AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 1

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 1**
Specialist Theme	Aquatic Biodiversity SSVR
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 1
Report Version/Date	24/04/2025
Environmental Assessment Practitioner/Client	
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Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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1. Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Tabor Solar 1 Facility**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

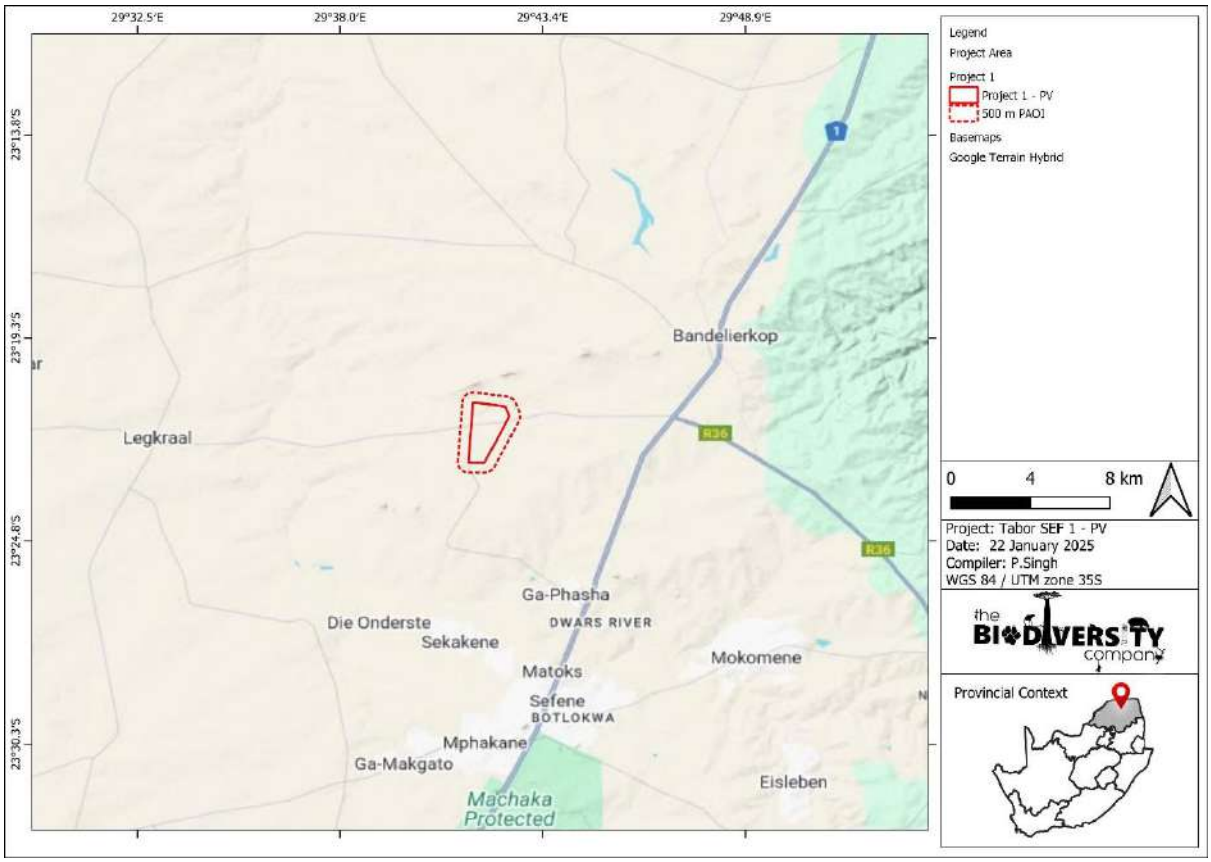

Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- Onsite Switching Station (SS), adjacent to the IPP Substation.
- 132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.
- Access Road to SS; and
- Maintenance access road below or adjacent to the power line.

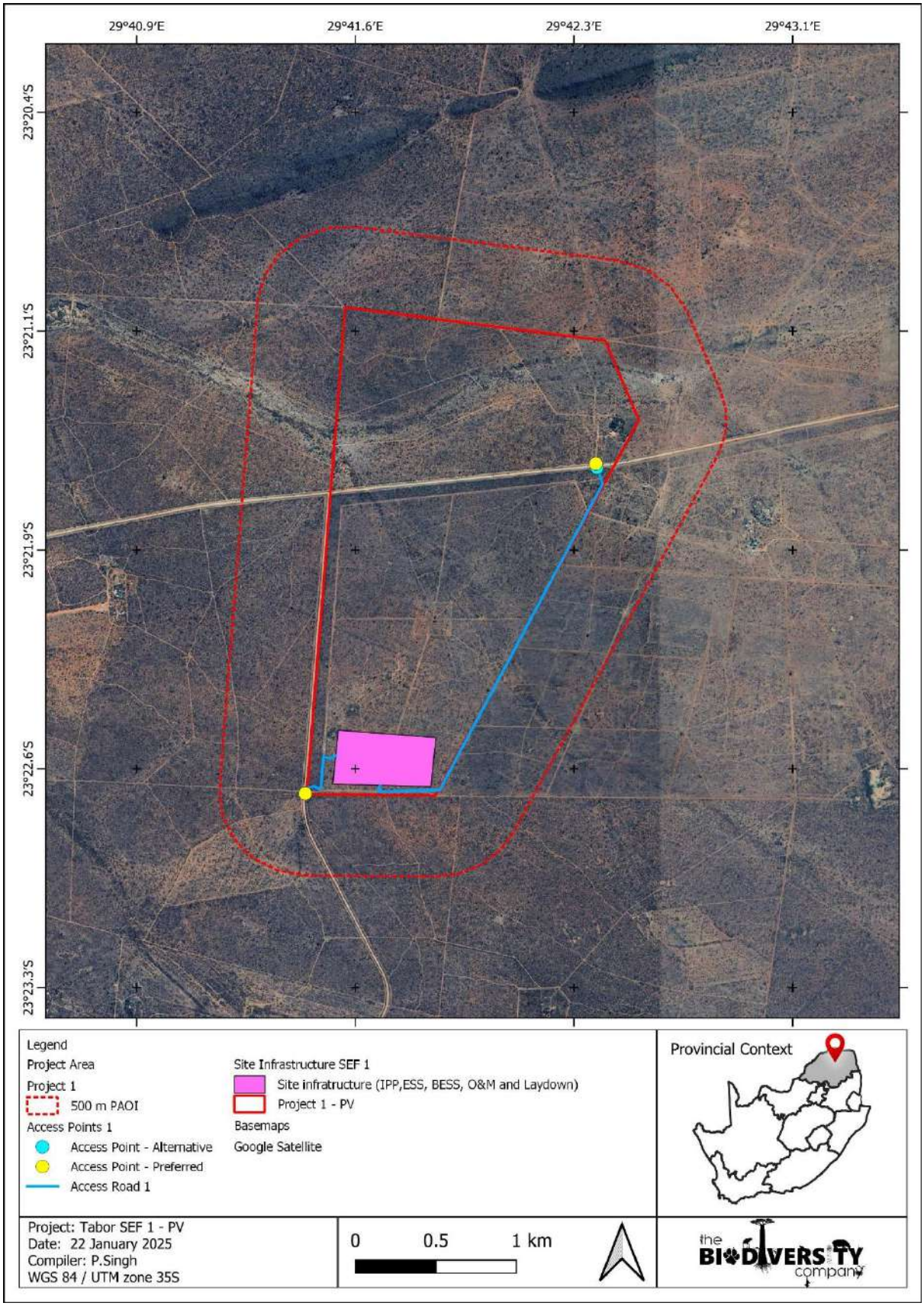

Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2. Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” sensitivity for the project area as presented in Figure 2-1.

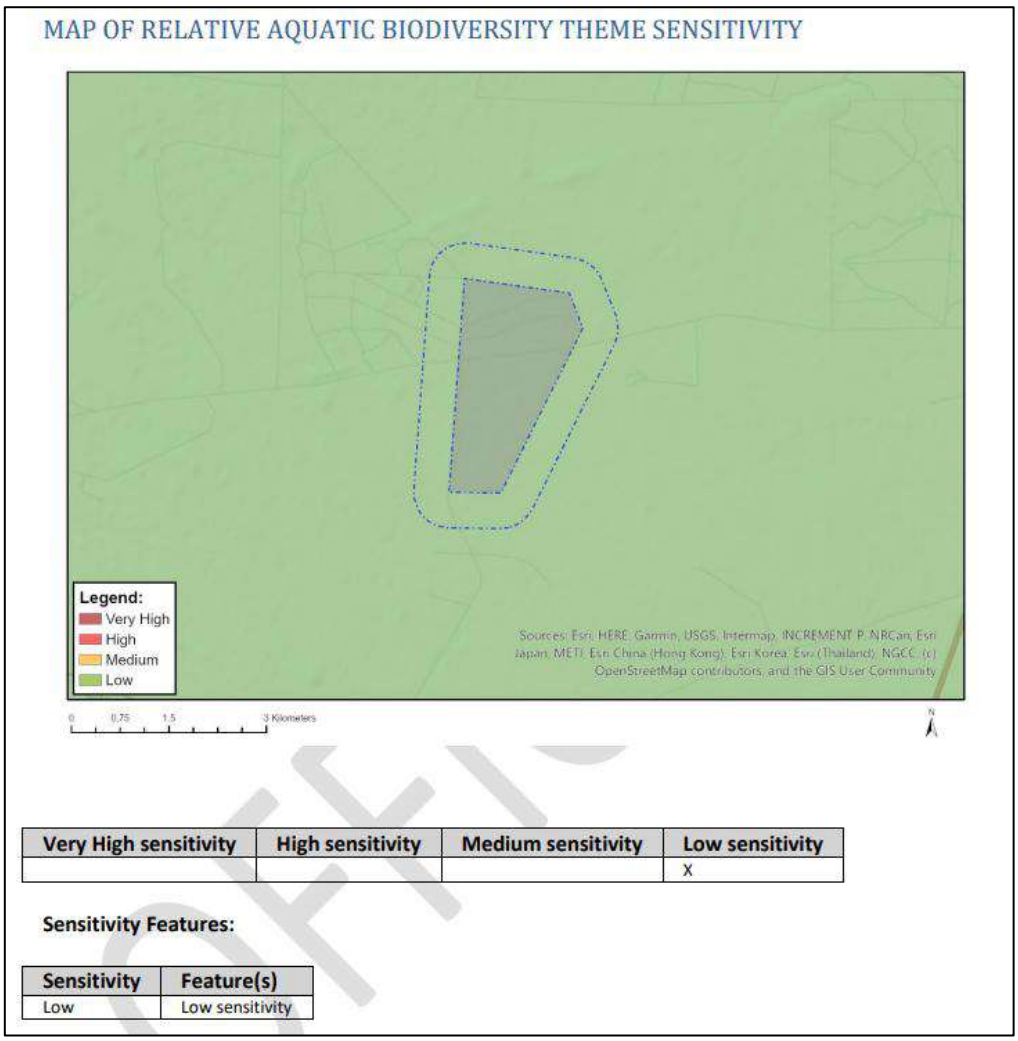

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River, the latter being classified as 'Endangered'.
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI does not overlap with any approved Renewable Energy Projects.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributary of the Sand River; and
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI westward, eventuating in the Sand River. Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers)

requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

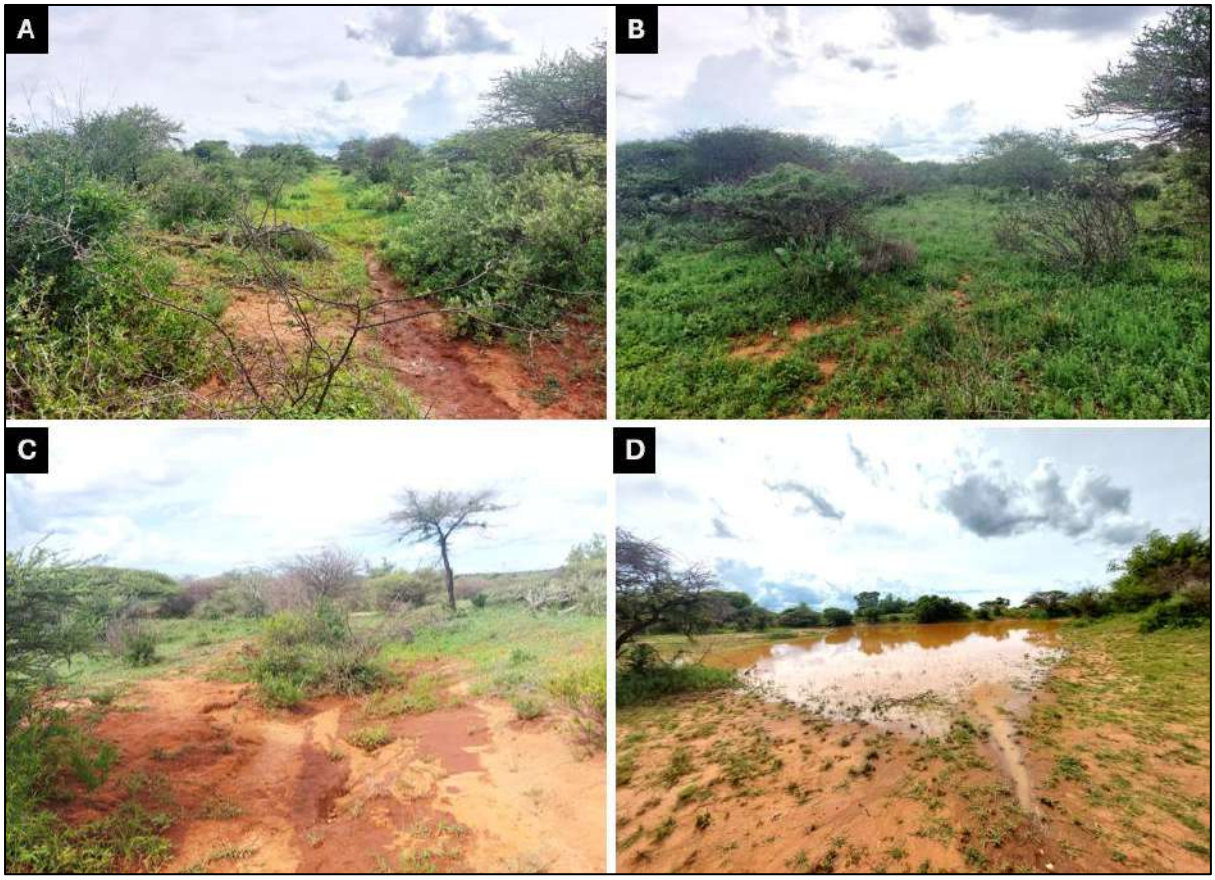

Figure 2-2 Illustration of some of the watercourses (A-C) and the impoundment (D) within the project area and PAOI (January 2025).

2.4 Results Summary

Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within Drainage Area 4 due to its instream impoundment (site H2 Dam). The results are summarised in Table 2-2 below.

Table 2-2 Summary of the results (January 2025))

	Sand River Tributary 2 (Site S4 and H12)	**Drainage Area 4 (Site H2, H1 and H2 Dam))**
Water Quality	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)
Instream Ecological Category (IHI)	B	C
Riparian Ecological Category (IHI)	B	C
Aquatic Invertebrate Ecological Category	Not Applicable	Not Applicable
Fish Community	Not Applicable	Not Applicable
PES	**B (Largely Natural)**	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)	C (Moderately Modified)
Management Objective	Maintain PES	Maintain PES

2.5 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-2, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

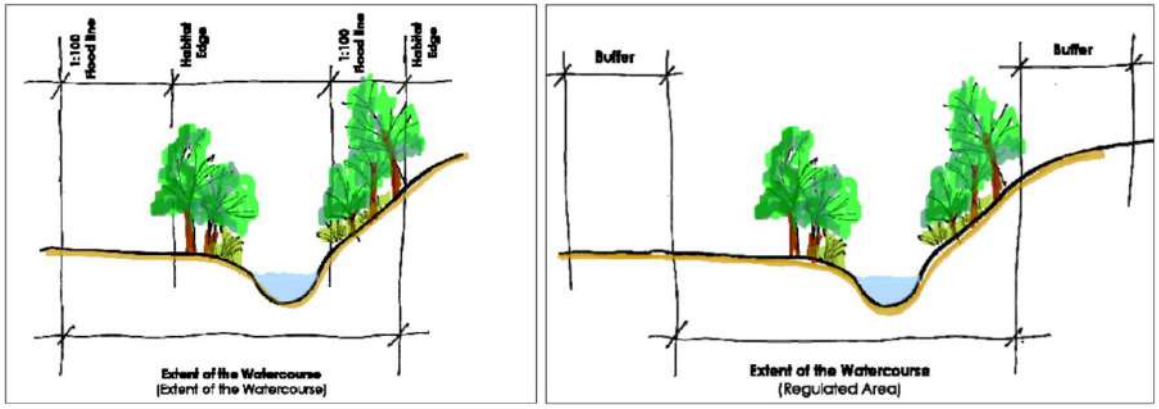

Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

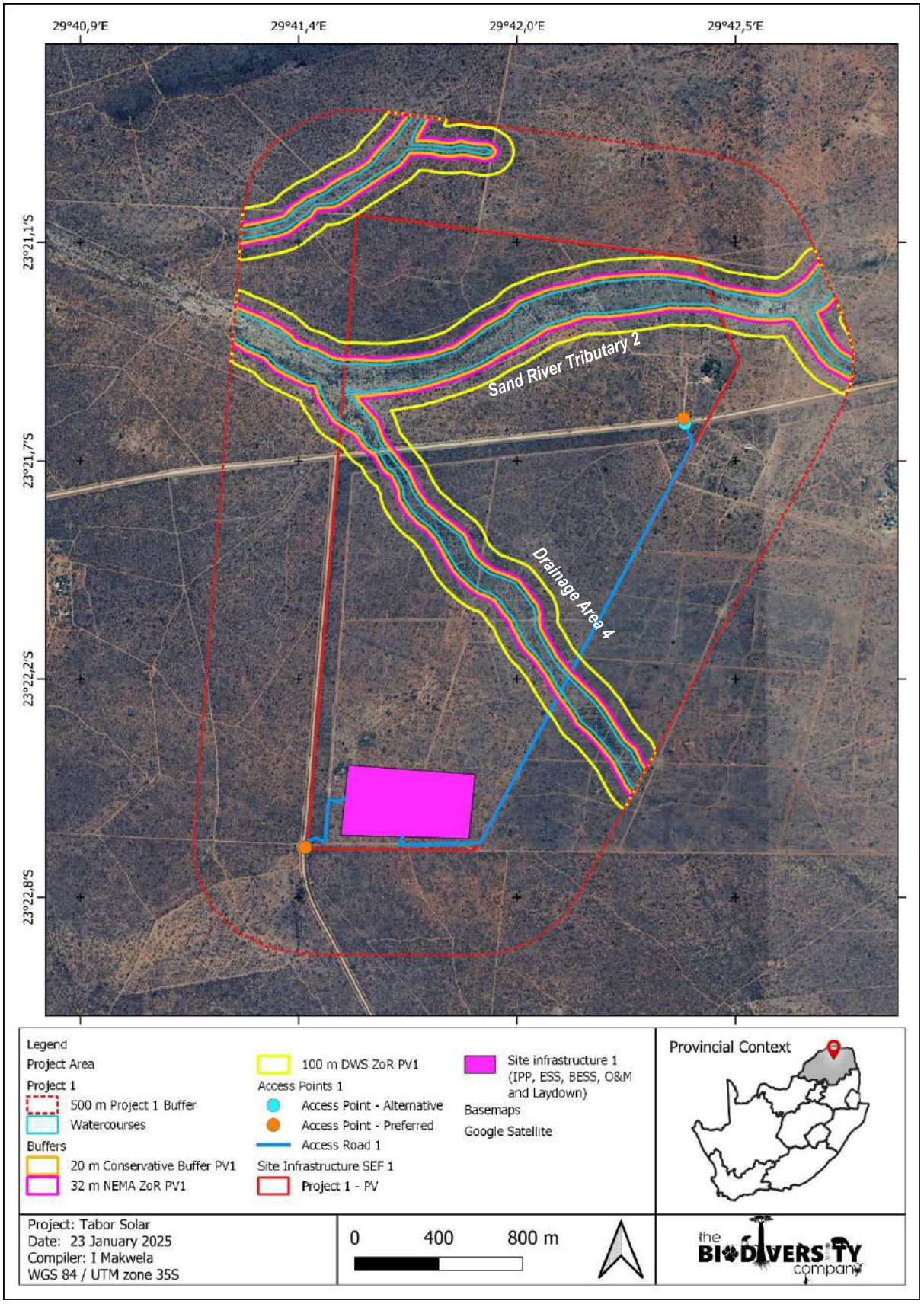

Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.6 Screening Tool Comparison

Table 2-3 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-3 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

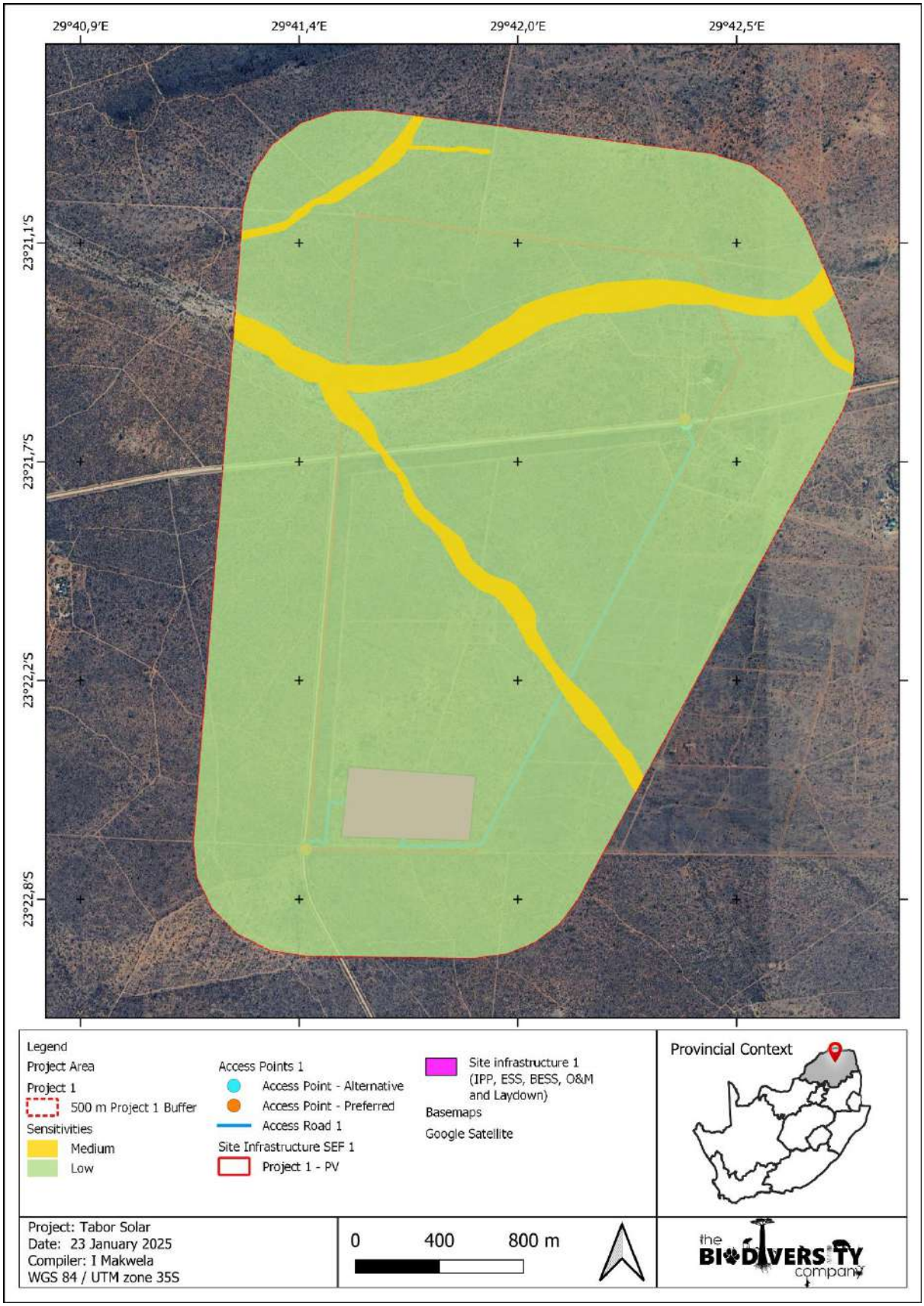

Figure 2-5 Aquatic delineated sensitivity for the PAOI

2. Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;
- A walkdown must be conducted on the final layout to confirm the larger watercourses are adequately avoided, and that the smaller drainage features (regardless of how insignificant they may appear) will have adequate flow catering structures in place. This must be conducted prior to final design sign off and construction.

3. Conclusion

Based on the survey findings, the specialist disputes the “Low” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project

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5. Appendix A Specialist Declaration

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 2

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 2**	
Specialist Theme	Aquatic Biodiversity SSVR	
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 2	
Report Version/Date	24/04/2025	
Environmental Assessment Practitioner/Client		
Fieldwork	Charles de Beer (SACNASP 168416)	
Report Writer	Charles de Beer (SACNASP 168416)	
Reviewer	Prasheen Singh (SACNASP 116822)	
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.	

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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Figures

1 Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Tabor Solar 2 Facility**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

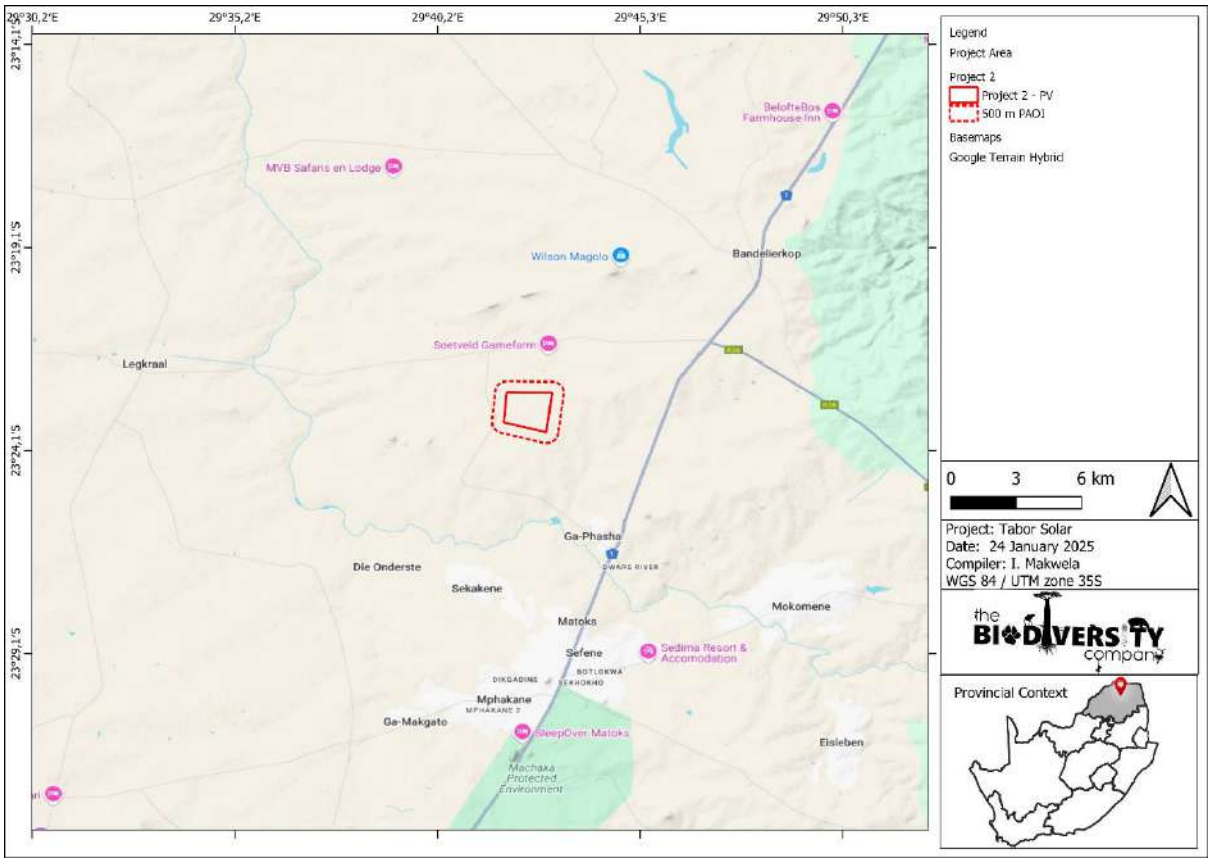

Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- Onsite Switching Station (SS), adjacent to the IPP Substation.
- 132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.
- Access Road to SS; and
- Maintenance access road below or adjacent to the power line.

