water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Private Bag X313, Pretoria, 0001, Sedibeng Building, 185 Francis Baard Street, Pretoria,
Tel: (012) 336-7500 Fax: (012) 323-4472 / (012) 326-2715

WATER USE LICENCE APPLICATION SUMMARY

(DRAFT VERSION)

Watt 80 MW Solar Photovoltaic Energy Facility, Brakpan, Gauteng

(WU36396)

NAME OF APPLICANT:

WATT SOLAR PV (Pty) Ltd

Compiled by:

James Dabrowski
(Confluent Environmental)

Signature: 

Date: 6 February 2025

1. Applicant details

Name of applicant:	Watt Solar PV
Postal address:	240 Main Road, Rondebosch, Cape Town
Cell phone number	079 578 4511
E-mail address:	marshall@merchant.energy

2. Person submitting application

Dr J.M Dabrowski	(Ph.D., Pr.Sci.Nat. Water Resources)
Registration Number:	114084
Date of registration:	November 2015

3. Background and Purpose

Watt Solar PV (Pty) Ltd proposes to develop an 80MWAC Watt Solar PV array (hereafter referred to as the "proposed facility / facilities / development") on the Remaining Extent of Portion 3 of the Farm Rooikat 156, approximately 8 km west of Brakpan within the City of Ekurhuleni Metropolitan Municipality in the Gauteng Province (Figure 1). The proposed power plant will have a contracted generation capacity of up to 80MW.

The development will take place within the regulated area of a watercourse and triggers Section 21 (c) and (i) water uses as defined by the National Water Act. In addition, water will be abstracted from a borehole to support the construction and operational phase of the project, which triggers a Section 21 (b) water use.

