ELECTRICAL GRID INFRASTRUCTURE (EGI) FOR THE RONDAVEL PHOTOVOLTAIC SOLAR ENERGY FACILITY, LOCATED NEAR KROONSTAD, FREE STATE PROVINCE

Basic Assessment Report

September 2021

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PROJECT DETAILS

DFFE Reference	:	14/12/16/3/3/1/2405
Title	:	Electrical Grid Infrastructure (EGI) for the Rondavel SEF near Kroonstad, Free State Province
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Client	:	South Africa Mainstream Renewable Power Developments (Pty) Ltd
Report Revision	:	Revision 1 – Basic Assessment Report for authority review and decision-making
Date	:	September 2021

When used as a reference this report should be cited as: Savannah Environmental (2021). Basic Assessment Report for the Electrical Grid Infrastructure (EGI) for the Rondavel SEF near Kroonstad, Free State Province.

PURPOSE OF THE BASIC ASSESSMENT REPORT

South Africa Mainstream Renewable Power Developments (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Basic Assessment (BA) for the Electrical Grid Infrastructure (EGI) for the Rondavel Photovoltaic (PV) Solar Energy Facility (SEF) near Kroonstad, Free State Province. The BA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This BA Report has been compiled in accordance with Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) and consists of the following sections:

- **Chapter 1** provides background to the proposed project and the BA process.
- **Chapter 2** provides a description of the proposed development, the identified and assessed project alternatives and the need and desirability of the project.
- **Chapter 3** outlines the strategic regulatory and legal context for energy planning in South Africa, specifically relating to the electrical grid connection infrastructure proposed.
- **Chapter 4** describes the approach to undertaking the BA process, the legal requirements as per the EIA regulations and the relevant legislative permitting requirements relevant to the project.
- **Chapter 5** provides a description of the existing biophysical, regional, and social environment within and surrounding the assessed grid connection corridor.
- **Chapter 6** provides an assessment of the potential direct and indirect impacts associated with the proposed development and presents recommendations for the mitigation of significant impacts.
- **Chapter 7** provides an assessment of the cumulative impacts associated with the proposed development and presents recommendations for the mitigation of significant impacts.
- **Chapter 8** presents the conclusions and recommendations based on the findings of the BA Report.
- **Chapter 9** provides the references used in the compilation of the BA Report

The BA Report was available for download and review from **Friday, 6 August 2021** until **Monday, 6 September 2021** on the Savannah Environmental website: https://www.savannahsa.com/public-documents/. All comments received and recorded during the 30-day review and comment period have been included, considered, and addressed within this final BA Report submitted for the consideration of the Competent Authority. Changes made in this BA Report for submission have been underlined for ease of reference.

EXECUTIVE SUMMARY

South Africa Mainstream Renewable Power Developments (Pty) Ltd proposes the development of Electrical Grid Infrastructure (EGI) to support the Rondavel Photovoltaic (PV) Solar Energy Facility (SEF) (DFFE ref: 14/12/16/3/3/2/2039), which aims to export energy to the national electricity grid. The project (hereafter also referred to as 'Rondavel EGI') is located ~7km south-west of Kroonstad in the Free State Province within the Fezile Dabi District, in the Moqhaka Local Municipality, on the following affected properties (**Figure 1**):

- Farm Rondavel No. 627 (Remaining Extent, Portion 1 and Portion 0)
- Farm Boschplaat No. 330 (Remaining Extent)
- Farm Salie No. 1837 (Remaining Extent)
- Farm Rondavel-Noord No. 1475 (Remaining Extent)
- Farm Naseby Thorns No. 288 (Portion 1)
- Farm Leeuwkrantz No. 1384 (Portion 0)
- Farm Dorp Gronden Van Kroonstadt No. 460 (Remaining Extent, Portion 225 and Portion 226)
- Farm Waterloo No. 1383 (Remaining Extent)

The Electrical Grid Infrastructure required includes a 132kV double- or single-circuit overhead power line (OHL) and an on-site 33/132kV substation. The EGI will connect to the national grid via a loop-in loop-out connection into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line near the site, or a direct connection to the existing Kroonstad Municipality 132kV substation, depending on which alternative is implemented. Three (3) alternative corridors, with varying widths of up to 320m and two (2) alternative substation locations are assessed as part of this BA process. Regardless of which alternative corridor is implemented, a 4 – 6m wide servitude service road under the power line is also required. The EGI corridor alternatives vary in length from ~2.33km (Alternative 1 - Preferred), to ~6.11km (Alternative 2) and ~3.68km (Alternative 3).

The project is intended to support the Rondavel SEF in addressing South Africa's energy challenge and to align with the Department of Mineral Resources and Energy (DMRE's) Integrated Resource Plan (IRP) 2019, to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. It is the Developer's intention to bid the Rondavel SEF and associated EGI under the DMRE's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), or sign a Power Purchase Agreement through a similar programme, following receipt of the regulator's concurrence with a Ministerial determination that clears the way for resumption of procurement while simultaneously diversifying South Africa's electricity mix, and positively contributing towards socio-economic and environmentally sustainable growth.

In terms of the EIA Regulations of December 2014 (as amended in April 2017) published in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) as amended, the construction and operation of the Rondavel EGI is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by a Basic Assessment (BA) process based on the contracted capacity of the power line and on-site Eskom substation being 132kV and Activity 11 of Listing Notice 1 (GN R.327), as amended, being triggered. A BA Process in terms of Appendix 1 of the 2014 NEMA EIA Regulations (as amended) has therefore been undertaken for the Rondavel EGI.

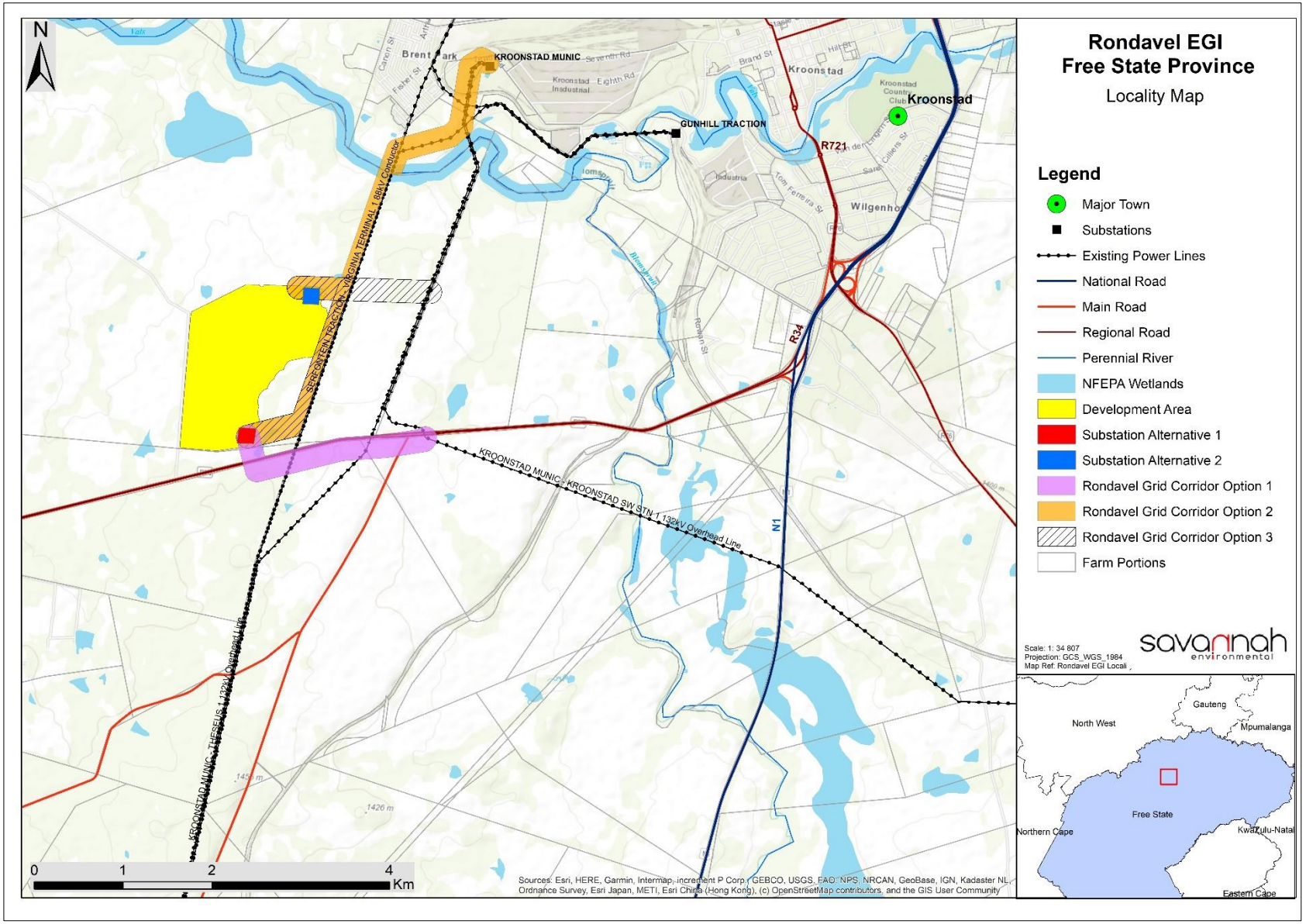

Figure 1: Locality map showing the proposed Rondavel EGI (all alternatives).

Access to the EGI site is possible via direct access from the Rondavel SEF site, which is reached directly from the existing, tarred R34 regional road, which links Kroonstad with Welkom. Alternative 2 may be accessed similarly through the Rondavel SEF site, or where maintenance activities are required via the existing tarred Chris Esterhuyse and 10th Street intersection, located in the Kroonstad Industria suburb.

No environmental fatal flaws or impacts of high significance were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features as specified by the specialists. The specialist conclusions associated with the proposed project are summarised as follows:

Impacts on Ecology

Overall, no significant terrestrial ecological flaws that could pose a problem to the proposed EGI development were identified during the BA process.

The ecological specialist determined the following ecological sensitivities on site, based on the respective ecological contribution and delineation of the various habitat types present on site:

- All wetland features were deemed to be of very high ecological sensitivity and a 30m no-go buffer around them is recommended.
- Dolerite outcrops and Acacia karroo – Asparagus laricinus Shrub-Grassland were considered to be of medium sensitivity.

The main impacts on ecological features which have been identified for the construction, operation and decommissioning phases include the following:

- Loss of local vegetation and listed protected plant species.
- Negative effects on fauna due to disturbance, transformation, and loss of habitat.
- Increased erosion risk due to increased disturbed and loose soil at the site.
- Altered runoff patterns, resulting in high levels of erosion.
- Potential increased alien plant invasion.

Based on the findings of the Ecological Impact Assessment, there is no objection to the authorisation of the proposed project, provided that the recommended mitigation measures are implemented.

Impacts on Avifauna

Species composition, distribution and abundance within the project site is largely influenced by the broad vegetation type; however, species behaviour and fine scale distribution is linked to the avifaunal habitats present. Four bird habitats were determined for the project site, namely, Grassland, Woodland, Dams and Rivers, as well as Fences.

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 192 bird species could potentially occur within the study area and immediate surroundings. Of these, 37 species are classified as priority species, and 2 of these are South African Red Data species. Of the priority species, 20 are likely to occur regularly at the study area and immediate surrounding area, and another 17 could occur sporadically.

On-site surveys were conducted from 20 - 22 July 2020 by means of transect counts. The Index of Kilometre Abundance (IKA) expresses the ratio of the total number of individuals (or of signs of presence) observed along a transect by the total transect length covered, and is a common measure used in avifaunal studies as it allows a straightforward comparison of species abundance in different sites or at different times. The species of greatest abundance as determined by on site observations was the Helmet Guineafowl followed by the Egyptian Goose, Northern Black Korhaan, Hadeda, the South African Shelduck, following which the Western Cattle Egret and the Pale Chanting Goshawk shared equal abundance values.

