

## **APPENDIX E - FRESHWATER REPORT**

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# PROPOSED DEVELOPMENT OF ADAMS BATTERY ENERGY STORAGE SYSTEM (BESS) AND ASSOCIATED INFRASTRUCTURE ON FARM ADAMS NO. 328

## FRESHWATER COMPLIANCE ASSESSMENT

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**PREPARED BY:**



**Environmental Services**

**PREPARED FOR:**



**DATE:**

31 October 2022

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## DECLARATION OF INDEPENDENCE

<b>Specialist Name</b>	Craig Burne <i>Pr.Sci.Nat.</i>
<b>Declaration of Independence</b>	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 amended Environmental Impact Assessment (EIA) Regulations, that:</p> <ul style="list-style-type: none"> <li>• I act as an independent specialist in this application</li> <li>• 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</li> <li>• I declare that there are no circumstances that may compromise my objectivity in performing such work</li> <li>• 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</li> <li>• I will comply with the Act, Regulations, and all other applicable legislation</li> <li>• I have no, and will not engage in, conflicting interests in the undertaking of the activity</li> <li>• 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</li> <li>• All the furnished by me in this form are true and correct; and</li> <li>• I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.</li> </ul>
<b>Signature</b>	
<b>Date</b>	31 October 2022
<b>SACNASP No</b>	115213
<b>Company</b>	NCC Environmental Services (Pty) Ltd
<b>Position</b>	Senior Environmental Consultant

## DOCUMENT GUIDE

The table below outlines the gazetted National Environmental Management Act (NEMA) procedures published in GN320 dated 20 March 2020 (Government Gazette 43110) which relates to the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity for activities requiring environmental authorisation.

No.	Criteria/requirements for the assessment and reporting of impacts on aquatic biodiversity for activities requiring environmental authorisation	Page/Section in this report
2. Site sensitivity verification and minimum report content requirements		
2.1	A site sensitivity verification must be undertaken by an Environmental Assessment Practitioner or a specialist.	<b>This report (pg 4, pg 14-Annexure D, section 5 &amp; section 7).</b>  <b>Also see Adams BAR.</b>
2.2	The sensitivity verification must be undertaken through the use of: a. A desktop analyses, using satellite imagery; b. A preliminary on-site inspection; and Any other available and relevant information.	
2.3	The outcome of the site sensitivity verification must be recorded in the form of a report that: a. Confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructures, the change in vegetation cover status etc.;	
	b. Contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and	
	c. Is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.	
3. Specialist assessment and minimum report content requirements		
3.1	The compliance statement must be prepared by a suitably qualified specialist registered with the SACNASP, with expertise in the field of aquatic sciences.	<b>Annexure D</b>
3.2	The compliance statement must: be applicable to the preferred site and the proposed development footprint; confirm the site is of 'low' sensitivity for aquatic biodiversity and indicate whether or not the proposed development will have an impact on the aquatic features.	<b>Section 8</b>
3.3	The compliance statement must contain, as a minimum, the following information:	<b>Refer below</b>
3.3.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	<b>Pg 4 &amp; Annexure B</b>
3.3.2	A signed statement of independence by the specialist;	<b>Pg 4</b>
3.3.3	A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	<b>Section 5 &amp; 7</b>
3.3.4	A baseline profile description of biodiversity and ecosystems on site;	<b>Annexure A &amp; Section 7</b>
3.3.5	The methodology used to verify the sensitivities for the aquatic biodiversity features on the site, including equipment and modelling used where relevant;	<b>Section 5</b>
3.3.6	in the case of a linear activity, confirmation from the aquatic biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;	<b>n/a</b>
3.3.7	where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;	<b>Annexure B &amp; C</b>
3.3.8	a description of the assumptions made as well as any uncertainties or gaps in knowledge or data; and	<b>Section 6</b>
3.3.9	any conditions to which this statement is subjected.	<b>Section 8 &amp; 9</b>
3.4	A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	<b>Noted</b>

## ABBREVIATIONS

<b>BAR</b>	Basic Assessment Report
<b>BESS</b>	Battery Energy Storage System
<b>CBA</b>	Critical Biodiversity Area
<b>CDNGI</b>	Chief Directorate National Geospatial Information
<b>CSIR</b>	Council for Scientific and Industrial Research
<b>DEA</b>	Department of Environmental Affairs
<b>DENC</b>	Department of Environment and Nature Conservation (Northern Cape)
<b>DFFE</b>	Department of Forestry, Fisheries and the Environment
<b>DWAF</b>	Department of Water Affairs and Forestry
<b>DWS</b>	Department of Water and Sanitation
<b>EA</b>	Environmental Authorisation
<b>EC</b>	Ecological Category
<b>EGP</b>	Enel Green Power
<b>EIA</b>	Environmental Impact Assessment
<b>EI</b>	Ecological Importance
<b>EIS</b>	Ecological Importance and Sensitivity
<b>EMPr</b>	Environmental Management Programme
<b>ESA</b>	Ecological Support Area
<b>FBIS</b>	Freshwater Biodiversity Information System
<b>FSA</b>	Fish Support Area
<b>GN</b>	Government Notice
<b>IAP</b>	Invasive Alien Plant
<b>NBA</b>	National Biodiversity Assessment
<b>NEMA</b>	National Environmental Management Act
<b>NEMBA</b>	National Environmental Management: Biodiversity Act
<b>NFEPA</b>	National Freshwater Ecosystem Priority Area
<b>NWA</b>	National Water Act
<b>PES</b>	Present Ecological State
<b>PV</b>	Photovoltaic
<b>SANBI</b>	South African National Biodiversity Institute
<b>WMA</b>	Water Management Area
<b>WRC</b>	Water Research Commission
<b>WUA</b>	Water Use Authorisation

## GLOSSARY OF TERMS AND DEFINITIONS

### **Altering the bed, banks, course and characteristics of a watercourse**

Any change affecting the resource quality within the riparian habitat or 1:100 year floodline.

### **Aquatic**

Associated with and dependent on water e.g. aquatic vegetation.

### **Aquatic ecosystem**

The abiotic (physical and chemical) and biotic components, habitats and ecological processes contained within rivers and their riparian zones and reservoirs, lakes, wetlands and their fringing vegetation.

### **Biodiversity**

The diversity of genes, species and ecosystems on Earth, and the ecological and evolutionary processes that maintain this diversity.

### **Catchment**

In relation to a watercourse, watercourses or part of a watercourse means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points.

### **Critical Biodiversity Area**

Areas required to meet biodiversity targets for ecosystems, species or ecological processes, as identified in a systematic biodiversity plan. May be terrestrial or aquatic.

### **Ecological Support Area**

An area that is not essential for meeting biodiversity targets but plays an important role in supporting the ecological functioning of one or more Critical Biodiversity Areas or in delivering ecosystem services. May be terrestrial or aquatic.

### **Invasive Alien**

A species whose natural range occurs outside of South Africa and which were transported to their current location by humans; where they are able to reproduce, spread and typically cause negative ecological impact

### **In-stream habitat**

The physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse.

### **Pollution**

The direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it -

- a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- b) harmful or potentially harmful -
  - i. to the welfare, health or safety of human beings;
  - ii. to any aquatic or non-aquatic organisms;
  - iii. to the resource quality; or
  - iv to property.

### **Protection**

In relation to a water resource, means -

- a) maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way;

- b) prevention of the degradation of the water resource; and
- c) the rehabilitation of the water resource.

#### **Regulated area of a watercourse**

- a) 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;
- b) In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or
- c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

#### **Resource quality**

Means the quality of all the aspects of a water resource including -

- a) the quantity, pattern, timing, water level and assurance of in-stream flow;
- b) the water quality, including the physical, chemical and biological characteristics of the water;
- c) the character and condition of the in-stream and riparian habitat; and
- d) the characteristics, condition and distribution of the aquatic biota.

#### **Riparian habitat**

The physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

#### **Section 21(c) water use**

One which can *impede* or *divert* the flow of water in a watercourse:

*Diverting the flow* - a temporary or permanent structure causing the flow of water to be rerouted in a watercourse for any purpose.

*Impeding the flow* - a temporary or permanent structure causing the flow of water to be rerouted in a watercourse for any purpose.

#### **Section 21(i) water use**

One which can lead to the altering of the bed, banks, course or characteristics of a watercourse.

#### **Watercourse**

- a) a river or spring;
- b) a natural channel in which water flows regularly or intermittently;
- c) a wetland, lake or dam into which, or from which, water flows; and
- d) 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.

