

AQUATIC SITE SENSITIVITY ANALYSIS REPORT FOR THE PROPOSED SUNVELD SOLAR ENERGY FACILITY AND BATTERY ENERGY STORAGE SYSTEM (BESS) NEAR VELDDRIF IN THE WESTERN CAPE

SEPTEMBER 2023



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1. SPECIALIST DETAILS, EXPERTISE AND DECLARATION

1.1. QUALIFICATIONS OF SPECIALIST CONSULTANT

Name: Antonia Belcher
Contact details: 53 Dummer St, Somerset West, 7130; Phone: 082 883 8055;
 Email: toni@bluescience.co.za
Profession: Aquatic Scientist (P. Sci. Nat. 400040/10)
Fields of Expertise: Specialist in freshwater assessments, monitoring and reporting
Years in Profession: 30+ years

Toni Belcher worked for the Department of Water Affairs and Forestry for more than 17 years. During this period she worked for the Directorate Water Quality Management, the Institute for Water Quality Studies and the Western Cape Regional Office and has built up a wide skills base on water resource management and water resource quality for rivers, estuaries and the coastal marine environment. Since leaving the Department in 2007, she has been working in her private capacity and was co-owner of BlueScience (Pty) Ltd, working in the field of water resource management and has been involved in more than 500 aquatic ecosystem assessments for environmental impact assessment and water use authorisation purposes. In 2006 she was awarded a Woman in Water award for Environmental Education and was a runner up for the Woman in Water prize for Water Research.

Professional Qualifications:

1984 Matriculation Lawson Brown High School
 1987 B.Sc. – Mathematics, Applied Mathematics University of Port Elizabeth
 1989 B.Sc. (Hons) – Oceanography University of Port Elizabeth
 1998 M.Sc. – Environmental Management (cum laude) Potchefstroom University

Key Skills: Areas of specialisation: Aquatic ecosystem assessments, Monitoring and evaluation of water resources, Water resource legislation and authorisations, River classification and Resource Quality Objectives, River Reserve determination and implementation, Water Quality Assessments, Biomonitoring, River and Wetland Rehabilitation Plans, Catchment management, River maintenance management, Water education.

Summary of Experience:

1987 – 1988	Part-time field researcher, Department of Oceanography, University of Port Elizabeth
1989 – 1990	Mathematics tutor and administrator, Master Maths, Randburg and Braamfontein Colleges, Johannesburg
1991 – 1995	Water Pollution Control Officer, Water Quality Management, Department of Water Affairs, Pretoria
1995 – 1999	Hydrologist and Assistant Director, Institute for Water Quality Studies, Department of Water Affairs and Forestry, Pretoria
1999 – 2007	Assistant and Deputy Director, Water Resource Protection, Western Cape Regional Office, Department of Water Affairs, Cape Town
2007 – 2012	Self-employed – Aquatic Specialist
2013 – 2020	Senior Aquatic Specialist and part-owner, BlueScience
2020 – present	Self-employed – Aquatic Specialist


1.2. DECLARATION OF INDEPENDENCE

I, **Antonia Belcher**, as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
 - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
 - ~~am not independent, but another specialist that meets the general requirements set out in Regulation 13 of GN No. 326 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);~~
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the Applicant, the Department and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations, 2014 (as amended).

Date: 12 August 2023

Name of company: -

Signature of the specialists: 

2. INTRODUCTION

2.1. SCOPE OF STUDY

This aquatic site sensitivity verification report comprises an aquatic ecosystem constraints assessment of the proposed solar farm and associated infrastructure referred to as the Sunveld Solar Energy Facility. The assessment is based on a desktop analysis of existing data and mapping available for the area as well as a site visit and field assessment undertaken in July 2023. The proposed development is to consist of solar PV modules with associated electrical infrastructure and Battery Energy Storage System (BESS). The site's total extent is approximately 2 362 ha. The site falls primarily under the jurisdiction of the Bergrivier Local Municipality and is located within the greater West Coast District Municipality in the Western Cape Province. The site is located approximately 8 km to the east of the town of Velddrif. The area lies in the lower Berg River Catchment. Details of the watercourses at the site are provided in the table below.

Table 1. Water resource information related to the site assessed

Descriptor	Name / Details	Notes
Water Management Area	Berg Olifants	
Catchment Area	Lower Berg	
Quaternary Catchment	G10M	
Present Ecological State	Berg Estuary: C Category (moderately modified)	Ramsar site and one of the three most important estuaries in SA
Ecological Importance	Very High	