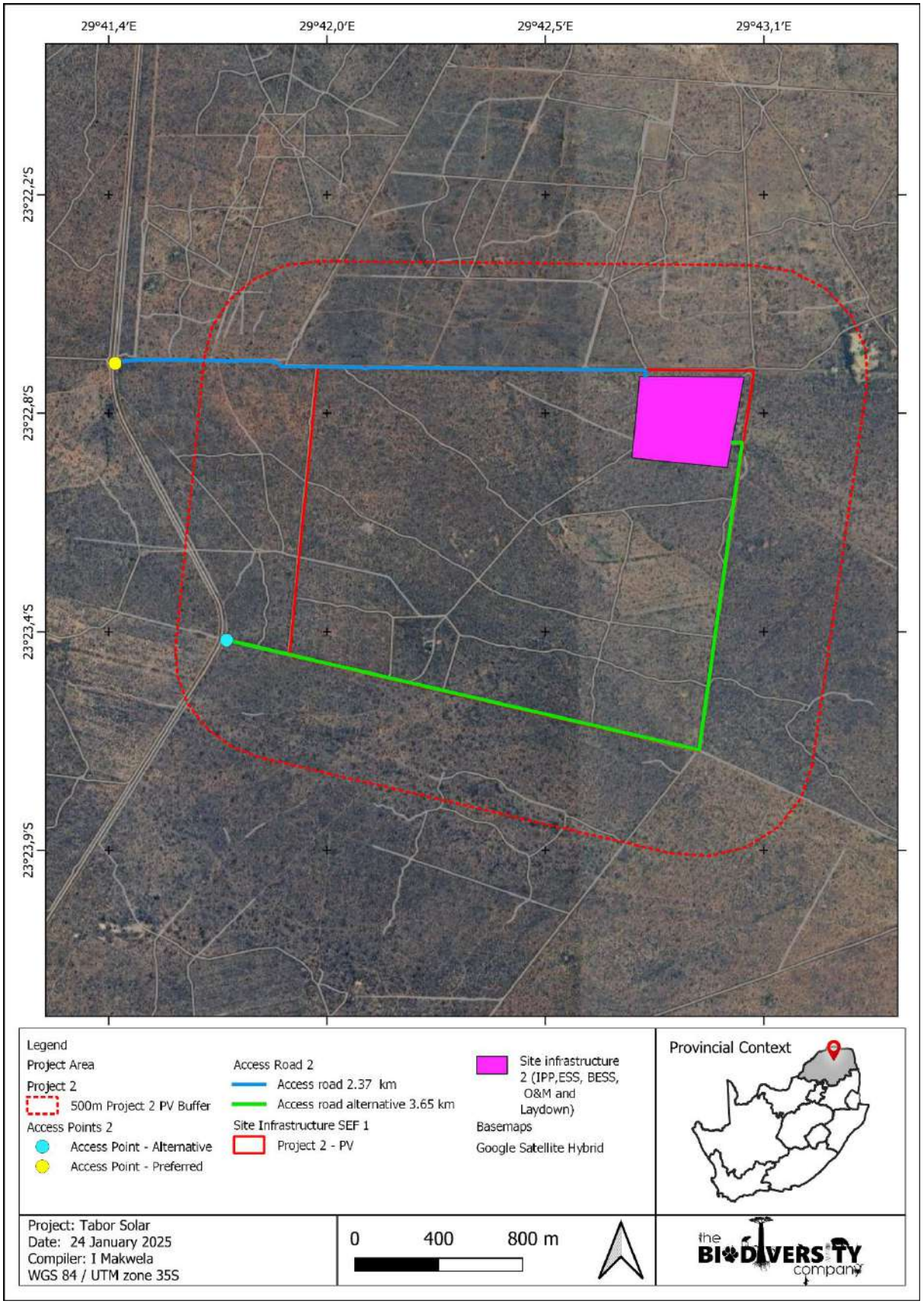

Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2 Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” sensitivity for the project area as presented in Figure 2-1.

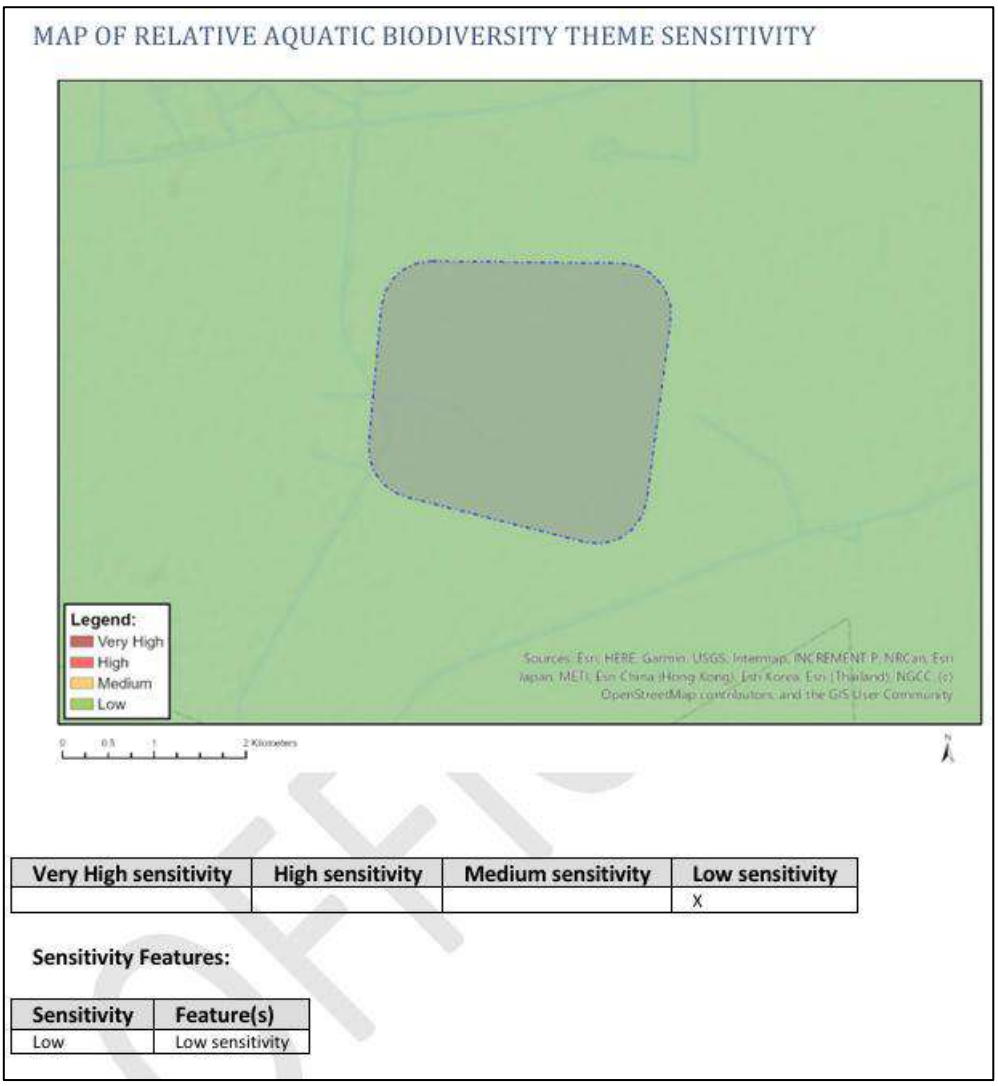

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River, the latter being classified as 'Endangered'.
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI does not overlap with any approved Renewable Energy Projects.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI westward, eventuating in the Sand River. Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers)

requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

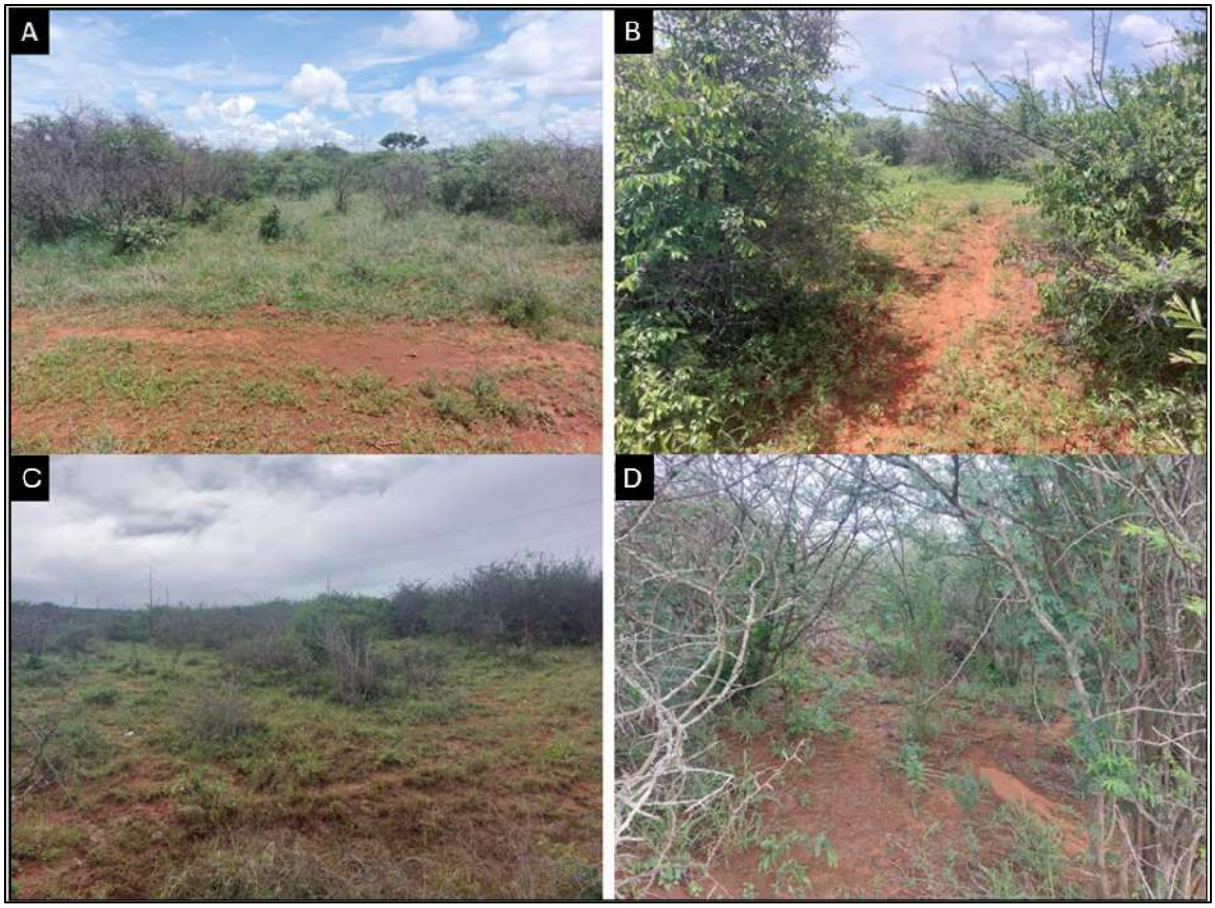

Figure 2-2 Illustration of some of the watercourses (A-D) within the project area and PAOI (January 2025).

2.4 Results Summary

Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within Drainage Area 4 due to its instream impoundment (site H2 Dam). The results are summarised in Table 2-2 below. Note that although site H2 Dam is not part of the PAOI, it is still an indicator of water quality impacts within the respective catchment.

Table 2-2 Summary of the results (January 2025)

	Drainage Area 4 (Site F1, Xstra D and F2)
Water Quality	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)
Instream Ecological Category (IHI)	C
Riparian Ecological Category (IHI)	C
Aquatic Invertebrate Ecological Category	Not Applicable
Fish Community	Not Applicable
PES	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)
Management Objective	Maintain PES

2.5 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-3, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

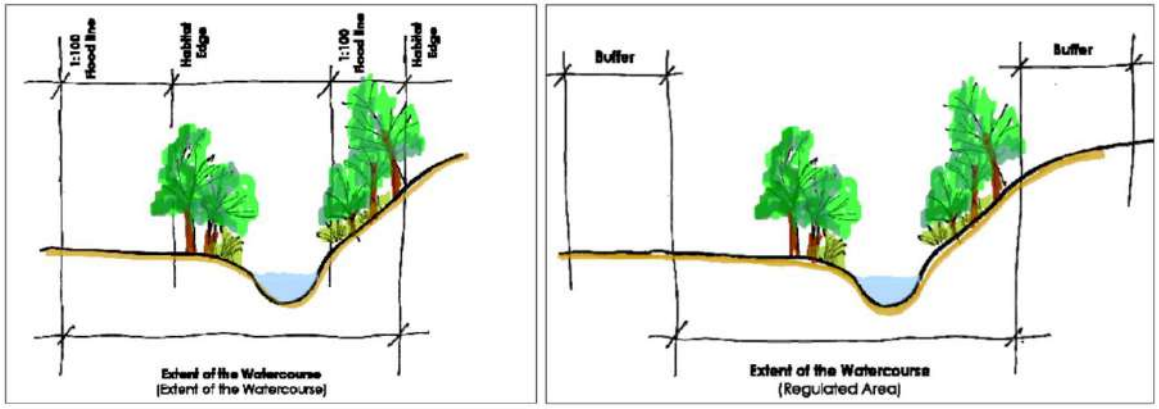

Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

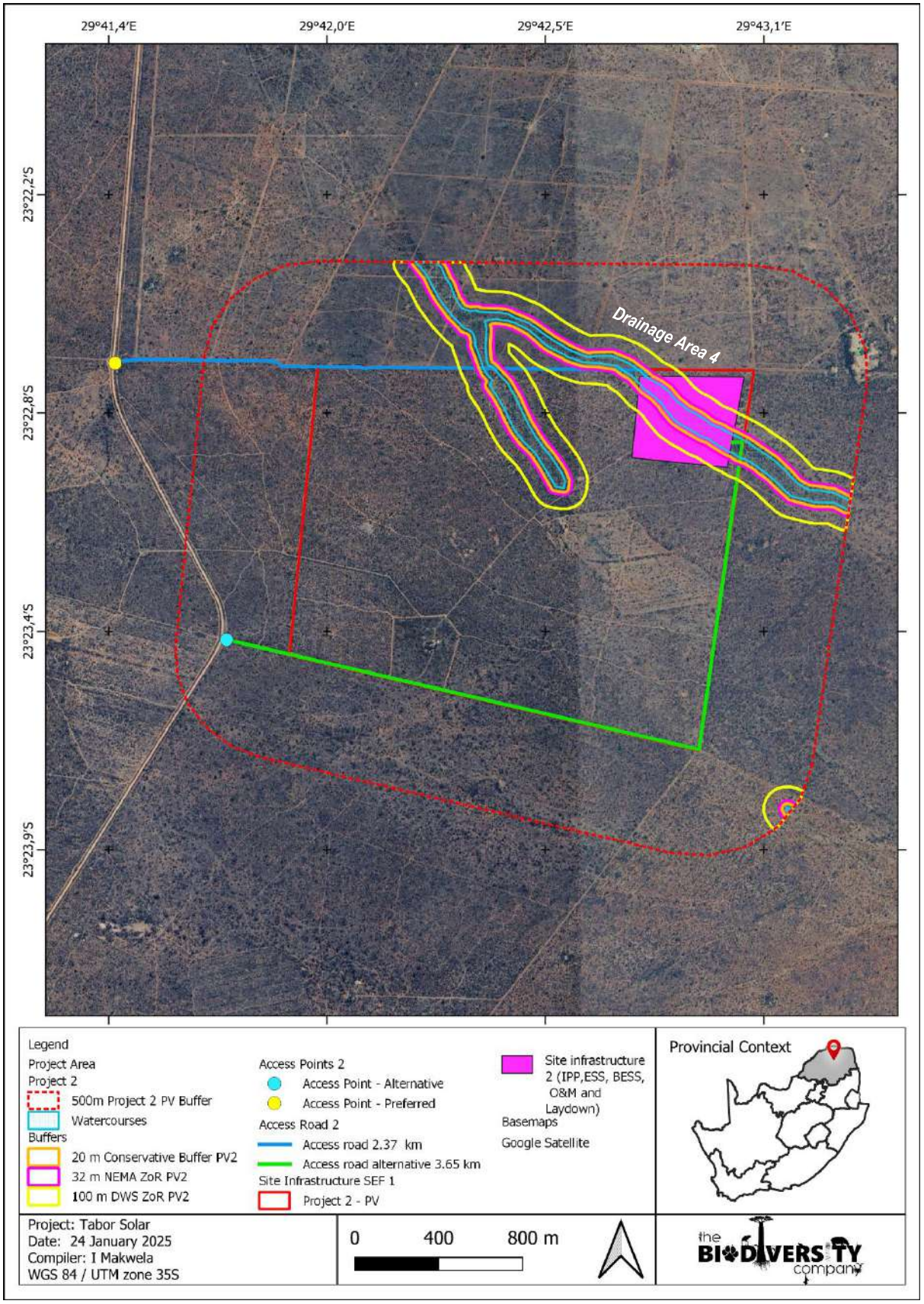

Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.6 Screening Tool Comparison

Table 2-3 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-3 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

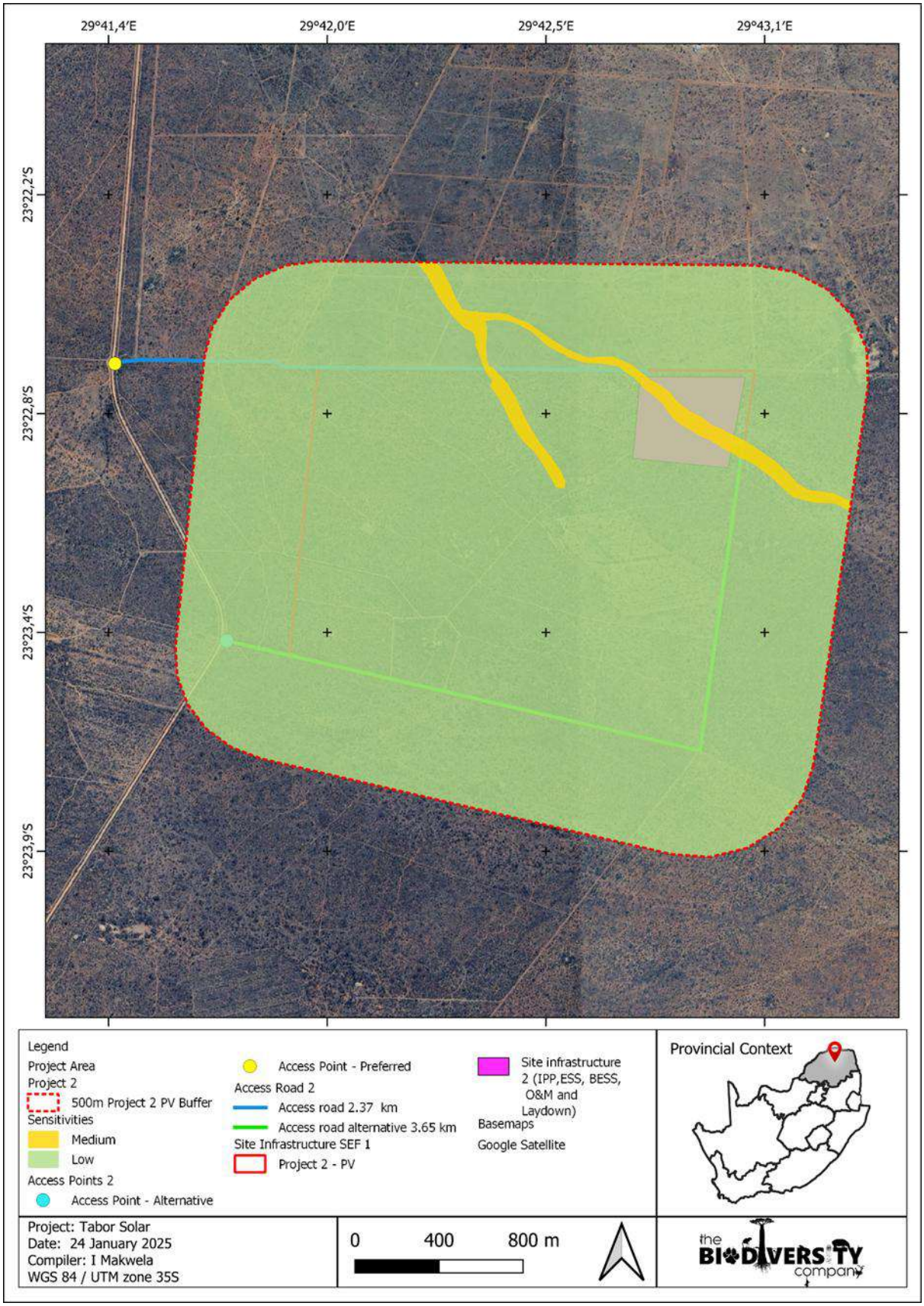

Figure 2-5 Aquatic delineated sensitivity for the PAOI

3 Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Currently there is proposed ground infrastructure that intersects with a watercourse. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life; and
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions.

4 Conclusion

Based on the survey findings, the specialist disputes the “Low” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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6 Appendix A Specialist Declaration

I, Charles de Beer, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Charles de Beer

Freshwater Ecologist

The Biodiversity Company

24/04/2025

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 3

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 3**	
Specialist Theme	Aquatic Biodiversity SSVR	
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 3	
Report Version/Date	24/04/2025	
Environmental Assessment Practitioner/Client		
Fieldwork	Charles de Beer (SACNASP 168416)	
Report Writer	Charles de Beer (SACNASP 168416)	
Reviewer	Prasheen Singh (SACNASP 116822)	
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.	

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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Figures

1 Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Tabor Solar 3 Facility**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

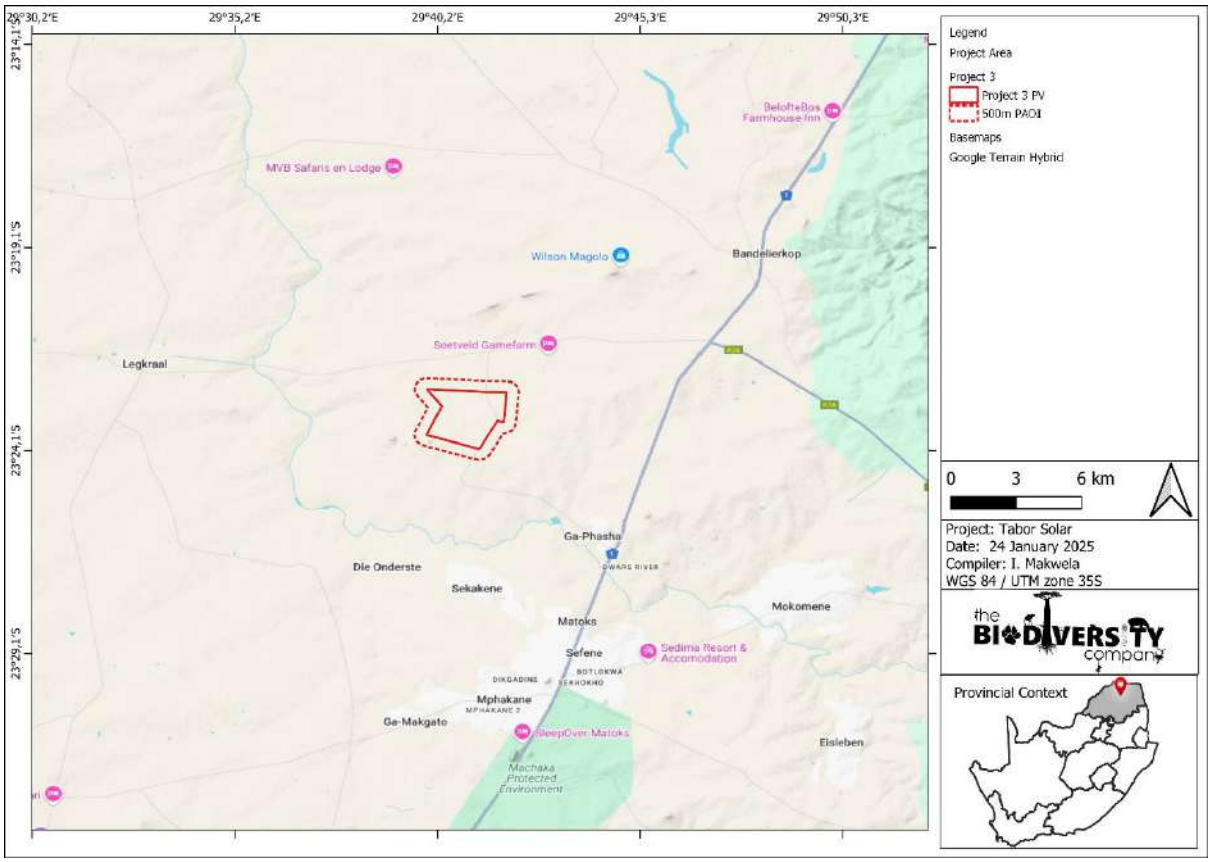


Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

    - MV collector switchgear buildings;
    - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
    - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
    - Battery Cells, Modules, Racks and containers;
    - Power Conversion Equipment;
    - Battery Management System;
    - Energy Management System;
    - MV transformers;
    - MV cabling and collector stations;
    - Fencing;
    - Offices, workshop; and
    - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- Onsite Switching Station (SS), adjacent to the IPP Substation.
- 132 kV Overhead Power Line (OHPL) – 30m height from the switching station to the existing Eskom Tabor Substation.
- Access Road to SS; and
- Maintenance access road below or adjacent to the power line.