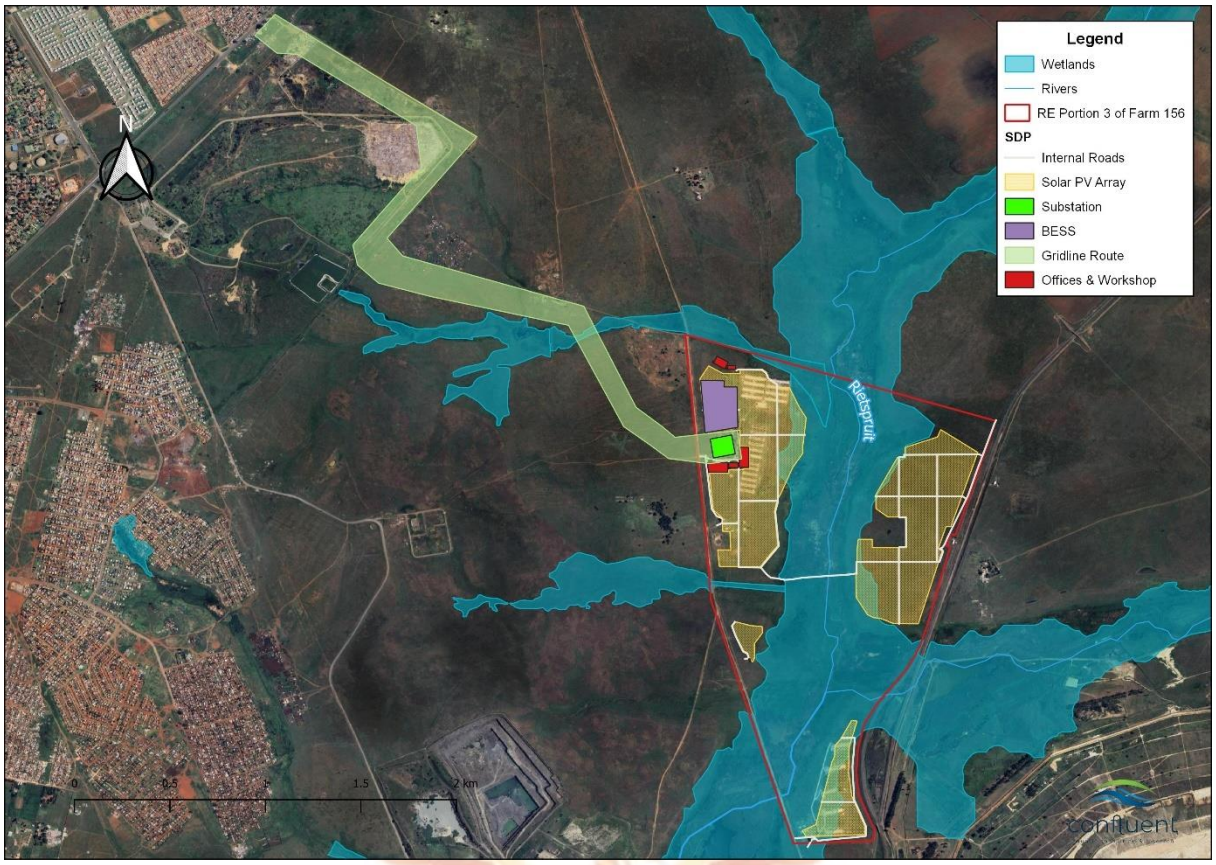

Figure 1: Map indicating the SDP and gridline route for Watt Solar PV.

4. Location of water uses

The property is located in quaternary catchment C22C, in the Upper Vaal Water Management Area in the Gauteng Province (Figure 2). On a fine-scale vegetation type, the PV development area overlaps with the Tsakane Clay Grassland vegetation type which occurs in patches extending from Soweto and Springs, southwards to Nigel and Vereeniging. Flat to slightly undulating plains and low hills are characteristic of Tsakane Clay Grassland vegetation types. 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.