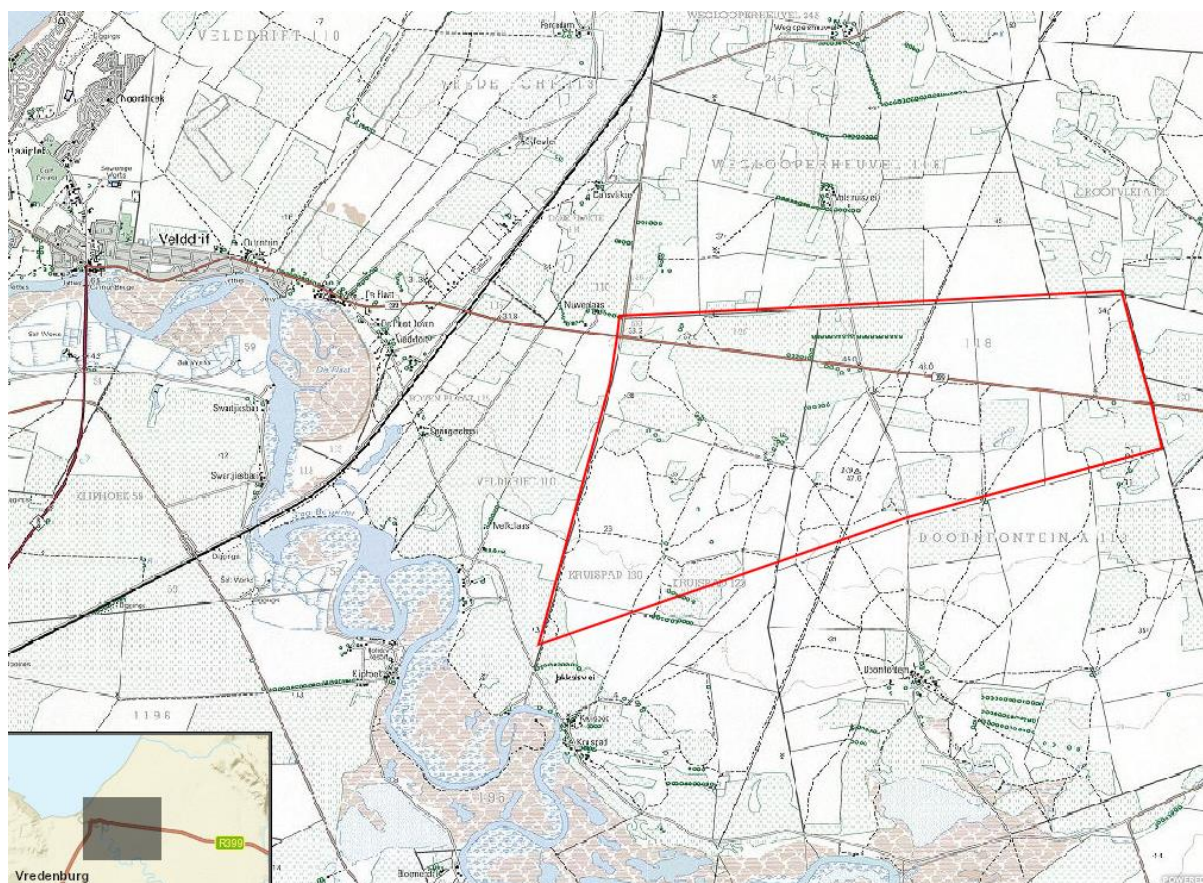


Figure 1. A topographical map of the study area, indicating the locality of the site (red polygon)

The study site is located within an area that is mostly considered of Low Aquatic Biodiversity Combined Sensitivity (Figure 2) as it does not lie within a Freshwater Ecosystem Priority Area (FEPA) River Sub catchment or has any Aquatic Critical Biodiversity Areas mapped. The site is also not located within Strategic Water Source

Area (SWSA) for surface water but is within the West Coast Aquifer SWSA. The only areas mapped as being of very high Aquatic Biodiversity Sensitivity are mapped wetland areas that are discussed in Section 3.6 of this report.