#### **Water resource**

Includes a watercourse, surface water, estuary or aquifer.

#### **Wetland**

Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

## 1 INTRODUCTION

Enel Green Power South Africa (Pty) Ltd (**EGP**) is a company of the Enel Group dedicated to the development and management of power generation from renewable sources worldwide. Currently the operating plants and projects of EGP in advanced state of development are located in several countries across Europe, the Americas, Asia Pacific and Africa. In the context of this report, there is currently a bid process underway to develop a Battery Energy Storage System (BESS) and associated infrastructure at the Adams Solar Photo Voltaic (PV) Energy Facility in the Northern Cape Province, South Africa and to this end, EGP appointed NCC Environmental Services (Pty) Ltd (NCC) to carry out a specialist freshwater study in terms of the overarching regulatory framework, primarily the National Environmental Management Act (Act 107 of 1998) (NEMA) and the National Water Act (Act 36 of 1998) (NWA).

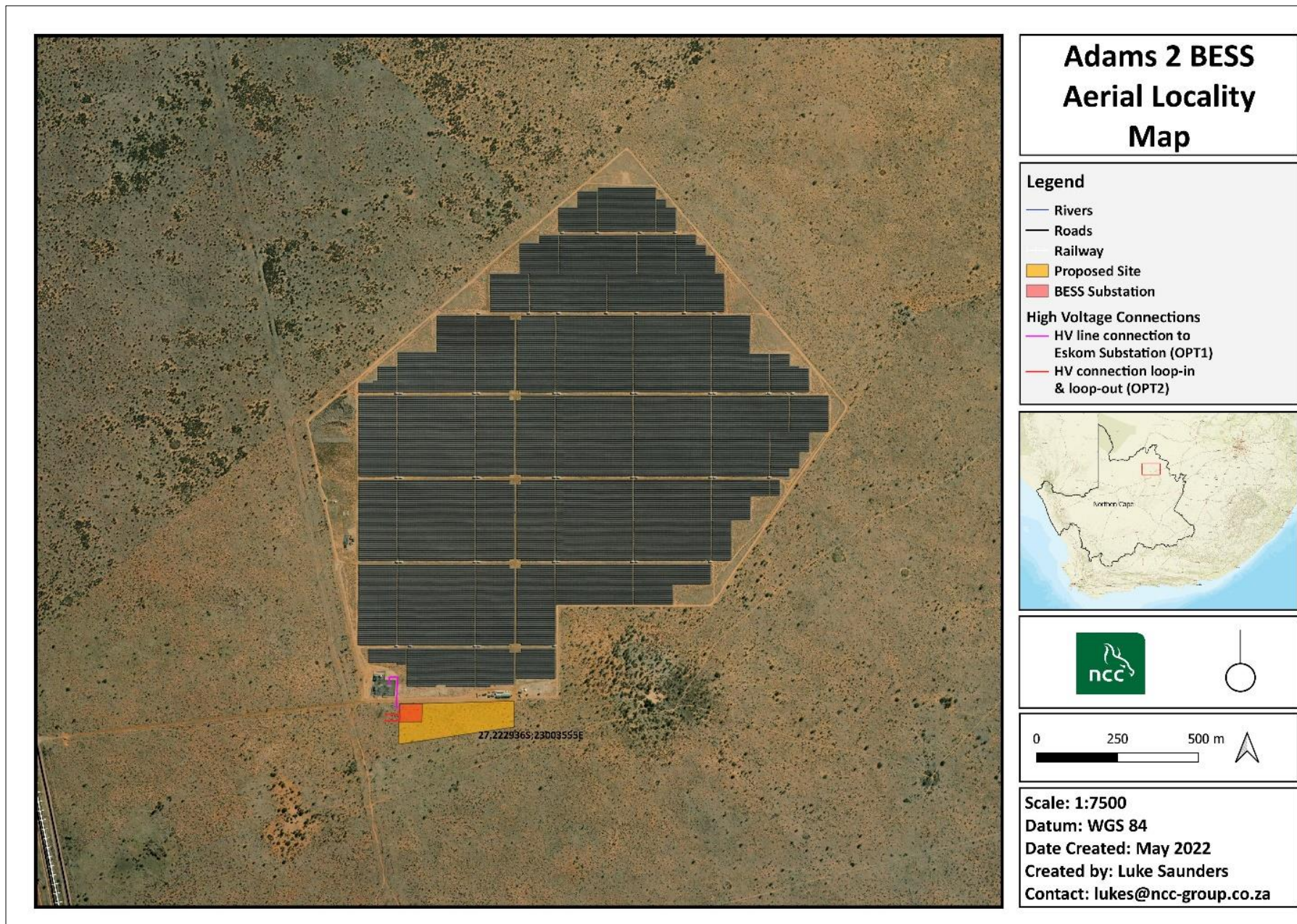
## 2 SITE LOCATION

The proposed BESS site (**Figure 1**) is adjacent to the existing (i.e. authorised) Adams 2 Solar PV Facility approximately 40km north of Kathu and 20km south of Hotazel in the Northern Cape. The site is located on the farm Adams No. 328 and is accessible by the R380 tarred road between Hotazel and Kathu.

## 3 PROJECT DESCRIPTION

The project will include the development of the BESS of up to 4ha in extent to be located adjacent to (within 100m of) the existing Photovoltaic Facility (PV) and substation. The associated infrastructure includes:

- i. A substation with a maximum height of - HV busbar up to 10 m max and an HV building up to 4m max.
- ii. Access road to the BESS (6m wide road surface with side ditch drainage on each side of the road) branching off the existing roads, and internal roads (up to 8m wide) within the footprint of the BESS, as needed. The length of the road will not exceed 700m.
- iii. MV Cabling (underground or overhead) between the BESS and the HV/MV BESS substation.
- iv. HV Cabling (underground or overhead) between the HV/MV BESS substation and the existing HV substation or for loop in and loop out to the existing HV connection line.
- v. Fencing around the BESS and the substation for increased security measures.
- vi. Temporary laydown area within the 4ha footprint of the BESS.
- vii. Possible firebreak around the BESS facility which is to be located within the 4ha BESS footprint.



**Figure 1:** Location of the proposed BESS site.

## 4 SCOPE OF WORK

The objectives of this assessment included the following:

- To undertake a desktop analysis, site sensitivity verification and site inspection to verify the sensitivity of aquatic biodiversity as **Very High** or **Low**;
- In the event that any watercourses and aquatic biodiversity features are confirmed to fall within the development footprint and where these watercourses will be impacted by the development, then the site sensitivity is confirmed as **Very High** and a full specialist freshwater assessment would be required;
- In the event that no watercourses or aquatic biodiversity features are identified within the development footprint the site sensitivity is confirmed as **Low** and an Aquatic Compliance statement would suffice.

## 5 METHODOLOGY

### 5.1 Desktop study

An initial site sensitivity verification exercise to determine if there are any potential inconsistencies, if applicable, between the national screening tool data and the current status quo on the site was undertaken at desktop level followed by a site visit. The purpose is to identify if any features are identifiable on the site that are not currently reflected in the screening tool data/report and whether any areas have been significantly modified since the data were updated and input into the tool.

The determination of the site sensitivity relied upon a review and interrogation of available desktop and other literature resources including:

- Department of Forestry, Fisheries and the Environment (DFFE) National Screening Tool
- Department of Water and Sanitation (DWS) spatial layers
- National Freshwater Ecosystem Priority Area (NFEPA) spatial layers and reports (Driver *et al.*, 2011, Nel *et al.*, 2011)
- The National Wetland Map 5 (Van Deventer *et al.*, 2018)
- Information and data on the South African National Biodiversity Institute (SANBI) BGIS platform
- The Freshwater Biodiversity Information System (FBIS)
- Satellite aerial imagery (Google Earth Pro)
- Topographical maps, aerial photos, contour data and drainage data (CDNGI)
- Cape Farm Mapper (<https://gis.elsenburg.com/apps/cfm/>)
- 2016 Northern Cape Critical Biodiversity Areas (DENC, 2016)
- Existing approvals/authorisations and previous specialist studies for the site

## 5.2 Site visit

A site visit was undertaken on 14<sup>th</sup> December 2021, during which time the following activities were undertaken:

- Verification of any watercourses and wetlands within the footprint of the site and 500m from the site according to methods detailed in Ollis et al. (2013) and DWAF (2005, 2008). This involves assessing the presence, either permanently, seasonally or temporarily, of water at or near the surface – *Hydrological indicators*;
- Verification of any hydrophytic plant species and vegetation which is adapted to or tolerant of saturated soil conditions which may indicate the presence of wetland plant species (if applicable) - *Vegetation indicators*;
- Site photographs were taken to document the site conditions at the time of the field visit (See report section 7).

