These plant must be watered well after replanting to ensure its survival.
- A permit from the appropriate competent authority is required before construction commences or clearing for the servitude in order to remove, cut or disturb the identified SCC.
- During construction activities, monitoring and control of alien weeds and invaders through hand removal; slashing (annuals) or chemical control (perennials) must be undertaken. Chemical control may only be done upon approval from the ECO and may only be done by a registered PCO.
- Appropriate measures should be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person.
- Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks.
- Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.
- Implement suitable erosion control measures.
- The Contractor should employ personnel on site responsible for preventing and controlling of litter. Promote good housekeeping with daily clean-ups on site.
- During construction, refresher training can be conducted to construction workers with regards to littering, ad hoc veld fires, and dumping.
- No fires are allowed on site.
- Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by ECO.
- Areas which could be deemed as no go should be clearly marked.
- No trees to be felled for fuel purposes.
- Photographs of protected and sensitive flora species must be displayed in the construction camp to heighten awareness.
- Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.
- All areas to be affected by the proposed project will be rehabilitated after construction activities.
- *A permit must be obtained from the entire relevant provincial nature conservation agency(s) for the removal or destruction of indigenous protected and endangered plant and animal species.*
- *No exotic plants may be used for rehabilitation purposes. Only indigenous plants of the area may be utilised.*
- All mitigation measures prescribed by previous specialist ecological reports (Environmental Impact Assessment Report) remain applicable for the development and must be adhered to;
- Rocky outcrops and wetlands/drainage areas/water resources must be avoided as much as possible.
- Indigenous vegetation to be maintained under the pylons to ensure biodiversity is maintained and to prevent soil erosion;

- Protected flora species, listed in section 3.1 of the specialist walkdown report will require relevant permit application, if their disturbance cannot be mitigated. A subsequent search and rescue plan must be drafted and search and rescue operations must be conducted thereafter; and
- The floral search and rescue operation must be undertaken during December - March for the summer flowering species, and during August for the winter flowering species.
- The ECO and Contractor EO must be present at the towers that were not surveyed (No. 39, 103, 104, 201-210 and, 259-265) prior to construction, to ensure no SCC and protected species are present and/or disturbed without obtaining the necessary permits where required.

Responsibilities:

- Proponent – acquire permits
- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Permits.
- Encroachment of alien invasive plants and noxious weeds.
- Successful rehabilitation.
- Contractor's method statement.

9.2.22 MANAGEMENT OF FAUNA

Management Objective:

- Ensure the protection of animals

Target:

- No direct / indirect harm to animals from construction activities.

Management Actions:

- Comply with the requirements of the National Environmental Management: Biodiversity Act (No. 10 of 2004), Natal Nature Conservation Ordinance 15 of 1974 and Animal Protection Act (No. 71 of 1962).
- Stringent and dedicated control of poaching.
- No wilful harm to any animals, unless a direct threat is posed to a worker's health or safety.
- Animals residing within the designated area shall not be unnecessarily disturbed.
- Ensure that suitable fencing is erected prior to the commencement of construction to ensure that livestock does not wonder into dangerous construction areas.
- Construction workers must be prohibited from interfering with stock and game animals.
- Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- Before construction starts, construction workers must be educated with regards to littering and poaching.
- During construction, refresher training can be conducted to construction workers with regards to littering and poaching.
- The Contractor and his / her employees shall not bring any domestic animals onto site.

- Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes.
- Construction areas must be demarcated but should allow for the migration of small faunal species out of the construction zone. Fencing types must be selected for minimal disturbance to animal movement corridors (e.g. palisade fencing is preferable to diamond mesh fencing).
- Open trenches inspected regularly ensure that animals have not become trapped. Such animals will be safely removed and released, where possible.
- With regards to other areas which may need to be fenced temporarily during construction, i.e. aloe area where moles were found, a normal stock fence can be utilised, either diamond or rectangular fencing.
- Lines within the migratory pathways of avifauna must be fitted with bird flappers.
- A permit is required from the provincial authority if Baboon Spiders which are listed nationally as Protected under Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are identified on site.
- *Anti-collision devices such as bird flappers must be installed where powerlines crosses avifaunal corridors. The input of an avifaunal specialist must be obtained for the fitting of the anti-collision devices onto specific sections of the line once the exact positions of the towers have been surveyed and pegged.*
- Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.
- The design of the powerlines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins et al., 2015).
- Due to the high sensitivities of the proposed line, a SACNASP-registered avifauna specialist will have to draft a detailed ornithological management plan.
- Powerlines must be fitted with industry-standard bird flight diverters in order to make the lines as visible as possible to collision-susceptible species.
- It is recommended that NTCSA mark one-third of the line with nocturnal Bird flight diverters (BFDs) in an experimental block design (a repeating pattern of 4 spans marked, 8 spans unmarked) and monitor the line for carcasses across all four seasons for at least one year after construction and mitigation. Should hotspots emerge during the one-year post-construction study NTCSA will mark the identified spans if they happen to be part of the unmarked spans within 365 days of receiving the specialist report. This is to be completed by a SACNASP-registered avifauna specialist.
- All the parts of the infrastructure must be nest-proofed and anti-perch devices placed on areas that can lead to electrocution.
- Any devices that become damaged or fall during the operational phase must be replaced as per NTCSA standards.
- Ensure that the phase cables are spaced far enough apart to reduce the risk of large birds (vultures) touching both simultaneously. If such separation (isolation) cannot be provided, exposed parts must be covered (insulated) to reduce electrocution risk.
- A maintenance schedule must be followed as per NTCSA maintenance standards to ensure that all components are still intact and do not pose an electrocution risk, this must be done for the extent of the lifetime of the powerline.
- All infrastructure must be removed if the power line is decommissioned.

Responsibilities:

- Proponent – acquire permits (if applicable)
- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Permits (if applicable).
- Contractor's method statement.

9.2.23 MANAGEMENT OF ARCHAEOLOGICAL AND CULTURAL FEATURES

Management Objective:

- To have no adverse impact on the historical inheritance of the area.
- The protection of land considered to be of traditional cultural value.
- The protection of known archaeological sites against vandalism, destruction and theft during the construction phase.
- To avoid damage to or destruction of previously unknown or excavated archaeological artefacts during construction.
- The preservation and appropriate management of new findings should these be discovered during construction.

Management Target:

- No archaeological and cultural resources or graves to be damaged during construction.

Management Actions:

- All staff involved in the construction phase should be advised of the nature of cultural heritage resource material that may be found and informed of their obligation to report any items found that they may happen upon during the construction process.
- For any chance finds, all work will cease in the area affected and the Contractor will immediately inform the ECO who will notify the Site Supervisor who will inform the Project Manager. A registered heritage specialist must be called to site for inspection. The relevant heritage resource agency must be informed about the finding.
- Permits to be obtained in terms of the National Heritage Resources Act (No. 25 of 1999) if heritage resources are to be impacted on and for the removal of graves.
- Should any remains be found on site that is potentially human remains, the South African Police Service and archaeologist should also be contacted.
- All archaeological, palaeontological and historical sites older than 50 years are protected in terms of the National Heritage Resources Act No 25 of 1999. In terms of this Act it is an offence to disturb any part of such site or material without a permit, should an archaeological or other such discovery be made during any excavations.
- Under no circumstances shall archaeological artefacts be removed, destroyed or interfered with by the Contractor, his employees, his sub-contractors or his sub - contractors' employees. Any person who causes intentional damage to archaeological or historical sites and artefacts could be penalised or legally prosecuted in terms on the Act.
- Cemeteries to be fenced by NTCSA (if agreed by community).
- Buffer material must be highly visible.
- Archaeological monitoring during clearing of bush and construction of towers.