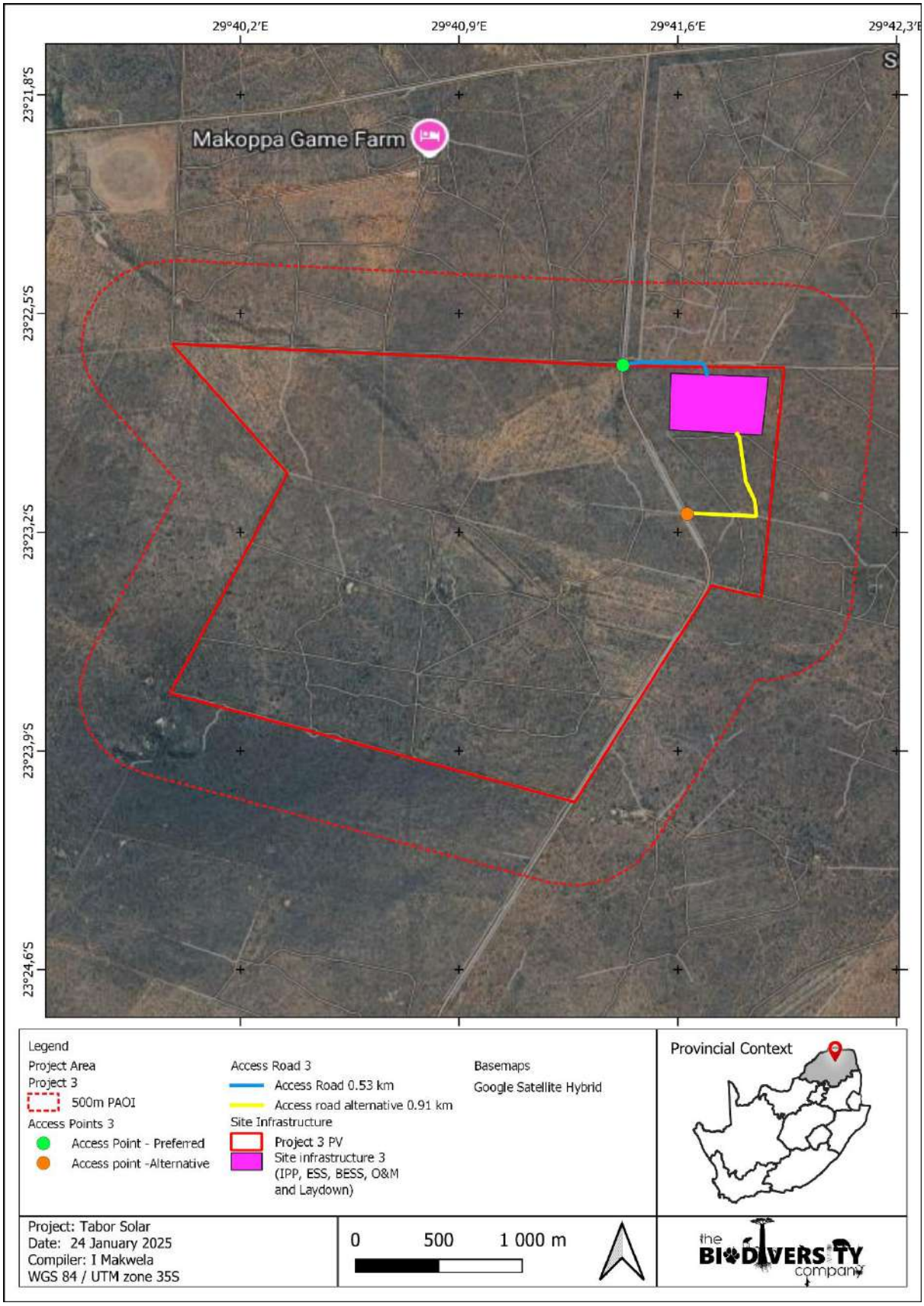


Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

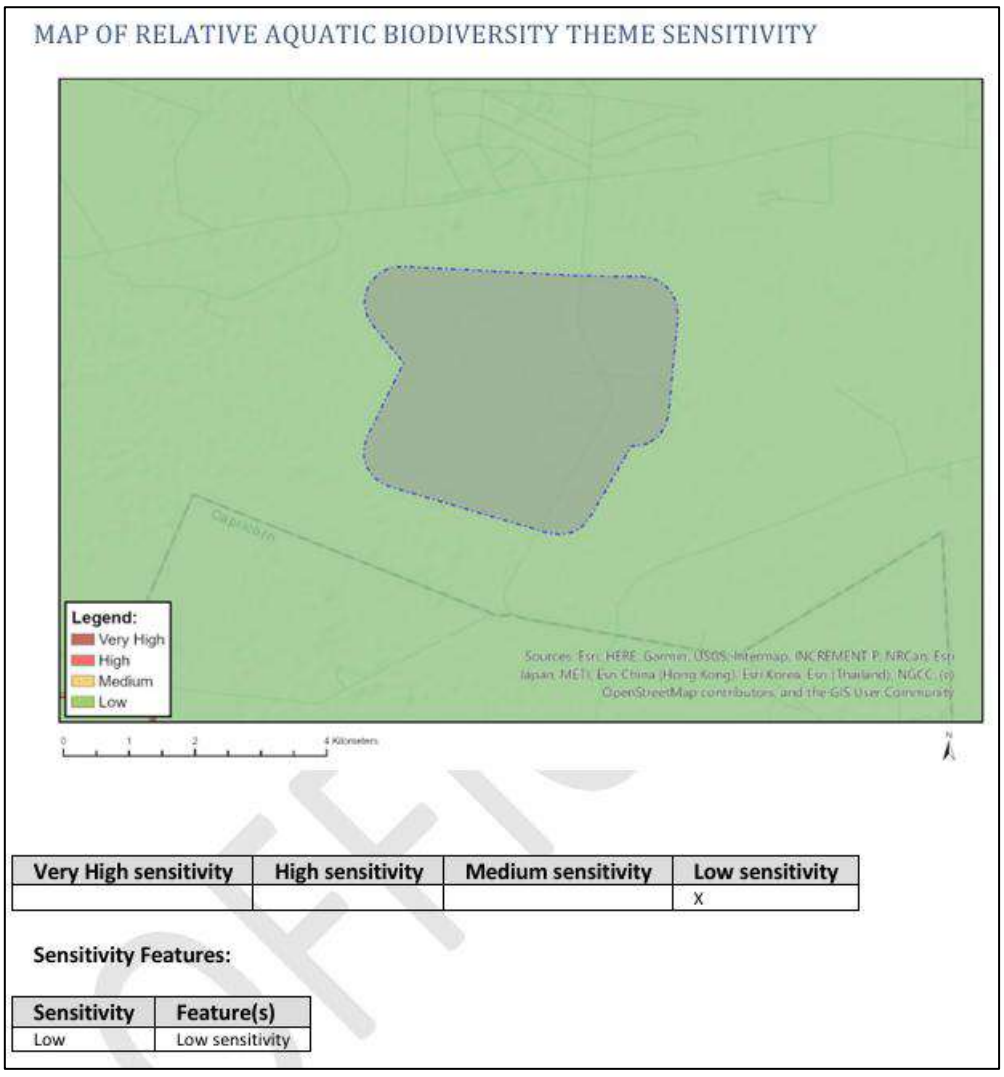
1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2 Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” sensitivity for the project area as presented in Figure 2-1.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River, the latter being classified as 'Endangered'.
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI does not overlap with any approved Renewable Energy Projects.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributary of the Sand River.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI westward, eventuating in the Sand River. Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers) requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

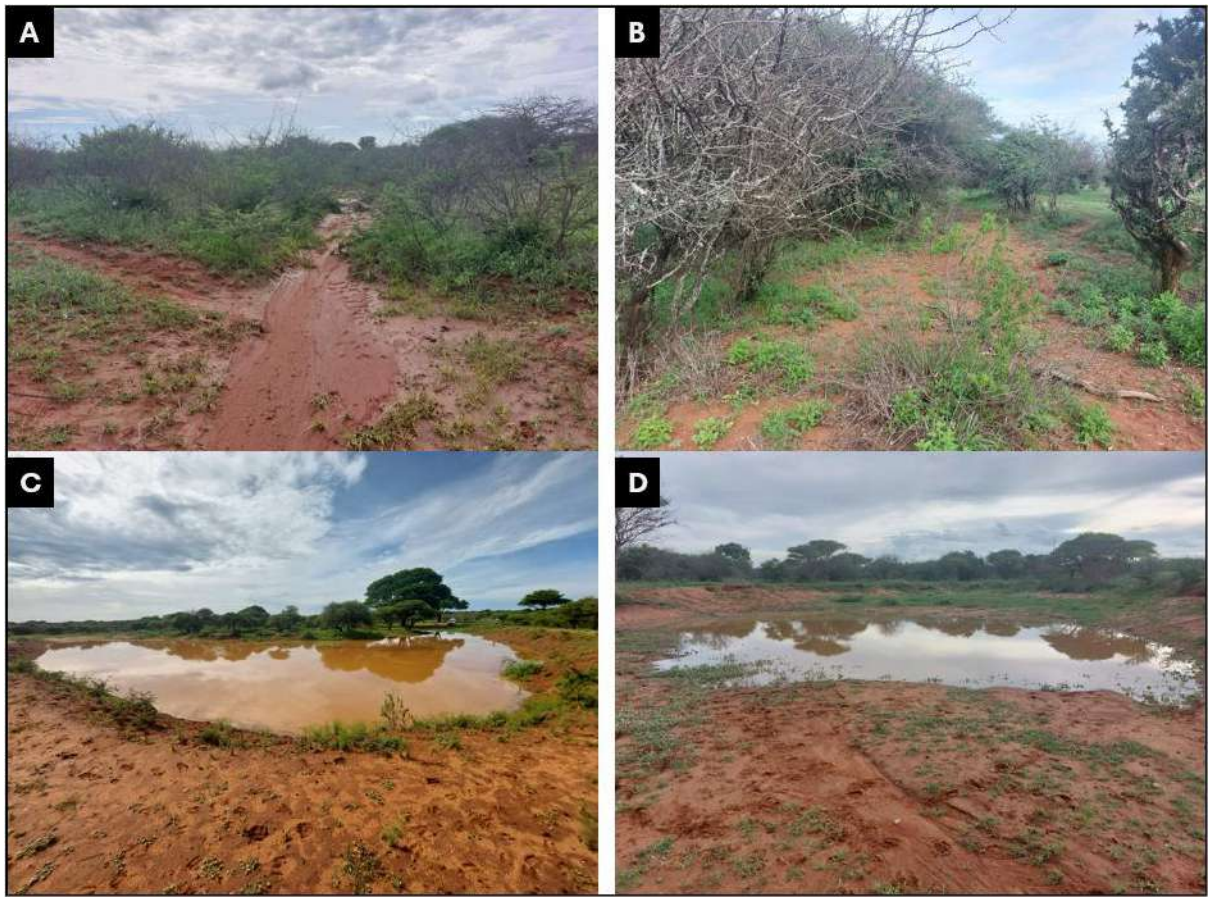


Figure 2-2 Illustration of some of the watercourses (A-B) and instream impoundments (C-D) within the project area and PAOI (January 2025).

2.4 Results Summary

Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within instream impoundments along the tributary (at sites S7 Dam and S8 Dam). The results are summarised in Table 2-2 below.

Table 2-2 Summary of the results (January 2025)

	Sand River Tributary 3 (Site S7 & S8)
Water Quality	No signs of pollution, parameters suitable for tolerant aquatic organisms (S7 Dam & S8 Dam)
Instream Ecological Category (IHI)	B
Riparian Ecological Category (IHI)	B
Aquatic Invertebrate Ecological Category	Not Applicable
Fish Community	Not Applicable
PES	**B (Largely Natural)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)
Management Objective	Maintain PES

2.5 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-2, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

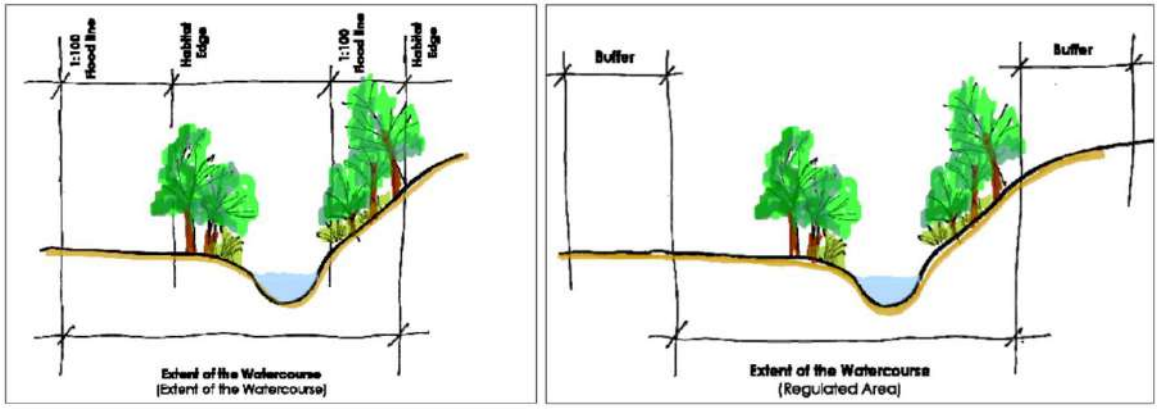


Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

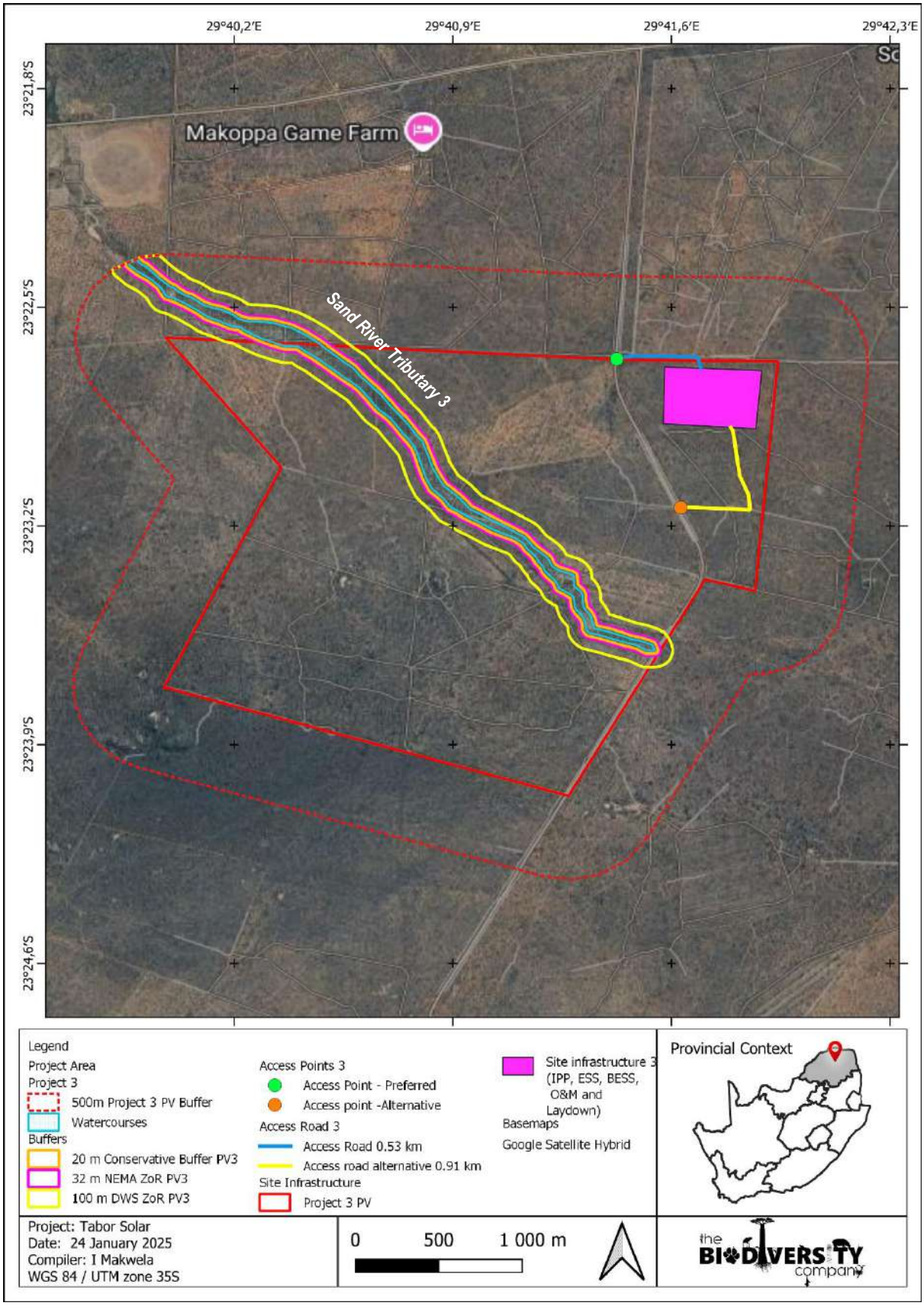


Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.6 Screening Tool Comparison

Table 2-3 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-3 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

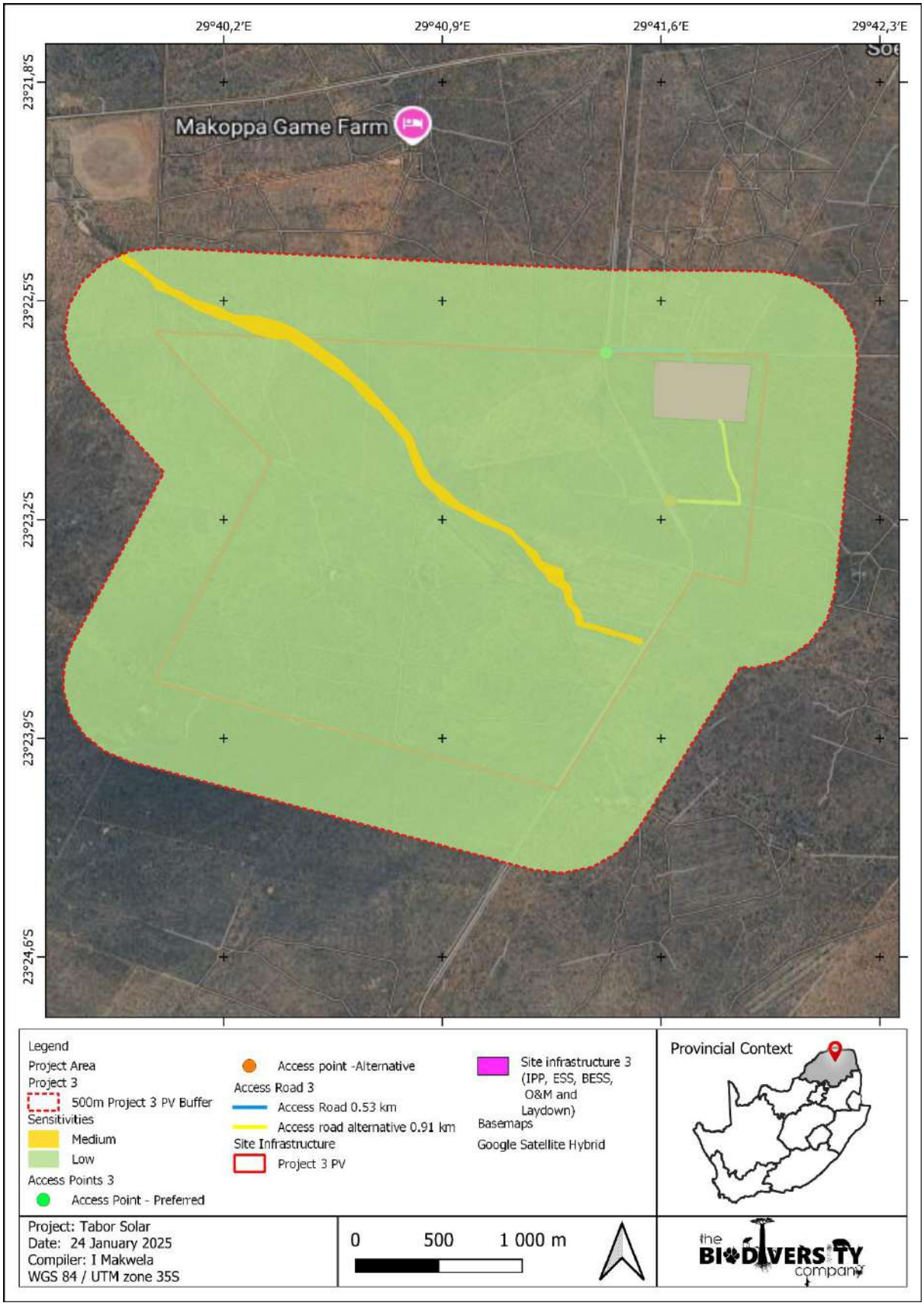


Figure 2-5 Aquatic delineated sensitivity for the PAOI

3 Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;

4 Conclusion

Based on the survey findings, the specialist disputes the “Low” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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6 Appendix A Specialist Declaration

I, Charles de Beer, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Charles de Beer

Freshwater Ecologist

The Biodiversity Company

24/04/2025

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 4

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

The Biodiversity Company

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Fax: +27 86 527 1965

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 4**	
Specialist Theme	Aquatic Biodiversity SSVR	
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 4	
Report Version/Date	24/04/2025	
Environmental Assessment Practitioner/Client		
Fieldwork	Charles de Beer (SACNASP 168416)	
Report Writer	Charles de Beer (SACNASP 168416)	
Reviewer	Prasheen Singh (SACNASP 116822)	
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.	

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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Figures

1 Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Tabor Solar 4 Facility**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

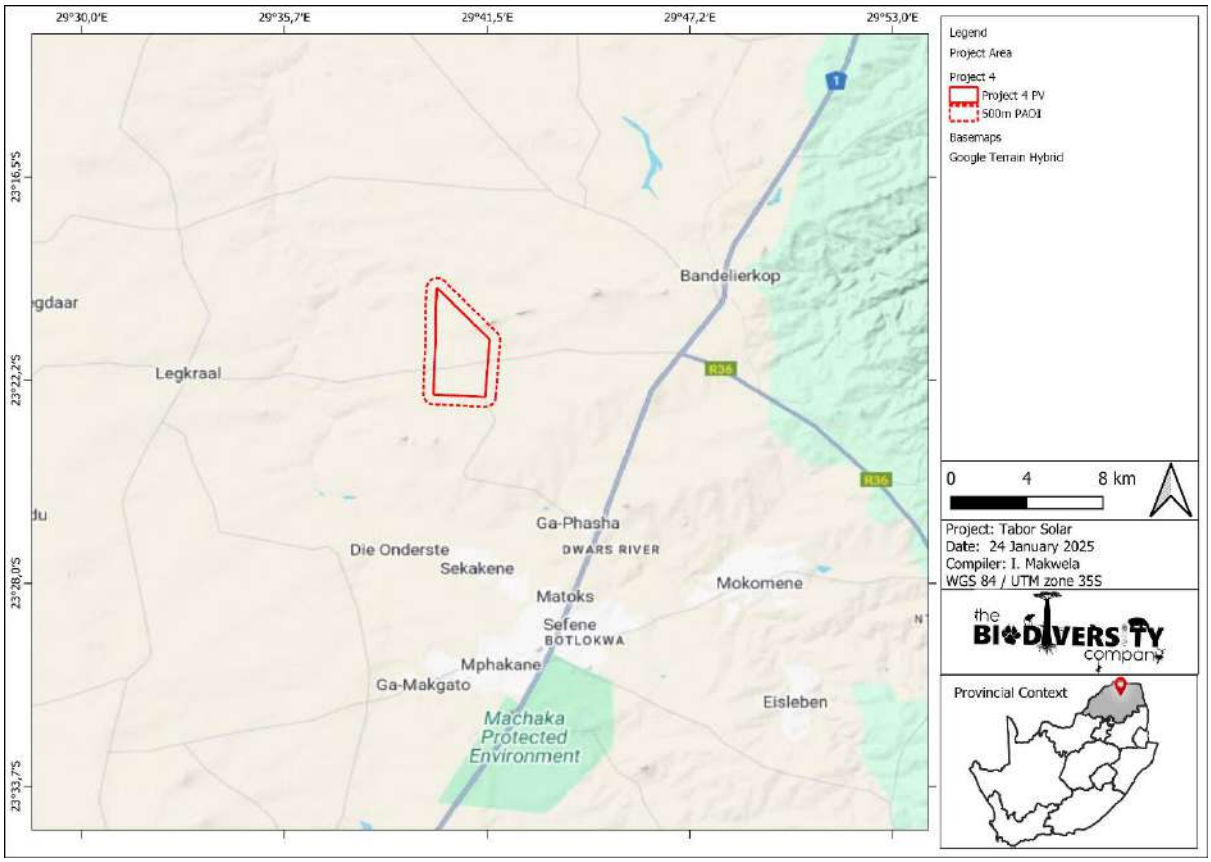


Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- Onsite Switching Station (SS), adjacent to the IPP Substation.
- 132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.
- Access Road to SS; and
- Maintenance access road below or adjacent to the power line.

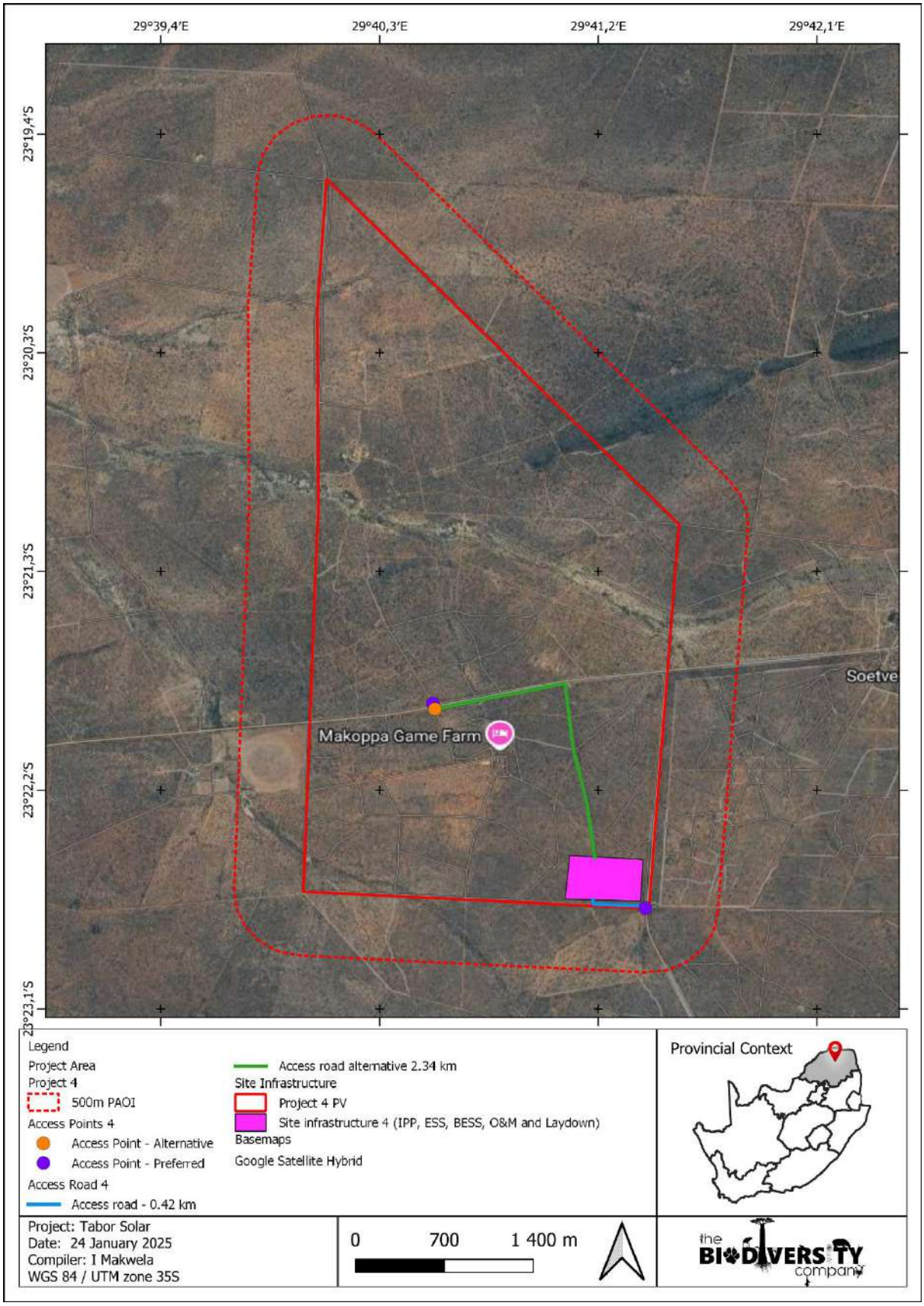


Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

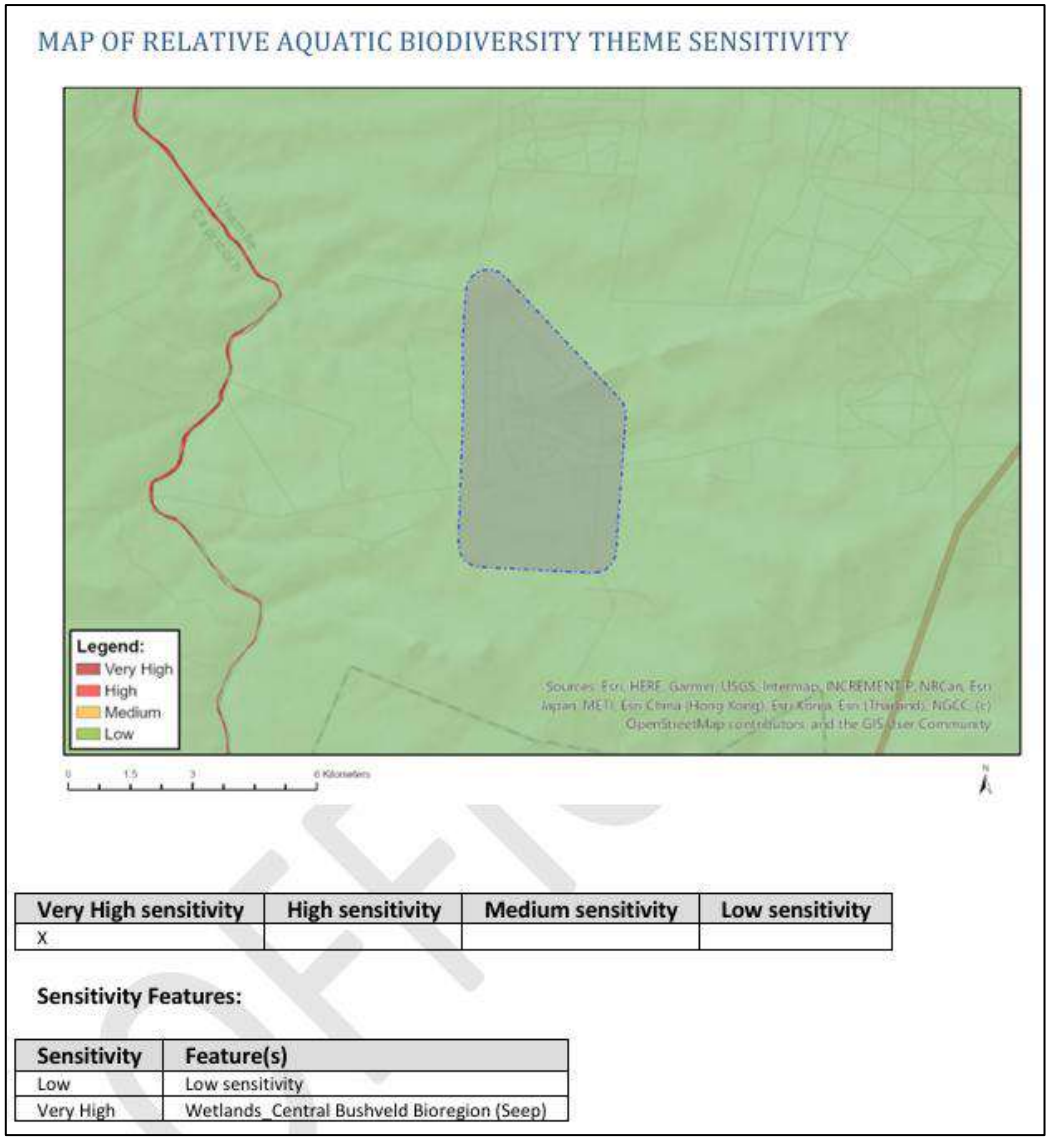
1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2 Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Very High” sensitivity due to a “Seep” wetland present for the project area as presented in Figure 2-1. It is the specialist's opinion that the NBA2018 seep wetland within the PAOI may be an error due to the irregular spatial delineation within the dataset, as well as site verification.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Wetlands_Central Bushveld Bioregion (Seep)