There are no Important Bird Areas (IBA) within a 60km radius of the proposed Rondavel EGI. It is therefore highly unlikely that the proposed grid connection will have an impact on any IBA.

The main impacts of grid connection infrastructure on avifauna which have been identified from the avifauna study (refer to **Appendix E** for more details) include the following:

Construction Phase
» Displacement of priority species due to disturbance associated with construction of the grid and on-site substation.

Operational Phase
» Displacement of priority species due to habitat transformation associated with the operation of the overhead power line and onsite substation.
» Mortality of priority species due to collisions with the 132kV overhead power line.
» Electrocution of priority species in the onsite substation.

Decommissioning Phase
» Displacement of priority species due to disturbance associated with decommissioning of the grid and onsite substation.

The following environmental sensitivities were identified from an avifaunal perspective (refer to **Figure 6.2**):

» **High sensitivity – Mark with Bird Flight Diverters: Flight paths associated with surface water.**
  * Rivers and drainage lines are used by birds as flight paths, particularly waterbirds that commute up and down channels. Dams are also a large attraction for waterbirds, and birds commuting between dams may be at risk of collisions.

The expected impacts of the Rondavel EGI were rated to be of Moderate significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to Low negative. No fatal flaws were discovered in the course of the investigation. It the opinion of the specialist that the activity be authorised on condition that the proposed mitigation measures, as detailed in the impact tables and the EMPr (**Appendices I & J**), are strictly implemented.

Impacts on Aquatic Resources

The Freshwater Impact Assessment (**Appendix D**) identified two wetland features close to the project site, which were at risk of impact. These were defined as no-go areas together with their defined 30m buffer zones. Impacts on wetland features due to the proposed project are possible during the construction and

operation phases. With the implementation of mitigation measures, impacts will be localised, short-term and of low intensity and are expected to have a moderate-low and low overall significance.

Impacts on aquatic features associated with the Rondavel EGI include the following:

» Impact on localised surface water quality.
» Increase in sedimentation and erosion within the freshwater resource features.
» Loss of riparian systems and disturbance of alluvial water courses.
» Impact on riparian systems through increase in surface runoff on riparian form and functioning.

Based on the findings of the Freshwater Impact Assessment, there is no objection to the authorisation of the proposed activities provided that the recommended mitigation measures are implemented.

Impacts on Heritage

The area proposed for the development of the Rondavel SEF and EGI yielded some cultural remains, but with varied value and preservation. The isolated and scattered lithic artefacts (RDW001, RDW003 and RDW004) are typical of a deflated landscape and have very limited cultural value given that they have been accumulated and modified by various natural processes to their current ex situ state. The stone piles found in the southwest of the property (RDW002) are more noteworthy (Grade IIIA) and require sensitive treatment. The dense vegetation on site limited comprehensive coverage of the landscape during the heritage survey and so caution should be practiced when clearing the vegetation during construction.

No fossils were identified on site, except for a few possible fragments of petrified wood. These were ex situ, and their stratigraphic origin could not be determined. Based on the geology of the proposed development area as well as the current palaeontological record, it is anticipated that the impact of the development will be HIGH to VERY HIGH due to the likely presence of highly fossiliferous Adelaide Subgroup and Volksrust Formation mudstones and shales underlying almost the entirety of the affected properties, underneath the reworked soil layers.

The heritage specialist identified the following impact for the construction phase of the project, which was rated as low significance in the case of both impact to archaeology and palaeontology following implementation of the prescribed mitigation measures:

» Impact to buried archaeological and palaeontological resources due to the proposed development.

The specialist further determined that there is no objection to the proposed development from a heritage perspective and the following mitigation measures were recommended:

» There is no preferred alternative in terms of impacts to heritage resources.
» A no-development buffer zone of 100m must be implemented around RDW001 and RDW004.
» All excavations into bedrock must be monitored by a suitably qualified palaeontologist and a report on the outcomes of the monitoring activities must be submitted to the South African Heritage Resources Agency (SAHRA)on completion of the development of the infrastructure.
» All other excavation activities must be subject to the Palaeontological Chance Finds Procedure.
» Should any previously unrecorded archaeological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.

Visual Impacts

Due to the generally remote location of the proposed Grid Connection Infrastructure, there are only a few potential sensitive visual receptors located within a 6km radius of the proposed infrastructure. These are residents of, or visitors to:

- Southern outlying parts of Brent Park;
- Nasenby Thorns;
- Blomtuin;
- Retreat;
- Fraaiuitsig; and
- Northern part of the Boslaagte Nature Reserve.

Visual impacts associated with the development of the Rondavel EGI include the following:

- Potential impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.
- Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase.
- Potential visual impact on sensitive visual receptors within the region (0.5 – 3km) radius) during the operational of the grid connection infrastructure.
- The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.

The anticipated visual impacts listed above (i.e., post mitigation impacts) range from moderate to low significance. No visual impacts of high significance are expected to occur. Anticipated visual impacts on sensitive visual receptors in proximity to the power line are not considered to be fatal flaws for the proposed project. Considering all factors, it is the opinion of the specialist that the development of the Grid Connection Infrastructure as proposed be authorised; subject to the implementation of the recommended mitigation measures and EMPrs.

Social Impacts

Impacts on the social environment are expected in all phases of project development. The social impacts identified will either be of low or medium negative significance following mitigation, with one high positive impact determined following implementation of enhancement measures. The following positive and negative impacts were identified and assessed for the project:

Construction Phase:

Positive:

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Negative:

- Impacts associated with the presence of construction workers on local communities.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Risks posed to farming activities by construction workers.

Operations Phase:

Positive:

- Improved energy security and establishment of energy infrastructure.
- Creation of employment opportunities.

Negative:

- The visual impacts and associated impact on sense of place.
- Risks posed to farming activities by maintenance workers.
- Impact on Tourism.

The findings of the Social Impact Assessment (SIA) indicate that the nature and significance of the social impacts associated with each of the transmission line alternatives are similar. The social impacts associated with substations will be negligible. The significance of the potential negative social impacts for both the construction and operation phase are Low Negative with mitigation.

All negative social impacts are within acceptable limits with no impacts considered as unacceptable from a social perspective. The recommendations proposed for the project are considered appropriate and suitable for the mitigation of the negative impacts and the enhancement of the positive impacts. The establishment of the proposed project is therefore supported by the findings of the SIA.

Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The most significant of these will be the contribution towards a reduction in greenhouse gas emissions and consequent assistance with climate change mitigation.

Considering the findings of the specialist assessments undertaken for the project, the cumulative impacts for the proposed Rondavel EGI will be acceptable, and the majority are rated as being of low to moderate significance with the implementation of appropriate mitigation. On this basis, the following can be concluded considering the Rondavel EGI:

- The proximity of the Rondavel EGI to existing similar developments is seen as a positive aspect of the development and overall cumulative impacts associated with the Rondavel EGI development are considered acceptable.
- The construction of the project will not result in unacceptable impacts on ecological processes and aquatic features.
- The avifaunal cumulative impact of the planned EGI was considered low from a potential bird collision perspective after mitigation. However, the combined cumulative impact of the existing and planned power lines within a 30km radius is considered moderate. The cumulative impact of displacement due to habitat transformation as a result of the construction of the on-site substation associated with the Rondavel SEF is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions in the substation yard of the onsite substation is also likely to be low as it is expected to be a rare event. The avifauna specialist determined that the Rondavel EGI project is acceptable from a cumulative avifaunal impact perspective.
- The construction of the project will not result in the complete or whole-scale change in sense of place and character of the area nor will the project result in unacceptable visual intrusion.

- The construction of the project will not result in unacceptable loss of or impact to heritage resources.
- The project will contribute towards a reduction in greenhouse gas emissions indirectly via the support of energy generation and will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government has committed to become a signatory.

Based on the detailed evaluation, the cumulative impact associated with the construction and operation of the proposed Rondavel EGI and other proposed renewable energy facilities, including their associated grid connection infrastructure in the region is considered acceptable.

Environmental Sensitivity of the Rondavel EGI

As part of the specialist investigations undertaken within the project development area, specific environmental features and areas were identified. The environmental features identified within and directly adjacent to the development area and development footprint are illustrated in **Figure 2**. The features identified specifically relate to ecology, freshwater resources, avifauna habitats, palaeontology, and heritage features. The following points provide a description of those features of very high and high sensitivity identified within the development area:

- **Ecological features:**
  - All wetland features were deemed very high ecological sensitivity and a 30m no-go buffer around them is recommended.
  - Dolerite outcrops and *Acacia karroo – Asparagus laricinus* Shrub-Grassland were considered to be of medium sensitivity.
- **Freshwater features:**
  - All wetland features are deemed high sensitivity and a 30m no-go buffer around them is recommended. These are considered no-go regions.
- **Avifaunal features:**

  High sensitivity – Mark with Bird Flight Diverters: Flight paths associated with surface water.
  - Rivers and drainage lines are used by birds as flight paths, particularly waterbirds that commute up and down channels. Dams are also a large attraction for waterbirds, and birds commuting between dams may be at risk of collisions.
- **Palaeontological features:**
  - Although no palaeontological resources were identified within the development area, the palaeontological sensitivity of the study area is rated as high to very high for all corridor and substation alternatives. It is therefore recommended that palaeontological monitoring of excavations takes place during the construction phase of the grid connection infrastructure.
- **Heritage features:**
  - A heritage resource with a grading of IIIA (RDW002) was identified within the development area for the Rondavel SEF and on-site substation. It is recommended that a no-go buffer of 100m be implemented around these identified stone piles.

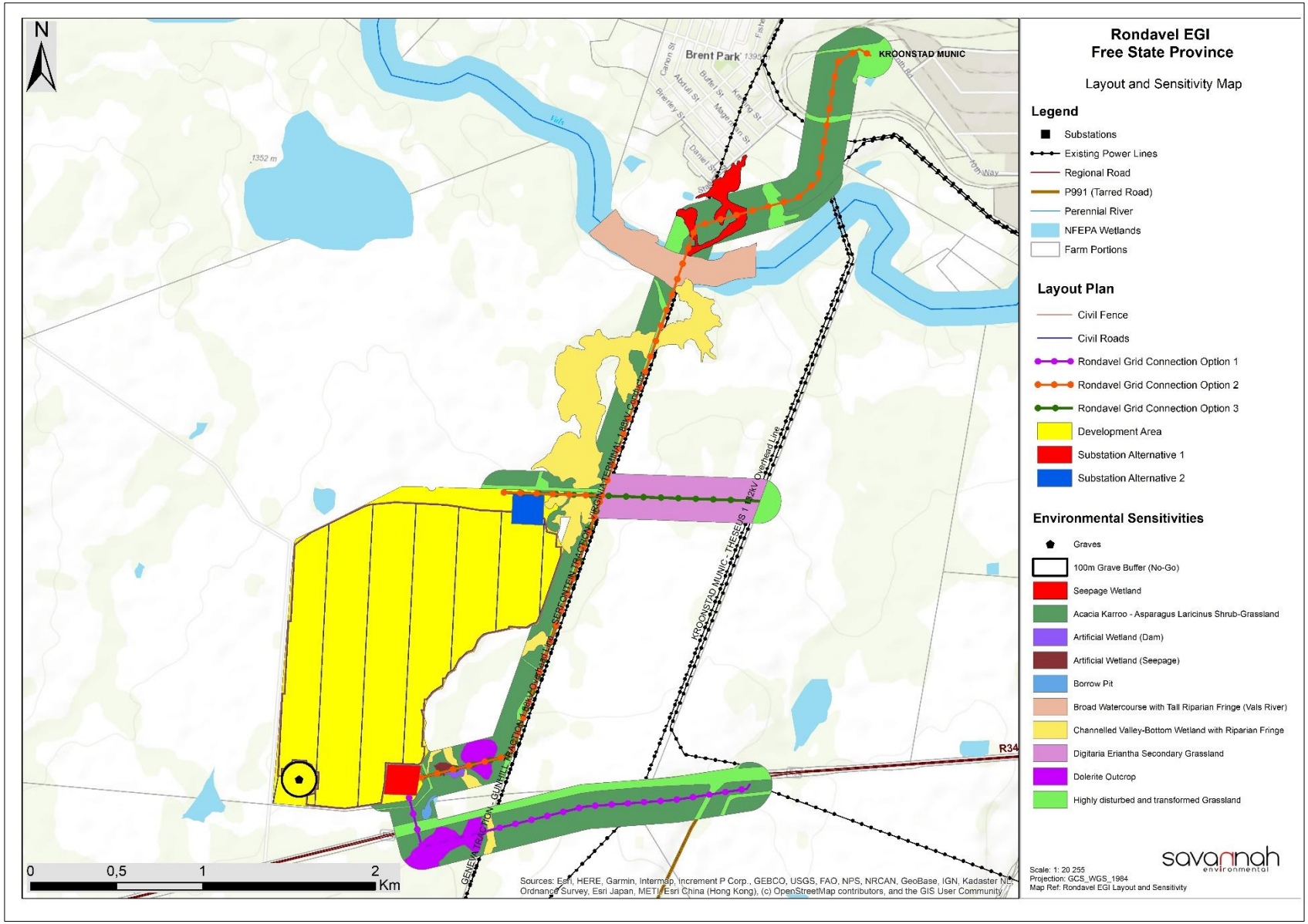

Figure 2: Environmental sensitivity and layout map of the Rondavel EGI development footprint including all corridor and substation alternatives.