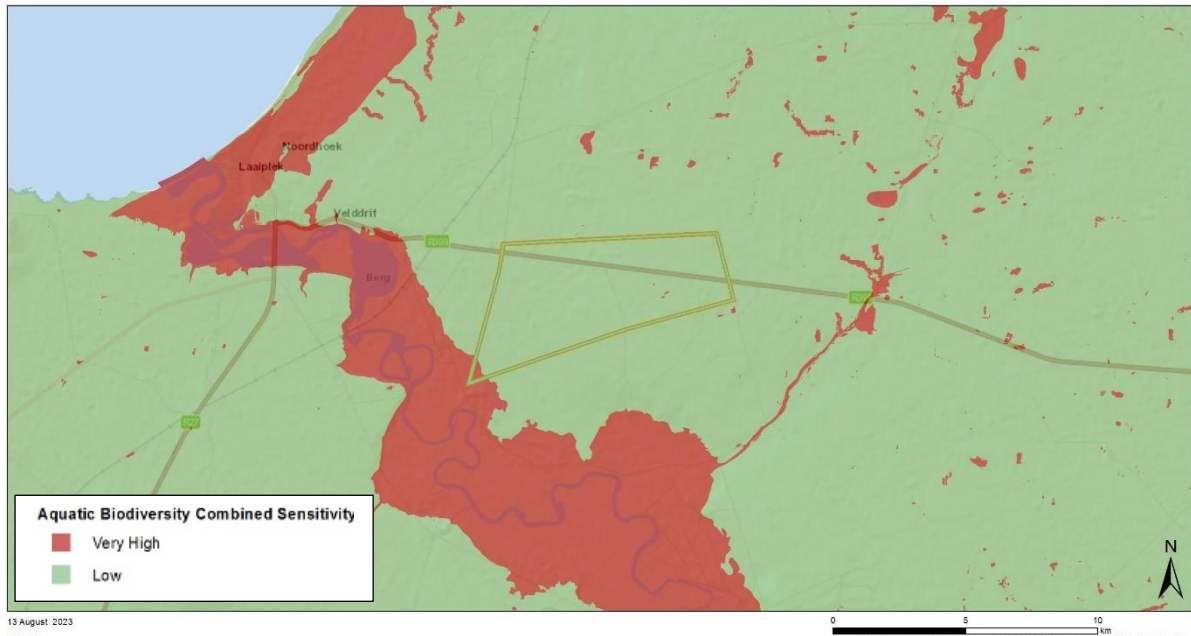


Figure 2. DFFE Screening Map for the area in terms of Aquatic Biodiversity Combined Sensitivity

2.2. TERMS OF REFERENCE

The terms of reference for this assessment were as follows:

1. Undertake a site sensitivity Assessment of the Total Assessment Area.
2. Provision of a spatial dataset of all no-go areas and buffers (if any from an Aquatic perspective).
3. Aquatic Scoping Report for an up to 600MW PV Development (this may be smaller at the end of the day – specialist sensitivities in point 2 will be used to guide the final size and position).
4. Aquatic Impact Assessment Report for an up to 600mw PV Development – Provision should be made to assess 2 x layout alternatives.

This report includes the outcomes of a site visit and field verification exercise to provide an interpretation of the aquatic ecosystem's sensitivity.

2.3. METHODOLOGY AND LIMITATIONS OF THE STUDY

Input into this report was informed by a desktop assessment for the study area as well as field verification that was undertaken on 5 July 2023. The timing of the site visit was deemed suitable for the assessment as it was undertaken during the rainfall period.

The 1 in 50000 topographical rivers cover was used as a basis and refined based on knowledge of the aquatic features in the area as well as Satellite imagery. The SANBI Biodiversity GIS, Cape Farm Mapper and Freshwater Biodiversity Information System websites were consulted to identify any constraints in terms of features of aquatic biodiversity conservation importance within the area. This information/data was used to inform the resource protection-related recommendations.

2.4. USE OF THIS REPORT

This report reflects the professional judgment of its author. The full and unedited content of this should be presented to the regulatory authority. Any summary of these findings should only be produced in consultation with the author.

3. DESCRIPTION OF THE STUDY AREA

3.1. GENERAL OVERVIEW

The site is located in the Fynbos Biome on a relatively flat topography. Drainage is predominately towards the Berg Estuary to the south-west of the site. The aquatic features in the area comprise depression wetlands on the Saldanha Flats. The Berg River Estuary is located immediately to the south-west of the site with a portion of the south-western extent of the site potentially within the estuarine functional zone (below the 5m contour) of the estuary.