- If archaeological finds are made during monitoring, rescue permit will be required from the Eastern Cape Heritage Agency / South African Heritage Resources Agency (SAHRA).
- If bone fragments, clothing, etc., are found then all work must stop and the necessary permit must be obtained from the Eastern Cape Heritage Agency to remove the grave.
- *No artefacts must be moved, destroyed or interfered with by anyone on site. Known sites must e clearly marked and fenced off in order that they can be avoided during construction activities.*
- Sixty-nine (69) heritage features were identified during the site-specific walkdown survey. These included several confirmed graves, Stone Age sites, as well as markers representative of the cultural heritage of the area. The development will potentially have an impact on 46 of the identified features apart from underground heritage features as well as the intangible heritage and sense of place of the area. However, identified impacts can be mitigated, primarily through avoidance. A Chance Find Procedure is recommended to manage any further discoveries during development should finds be discovered during the proposed activities. This includes halting activities if significant finds are discovered, recording their location, and consulting a qualified archaeologist for further evaluation.

Responsibilities:

- Proponent – acquire permits.
- Project Manager and ECO - to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Permits (if applicable).
- Contractor's method statement.

9.2.24 MANAGEMENT OF WATER

Management Objective:

- Minimise environmental impacts associated with storm water as well as water services for construction workers.
- Minimise stormwater runoff from the site onto neighbouring roads.
- Minimise water use through recycling and water efficient practices.

Target:

- No visual evidence of erosion caused by wastewater or stormwater practices.
- No environmental contamination associated with wastewater or stormwater practices.

Management Actions:

- All construction activities to comply with the National Water Act (Act No. 36 of 1998).
- During the construction stage, water will be required for various purposes, such as concrete batching, washing of plant and equipment in dedicated areas, dust suppression, potable use by construction workers, etc. Water tankers will supply water to the site.
- Manage stormwater from construction site to avoid environmental contamination and erosion.
- Establish a dedicated vehicle maintenance area and wash-bay, where suitable storm water management measures are in place to prevent pollution.

- Manage stormwater from construction site to avoid environmental contamination and erosion.
- Stormwater runoff from workshops, vehicle maintenance area, wash-bays and other potential pollution sources shall be collected and treated in hydrocarbon separation pits/tanks before discharged to drains and waterways.
- Measures must be taken to divert unpolluted water and runoff away from the site.
- All discharges to comply with legal requirements associated with the National Water Act (Act No. 36 of 1998).
- All wastewater discharges to comply with legal requirements associated with the National Water Act (Act No. 36 of 1998), including the General Authorisation that specifically deals with S21 (f) and (g) water uses.
- Ensure proper storage of material (including fuel, paint) that could cause water pollution. Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.
- Wastewater discharges to form part of water monitoring programme.
- Visual inspections for the occurrence of erosion should be undertaken on a weekly basis.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Water monitoring programme – discharges.
- Disposal certificates
- Contractor's method statement.

9.2.25 MANAGEMENT OF WATERCOURSES

Management Objective:

- Ensure that the watercourses (including affected rivers, natural channels, and drainage lines) are protected and incur minimal negative impact to resource quality (i.e. flow, water quality, riparian habitat, morphology, and aquatic biota).
- Existing water use entitlements not to be affected.

Target:

- Minimise the habitat unit destruction and potential loss of wetland/aquatic-dependent biodiversity.
- Unaltered downstream flow regime.
- Downstream water quality to remain within acceptable ranges, as determined through baseline monitoring.
- Ecological category not to be influenced by construction activities.

Management Actions:

- *No activities will be allowed to encroach into a water resource without a water use authorisation being in place from the Department of Water Affairs.*
- A wetland ecologist should monitor the construction phase of the project, in order to assess compliance and to also provide guidance for other wetland related matters that arise.

- A photographic record documenting the visual changes in the wetland systems is to be kept.
- Construction activities and vehicles could cause spillages of lubricants, fuels and construction material which could then be transported to the wetland areas, impacting on the water quality and potentially the functioning of the wetland systems. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the wetland areas.
- A 30m buffer is recommended for the affected wetlands.
- No dumping of construction material onsite may take place.
- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel.
- A spill containment plan is required to be in place prior to construction to minimize the potential impacts of spills or leaks of hazardous substances.
- Use of erosion control measures (such as effective stormwater management structures) to minimise erosion at construction areas or aggregate storage sites.
- All sand and stored aggregate must not be placed in a flow path. This material must be protected from run-off and placed outside the respective buffer areas.
- Supporting construction activities and aspects are prohibited within the 30m buffer zones of the identified watercourses, and that construction takes place during the dry season period.
- All non-essential activities, equipment and machinery are not permitted within the associated 30m buffers.
- Servicing and fuelling of vehicles, equipment and machinery must take place offsite and have measures in place to clean and remove sources of contamination.