Conclusion

Technically viable grid connection corridor alternatives for the Rondavel EGI were proposed by the developer and assessed as part of this BA Report. The environmental assessment of the development footprint (grid layout) within the development area was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of Rondavel EGI, should the mitigation measures provided be implemented, and the preferred alternative only be approved for development. Through assessment of these alternatives, Grid Corridor Alternatives 1 and 3 were recommended as the preferred alternatives for authorisation, and both substation alternatives were rated as acceptable for authorisation.

The preferred grid corridor alternatives (Alternative 1 and 3) and both substation alternatives are considered as the most appropriate from an environmental perspective and are considered acceptable within all fields of specialist study undertaken for the project, provided mitigation, as required by the respective specialists, are implemented. All impacts associated with the proposed Rondavel EGI can be mitigated to acceptable levels or enhanced through implementation of the recommended mitigation or enhancement measures. The layout map included as **Figure 3** is therefore considered to be the preferred grid layout for the Rondavel EGI.

Considering the findings of the independent specialist studies and the impacts identified, it is the reasoned opinion of the EAP that the development of the Rondavel EGI, is acceptable within the landscape and can reasonably be authorised for either Grid Corridor Alternatives 1 and 3, as well as either substation options (Alternatives 1 and 2). The period for which the Environmental Authorisation is required to remain valid is 10 years from the date of authorisation, with a period of 10 years for the design, planning, construction, and commissioning of the activity to be concluded.

The authorisation for Rondavel EGI would include the following key infrastructure and components:

- **On-site substation which consists of:**
  - 33/132kV portion of the substation (adjacent to the Independent Power Producer (IPP) substation).
  - Associated equipment, infrastructure, and buildings.
  - Temporary and permanent laydown areas.

- **Distribution Line:**
  - For the Rondavel PV solar energy facility, the 132kV distribution line from the onsite 33/132kV Eskom portion of the substation will loop in and loop out into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line, or connect directly with the Kroonstad Municipality 132kV substation, depending on which alternative is implemented.

Key conditions that would be required to be included within an authorisation issued for Rondavel EGI are detailed in **Chapter 8**.

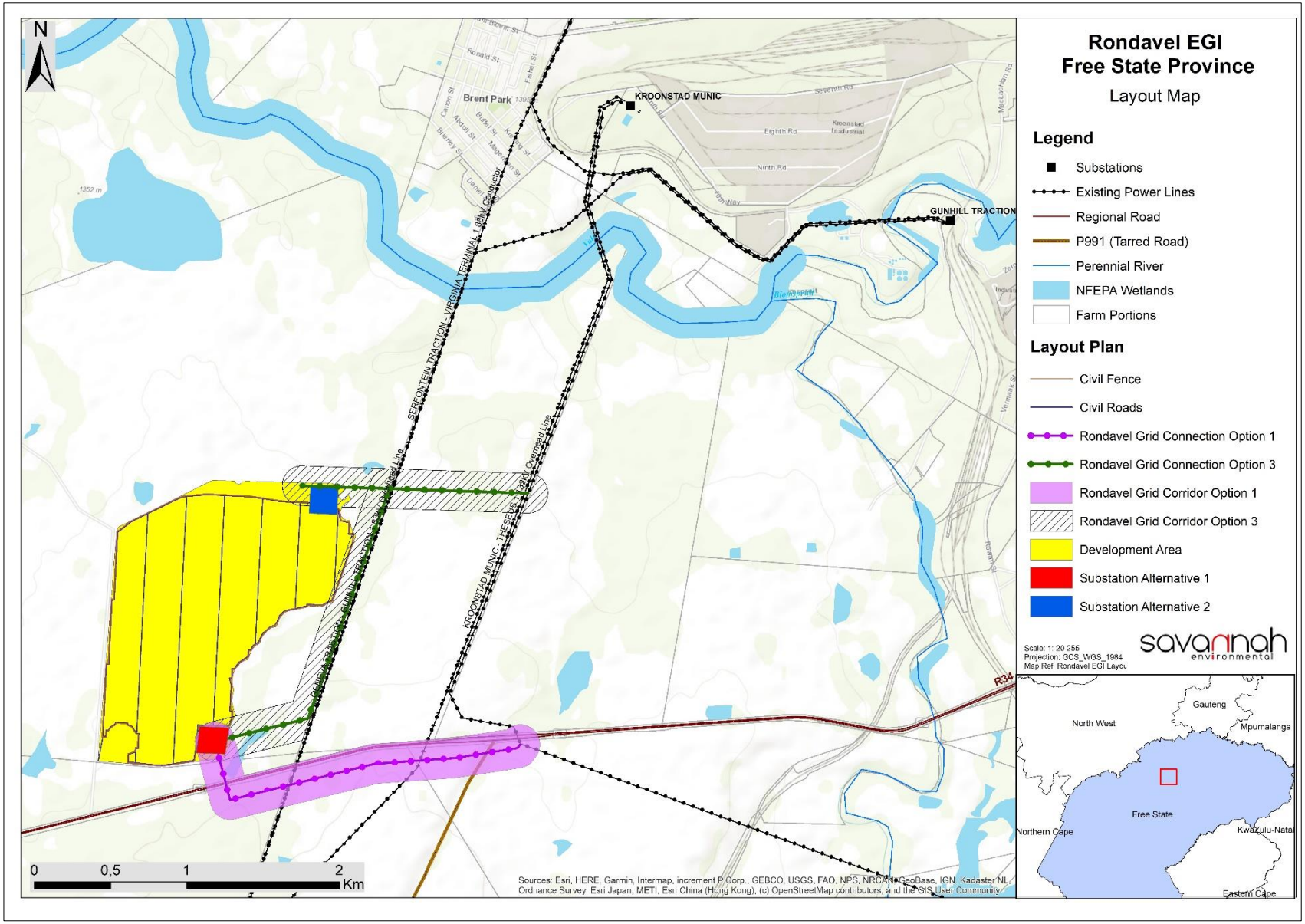

Figure 3: Preferred Layout for the Rondavel EGI.

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g., noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g., the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust, or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g., geotechnical surveys).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment

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Appendix P: Coordinates for the proposed infrastructure

1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd is proposing the development of Electrical Grid Infrastructure (EGI) to support the Rondavel Photovoltaic (PV) Solar Energy Facility (SEF) (DFFE ref: 14/12/16/3/3/2/2039), which aims to export energy to the national electricity grid. The project (hereafter also referred to as 'Rondavel EGI') is located ~7km south-west of Kroonstad in the Free State Province within the Fezile Dabi District, in the Moqhaka Local Municipality, on the following affected properties:

- Farm Rondavel No. 627 (Remaining Extent, Portion 1 and Portion 0)
- Farm Boschplaat No. 330 (Remaining Extent)
- Farm Salie No. 1837 (Remaining Extent)
- Farm Rondavel-Noord No. 1475 (Remaining Extent)
- Farm Naseby Thorns No. 288 (Portion 1)
- Farm Leeuwkrantz No. 1384 (Portion 0)
- Farm Dorp Gronden Van Kroonstadt No. 460 (Remaining Extent, Portion 225 and Portion 226)
- Farm Waterloo No. 1383 (Remaining Extent)

1.1. Requirements for an Environmental Impact Assessment Process

The construction and operation of the Rondavel EGI is subject to the requirements of the EIA Regulations, 2014 (as amended), published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. NEMA is the national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of the NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation (EA)

The main listed activity triggered by the proposed project is Activity 11(i) of Listing Notice 1 (GNR 327 of the EIA Regulations, 2014 (as amended)), which relates to the development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. The proposed project is therefore subject to a Basic Assessment (BA) process in terms of Appendix 1 of the 2014 NEMA EIA Regulations (as amended).

In terms of GNR 779 of 01 July 2016, the national Department of Forestry, Fisheries and Environment (DFFE) has been determined as the Competent Authority (CA) for all projects which relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. As this project is associated with a renewable energy development intended to form part of the country's national energy supply (which is included in the IRP), the DFFE is considered as the CA. Through the decision-making process, the DFFE will be supported by the Free State Department of Economic Development, Tourism and Environmental Affairs as the commenting authority.

1.2. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This BA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended in April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998).

This chapter of the BA Report includes the following information required () in terms of the EIA Regulations - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(a) the details of the (i) EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	The details of the EAP who prepared the report and the expertise of the EAP is included in **Section 1.4**. The curriculum vitae of the EAP, project team and independent specialists are included in **Appendix A**.
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	The location of the Rondavel EGI is included in **Section 1.3**, **Table 1.1** and **Figure 1.1**. The information provided includes the 21-digit Surveyor General code of the affected properties and the farm names. Additional information is also provided regarding the location of the development which includes the relevant province, local and district municipalities, ward and current land zoning.

This BA Report has been compiled in accordance with Appendix 1 of the EIA Regulations, 2014 (as amended) and consists of the following sections:

- **Chapter 1** provides background to the proposed project and the BA process.
- **Chapter 2** provides a description of the proposed development, the identified and assessed project alternatives and the need and desirability of the project.
- **Chapter 3** outlines the strategic regulatory and legal context for energy planning in South Africa, specifically relating to the electrical grid connection infrastructure proposed.
- **Chapter 4** describes the approach to undertaking the basic assessment process, the legal requirements as per the EIA regulations and the relevant legislative permitting requirements relevant to the project.
- **Chapter 5** provides a description of the existing biophysical, regional, and social environment within and surrounding the assessed grid connection corridor.
- **Chapter 6** provides an assessment of the potential direct and indirect impacts associated with the proposed development and presents recommendations for the mitigation of significant impacts.
- **Chapter 7** provides an assessment of the cumulative impacts associated with the proposed development and presents recommendations for the mitigation of significant impacts.
- **Chapter 8** presents the conclusions and recommendations based on the findings of the BA Report.
- **Chapter 9** provides the references used in the compilation of the BA Report.

1.3. Project overview

The Electrical Grid Infrastructure (**Figure 1.1**) required as part of the Rondavel EGI includes a 132kV double- or single-circuit overhead power line and an on-site 33/132kV substation. The EGI will connect to the national grid via either a loop-in loop-out connection into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line near the site, or a direct connection to the existing Kroonstad Municipality 132kV substation, depending on which alternative is implemented. Three (3) alternative corridors, with varying widths of up to 320m and two (2) alternative substation locations are assessed as part of this BA process. Regardless of which alternative corridor is implemented, a 4 – 6m wide servitude service road under the power line is also required. The EGI corridor alternatives vary in length from ~2.33km (Alternative 1 - Preferred), to ~6.11km (Alternative 2) and ~3.68km (Alternative 3).