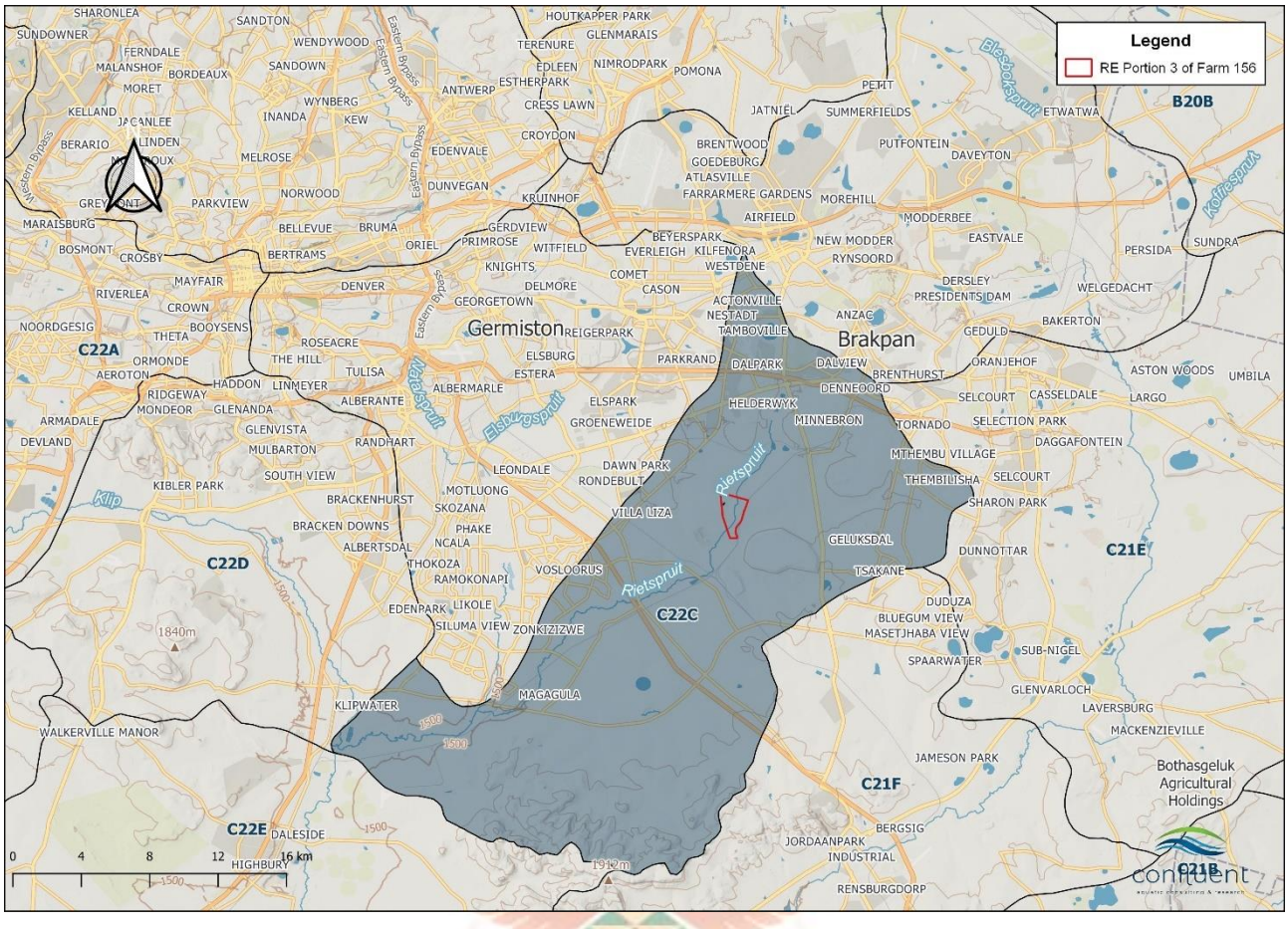

Figure 2: Map indicating location of RE Portion 3 of Farm 156.

The development will occur adjacent to the Rietspruit River which has been classified as a broad channelled valley bottom (CVB) wetland (see Figure 3 and Appendix 1). Seep wetlands are associated with gentle slopes either side of the CVB wetland. The identified seeps 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. A depression (dam) was identified was created by excavating soil material from the ground. 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. The following points are relevant:

- The Present Ecological State (PES) of all delineated wetlands has been assessed as **D (Largely Modified)**. This indicates that a large change in ecosystem processes and loss of natural habitat and biota has occurred.
- The overall goods and services provided by all delineated wetland units was determined to be **Moderately Low:**
    - The CVB wetland provides 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 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.

The layout of the solar PV array avoids the CVB wetland and all PV arrays will remain outside of the 50 m buffer (as determined by the freshwater assessment). Some sections will overlap with delineated seep wetlands (Figure 3). An access road crossing the Rietspruit River will be required to connect the eastern and western section of the development.