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	The PAOI doe overlaps with Critical Biodiversity Area 1 (CBA 1), Ecological Support Area 1 (ESA 1) and with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River, the latter being classified as 'Endangered'.
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI does not overlap with any approved Renewable Energy Projects.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributaries of the Sand River; and
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributaries of the Sand River as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI westward, eventuating in the Sand River. Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers)

requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

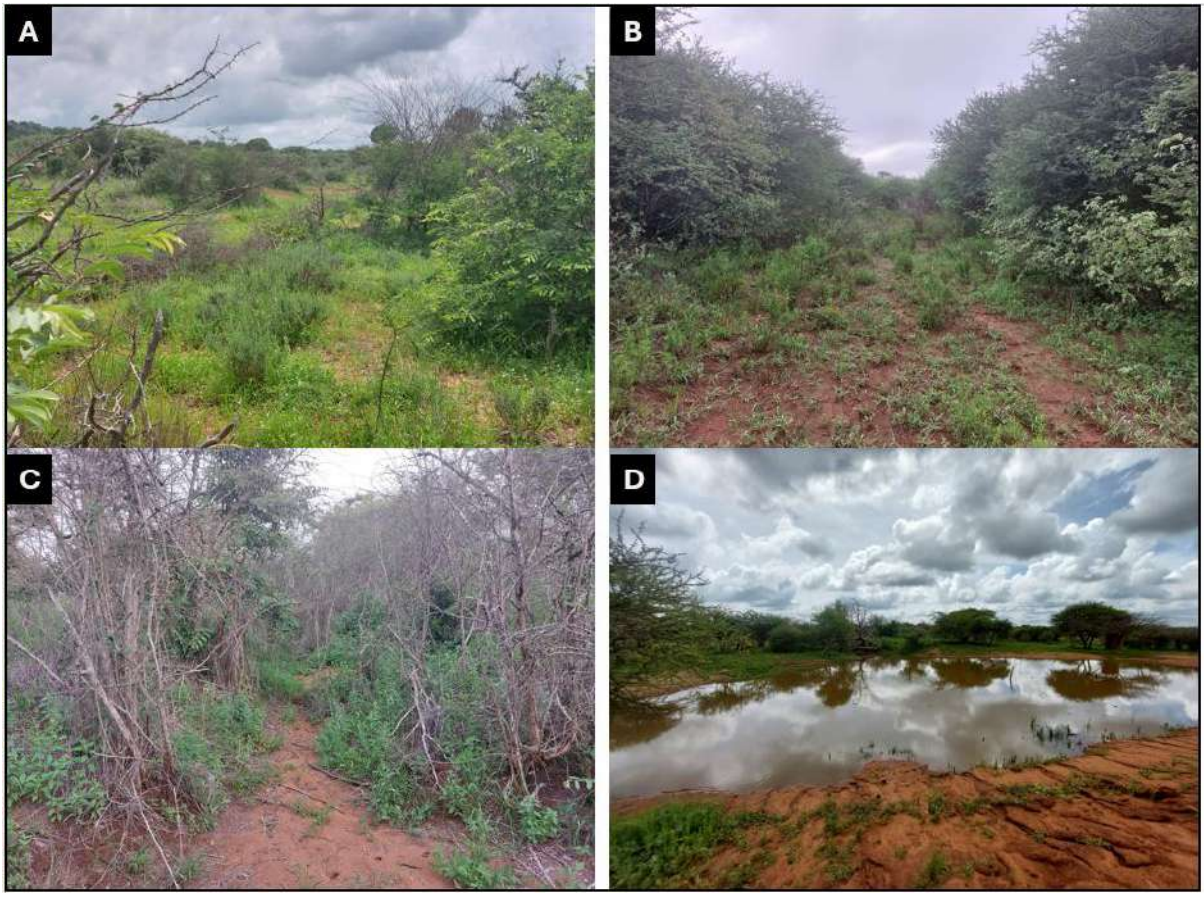


Figure 2-2 Illustration of some of the watercourses (A-C) and an instream impoundment within the project area and PAOI (January 2025).

2.3.1 Ichthyofauna

Fish were collected using electrofishing, cast nets and visual observation techniques in all available biotopes. The fish species were then identified using a complete guide to the Freshwater Fishes of Southern Africa (Skelton, 2024). All fish were released at the point of capture. It should be noted that these expected species lists are compiled on a SQR basis by DWS (2014) and not on a site-specific basis. It is therefore highly unlikely that all the expected species will be present at every site in the SQR with habitat type and availability being the main driver of species present. Therefore, Table 2-2 should be viewed as a list of potential species rather than an expected species list. The conservational status of the fish species was assessed against the latest International Union for Conservation of Nature (IUCN) database (IUCN, 2025). A single hybrid fish species between *Oreochromus mossambicus* (Mozambique Tilapia) and *Oreochromus niloticus* (Nile Tilapia), was collected at site Dam 4. Hybridization has already been documented in the Limpopo River Catchment (IUCN, 2025). Although the potential species list indicates *Oreochromus mossambicus* (Mozambique Tilapia) to be present within the SQR, it is possible that the hybrid fish species was introduced into the impoundment (Dam 4). A photographic example of the fish species is presented in Table 2-3.

Table 2-2 Fish data collected during the 2025 study

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Clarias gariepinus	Sharptooth Catfish	LC	No
Enteromius paludinosus	Straightfin Barb	LC	No
Enteromius trimaculatus	Three Spotted Barb	LC	No
Pseudocrenilabrus philander	Southern Mouthbrooder	LC	No
Oreochromus mossambicus***	Mozambique Tilapia	VU	Yes
Total Exotic Species Sampled			**1**
Total Indigenous Species Sampled			**1**

*IUCN: International Union for the Conservation of Nature
**Skelton (2024).
***Hybrid species
LC: Least Concern
VU: Vulnerable
Exotic species indicated in Red

Table 2-3 Photograph of the fish species collected during the 2025 study

Hybrid specimen

2.4 Results Summary

Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within instream impoundments within the PAOI (sites H2 Dam, S8 Dam, Dam 4 & Dam 10.5). The results are summarised in Table 2-4 below.

Table 2-4 Summary of the results (January 2025)

	Sand River Tributary 1 (Site S1 and S2)	Sand River Tributary 2 (Site H12, S5 & S4)	Sand River Tributary 3 (S8 and S8 Dam)	Drainage Area 1 (Site S10.1)	Drainage Area 3 (S10.3, Dam 4)	Drainage Area 2 (Site S10.5, Dam 10.5)	Drainage Area 4 (Site H2 &H2 Dam)
Water Quality	Not Applicable	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (S8 Dam)	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (Dam 4)	No signs of pollution, parameters suitable for tolerant aquatic organisms (Dam 10.5)	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)
Instream Ecological Category (IHI)	C	B	C	C	C	C	C
Riparian Ecological Category (IHI)	C	B	C	C	C	C	C
Aquatic Invertebrate Ecological Category	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Fish Community	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PES	**B (Largely Natural)**	**B (Largely Natural)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)
Management Objective	Maintain PES	Maintain PES	Maintain PES	Maintain PES	Maintain PES	Maintain PES	Maintain PES

2.5 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-3, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

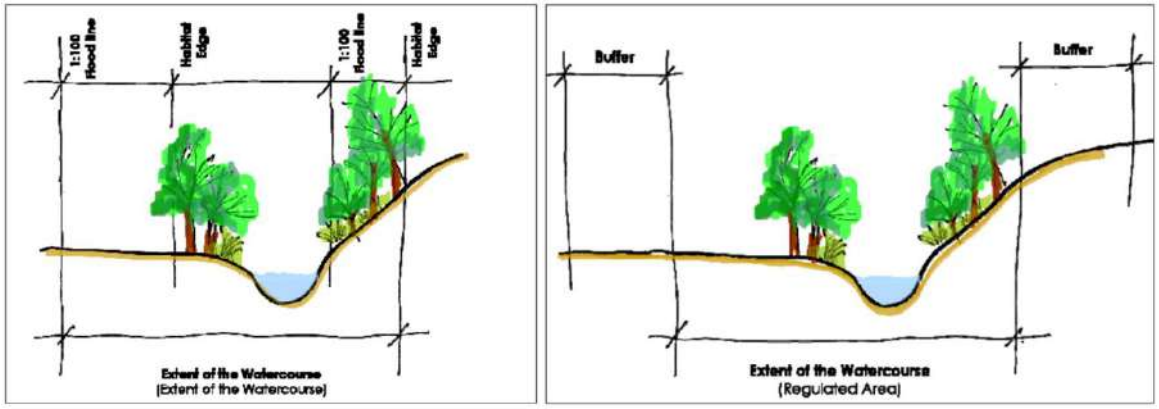


Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

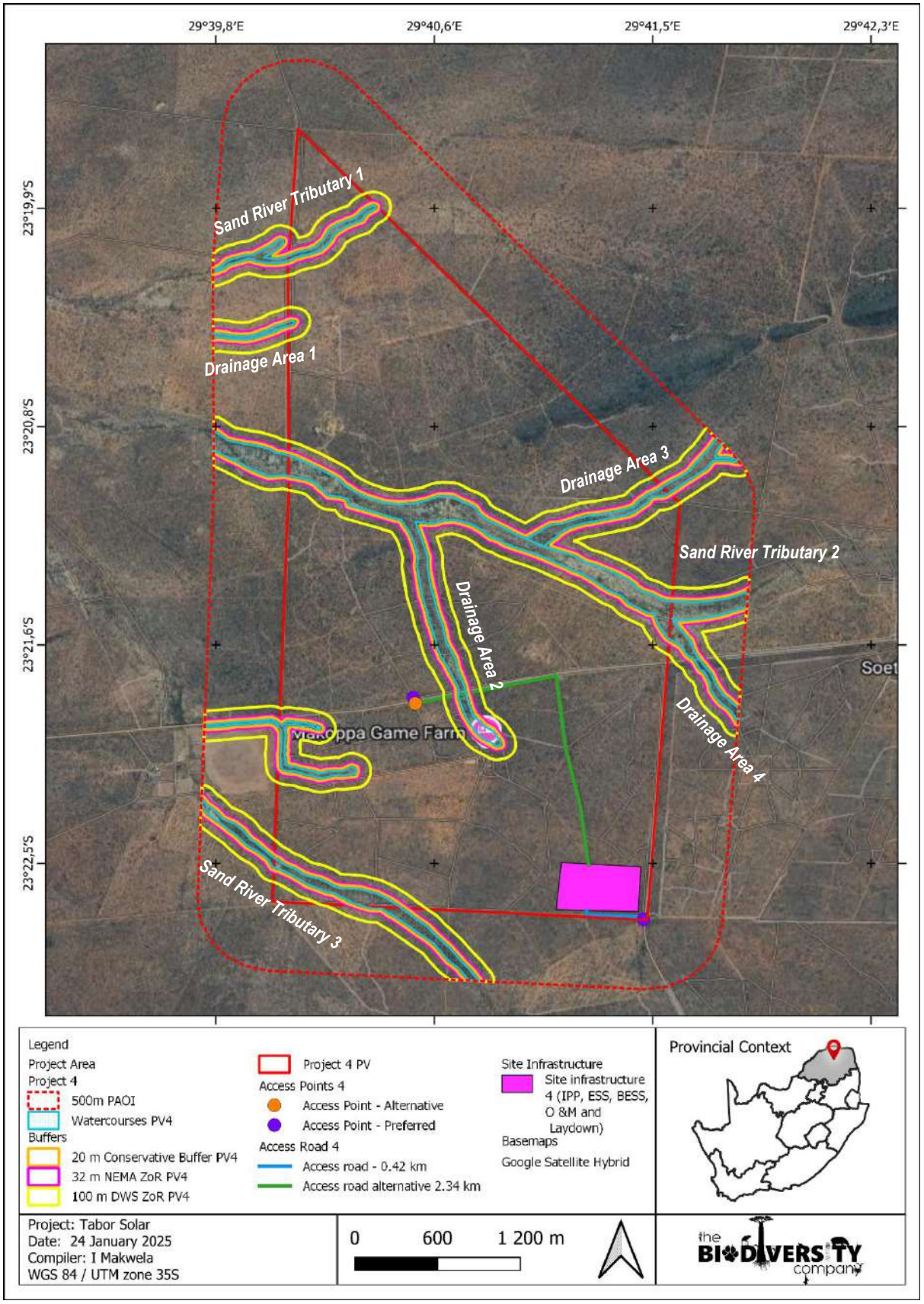


Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.6 Screening Tool Comparison

Table 2-5 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-5 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Very High	Wetlands_Central Bushveld Bioregion (Seep)	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses. The NBA seep wetland is an error within the dataset.

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

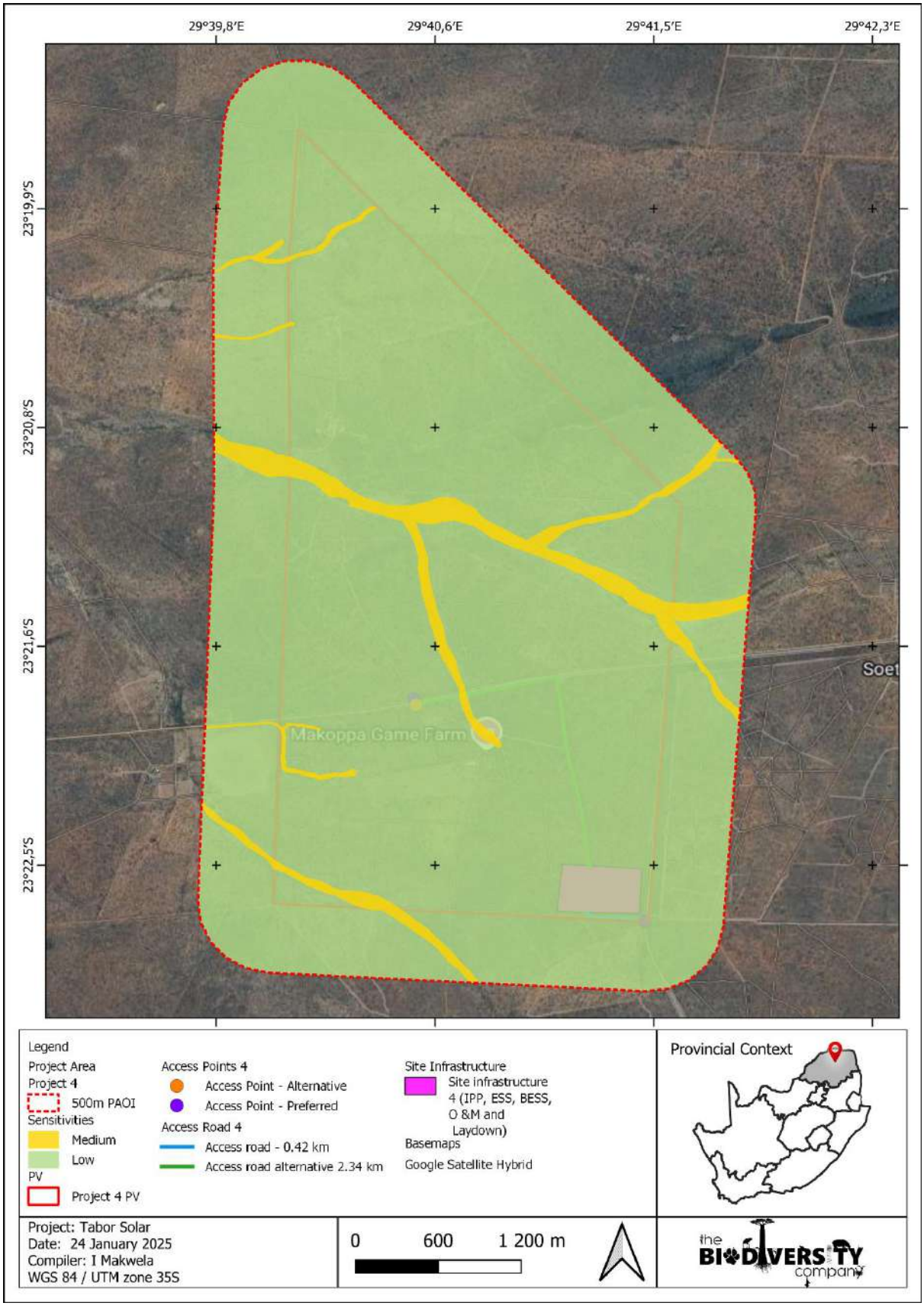


Figure 2-5 Aquatic delineated sensitivity for the PAOI

3 Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;

4 Conclusion

Based on the survey findings, the specialist disputes the “Very High” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area of ‘Medium’ aquatic sensitivity. It is the specialist's opinion that the NBA2018 seep wetland within the PAOI may be an error due to the irregular spatial delineation within the dataset, as well as site verification. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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6 Appendix A Specialist Declaration

I, Charles de Beer, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Charles de Beer

Freshwater Ecologist

The Biodiversity Company

24/04/2025

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 1

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

The Biodiversity Company

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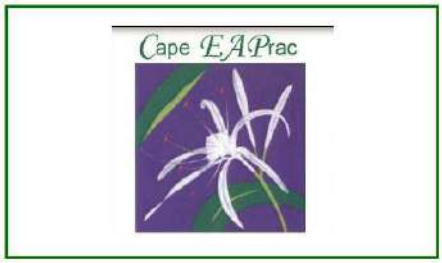
Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 1**
Specialist Theme	Aquatic Biodiversity SSVR
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 1 – Gridline
Report Version/Date	24/04/2025
Environmental Assessment Practitioner/Client	
Fieldwork	Charles de Beer (SACNASP 168416) 
Report Writer	Prasheen Singh (SACNASP 116822) 
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
OHL/OHPL	Overhead Line / Overhead Powerline
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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Tables

Figures

1. Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed gridlines associated with Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Gridline connecting the Tabor Solar 1 facility to the Tabor Main Transmission Substation (MTS)**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

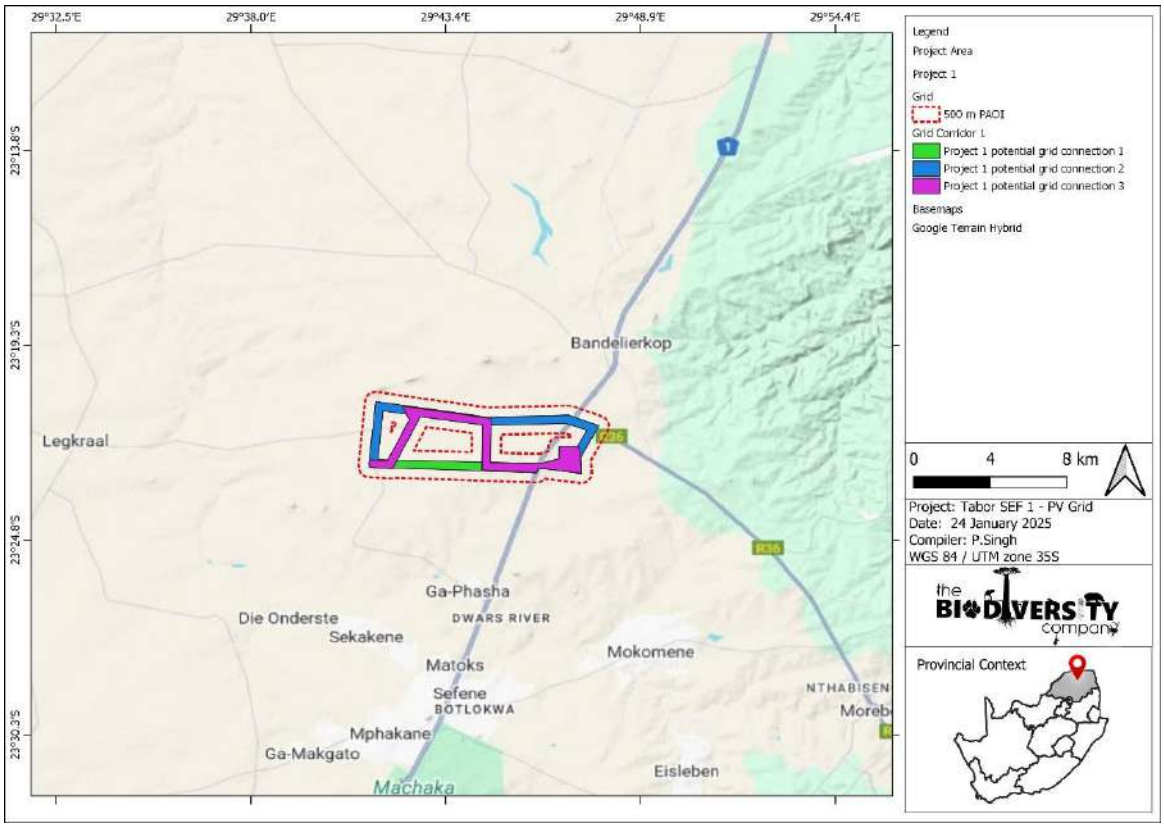


Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- **Onsite Switching Station (SS), adjacent to the IPP Substation.**
- **132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.**
- **Access Road to SS; and**
- **Maintenance access road below or adjacent to the power line.**