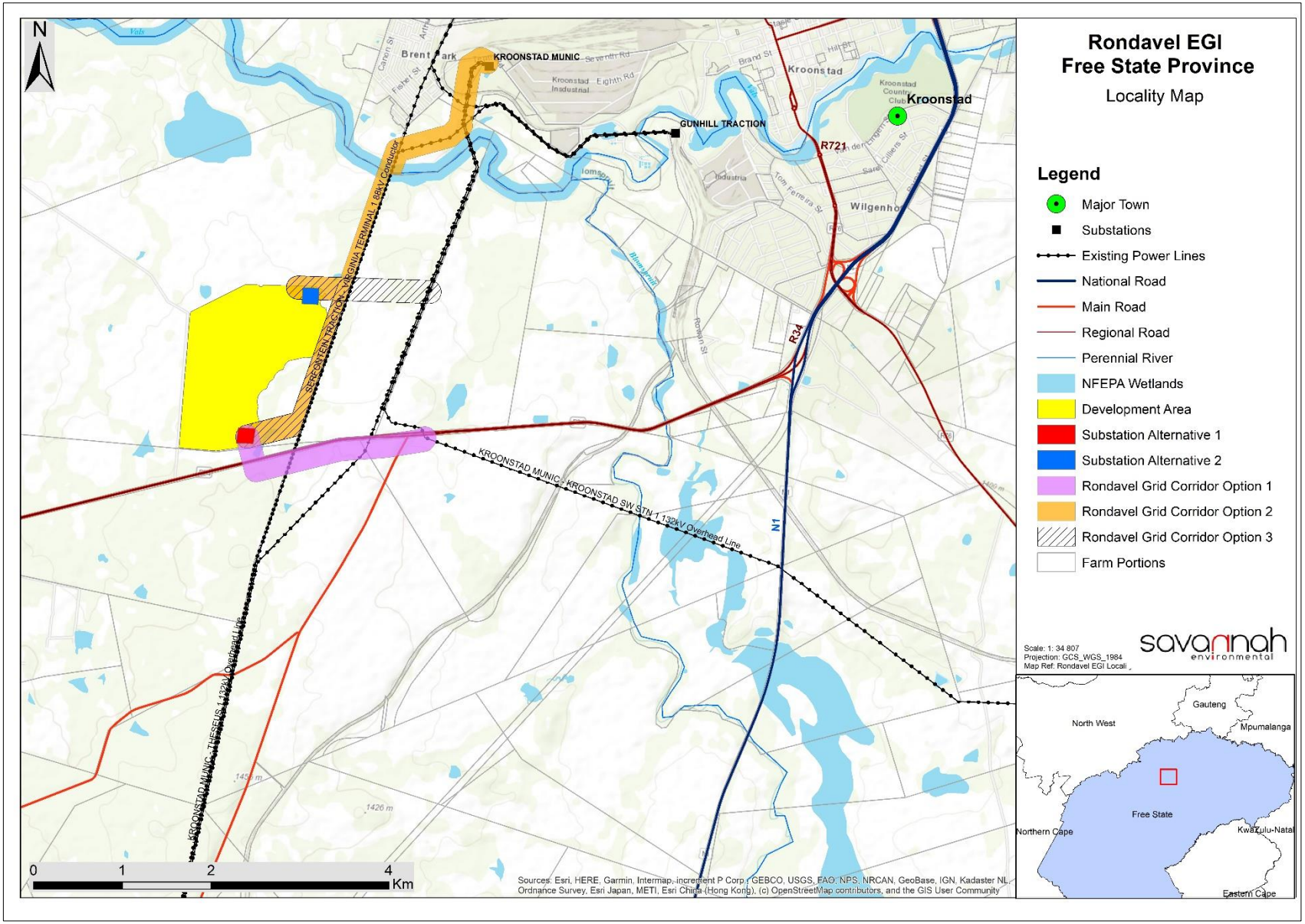

Figure 1.1: Locality map showing the proposed Rondavel EGI and all alternatives.

The project is intended to support the Rondavel Photovoltaic Solar Energy Facility[1] in addressing South Africa's energy challenge and to align with the Department of Mineral Resources and Energy (DMRE's) Integrated Resource Plan (IRP) 2019, to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. It is the Developer's intention to bid the Rondavel SEF and associated EGI under the DMRE's renewable energy procurement programme or sign a Power Purchase Agreement through a similar programme, following receipt of the regulator's concurrence with a Ministerial determination that clears the way for resumption of procurement while simultaneously diversifying South Africa's electricity mix, and positively contributing towards socio-economic and environmentally sustainable growth.

The nature and extent of the proposed EGI, as well as the potential environmental impacts associated with the construction, operation and decommissioning phases of the proposed infrastructure are assessed in this BA Report. Site specific environmental issues and constraints within the assessment corridors are considered within independent specialist studies in order to test the environmental suitability of the corridors for the proposed project, delineate areas of sensitivity within the corridors, identify a preferred corridor for implementation and ultimately inform the placement of the power line within the assessment corridor.

Table 1.1. provides a summary of the location of the Rondavel EGI. Specific details of the Electrical Grid Infrastructure are included within **Section 2.2**.

Table 1.1: Details of the location of the Rondavel EGI (all alternatives)

Province	**Free State Province**
District Municipality	Fezile Dabi District Municipality
Local Municipality	Moqhaka Local Municipality
Ward number(s)	7
Nearest town(s)	Kroonstad (~7km south-west)
Affected Properties: Farm name(s), number(s) and portion numbers, for all alternatives	» Farm Rondavel No. 627 (Remaining Extent, Portion 1 and Portion 0) » Farm Boschplaat No. 330 (Remaining Extent) » Farm Salie No. 1837 (Remaining Extent) » Farm Rondavel-Noord No. 1475 (Remaining Extent) » Farm Naseby Thorns No. 288 (Portion 1) » Farm Leeuwkrantz No. 1384 (Portion 0) » Farm Dorp Gronden Van Kroonstadt No. 460 (Remaining Extent, Portion 225 and Portion 226) » Farm Waterloo No. 1383 (Remaining Extent)
SG 21 Digit Code (s): Affected Properties (for all alternatives)	» Portion 0 and Remaining Extent of the farm Rondavel No. 627: F02000000000062700000 » Portion 1 of the farm Rondavel No. 627: F02000000000062700001 » Remaining Extent of the farm Boschplaat No. 330: F02000000000033000000 » Remaining Extent of the farm Salie No. 1837: F02000000000183700000 » Remaining Extent of the farm Rondavel-Noord No. 1475: F02000000000147500000 » Portion 1 of the farm Naseby Thorns No. 288: F02000000000028800001 » Portion 0 of the farm Leeuwkrantz No. 1384: F02000000000138400000 » Remaining Extent of the farm Dorp Gronden Van Kroonstadt No. 460: F02000000000046000000

[1] A separate EIA process has been undertaken for the Rondavel PV SEF (DFFE Ref No.: 14/12/16/3/3/2/2039)

	» Portion 225 of the farm Dorp Gronden Van Kroonstadt No. 460: F02000000000046000225 » Portion 226 of the farm Dorp Gronden Van Kroonstadt No. 460: F02000000000046000226 » Remaining Extent of the farm Waterloo No. 1383: F02000000000138300000
Coordinates of the respective power line corridor alternatives and substation alternatives	Please refer to **Appendix P** for a complete detailing of the respective coordinates of the power line corridor alternatives and substation alternatives.

1.4. Details of the Environmental Assessment Practitioner and Expertise to conduct the BA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), South Africa Mainstream Renewable Power Developments (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent Environmental Assessment consultant to undertake the Basic Assessment process and prepare the BA Report for the Rondavel EGI. Neither Savannah Environmental nor any of its specialists are subsidiaries of or are affiliated to South Africa Mainstream Renewable Power Developments (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in basic assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

The Environmental Assessment Practitioners (EAPs) from Savannah Environmental responsible for this project include:

» **Mmakoena Mmola,** the principle author of this report, holds a BSc Honours in Geochemistry from the University of the Witwatersrand and is currently completing a BSc Honours in Environmental Management with the University of South Africa. She has 3.5 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, public participation, and environmental management programmes. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748.

» **Jo-Anne Thomas**, the principle EAP for this project, is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA). She provides technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Her Key focus is on integration of

the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures.

» **Nicolene Venter** is responsible for the public participation process for the BA. She is a Board Member of IAPSA (International Association for Public Participation South Africa). She has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

The CVs of the EIA Consulting Team are included in **Appendix A** and the EAP Declaration of Independence and Affirmation is included in **Appendix L**.

2. PROJECT DESCRIPTION

This chapter provides an overview of the proposed Rondavel EGI and details the project scope, which includes the planning/design, construction, operation, and decommissioning activities required for the development.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed Rondavel EGI is detailed in **Chapter 1**, **Table 1.1**, as well as in **Section 2.2** below.
3(c)(i)(ii) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A locality map illustrating the Rondavel EGI is included as **Figure 1.1**.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of the Rondavel EGI is included in **Table 2.1** and **Table 2.2.**
3(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability for the development of the Rondavel EGI is included and discussed as a whole within **Section 2.4**.
3(g) a motivation for the preferred site, activity and technology alternative	The motivation for the alternatives associated with the development proposal is included in **Section 2.3**.
3(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Rondavel EGI is included in **Section 2.3**.
3(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the Rondavel EGI is described in **Section 2.3**.
3(h)(x) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included in **Section 2.3**.

2.2. Nature and extent of the proposed Rondavel EGI

South Africa Mainstream Renewable Power Developments (Pty) Ltd is proposing the development of Electrical Grid Infrastructure (EGI) for the Rondavel Photovoltaic (PV) Solar Energy Facility (SEF) near Kroonstad, Free State Province, in order to connect the proposed Rondavel PV SEF to the national electricity

grid. Three (3) alternative corridors, with varying widths of up to 320m and two (2) alternative substation locations are assessed as part of this BA process. Regardless of which alternative corridor is implemented, a 4 – 6m wide servitude service road under the power line is also required. The EGI corridor alternatives vary in length from ~2.33km (Alternative 1 - Preferred), to ~6.11km (Alternative 2) and ~3.68km (Alternative 3).

2.2.1. Electrical Grid Infrastructure

The Rondavel EGI is located ~7km south-west of Kroonstad in the Free State Province within the Fezile Dabi District, in the Moqhaka Local Municipality, on the following affected properties:

- Farm Rondavel No. 627 (Remaining Extent, Portion 1 and Portion 0)
- Farm Boschplaat No. 330 (Remaining Extent)
- Farm Salie No. 1837 (Remaining Extent)
- Farm Rondavel-Noord No. 1475 (Remaining Extent)
- Farm Naseby Thorns No. 288 (Portion 1)
- Farm Leeuwkrantz No. 1384 (Portion 0)
- Farm Dorp Gronden Van Kroonstadt No. 460 (Remaining Extent, Portion 225 and Portion 226)
- Farm Waterloo No. 1383 (Remaining Extent)

Access to the EGI site is possible via direct access from the Rondavel SEF site, which is reached directly from the existing, tarred R34 regional road, which links Kroonstad with Welkom. Alternative 2 may be accessed similarly through the Rondavel SEF site, or where maintenance activities are required via the existing tarred Chris Esterhuyse and 10th Street intersection, located in the Kroonstad Industria suburb.

During construction, a permanent access road along the length of the power line corridor between 4 - 6m wide will be established to allow for large crane movement. This track will then be utilised for maintenance during operation. Other associated infrastructure includes a temporary laydown area/s that will be rehabilitated upon completion of the construction phase. **Figure 1.1** of Chapter 1 illustrates the proposed EGI location, along with all proposed alternatives.