- Avoid the delineated watercourse areas where feasible;
- Ensure that all mitigation measures are adhered to;
- Take special precautions in order to prevent erosion;
- The use of existing roads is preferable to avoid additional impact to the area;
- A competent Environmental Control Officer (ECO) must oversee the construction and rehabilitation phase of the project, with watercourse areas as a priority; and
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase.
- In a case where the tower is located within the delineated watercourse, try and relocate the tower to the highest point to avoid the micro-channel or preferential flow paths.
- If possible, try to avoid the wider area of the watercourse.
- Restrict the disturbance and clearance footprint to within 5 m on either side of the proposed powerline route (10 m disturbance corridor).
- Avoid riparian rivers, wetlands and buffers where feasible.
- Implement a rehabilitation plan for any disturbed wetlands.
- Cleared areas must be rehabilitated and stabilised to avoid impacts to adjacent wetland and buffer areas.
- Reduce the disturbance footprint and the unnecessary clearing of vegetation when traversing the identified drainage lines.

- Make use of existing access routes as much as possible, before new routes are considered. Any selected "new" route must not encroach into the wetland areas.
- Keep tower base excavation and soil heaps neat and tidy.
- Limit construction activities in proximity (< 50 m) to wetlands to the dry season when storms are least likely to wash concrete and sand into wetlands. This is only where towers are within wetlands and buffer areas.
- Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.
- Mixing of concrete must under no circumstances take place in any riparian rivers, wetlands or their buffers. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished.
- Limit the placement of towers within riparian rivers, wetlands and buffer areas where feasible.
- Do not situate any of the construction material laydown areas within any riparian rivers, wetlands or buffer areas. Try adhering to the buffers in these instances.
- No machinery should be allowed to park in any wetlands or buffer areas.
- Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.
- Limit soil disturbance.
- The use of herbicides is not recommended in or near riparian rivers or wetlands (opt for mechanical removal).
- Appropriately stockpile topsoil cleared from the powerline footprint.
- Clearly demarcate powerline construction footprint and limit all activities to within this area.
- Minimize unnecessary clearing of vegetation beyond the tower footprints and powerline corridors.
- Lightly till any disturbed soil around the tower footprint to avoid compaction.
- Re-instate topsoil and lightly till transmission tower disturbance footprint.
- Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering riparian rivers, wetlands or buffer areas.
- Mixing of concrete must under no circumstances take place within the wetland or buffer areas.
- Check for oil leaks, keep a tidy operation, and promptly clean up any spills or litter.
- Provide appropriate sanitation facilities for workers during construction and service them regularly.
- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected must be disposed of at a licensed disposal facility.
- The Contractor must be in possession of an emergency spill kit that must be complete and available at all times on site.

- Any possible contamination of topsoil by hydrocarbons must be avoided. Any contaminated soil must be treated in situ or be placed in containers and removed from the site for disposal in a licensed facility.
- Clear vegetation in line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes".
- Any maintenance activities must be conducted in accordance with a workplan and all waste resulting from the maintenance activities must be adequately managed and disposed of at licensed facilities.
- Avoid the use of herbicides and diesel to treat stumps within the riparian rivers, wetlands and buffer areas.
- Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint needed for maintenance must be kept to a minimum.
- Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone must be provided for maintenance staff in the event of prolonged and large-scale maintenance activities.
- Maintenance vehicles must stay on dedicated roads/ servitudes and make use of existing access routes as much as possible, before new routes are considered. Any selected “new” route must not encroach into the riparian rivers or wetland areas.
- In line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes" all alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this NTCSA is obliged to control category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas.