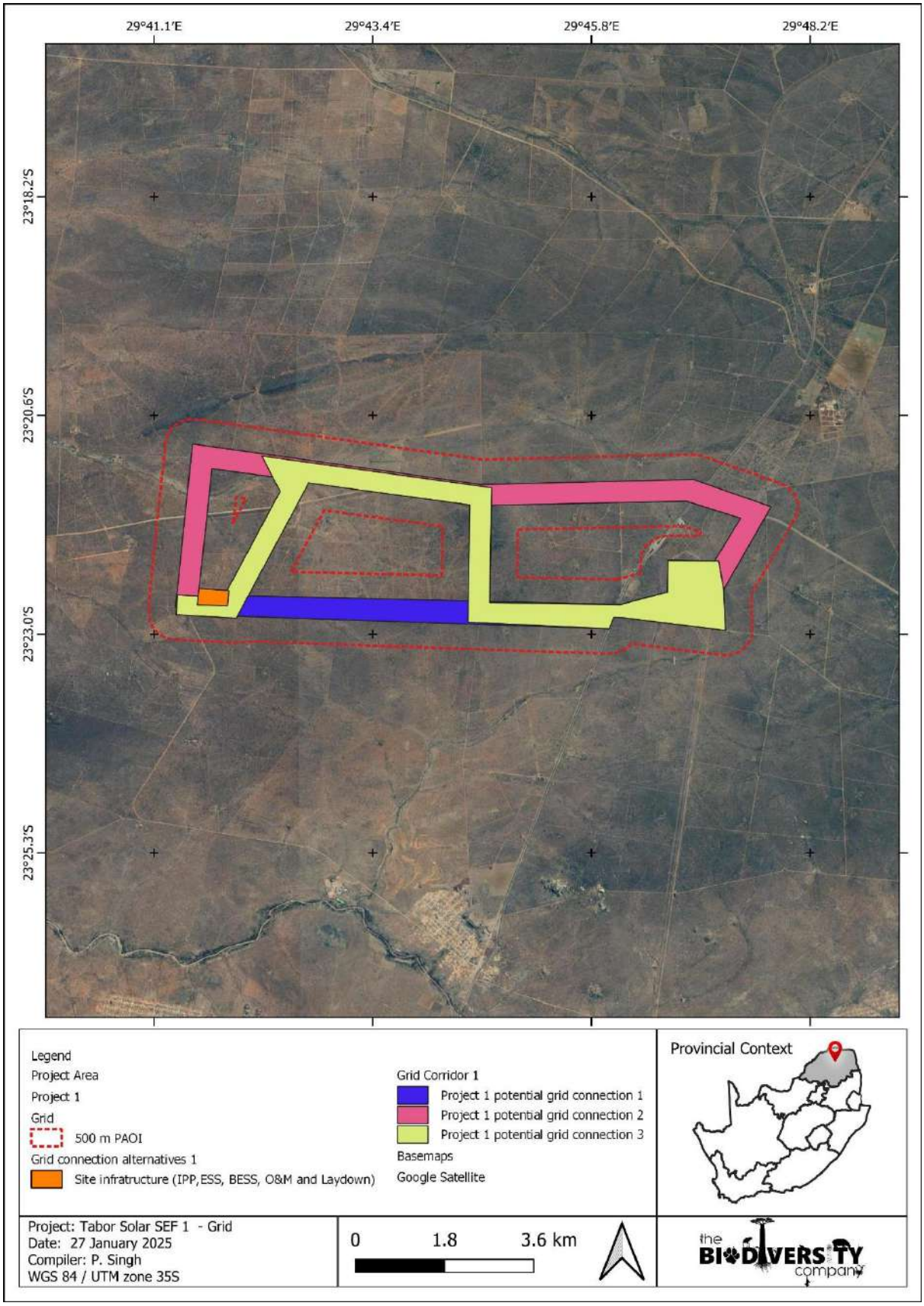


Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

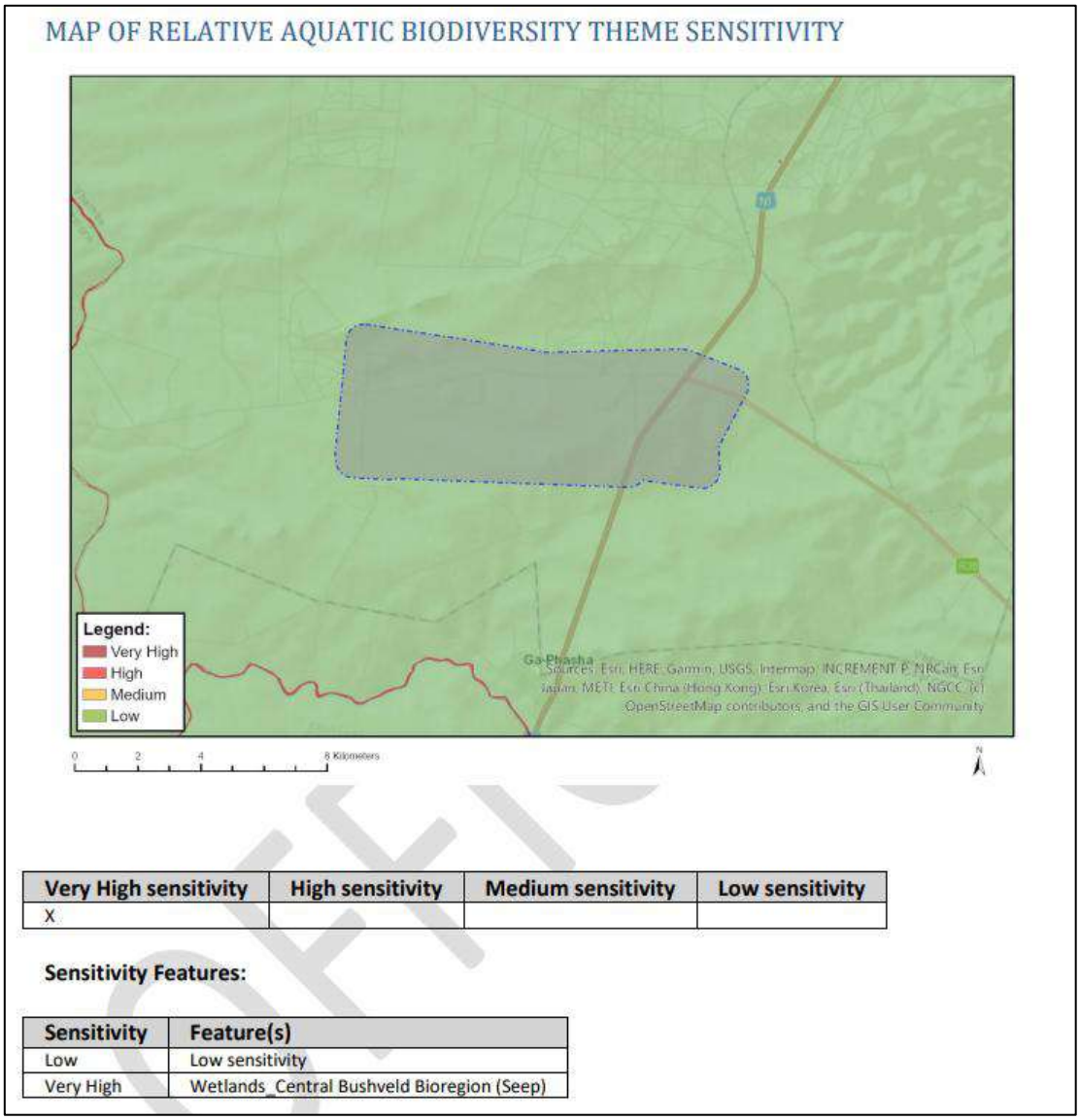
1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2. Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” and “Very High” sensitivity for the project area as presented in Figure 2-1. Note: due to an error in the screening tool, the polygon had to be filled and is therefore not representative of the actual PAOI and project area.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Wetlands_Central Bushveld Bioregion (Seep)

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River (Endangered) and a tributary of the Dwars River (Critically Endangered).
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA priority wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI traverses the proposed Ingwe Solar Power Plant.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributary of the Sand River;
    - Tributary of the Dwars River; and
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River, tributary of the Dwars River, as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI 1) westward, eventuating in the Sand River and 2) southward, eventuating in the Dwars River (which also confluences with the Sand River in the west). Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these

systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers) requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

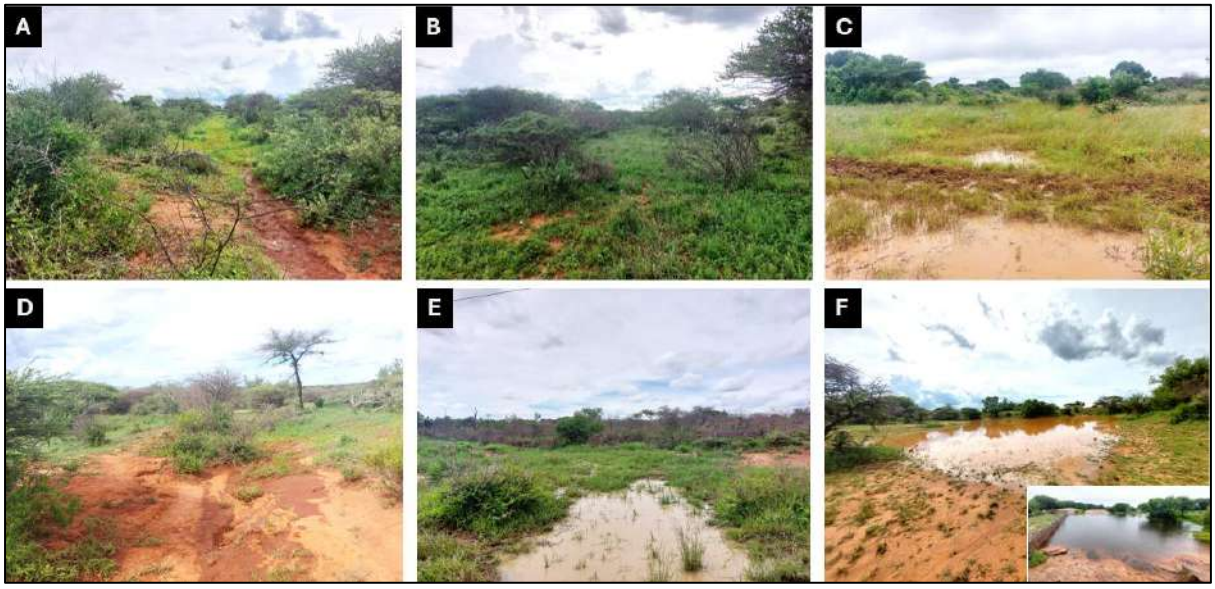


Figure 2-2 **Illustration of some of the watercourses (A-E) and the impoundment (F) within the project area and PAOI (January 2025)**

2.4 Ichthyofauna

Fish were collected using electrofishing, cast nets and visual observation techniques in all available biotopes. The fish species were then identified using a complete guide to the Freshwater Fishes of Southern Africa (Skelton, 2024). All fish were released at the point of capture. It should be noted that these expected species lists are compiled on a SQR basis by DWS (2014) and not on a site-specific basis. It is therefore highly unlikely that all the expected species will be present at every site in the SQR with habitat type and availability being the main driver of species present. Therefore, Table 2-2 should be viewed as a list of potential species rather than an expected species list. The conservational status of the fish species was assessed against the latest International Union for Conservation of Nature (IUCN) database (IUCN, 2025). A single hybrid fish species between *Oreochromus mossambicus* (Mozambique Tilapia) and *Oreochromus niloticus* (Nile Tilapia), was collected at site Dam 4. Hybridization has already been documented in the Limpopo River Catchment (IUCN, 2025). Although the potential species list indicates *Oreochromus mossambicus* (Mozambique Tilapia) to be present within the SQR, it is possible that the hybrid fish species was introduced into the impoundment (Dam 4). A photographic example of the fish species is presented in Table 2-3.

Table 2-2 Fish data collected during the 2025 study

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Clarias gariepinus	Sharptooth Catfish	LC	No
Enteromius paludinosus	Straightfin Barb	LC	No
Enteromius trimaculatus	Three Spotted Barb	LC	No
Pseudocrenilabrus philander	Southern Mouthbrooder	LC	No
Oreochromus mossambicus*	Mozambique Tilapia	VU	Yes

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Total Exotic Species Sampled			**1**
Total Indigenous Species Sampled			**1**

*IUCN: International Union for the Conservation of Nature
**Skelton (2024).
***Hybrid species
LC: Least Concern
VU: Vulnerable
Exotic species indicated in Red

Table 2-3 Photograph of the fish species collected during the 2025 study

Hybrid specimen

2.5 Results Summary

Only watercourses at an appreciable level of risk in relation to the proposed project and related activities were considered for assessment. Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within isolated pools and instream impoundments. The results are summarised in Table 2-4 below.

Table 2-4 Summary of the results (January 2025))

	Sand River Tributary 2 (Site S4, H12) and Drainage Area 5 (H11)	Dwars Tributary 1 (Site S19,& S16), Drainage Area 8 (Site S18) and Drainage Area 9 (Site S17 and Dam 3)	Drainage Area 4 (Site H2, H1, H2 Dam, F2, F1, Xstra D)	Drainage Area 6 (Site H9) and Drainage Area 7 (Site H10)	Drainage Area 3 (Site S10.3 and Dam 4)
Water Quality	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (S17)	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)	No signs of pollution, parameters suitable for tolerant aquatic organisms	No signs of pollution, parameters suitable for tolerant aquatic organisms (Dam 4)
Instream Ecological Category (IHI)	B	C	C	C	C
Riparian Ecological Category (IHI)	B	C	C	C	C
Aquatic Invertebrate Ecological Category	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Fish Community	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PES	**B (Largely Natural)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)
Management Objective	Maintain PES	Maintain PES	Maintain PES	Maintain PES	Maintain PES

2.6 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-3, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

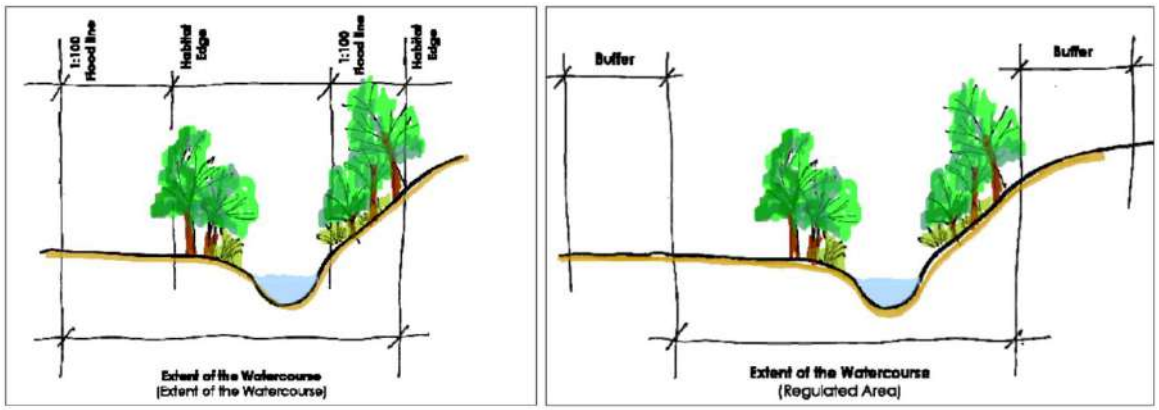


Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

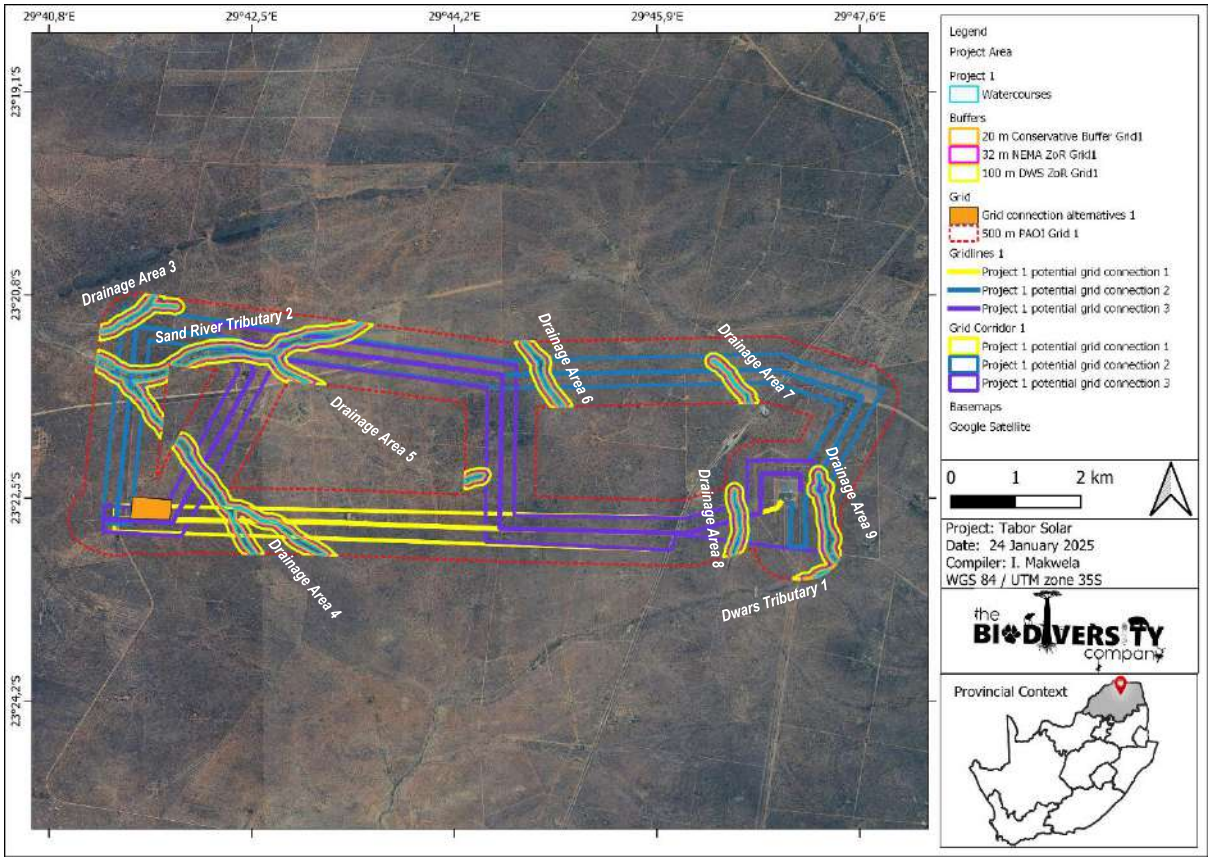
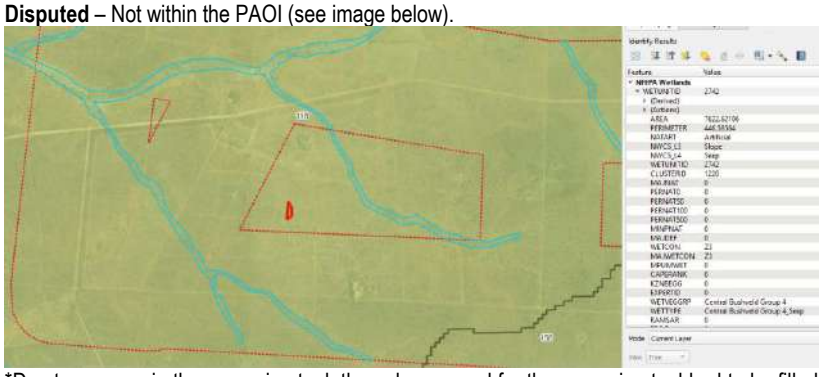


Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.7 Screening Tool Comparison

Table 2-5 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-5 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses
Very High	Wetlands_Central Bushveld Bioregion (Seep)	**Disputed** – Not within the PAOI (see image below).  *Due to an error in the screening tool, the polygon used for the screening tool had to be filled and is therefore not representative of the actual PAOI and project area

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

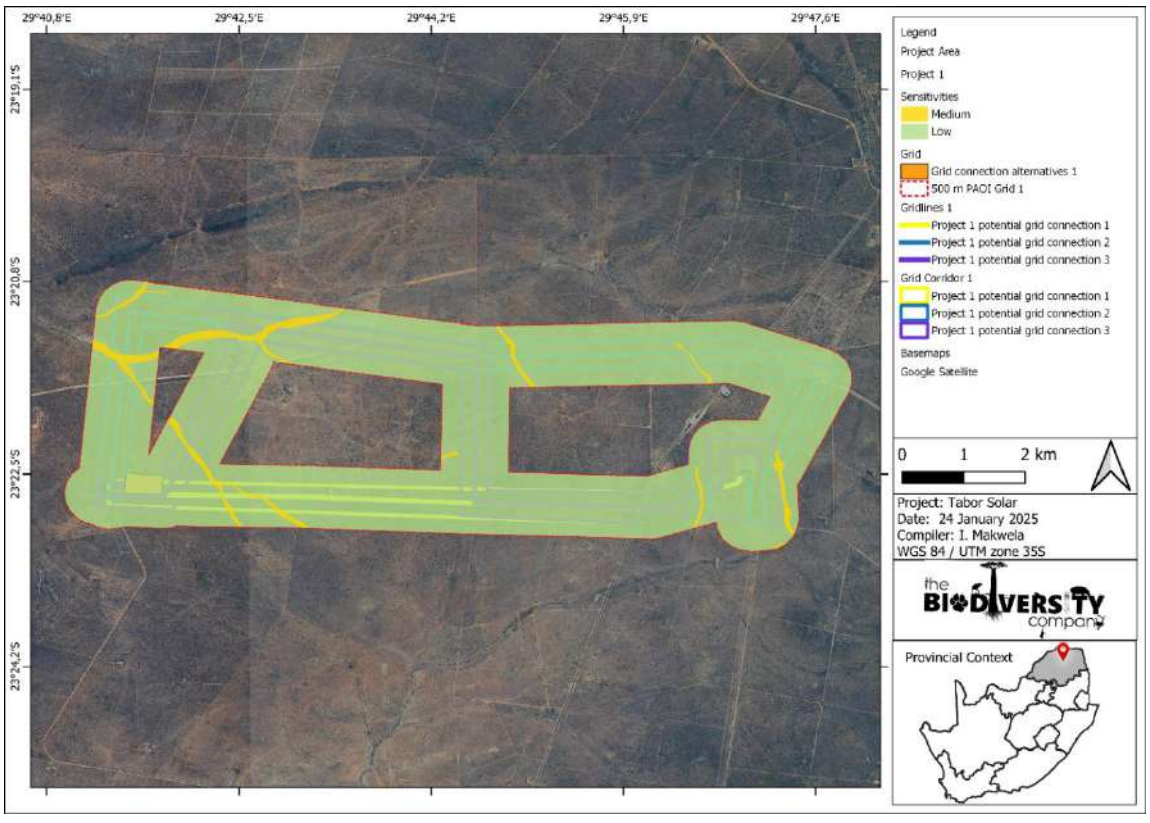


Figure 2-5 Aquatic delineated sensitivity for the PAOI

3. Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;
- A walkdown is recommended on the final layout to confirm that watercourses are adequately avoided, and that the smaller drainage features (regardless of how insignificant they may appear) will have adequate flow catering structures in place. This should be conducted prior to final design sign off and construction.

4. Conclusion

Based on the survey findings, the specialist disputes the “Low” and “Very High” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area, and the NFEPA non-priority seep wetland not occurring within the actual PAOI. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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Appendix A Specialist Declaration

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 2

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 2**
Specialist Theme	Aquatic Biodiversity SSVR
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 2 – Gridline
Report Version/Date	24/04/2025
Environmental Assessment Practitioner/Client	
Fieldwork	Charles de Beer (SACNASP 168416)
Report Writer	Prasheen Singh (SACNASP 116822)
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
OHL/OHPL	Overhead Line / Overhead Powerline
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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1. Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed gridlines associated with Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Gridline connecting the Tabor Solar 2 facility to the Tabor Main Transmission Substation (MTS)**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

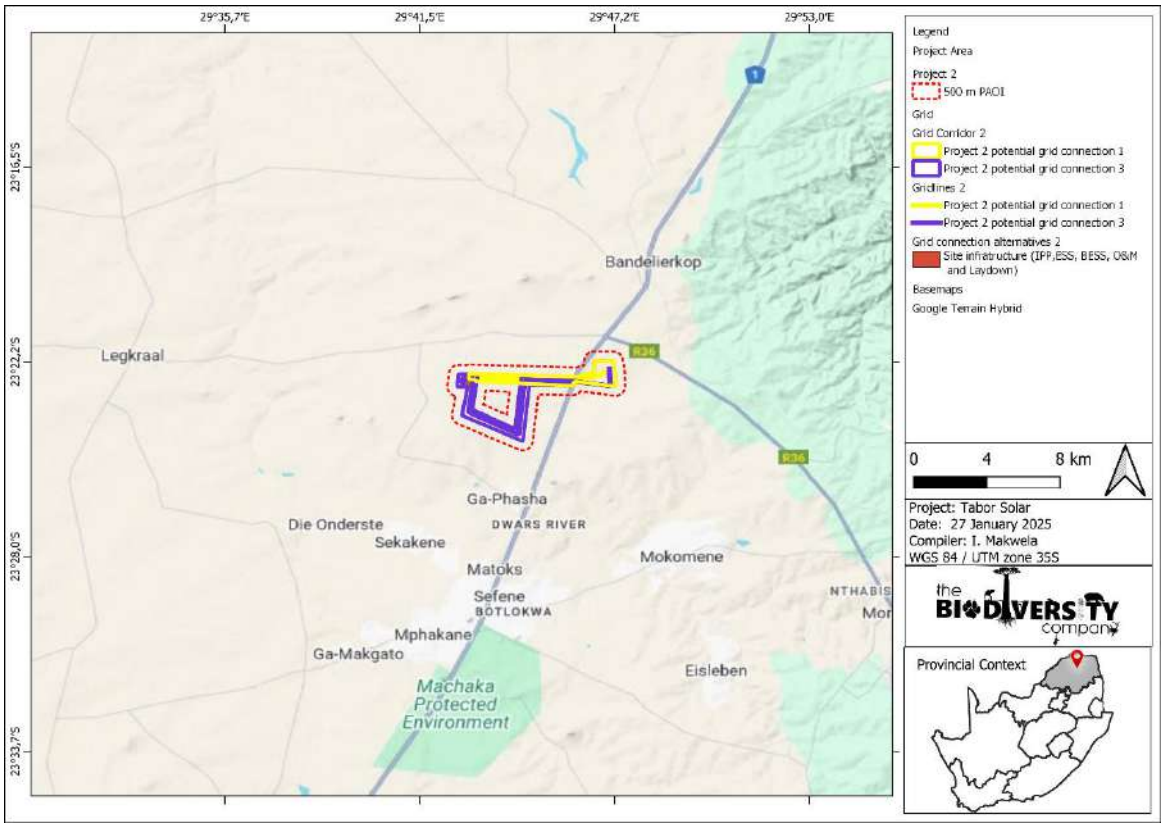

Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- **Onsite Switching Station (SS), adjacent to the IPP Substation.**
- **132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.**
- **Access Road to SS; and**
- **Maintenance access road below or adjacent to the power line.**

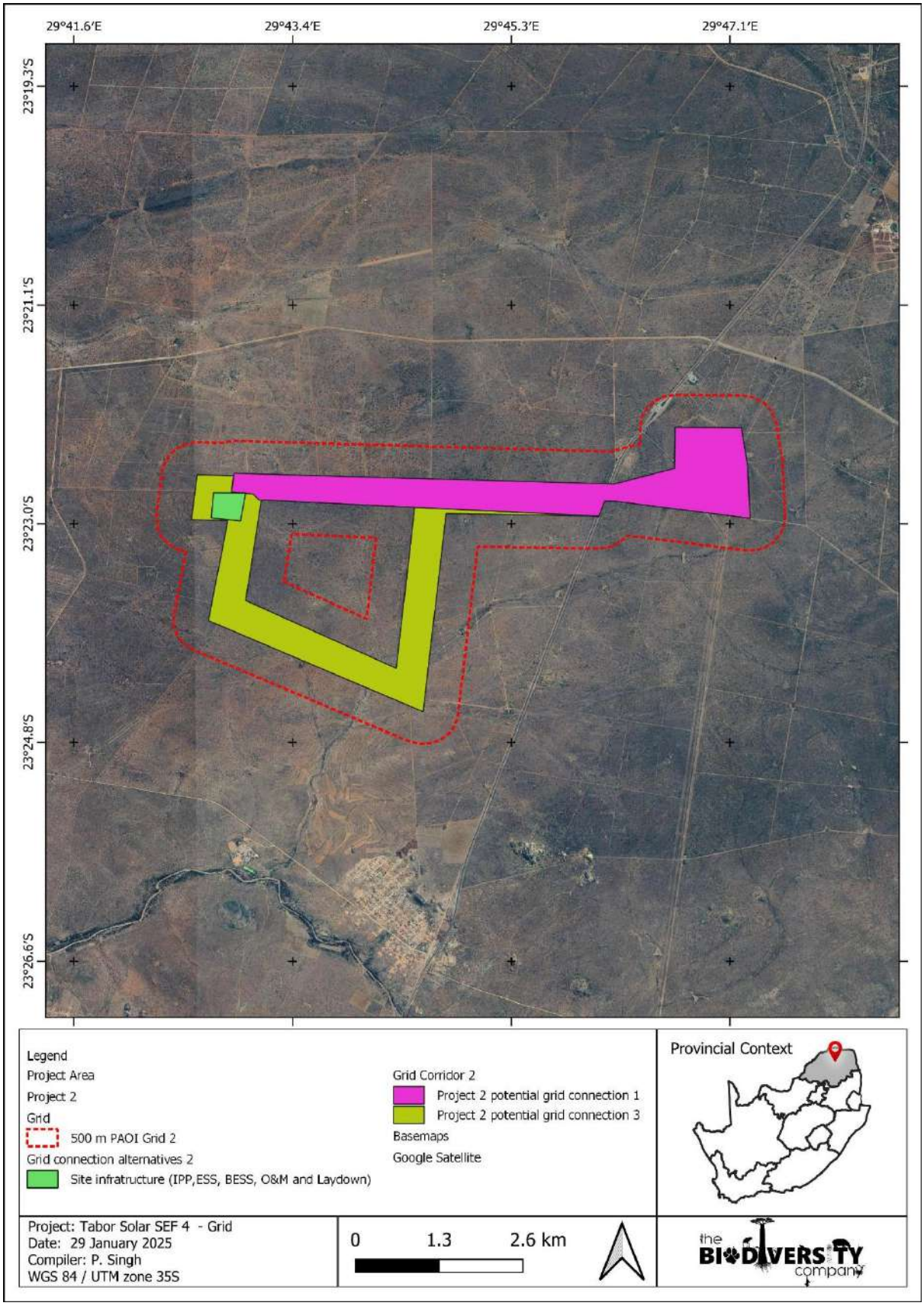

Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2. Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” sensitivity for the project area as presented in Figure 2-1. Note: due to an error in the screening tool, the polygon had to be filled and is therefore not representative of the actual PAOI and project area.