2.2.2. Components of the Rondavel EGI

A summary of the details and dimensions of the proposed EGI is provided in **Table 2.1.**

Table 2.1: Details of the proposed EGI for the Rondavel SEF

Infrastructure	Footprint, dimensions, and details
Corridor width (for assessment purposes)	Three (3) grid connection alternative corridors have been identified for the assessment and placement of the grid connection infrastructure. The grid connection corridors have varying widths of up to 320m to allow for avoidance of environmental sensitivities, and suitable placement within the corridor (please refer **Figure 1.1**).
Power line capacity	132kV (single- or double-circuit)
Tower height	Up to 32m
Power line servitude width	Up to 40m
Length of the proposed power line/s	**Alternative 1**: On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~2.33km long [PREFERRED]. **Alternative 2**: On-site substation directly connecting to the existing Kroonstad Municipality 132kV substation. This corridor is ~6.11km long.

Infrastructure	Footprint, dimensions, and details
	Alternative 3: On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~3.68km long.
Size of the Substation	~3.3ha footprint, with an additional 1ha laydown area required, all contained within a 25ha assessment region.
Capacity of the substation	33/132kV
A description and coordinates of the corridor in which the proposed activity or activities is to be undertaken	The EGI proposed for authorisation, including all infrastructure associated with the project, will be contained within the coordinates provided for in **Appendix P** of this report.
Substation coordinates (approximate centre point)	

2.2.3. Project Development Phases

Table 2.2 details the activities to be undertaken for the various development phases.

Table 2.2: Details of the activities related to the various development phases (i.e., construction, operation, and decommissioning), applicable to all alternatives and infrastructure proposed

Construction Phase	
Requirements	» Duration of the construction phase is expected to be 9-12 months. » Create direct construction employment opportunities. Up to 40 employment opportunities will be created during the construction phase. » No on-site housing is envisaged with daily commute to and from site expected of construction staff. » Overnight on-site worker presence would be limited to security staff. » Construction waste will be temporarily stored on site and subsequently collected by a private contractor and will be disposed of at a licensed wate disposal site. » Electricity required for construction activities will be generated by a generator or will be sourced from available Eskom distribution networks in the area. » Negligible water will be required for the construction phase and potable needs. If required, water will be sourced from the local municipality, or existing borehole/s on or near the project site (subject to agreement with landowners and authorisation from the Department of Human Settlements, Water and Sanitation (DHSWS)).
Construction sequence	Overhead power lines are constructed in the following simplified sequence: » Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs to inform permitting requirements and micro-siting of the pylon infrastructure. » Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and identified environmental sensitivities. » Step 3: Search-and-rescue activities, vegetation clearance and construction of access roads/tracks (where required) and watercourse crossings (where required). » Step 4: Construction of tower foundations. » Step 5: Assembly and erection of infrastructure on site. » Step 6: Stringing of conductors. » Step 7: Rehabilitation of disturbed areas. » Step 8: Continued maintenance. Similarly, the following simplified sequence is conducted for the construction of the substation: » Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs to inform permitting requirements.

	» Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and potential environmental sensitivities. » Step 3: Search-and-rescue activities, vegetation clearance and construction of access roads/tracks (where required), including installation of fencing. » Step 4: Trenching and ground grid conduit installation. » Step 5: Installation of concrete foundations. » Step 6: Assembly and installation of steel structures and isolators. » Step 7: Control building assembly. » Step 8: Gravel placement and commissioning. » Step 9: Rehabilitation of disturbed areas. » Step 10: Continued maintenance.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to a geotechnical survey, environmental walkthroughs to inform search-and-rescue and permitting requirements, site survey (including the location of the towers along the proposed power line route) and confirmation of the power line servitude, and all other associated infrastructure. » Undertake search and rescue of floral and faunal species of concern (if applicable).
Undertake site preparation	» Including the clearance of vegetation at the pylon foundations and switching station, trimming of vegetation along the final power line route (if required to ensure sufficient clearance between vegetation and the power line), establishment of the laydown areas, the establishment of access roads/tracks, and excavations for foundations as well as the fencing of the switching station. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site. To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion. » Include search and rescue of floral and faunal species of concern (only where and if required) and the identification and excavation of any sites of cultural/heritage value (only where and if required) along the power line route and switching station footprint.
Establishment of laydown areas and batching plant on site	» Laydown area/s for the storage of grid infrastructure and substation components, including the civil engineering construction equipment. » The laydown area will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials (if required) will be sourced from third-party suppliers or licenced borrow pits within the surrounding areas. » If necessary, a temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for grid infrastructure and switching station foundations. Other options include the use of mobile batching plants that allow for in situ batching of concrete. Should concrete batching be required, the proponent will utilise that of the Rondavel SEF if feasible.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. » On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
	<u>Operation Phase</u>
Requirements	» Duration will be at least 20 years, or longer as needed for the operation of the Rondavel SEF. » Requirements for security and maintenance of the power line and switching station infrastructure. » Control operations associated with the electrical switching station. » Employment opportunities relating mainly to operation activities and maintenance. Very limited employment opportunities will be available.
Activities to be undertaken	
Operation and Maintenance	» Ad hoc infrastructure maintenance activities. Once built, the power line and switching station will likely be ceded to Eskom, and it will be Eskom's full-time employees undertaking maintenance. » Disposal of waste products (e.g., oil) in accordance with relevant waste management legislation.

	» On-going rehabilitation of those areas which were disturbed during the construction phase. » During this operation phase natural vegetation within the power line servitude (up to 40m), will require management only if it impacts on the safety and operational objectives of the project. Alien plant management will be required throughout the operation phase in accordance with relevant legislation. » The maintenance of the grid connection infrastructure will be the responsibility of the holder of the Environmental Authorisation.
Decommissioning Phase	
Requirements	» Decommissioning of the power line and switching station may occur at the end of its economic life and that of the Rondavel SEF, unless the infrastructure is required by Eskom. » Expected lifespan of at least 20 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of access to the grid connection infrastructure to accommodate the required equipment. » Mobilisation of decommissioning equipment.
Disassemble components and rehabilitation	» The power line and switching station infrastructure components will be disassembled and reused and recycled (where possible). » Where components cannot be reused or recycled it will be disposed of in accordance with the regulatory requirements at the time of decommissioning. » Disturbed areas, where infrastructure has been removed, will be rehabilitated, if required and depending on the future land-use of the affected areas and the relevant legislation applicable at the time of decommissioning.

It is expected that the areas affected by the EGI will revert to the original land-use (i.e., grazing, or fallow land) once the Rondavel SEF (and by implication the proposed Rondavel EGI) has reached the end of its economic life and all infrastructure has been decommissioned.

2.3. Alternatives Considered during the BA Process

In accordance with the requirements of Appendix 1 of the EIA Regulations (GNR 326), 2014 (as amended) a BA Report must contain a consideration of alternatives including site (i.e., development footprint), activity, technology alternatives, as well as the "do-nothing" alternative. Alternatives are required to be assessed in terms of social, biophysical, economic, and technical factors.

2.3.1. Location Alternatives

South Africa Mainstream Renewable Power Developments (Pty) Ltd, as the proponent for the Rondavel EGI, identified two technically feasible locations for the on-site substation (as determined through the EIA process for the Rondavel PV SEF), and three potential grid connection corridors for consideration in the BA process. These corridors are considered highly suitable from a technical perspective for development as these are located in relatively close proximity to the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line and the existing Kroonstad Municipality 132kV substation. Specific characteristics considered in identifying suitable grid connection corridors, and the results thereof, are discussed in the sections below.

» **Land Availability and Land Use** – In order to develop the Rondavel EGI, sufficient space and access to land between the Rondavel EGI substation and the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line, and that of the between the Rondavel EGI substation and the existing Kroonstad Municipality 132kV substation is required. The land use within the identified

alternative grid connection corridors is mainly grazing (or fallow land), which is generally preferred for developments of this nature as the grazing activities can continue on the affected properties in tandem with the operation of the EGI. In addition, the footprint for the EGI is relatively minor and therefore does not conflict with the current grazing practices. There is no recent cultivated agricultural land on the affected properties or directly adjacent to them which could be impacted upon by the proposed development.

- **Access to the National Grid** – Three alternative grid corridors are being considered for the Rondavel EGI. Two of the alternatives will loop into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line located approximately 3km from the Rondavel PV SEF site, to connect to the national grid, whereas the third will connect directly into the existing Kroonstad Municipality 132kV substation. The existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line and the Kroonstad Municipality 132kV substation have been determined by the proponent as technically feasible points for connection. Based on the nearby location and suitability of the anticipated grid connection solutions, no further grid access alternatives are considered in this application.
- **Geographical and topographical considerations** – The terrain traversed by the identified grid connection corridors is relatively flat, providing good conditions for power line construction. The area is also currently fallow, and previously disturbed by virtue of past agricultural practices, and therefore compliments the proposed land use by repurposing previously disturbed land with an economically viable land use.
- **Consideration of sensitive environmental features –** The locations of the onsite substations were informed by environmental sensitivities within the Rondavel PV SEF as determined through the EIA process undertaken for the facility. Through the assessment of the grid connection corridors, which are much larger than the area required for the servitude of up to 40m, an opportunity is created by the proponent for the avoidance of sensitive environmental features and areas. The consideration of broader grid connection corridors enables the avoidance of environmental sensitivities, thereby ensuring that the Rondavel EGI may be placed appropriately without resulting in an unacceptable environmental impact. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e., avoid, minimise, mitigate). This application of the mitigation strategy will result in the identification of the optimised placement of the grid connection infrastructure within the grid connection corridors with the least environmental impact. In placing the 40m wide servitude for the Rondavel EGI, consideration will also be given to landowner specific requirements as determined through the negotiation process.
- **Landowner support:** The selection of a site where the landowner is supportive of the development of renewable energy and in particular this proposed EGI, is essential for ensuring the success of the project. The owner of the properties that the various grid connection corridors traverse does not view the development as being in conflict with their current land use practices.

2.3.2. Design and Layout Alternatives

The design of the grid connection infrastructure is required to conform to Eskom's technical standards as it will form part of the national electricity supply network and must therefore be in-line with the existing network systems, technology, and infrastructure. As such, technical specifications as determined by Eskom will be adhered to by the proponent. Therefore, no design alternatives are possible or assessed within this BA Report.

This assessment considered the development of a 132kV double-or single-circuit overhead power line and an on-site Eskom substation, connecting to the national grid via a loop-in loop-out connection into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line or directly to the existing Kroonstad Municipality 132kV substation (depending on which alternative is authorised). Two alternative,

viable substations were assessed and considered in the Rondavel SEF EIA, and therefore both are considered feasible alternatives for the purposes of this application. These alternatives are therefore:

Preferred Substation (Alternative 1) (PS), comprising the following infrastructure:

- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

Alternative Substation (Alternative 2) (AS), comprising the following infrastructure:

- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

In addition, three alternative grid corridors have been identified for assessment to allow for avoidance of environmental sensitivities as far as possible. The following grid corridors alternatives are provided for assessment for the Rondavel EGI (refer to **Figure 1.1**):

» **Alternative 1 (Preferred):** On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~2.33km long.
» **Alternative 2**: **Alternative 2**: On-site substation directly connecting to the existing Kroonstad Municipality 132kV substation. This corridor is ~6.11km long
» **Alternative 3**: On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~3.68km long.

All the corridor options and substation alternatives represent technically feasible options, although the shortest route is preferred. The preferred corridor may therefore be determined by the route incurring the least environmental impact.

2.3.3. Technology Alternatives

No technology alternatives exist for similar large-scale distribution and switching of electricity, with conductor and substation technology having been refined for numerous years by Eskom and employed throughout the country. As such, the selected technology is regarded the most suitable and appropriate for this development type, and no further technology alternative is assessed for the project as part of this BA process.

2.3.4. The 'Do Nothing' Alternative

The 'do-nothing' alternative is the option of Mainstream not constructing the grid connection infrastructure. This would result in no environment or social impacts (positive or negative) as a result of the development. However, the do-nothing alternative would also mean that energy generated by the proposed Rondavel SEF would not be exported into the national electricity grid, with the result being that the Rondavel SEF would not be constructed, resulting in all positive socio-economic benefits associated with the SEF and the grid connection being foregone. This alternative is assessed and further detailed in Chapter 7.