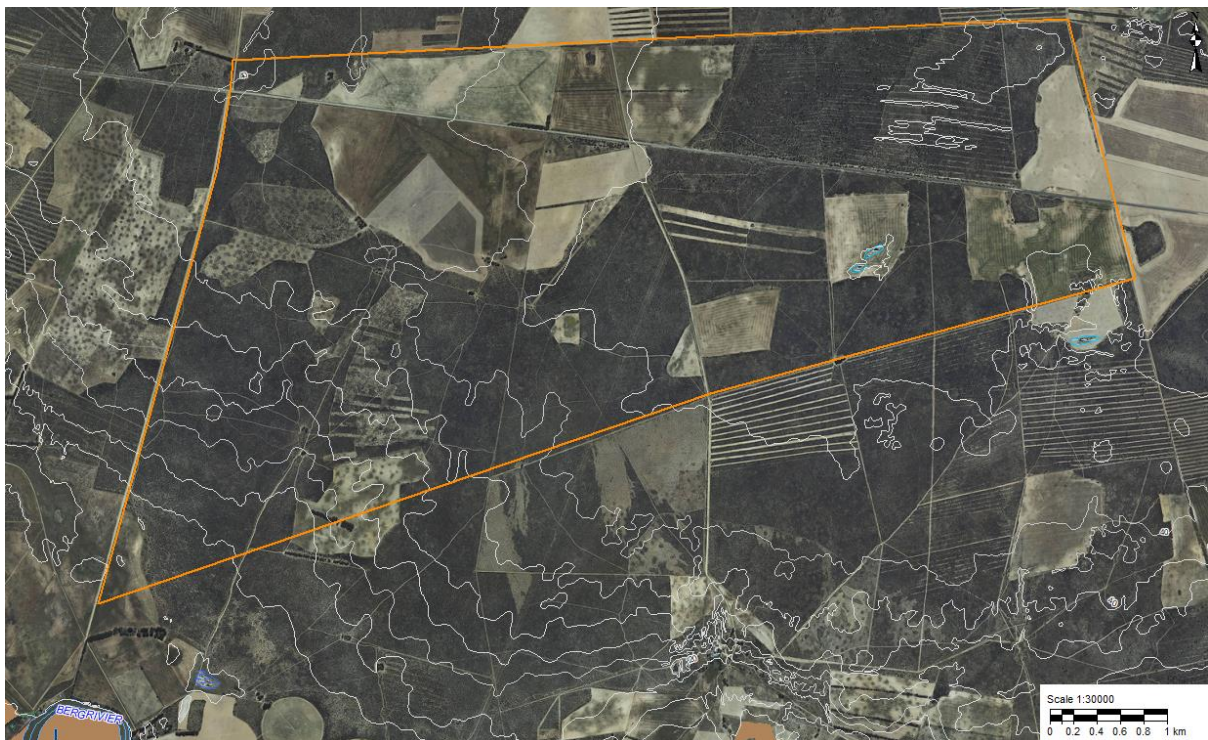


Figure 3. River and wetland map for study site (orange polygon represents the study boundaries) overlaid on a 2016 Orthophotograph of the area, with the 5m contours shown

The area normally receives about 253 mm of rain per year, mostly during winter. Typically, very little rain falls between December and March and the highest rainfall (41mm) occurs in June (Figure 4). As a result of the very low rainfall in the area, the depression wetlands at the site are ephemeral and are only inundated for short periods immediately following local rainfall events. The larger Berg River is perennial, receiving most of its runoff from the upper mountainous catchment area at Franschoek where the mean annual rainfall in places exceeds 2000 mm. Based on the tidal exchange in the estuary, the length of the estuary is estimated to be about 68km long. An extensive mosaic of wetlands (more than 1000 ha) occurs on the floodplain of the estuary that provides important habitat for biota, in particular birdlife, leading to the estuary being declared a Ramsar site in 2022.

Long Term Monthly Rainfall Median

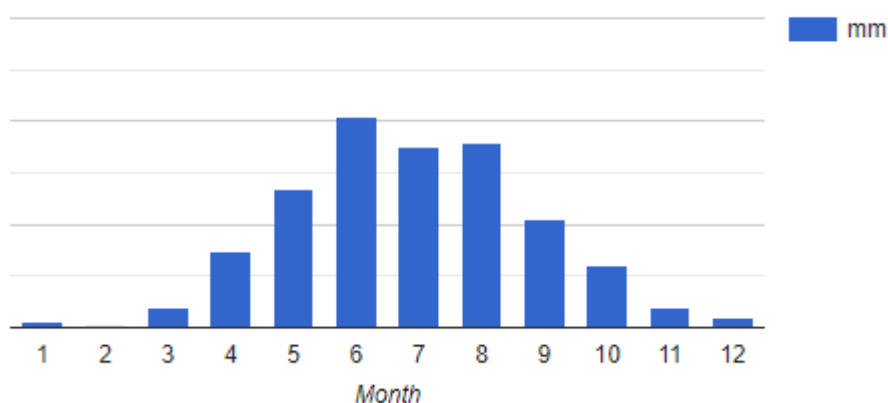


Figure 4. Average monthly rainfall for the area (SA Atlas of Climatology and Agrohydrology, R.E. Schulze, 2009 – obtained from CapeFarmMapper, 2023)

As mentioned, the area lies in a SWSA for groundwater. A major intergranular aquifer occurs throughout the study area, with the water table typically occurring at depths of about 6.9 m below ground level and a yield of less than 0.1 litres a second. The surface and groundwater quality tend to be brackish, with natural electrical conductivity concentrations of more than 370 mS/m. The recharge of the aquifer is estimated to be about 17.5 mm/a. The aquifer has a very high susceptibility and vulnerability to contamination.

The geology of the area is characterised by deep Aeolian sands with underlying greywacke and phyllite and beds and lenses of quartz schist, limestone and grit of the Moorreesburg Formation; Malmesbury Group. The grey regic sands are excessively drained with limited pedological development.

The natural vegetation of the study area is mapped as comprising Saldanha Flats Strandveld which is an Endangered vegetation type. The typical land cover comprises a mix of low fynbos shrubland and dryland cultivated areas or fallow land. Dominant species in the Strandveld shubland at the site include *Euclea tomentosa*, *Osteospermum incanum*, *Searsia glauca*, *Diospyros glabra*, *Gymnosporia buxifolia*, *Salvia lanceolata*, *Pelargonium capitatum*, *Elegia recta*, *Willdenowia incurvata*, *Ehrharta calycina*, and *Ehrharta villosa*. The aquatic features typically contain little to no vegetation.

3.2. CONSERVATION VALUE OF AQUATIC FEATURES

Three sets of conservation mapping at a national, provincial and local scale are of relevance to the identification of aquatic features of ecological and biodiversity conservation importance. These are the National Freshwater Ecosystem Priority Areas (FEPA) map, the National Wetland Map version 5 (NWM5), and the provincial Western Cape Biodiversity Spatial Plan (WCBSP).