## 6 LIMITATIONS AND ASSUMPTIONS

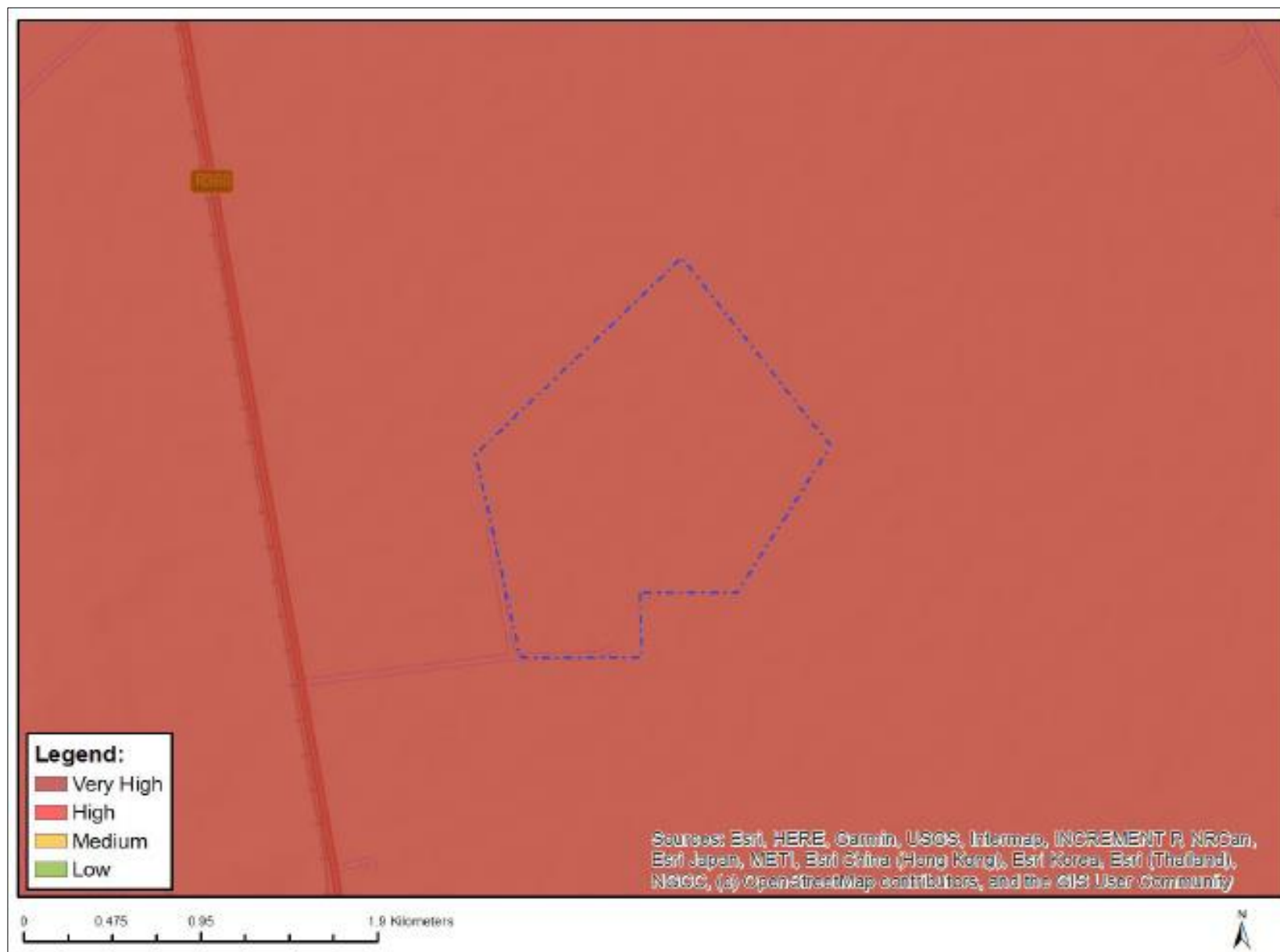
There are often limitations when assessing ecological systems which are complex, dynamic and often evolving on relatively short temporal scales, such as over decades in the context of the current climate change scenario and particularly with watercourse features which are often cryptic and transient in dry regions such as where the development is proposed. In order to apply generalised and often rigid scientific methods or techniques to natural, dynamic environments, a number of inherent assumptions are stated below:

- The databases consulted may not at all times be recent or as fully reliable as is the nature databases;
- This compliance statement assumes that the previous EIA and assessments undertaken in 2014 by the previous EAP and specialists are unbiased where appropriate assessment methods were followed;
- The sensitive area identified during the previous EIA which exists to the east of the entrance to the existing Adams Solar PV Plant will remain as a 'no go' area for any development related to the proposed BESS;
- Any impacts related to the BESS site would be limited to the site only and on that basis, no significant impacts on freshwater resources and biodiversity are predicted. This assumption may change should the developer consider any other alternative BESS sites.

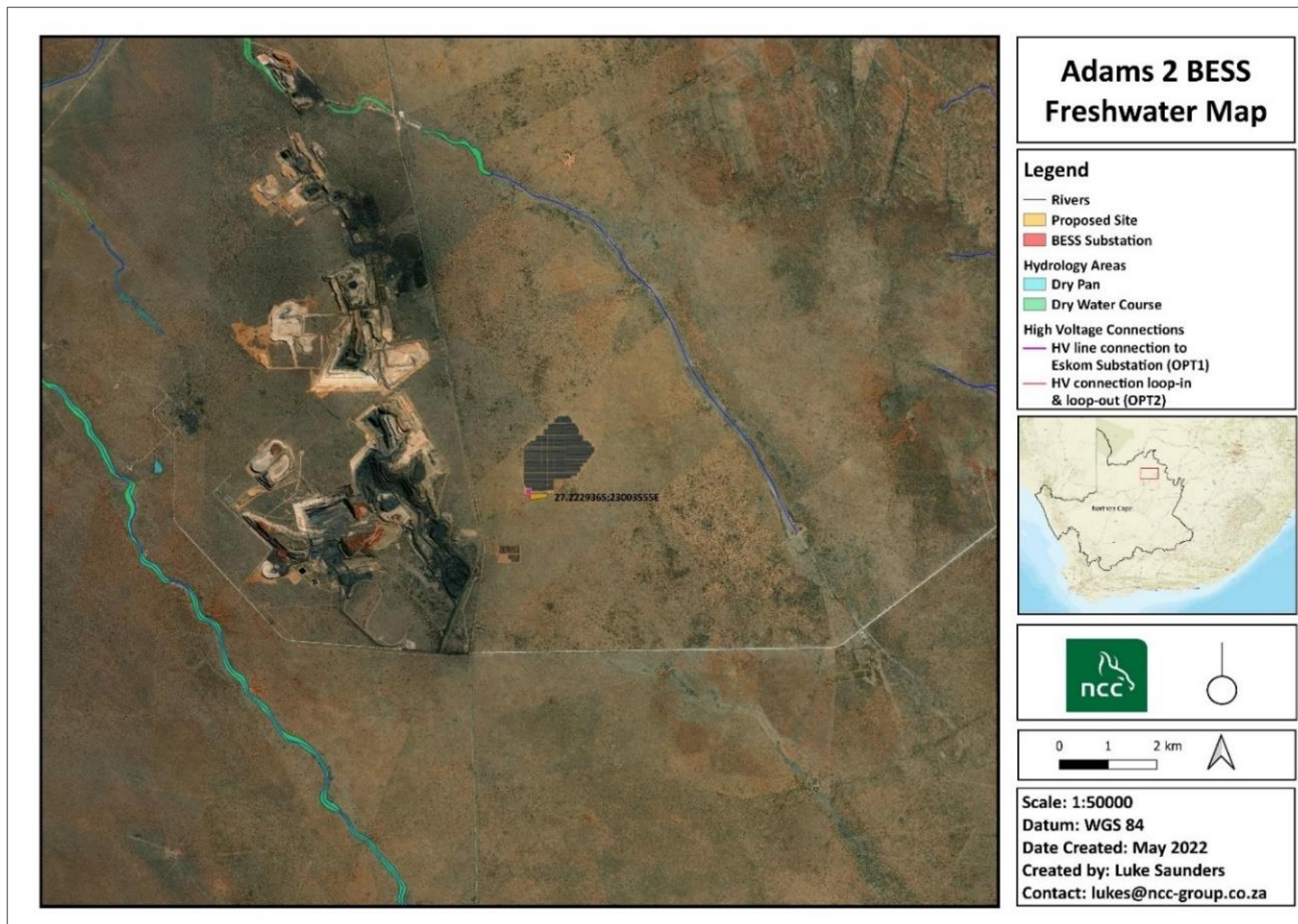
## 7 RESULTS

### 7.1 DFFE Screening tool output

The proposed development area is situated in the Sishen/Kathu National Strategic Water Source Area (SWSA) for groundwater and as per the DFFE screening tool, in an area considered to have a very high sensitivity for the aquatic biodiversity theme (**Figure 2-1**). Freshwater resources around the existing Adams 2 Solar Facility and the proposed BESS are shown in **Figure 2-2**.