Road Construction

- A key component of any development is the road network that is expected to traverse the project footprint, altering the surface topography while lowering the infiltration rate due to increased hardened surfaces. The increased hardened surfaces are expected to alter the movement of surface water, increasing the erosion and sedimentation potential along the water path and receiving areas, negatively influencing freshwater habitats. Therefore, the project must focus on responsible stormwater management during construction and operation.
- The following road construction specific mitigation measures are provided:
    - The disturbance footprint for the crossing construction must be kept to a minimum and only necessary and authorised activities should take place within the watercourse and buffer during the construction.
    - To minimise the impact on both surface water flow and interflow, portions of the road must include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability of the sub-layers of the road. This is most applicable in depressions and the supporting structures of watercourse crossings.
    - The culverts used for the road crossings must span the width of the watercourse and be positioned to allow flow even during the dry season.

- Box culverts are preferable over pipe culverts as these structures provide more stability and are less likely to be affected by extreme flows.
- Exposed road surfaces awaiting grading must be stabilised to prevent the erosion of these surfaces. Signs of erosion must be addressed immediately to prevent further erosion of the road.
- The road surface should limit the potential for increased surface flows and be fitted with regular drainage channels/furrows that channel flows (adjacent to surface flow direction) into adjacent drainage depressions that are grassed with regular berms.
- A combination of step-like grassed berms and silt traps must be placed in the preferential flow paths along the road to prevent scouring of the road margins and subsequent sedimentation of the downslope water resources.

Responsibilities:

- Project Manager and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Water monitoring programme – discharges.
- Disposal certificates
- Contractor's method statement.

9.2.26 MANAGEMENT OF REHABILITATION

Management Objective:

- Adequate reinstatement and rehabilitation of construction areas.
- Conduct concurrent or progressive rehabilitation of areas affected by construction activities that are situated outside of the construction footprint.

Target:

- Complete site clean-up.
- Reinstate and rehabilitate areas disturbed by construction activities that are located outside of the construction area.
- Landscaping of the finished development to complement the surrounding area.

Management Actions:

9.2.26.1 REMOVAL OF STRUCTURES AND INFRASTRUCTURE

- After the construction phase, the area disturbed outside of the pipeline servitude must be rehabilitated by appropriate landscaping, levelling, topsoil dressing, land preparation, alien plant eradication and vegetation establishment.
- Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, and fixtures.
- Ensure that all access roads utilised during construction which are outside of the powerline servitude and not earmarked for use during the operational phase, are returned to a state no worse than prior to construction.

9.2.26.2 INERT WASTE AND RUBBLE

- Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated.
- Load and haul excess spoil and inert rubble to fill in borrow pits/dongas or to dump sites indicated/approved by the Project Manager.
- Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site.

9.2.26.3 HAZARDOUS WASTE AND POLLUTION CONTROL

- Remove from site all pollution containment structures.
- Remove from site all temporary sanitary infrastructure and wastewater disposal systems. Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner.
- Comply with relevant provisions under the following EMPr sections: Management of Storage and Handling of Hazardous Material, Management of Water, Management of Waste, Management of Pollution Generation Potential.

9.2.26.4 LANDSCAPING

- The landscape profile should be restored, matching as closely as possible to the original land form prior to the distribution of the topsoil.
- In general, no slopes steeper than 1(V):3(H) are permitted in cut-and-fill areas, unless otherwise specified by the Project Manager.
- Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil. Compact in layers for best results.
- Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material.
- Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfill is landscaped to blend in with the surrounding landscape.
- Rehabilitate construction camp according to DWAF's Integrated Environmental Management Series No.6: Environmental Best Practice Specifications (Construction).

9.2.26.5 TOPSOIL REPLACEMENT AND SOIL AMELIORATION

- Execute top soiling activity prior to the rainy season or any expected wet weather conditions.
- Execute topsoil placement only after all construction work has ceased.
- Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes. Replace topsoil to the original depth.
- Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality.
- The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage.
- Do not use topsoil suspected to be contaminated with the seed of alien vegetation (e.g. black wattle). Alternatively, the soil is to be appropriately treated.
- Ensure that stormwater run-off is not channelled alongside the gentle mounding, but that it is taken diagonally across it.
- Shape remaining stockpiled topsoil not utilised elsewhere in an acceptable manner so as to blend in with the local surrounding area.
- After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area.

- Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.
- Machines should remove the stone material and transported to another location and reused if it is required, removed correctly to a licensed facility, or offered to the landowner.
- The geotextile base material, and other foreign material should also then removed during rehabilitation.

9.2.26.6 RIPPING AND SCARIFYING

- Rip and / or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be determined based on the site conditions immediately before these works begin.
- Rip and / or scarify all disturbed (and other specified) areas of the construction site, including temporary access routes and roads, compacted during the execution of the works.
- Rip and / or scarify along the contour to prevent the creation of down-slope channels.
- Do not rip and / or scarify areas under wet conditions, as the soil will not break up.
- The area should be ripped to an appropriate depth (at least 300 mm) to remove any minor compaction.

9.2.26.7 PLANTING

- The areas that have been denuded and disturbed as a result of the construction on site must be vegetated with indigenous vegetation as soon as possible.
- No exotic plants may be used for rehabilitation purpose, only indigenous plants of the area may be utilised.
- Plants should be located from other undisturbed areas, and this along with the original seed-bank within the replaced topsoil will assist with stabilising soils and re-vegetation of the area.
- All planting work is to be undertaken by suitably experienced personnel, making use of the appropriate equipment.
- Transplanting entails the removal of plant material and replanting the same plants in another designated position.
- Transplant trees and shrubs into designated positions.
- Establish further specifications for transplanted plants.
- Plant all trees, shrubs and individual plants in designated positions.
- Planting should preferably be done during the rainy season.
- After planting, each plant must be well watered, adding more soil upon settlement if necessary.
- Establish further specifications for nursery plants.
- Tree seedling material should be fresh and of local origin. Resist using plants from far afield as they may not be best suited to local climatic or soil conditions.
- Small seedlings are likely to transplant more successfully than will large ones. These should be potted and kept under nursery conditions until they are large enough to plant out.
- Establish further specifications for seeds and seedlings.

9.2.26.8 GRASSING

- Suitably trained personnel must undertake grassing by making use of the appropriate equipment and grass species as specified by the terrestrial ecologist.
- Sodding may be done at any time of the year, but it is recommended that seeding be done during the summer when the germination rate is better.
- Hydroseeding with a winter mix will only be specified where re-grassing is urgent, and cannot wait for the summer.
- Establish further specifications for sods, runners and hand seeding.

9.2.26.9 MAINTENANCE

- Monitor the re-growth of invasive vegetative material.
- Cordon off areas that are under rehabilitation as no-go areas.
- Revegetation must match the vegetation type, which previously existed, unless otherwise indicated by a suitable specialist.
- Control invasive plant species and noxious weeds by means of extraction, cutting or other approved methods.
- For planted areas that have failed to establish, replace plants with the same species as originally specified.
- Establish further specifications for maintenance.

9.3 OPERATIONAL PHASE

The EA for the Neptune-Poseidon 400kV Powerline was authorised on 11 July 2012 and subsequently amended to extend the EA validity period. The EA specifies the following two conditions in regards to the operation of Neptune-Poseidon 400kV Powerline:

> **Condition 24**: *Fourteen (14) days written notice must be given to the Department that the activities operational phase will commence.*
>
> **Condition 25:** *The applicant must compile an operational EMP for the operational phase of the activity or alternatively, if the applicant has an existing operational environmental management system, it must be amended to include the operation of the authorised activity.*

Based on the above, a separate Operational EMPr must be compiled.

10 CONCLUSION

With the adoption and proper implementation of the mitigation measures included in this Construction EMPr report, all the mitigation measures recommended by the Specialists, and the conditions of the EA, it is believed that the sensitive environmental features, the significant environmental aspects and impacts associated with the construction phase of the project can be suitably mitigated

Appendix 1: Specialist WalkDown Survey Reports

Appendix 2: EMPr Addendum