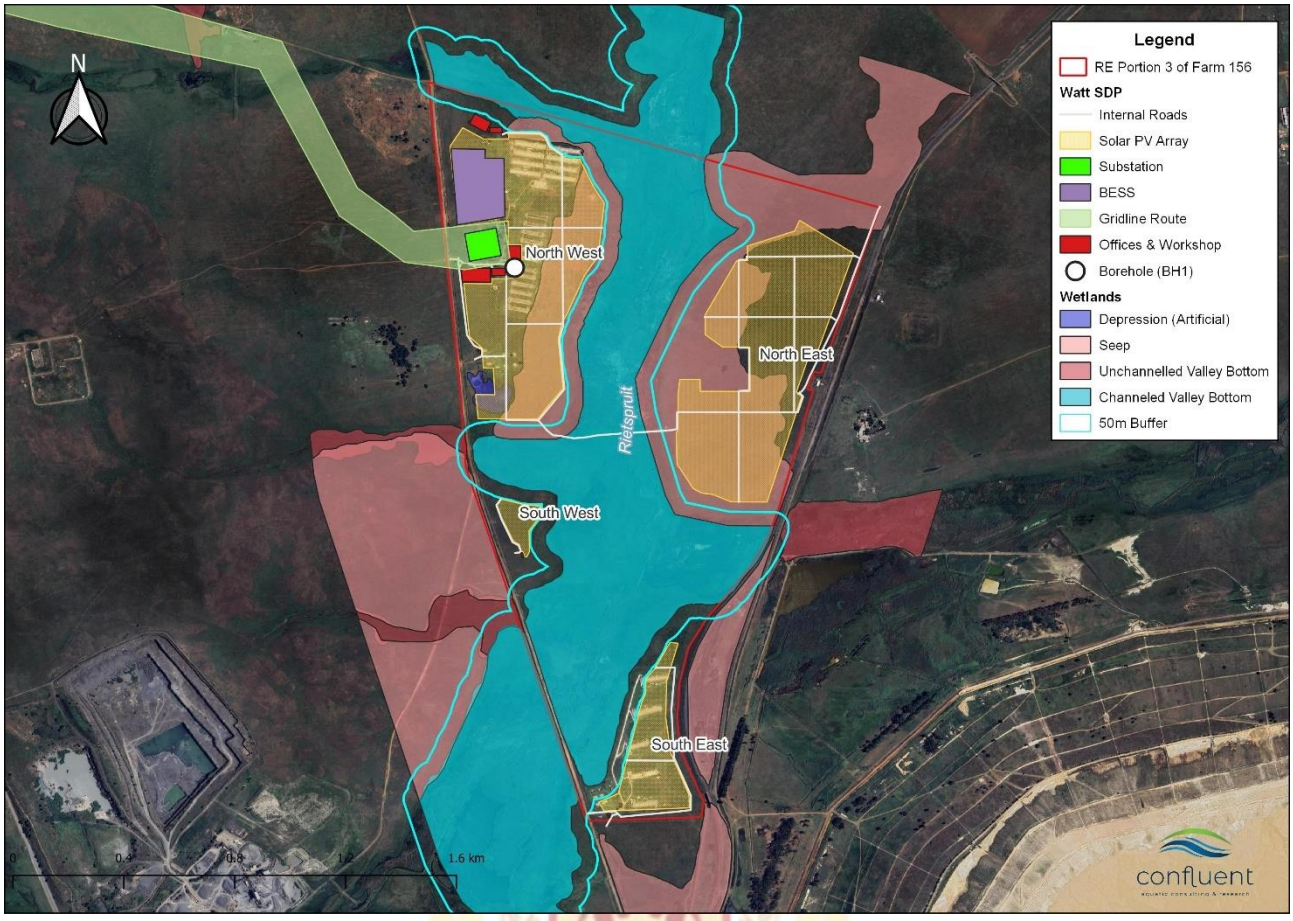

Figure 3: Map indicating location of water uses relative to delineated wetlands

Table 1: Property details

Property description	Title Deed number	Owner
Remaining Extent Portion 3 of the Farm Rooikraal No. 156	T52903/2023	Kiron Projects (Pty) Ltd

5. Administrative documents and technical reports submitted by applicants

5.1 Administrative documents

The following administrative documents will be submitted in support of this application:

- Letter of appointment
- Title deeds of properties
- Applicant's company registration certificate
- Applicant's contact details

5.2 Reports and other technical documents

Technical documents	Compiled by	Date compiled
Appendix 1 – Freshwater Assessment Report	The Biodiversity Company	February 2025
Appendix 2 – Stormwater Management Report	Skerp Consulting Engineers	February 2025
Appendix 3 – Hydrogeological Assessment	HK Geohydrological Services Pty Ltd	January 2025

6. Project Description

The proposed Watt Solar PV forms part of a cluster development together with the Witpoortjie Solar PV, with each PV area being owned by separate companies (Watt Solar PV (Pty) Ltd and Witpoortjie Solar PV (Pty) Ltd.) and thus treated as separate EIA and water use applications. The developments will share the following infrastructure (see Figure 3 and Figure 4):

- 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

A water use authorisation for the shared infrastructure has already been obtained as part of the water use authorisation for the Witpoortjie Solar PV. The two developments will also share a single gridline infrastructure for which authorisation has also already been granted.