**Figure 2-1:** Very high relative aquatic biodiversity theme sensitivity of the area in which the site is situated.  
(Source: DFFE Screening Tool report <https://screening.environment.gov.za>)

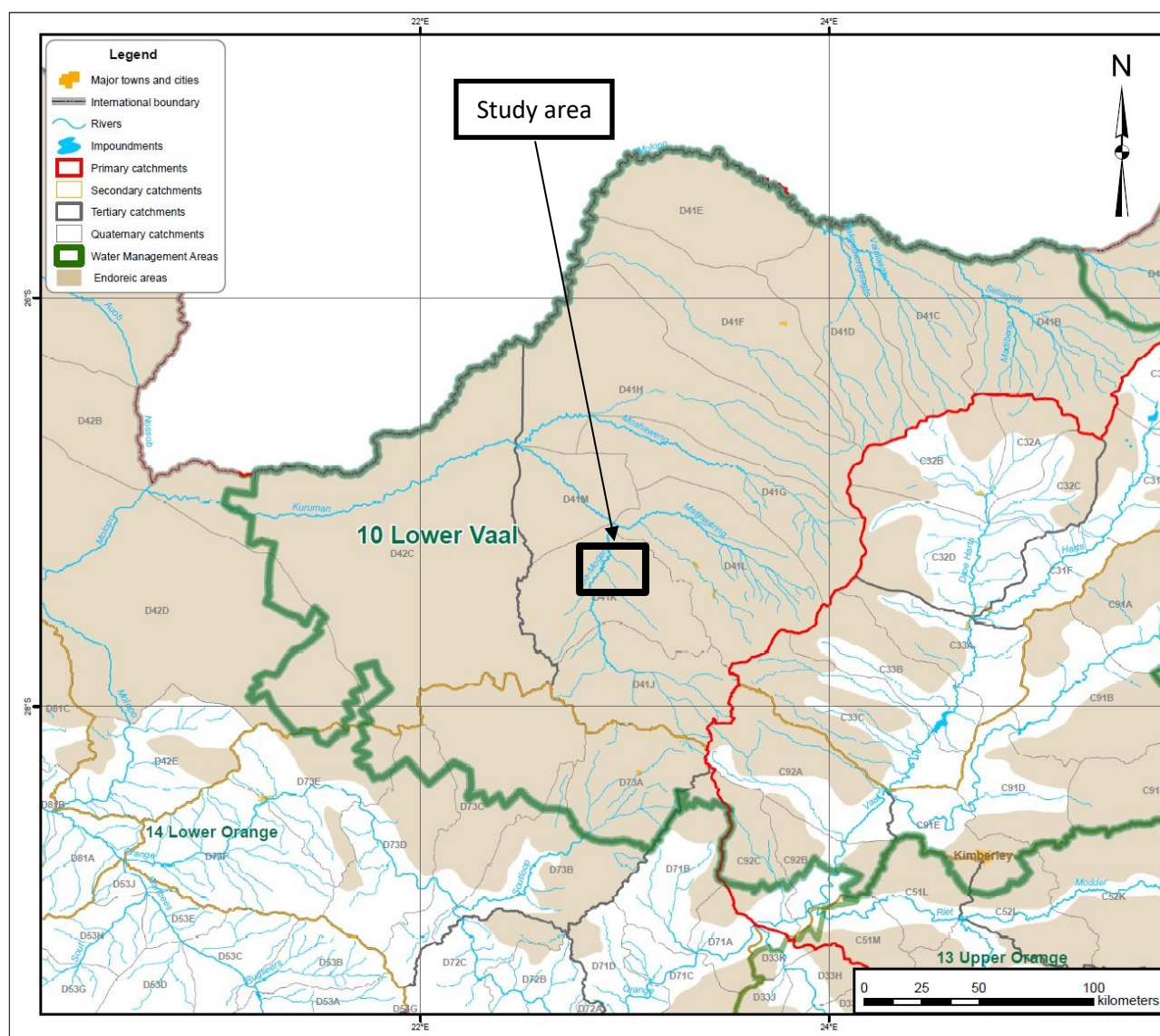


**Figure 2-2:** Freshwater resources around the existing Adams 2 Solar Facility and the proposed BESS site.

## 7.2 Desktop

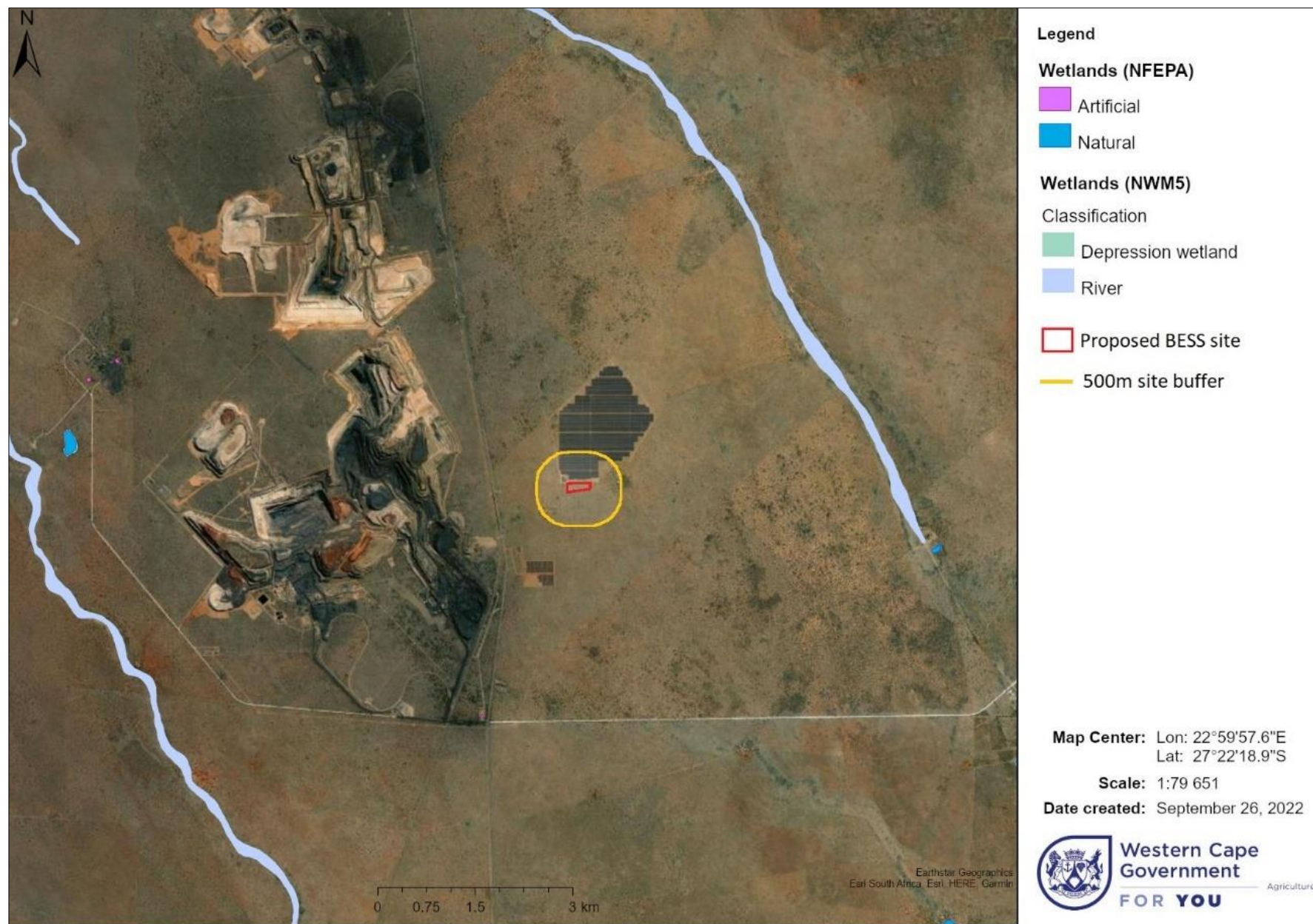
Desktop screened information is presented in tabular form in **Annexure A**.