2.4. Need and Desirability of the Rondavel EGI

One of the requirements of Appendix 1 of the EIA Regulations, 2014, as amended, is to motivate for "*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location*". The need and desirability of a development needs to consider whether it is the right time and place for locating the type of land-use / activity within the proposed location.

The need and desirability for the proposed project is directly linked to the need for the Rondavel SEF (DFFE ref: 14/12/16/3/3/2/2039), as the main purpose of the EGI is to connect this facility to the national grid at a feasible connection point (i.e., the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line or via a direct connection to the existing Kroonstad Municipality 132kV substation, depending on which grid option is implemented).

Given the relationship between, and the necessity of, the proposed EGI for the Rondavel SEF, similar need and desirability considerations are applicable. These are aligned with national, regional, and local policies and plans, as detailed below:

- The need for the country to respond to the international commitments regarding climate change and reduction in carbon emissions, through a lower emission energy mix.
- The need at a national level to diversify the power generation technology mix to include renewable energy, with allocations as defined in the Integrated Resource Plan (IRP), 2019 (as discussed in detail in Chapter 3).
- The need to align development with the requirements of the National Development Plan in order to address the identified socio-economic issues affecting development in South Africa.
- The need for sustainable development at a Provincial level, including the need to utilise its extensive resources for the benefits of the local area.
- The need to create an environment that promotes the development of the local economy and facilitates job creation, as well as to expand the electrification programme to any remaining areas and roll out solar energy in any identified areas at prescribed standards as per the Moqhaka Local Municipality Integrated Development Plan.

From an overall environmental sensitivity and planning perspective, the proposed Rondavel EGI supports the broader strategic context of the municipality as it is linked to a renewable energy facility which is considered a driver for economic growth in the region. It is also in line with broader societal needs and the public interest as it is linked to a renewable energy facility, for which there is national policy and support. No exceedance of social, ecological, heritage or avifaunal limits will result from the construction of the proposed project, and no significant disturbance of biological diversity is anticipated, as detailed in this BA Report.

The project will not compromise IDP objectives but will rather assist in reaching these objectives as the IDP of the municipality aims to ensure that there is enough energy available to support existing and developmental needs in the Moqhaka Local Municipality. This project will assist in supporting the local and national electricity supply though its contribution to the National Eskom Grid. The project will further assist in local job creation which will further help achieve IDP objectives and inject money into the local and regional economy.

3. REGULATORY AND PLANNING CONTEXT

This chapter provides insight into the policy and legislative context within which the proposed development will be undertaken. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project.

3.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report (BA)

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(e)(i) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report	**Chapter 3** as a whole provides an overview of the policy and legislative context which is considered to be associated and relevant to the proposed development. Regulatory and planning context has been considered at international, national, provincial, and local level.
3(e)(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools, frameworks and instruments.	**Tables 3.1, 3.2, 3.3** and **3.4** illustrate the compliance of the proposed development with the legislation, policies, plans, guidelines, tools, frameworks, and instruments.

The regulatory hierarchy of policy and planning documentation that supports the development of a project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the proposed development of the Electrical Grid Infrastructure (EGI) for the Rondavel Photovoltaic (PV) Solar Energy Facility (SEF).

At **National Level**, the main regulatory agencies are:

- ***Department of Forestry, Fisheries, and the Environment:*** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GN R326) as amended. DFFE is the competent authority for this project (as per GNR 779 of 01 July 2016) and is charged with granting the EA for the project under consideration.
- ***South African Heritage Resources Agency (SAHRA):*** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- ***Department of Human Settlements, Water and Sanitation:*** This Department is responsible for effective and efficient water resources management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e., Water Use Licenses (WUL) and General Authorisation), where these may be applicable.

» ***Department of Mineral Resources and Energy (DMRE):*** This Department is responsible for granting approvals for the use of land which is contrary to the objectives of the Mineral and Petroleum Resource Development Act (No. 28 of 2002) (MPRDA) in terms of Section 53 of the MPRDA. Therefore, in terms of the Act, approval from the Minister is required to ensure that the proposed activities do not sterilise mineral resource that could occur within the broader study area and development area.

At **Provincial Level**, the main regulatory agencies are:

» **Provincial Government of the Free-State – Department of Economic Development, Tourism and Environmental Affairs (DEDTEA):** This Department is the commenting authority for the BA process for the project and is responsible for issuing of biodiversity and conservation-related permits.
» **Free State Department: Police, Roads and Transport:** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.
» **Free State Heritage Resources Authority (FSPHRA):** This Department identifies, conserves, and manages heritage resources throughout the Free State Province.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Free State Province, both the local and district municipalities play a role. The project falls within the **Moqhaka Local Municipality**, which forms part of the **Fezile Dabi District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

The relevant legislation and policies listed and discussed below are relevant to the proposed development and the associated Rondavel EGI, due to close association of the grid connection infrastructure proposed to that of the Rondavel SEF. Neither the Rondavel SEF or the grid connection infrastructure can operate on its own and require the other to be developed in order to fulfil the need for the development of both in its entirety.

3.2. Policy and Planning Considerations on International, National, Provincial and Local Levels

3.2.1. Policy and Planning on an International Level

South Africa has committed to various international policies which relate to environmental concerns, specifically that of climate change and global warming. **Table 2.3** below provides a summary of the international policies and plans that South Africa has made commitments towards, and how the proposed development aligns with the thinking or commitments of these agreements.

Table 2.3: International policies and plans relevant to the proposed development.

Policy or Plan	Aspects of policies and plans relevant to the Rondavel EGI
The Kyoto Protocol, 1997	The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the Rondavel EGI will enable the evacuation of additional renewable energy from the Rondavel SEF into the national electricity grid and strengthen the commitment and action plan to achieve the requirements as set out in the protocol.

Policy or Plan	Aspects of policies and plans relevant to the Rondavel EGI
United Nations Framework Convention on Climate Change and COP21 – Paris Agreement	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. This Agreement is open for signature and subject to ratification, acceptance or approval by States and regional economic integration organisations that are Parties to the Convention from 22 April 2016 to 21 April 2017. Thereafter, this Agreement shall be open for accession from the day following the date on which it is closed for signature. The agreement can only be sanctioned once it has been ratified by 55 countries, representing at least 55% of emissions. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement was promulgated on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention, which account for at least 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary. Following COP21, countries met in Katowice, Poland from 2 December to 14 December 2018 for COP24. Countries agreed on various elements from COP21 held in Paris in 2015, which pertained to how governments will measure, report and verify their emission-cutting efforts, which was a key element as it ensured all countries are held to proper standards and will find it difficult to renege from the signed agreements. There was, however, a disagreement amongst countries over carbon credits which are awarded to countries for their emission-cutting efforts and their carbon sinks, such as forests, which absorb carbon. The emission count towards countries' emission-cutting targets. Brazil, which hoped to benefit from its large rainforest cover, insisted on a new form of wording which would allow double counting of credits, undermining the integrity of the system. This issue was put on hold and will be discussed at the COP25, to be held in Santiago de Chile, Chile. Largely absent from the COP24 discussions was the question of how countries will step up their targets on cutting emissions. On current targets, the world is set for 3° of warming from pre-industrial levels, which scientists have said would be disastrous, resulting in droughts, floods, sea level rises and the decline of agricultural productivity. However, in 2019, the United Nations will meet again in Chile to discuss the final elements of the COP21 agreement and begin to work on future emission targets[2]. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively.

[2] https://www.theguardian.com/environment/2018/dec/16/what-was-agreed-at-cop24-in-poland-and-why-did-it-take-so-long

Policy or Plan	Aspects of policies and plans relevant to the Rondavel EGI
	The policy provides support for the Rondavel EGI which will contribute to managing climate change impacts and assist in reducing GHG emissions in a sustainable manner as the project will connect the Rondavel SEF to the national grid.
The Equator Principles III, June 2013	The Equator Principles (EPs) III constitute a financial industry benchmark used for determining, assessing, and managing a project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects and apply globally to all industry sectors. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability and Environmental Health and Safety (EHS) Guidelines. The Rondavel EGI is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended (GNR 326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed. While the specific EPFI will determine the category applicable, it is likely this project may be classified as Category B.
International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, January 2012	The overall objectives of the IFC performance standards are to fight poverty, do no harm to people or the environment, fight climate change by promoting low carbon development, respect human rights, promote gender equality, provide information prior to project development, collaborate with the project developer in order to achieve the performance standard, provide advisory services and notify countries of trans boundary impacts. When considering the proposed development, the following performance standards are anticipated to be applicable at this stage of the BA process: » *Performance Standard 1:* Assessment and Management of Environmental and Social Risks and Impacts » *Performance Standard 2:* Labour and Working Conditions » *Performance Standard 3:* Resource Efficiency and Pollution Prevention » *Performance Standard 4:* Community Health, Safety and Security » *Performance Standard 6:* Biodiversity Conservation and Sustainable Management of Living Natural Resources » *Performance Standard 8:* Cultural Heritage
Environmental, Health, and Safety General Guidelines April 2007	The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons.
Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution April, 2007	The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. Annexure A of the EHS Guidelines document provides a summary of industry sector activities.

3.2.2. Policy and Planning on a National Level

National policies and plans adopted by South Africa which are considered to be relevant to the proposed development have been summarised in **Table 2.4**.

Table 2.4: National policies, plans and legislation relevant to proposed development

Policy, Plan or Legislation	Aspects of policies and plans relevant to the Rondavel EGI
Constitution of the Republic of South Africa, 1996	Section 24 of the Constitution pertains specifically to the environment. It states that Everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development, and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts.
National Environmental Management Act (No. 107 of 1998) (NEMA)	South Africa's environmental legislation sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. The national environmental management principles states that the social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.
The National Energy Act (2008)	One of the objectives of the Act is to promote the diversity of the supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources and states that provision must be made for increased generation and consumption of renewable energies. The development of the grid connection infrastructure enables the evacuation of renewable power into the national grid and thereby promotes diversity of supply of energy and the source of supply, in line with the Act's objectives.
White Paper on the Energy Policy of South Africa, 1998	Yes. The South African Energy Policy of 1998 identifies five key objectives, namely increasing access to affordable energy services, improving energy sector governance, stimulating economic development, managing energy related environmental impacts, and securing supply through diversity. In order to meet these objectives South Africa needs to optimally use available energy resources. The development of the grid connection infrastructure will enable the contribution, albeit only to a limited extent, to the achievement of the five objectives of the Energy Policy of the country.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that need to be met, including that equitable resources are invested in renewable technologies. South Africa is also endowed with renewable energy resources that can be sustainable alternatives to fossil fuels. The development of additional renewable energy projects (including supporting infrastructure projects such as this application) will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.

