WATT SOLAR PHOTOVOLTAIC PROJECT– AQUATIC BIODIVERSITY ASSESSMENT REPORT

Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa

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CLIENT

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Report Name	**WATT SOLAR PHOTOVOLTAIC PROJECT– AQUATIC BIODIVERSITY ASSESSMENT REPORT**
Submitted to	savannah environmental
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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 principals of science.

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1 Introduction

The Biodiversity Company was appointed to undertake an Aquatic Biodiversity Assessment for the proposed Watt Solar Photovoltaic (PV) facility The project area is located within the Ekurhuleni Metropolitan Municipality near Brakpan in the Gauteng Province (Figure 1-1). The area of the site totals 225 ha in size (site details can be seen in Figure 1-2 and comprises the following farm portions:

- Remaining Extent of Portion 3 of the farm Rooikat 156.
- The scoping assessment comprises terrestrial and freshwater ecosystems, and soil and agricultural potential. The proposed power plant will have a contracted generation capacity of up to 80MW. The Watt project site is proposed to accommodate the following infrastructure:
- PV facility and Battery Energy Storage System (BESS); and
- Related infrastructure.

A 500 m radius around the project site, which is the suggested regulation area for the identification of water resources in terms of the proposed project, has been demarcated and is referred to hereafter as the Project Area of Influence (PAOI).

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) 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).

After taking into consideration the findings and recommendations provided by the specialist herein, this report should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, facilitating informed decision making as to the ecological viability of the proposed project.

1.1 Project Description

The infrastructure associated with the Watt Solar PV facility will include:

- Solar PV arrays, modules and mounting structures;
- Inverters and transformers;
- Cabling between the project components;
- Battery Energy Storage System (BESS);
- On-site facility substation;
- Temporary and permanent laydown areas, O&M buildings, security infrastructure, and fencing around the development area; and
- Site and internal access roads up to 6m in width, where required.

Witpoortjie Solar PV (Pty) Ltd is an adjacent project from the same developer and is following a concurrent Scoping and Environmental Impact Assessment (S&EIA) process. The Watt and Witpoortjie Solar PV projects will share the permanent building facilities, BESS, on-site Substation and some of the laydowns and roads. The shared footprints total about 9ha and including roads in an 11.66ha fenced area

The table below provides the details of the project, including the main infrastructure components and services that will be required during the project life cycle.

Table 1-1 Details of the Watt Solar PV Facility and associated infrastructure

Component	Description / Dimensions
District Municipality	City of Ekurhuleni Metropolitan Municipality
Ward Number (s)	Ward 99
Nearest town(s)	Brakpan
Farm name(s) and number(s) of properties affected by the PV Facility, incl SG 21 Digit Code (s)	» Remaining Extent of Portion 3 of the Farm Rooikraal 156 (T0IR00000000015600030)
Current zoning	Agriculture
Site Coordinates (centre of development area)	26°19'24.66"S, 28°17'41.11"E
Total extent of the Affected Property	~225ha
Total extent of the Development area[1]	Up to ~225ha
Total extent of the Development footprint[2]	86ha
Contracted capacity of the PV facility	Up to 80MW
PV panels	Height: up to 5m from ground level (installed)
On-site Facility Substation, BESS, and O&M buildings	» Located within the development area. » Up to 9ha in extent.
Access roads and internal roads	» Existing roads will be used, wherever possible, to access the development area. » Access and internal roads up to 6m in width will be required to access the PV panels and on-site substation.
Other infrastructure	» Battery Energy Storage System (BESS) » Offices, operational control centre, operation and maintenance area, guard houses, ablution facilities. laydown areas » Warehouse and workshop » Perimeter fencing

[1] The development area is that identified area where the 80MW PV facility is planned to be located, within which indirect and direct effects of the project may occur. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~225ha in extent.

[2] The development footprint is the defined area (located within the development area) where the PV panel array and other associated infrastructure for the Watt Solar PV facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

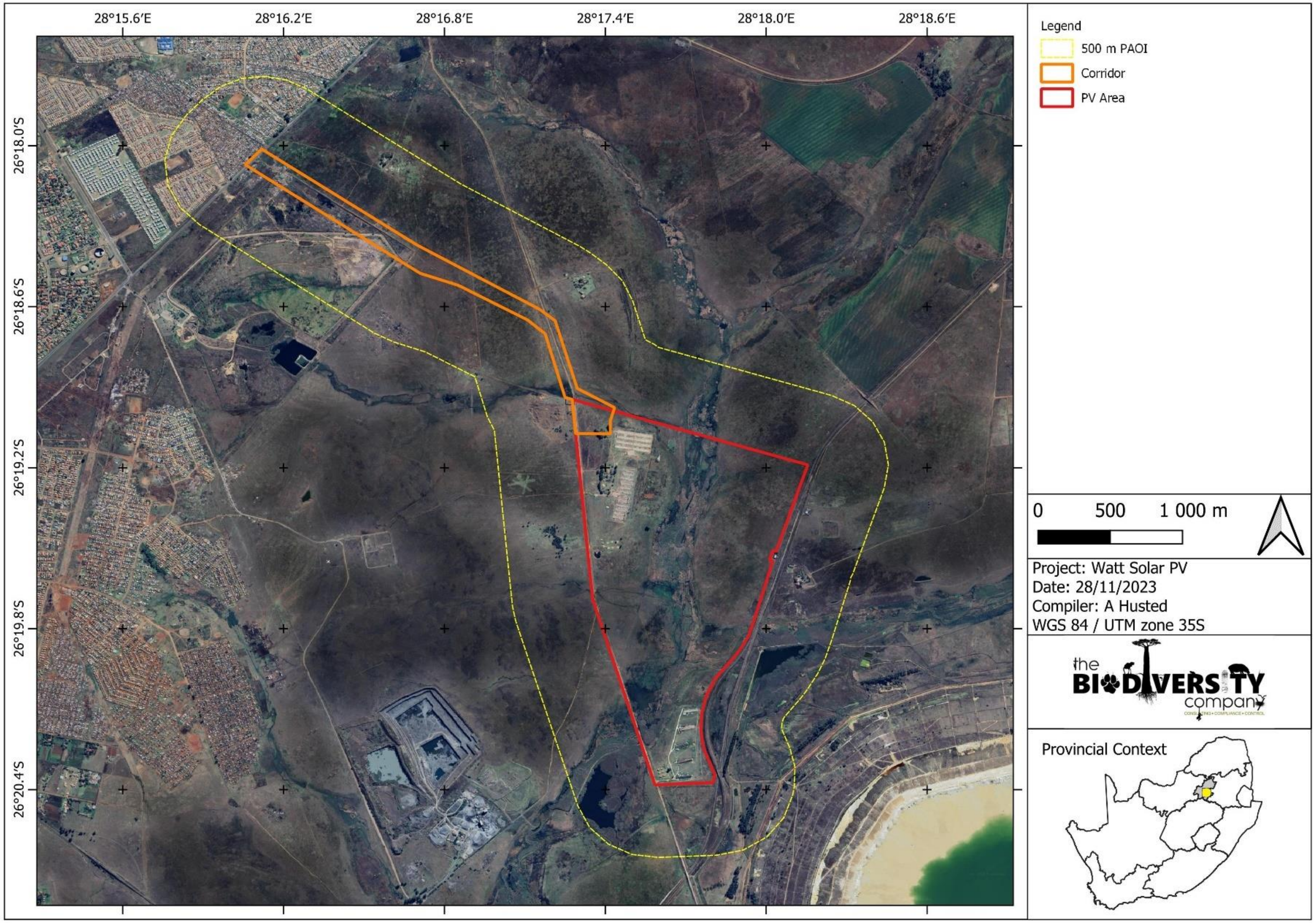

Figure 1-1 Map illustrating the location of the proposed Project Area of Interest (PAOI)

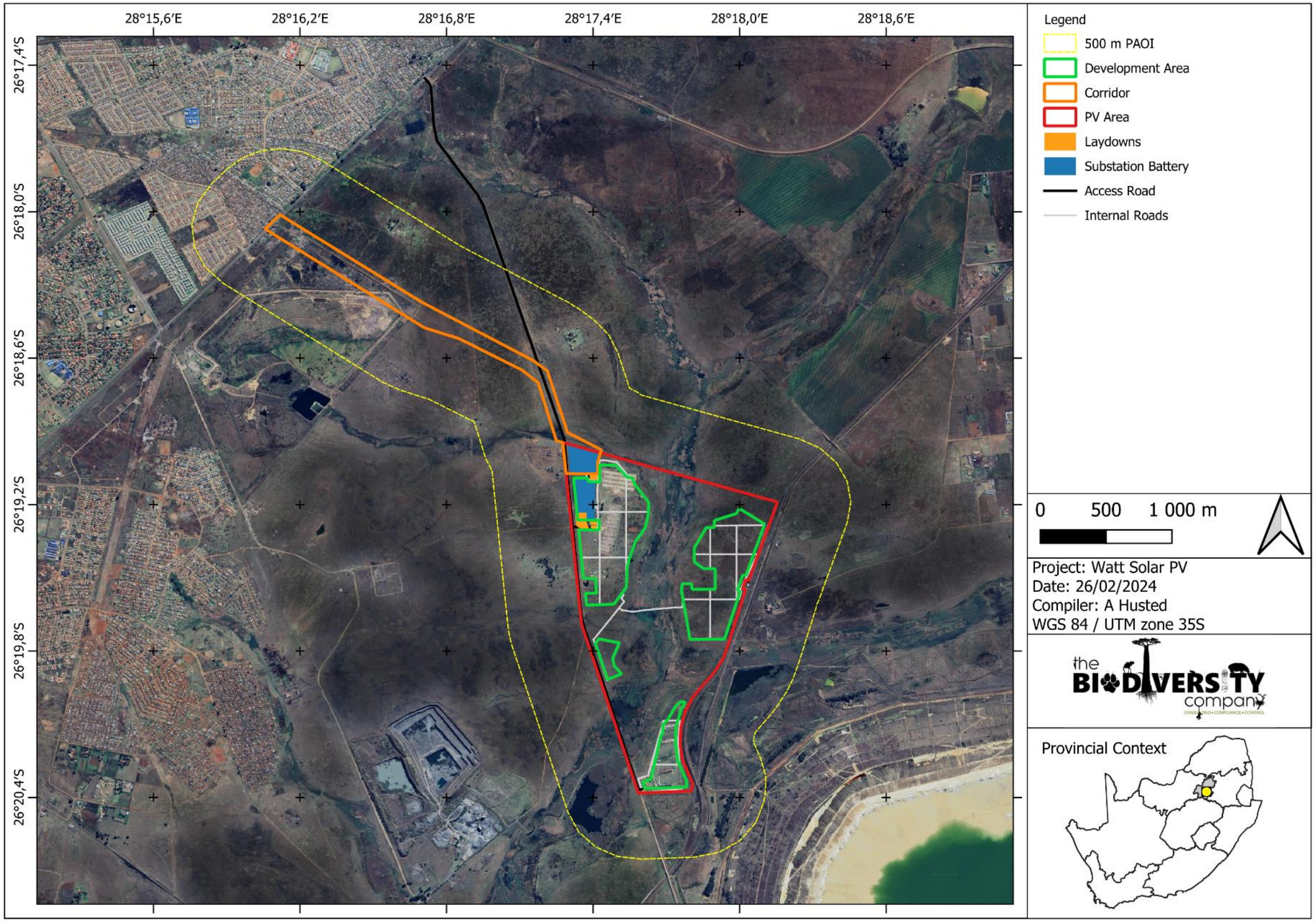

Figure 1-2 The proposed layout

1.2 Terms of Reference

The following tasks were completed in fulfilment of the terms of reference for this assessment:

- The delineation, classification and assessment of wetlands within 500 m of the project area;
- Conduct risk assessments relevant to the proposed activity;
- Recommendations relevant to associated impacts; and
- Report compilation detailing the baseline findings.