On a regional scale, the study area is located within the Lower Vaal Water Management Area (WMA) in quaternary catchment D41K (**Figure 3**).

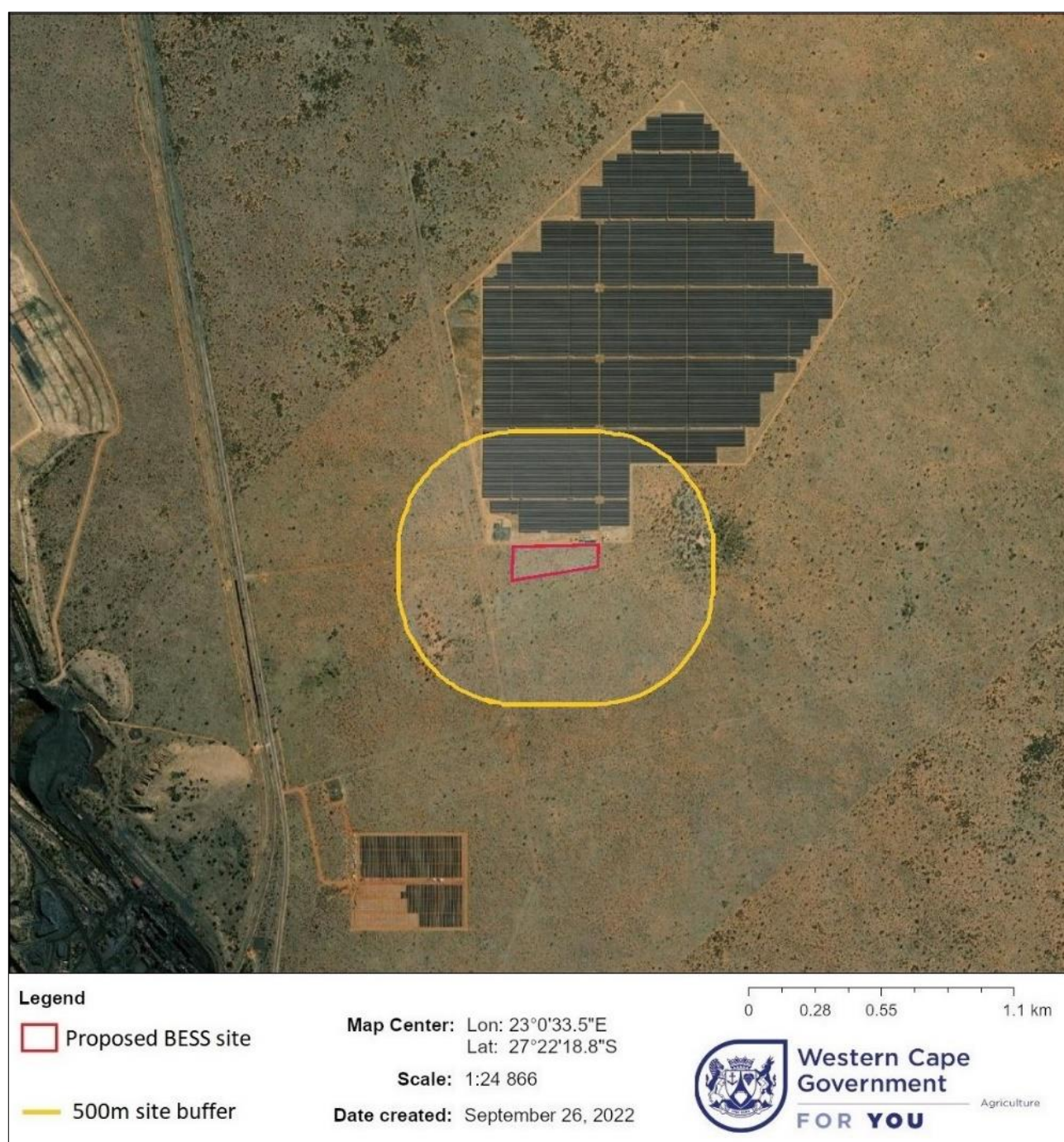


**Figure 3:** Study area site location in the Lower Vaal WMA in quaternary catchment D41K (Source: Bailey and Pitman, 2016).

According to geospatial data sources no natural freshwater features are indicated to occur within the footprint of the property or within close proximity to the property. **Figures 4-1** and **4-2** are the same maps at different scales showing that no freshwater resources (wetlands or watercourses) occur within 500m from the proposed BESS site. The Witleegte River, a tributary of the Kuruman River, is located >3.5km to the north and north-east from the site and several small artificial and natural wetlands occur to the west >5km from the site (**Figure 4-1**). It is a non-perennial first order river with episodic flows and for that reason has not had a PES category assigned owing to that reason (DWS, 2012). At a desktop level SQ reach D41K-02181, which is in catchment D41K, has been assessed to have a **Low** mean Ecological Importance (EI) and a **D** default EC (DWS, 2012).



**Figure 4-1:** Freshwater map indicating no watercourses and no NFEPA or NWM5 wetland occurrence within the regulated area (500m) from the proposed BESS site.

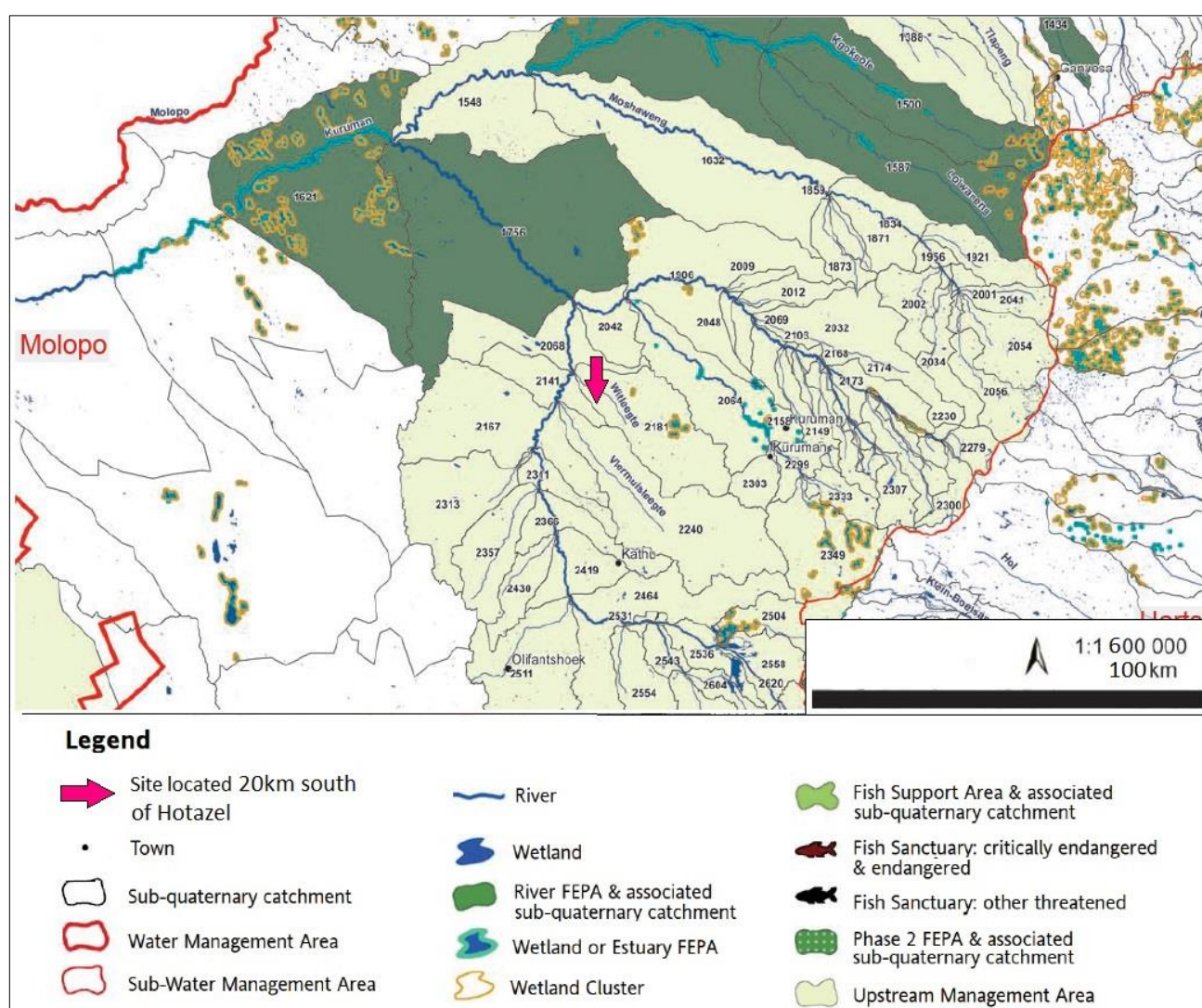


**Figure 4-2:** Site map indicating no watercourses or wetlands occur within 500m from the proposed BESS site.

**Figure 5** represents an overview of aquatic biodiversity of the sub-quaternary catchment in Lower Vaal WMA in the context of the NFEPA Map (CSIR, 2011). The study area occurs in an Upstream Management Area in a sub-quaternary catchment with FEPA Unit ID 2181 where notable biodiversity features include 3 wetland clusters (WetCluster FEPAs) as indicated below:

Wetland ecosystem type	<i>Eastern Kalahari Bushveld Group 3</i>	Depression
Wetland ecosystem type	<i>Eastern Kalahari Bushveld Group 3</i>	Seep
Wetland ecosystem type	<i>Eastern Kalahari Bushveld Group 3</i>	Unchannelled valley-bottom wetland

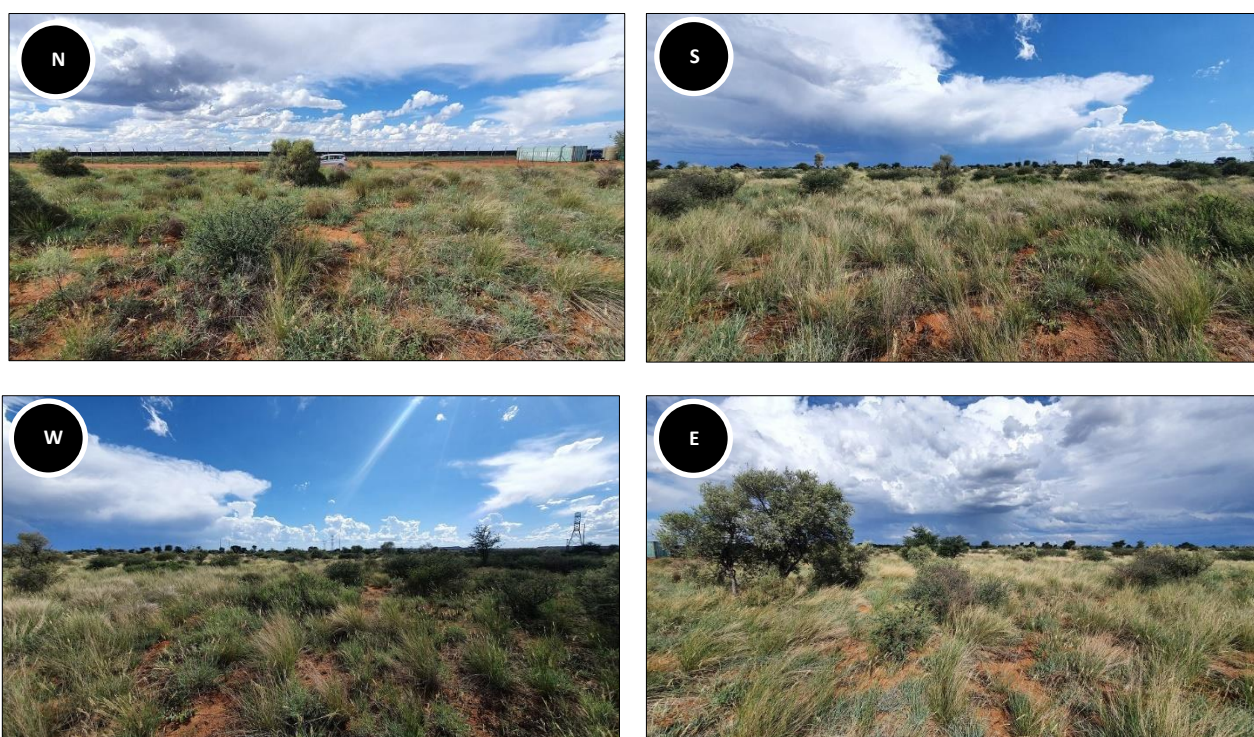
Wetland clusters are groups of wetlands within 1km of each other and embedded in a relatively natural landscape. This allows for important ecological processes such as migration of frogs and invertebrates between wetlands. A goal of NFEPA is to ensure that at least 20% of the wetland cluster area identified for each wetland vegetation group is managed in a way that supports dispersal between wetlands within the cluster, ideally associated with a natural or near-natural condition. However as seen in **Figure 5**, these wetland clusters are situated greater than 10-15km away from the proposed development site which will not have any impact on them. Furthermore, there are no fish support areas, fish sanctuaries (for critically endangered or threatened fish species), fish translocation areas, fish migration corridors, fish rehabilitation areas, NFEPA wetlands, high water yield areas, or free-flowing rivers (**Figure 5**) and no high yielding groundwater recharge areas in the study area.



**Figure 5:** Overview of aquatic biodiversity of the sub-quaternary catchment (Unit 2181) in the Lower Vaal WMA in the context of the NFEPA Map (Source: CSIR, 2011). The site (denoted by the pink arrow) is situated between the Wittelegte River (east) and Gamagara River (west) in an 'Upstream Management Area'.

### 7.3 Site visit

The site sensitivity verification field visit and ground-truthing exercise was conducted in the summer season by the freshwater specialist on 14<sup>th</sup> December 2021. There were no clear areas of natural drainage on either site and no hydro-geomorphological landscape features indicating the presence of a watercourse (i.e. stream, river or wetland) (See photos in **Plate 1** below). No hydrophytic, wetland or riparian vegetation or riparian habitats were present or observed. The vegetation is terrestrial in nature consisting of a mosaic of trees comprising species such as *Acacia mellifera*, (blackthorn) and *Grewia flava* (raisin tree) with a perennial grass understorey and scattered shrubs.



**Plate 1:** Photographs of the proposed BESS site situated to the south of the existing solar plant in a fully terrestrial area. Facing in the direction of the four compass points N, S, W and E.

## 8 AQUATIC BIODIVERSITY COMPLIANCE STATEMENT

Based on the results of the combined desktop review and site sensitivity verification in the field, the sensitivity of aquatic biodiversity at the proposed Adams BESS site is regarded to be **Low**. It is concluded with a high degree of confidence that no sensitive freshwater features occur on or within 500m from the site footprint. The proposed development will not impact on any freshwater biodiversity and no specific impact management interventions for freshwater biodiversity features are considered necessary or provided in this respect.

## 8.1 Freshwater specialist opinion

It is the opinion of the author of this report that the proposed development will not require a water use authorisation (WUA) in terms of section 21 (c) and (i) of the National Water Act (Act 36 of 1998). Furthermore, there is no reason or fatal flaw from a freshwater biodiversity perspective that an environmental authorisation (EA) applied for under the framework of the National Environmental Management Act (Act 107 of 1998) and in terms of the 2014 EIA Regulations (as amended) should not be considered favourably by the competent authority. An EA being issued to the applicant is however contingent on the outcomes of the other specialist studies including input from other authorities, stakeholders and interested and affected parties.

# 9 RECOMMENDATIONS

## 9.1 Generic mitigation measures

A list of generic impact management outcomes and monitoring requirements for inclusion in the EMP are provided in **Annexure B** to manage alien invasive plants, stormwater around the BESS and to manage spills during construction and operations in order to reduce the risk of potential groundwater pollution.

## 9.2 Battery storage

It is understood that both Solid State Lithium-ion (Li-ion) and Vanadium Redox flow batteries are being considered as options however owing to the tender and procurement processes associated with the proposed BESS, final selection of the battery technology has not yet been confirmed at the time this report was compiled. For Li-ion batteries, prevailing site temperature instability can have an impact on these battery types which can include fire, or permanent structural damage to the batteries. The volatility of the battery system, prior to any mitigation, could result in significant fire risk. In addition to this there is a risk associated with the chemicals contained within the actual battery storage system itself leaking into the ground.