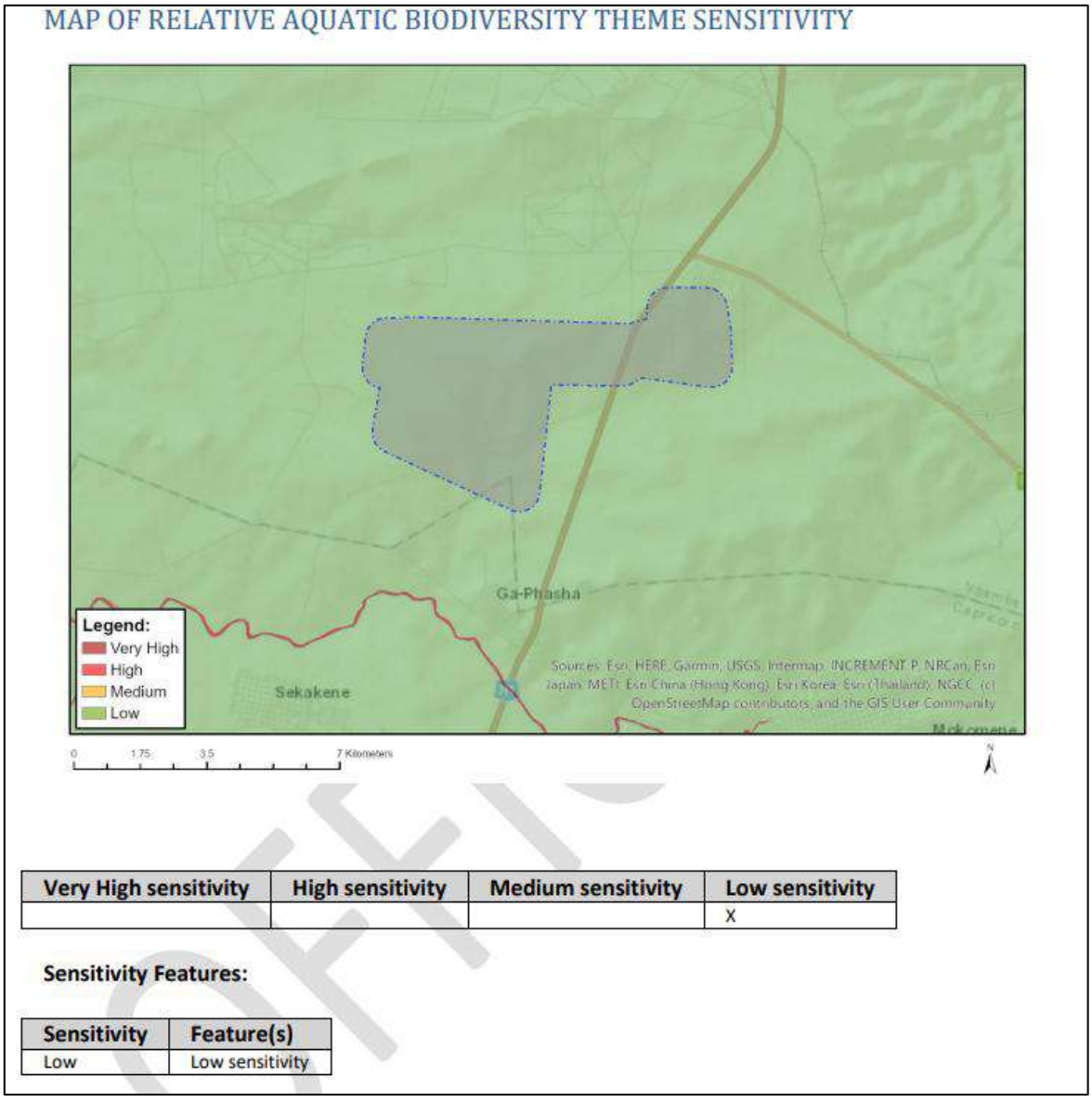

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River (Endangered) and a tributary of the Dwars River (Critically Endangered).
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA priority wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	Yes	The PAOI traverses the proposed Ingwe Solar Power Plant.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributary of the Sand River;
    - Tributary of the Dwars River; and
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River, tributary of the Dwars River, as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI 1) westward, eventuating in the Sand River and 2) southward, eventuating in the Dwars River (which also confluences with the Sand River in the west). Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these

systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers) requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

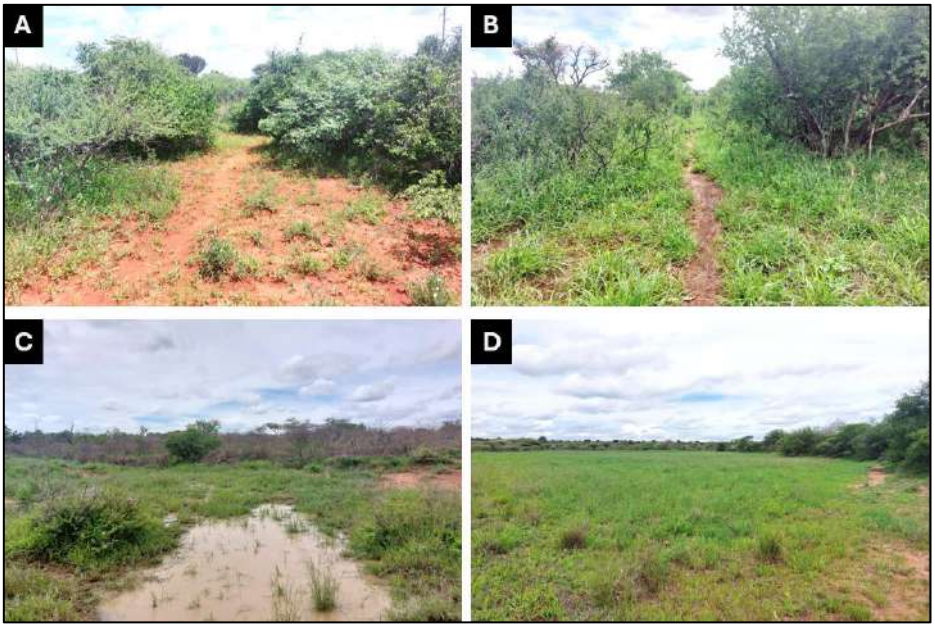

Figure 2-2 **Illustration of some of the watercourses (A-C) and the impoundment (D) within the project area and PAOI (January 2025)**

2.4 Results Summary

Only watercourses at an appreciable level of risk in relation to the proposed project and related activities were considered for assessment. Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within isolated pools and instream impoundments. The results are summarised in Table 2-2 below.

Table 2-2 ***Summary of the results (January 2025))***

	Drainage Area 5 (H11)	**Dwars Tributary 1 (Site S19,& S16), Drainage Area 8 (Site S18) and Drainage Area 9 (Site S17 and Dam 3)**	**Drainage Area 4 (Site, F2, F1, Xstra D)**
Water Quality	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (S17)	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)
Instream Ecological Category (IHI)	B	C	C
Riparian Ecological Category (IHI)	B	C	C
Aquatic Invertebrate Ecological Category	Not Applicable	Not Applicable	Not Applicable
Fish Community	Not Applicable	Not Applicable	Not Applicable
PES	**B (Largely Natural)**	**C (Moderately Modified)**	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)
Management Objective	Maintain PES	Maintain PES	Maintain PES

2.5 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-3, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

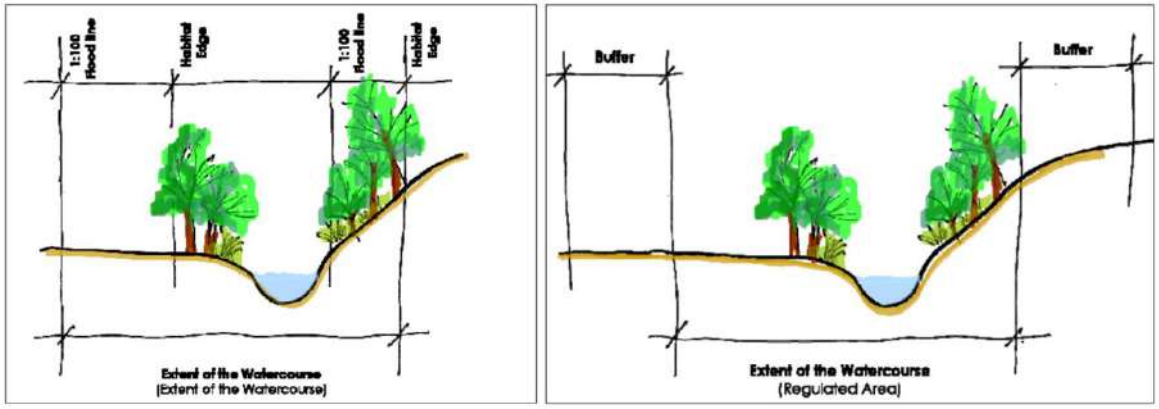

Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

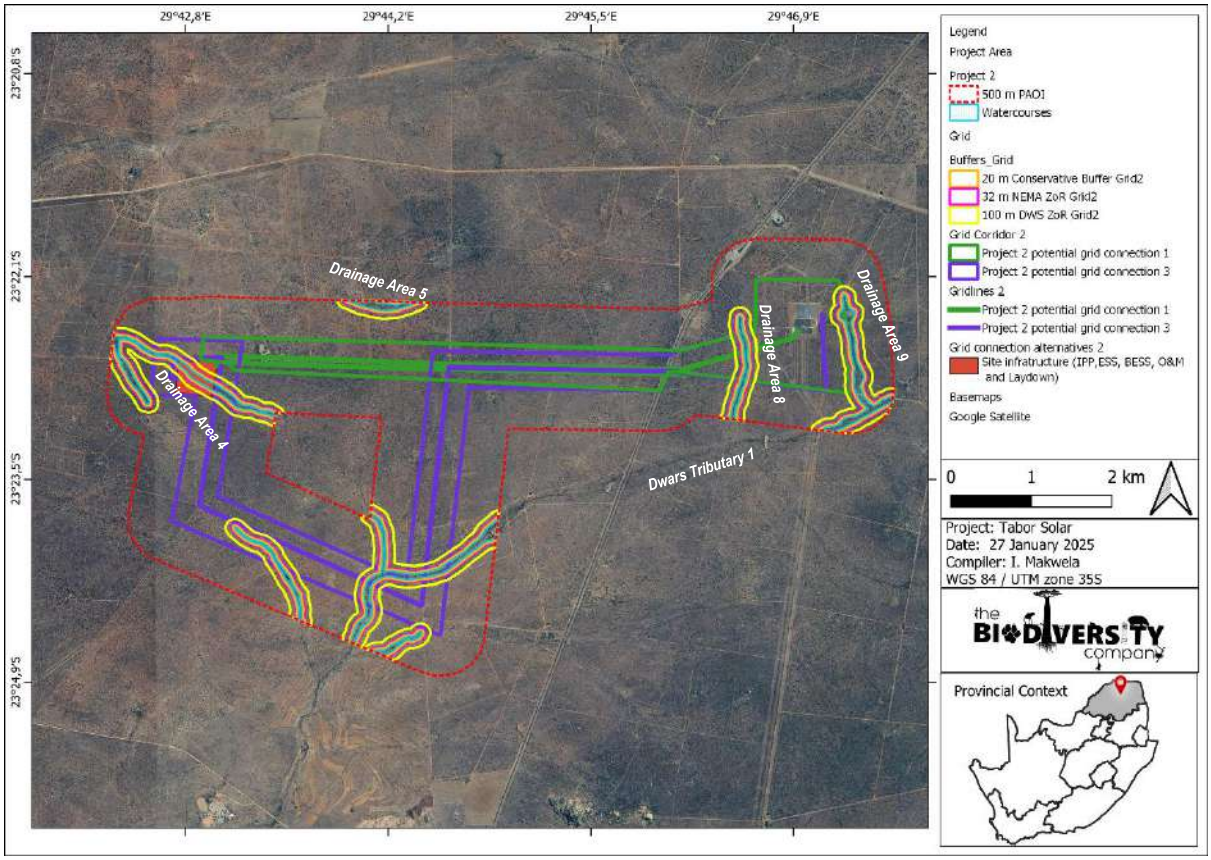

Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.6 Screening Tool Comparison

Table 2-3 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-3 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

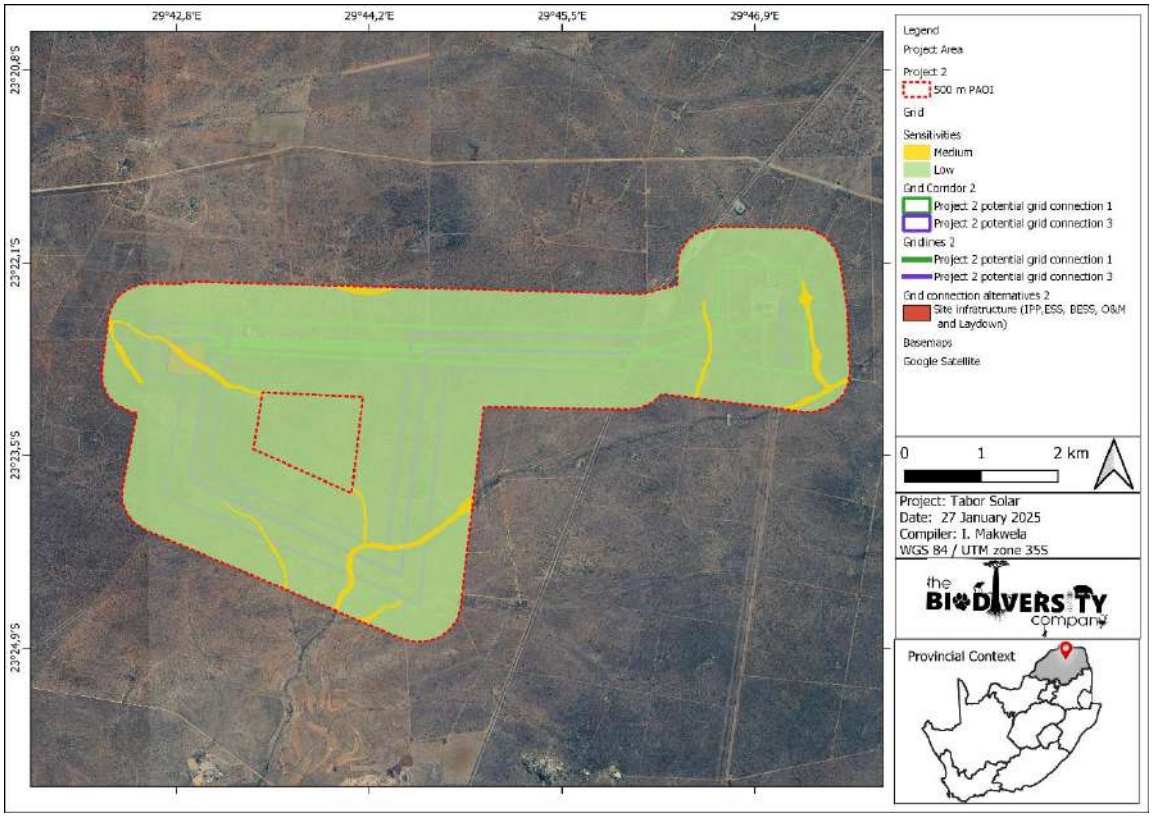

Figure 2-5 Aquatic delineated sensitivity for the PAOI

3. Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;
- A walkdown is recommended on the final layout to confirm that watercourses are adequately avoided, and that the smaller drainage features (regardless of how insignificant they may appear) will have adequate flow catering structures in place. This should be conducted prior to final design sign off and construction.

4. Conclusion

Based on the survey findings, the specialist disputes the “Low” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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Appendix A Specialist Declaration

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 3

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

The Biodiversity Company

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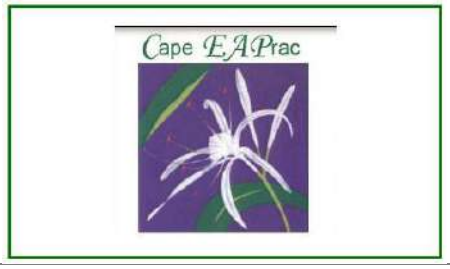
Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 3**
Specialist Theme	Aquatic Biodiversity SSVR
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 3 – Gridline
Report Version/Date	24/04/2025
Environmental Assessment Practitioner/Client	
Fieldwork	Charles de Beer (SACNASP 168416) 
Report Writer	Prasheen Singh (SACNASP 116822) 
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
OHL/OHPL	Overhead Line / Overhead Powerline
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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1. Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed gridlines associated with Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Gridline connecting the Tabor Solar 3 facility to the Tabor Main Transmission Substation (MTS)**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

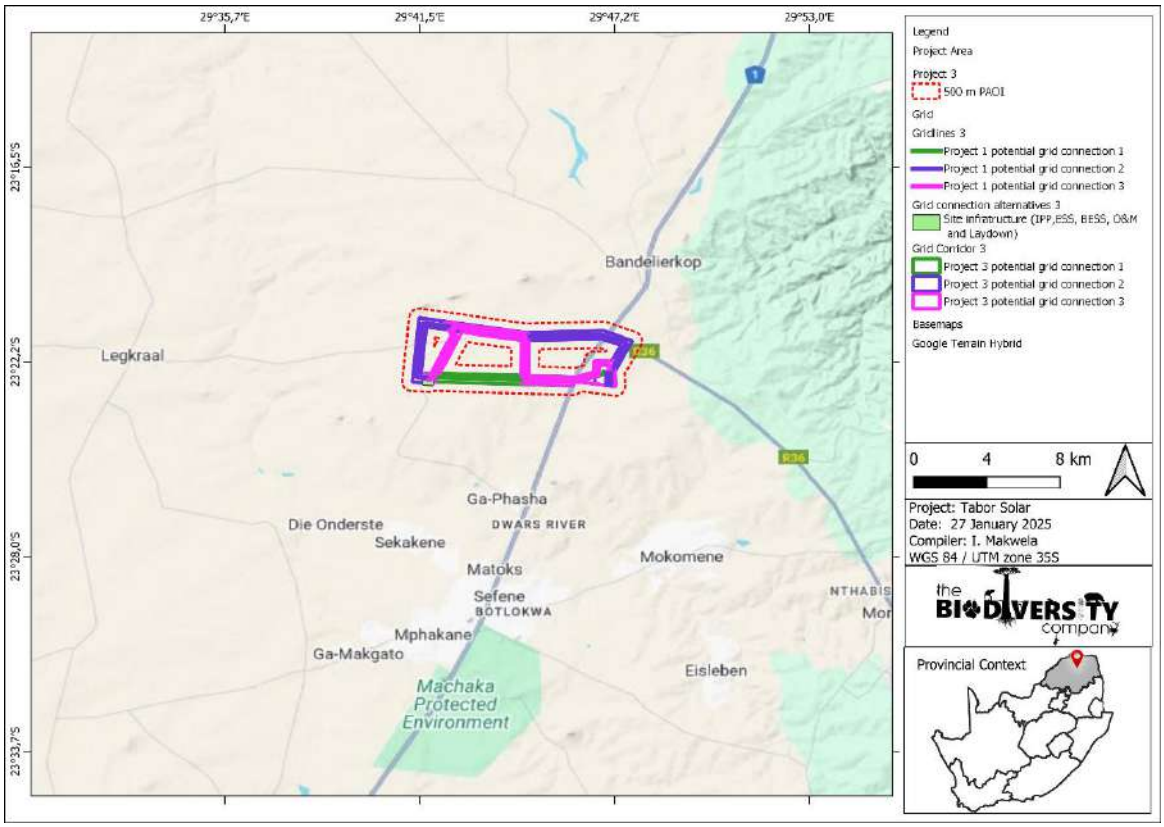


Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- **Onsite Switching Station (SS), adjacent to the IPP Substation.**
- **132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.**
- **Access Road to SS; and**
- **Maintenance access road below or adjacent to the power line.**

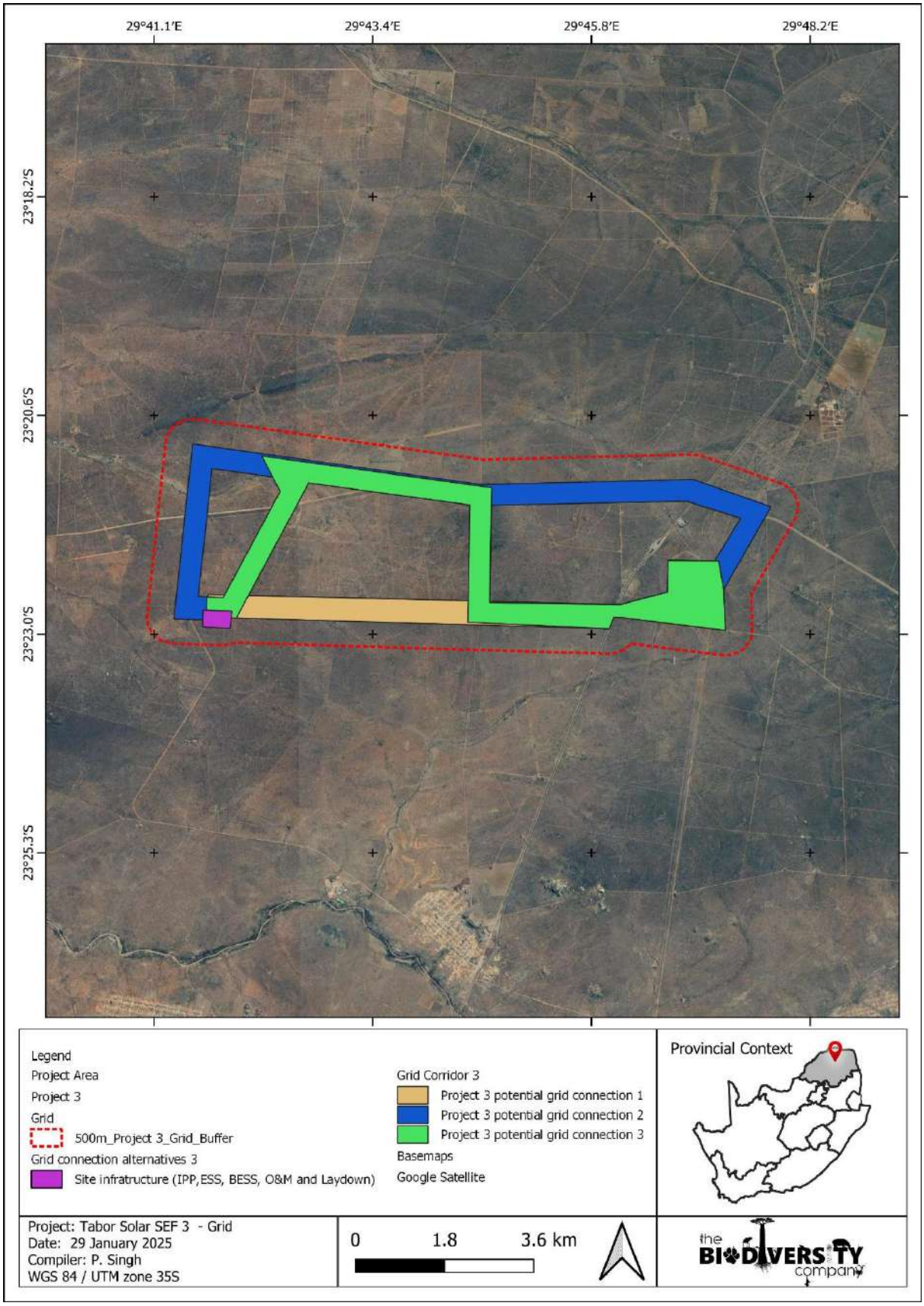


Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

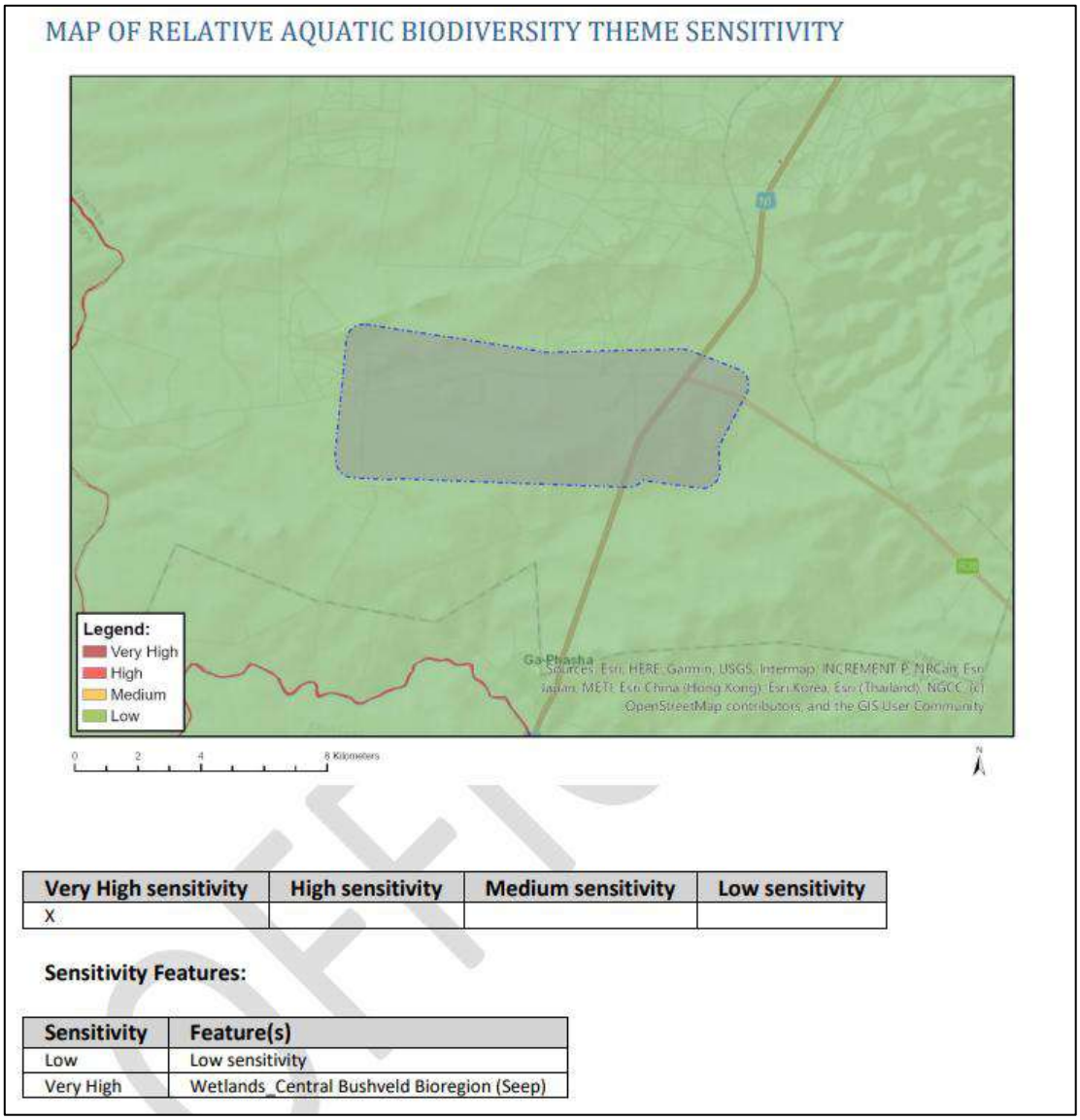
1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2. Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” and “Very High” sensitivity for the project area as presented in Figure 2-1. Note: due to an error in the screening tool, the polygon had to be filled and is therefore not representative of the actual PAOI and project area.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Wetlands_Central Bushveld Bioregion (Seep)

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River (Endangered) and a tributary of the Dwars River (Critically Endangered).
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA priority wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI traverses the proposed Ingwe Solar Power Plant.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributary of the Sand River;
    - Tributary of the Dwars River; and
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River, tributary of the Dwars River, as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI 1) westward, eventuating in the Sand River and 2) southward, eventuating in the Dwars River (which also confluences with the Sand River in the west). Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these

systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers) requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

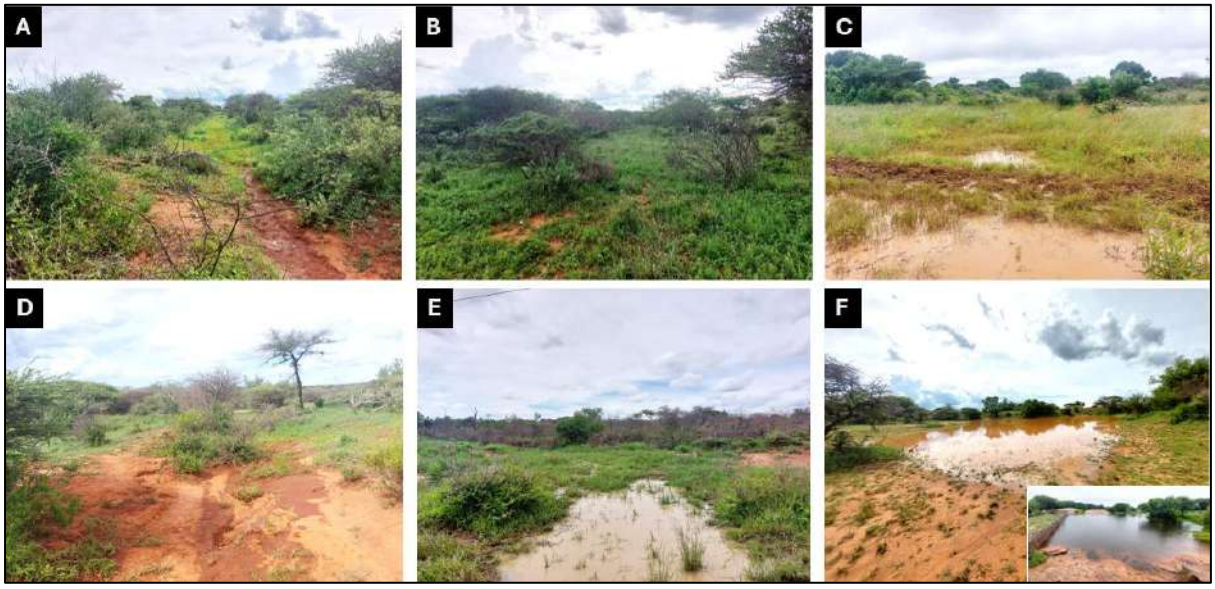


Figure 2-2 **Illustration of some of the watercourses (A-E) and the impoundment (F) within the project area and PAOI (January 2025)**

2.4 Ichthyofauna

Fish were collected using electrofishing, cast nets and visual observation techniques in all available biotopes. The fish species were then identified using a complete guide to the Freshwater Fishes of Southern Africa (Skelton, 2024). All fish were released at the point of capture. It should be noted that these expected species lists are compiled on a SQR basis by DWS (2014) and not on a site-specific basis. It is therefore highly unlikely that all the expected species will be present at every site in the SQR with habitat type and availability being the main driver of species present. Therefore, Table 2-2 should be viewed as a list of potential species rather than an expected species list. The conservational status of the fish species was assessed against the latest International Union for Conservation of Nature (IUCN) database (IUCN, 2025). A single hybrid fish species between *Oreochromus mossambicus* (Mozambique Tilapia) and *Oreochromus niloticus* (Nile Tilapia), was collected at site Dam 4. Hybridization has already been documented in the Limpopo River Catchment (IUCN, 2025). Although the potential species list indicates *Oreochromus mossambicus* (Mozambique Tilapia) to be present within the SQR, it is possible that the hybrid fish species was introduced into the impoundment (Dam 4). A photographic example of the fish species is presented in Table 2-3.