1.3 Key Legislative Requirements

1.3.1 National Water Act (NWA, 1998)

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; and
- 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; and
- 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).

1.3.2 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, states 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 Methods

A wetland site visit was conducted on the 31st August 2023, constituting a dry season survey.

2.1 Identification and Mapping

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 2-1. The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
    - The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

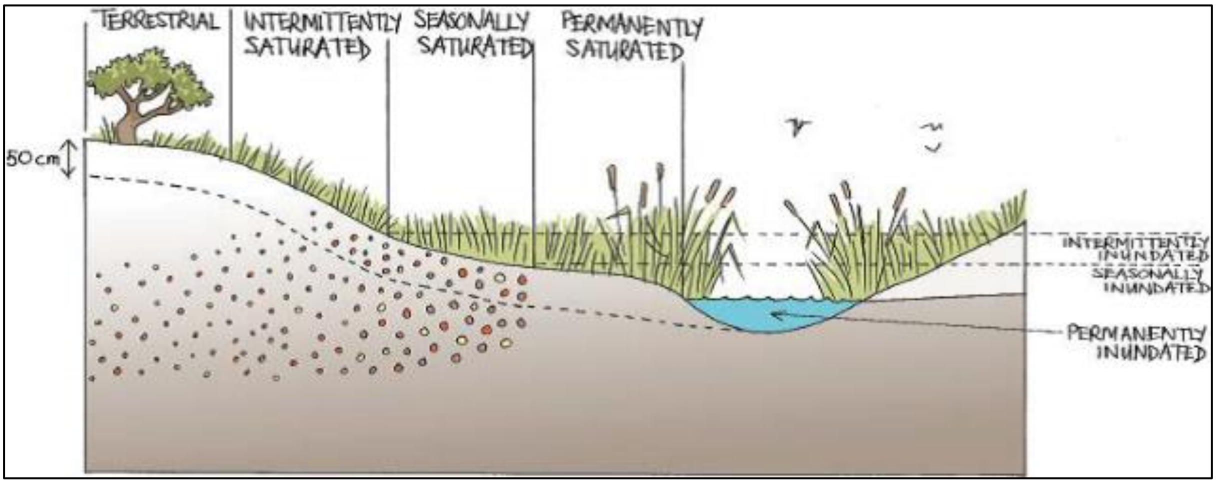

Figure 2-1 Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al. 2013)

2.2 Delineation

The wetland indicators described above are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions.

2.3 Functional Assessment

Wetland Functionality refers to the ability of wetlands to provide healthy conditions for the wide variety of organisms found in wetlands as well as humans. Eco Services serves as the main factor contributing to wetland functionality.

The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-EcoServices (Kotze *et al*. 2008). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 2-1).

Table 2-1 Classes for determining the likely extent to which a benefit is being supplied

Score	Rating of likely extent to which a benefit is being supplied
< 0.5	Low
0.6 - 1.2	Moderately Low
1.3 - 2.0	Intermediate
2.1 - 3.0	Moderately High
> 3.0	High

2.4 Present Ecological Status

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State categories are provided in Table 2-2.

Table 2-2 The Present Ecological Status categories (Macfarlane, et al., 2008)

Impact Category	Description	Impact Score Range	PES
None	Unmodified, natural	0 to 0.9	A
Small	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.0 to 1.9	B
Moderate	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	6.0 to 7.9	E
Critical	Critical Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

2.5 Importance and Sensitivity

The importance and sensitivity of water resources is determined to establish resources that provide higher than average ecosystem services, biodiversity support functions or are particularly sensitive to impacts. The mean of the determinants is used to assign the Importance and Sensitivity (IS) category as listed in Table 2-3.

Table 2-3 Description of Importance and Sensitivity categories

IS Category	Range of Mean	Recommended Ecological Management Class
Very High	3.1 to 4.0	**A**
High	2.1 to 3.0	**B**
Moderate	1.1 to 2.0	**C**
Low Marginal	< 1.0	**D**

2.6 Ecological Classification and Description

The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) will be considered for this study. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, and then also includes structural features at the lower levels of classification (Ollis *et al.,* 2013).

2.7 Recommended Ecological Category / Management Objective

The Recommended Ecological Category (REC) and Recommended Management Objective (RMO) (Table 4-4) was determined based on the results obtained from the PES and EIS of the assessed wetlands, with the objective of recommending how a water resource should be managed. This is achieved by either maintaining or improving the ecological integrity of the wetland in order to ensure continued ecological functionality (DWA, 1999).

Table 2-4 Recommended Ecological Category / Management Objectives for water resources based on PES & EIS scores

			Ecological Importance and Sensitivity			
			Very High	*High*	*Moderate*	*Low*
PES	*A*	Pristine	A Maintain	A Maintain	A Maintain	A Maintain
	B	Natural	A Improve	A/B Improve	B Maintain	B Maintain
	C	Good	A Improve	B/C Improve	C Maintain	C Maintain
	D	Fair	C Improve	C/D Improve	D Maintain	D Maintain
	E/F	Poor	D Improve	E/F Improve	E/F Maintain	E/F Maintain

2.8 Buffer Requirements

The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane *et al.,* 2014) was used to determine the appropriate buffer zone for the proposed activity.

2.9 Risk Assessment (DWS, 2016)

The Department of Water and Sanitation (DWS) risk matrix assesses impacts in terms of consequence and likelihood. The significance (product of the likelihood and consequence) of the impact is then rated according to Table 2-5.

Table 2-5 Significance ratings (DWS, 2016)

Rating	Class	Management Description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s)impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

2.10 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The focus area was based on the spatial files provided by the client and any alterations to the area and/or missing GIS information would have affected the area surveyed;
- Only the outline of the site and a workplan map was provided to the specialist;
- The GPS used for the survey has a 5 m accuracy and therefore any spatial features may be offset by 5 m; and
- Where inaccessible, areas within the broader 500m PAOI were assessed via desktop only.

3 Receiving Environment

3.1 Vegetation Type

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all biomes excluding desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

a) Seasonal precipitation; and
b) The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

On a fine-scale vegetation type, the PV development area overlaps with the Tsakane Clay Grassland vegetation type (Figure 3-1).

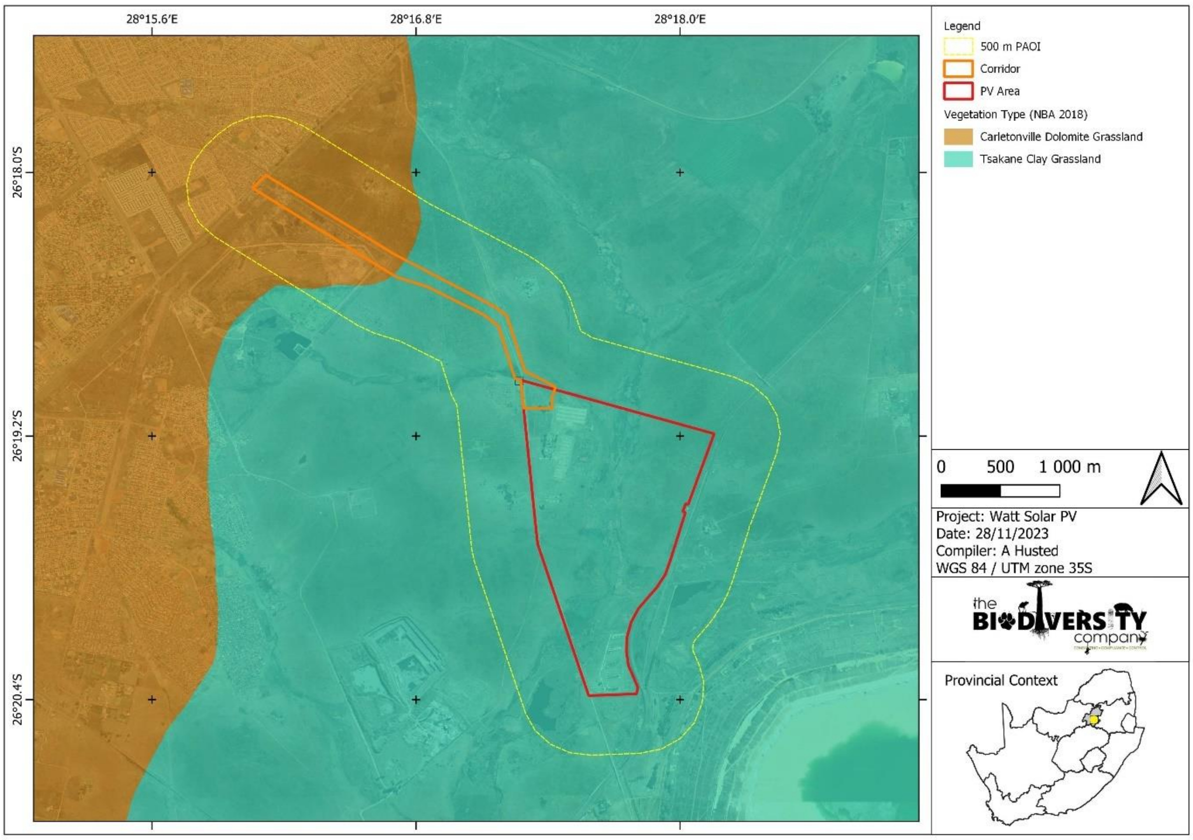

Figure 3-1 Map depicting the vegetation type associated with the project area.