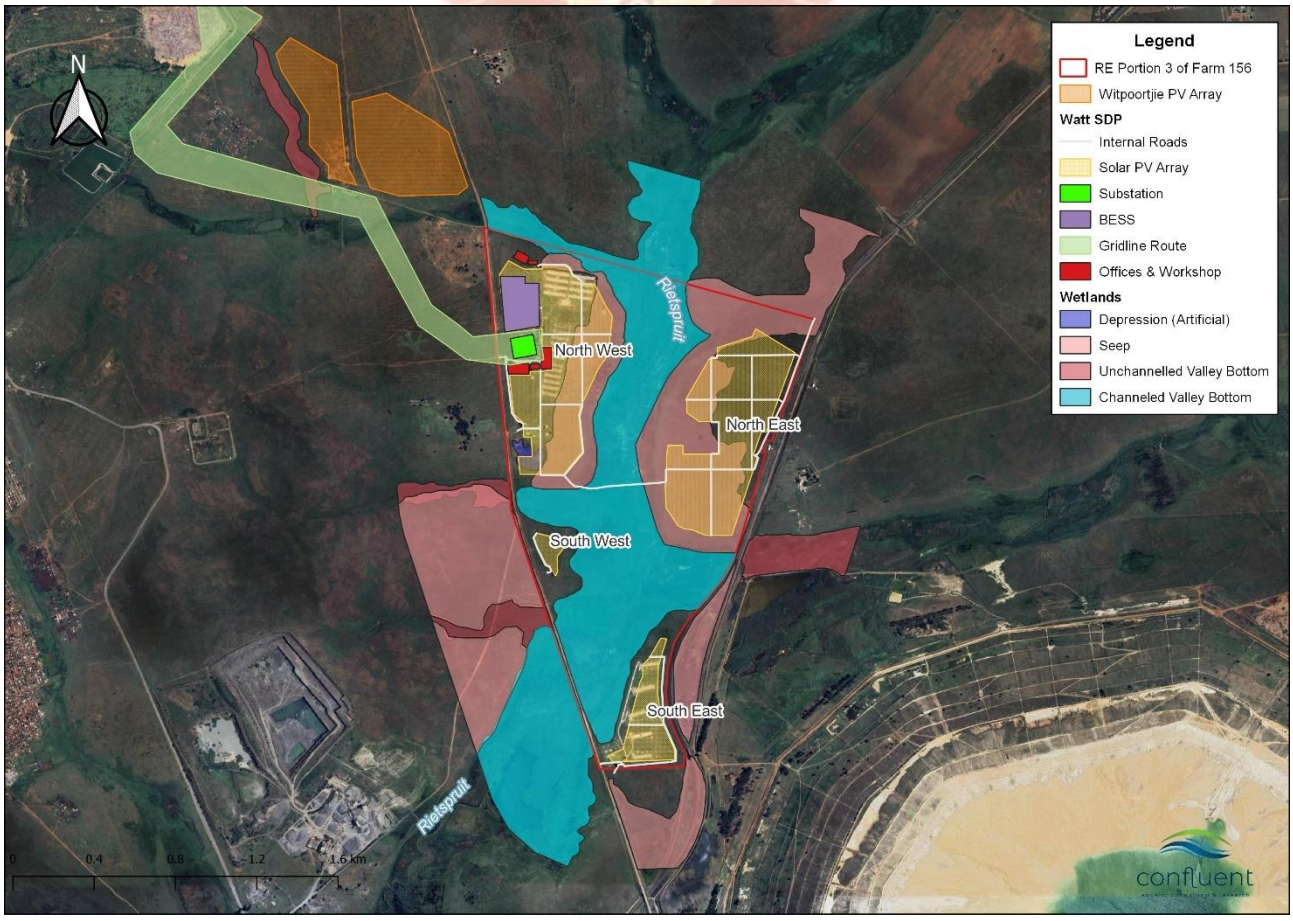

Figure 4: Map indicating the Watt SDP and the Witpoortjie PV array. The gridline, substation, BESS, offices and workshops will be shared by both developments.

This application deals specifically with the following water uses that will be applied for under the Watt Solar PV application:

Solar PV Array

Four distinct solar PV arrays will be constructed (South East, South West, North East and North West – see Figure 3). These areas will comprise of solar PV arrays, modules and mounting structures and internal access roads. Some sections of the PV arrays will overlap with delineated seep wetland and for this reason, the freshwater assessment identified a **Medium** risk associated with the construction and operation of the PV arrays (see Appendix 1). Internal roads will not be surfaced and will be gravel roads.

Access Road

An internal access road that crosses the Rietspruit River will need to be upgraded to connect the North East and North West PV array. The road will be constructed within an existing sewer line servitude that crosses the Rietspruit (see Figure 3). The alignment of the road will be infilled with dump rock and a road surface installed to a height approximately 0.9 m above the existing ground level (Figure 5). The road crossing will incorporate four evenly spaced portal culverts (4 m wide x 0.6 m high – see Figure 5 and Figure 6), which, according to the Freshwater Assessment (see Appendix 1) are likely to 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.