FEPAs are intended to provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting the sustainable use of water resources. FEPAs were determined through a process of systematic biodiversity planning and were identified using a range of criteria for serving ecosystems and associated biodiversity of rivers, wetlands and estuaries. The river and wetland FEPAs are required to be maintained in a largely natural ecological state, while Fish Support Areas should not be allowed to degrade from their existing ecological condition. In terms of Freshwater Ecosystem Biodiversity Areas mapped within the study area, the site does not lie within a FEPA Sub-catchment. There are mapped natural FEPA wetland areas (depression wetlands) within the study site and the estuarine wetland to the south and west of the site (Figure 5).

Figure 6 shows the NWM5 for the area together with the FEPA Wetlands. In terms of natural wetland habitats mapped in the NWM5, there same wetland features mapped in the FEPA mapping are mapped in the NWM5, although the delineation of the estuarine wetland differs slightly as the FEPA mapping of the estuary does not extend into the site as the NWM5 does.

In the WCBSP (Figure 7), most of the site is mapped as Terrestrial Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). There is a small aquatic CBA mapped near the depression wetlands in the FEPA and NWM5. The two natural depressions mapped in the FEPA and NWM5 are mapped as aquatic ESAs in the WCBSP. The aquatic CBA associated in the WCBSP with the Berg River Estuary follows the mapping of the FEPA wetland mapping.

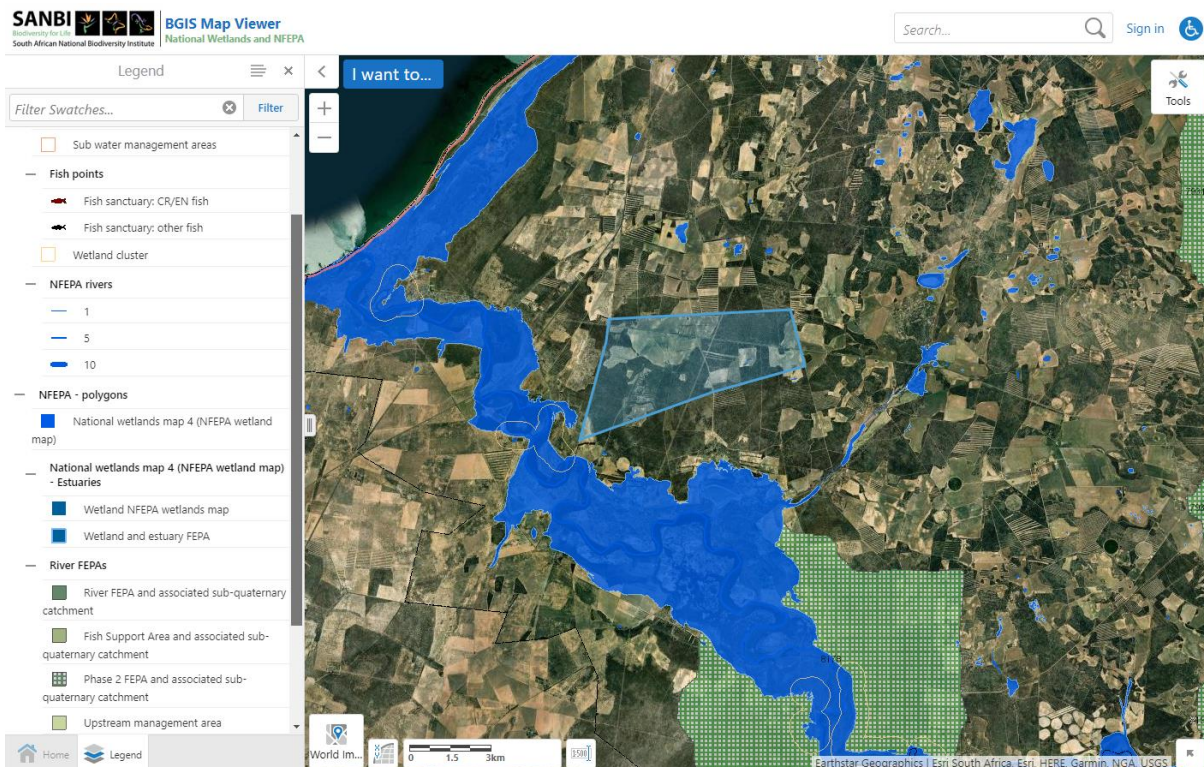


Figure 5. National Freshwater Ecosystem Priority Areas for the study sites (SANBI Biodiversity GIS, 2023)