The Tsakane Clay Grassland vegetation type occurs in patches extending from Soweto and Springs, southwards to Nigel and Vereeniging. It also occurs north of the Vaal Dam and between the towns of Balfour and Standerton (Mucina & Rutherford 2006). Flat to slightly undulating plains and low hills are characteristic of Tsakane Clay Grassland vegetation types.

According to Mucina and Rutherford (2006), the Tsakane Clay Grassland vegetation type is classified as Endangered. The national target for conservation protection for this vegetation type is 24%, with only 1.5% conserved in statutory reserves (Suikerbosrand, Olifantsvlei, Klipriviersberg, Marievale) and a small portion also in private nature reserves (Avalon, Ian P. Coetser, Andros). More than 60% has been transformed by cultivation, urbanisation, mining, dam-building and roads. Large portions of Alberton, Springs, Tsakane and part of Soweto (all south and east of Johannesburg) were built in the area of this vegetation unit. Urbanisation is increasing and further expansion of especially the southern suburbs of Johannesburg and the towns of the East Rand (especially the Brakpan District) will bring further pressure on the remaining vegetation.

3.2 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 – 2006), the PV development area is characterized by Ba 1 land type (Figure 3-2). Figure 3-3 illustrates the respective terrain units relative to the most prevalent land use type (i.e., Ba 1 land type). The geology is described as quartzite, shale, slate, sandstone, diabase and lava of the Witwatersrand Supergroup; also, of the Black Reef Formation and Pretoria Group of the Transvaal Sequence; chert and dolomite of the Chuniespoort Group, Transvaal Sequence.

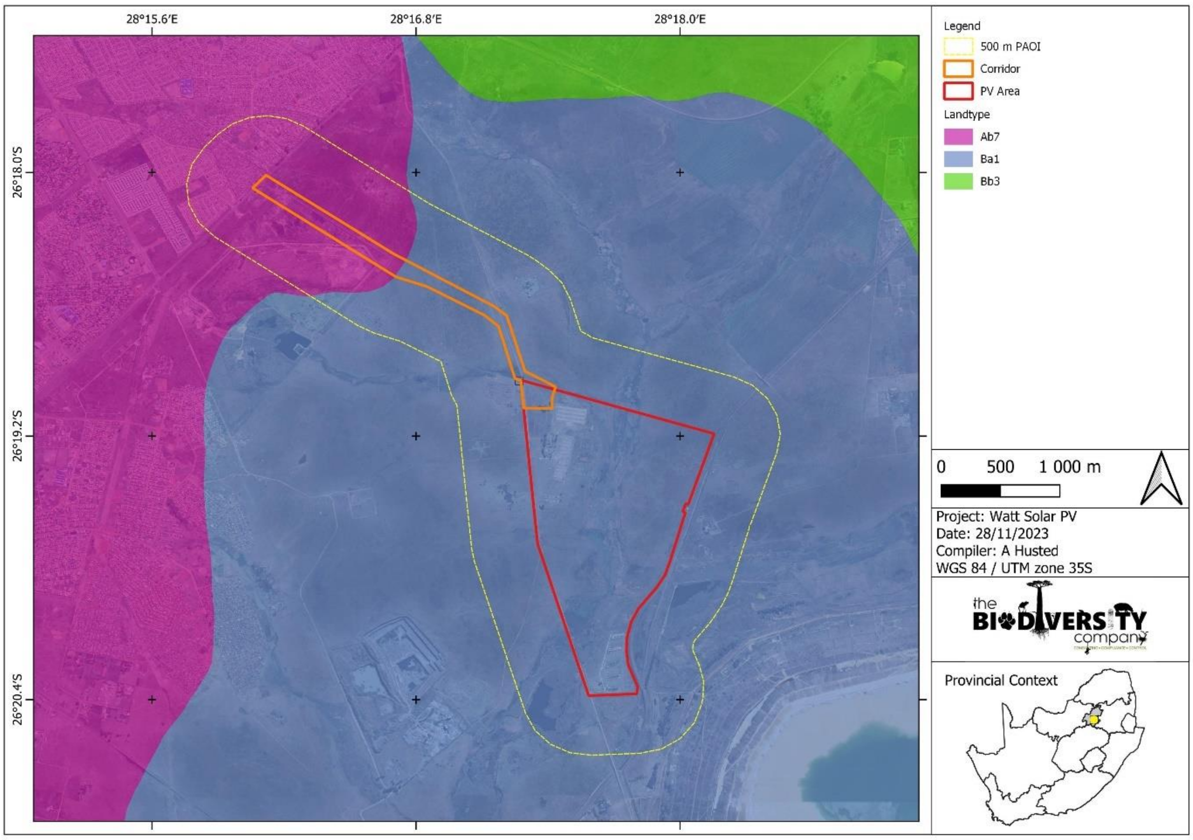

Figure 3-2 Map depicting the land types associated with the project area.

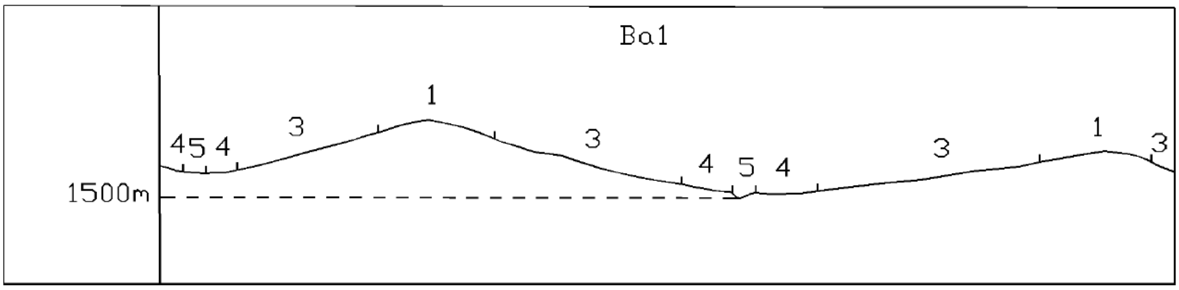

Figure 3-3 Illustration of land type Ba 1 terrain unit (Land Type Survey Staff, 1972 – 2006).

3.3 Climate

The Gm 9 Tsakane Clay Grassland and Gh 15 Carletonville Dolomite Grassland vegetation type. The Tsakane Clay Grassland is characterised by strong seasonal summer rainfall, with very dry winters. The Mean Annual Precipitation (MAP) ranges from 630 – 720 mm. The overall Mean Annual Temperature (MAT) of 15°C indicates a transition between a cool-temperate and warm-temperate climate. The incidence of frost is frequent, increasing towards the southeast. The Carletonville Dolomite Grassland is characterised by slightly undulating plains dissected by prominent rocky chert ridges and high summer temperatures. The Mean Annual Precipitation (MAP) of 593 mm (Figure 3-4) (Mucina & Rutherford, 2006).

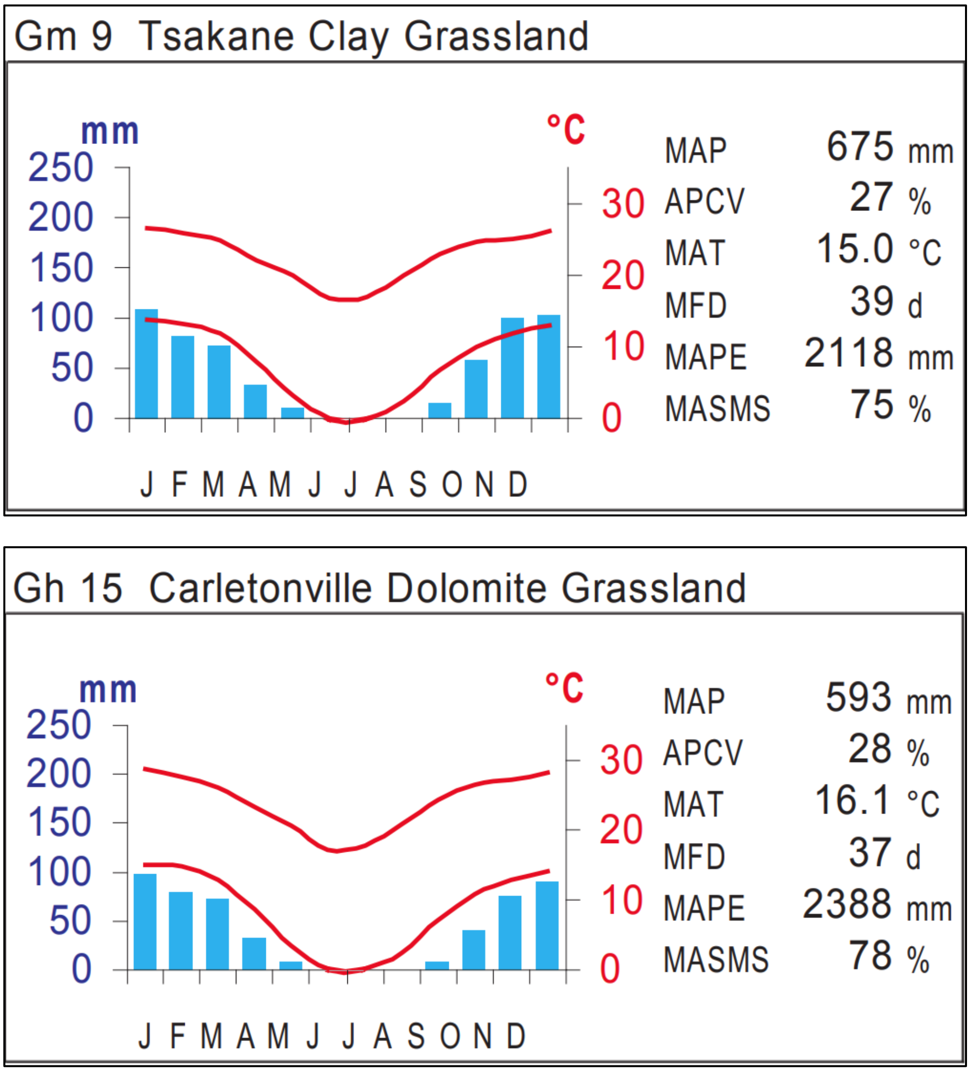

Figure 3-4 Climatic classification for the Gm 9 Tsakane Clay Grassland

3.4 South African Inventory of Inland Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released in conjunction with the NBA 2018. The Ecosystem Threat Status (ETS) of river and wetland ecosystems are categorised based on the extent to which each ecosystem type has been altered from its natural condition. Ecosystem types are categorised as CR (Critical), EN (Endangered), VU (Vulnerable) or LC (Least Concern). CR, EN and VU ecosystem types are collectively referred to as “threatened” (Van Deventer et al., 2019; Skowno et al., 2019). The proposed project area overlaps with CR SAIIAE wetlands (Figure 3-5).