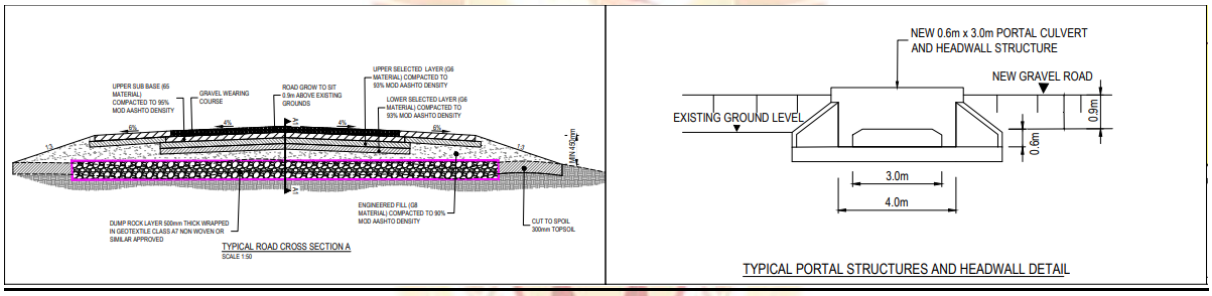

Figure 5: Cross section of the road crossing the Rietspruit (left) and detail of proposed portal culverts (right).

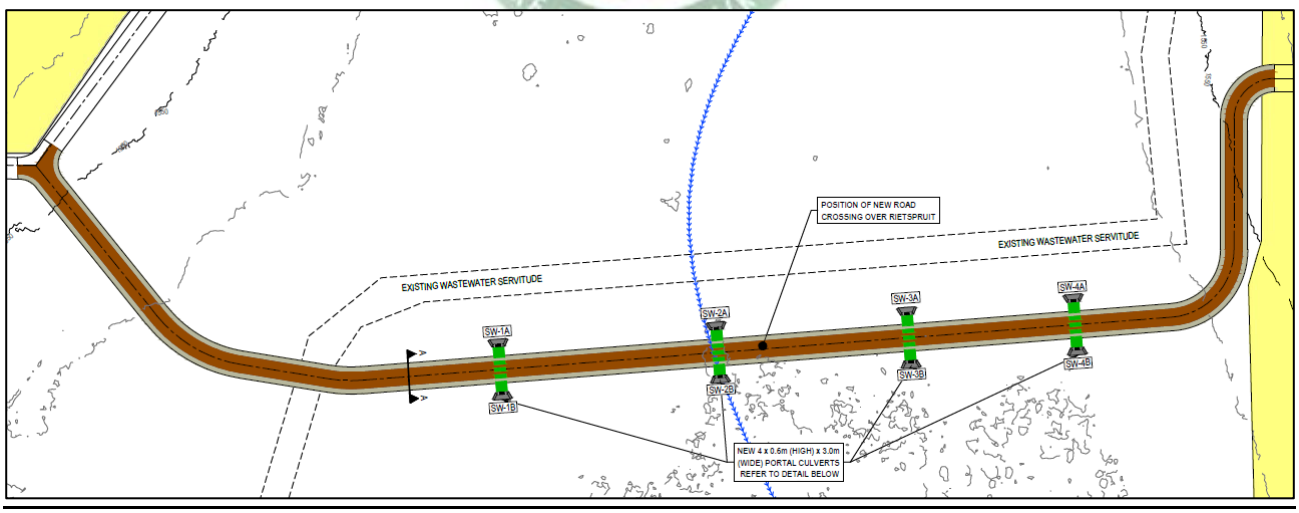

Figure 6: Location of portal culverts along the road crossing the Rietspruit River.

Borehole

A borehole will be required to meet the water demand of 24 700m^3/annum (or 67m^3/d). One groundwater abstraction borehole was drilled, and yield tested for the project and will be used to supply the water demand for the development.

7. Methods Statement

Construction Activities

- The construction footprint width must be kept to a minimum, for the PV arrays and the river crossing. Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area.
- A sequential construction strategy should be followed, i.e. construction must be immediately followed by rehabilitation;
- Soils excavated in the wetland should be stored in sequence and not in the wetland perimeter
- Soils must be replaced in same sequence as excavated;
- Soil surfaces must not be left open for lengthy periods to prevent erosion. Sods must be stored and placed back immediately after sub-soils have been backfilled;
- Storm water management measures must be implemented;
- Where possible, construction should take place during the dry season. Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil or building works during a storm event. Appropriate action must be taken in advance to protect construction works should a storm event be forecasted;
- Appropriate erosion and sediment control measures must be implemented. Sediment barriers must be constructed across the entire construction right of way at all watercourse crossings where necessary to prevent sediment flow into the watercourse;
- Vegetation and soil must be retained in position for as long as possible, and should only be removed immediately ahead of construction / earthworks in any specific area;
- Remove only the vegetation where essential for the continuation of construction of the conveyor/access road. Do not allow any disturbance to the adjoining natural vegetation cover or soils.