Vanadium Redox Flow batteries have a corrosive character as the electrolyte solution contains highly acidic (or alkaline) ion exchange materials which are classified as toxic and hazardous to groundwater and the relatively high toxicity of oxides of vanadium (USEPA, 2011). If selected, the electrolyte tanks and associated pipes, valves, etc need to be designed from materials that are resistant to corrosion in a very low pH environment and batteries stored in tanks within containers mounted onto plinths and secured within a secondary or tertiary bunded platform, **Annexure C** provides the risks and mitigation battery technology options being considered. It is recommended that the environmental impact assessment process includes a comparative assessment of the preferred battery technologies being considered for the proposed Adams BESS.

## 10 REFERENCES

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## ANNEXURE A: BASELINE PROFILE DESCRIPTION OF BIODIVERSITY AND ECOSYSTEMS

Province	Northern Cape
District	Taolo Gaetsewe
Local municipality	Joe Morolong
Ward	4
1: 50 000 grid reference	2723AC
1: 10 000 grid reference	2723AC_11
Area of proposed site	~4ha
Geographical locations (co-ordinates) of the site	27.222936S; 23003555E
Water Management Area (WMA)	Lower Vaal
Catchment Management Area (CMA)	Vaal River CMA
Quaternary catchment	D41K
Quinary catchment	D41K3
Main rivers / drainage	Witleegte (west) and Gamagara (east) - tributaries of the Kuruman River
Freshwater Ecoregion of the World (FEOW)	Southern Kalahari
Ecoregion Level 1 - Kleynhans <i>et al.</i> (2005)	29 Southern Kalahari
Ecoregion Level 2 - Kleynhans <i>et al.</i> (2005)	29.01
Biome	Savanna
Aquatic CBAs and/or ESAs	None on the site. the Witleegte River is an ESA however it is >3km away.
Depth to groundwater	25 mbgl
SWSA surface water	No
SWSA groundwater	Yes - Sishen / Kathu
Aquifer Type and Yield Classification	Intergranular and fractured 0.1 - 0.5 l/s
Aquifer Classification	Poor
Aquifer Susceptibility	Least
Aquifer Vulnerability	Least
Fish sanctuary	No
NFEPA River FEPA 2011	No
NFEPA Fish Support Area (FSA)	No
Freshwater conservation status (DENC)	None
Desktop PESEIS (DWS, 2014)	SQ reach D41K-02181 = <b>Low</b> Mean EI, <b>D</b> EC
Terrain Morphology: Broad division (dominant types in <b>bold</b> ) (Primary) Kleynhans <i>et al.</i> (2005)	<b>Plains; Low Relief;</b> Plains Moderate Relief; Lowlands; Hills and Mountains; Moderate and High Relief (limited) <b>Open Hills, Lowlands; Mountains; Moderate to High Relief;</b> Closed Hills; Mountains; Moderate and High Relief
Altitude (m a.m.s.l)	500-1700; 1700-1900 limited
Geology Council for Geoscience (2003)	Kalahari Group
Lithology	Pebbly and calc-conglomerate, mudstone, gritstone, siliceous/calcareous sandstone, silcrete, diatomaceous limestone, calcrete. Aeolian red sand and surface calcrete, deep (>1.2 m) sandy soils of Hutton and Clovelly soil forms. Land types of mainly Ah and Ae, with some Ag (Mucina & Rutherford, 2006).

## ANNEXURE B: IMPACT MANAGEMENT OBJECTIVES & MONITORING REQUIREMENTS

Objective	Action	Frequency
Manage alien invasive plants	i. Manage the invasive alien plants at any disturbed or spoil areas.	With immediate effect
	ii. Manage the invasive alien plants around the BESS during operation.	With immediate effect
Manage stormwater run-off from the BESS	iii. Ensure appropriate storm water infrastructure is installed to dissipate flow and direct away from concentrated paths.	During rainfall season
	iv. Ensure drip trays are used under vehicles/machinery and that impervious floor surfaces are constructed to ensure chemicals and waste do not enter the sub-surface.	With immediate effect throughout construction
	v. Where practical, plant appropriate grass species or install energy dissipation structures in stormwater drains around the BESS.	With immediate effect
Manage spills during construction	vi. Ensure drip trays are used under vehicles/machinery and erosion control measures are implemented.	With immediate effect ECO to check every 2 months
	vii. Ensure a spill contingency plan is put into place.	
Manage spills during operation	viii. Record and report any fuel, oil, hydraulic fluid or electrolyte spills to the Site Manager/Engineer so that appropriate clean-up measures can be implemented. ix. Spills must be completely removed from the site. x. Appropriate fire extinguisher equipment installed within the BESS. xi. Temperature of battery systems monitored continually. xii. Ensure air circulation to prevent the buildup of chemicals. xiii. Implement the storm-water management plan and ensure appropriate water diversion systems are put in place. xiv. Compile (and adhere to) a procedure for the safe handling of battery cells. xv. Compile an emergency response plan and implement should an emergency occur. xvi. Ensure that spill kits (if appropriate) are available on site for clean-up of spills and leaks. xvii. Drip-trays or containment measures must be placed under equipment that poses a risk when not in use. xviii. Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility. xix. Dispose of waste appropriately to prevent pollution of soil and groundwater. xx. Completely lined infrastructure (concrete bunded area), with the capacity to contain 120% of the total amount of chemicals stored within the BESS. xxi. Install monitoring systems to detect leaks or emissions.	With immediate effect/Ongoing

## ANNEXURE C: BATTERY TECHNOLOGY RISKS AND MITIGATION

Option 1: Vanadium redox flow battery (VRFB) technology	
Risk	Mitigation
<p><u>Dangerous chemicals and gases</u></p> <p>The fire risk of VRFB systems is markedly lower compared with other battery technologies due to the use of aqueous electrolytes. Overcharging the battery does not lead to fire but to a reduction in battery performance and aging of the stacks. Thermal runaway as with lithium-ion batteries is excluded.</p> <p>In addition to its corrosive character, the vanadium electrolyte solution is toxic and hazardous to groundwater where although the electrolyte is used in a closed system, vanadium can escape solely through electrolyte leaks. A small amount of hydrogen is always produced during charging at high states of charge which is a safety risk due to the possible explosive reaction with atmospheric oxygen. Although the amount is extremely small reducing this risk must be taken into account when installing the battery.</p>	<p>The design of the VRFBs should include:</p> <ul style="list-style-type: none"> <li>• Battery condition monitoring;</li> <li>• Fire detection and suppressant systems;</li> <li>• Leak detection and monitoring system;</li> <li>• A secondary containment to prevent the escape of vanadium solution into the environment during operation (storage and refilling when required);</li> <li>• VRFBs placed within a 2.5m high berm wall;</li> <li>• Hydrogen gas is discharged from the negative tank into the environment through a simple pipe and the battery room or container is well ventilated and flushed with fresh air to prevent any build-up of hydrogen gas;</li> <li>• Should VRFBs be selected, a Major Hazards Risk Assessment should be considered to be undertaken prior to construction and the recommendations of the assessment implemented.</li> </ul>
Option 2: Li-ion battery technology	
Risk	Mitigation
<p><u>Fire and dangerous/toxic chemicals</u></p> <p>The volatility of the battery system prior to any mitigation, could result in significant fire danger. Additionally there is a risk associated with the chemicals contained within the actual battery storage unit itself.</p>	<p>The design of the Li-ion system should include:</p> <ul style="list-style-type: none"> <li>• Fire detection and suppressant systems;</li> <li>• Gas level monitoring for several different gases (related to degradation of the batteries that increases risk of fire);</li> <li>• Dousing mechanism for emergency cooling and fire suppression;</li> <li>• Heat sensors;</li> <li>• Battery condition monitoring;</li> <li>• Density limits in the containers;</li> <li>• Spacing limits between the containers.</li> </ul>
<p><u>Temperature fluctuations</u></p> <p>As temperature fluctuations in the Kathu area and the Northern Cape in general are wide ranging with the minimum temps falling below 0°C and maximum temps exceeding 25°C, Li-ion batteries may be at risk of being damaged due to this temperature instability/fluctuation. Resultant impacts could include fire, or permanent structural damage to the batteries.</p>	<p>The design of the Li-ion system should include:</p> <ul style="list-style-type: none"> <li>• Insulated containers;</li> <li>• High powered HVAC (Heating, Ventilation and Air-Conditioning) System, monitored centrally;</li> <li>• Multiple temperature sensors for both the cells and air temperature;</li> <li>• Automated shut down mechanism if temperatures get too high;</li> <li>• Containers sealed and douse in case of fire to prevent the spread;</li> <li>• Battery management system to prevent overuse and maintain good battery condition.</li> </ul>