3.5 National Freshwater Ecosystem Priority Areas

To better conserve aquatic ecosystems, South Africa has categorised its river and wetland systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify National Freshwater Ecosystem Priority Areas (NFEPAs) (Driver et al., 2011). NFEPAs are intended to serve as conservation support tools envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act’s (NEM:BA) biodiversity goals (Nel et al., 2011). The project area does not overlap with any unclassified or classified NFEPA wetlands, nor any NFEPA rivers (Figure 3-5).

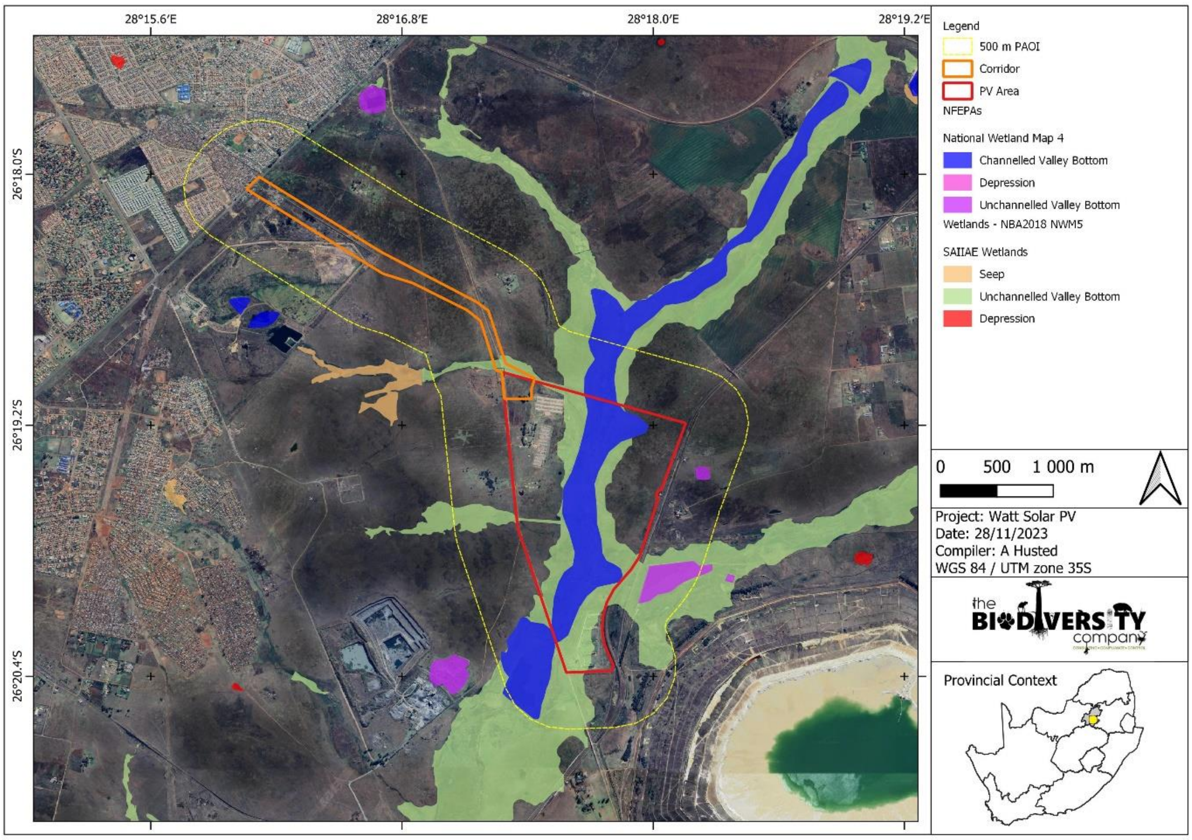

Figure 3-5 ***Map depicting the project area relative to the SAIIAE and NFEPA wetlands and rivers.***

4 Field Assessment

4.1 Delineation and Description

Four (4) wetland hydro-geomorphic (HGM) types were identified and delineated for the regulated area, these comprised of eight (8) distinct HGM units, namely unchannelled and channelled valley bottom systems, hillslope seepage systems and a depression. The level 1-4 classification for these HGM units, as per the national wetland classification system (Ollis *et al.,* 2013), is presented in (Table 4-1). A map showing the extent of these wetlands is shown in Figure 4-1. Photographs of systems and features identified for the project are presented in Figure 4-2. It is assumed that systems of a similar type, and also positioned in a similar landscape are likely to provide similar ecological services. Only systems at an appreciable level of risk of the project (i.e. traversed or proximal to infrastructure) have been classified and further assessed. Due to the artificial characteristics of some of the identified seepage areas and dams, no further assessment has been completed for these systems.

A depression (dam) was identified and delineated for this assessment. According to Ollis et al (2013) a depression is formed by excavation, which is an artificial depression created by digging out material from the ground. An artificial sub-category (Ollis et al, 2013) defines a dam as an 'artificial body of water created specifically for the storage of water, and which is not located along the course of a river'. This systems, HGM 5 has been delineated for the purposes of this report, but no further assessment has been completed.

The identified seepage wetlands (HGM 8) delineated for the project have been partially formed through artificial means. The systems are located adjacent to waste impoundments. Water infiltrates waste impoundments during rainfall events and seeps out in areas without the presence of successful trenches. These trenches are purposed to intercept (for diversion) any infiltrating water.

The depression, delineated as HGM 5, was an excavation, with a deeper pit in the middle, and a low level of surface water present at the time of the survey, followed by a shelf covered in large rocks which was situated slightly higher than the pit containing the water. These excavations can accumulate water overtime, as well as possibly contain hydrophytes, however they are still categorised as artificial systems. No hydrophytes or other vegetation was present within the depression.