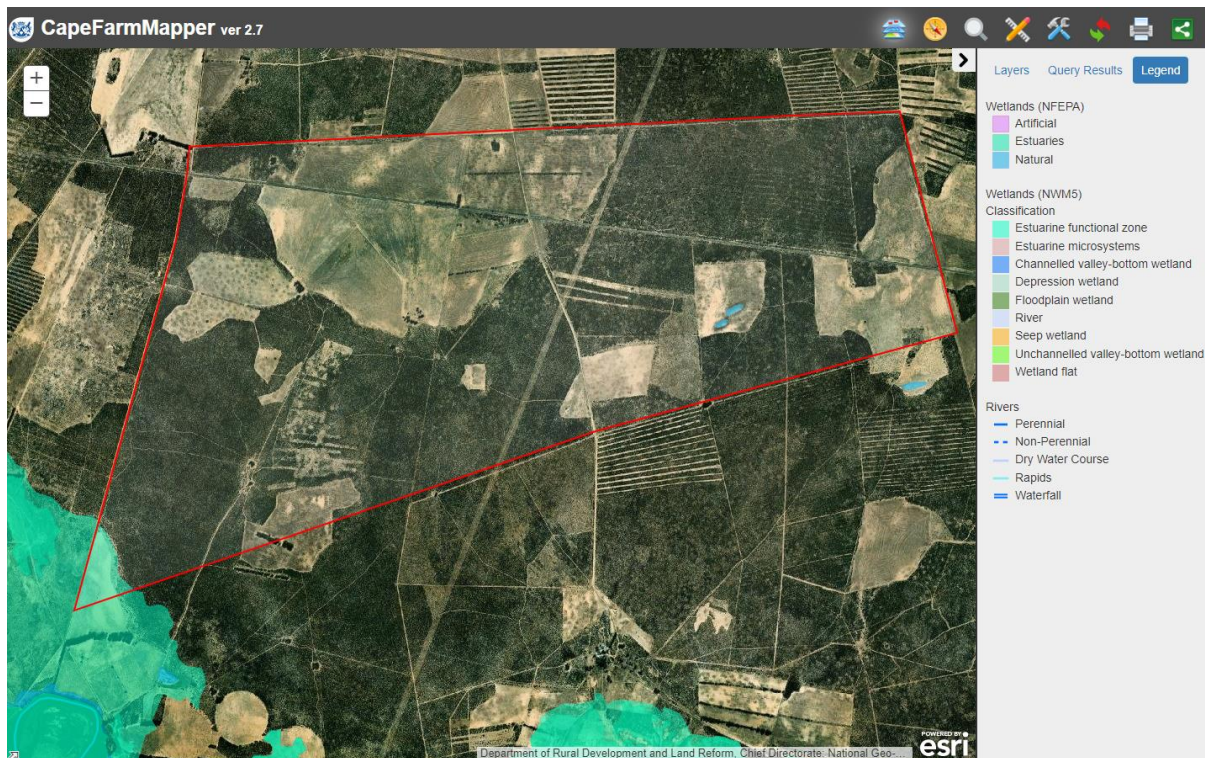


Figure 6. National Wetland map and National Freshwater Ecosystem Priority Areas map for the study site where the red polygon indicates the study boundaries (CapeFarmMapper, 2023)