Policy, Plan or Legislation	Aspects of policies and plans relevant to the Rondavel EGI
The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended	The Act establishes a national regulatory framework for the electricity supply industry of the country and introduces the National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The proponent of this grid connection infrastructure will have to ensure compliance with this Act for the distribution of the generated power into the national grid.
Renewable Energy Policy in South Africa	Support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable energy resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e., the cost of fuel in generating electricity from such technology); more so when social and environmental costs are taken into account. However, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been largely neglected in South Africa. Challenges regarding the implementation of renewable energy have been identified. Through the development of renewable energy projects (including supporting infrastructure such as considered in this application), additional renewable energy will be made available which will assist with the further growth and development of the renewable energy sector. The development of the grid connection infrastructure enables the evacuation of the generated power into the national grid and thereby enables further growth and development of the renewable energy sector.
National Development Plan (NDP)	The NDP aims at eliminating poverty and reducing inequality by 2030 and identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy. The plan also sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to the primary-energy needs, while gas and renewable energy resources – especially wind, solar and imported hydroelectricity – will play a much larger role. Through the development of renewable energy projects (including supporting infrastructure projects such as this application) additional renewable energy will be available which will assist in expanding the renewable energy sector of the country and add to the diversification of the energy mix, which is moving away from coal and towards the use of gas and renewable energy.
Integrated Energy Plan (IEP)	The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. Eight key objectives were identified which relate mainly to the security, cost, access, diversity, efficiency, impact in terms of emissions, conservation and social benefits in terms of energy planning. The IEP recognises the potential of renewable energy for power generation. With the additional renewable energy to be generated by the Rondavel SEF and to be evacuated to the national grid via the proposed grid connection infrastructure, a contribution to this objective will be made. Also, with the implementation of the Rondavel SEF and the proposed grid connection infrastructure, the eight key objectives in terms of energy planning will be met, even if only to a limited extent.
Integrated Resource Plan (IRP) 2010 - 2030	The IRP attempts to harmonize the dichotomy, especially with regard to nuclear, gas and energy storage technologies, which technologies require more consideration of future developments. The South African power system consists of the generation options, which are 38 GW installed capacity from coal, 1.8 GW from nuclear, 2.7 GW from pumped storage, 1.7 GW

Policy, Plan or Legislation	Aspects of policies and plans relevant to the Rondavel EGI
	from hydro, 3.8 GW from diesel and 3.7 GW from renewable energy. The electricity generated is transmitted through a network of high-voltage transmission lines that connect the load centres and Eskom and municipalities distribute the electricity to various end users. Eskom also supply a number of international customers, including electricity utilities, in the SADC region. Energy security in the context of this IRP is defined as South Africa developing adequate generation capacity to meet its demand for electricity, under both the current low-growth economic environment and even when the economy turns and improves to the level of 4% growth per annum. Generation capacity must accordingly be paced to restore the necessary reserve margin and to be ahead of the economic growth curve at least possible cost, including renewable energy projects such as the Rondavel SEF and associated EGI. The IRP Update (2019) confirms the Government's commitment to the procurement of additional energy from wind power projects, from the present day up to 2030. The development of the proposed grid connection infrastructure enables the evacuation of the generated power from the Rondavel SEF into the national grid and thereby contributes to the energy mix of the country as set out in the IRP.
Strategic Integrated Projects (SIP)	In 2010, a National Development Plan was drafted to address socio-economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. The development of the grid connection infrastructure will support the Strategic Integrated Projects within one SIP, which relates to the development of the associated infrastructure. This is known as SIP 10 – electricity transmission and distribution for all. Should the Rondavel SEF and its associated EGI be selected as a preferred bidder, application can be made for the EGI to be registered as a SIP project.
New Growth Path (NGP) Framework, 2010	The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020. With economic growth and employment creation as the key indicators identified in the NGP. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas. The proposed development will assist with the creation of both temporary and permanent employment opportunities during the construction and operation phases, which will contribute, albeit to a limited extent, to the economy and sustainable growth.
National Climate Change Response Strategy	This strategy aims to address issues identified as priorities for dealing with climate change in the country. The focus of the strategy is adapting to climate change; developing a sustainable energy programme; adopting an integrated response by the relevant government departments; compiling inventories of greenhouse gases; accessing and managing financial resources; and research, education, and training. The proposed development (through the Rondavel EGI) will enable additional uptake of renewable energy into the national grid which will reduce the need for the use of coal as an energy resource and thereby assist in addressing climate change and global warming.
Climate Change Bill, 2018	The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The bill aims to provide for the coordinated and integrated response to climate change and its impacts, provide effective management of inevitable climate change impacts and to make a fair contribution to the global effort to

Policy, Plan or Legislation	Aspects of policies and plans relevant to the Rondavel EGI
	stabilise greenhouse gas concentrations. The proposed development relates only to the evacuation of renewable energy into the national grid and would therefore not result in the generation or release of emissions during its operation.

3.2.3. Policy and Planning at a Provincial Level

Policies and plans have been adopted by the Free State Province for the management of the area and are considered to be relevant to the proposed development. **Table 2.5** provides a summary of the relevant provincial plans and policies.

Table 2.5: Provincial policies and plans relevant to the proposed development

Relevant policy	Aspects of policies and plans relevant to the Rondavel EGI
Free State Provincial Growth and Development Strategy (FSGDS) (2005 – 2014)	The overarching goal of the Free State Growth and Development Strategy (FSGDS) is to align the provincial and national policies and programmes and to guide development in terms of effective and efficient management and governance to achieve growth and development. The strategy is a living document that uses the latest business planning and evaluation tools in order to maximise the effect of all spending. Based on the social and economic development challenges of the Province, the Strategy identifies a few primary objectives, including stimulating economic development and developing and enhancing the infrastructure for economic growth and social development, poverty alleviation through human and social development, ensuring a safe and secure environment for all and the promotion of effective and efficient governance and administration. The development of the grid connection infrastructure supports the overall objective of stimulating economic development and infrastructure investment towards growth and social development, by contributing to the energy mix (through the evacuation of generated solar power from the Rondavel SEF to the national grid), supply and infrastructure of the province. The development of the grid connection infrastructure will also contribute (albeit limited) to the alleviation of poverty through the creation of direct and indirect employment opportunities and well as skills development.
Free State Provincial Growth and Development Strategy (FSGDS), Revised October 2007	The revised FSGDS refers to specific imperatives which sets the tone and pace for shared growth and development in the province. These include: » The need to effectively use scarce resources within the province, while addressing the real causes of development challenges. » The need to accelerate service delivery based on a common provincial development agenda as the basis for provincial strategic direction. » The need to identify investment opportunities and provide an environment of certainty critical for private-sector investment. » The need to promote intergovernmental coordination between the three spheres of government. » The need to facilitate facilitates the implementation of the People's Contract within the Province. » The need to provide a common vision as the basis for common action amongst all stakeholders, both inside and outside government. » The need to provide a framework for budgets, implementation, performance management and spatial development.

Relevant policy	Aspects of policies and plans relevant to the Rondavel EGI
	The development of the grid connection infrastructure enables the evacuation of the generated power into the national grid and thereby enables further growth and development of the renewable energy sector. The use of renewable energy will assist with the need to effectively use scarce resources and the need to identify investment opportunities, including private sector-investment. The development of a solar facility and associated grid infrastructure reduces the need to make use of non-renewable resources for the generation of electricity and opens up the province to further future solar energy development.
Free State Provincial Spatial Development Framework (PSDF) - Executive Summary (Inception Report)	The Free State PSDF is a provincial spatial and strategic planning policy that responds to and complies with, in particular, the National Development Plan Vision 2030 and the National Spatial Development Perspective (NSDP). The latter encourages all spheres of government to prepare spatial development plans and frameworks (such as the PSDF) that promote a developmental state in accordance with the principles of global sustainability as is advocated by, among others, the South African Constitution and the enabling legislation. The Free State Provincial Growth and Development Strategy states that sustainable economic development is the only effective means by which the most significant challenge of the Free State, namely poverty, can be addressed. The PSDF gives practical effect to sustainable development, which is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The PSDF is prepared in accordance with bioregional planning principles that were adapted to suit the site-specific requirements of the Free State. It incorporates and complies with the relevant protocols, conventions, agreements, legislation and policy at all applicable levels of planning, ranging from the international to the local. The Rondavel EGI, and the Rondavel SEF which it will cater to will contribute to the sustainable and economic development goals of the Free State PSDF, once completed and formally adopted.
Free State Green Economy Strategy (2014)	This Green Economy Strategy for Free State Province (FSGES) was developed in alignment with the national green economy strategy elaborated in the National Green Economy Framework and Green Economy Accord, as well the Free State Provincial Growth and Development Strategy. The development process was spearheaded by the Department of Economic Development, Tourism and Environmental Affairs (DETEA). The objective was to develop a green economy strategy to assist the Province to, amongst others, improve environmental quality and economic growth, and to develop green industries and energy efficiency within the Province. The Rondavel SEF and its associated EGI will contribute to the aim of energy efficiency and green industry while promoting economic growth and is therefore consistent with this strategy.
Free State Investment Prospectus (2019)	The Premier of the Free State considers providing access to individual investors to accurate and pertinent information makes it easier for investors to glean investor ready opportunities that are currently available in the Free State. Opportunity of the development of renewable energy is considered in the key sectors overview. The prospectus states that opportunities are opening up in the province for the

Relevant policy	Aspects of policies and plans relevant to the Rondavel EGI
	energy sector, including renewable energy. Rezoning for the development of multiple solar energy facilities has already been undertaken in the province. The development of a Solar Park in the Xhariep region is seen as a driver of growth along the banks of the Orange (Gariep) River. Considering the future opportunities available for the development of renewable energy facilities (including solar PV facilities) and their associated EGI, the development of the Rondavel SEF and EGI is considered to be in-line with the Investment Prospectus of the Province.

3.2.4. Policy and Planning on a District and Local Level

Strategic policies at the district and local level have similar objectives for the respective areas, namely the delivery of basic services, including the provision of electricity. The development of the proposed grid connection infrastructure is considered to align with the aims of these policies. **Table 2.6** provides a summary of the district and local level policies and plans considered to be relevant to the proposed development.

Table 2.6: District and local policies and plans relevant to proposed development

Relevant policy	Aspects of policies and plans relevant to the Rondavel EGI
Fezile Dabi District Municipality Integrated Development Plan (IDP) 2020/2021 (Draft)	The Vision of the Municipality is "Improving the lives of citizens and progressively meeting their basic, social and economic needs, thereby restoring the community confidence and trust in government". The Mission of the Municipality is to "…strive to be a more responsive and accountable municipality towards sustainable development." The IDP identifies Local Economic Development as a Key Performance Area (KPA4). Based on the fact that the proposed development the Rondavel SEF and its associated EGI IS sustainable with little resource use required and that the development will encourage local economic development, it is considered that the development is in-line with the objectives of the IDP.
Fezile Dabi District Municipality Climate Change Vulnerability Assessment and Response Plan (2016)	The development of the Rondavel EGI will enable the evacuation of renewable energy from the Rondavel SEF into the national electricity grid and indirectly contribute to the overall climate change response plan of the district municipality by providing energy without reliance on fossil fuels and therefore exacerbating climate change at ta provincial and national level.
Moqhaka Local Municipality Integrated Development Plan IDP (2017 – 2022)	The Moqhaka Local Municipality IDP has, under the local economic development goal, the following aims: » Create an environment that promotes the development of the local economy and facilitate job creation. » To expand the electrification programme to any remaining areas and roll out solar energy in any identified areas at prescribes standards. In addition, the IDP also indicates that an Energy Master Plan is currently being developed, with the primary aim of ensuring enough energy is available to support existing and developmental needs.

Relevant policy	Aspects of policies and plans relevant to the Rondavel EGI
	The Rondavel EGI and the Rondavel SEF that it will cater to thus directly addresses various aims of the Moqhaka Local Municipality IDP.
Moqhaka Local Municipality Spatial Development Framework (SDF) (2019/2020)	The SDF identifies ten spatial related directives and objectives. Directive number 8 refers to Surface Infrastructure. The objective of this directive specifically refers to the promotion of development of renewable energy supply schemes. The SDF also identifies the need for new bulk transmission lines based on the envisaged new development in the area. Considering the above, the development of the Rondavel EGI and the Rondavel SEF that it will cater is in line with the SDF.

CHAPTER 4: APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

In terms of the EIA Regulations of December 2014 (as amended in April 2017) published in terms of the NEMA (Act No. 107 of 1998) as amended, the construction and operation of the Rondavel EGI is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by a Basic Assessment (BA) process based on the contracted capacity of the power line and on-site Eskom substation being 132kV and Activity 11 of Listing Notice 1 (GN R.327), as amended, being triggered.

The BA process aims at identifying and describing potential environmental issues associated with the development of the proposed grid infrastructure. In order to ensure that a comprehensive assessment is provided to the competent authority and I&APs regarding the impacts of the grid, detailed independent specialist studies were undertaken as part of the BA process.