## ANNEXURE D: CURRICULUM VITAE

**Craig Burne**

**Profession**

Environmental Consultant

**Qualifications**

MSc (Dissertation): Freshwater Ecology

- University of the Witwatersrand  
2013-2015

BSc (Hons): Environmental Science

- University of KwaZulu-Natal  
2007

BSc: Zoology & Environmental Science

- Rhodes University  
2003-2005

Accredited SASS5 Practitioner

- Departments of Water & Sanitation and  
Environmental Affairs  
2019

**Professional certification**

Professional Natural Scientist (*Pr. Sci. Nat.*)

- South African Council for Natural Scientific  
Professions (SACNASP)
- Membership no: 115213

**Short courses**

Environmental Law

- Centre for Environmental Management;  
2010

Lead Auditing Course: ISO 14001

- DQS; 2010

**Years of experience**

- 14.5 years

**Key skills/knowledge areas**

- Freshwater (aquatic and wetland) ecology
- Water quality assessment/reporting
- Freshwater macroinvertebrate assessment
- Aquatic assessment & biomonitoring
- Wetland assessment & monitoring
- Alien vegetation assessment & monitoring
- Environmental management (ISO14001)
- Environmental compliance monitoring
- Environmental risk assessment
- Environmental permitting/licensing
- Auditing & EMS implementation
- Scientific report writing
- Technical proposal writing
- Basic statistical techniques
- Basic mapping
- Applied and basic research

**Personal Details**

Gender: Male

Date of Birth: 26.10.1982

Nationality: South African

Drivers License: Code EB

Languages: English (native) Afrikaans (basic)

**NCC Environmental Services (Pty) Ltd**

Feb 2008 – present

**Previous and current roles and responsibilities**

Aquatic & water quality assessments, aquatic biomonitoring, delineation and assessment of freshwater resources, compilation of river rehabilitation & alien vegetation management plans, river rehabilitation monitoring, alien vegetation monitoring & environmental/risk assessment. Participation in the coordination of environmental assessments, EMPRs & environmental license/permit applications. Undertaking environmental legal compliance monitoring & implementation functions on various projects across South Africa. Compilation & implementation of environmental method statements, site-specific rehabilitation plans, environmental risk assessments (ERAs) & construction work procedures. Preparing, undertaking & reviewing customised environmental audits for various projects/clients, stakeholder & authority engagement, public participation facilitation, management; mentoring & advice to internal staff on multiple projects, conducting rehabilitation assessments & cost estimates post-construction, closure reporting, coordination of waste management & recycling programmes on civil & building construction sites, management & resourcing of sub-contractors.

**Consulting Projects**

- Freshwater Assessment and risk assessment for Pulida PV BESS, Free State - 2022
- Thembaletu Secondary School Basic Assessment and WULA, KZN - 2021-current
- Freshwater Assessment and Basic Assessment for Amaoti School, KZN - 2021-current
- Kwamancinza township sensitivity and verification screening, KZN - 2021
- Freshwater Assessment (wetland and aquatic) and risk assessment for the upgrade of provincial road D4407 between Hlulukani and Timbavati, Mpumalanga - 2020
- Freshwater Assessment (wetland and aquatic) and risk assessment for the proposed Modelkloof X18 Township Development, KZN - 2020
- Freshwater assessment and risk assessment for proposed hydroponic facility on farm Klein Dassenberg 39/20, Western Cape - 2019-2020
- Seasonal Aquatic Biomonitoring Mhlathuze River, KZN - 2019-2020
- EMPr for hydroponic facility on farm Klein Dassenberg 39/20, Western Cape - 2019-2020
- Wetland rehabilitation monitoring, aquatic habitat assessment, wetland assessment, aquatic biomonitoring (fish and macroinvertebrates) and water quality monitoring for N2 Road Upgrade, KZN - 2017-2020
- Sabi Game Reserve Watercourse Risk Assessment, Mpumalanga - 2019
- Surface water verification assessment for erf 803 and 804 in the Newcastle Local Municipality, KZN - 2019
- Thembinkosi Primary School Basic Assessment, KZN - 2019-2020
- SANS 241-1:2015 drinking water quality assessment, monitoring & reporting in the Port of Durban - 2019-2021
- Water resource use licensing & SANS water interpretation for 'Rocking the Daisies 2018', W. Cape - 2018
- Environmental screening/feasibility assessment Kalahari Films, N. Cape - 2017
- Participation in basic assessment for D281 road upgrade, Mpumalanga - 2015-2016

**Compliance Monitoring Projects**

- Taweni-Mfinizo 132kV distribution line, Eastern Cape - 2021-current
- Haga Haga Wind Energy Facility - 2021
- Makaula 132kV substation, Eastern Cape, 2020-2021
- Dube Tradeport Corporation (DTPC) Agrizone, KZN - 2018-2020
- DTPC Hlawe/Tonga Trunk Sewer Line, KZN - 2018-2019
- Daggakraal D281 Road Upgrade, Mpumalanga - 2018-2019
- Cornubia Sigma and Cornubia II, Durban, KZN - 2018-2019
- Crown Cornubia Cold Storage Facility, Durban, KZN - 2017
- Ingula Pumped Storage Scheme, KZN - 2016
- Everest-Merapi 400kV transmission line construction, Free State - 2016
- Lower Thukela Bulk Water Supply Scheme, KZN - 2016
- SANBI Botanical Garden Upgrade, Durban & Pietermaritzburg, KZN - 2015-2017
- Cornubia BFS Cold Storage Facility, Durban, KZN - 2015
- NCC Team Manager for Eskom and Transnet Infrastructure Projects - 2012-2017
- Medupi 400kV Transmission Integration: Phase Alpha, Limpopo & NW - 2010-2012
- Majuba-Mfolozi 765kV transmission line construction, KZN - 2009
- Mercury 765kV Substation, Free State - 2008
- VRESAP Bulk Water Pipeline, Gauteng and Mpumalanga - 2008
- VRESAP Bulk Water Pump Station, Vaal Dam, Gauteng - 2008



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

### DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:  
NEAS Reference Number:  
Date Received:

(For official use only)

DEA/EIA/

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

#### PROJECT TITLE

**Proposed development of Adams Battery Energy Storage System (BESS) and associated infrastructure on farm Adams No. 328.**

#### Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

#### Departmental Details

##### Postal address:

Department of Environmental Affairs  
Attention: Chief Director: Integrated Environmental Authorisations  
Private Bag X447  
Pretoria  
0001

##### Physical address:

Department of Environmental Affairs  
Attention: Chief Director: Integrated Environmental Authorisations  
Environment House  
473 Steve Biko Road  
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support  
Email: [EIAAdmin@environment.gov.za](mailto:EIAAdmin@environment.gov.za)



## 1. SPECIALIST INFORMATION

Specialist Company Name:	NCC Environmental Services (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition
Specialist name:	Craig Burne		
Specialist Qualifications:	MSc (Freshwater Ecology)		
Professional affiliation/registration:	SACNASP <i>Pr.Sci.Nat.</i> 115213		
Physical address:	26 Bell Close, Westlake Business Park, Westlake, Cape Town		
Postal address:	PO Box 30223, Tokai		
Postal code:	7966	Cell:	078 467 3685
Telephone:	021 702 2884	Fax:	(+27) 86 555 0693
E-mail:	craigb@ncc-group.co.za		

## 2. DECLARATION BY THE SPECIALIST

I, Craig Burne, 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 48 and is punishable in terms of section 24F of the Act.

*C. Burne*

Signature of the Specialist

NCC Environmental Services (Pty) Ltd

Name of Company

27 September 2022

Date


Details of Specialist, Declaration and Undertaking Under Oath

SOUTH AFRICAN POLICE SERVICE
COMMUNITY SERVICE CENTRE
2022 -09- 27
DURBAN NORTH
KWAZULU-NATAL

C.B.  
Page 2 of 3  
D.S.

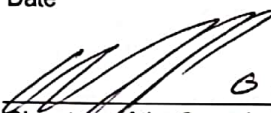
### 3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Craig Burne, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

  
Signature of the Specialist

NCC Environmental Services (Pty) Ltd  
Name of Company

27 September 2022  
Date

 G. L. O. G. 2222, W. L. E. F., A. L. D. R. S. 1208  
Signature of the Commissioner of Oaths

2022/9/27  
Date



Details of Specialist, Declaration and Undertaking Under Oath

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C.B.