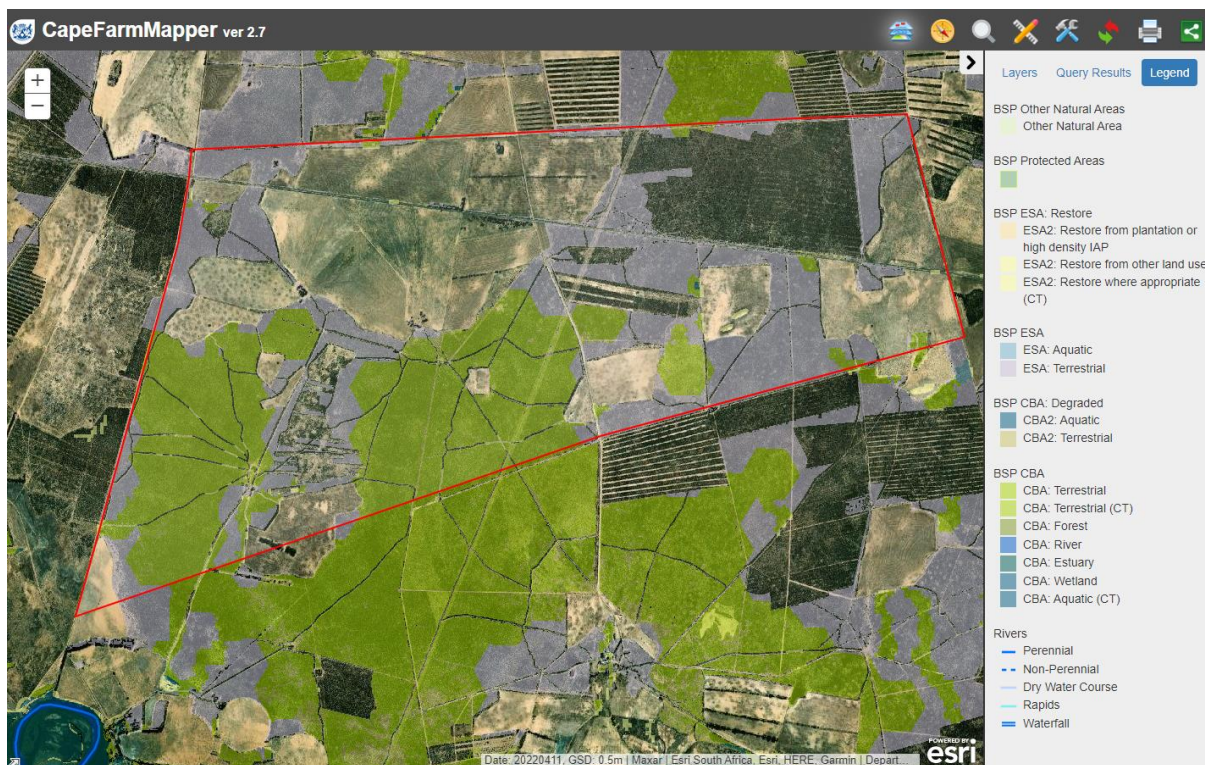


Figure 7. Western Cape Biodiversity Spatial Plan for the study site (SANBI Biodiversity GIS, 2023)

4. SITE VERIFICATION OUTCOMES

The aquatic features occurring within the site comprise some disturbed depression wetlands within cultivated areas on the site and the floodplain of the Berg River Estuary in the south-western corner of the site. The depression wetlands as well as the floodplain wetland are in largely to seriously modified ecological condition within the site as they are all in cultivated areas. The depression wetlands have a moderate to low ecological importance and sensitivity. The highly modified wider floodplain wetlands associated with the Berg River Estuary are of moderate ecological importance and sensitivity.

It is recommended that the wetlands be treated as no-go areas by the proposed activities and that any development of the wetlands be avoided by the PV facilities. A buffer of 50m is deemed to be adequate to protect them from the proposed adjacent activities. Services could be placed through these buffer areas but must be adequately mitigated.



Figure 8. Views of the depression wetlands within the site



Figure 9. View of the cultivated wider floodplain area of the estuary within the site (top) and the estuarine functional zone outside of the study area(bottom)

5. AQUATIC CONSTRAINTS MAPPING AND AQUATIC SENSITIVITY

In the aquatic sensitivity mapping, the wetlands have been mapped as being of moderate to low sensitivity and aquatic no-go areas. In addition, to protect the aquatic habitats, the buffer zones of 50m from the delineation edge of the depression wetlands and the floodplain of the Berg River Estuary. Figure 10 shows the mapped aquatic features together with the recommended buffers and Figure 11 shows the sensitivity mapping.

Most of the potential aquatic ecosystem impacts of the proposed solar farm are likely to take place during the construction phase. The potential aquatic ecosystem impacts of the proposed activities during construction include:

- Disturbance and possibly loss of aquatic habitats within the wetlands with the associated impact on associated aquatic biota;

- Demand for water for construction could place stress on the existing available water resources;
- Alien vegetation infestation within the aquatic features due to disturbance; and
- Increased sedimentation and risks of contamination of surface water runoff during construction.

During the operational phase for all the proposed works, the potential impacts would include:

- Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to the infrastructure that needs to be maintained;
- Modified runoff characteristics from hardened surfaces that have the potential to result in flow modification impacts within the wetland areas; and
- Possible increase in water consumption and potential for water quality impacts (such as contamination from sewage generated onsite) as a result of the operation of the site.

During the decommissioning phase, the potential impacts would largely be associated with an increased disturbance of aquatic habitat due to the increased activity on the site. Increased sedimentation and risks of contamination of surface water runoff may also occur.

By implementing suitable buffers (50m) adjacent to the wetlands and minimising the works within and adjacent to the wetlands, the impact of the proposed project activities would be low and unlikely to impact the integrity of the aquatic ecosystems. The recommended buffers are deemed adequate, irrespective of the proposed infrastructure.

Linear infrastructure would be able to cross aquatic habitats of medium or even high sensitivity if adequately mitigated, although it is recommended that areas of high sensitivity are avoided.

The other structures/infrastructure should avoid the aquatic habitats of medium and high sensitivity. Where unavoidable structures could be placed in areas of medium sensitivity.