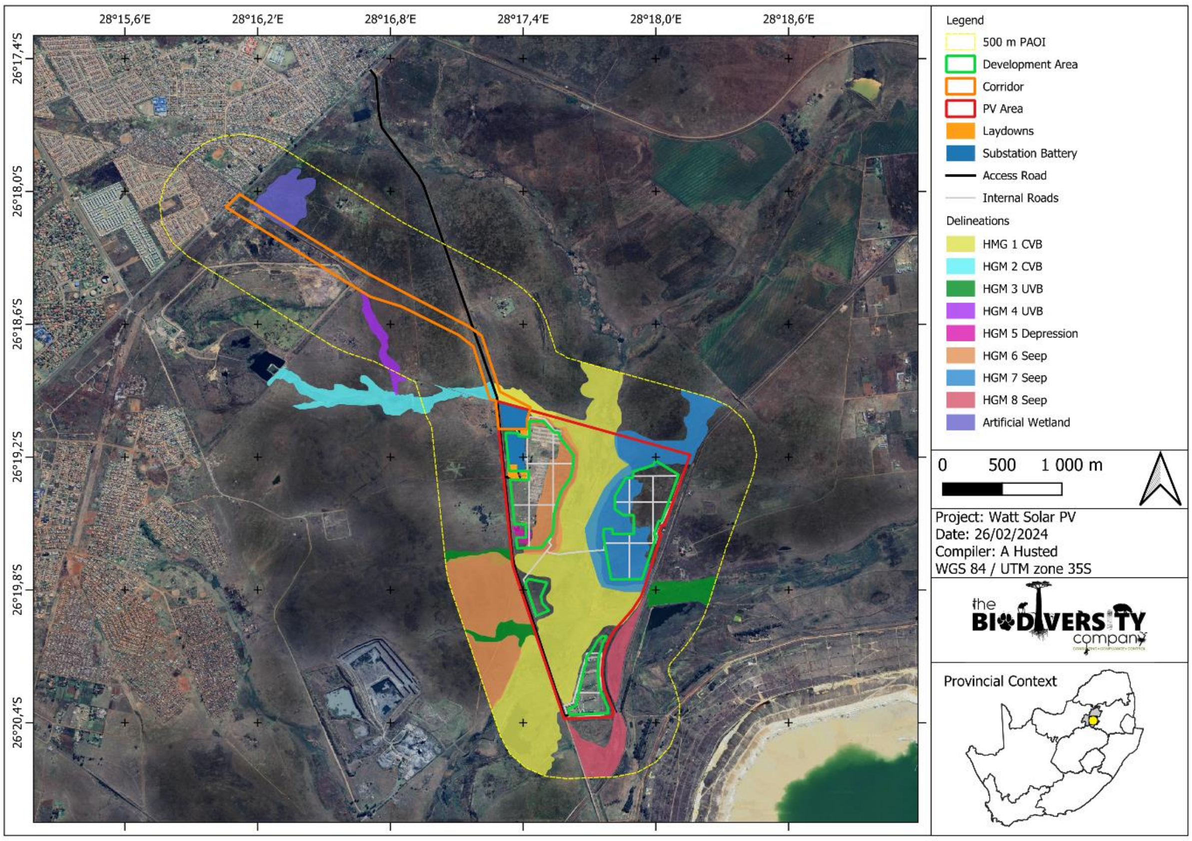

Figure 4-1 The delineated water resources in relation to the PAOI

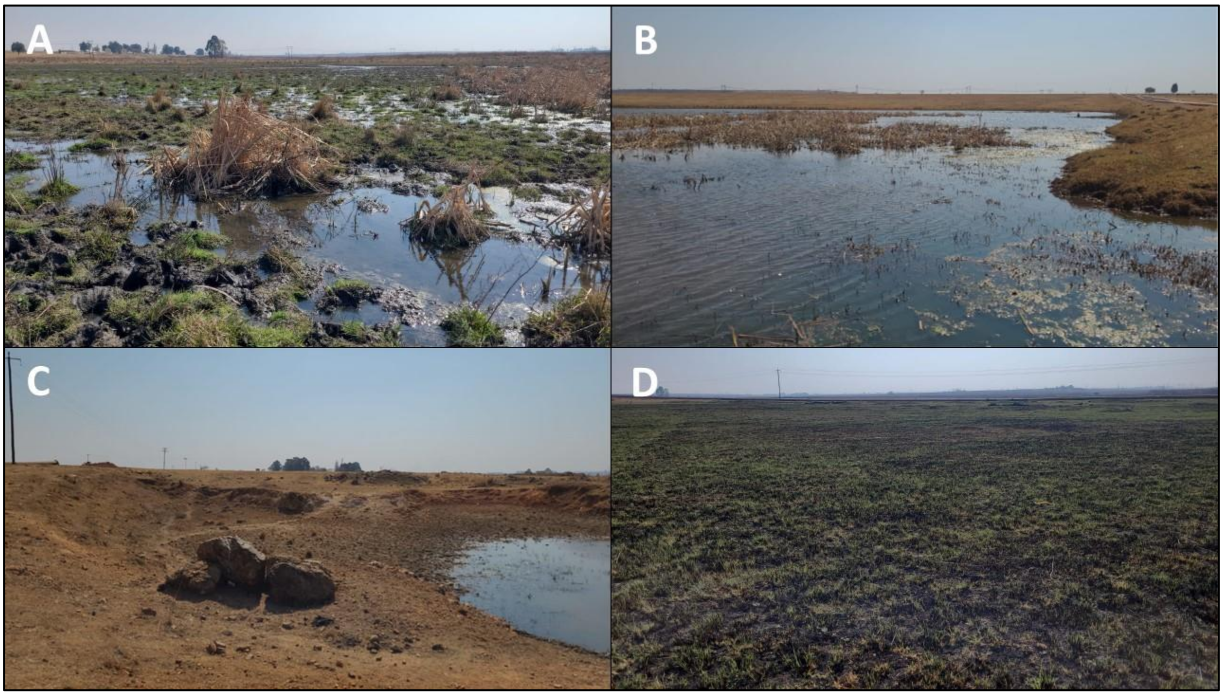

Figure 4-2 ***Photographical evidence of the different wet areas. A & B) Channelled valley-bottoms; C) Artificial depression; and D) Seep***

4.2 Unit Identification

The wetland classification as per SANBI guidelines (Ollis et al., 2013) is presented in Table 4-1. Four wetland types were identified within the project area, namely unchannelled and channelled valley-bottom systems, hillslope seepages and a depression.

Table 4-1 Wetland classification as per SANBI guideline (Ollis et al. 2013)

Wetland System	Level 1	Level 2		Level 3	Level 4		
	System	DWS Ecoregion/s	NFEPA Wet Veg Group/s	Landscape Unit	4A (HGM)	4B	4C
HGM 1 & 2	Inland	Highveld	Mesic Highveld Grassland Group 2	Valley floor	Unchannelled Valley Bottom	N/A	N/A
HGM 3 & 4	Inland	Highveld	Mesic Highveld Grassland Group 2	Valley floor	Channelled Valley Bottom	N/A	N/A
HGM 5	Inland	Highveld	Mesic Highveld Grassland Group 2	Slope	Depression	Dammed	N/A
HGM 6 - 8	Inland	Highveld	Mesic Highveld Grassland Group 2	Slope	Seep	With channelled outflow	N/A

4.3 Unit Setting

Channelled valley bottom wetlands are typically found on valley floors with a clearly defined, finite stream channel and lacks floodplain features, referring specifically to meanders. Channelled valley bottom wetlands are known to undergo loss of sediment in cases where the wetlands' slope is steep and the deposition thereof in cases of low relief. Figure 4-3 presents a diagram of a typical channelled valley bottom, showing the dominant movement of water into, through and out of the system.

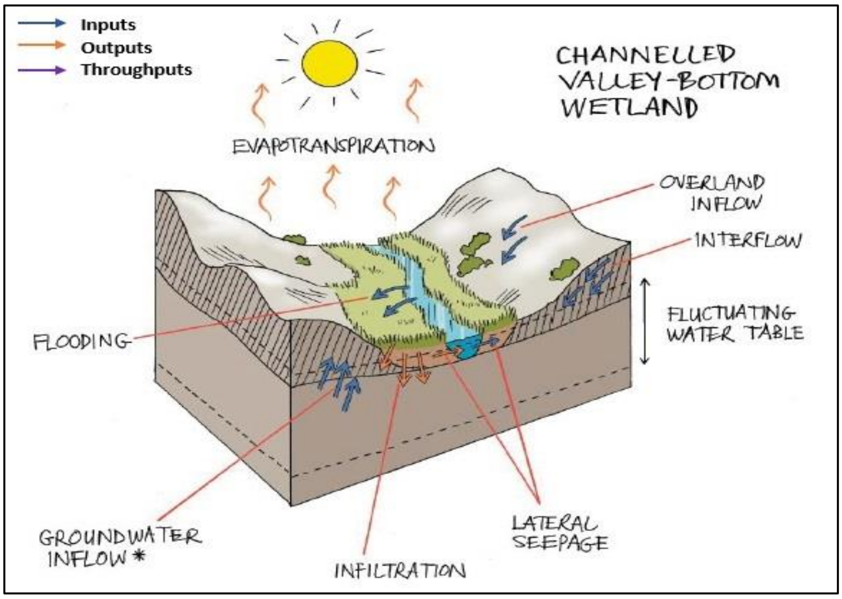

Figure 4-3 ***Amalgamated diagram of a typical channelled valley bottom, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al. 2013)***

Unchannelled valley bottom wetlands are typically found on valley floors where the landscape does not allow high energy flows. Figure 4-4 presents a diagram of a typical unchannelled valley bottom wetland, showing the dominant movement of water into, through and out of the system.

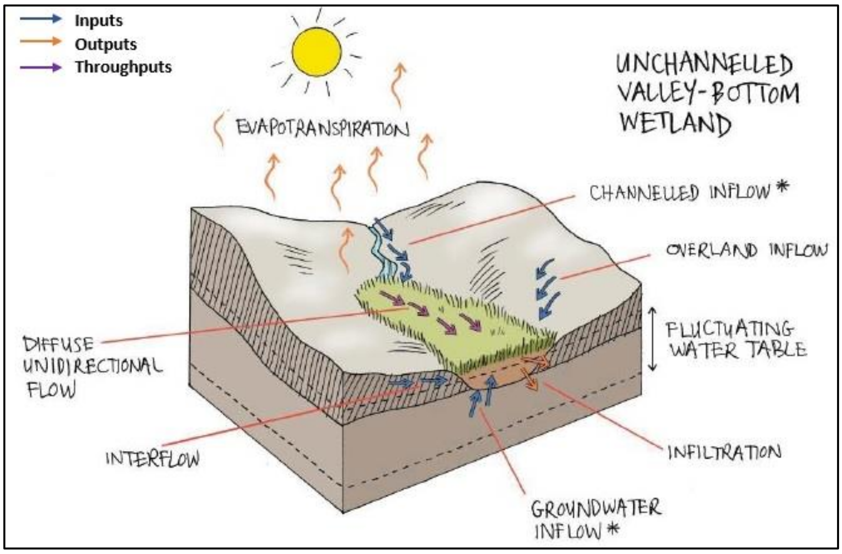

Figure 4-4 ***Amalgamated diagram of an unchannelled valley-bottom, highlighting the dominant water inputs, throughputs, and outputs, SANBI guidelines (Ollis et al. 2013)***

A typical hillslope seep is located within slopes, as displayed in Figure 4-5. Isolated hillslope seeps are characterised by colluvial movement of material. These systems are fed by very diffuse sub-surface flows which seep out at very slow rates, ultimately ensuring that no direct surface water connects this wetland with other water courses within the valleys. Figure 4-5 illustrates a diagram of the hillslope seeps, showing the dominant movement of water into, through and out of the system.

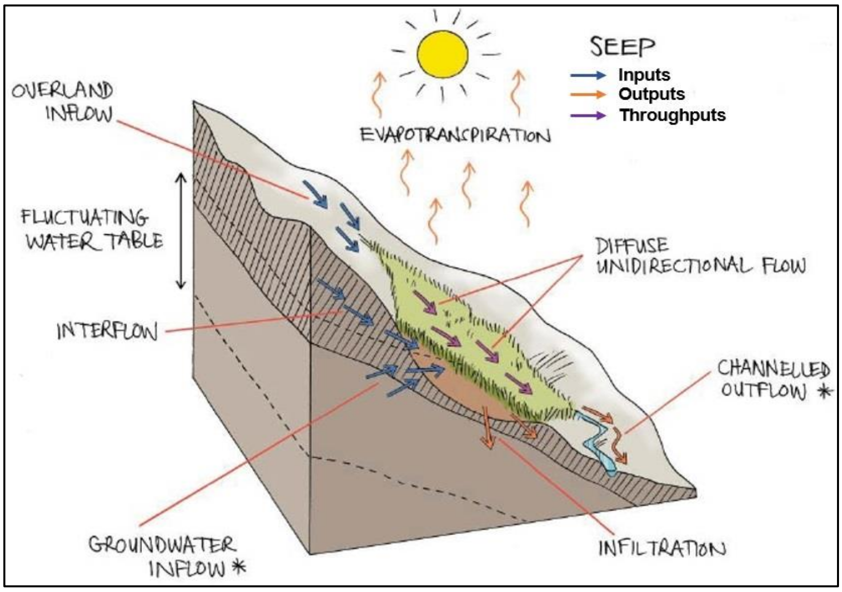

Figure 4-5 Amalgamated diagram of a typical hillslope seep, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al. 2013)

The DWAF (2005) manual separates the classification of watercourses into three (3) separate types of channels or sections defined by their position relative to the zone of saturation in the riparian area. The classification system separates channels into:

- those that do not have baseflow ('A' Sections);
- those that sometimes have baseflow ('B' Sections) or non-perennial; or
- those that always have baseflow ('C' Sections) or perennial.