Storage of Materials

- No construction materials may be stored or disposed of within the delineated wetlands or within the buffer zone of 30 m from the wetlands.
- No concrete batching may take place within the delineated wetlands or within the buffer zone of 30 m from the wetlands.
- No refuelling may take place within the delineated wetlands or within the buffer zone of 30 m from the wetlands.

Disposal

- All material must be removed to a designated area, or a licenced waste disposal facility, if it cannot be re-used.

8. Stormwater Management Plan

A detailed stormwater management plan has been compiled, primarily to guide the design of the road crossing the Rietvleispruit (see Appendix 2). The report concluded that the proposed development will have little to no effect on the pre- and post-development flows and recommended that the implementation of minor localised stormwater management guidelines can accommodate the proposed development without negatively impacting the downstream catchment. The need for formal stormwater interventions can be minimised if the development is designed to maintain the existing drainage patterns. Overland flow via poorly-defined drainage paths will be the primary form of conveyance. The following recommendations were made:

- The orientation of the solar panels must be optimised to encourage run-off as sheet flow across the entire site. In this respect rows should be orientated parallel to contours. Rows perpendicular to the contours may result in higher run-off concentrations.
- PV panels must be designed and constructed in such a manner to allow for vegetative growth and maintenance beneath and between the panels. The lowest vertical clearance of the panels to above the ground must not exceed 3 m which will prevent/control erosion and scour along the dripline.
- Roads should be designed and graded to avoid the concentration of flow along and off the road Regular side drains discharge points along roads for overland flow to continue as sheet flow towards drainage lines per pre-development conditions.

9. Rehabilitation Plan

In areas where construction activities have been completed and no further disturbance is anticipated, rehabilitation and re-vegetation should commence as soon as possible.

- Profile the banks of the watercourse over the disturbed areas to an acceptable slope and replace topsoil;
- Where required, cover the disturbed area at watercourse crossings with a biodegradable woven jute geotextile erosion control blanket (e.g. Geojute);
- Ensure that the erosion control blanket is well anchored by burying the edges and pegging the rest of the material on a 1 m^2 grid over its entire area. Use only wooden pegs;
- Take plugs of indigenous sedge and grass material from the adjacent areas;
- Plant these plugs on a 50 x 50 cm grid in holes punched through the erosion control blanket. Add appropriate fertiliser in the bottom of the hole prior to planting;
- Water the planted plugs thoroughly immediately after planting and continue to water every three days in the absence of more than 10 mm of rainfall until plants are established.
- Re-vegetation of disturbed areas must be undertaken with indigenous species and in accordance with the instructions issued by the Environmental Control Officer (ECO).
- Replanting activities should be undertaken at the end of the dry season (middle to end September) to ensure optimal conditions for germination and rapid vegetation establishment;
- Should plants not successfully establish within two growing seasons after the first planting, new plant material should be provided;
- Any weed or alien species that germinates during the contract period should be cleared by hand before flowering;
- Any erosion channels developed during the construction period should be appropriately backfilled (and compacted where relevant) and the areas restored to a condition similar to the condition before the construction erosion occurred.