Table 2-2 Fish data collected during the 2025 study

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Clarias gariepinus	Sharptooth Catfish	LC	No
Enteromius paludinosus	Straightfin Barb	LC	No
Enteromius trimaculatus	Three Spotted Barb	LC	No
Pseudocrenilabrus philander	Southern Mouthbrooder	LC	No
Oreochromus mossambicus*	Mozambique Tilapia	VU	Yes

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Total Exotic Species Sampled			**1**
Total Indigenous Species Sampled			**1**

*IUCN: International Union for the Conservation of Nature
**Skelton (2024).
***Hybrid species
LC: Least Concern
VU: Vulnerable
Exotic species indicated in Red

Table 2-3 Photograph of the fish species collected during the 2025 study

Hybrid specimen

2.5 Results Summary

Only watercourses at an appreciable level of risk in relation to the proposed project and related activities were considered for assessment. Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within isolated pools and instream impoundments. The results are summarised in Table 2-4 below.

Table 2-4 Summary of the results (January 2025))

	Sand River Tributary 2 (Site S4, H12) and Drainage Area 5 (H11)	Dwars Tributary 1 (Site S19,& S16), Drainage Area 8 (Site S18) and Drainage Area 9 (Site S17 and Dam 3)	Drainage Area 4 (Site H2, H1, H2 Dam, F2, F1, Xstra D)	Drainage Area 6 (Site H9) and Drainage Area 7 (Site H10)	Drainage Area 3 (Site S10.3 and Dam 4)
Water Quality	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (S17)	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)	No signs of pollution, parameters suitable for tolerant aquatic organisms	No signs of pollution, parameters suitable for tolerant aquatic organisms (Dam 4)
Instream Ecological Category (IHI)	B	C	C	C	C
Riparian Ecological Category (IHI)	B	C	C	C	C
Aquatic Invertebrate Ecological Category	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Fish Community	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PES	**B (Largely Natural)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)
Management Objective	Maintain PES	Maintain PES	Maintain PES	Maintain PES	Maintain PES

2.6 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-3, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

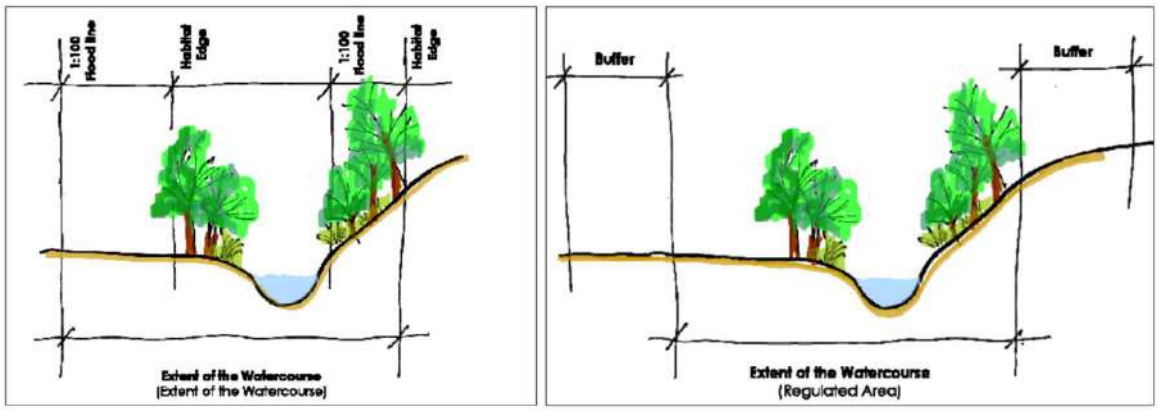


Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

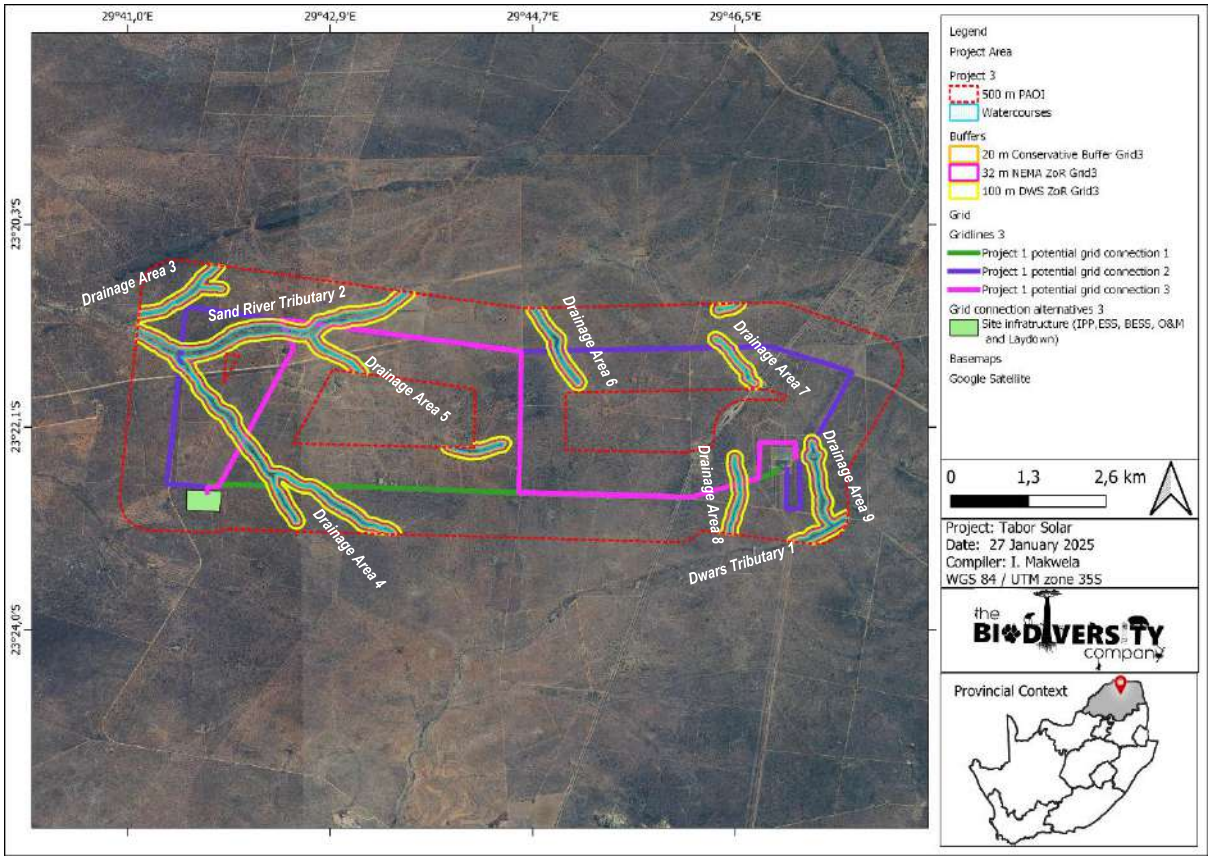
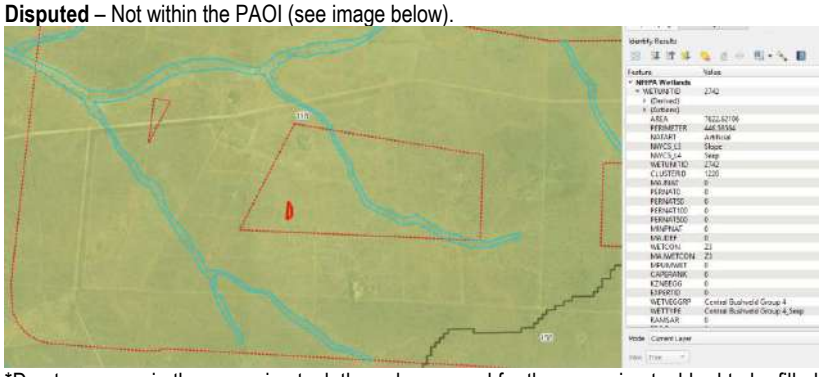


Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.7 Screening Tool Comparison

Table 2-5 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-5 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses
Very High	Wetlands_Central Bushveld Bioregion (Seep)	**Disputed** – Not within the PAOI (see image below).  *Due to an error in the screening tool, the polygon used for the screening tool had to be filled and is therefore not representative of the actual PAOI and project area

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

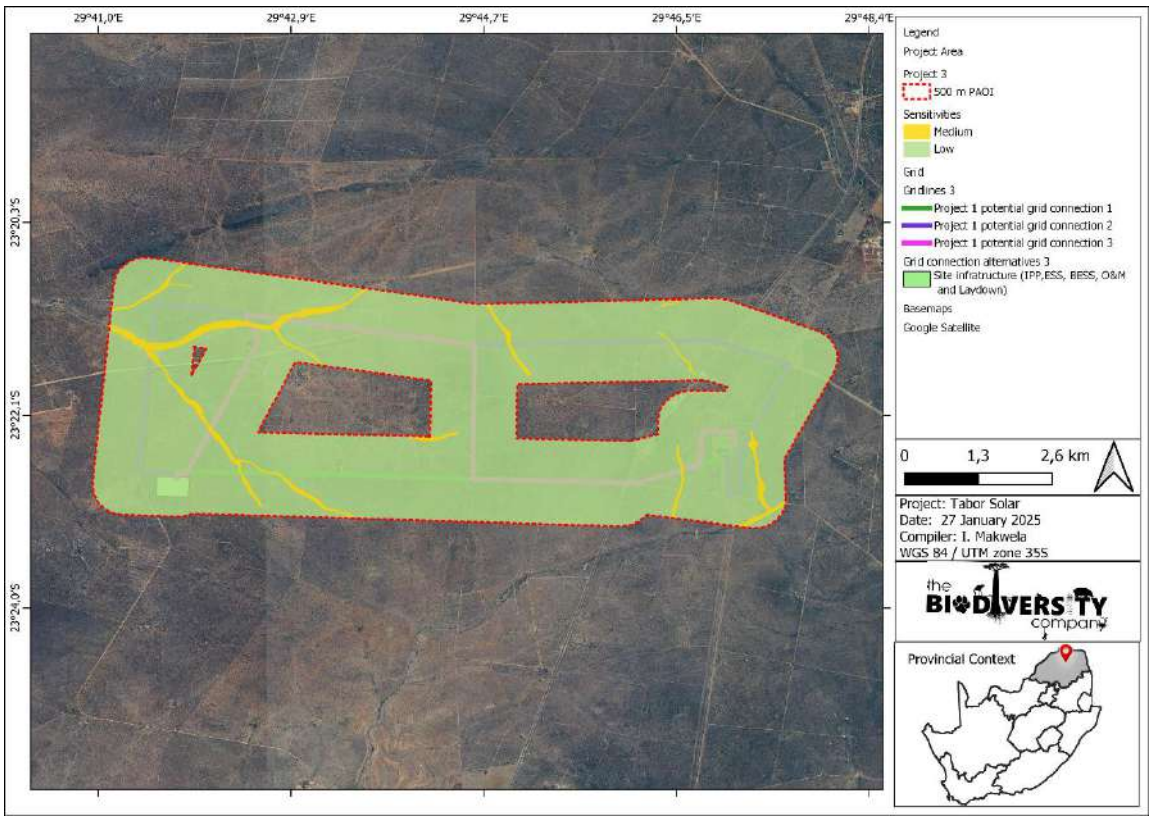


Figure 2-5 Aquatic delineated sensitivity for the PAOI

3. Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;
- A walkdown is recommended on the final layout to confirm that watercourses are adequately avoided, and that the smaller drainage features (regardless of how insignificant they may appear) will have adequate flow catering structures in place. This should be conducted prior to final design sign off and construction.

4. Conclusion

Based on the survey findings, the specialist disputes the “Low” and “Very High” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area, and the NFEPA non-priority seep wetland not occurring within the actual PAOI. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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Appendix A Specialist Declaration

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025

AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 4

Makhado Local Municipality, Vhembe District Municipality, Limpopo Province, South Africa

Report Date: 24/04/2025

Prepared by:

The Biodiversity Company

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED GRIDLINE ASSOCIATED WITH THE TABOR SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY 4**
Specialist Theme	Aquatic Biodiversity SSVR
Project Reference	Tabor Solar Photovoltaic (PV) Energy Facility 4 – Gridline
Report Version/Date	24/04/2025
Environmental Assessment Practitioner/Client	Cape EAPrac
Fieldwork	Charles de Beer (SACNASP 168416)
Report Writer	Prasheen Singh (SACNASP 116822)
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principles of science.

Abbreviations

Abbreviation	Definition
ASPT	Average Score per Recorded Taxon
CBA	Critical Biodiversity Area
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
ETS	Ecosystem threat status
IHI	Index of Habitat Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concerned
MASL	Meters Above Sea Level
NEMA	The National Environmental Management Act
NFEPA (FEPA)	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
NWBEST	National Web-Based Environmental Screening Tool
OHL/OHPL	Overhead Line / Overhead Powerline
PAOI	Project Area Of Influence
PES	Present Ecological State
RQO's	Resource Quality Objectives
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SCC	Species of Conservation Concern
SQR	Sub Quaternary Reach
TBC	The Biodiversity Company
TWQR	Target Water Quality Range
VU	Vulnerable
WMA	Water Management Area

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Figures

1. Introduction

1.1 Background

The Biodiversity Company was appointed to conduct an Aquatic Biodiversity Site Sensitivity Verification (SSVR) for proposed gridlines associated with Tabor Solar Photovoltaic (PV) Facilities. Four facilities are proposed for the Tabor Solar cluster, with associated grid connection lines for each facility. This report assesses the **Gridline connecting the Tabor Solar 4 facility to the Tabor Main Transmission Substation (MTS)**. The other facilities and associated gridlines are assessed separately. The SSVR is required to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Department of Forestry; Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool. The proposed Project Area and 500 m Project Area of Influence (PAOI) is located approximately 40 km south of Makhado, and 8.5 km southwest of Bandelierkop, Limpopo Province, South Africa (Figure 1-1). The spatial layout of the infrastructure is presented in Figure 1-2 below.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (amended by GNR 326, 7 April 2017 and GNR. 517, 11 June 2021) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities at a scoping level, enabling informed decision making.

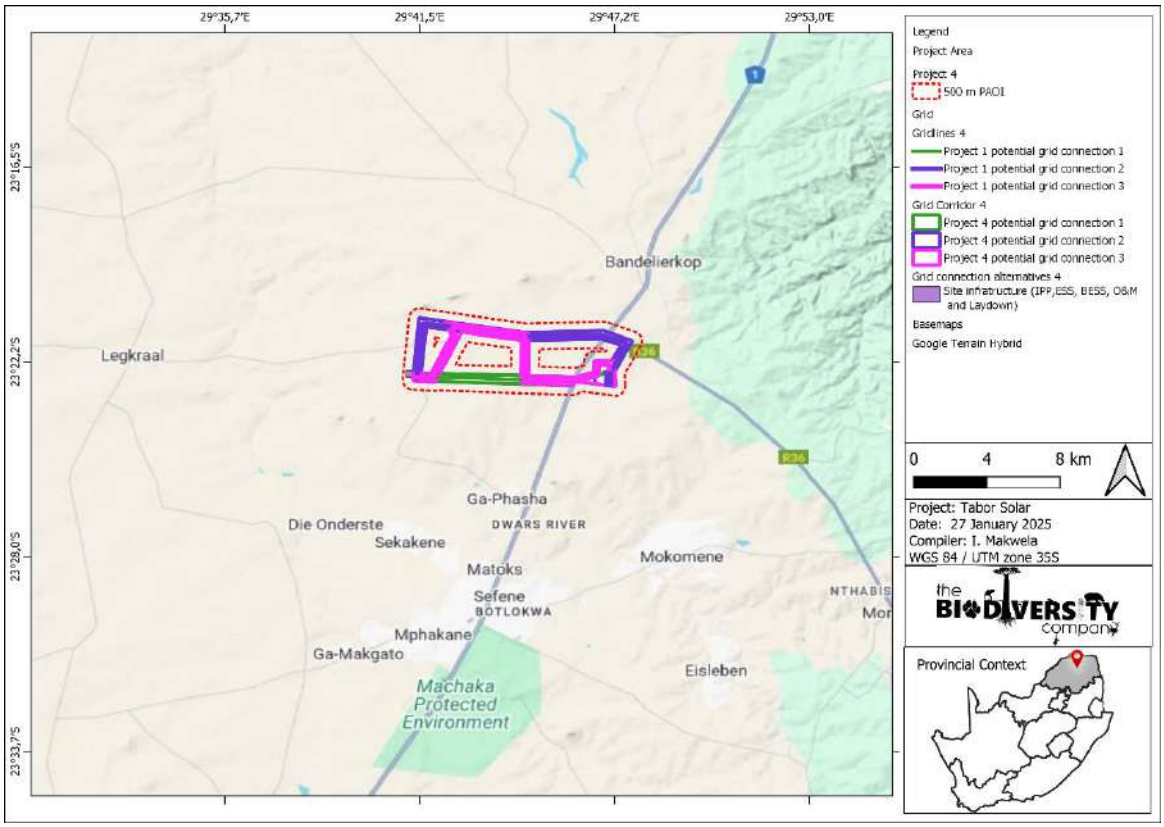


Figure 1-1 Locality of the project area and PAOI

1.2 Project Description

The Tabor Solar Cluster is to be divided into four (4x) PV projects (average 160 MW each), with each project to obtain a standalone Environmental Authorisation. Each solar project will have its own grid connection i.e. four (4x) grid connections, although routing may be similar for parts of the grid lines, to also obtain its own standalone Environmental Authorisation. The environmental application process will therefore consist of eight (8x) applications consisting of four (4x) Environmental Impact Assessments (EIAs) for the solar facilities and four (4x) Basic Assessments (BAs) for the grid connections. Basic preliminary design details for each of the four Solar PV project include:

- Solar Field:
    - Solar Arrays: PV modules;
    - Single axis tracking technology maximum height of 5 m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters;
        - Lithium Ion battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System; and
        - Energy Management System.
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area); and
    - O&M buildings, store.
- Project IPP Substation;
    - 132 kV substation 200 m x 200 m;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;

  - MV collector switchgear buildings;
  - Compensation equipment (Filters capacitors reactors statcoms);

- AC coupled BESS installation (400 m x 400 m) at project substation and laydown area:
  - Solid Sate Battery technology - either Lithium-on or Sodium Sulphide (NaS);
  - Battery Cells, Modules, Racks and containers;
  - Power Conversion Equipment;
  - Battery Management System;
  - Energy Management System;
  - MV transformers;
  - MV cabling and collector stations;
  - Fencing;
  - Offices, workshop; and
  - Fire Protection systems.

The four (4x) grid connection corridors for each project (which will be handed over to Eskom post-construction, may include:

- **Onsite Switching Station (SS), adjacent to the IPP Substation.**
- **132 kV Overhead Power Line (OHPL) – 30 m height from the switching station to the existing Eskom Tabor Substation.**
- **Access Road to SS; and**
- **Maintenance access road below or adjacent to the power line.**

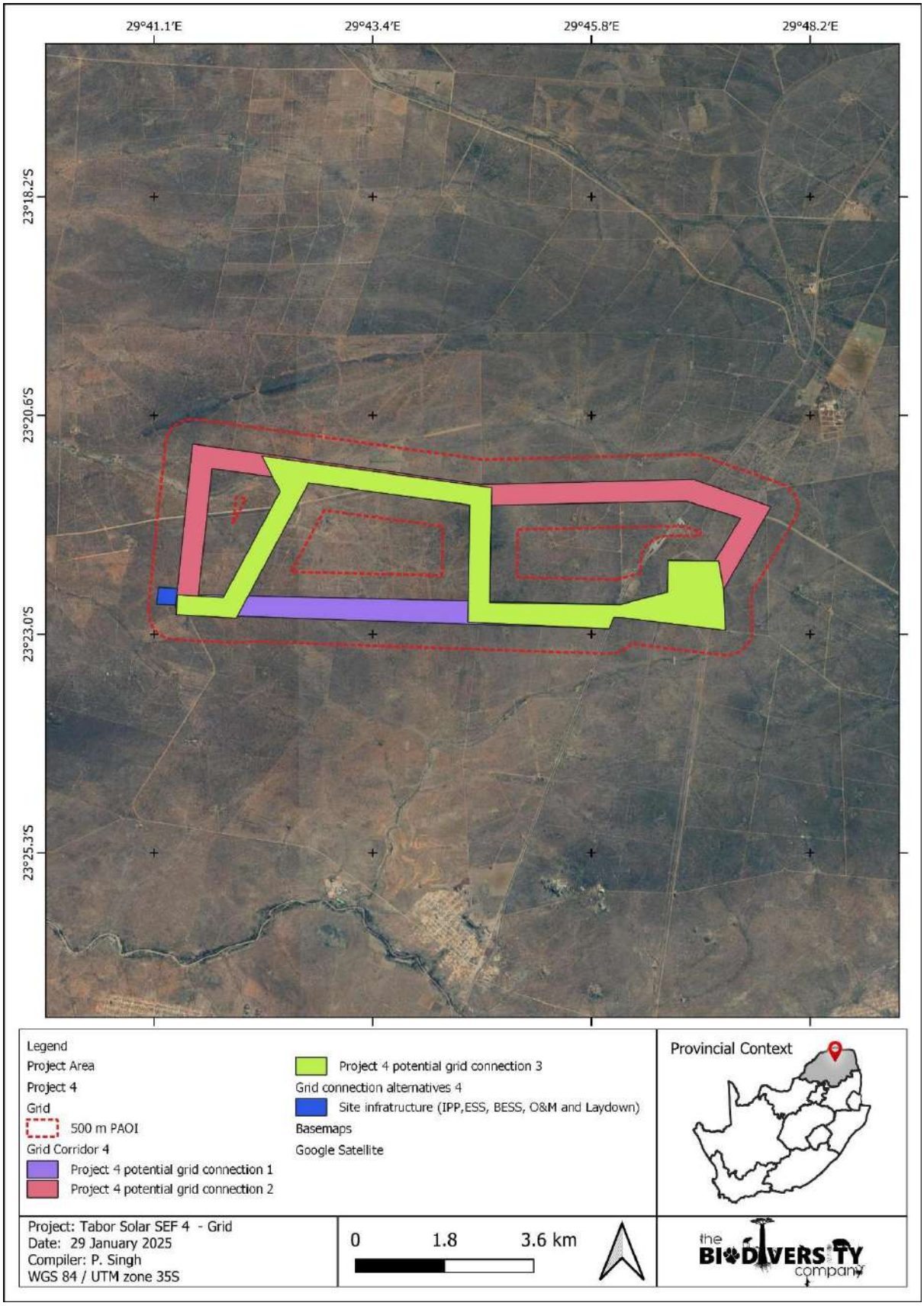


Figure 1-2 Spatial layout of the proposed project infrastructure

1.3 Approach

In line with the minimum requirements for aquatic biodiversity surveys a single field survey for the project area was undertaken on the 6th to 9th of January 2025 (summer) to identify the presence and condition of freshwater resources and to delineate their spatial extents. The survey constituted a wet season/high flow assessment. Seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive. A verification report has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020).

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing and it is assumed that all this information is relevant and accurate;
- It is assumed that the extent of the project area provided to the specialist is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Standard aquatic methodologies that require presence of water could not be conducted due to the ephemeral nature of the watercourses within the PAOI;
- The survey was limited to sites that were accessible;
- A single-season survey was conducted for the respective study, which would constitute a wet season/high flow survey. Thus, temporal trends were not investigated. Despite this it is the specialist's opinion that the findings are conclusive, and no further fieldwork would be required; and
- The GPS used for water resource delineations is accurate to five meters. Therefore, the delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The reporting approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for Environmental Authorisation" (Reporting Criteria). The legislation, policies and guidelines for the project area are listed below in Table 1-1 but may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	National Environmental Management Act (Act 107 of 1998) (NEMA)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	NEMA Assessment Protocol (March 2020)	The minimum criteria for reporting.
	NEMA Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Water Act (Act 36 of 1998)	The regulation of water use.
	NWA - GN4167 of GG 49833 of 8th Dec 2023	General Authorisations in term of Section 39 of the National Water Act 36 of 1998 for Water Uses as defined in Section 21 (c) and (i)
Provincial	Limpopo Environmental Management Act (No. 7 of 2003)	An Act to consolidate and amend the environmental legislation of or assigned to the Province for matters incidental thereto, making provision with respect to the protection and conservation of the environment. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Limpopo Conservation Plan (2018)	To provide for the management and conservation of the province's biophysical environment and protected areas.