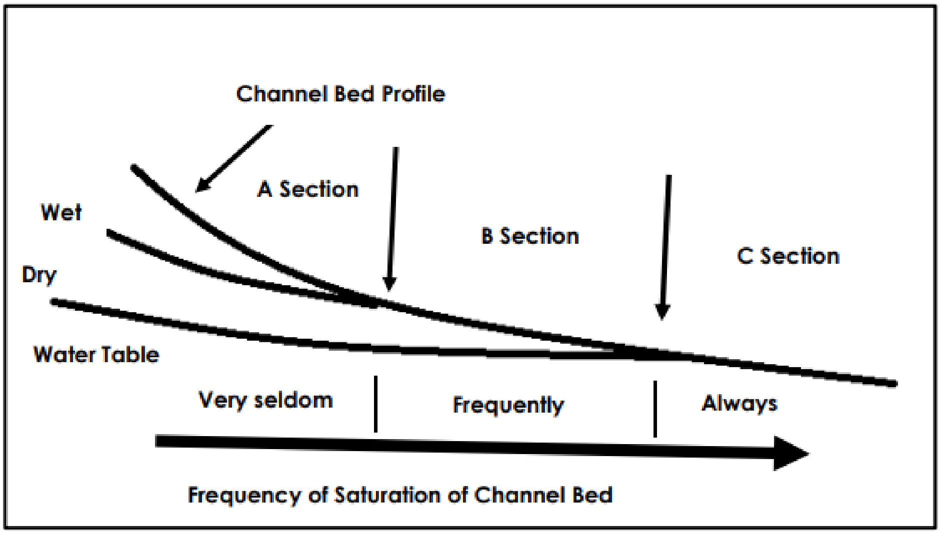

Figure 4-6 The watercourse classifications (DWAF, 2005)

4.4 General Functional Description

Unchanneled valley-bottoms are characterised by sediment deposition, a gentle gradient with streamflow generally being spread diffusely across the wetland, ultimately ensuring prolonged saturation levels and high levels of organic matter. The assimilation of toxicants, nitrates and phosphates are usually high for unchanneled valley-bottom wetlands, especially in cases where the valley is fed by sub-surface interflow from slopes. The shallow depths of surface water within this system adds to the degradation of toxic contaminants by means of sunlight penetration.

Channelled valley bottom wetlands tend to contribute less to sediment trapping and flood attenuation than other systems. Channelled valley bottom wetlands are well known to improve the assimilation of toxicants, nitrates and sulphates, especially in cases where sub-surface flows contribute to the system's water source (Kotze et al., 2009).

Hillslope seeps are well documented by (Kotze et al., 2009) to be associated with sub-surface ground water flows. These systems tend to contribute to flood attenuation given their diffuse nature. This attenuation only occurs while the soil within the wetland is not yet fully saturated. The accumulation of organic material and sediment contributes to prolonged levels of saturation due to this deposition slowing down the sub-surface movement of water. Water typically accumulates in the upper slope (above the seep). The accumulation of organic matter additionally is essential in the denitrification process involved with nitrate assimilation. Seeps generally also improve the quality of water by removing excess nutrient and inorganic pollutants originating from agriculture, industrial or mine activities. The diffuse nature of flows ensures the assimilation of nitrates, toxicants and phosphates with erosion control being one of the Eco-Services provided very little by the wetland given the nature of a typical seep's position on slopes

It is however important to note that the descriptions of the above-mentioned functions are merely typical expectations. All wetland systems are unique therefore, the ecosystem services ratings for the wetlands on site may differ slightly to the general expectation given by the nature of the wetland type in relation to its topographic setting.

4.5 Functional Assessment

The ecosystem services provided by the wetland units identified on site were assessed and rated using the WET-EcoServices method (Kotze et al., 2008). The overall goods and services provided by the wetland units was determined to be moderately low.

Despite the decreased ecological integrity of the wetland systems, the valley bottom systems still provide a moderately high level of indirect benefits (ecological services) such as assimilation of nitrates, phosphates and toxicants. Ecoservices such as biodiversity maintenance, erosion control and carbon storage are provided by the wetland at an intermediate level. The artificial system can contribute towards a generally low level of ecosystem service benefit, but some services such as sediment trapping and assimilation of nitrates, phosphates and toxicants are often not achieved. The artificial system can provide habitat for some faunal species and thus contribute to maintaining biodiversity.

The wetlands are not considered important in terms of their direct provisioning of harvestable resources and cultivated foods for humans as the systems are not actively cultivated.

Table 4-2 Summary of Ecosystem service scores for units

				Wetland Unit	HGM		
					1 & 2	3 & 4	6 - 8
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits		Flood attenuation	1.4	0.9	0.6
				Streamflow regulation	0.9	0.7	0.4
			Water Quality enhancement benefits	Sediment trapping	2.1	1.2	0.5
				Phosphate assimilation	2.0	1.3	0.4
				Nitrate assimilation	1.8	1.3	1.8

		Toxicant assimilation	1.9	1.2	1.9
		Erosion control	2.0	1.2	1.7
		Carbon storage	1.5	0.8	1.1
		Biodiversity maintenance	0.9	0.7	0.7
Direct Benefits	**Provisioning benefits**	Provisioning of water for human use	0.0	0.0	0.0
		Provisioning of harvestable resources	0.0	0.0	0.0
		Provisioning of cultivated foods	0.0	0.0	0.0
	Cultural benefits	Cultural heritage	0.0	0.0	0.0
		Tourism and recreation	0.2	0.2	0.2
		Education and research	0.3	0.3	0.3
Overall			**15.0**	**9.8**	**9.6**
Average			**1.0**	**0.7**	**0.6**

4.5.1 Present Ecological Status

The present ecological state (PES) of the wetlands identified within the project area is provided in the table below. The integrity of the systems was determined to be Largely Modified (class D). The land uses in the area have changed from natural to agricultural, and more recently include mining activities. The expansion of mining in the area has required the traversing of watercourses, and also the placement of mining infrastructure proximal to wetland systems. The land use changes of the area have also altered (or reduced) the catchment area, and this has also contributed to changes in topography and surface flows. The anthropogenic development of the catchment has contributed towards the altered hydrological regime of the systems, caused by the discharge of mine/treated water into the system. This altered regime has also contributed to geomorphological deterioration, with the extended retention time and also the increase in water volumes through the system. Areas have been cleared to accommodate development of the area, and these disturbances have also contributed to the infestation of alien vegetation to the area.

Considering the anthropogenic activities and influences within the landscape, several negative impacts to wetlands are currently expected for the area. These include:

- Concentrated flows from water discharge contributing to channel straightening and also incisions;
- Encroachment of infrastructure across watercourse, contributing to concentrated flows beneath infrastructure, causing erosion and channel straightening;
- Proximity of mining and ancillary activities to wetlands, likely contributing to impaired water quality;
- The fragmentation of watercourse reaches and reduced connectivity caused by infrastructure; and
- Loss of catchment area and also surface runoff due to the development of the area, and subsequent containment of ‘dirty’ water.

Table 4-3 Summary of PES Scores

	Hydrology		Geomorphology		Vegetation	
	Rating	Score	Rating	Score	Rating	Score
HGM 1 & 2	D: Largely Modified	5.5	D: Largely Modified	4.7	C: Moderately Modified	3.5
	4.7		Overall PES Class		D: Largely Modified	
HGM 3 & 4	E: Seriously Modified	**6.5**	D: Largely Modified	**5.5**	C: Moderately Modified	3.7
	5.4		Overall PES Class		D: Largely Modified	
HGM 6 - 8	E: Seriously Modified	**5.5**	D: Largely Modified	**4.9**	C: Moderately Modified	4.4
	5.0		Overall PES Class		D: Largely Modified	

4.5.2 Importance and Sensitivity

The results of the ecological IS assessment are shown in Table 4-4. Various components pertaining to the protection status of a wetland are considered for the IS, including Strategic Water Source Areas (SWSA), the NFEPA wetland vegetation (wet veg) threat status and the protection level of the wetland. At a regional scale, the NFEPA Wetveg database recognises valley bottom and seepage wetland types within the Mesic Highveld Grassland Group 2as Endangered / Critically Endangered (Nel and Driver, 2012). The IS for the units was calculated to be “High”. The proposed development area is partially classified as a Critical Biodiversity Area (CBA 2)

Table 4-4 The IS results for the delineated HGM unit

HGM Type	NFEPA Wet Veg			NBA Wetlands			SWSA (Y/N)	Calculated IS
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018	Ecosystem Protection Level		
Unchannelled valley-bottom	Mesic Highveld Grassland Group 2	Endangered	Not Protected	Class D (Largely Modified)	Critically Endangered	Not Protected	N	High
Channelled valley-bottom	Mesic Highveld Grassland Group 2	Critically Endangered	Not Protected	Class D (Largely Modified)	Critically Endangered	Not Protected	N	High
Hillslope seep	Mesic Highveld Grassland Group 2	Critically Endangered	Poorly Protected	Class D (Largely Modified)	Critically Endangered	Not Protected	N	High

4.6 Recommended Ecological Category / Management Objective

The REC and RMO for the features of the wetland areas was determined from the results of the PES and ecological IS assessments. These assessments indicated that all wetland features within the site, had to an extent, undergone transformation as a result of historical and current impacts, disruption of the hydrological cycle and anthropogenic activities. Nevertheless, despite the altered ecological integrity of these systems, they are considered to provide important ecological services. The appropriate REC and RMO estimated for the wetland areas is presented in Table 4-5 below.

Table 4-5 Summary of the REC and RMO categories assigned to all wetland features

Feature	REC – RMO
HGM 1 & 2	C/D Improve
HGM 3 & 4	C/D Improve

HGM 6 - 8	C/D Improve

4.7 Buffer Requirements

It is worth noting that the scientific buffer calculation (Macfarlane et al., 2014) was used to determine the size of the buffer zones relevant to the proposed project. A pre-mitigation buffer of 32 m and a post-mitigation buffer of 25 m and 15 m is recommended for the PV development area and grid route respectively. In the Province of Gauteng, the GDARD requires a buffer zone of 30 m and 50 m (GDARD, 2014) be allocated to wetland areas inside and outside urban areas respectively. A 50 m buffer zone has been allocated to the delineated wetland areas presented in Figure 6-2.

4.8 Regulation Zones

Table 4-6 presents the legislated zones of regulation that would be applicable to the wetland areas.

In accordance with General Notice (GN) 509 of 2016 as it relates to the NWA (1998), a regulated area of a watercourse for Section 21 (c) and 21 (i) of the NWA, 1998 means the outer edge of the 1 in 100 year flood or where no flood line has been determined it means 100 m from the edge of a watercourse or a 500 m radius from the delineated boundary (extent) of any wetland or pan.

Listed activities in terms of the NEMA (1998), (Act 107 of 1998) EIA Regulations as amended in April 2017 must be taken into consideration if any infrastructure is to be placed within the applicable zone of regulation. In this regard, there is no proposed infrastructure for the related activities as they relate to dewatering the mining pit and using the water for dust suppression.