10. Water Uses Applied For

Water use(s) activities	Purpose	Dimensions	Property Description	Co-ordinates
Section 21(a)				
Taking of water from a borehole (BH1)	Construction, cleaning solar panels & potable use	24 700 m^3	RE Portion 3 of Farm 156 Rooikraal	26.321800 S 28.290720 E
Section 21 (c)				
Borehole located within 500 m of a wetland	Construction, cleaning solar panels & potable use	24 700 m^3	RE Portion 3 of Farm 156 Rooikraal	26.321800 S 27.290720 E
Road Crossing	Access between North East and North West PV arrays	280 m	RE Portion 3 of Farm 156 Rooikraal	26.3271779 S 28.2940112 E
Solar PV Array (South East)	Solar power generation	87 300 m^2	RE Portion 3 of Farm 156 Rooikraal	26.337342 S 28.295038 E
Solar PV Array (South West)	Solar power generation	28 000 m^2	RE Portion 3 of Farm 156 Rooikraal	26.3304675 S 28.2909662 E
Solar PV Array (North East)	Solar power generation	302 000 m^2	RE Portion 3 of Farm 156 Rooikraal	26.324434 S 28.298887 E
Solar PV Array (North West)	Solar power generation	348 000 m^2	RE Portion 3 of Farm 156 Rooikraal	26.322012 S 28.291734 E
Section 21 (i)				
Borehole located within 500 m of a wetland	Construction, cleaning solar panels & potable use	24 700 m^3	RE Portion 3 of Farm 156 Rooikraal	26.321800 S 27.290720 E
Road Crossing	Access between North East and North West PV arrays	280 m	RE Portion 3 of Farm 156 Rooikraal	26.3271779 S 28.2940112 E
Solar PV Array (South East)	Solar power generation	87 300 m^2	RE Portion 3 of Farm 156 Rooikraal	26.337342 S 28.295038 E
Solar PV Array (South West)	Solar power generation	28 000 m^2	RE Portion 3 of Farm 156 Rooikraal	26.3304675 S 28.2909662 E
Solar PV Array (North East)	Solar power generation	302 000 m^2	RE Portion 3 of Farm 156 Rooikraal	26.324434 S 28.298887 E
Solar PV Array (North West)	Solar power generation	348 000 m^2	RE Portion 3 of Farm 156 Rooikraal	26.322012 S 28.291734 E

11. Impacts and Mitigation Measures

Water Use activity	Possible causes of impacts to the water resources	Possible Impacts to the water resource and other water users	Mitigation Measures
Construction of PV Arrays	• Site clearing and preparation.	• Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility.	• Avoid development within the wetland and buffer areas. • • Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. • 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.

Water Use activity	Possible causes of impacts to the water resources	Possible Impacts to the water resource and other water users	Mitigation Measures
			• Landscape and re-vegetate all denuded areas as soon as possible.
		• Increased erosion and sedimentation.	• 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;
		• Potential contamination of the wetland with machine oils and construction materials.	• 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.
Operation of Solar PV Array	• Increased hardened surfaces;	• Potential for increased stormwater runoff leading to Increased erosion and sedimentation.	• 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.
Maintenance of solar panels	• Washing solar panels	• Potential for increased contaminants entering the wetland systems.	• • 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.
Abstraction of water from boreholes	• Over abstraction	• Lowering of the water table due to water abstraction	• Use water as a scarce commodity. • Do not over abstract the boreholes. • Implement the groundwater monitoring plan as stipulated in Appendix ##.

12. Water Demand and Water Supply

Water Demand

Phase	Volume
Construction Phase	24 700 m^3/annum
Operational Phase	4 200 m^3/annum

Water Supply

The Geohydrological Assessment (see Appendix 3) concluded the following:

- The one available groundwater production borehole (BH 1) can be recommended for **216m^3/d** to supply in the water demand for the planned solar development.
- Based on the calculations for the surface area of Remaining Extent Portion 3 of the farm Rooikraal 156 IR, from which the borehole at the mentioned farm portion can gain groundwater, the abstraction is 13.5 % of groundwater recharge and can be classified as Category A – **Small Scale Abstraction (<60%) of recharge on the catchment area**.
- The mean groundwater recharge on the Remaining Extent Portion 3 of the farm Rooikraal 156 IR, is calculated to be in the order of 82.2mm/a or 11.3% of MAP or 183 518m^3/a or 502.8m^3/d or 11.6ℓ/s for 12h/d.
- The chemical water quality analyses of the one borehole BH 1 show that none of the chemical parameters analysed for, is above the standard limits. Chemically the water of this borehole is **good quality water** that can be used for domestic, and irrigation use without treatment to improve the chemical water quality.
- The Total Coliform count is 13 CFU/100mℓ, which means that the water must be chlorinated and filtrated prior to human consumption.
- The groundwater recharge figure calculated in this study and the borehole yield tests show that the **water demand of 67m^3/d is sustainable for long term water abstraction**.