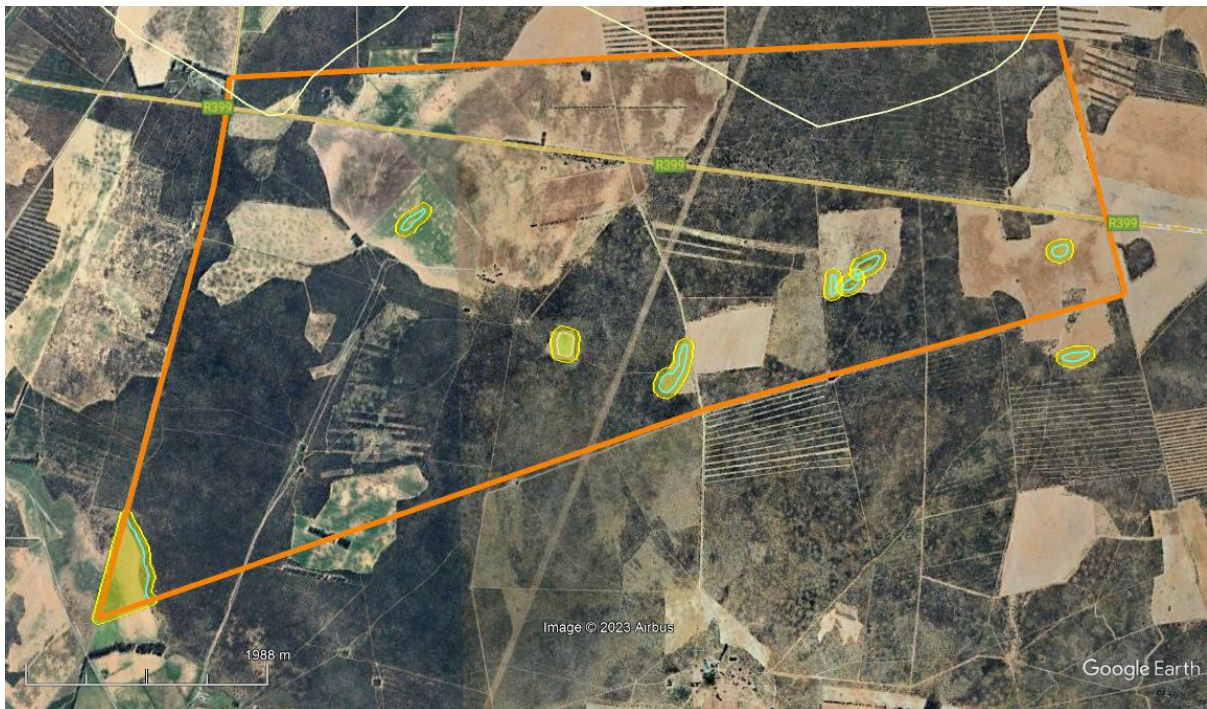


Figure 10. Mapped aquatic features within the project area (red polygon), shown in Google Earth

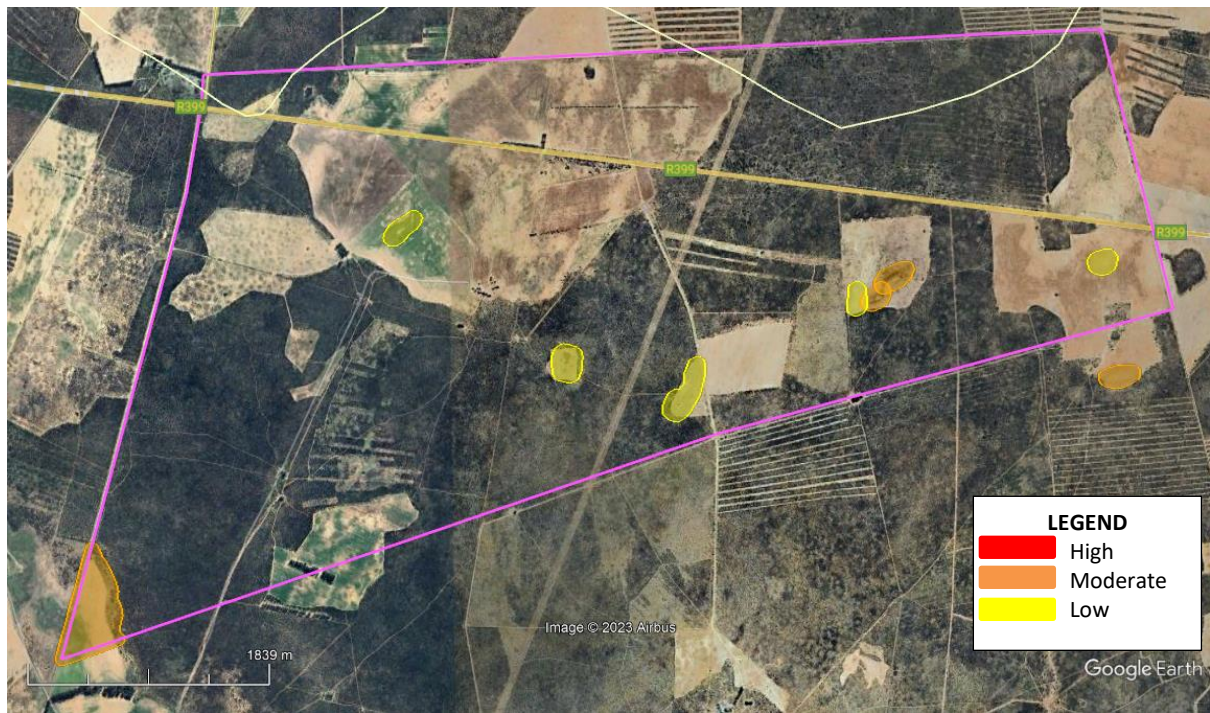


Figure 11. Mapped sensitivity of aquatic features within the project area (pink polygon), shown in Google Earth.