Table 4-6 Legislated zones of regulation

Regulatory authorisation required	Zone of applicability
Water Use License Application in terms of the National Water Act, 1998 (Act No. 36 of 1998). Department of Water and Sanitation (DWS)	Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998). In accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as: • the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; • in the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or • a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.
Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended. Department of Environmental Affairs and Development Planning (DEA&DP)	Activity 12 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended) states that: The development of: (xii) Infrastructure or structures with a physical footprint of 100 square meters or more; Where such development occurs— **a)** Within a watercourse; **b)** In front of a development setback; or **c)** If no development setback has been adopted, within 32 meters of a watercourse, measured from the edge of a watercourse. Excluding – (dd) where such development occurs within an urban area…

	Activity 19 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended) states "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."

5 Site Sensitivity Verification

5.1 Screening Report

The following was deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- The National Web-based Environmental Screening Tool has characterised the Aquatic Biodiversity Theme sensitivity as "Low" for the majority of the area (Figure 2-1), with expected wetlands classified as "Very High" sensitivity.

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	CBA 1
Very High	ESA 1
Very High	ESA 2
Very High	Rivers_EF
Very High	Rivers_Z
Very High	Wetlands_Dry Highveld Grassland Bioregion (Valley-bottom)
Very High	Wetlands_Mesic Highveld Grassland Bioregion (Valley-bottom)

Figure 5-1 ***Map of Relative Aquatic Biodiversity Theme Sensitivity for the proposed project, generated by the Environmental Screening Tool (DFFE, 2023)***

Table 5-1 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 for the respective systems.

Table 5-1 ***Summary of the Screening Tool Sensitivity versus the Specialist assigned Sensitivity***

Screening Tool Theme	Screening tool rating	Wetland Type	Specialist rating	Tool Validated or Disputed by Specialist - Reasoning
Aquatic Biodiversity Theme	Very High	Valley Bottoms	High	Rational for High rating: The delineated wetlands are listed as Endangered/Critically Endangered and Poorly/Not Protected.
	Low	Artificial	Low	Rational for Low rating: Excavation on the slope, and off-channel depression

6 Risk Assessment

6.1 Potential Impacts

This assessment has been completed in accordance with the requirements of the published Government Notice (GN) 4167 by the Department of Water and Sanitation (DWS) (previously GN 509 of 2016 and GN 3139 of 2023). The said notice was published in the Government Gazette (no. 49833) under Section 39 of the National Water Act (Act no. 36 of 1998) in December 2023, for a Water Use Licence (WUL) in terms of Section 21(c) & (i) water uses. The GN 4167 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a General Authorisation (GA), as opposed to a full Water Use Licence Application (WULA). A water use (or potential) qualifies for a GA under GN 4167 when the proposed water use/activity is subjected to analysis using the DWS Risk Assessment Matrix (RAM), provided the identified risks are all considered a low risk and the applicant is listed under Appendix D1 or Appendix D2 of the same notice. This assessment will implement the RAM and provide a specialist opinion on the favourability for a water use authorisation.

The risk assessment considered both direct and indirect impacts, if any, to the wetland systems. The proposed layout in relation to the delineated systems is presented in Figure 6-2. The mitigation hierarchy as discussed by the Department of Environmental Affairs (2013) will be considered for this component of the assessment (Figure 6-1). In accordance with the mitigation hierarchy, the preferred mitigatory measure is to avoid impacts by considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts.

A risk assessment was conducted for the proposed development. It should be noted that the assessment considers the post-mitigation risk ratings which assumes that mitigations will successfully be implemented, and that the layout will be amended to avoid wetland features and their post-mitigation buffers, unless for permissible and authorised activities. The risks posed by the proposed development to wetlands within the project areas are provided in Table 6-1 for scenarios with mitigation.

High risks are not applicable, despite the project posing direct risks to the systems, the significance of the risk is not regarded as high. This includes the upgrade of the access road between the two PV areas. Medium risk refers to wetland areas that are within the development area and possibly at a direct and also indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. The medium risks were the priority for the risk assessment, focussing on the expected potential for these indirect risks.

Due to the expected direct risks posed to the delineated systems in relation to the proposed PV facility area moderate (post-mitigation) risks are expected, despite the implementation of mitigation measures provided. Since avoidance cannot be (entirely) achieved, the focus was shifted to minimising impacts. Table 6-1 illustrates various aspects that are expected to impact upon the delineated wetlands during the respective project phases.

The risk assessment for the powerline route indicates that the pre-mitigation risk rating will be moderate due to the powerline intersecting the wetland. However, for the powerline avoidance of the wetland is possible by taking care of where the pylons of the powerlines will be located, preferably out of the wetland buffer, where possible. Therefore, the post-mitigation risks are anticipated to be “Low”. Although the risks will be minimised with the placement of the pylons outside of the wetland buffers the powerlines will still be pulled through the wetlands and some direct as well as indirect impacts will occur on the wetlands.

Upgrading the informal road and installing culverts can initially pose a risk to a wetland by disrupting natural water flows and potentially causing sedimentation and habitat disturbance. However, during the operational phase, these improvements can enhance and restore the wetland's connectivity and hydrology. Properly designed culverts facilitate the natural movement of water, allowing for better distribution and flow across the wetland, which can improve water quality and habitat conditions. Figure 6-3 presents the crossing structure for the project.

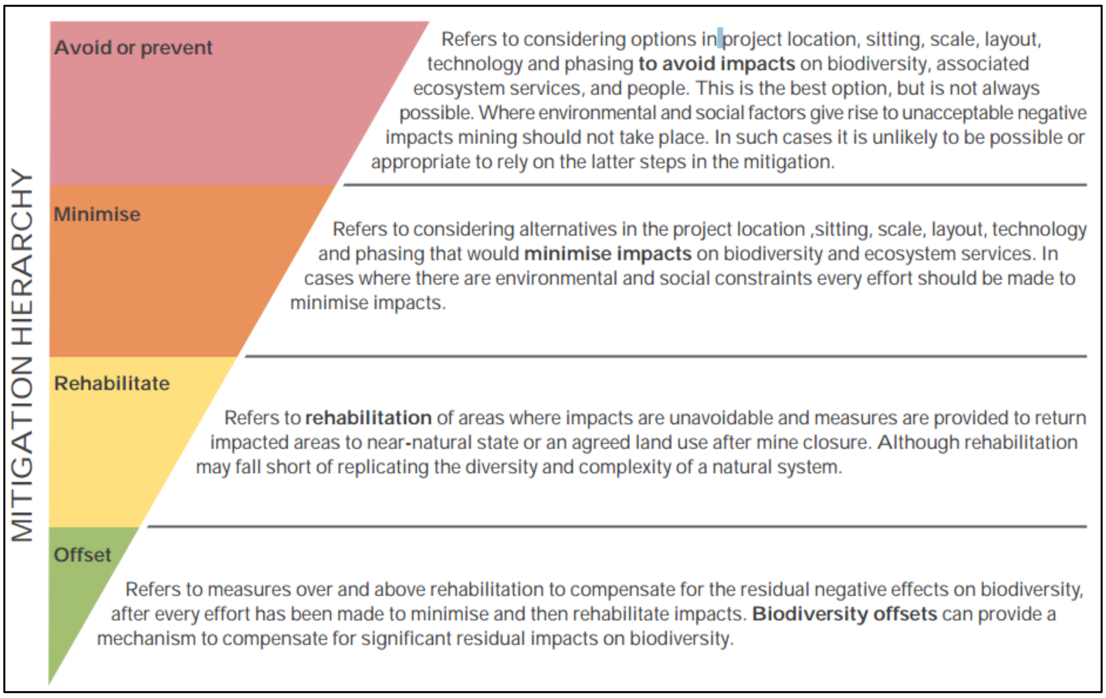

Figure 6-1 The mitigation hierarchy as described by the DEA (2013)