1.6 National Water Act

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource.
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

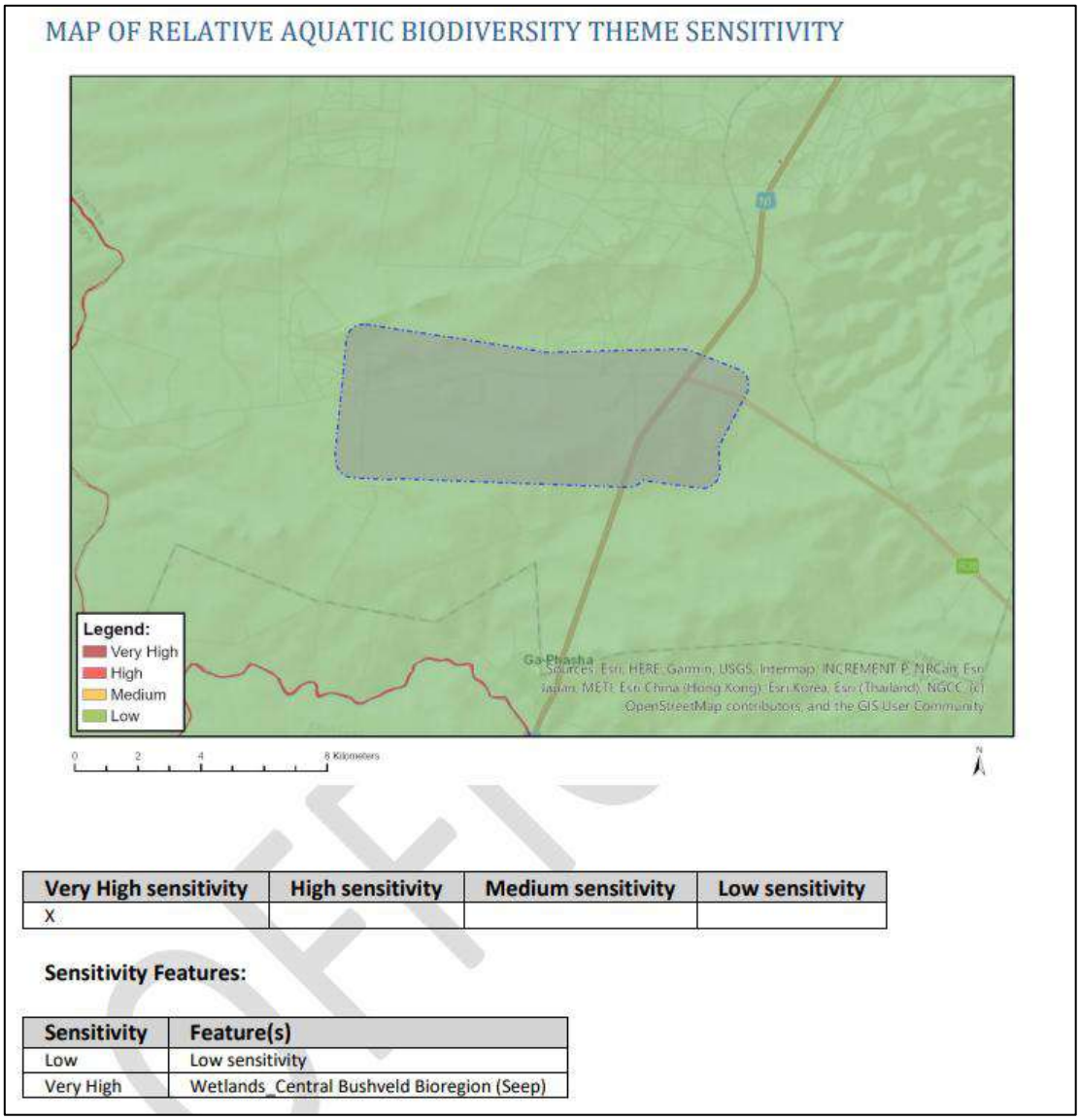
1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2. Site Sensitivity Verification

2.1 Environmental Screening Tool

This approach has also taken cognisance of the recently published Minimum Criteria for Reporting on Identified Environmental Themes (DWS, 2020). The aquatic biodiversity theme sensitivity as indicated in the screening tool report indicates “Low” and “Very High” sensitivity for the project area as presented in Figure 2-1. Note: due to an error in the screening tool, the polygon had to be filled and is therefore not representative of the actual PAOI and project area.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Wetlands_Central Bushveld Bioregion (Seep)

Figure 2-1 Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

2.2 Desktop Ecologically Important Landscape Features

The following spatial features describes the general area and associated freshwater resources (ecologically important landscape features). This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the South African National Biodiversity Institute (SANBI). The desktop analysis and their relevance to this project are summarised in Table 2-1. The relevance is based on the proximity and/or overlap of the project area as well as the 500 m PAOI.

Table 2-1 Summary of the relevance of the proposed project to ecologically important landscape features and general spatial features

Desktop Information Considered	Relevance	Reasoning
Strategic Water Source Areas (SWSAs)	No	The PAOI is not located within any SWSAs for groundwater or surface water.
Conservation Plan	Yes	Whilst the PAOI does not overlap with any Critical Biodiversity Area, the entire PAOI overlaps with Other Natural Areas' (ONAs).
National Biodiversity Assessment (NBA)	No	The PAOI does not traverse any NBA Wetlands or NBA Rivers.
Aquatic Ecosystem Threat Status	Yes	Whilst the PAOI does not overlap with any threatened watercourses, it is drained by a tributary of the Sand River (Endangered) and a tributary of the Dwars River (Critically Endangered).
Aquatic Ecosystem Protection Level	No	The PAOI does not intersect or drain towards any protected watercourses.
National Freshwater Ecosystem Priority Areas (NFEPA)	No	The PAOI does not overlap any NFEPA priority wetlands, rivers or areas.
Protected Areas	Yes	The PAOI overlaps the Vhembe Biosphere Reserve Conservation Area.
RAMSAR Wetlands	No	The PAOI does not overlap with any RAMSAR Wetlands.
Renewable Energy Development Zones (REDZ)	No	The PAOI does not overlap with any REDZ.
Renewable Energy Database	No	The PAOI traverses the proposed Ingwe Solar Power Plant.
Strategic Transmission Corridors (EGI)	Yes	The PAOI overlaps with the International Corridor.

2.3 Fieldwork Findings

During the field survey that was conducted between the 6th to 9th of January 2025 the following watercourses were identified within the PAOI:

- Rivers – None.
- Wetlands – None.
- Non-perennial/ephemeral watercourses:
    - Tributary of the Sand River;
    - Tributary of the Dwars River; and
    - Drainage areas.

The on-site assessment of the watercourses presented largely dry conditions in the tributary of the Sand River, tributary of the Dwars River, as well as the drainage areas, with surface water presence in isolated pools and instream impoundments. Cumulatively these non-perennial systems displayed ephemeral characteristics which is typical for watercourses in a semi-arid region (Figure 2-2). The watercourses drain the PAOI 1) westward, eventuating in the Sand River and 2) southward, eventuating in the Dwars River (which also confluences with the Sand River in the west). Portions of the watercourses intersect terrestrial habitat, highlighting their interdependence. Despite their current level of modification and ephemeral nature, the watercourses are sensitive to further modification as these

systems do provide drinking opportunities (following rainfall) and habitat for foraging, nesting and refugia for terrestrial biota and avifauna (see respective specialist project). Therefore, the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers) requiring avoidance from the project related disturbance activities and as well as maintenance of baseline conditions.

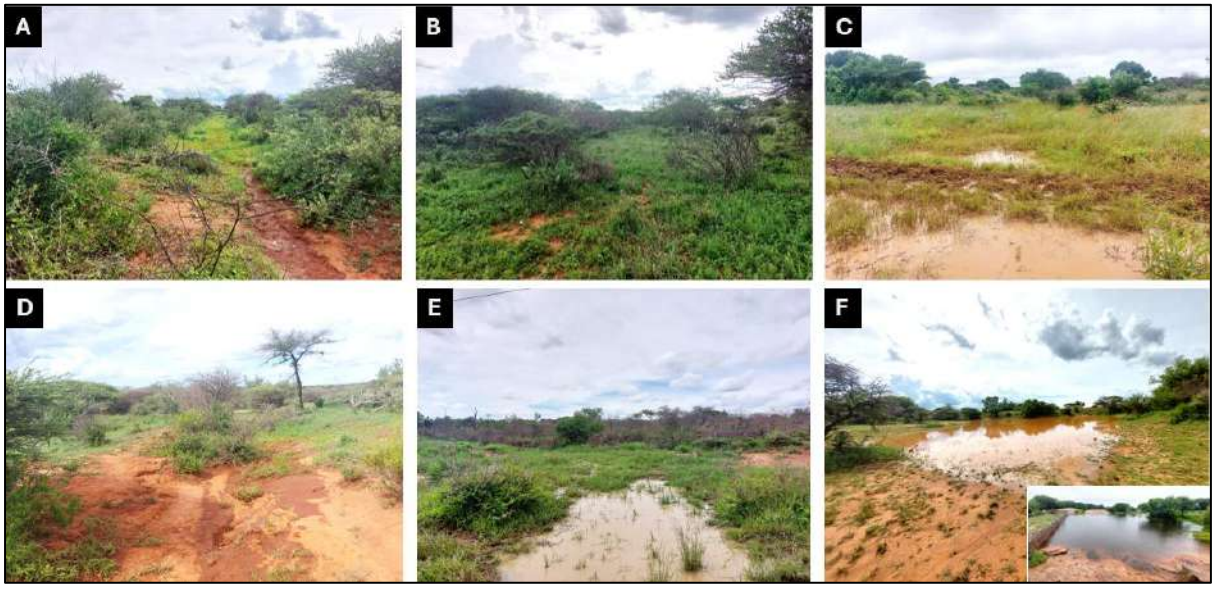


Figure 2-2 **Illustration of some of the watercourses (A-E) and the impoundment (F) within the project area and PAOI (January 2025)**

2.4 Ichthyofauna

Fish were collected using electrofishing, cast nets and visual observation techniques in all available biotopes. The fish species were then identified using a complete guide to the Freshwater Fishes of Southern Africa (Skelton, 2024). All fish were released at the point of capture. It should be noted that these expected species lists are compiled on a SQR basis by DWS (2014) and not on a site-specific basis. It is therefore highly unlikely that all the expected species will be present at every site in the SQR with habitat type and availability being the main driver of species present. Therefore, Table 2-2 should be viewed as a list of potential species rather than an expected species list. The conservational status of the fish species was assessed against the latest International Union for Conservation of Nature (IUCN) database (IUCN, 2025). A single hybrid fish species between *Oreochromus mossambicus* (Mozambique Tilapia) and *Oreochromus niloticus* (Nile Tilapia), was collected at site Dam 4. Hybridization has already been documented in the Limpopo River Catchment (IUCN, 2025). Although the potential species list indicates *Oreochromus mossambicus* (Mozambique Tilapia) to be present within the SQR, it is possible that the hybrid fish species was introduced into the impoundment (Dam 4). A photographic example of the fish species is presented in Table 2-3.

Table 2-2 Fish data collected during the 2025 study

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Clarias gariepinus	Sharptooth Catfish	LC	No
Enteromius paludinosus	Straightfin Barb	LC	No
Enteromius trimaculatus	Three Spotted Barb	LC	No
Pseudocrenilabrus philander	Southern Mouthbrooder	LC	No
Oreochromus mossambicus*	Mozambique Tilapia	VU	Yes

Scientific name	Common name	IUCN Status (IUCN, 2024)	Collected
Total Exotic Species Sampled			**1**
Total Indigenous Species Sampled			**1**

*IUCN: International Union for the Conservation of Nature
**Skelton (2024).
***Hybrid species
LC: Least Concern
VU: Vulnerable
Exotic species indicated in Red

Table 2-3 Photograph of the fish species collected during the 2025 study

Hybrid specimen

2.5 Results Summary

Only watercourses at an appreciable level of risk in relation to the proposed project and related activities were considered for assessment. Due to the ephemeral nature of the watercourses within the PAOI, standard aquatic methods could not be conducted. The Index of Habitat Integrity (IHI) model as described in Kleynhans (1996) v2 was therefore used to determine the Present Ecological State (PES) of these watercourses. *In-situ* water quality was only recorded within isolated pools and instream impoundments. The results are summarised in Table 2-4 below.

Table 2-4 Summary of the results (January 2025))

	Sand River Tributary 2 (Site S4, H12) and Drainage Area 5 (H11)	Dwars Tributary 1 (Site S19,& S16), Drainage Area 8 (Site S18) and Drainage Area 9 (Site S17 and Dam 3)	Drainage Area 4 (Site H2, H1, H2 Dam, F2, F1, Xstra D)	Drainage Area 6 (Site H9) and Drainage Area 7 (Site H10)	Drainage Area 3 (Site S10.3 and Dam 4)
Water Quality	Not Applicable	No signs of pollution, parameters suitable for tolerant aquatic organisms (S17)	No signs of pollution, parameters suitable for tolerant aquatic organisms (H2 Dam)	No signs of pollution, parameters suitable for tolerant aquatic organisms	No signs of pollution, parameters suitable for tolerant aquatic organisms (Dam 4)
Instream Ecological Category (IHI)	B	C	C	C	C
Riparian Ecological Category (IHI)	B	C	C	C	C
Aquatic Invertebrate Ecological Category	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Fish Community	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PES	**B (Largely Natural)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**	**C (Moderately Modified)**
PES (DWS, 2014) – SQR A71D-00118	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)	C (Moderately Modified)
Management Objective	Maintain PES	Maintain PES	Maintain PES	Maintain PES	Maintain PES

2.6 Sensitivity and Buffer Assessment

As noted in the geomorphological description of the project area, the watercourses considered in this assessment represented ephemeral system characteristics that have naturally been subjected to instream erosion and sedimentation compounded by surface flow alterations (gravel road crossings and instream impoundments). As can be observed in Figure 2-3, riparian areas comprised of a mix of herbaceous species and woody species present. Despite alteration, these areas were considered to be largely intact.

The ecological sensitivity of the watercourses draining the PAOI was determined to be 'Medium' and largely uniform across the project area. The watercourses presented evidence of reliance/ dependence on these systems by terrestrial biota (in times of surface water presence after rainfall), foraging, nesting and refugia, with animal tracks observed in the substrates in/proximal to majority of the watercourses. Despite the absence of water and consequently aquatic taxa at the time of the survey, all of the watercourses in the project area are regarded as sensitive environments in relation to changes in habitat integrity, flow and water quality (ecological drivers).

Given the varied geomorphological features of the watercourses, watercourse extents were mapped with associated sensitivity assigned by identifying vegetation features on aerial imagery and confirmation through ground truthing during the survey. A diagrammatic example of the typical watercourse extent as well as where appropriate buffer areas are located is provided in Figure 2-3. All infrastructure should avoid any 'Medium' sensitivity areas and apply a 20 m buffer from the edge of the watercourse as per the sensitivity maps. The 'Medium' sensitivity areas are to be treated as no-go areas, allowing only minimum critical watercourse crossing in these areas. The watercourse layout, their respective delineated sensitive areas and regulated areas are depicted in Figure 2-4.

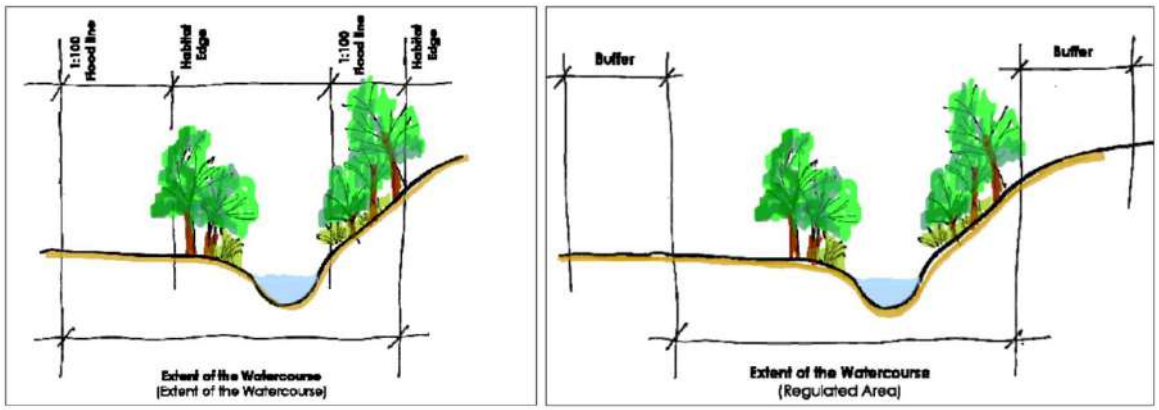


Figure 2-3 Illustration of the extent of a watercourse and the Regulated Area (DWA, 2012)

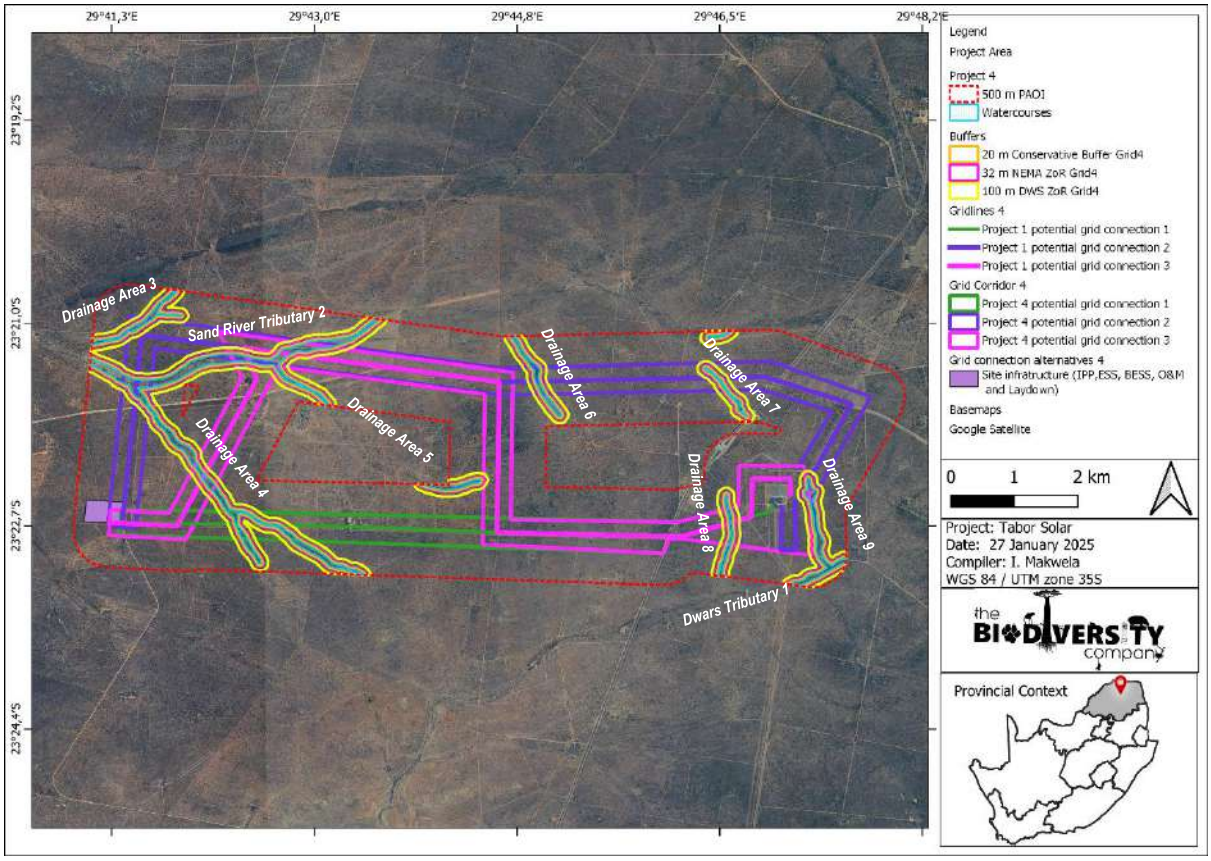
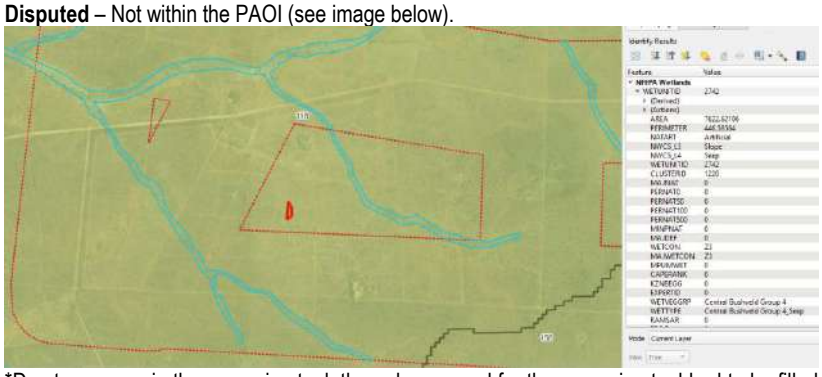


Figure 2-4 Watercourses, regulated areas and sensitivity buffers for the proposed project

2.7 Screening Tool Comparison

Table 2-5 provides a comparison between the Environmental Screening Tool and the specialist determined Site Habitat and System Characterisation. The specialist-assigned sensitivity ratings are based largely on the functionality assessment processes followed in the previous section, and consideration is given to any observed or likely presence of Species of Conservation Concern (SCC).

Table 2-5 Sensitivity features associated with Aquatic Biodiversity Combined Sensitivity (National Web based Environmental Screening Tool)

Sensitivity	Features	Specialist Verification
Low	Low sensitivity	**Disputed. Medium and Low sensitivity areas present.** The Project Area and PAOI includes non-perennial/ephemeral watercourses
Very High	Wetlands_Central Bushveld Bioregion (Seep)	**Disputed** – Not within the PAOI (see image below).  *Due to an error in the screening tool, the polygon used for the screening tool had to be filled and is therefore not representative of the actual PAOI and project area

*Screening tool uses metadata from 2018 NBA

The freshwater ecology of the immediate project area and further downstream areas are considered sensitive to disturbance from a hydrological and biological perspective, however due to the ephemeral nature of the watercourses, this sensitivity applies more to the watercourses' physical characteristics that influence the hydrological and biological aspects in times of surface water presence/ inundation. This will include all watercourses within the project area which are considered sensitive due to their relatively small spatial scale when compared to adjacent terrestrial habitat with a large demand for the ecosystem services which they provide. Construction and operation activities must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat (Figure 2-5).

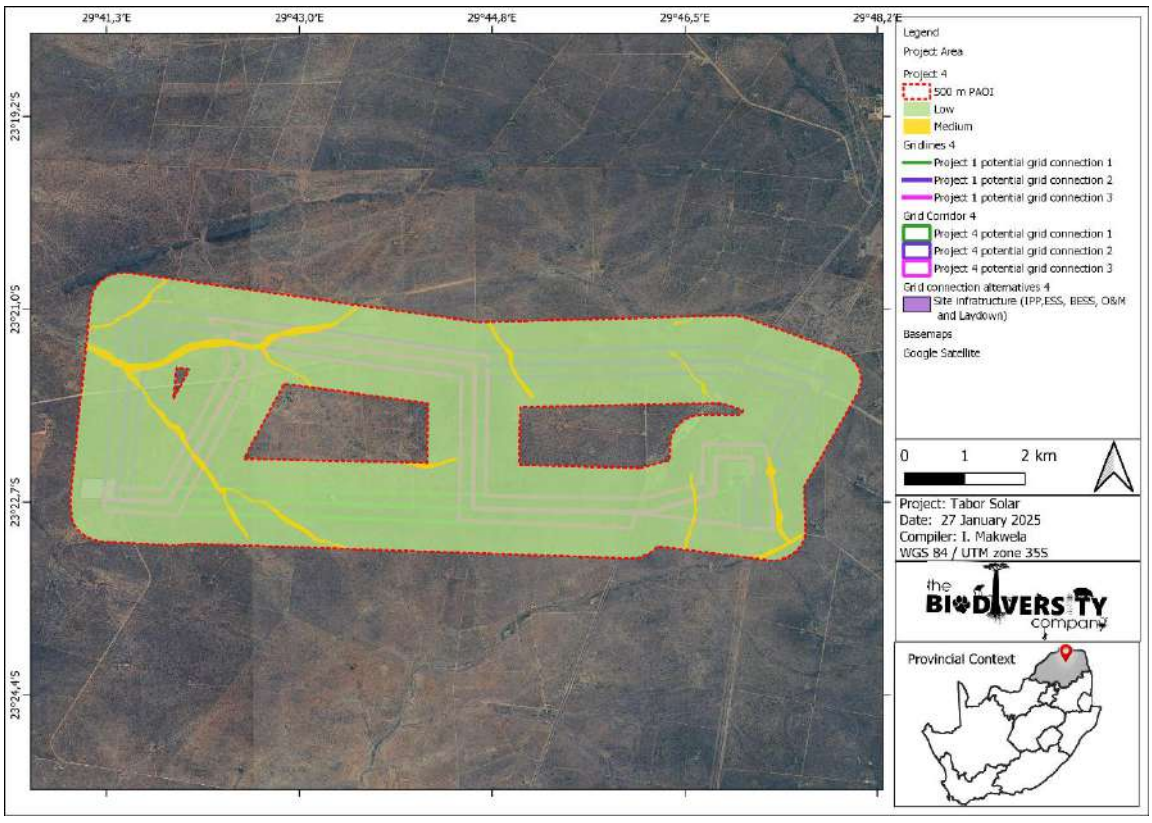


Figure 2-5 Aquatic delineated sensitivity for the PAOI

3. Management & Mitigation Measures

This section provides the management and mitigation measures the are deemed applicable for the proposed development. Note that this is not a complete list of mitigation measures for the proposed development but those considered to be pertinent. Further and detailed mitigation measures will be provided in the accompanying Freshwater Assessment report. It must be noted that these mitigation measures are mainly applicable for activities that may occur within the calculated buffers.

- A competent Environmental Control Officer (ECO) must oversee the construction and associated rehabilitation phase of the project, with watercourse areas as a priority to limit the listed impacts on the watercourses. Two (2) follow up ECO assessments/ audits must be carried out in the first and sixth months of operation. Ideally one of these audits should take place following a rainfall event. The ECO must be supplied with a copy of this report, and the full assessment report, to familiarise themselves with the mitigation and recommendations prior to construction;
- Several aquatic features or aquatic functional zones are present, which may provide some technical challenges due to seasonal flooding. Any footprint within these areas will likely require careful planning in order to minimise changes to flows which could alter species composition and affect ecological processes to both aquatic and terrestrial areas. As a minimum any roads traversing these alluvial areas must accommodate lateral flows (interconnectivity) of water and sediment between watercourses and alluvial area where seasonal flooding occurs. This challenge can be overcome through the use of raised access roads fitted with appropriate aggregate base layers and culverts to allow lateral movement of water and to minimise localised flooding and/or drying out;
- The PV areas, infrastructure and road alignments must be designed to avoid watercourses and their 20 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;
- A qualified Hydrologist with experience in semi-arid areas must develop a suitable and adaptive Stormwater management plan to ensure no erosion takes place and that clean water reports back to the local watercourses during rainfall events;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. The key focus should be placed on revegetation, stormwater and erosion prevention strategies for the development area. The plan should be adhered to for all stages of the project life;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include monitoring the crossings, all stormwater discharge points, energy dissipation structures, and stability and condition of watercourse habitat in the project footprint. This service plan should be adaptive based on on-site conditions;
- A walkdown is recommended on the final layout to confirm that watercourses are adequately avoided, and that the smaller drainage features (regardless of how insignificant they may appear) will have adequate flow catering structures in place. This should be conducted prior to final design sign off and construction.

4. Conclusion

Based on the survey findings, the specialist disputes the “Low” and “Very High” aquatic theme sensitivity as per the National Web based Environmental Screening Tool, due to the presence of ephemeral watercourses within the project area, and the NFEPA non-priority seep wetland not occurring within the actual PAOI. The project area should therefore be considered “Low” and “Medium” aquatic theme sensitivities. The project infrastructure will pose a risk to the watercourses, and it is the specialist’s opinion that following the implementation of avoidance mitigation, recommendations, rehabilitation and/or remedial measures, the risks can be lowered. An Aquatic Biodiversity Specialist Assessment is therefore required for this project.

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Appendix A Specialist Declaration

I, Prasheen Singh, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Prasheen Singh

Freshwater Ecologist

The Biodiversity Company

24/04/2025