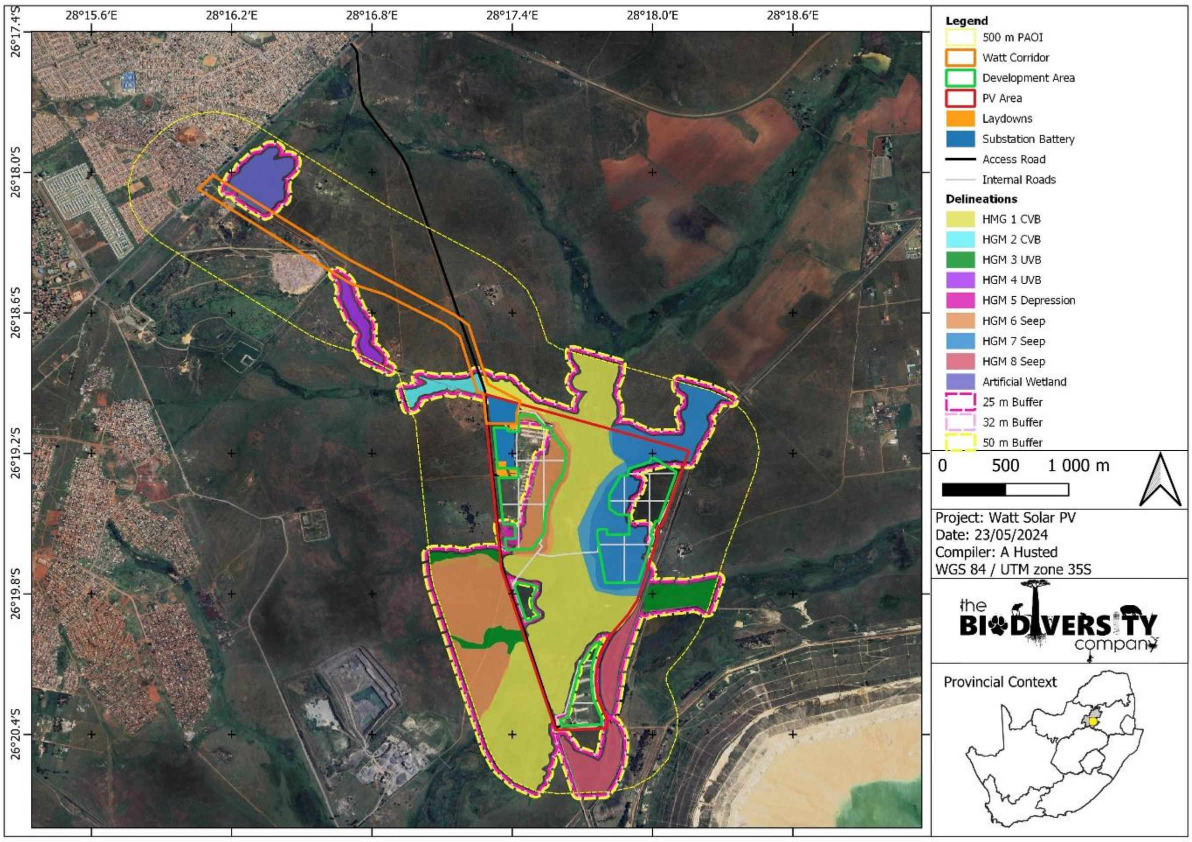

Figure 6-2 The layout in relation to the delineated systems and buffers

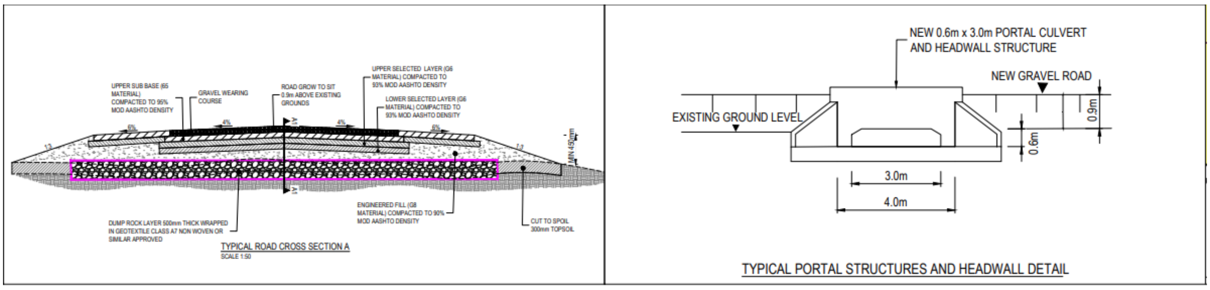

Figure 6-3 Cross section of the proposed crossing structure

6.2 Potential Aniticipated Impacts

The Risk Assessment Matrix illustrates the potential aspects expected to threaten the integrity of sensitive receptors during the proposed activities. The post-mitigation significance ratings have been calculated considering various parameters, these results are presented in the subsequent tables.

Provided that the suggested mitigations are implemented, the project is anticipated to result in predominantly “Low” post-mitigation risks to the watercourses, with two “Medium” residual risks. The greatest risk to the watercourses is expected to arise from direct disturbances within the wetland relating to close proximity of the watercourses and from altered hydrology which has the potential to induce erosion and sedimentation.

Table 6-1 DWS Risk Impact Matrix for the proposed project

Phase	Activity	Impact	Potentially affected watercourses	Significance (max = 100)	Risk Rating

			Name/s		
CONSTRUCTION	Construction/Upgrade of Internal Access Road	Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility.	HGM 1	30	M
		Proliferation of alien invasive species due to surrounding disturbances.		14.4	L
		Pollution and littering through inappropriate management of domestic and Industrial waste.		12.6	L
		Altered hydrology due to hardened surfaces and stormwater channelling		26.4	L
		Increased erosion and sedimentation.		12.6	L
		Potential contamination of wetlands with machine oils/pesticides/insecticides/herbicides and construction materials.		12.6	L
	Construction of SPP Facility and associated Infrastructure including: Site clearing and preparation, Earthworks and Vehicle Movement, Road Construction, Construction of fencing, Civil Works, Transportation and Installation of PV Panels, Wiring to Central Inverters, and Storage and Use of Hazardous substances and Equipment.	Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility.	HGM 1 HGM 6 HGM 7 HGM 8	16.8	L
		Proliferation of alien invasive species due to surrounding disturbances.		19.2	L
		Pollution and littering through inappropriate management of domestic and Industrial waste.		12.6	L
		Altered hydrology due to hardened surfaces and stormwater channelling		19.2	L
		Increased erosion and sedimentation.		16.8	L
		Potential contamination of wetlands with machine oils/pesticides/insecticides/herbicides and construction materials.		12.6	L
OPERATIONAL	Operation of Internal Access Road	Impaired water quality from use and access	HGM 1	15.6	L
		Altered hydrology due to hardened surfaces and stormwater channelling.		31.2	M
	Operation of the solar facility. Established SPP Area. Vehicle Traffic (Security Monitoring and Maintenance). Operation of on-site Stormwater Management.	Altered hydrology due to hardened surfaces and stormwater channelling.	HGM 1 HGM 6 HGM 7 HGM 8	18	L
		Increased erosion and sedimentation.		18	L
		Potential contamination of wetlands with machine oils and pesticides/herbicides/insecticides used within the facility.		16.2	L
		Pollution and littering through inappropriate management of domestic and Industrial waste.		18	L

		Continued proliferation of Alien Invasive species.		18	L
DECOMMISSIONING	Removal and Dismantlement of infrastructure. Vehicles and Equipment on roads. Rehabilitation of biophysical environment	Altered hydrology due to changing surfaces which affect the quantity of stormwater runoff.	HGM 1 HGM 6 HGM 7 HGM 8	19.2	L
		Increased erosion and sedimentation from altered hydrology and adjacent geomorphology		12.6	L
		Potential contamination of wetlands with chemicals (machine oils/fuel/pesticides/herbicides/insecticides and other potentially harmful elements).		12.6	L
		Direct disturbance / degradation / loss to wetland soils or vegetation due to inappropriate management.		16.8	L
		Pollution and littering through inappropriate management of domestic and Industrial waste.		12.6	L
		Continued proliferation of Alien Invasive species.		14.4	L

6.3 Mitigation Measures

The following measures are applicable for the construction phase:

- Avoid development within the wetland and buffer areas.
- Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area.
- The size and design of the crossing structure must be informed by the hydrology of the system, and must accommodate seasonal flows and flood events;
- A rehabilitation plan must be implemented on completion of the upgrade of the internal access road and crossing structure;
- Restrict the disturbance and clearance footprint to within 5 m on either side of the proposed powerline corridor (10 m disturbance corridor, where possible).
- When clearing vegetation, where possible allow for some vegetation cover as opposed to bare areas.
- Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area.
- Use the wetland shapefiles to signpost the edge of the wetlands closest to site.
- Educate staff and relevant contractors on the location and importance of the identified wetland through toolbox talks and by including them in site inductions as well as the overall master plan.
- All activities (including driving) must adhere to the 20 m buffer area.
- Promptly remove / control all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.
- Landscape and re-vegetate all denuded areas as soon as possible.

- Where possible, limit construction activities near (< 30 m) the wetland to winter (as much as possible) when rain is least likely to wash concrete and sand into the wetland.
- Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.
- No activities are permitted within the wetland and associated buffer areas.
- Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.
- Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.
- Appropriately stockpile topsoil cleared from the project area.
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetland.
- Ensure that no activities are permitted within the wetland and associated buffer area.

The following measures are applicable for the operational phase:

- Design and Implement an effective stormwater management plan.
- Promote water infiltration into the ground beneath the solar panels.
- Release only clean water into the environment.
- Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters (e.g. slabs of concrete with rocks cemented in).
- Re-vegetate denuded areas as soon as possible.
- Regularly clear drains.
- Minimise the extent of concreted / paved / gravel areas.
- A covering of soil and grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible then gravel is preferable over concrete or paving.
- Avoid excessively compacting the ground beneath the solar panels.
- Where possible minimise the use surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must be used do so well prior to any significant predicted rainfall events.
- Clear vegetation in line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes".
- Avoid the use of herbicides and diesel to treat stumps within the wetland and buffer areas.

- In line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes" all alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas.

The following measures are applicable for the decommissioning phase:

- Develop and implement a rehabilitation and closure plan.

- Appropriately rehabilitate the project area by ripping landscaping and re-vegetating with locally indigenous species.

6.4 Cumulative Impact

The quantitative impact of the proposed project in isolation on freshwater biodiversity is anticipated to be "Medium" due to the direct risks posed to these systems (Table 6-2). The cumulative impact of the proposed project on freshwater biodiversity is also anticipated to be "medium". It should be noted that pre-existing modifications to the wetland systems have occurred to some degree. The encroachment of the development into the systems will result in (negative) changes to the wetland's integrity and functionality conditions and some irreplaceable loss of freshwater biodiversity is anticipated. Despite these changes, and taking into account the potential to implement a compensation strategy for the remaining unaffected systems, the cumulative impact is considered to be acceptable.

Table 6-2 Cumulative Impacts to wetlands associated with the proposed project

Nature: Cumulative habitat loss within the region		
The loss and/or degradation of wetland systems		
	Local area (3)	Local area (3)
Extent	Moderate term (3)	Long term (4)
Duration	Moderate (6)	Moderate (6)
Magnitude	Probable (3)	Highly probable (4)
Probability	**Medium**	**Medium**
Significance	Moderate (3)	Moderate (3)
Status (positive or negative)	Negative	Negative
Reversibility	N/A	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

7 Conclusion

7.1 Baseline Ecology

Four (4) wetland hydro-geomorphic (HGM) types were identified and delineated for the regulated area, these comprised of eight (8) distinct HGM units, namely unchannelled and channelled valley bottom systems, hillslope seepage systems and a depression. The following is summarised from the functional assessment:

- The overall goods and services provided by the wetland units was determined to be moderately low;
- The integrity of the systems was determined to Largely Modified (class D);
- The ecological IS for the units was calculated to be High; and
- The REC/RMO was determined to be C/D Improve.

A post-mitigation buffer of 25 m and 15 m is recommended for the PV development area and grid route respectively.

The National Web-based Environmental Screening Tool has characterised the Aquatic Biodiversity Theme sensitivity as “Very High” for the expected wetland extent. The “Very High" sensitivity for the delineated systems has been determined to be “High”, considering the Critically Endangered threat status of the system.

7.2 Risk Assessment

Due to the expected direct risks posed to the delineated systems in relation to the proposed PV facility area moderate (post-mitigation) risks are expected, despite the implementation of mitigation measures provided.

The risk assessment for the powerline route indicates that the pre-mitigation risk rating will be moderate due to the powerline intersecting the wetland. However, for the powerline avoidance of the wetland is possible by taking care of where the pylons of the powerlines will be located, preferably out of the wetland buffer, where possible. Therefore, the post-mitigation risks are anticipated to be “Low”.

The risk assessment (DWS, 2016) concludes that the overall residual risk range is low to medium, and on this basis a Water Use Licence is required for this development.

7.3 Specialist Statement

Based on the results and conclusions presented in this report, it is expected that the proposed activities will pose medium and low residual risks on the wetlands. The proposed development does not pose a fatal flaw. It is the specialist opinion that the proposed project may be favourably considered for authorisation, but all prescribed mitigation measures must be considered by the Competent Authority as conditions for the authorisation.

A rehabilitation plan for the affected wetlands must be implemented, as per the requirement of the mitigation hierarchy. A wetland offset strategy is not required.

8 References

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