South Africa has been subject to the enforcement of Government Gazette 43096 which places the country in a national state of disaster limiting the movement of people to curb the spread of the COVID-19 virus. The status of national state of disaster was still relevant at the commencement of the BA process. Considering the limitations in place, a comprehensive consultation process was designed and implemented to cater for the undertaking of a full-scale, innovative public participation process which included I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders, while remaining within the limits as stipulated by the National Government. This chapter serves to outline the process that was followed during the BA process.

4.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	All listed activities triggered as a result of the development of the Rondavel EGI have been included in **Section 7.2**, **Table 4.1**. The specific project activity relating to the relevant triggered listed activity has also been included in **Table 4.1**.
3(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	A public participation plan was prepared and approved by the DFFE (**Appendix C9**). The details of the public participation process undertaken have been included and described in **Section 4.3.2**.
3(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	All comments received from the commencement of the BA process have been included and responded to in the Comments and Responses (C&R) Report (**Appendix C8**). All comments raised during the 30-day review and comment period of the BA Report and through on-going consultation with I&APs will be included and responded to as part of a C&R Report (**Appendix C8**) to be submitted as part of the Final BA Report to DFFE for decision-making.

Requirement	Relevant Section
3(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	The methodology used to assess the significance of the impacts of the Rondavel EGI has been included in **Section 4.4**.
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the BA process being undertaken for the Rondavel EGI is included in **Section 4.6**.

4.2. Relevant legislative permitting requirements

The legislative permitting requirements applicable to the Rondavel EGI, as identified at this stage in the process, are described in more detail under the respective sub-headings.

4.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(5) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA. Due to the fact that the grid connection infrastructure will cater to the Rondavel SEF, which is a power generation project and therefore relates to the IRP 2010 – 2030, the National Department of Forestry, Fisheries and Environment (DFFE) has been determined as the Competent Authority in terms of GN R779 of 01 July 2016. The Free State Provincial Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) is a Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under the NEMA ensures that proponents are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project and Application for EA.

The BA process being conducted for the Rondavel EGI is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

As the proposed EGI will have a contracted capacity of 132kV and therefore triggers Activity 11 of Listing Notice 1 (GN R. 327), as amended, the project is subject to a Basic Assessment process.

Table 4.1 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the Rondavel EGI and for which an application for Environmental Authorisation has been submitted to the DFFE. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 4.1: Listed activities as per the EIA regulations that are triggered by the Rondavel EGI

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN R327, 08 December 2014 (as amended on 07 April 2017)	11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. ***The Rondavel EGI will comprise the construction and operation of a 33/132kV substation and 132kV overhead power line.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more, where such development occurs (a) within a watercourse or (c) within 32 meters of a watercourse, measured from the edge of a watercourse. ***The development of the Rondavel EGI will require the establishment of infrastructure with a physical footprint exceeding 100m². The development footprint of the substation will be up to 3.3ha in extent, with a 1ha laydown area totalling 4.3ha clearance. The overhead power line (all alternatives) traverses a watercourse, with pylon placement occurring within 32m of this watercourse and the access road crossing the watercourse.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand shells, shell grit, pebbles, or rock of more than 10 cubic meters from a watercourse. ***Wetland (natural and artificial) and river features are present within the project site. During the construction phase, more than 10 cubic metres of rock will be removed from the water features for the development of the Rondavel EGI and associated access road.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for – i) the undertaking of a linear activity. ***The development footprint of the substation will be up to 3.3ha in extent, with a 1ha laydown area totalling 4.3ha clearance.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	28(ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. ***The Rondavel EGI (considered to be an industrial development) will be constructed and operated on land currently used for grazing. The development footprint considered for the***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		establishment of the on-site substation is up to 3.3ha, with an additional 1ha clearance required for the laydown area and is located outside an urban area.
GN R324, 08 December 2014 (as amended on 07 April 2017)	4(b)(i)(bb)	The development of a road wider than 4 m with a reserve less than 13.5m. b. Free State i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus area ***A 4 – 6m wide service road under the power line will be required within a National Protected Area Expansion Strategy focus area for grid corridor alternative 3.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	12(b)(iv)	The clearance of an area of 300m^2 or more of indigenous vegetation within: b. Free State iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. ***The Rondavel EGI development will require clearance in excess of 300m^2 within 100m from the edge of a watercourse.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(c)(b)(i)(ff)	The development of – (ii) infrastructure or structures with a physical footprint of 10m^2 or more; where such development occurs — (a) within a watercourse. (c) if no development setback has been adopted, within 32 m of a watercourse, measured from the edge of a watercourse. (b) Free State (i) Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; ***The development of the Rondavel EGI will require the establishment of infrastructure (including a servitude service road under the power line) with a physical footprint exceeding 10m^2 within a watercourse or within 32m of a watercourse, where such activity is conducted within an Ecological Support Area (ESA). The Rondavel EGI development is located within the Free State, outside urban areas and within both ESA1 and ESA2 regions.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	18(b)(i)(bb)(hh)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. (b) Free State Province (i) Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas. (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		The width of the servitude service road for the grid will be up to 4 - 6m. The Rondavel EGI project site is located outside of urban areas, within a National Protected Area Expansion Strategy focus area for grid corridor alternative 3, and within 100m from the edge of a watercourse.

4.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e., the Regional Department of Human Settlements, Water and Sanitation). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 4.7 lists the possible Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 4.7: List of Water Uses published under Section 21 of NWA, as amended.

Activity No.	Description of Water Use
Section 21 (a)	Taking water from a water resource. ***Two boreholes are currently in use in close proximity to the project site, and water for construction and operations and maintenance may be utilised from these sources. Water obtained from these sources must however be appropriately licenced/registered as per the requirements of the National Water Act.***
Section 21 (c)	Impeding or diverting the flow of water in a watercourse. ***The project site considered for the establishment of the electrical grid infrastructure is associated with the presence of wetland features. Activities pertaining to the establishment of the electrical grid infrastructure might encroach on the wetland features which may lead to an impediment and diversion of the flow of water in the features.***
Section 21 (i)	Altering the bed, banks, course, or characteristics of a watercourse. ***The project site considered for the establishment of the electrical grid infrastructure is associated with the presence of wetland features. Activities pertaining to the establishment of the electrical grid infrastructure might encroach on the wetland features which may lead to an altering of the bed, banks, course or characteristics of the features.***

In the event that any of the above-mentioned water uses are triggered by the project, then licensing would be required. An application would need to be made for a WUL in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received. This is in line with the requirements of the Department of Human Settlements, Water and Sanitation.

4.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b. the construction of a bridge or similar structure exceeding 50m in length;

c. any development or other activity which will change the character of a site –

i). exceeding 5 000m² in extent; or

ii). involving three or more existing erven or subdivisions thereof; or

iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the Rondavel EGI, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

4.3. Overview of the Basic Assessment Process for the Rondavel EGI

Key tasks undertaken for the BA included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for Environmental Authorisation to the competent authority (i.e., DFFE) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR 326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended, and the requirements of the Specialist Protocols published in Regulation GN R320, issued 20 March 2020 and 30 October 2020.

- Preparation of a BA Report and EMPr in accordance with the requirements of Appendix 1 of GN R326.
- 30-day public and authority review period of the BA Report.
- Compilation of a C&R Report detailing the comments raised by I&APs, addressing these comments in detail and finalisation of the BA Report.
- Submission of a final BA Report to the DFFE for review and decision-making.

The tasks are discussed in detail in the sub-sections below.

4.3.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

Consultation with the regulating authorities (i.e., DFFE and FSDESTEA) as well as with all other relevant Organs of State will continue throughout the BA process. To date, this consultation has included the following:

- A request for a pre-application meeting was sent to the DFFE via e-mail on 07 August 2020, following which the Department provided a response on 13 August 2020 indicating that a pre-application meeting is deemed not necessary as the agenda issues can be clarified via e-mail. A Public Participation Plan was sent to the Department on 19 August 2020, and subsequently approved on 06 October 2020 (refer to **Appendix C9**).
- Submission of the application form for Environmental Authorisation to the DFFE via the use of the DEA Novell Filr System.
- Submission of the BA Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
  - Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions, as listed above, were undertaken electronically, as required by the DFFE (in line with the directions for new applications for Environmental Authorisation provided for in GNR650 of 05 June 2020).
A record of all authority correspondence undertaken during the BA process is included in **Appendix C4** and **Appendix C5.**

4.3.2. Public Participation Process

Public participation is an essential and regulatory requirement for an Environmental Authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The Public Participation Process undertaken for the proposed development of Rondavel EGI considers the restrictions and limitations imposed by Government through section 27 (2) of the Disaster Management Act (Act No. 57 of 2002) of 2002 and the Directions issued by the Minister of the Department of Forestry and Fisheries and the Environment (DFFE) in terms of consultations with I&APs. A Public Participation Plan was prepared and submitted to the DFFE. Approval of the Plan was provided by DFFE via email on 06 October 2020 following the pre-application meeting (**Appendix C9**).

The alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and

raise comments on the project through an interactive web-based platform (i.e. online stakeholder engagement platform) readily available and accessible to any person registering their interest in the project, and ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014 as amended. The Public Participation Plan (**Appendix C9**) considers the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, as well as limitations which certain I&APs may have in terms of access to computers and internet as well as access to public spaces currently not open for operation that inhibits access to hard copy documentation. The online stakeholder engagement platform implemented by Savannah Environmental for the project allowed the EAP to visually present details regarding the project as well as consultation documentation, including project maps and plans, presentations, and posters. The platform also contains the BA Report available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, and still enables them to participate in a meaningful way in the consultation process.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the BA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:

During the BA process:

- Provide an opportunity to submit comments regarding the project.
- Assist in identifying reasonable and feasible alternatives.
- Contribute relevant local information and knowledge to the environmental assessment.
- Allow registered I&APs to verify that their comments have been recorded, considered, and addressed, where applicable, in the environmental investigations.
- Foster trust and co-operation.
- Generate a sense of joint responsibility and ownership of the environment.
- Comment on the findings of the environmental assessments.

During the decision-making phase:

- To advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

- Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
- The information presented during the public participation process is presented in such a manner, i.e., local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating.
- Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
- Various ways are provided to I&APs to correspond and submit their comments i.e., fax, post, email, SMS, WhatsApp or by sending a Please-call-me notification.
- An adequate review period is provided for I&APs to comment on the findings of the BA Report.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks are required to be undertaken:

- Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and

(ii) any alternative site mentioned in the application;

» Give written notice to:
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  (v) the municipality which has jurisdiction in the area;
  (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  (vii) any other party as required by the competent authority.
» Place an advertisement in one local newspaper.
» Open and maintain a register of I&APs and Organs of State.
» Release of a BA Report for a 30-day review and comment period.
» Prepare a Comments and Responses (C&R) report which documents the comments received on the BA process and during the 30-day review and comment period and the responses provided by the project team.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), and the approved Public Participation Plan, the following summarises the key public participation activities implemented. The schematic below provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

i. Stakeholder identification and register of I&APs	•Register as an I&AP on the online platfrom, via completion of a form and provison of contact information, by responding to an advert, or sending a 'please call me' which will be responded to •State interest in the project •Receive all project related information via email or other appropriate means.
ii. Advertisments and notifications	•Advertisements, site notices and notifications provide information and details on where to access project information. •Notifications regarding the BA processes and availability of project reports for public review to be sent via email, post or SMS notifications.
iii. Public Involvement and consultation	•Virtual presentation (in English) available via the online platform. •Availability of project information via the online platform or other appropriate means. •An opportunity for I&APs and stakeholders to request virtual meetings with the project team.
iv. Comment on the BA reports	•Availability of the project reports via the online platform for 30-day comment period. •Submission of comments via email or post to the PP team. •Comments recorded and responded to, as part of the process.
v. Identification and recording of comments	•Comments and Responses Report, including all comments received to be included in the reporting. •Comments received prior to report release for review to be included in draft reports. •Comments received during full process to be included within the final BA reports for decision-making.

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
    (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
    (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
    (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater surrounding area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners (including occupiers) have been identified and

registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of key stakeholders identified and registered is listed in **Table 4.3**.

Table 4.3: Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for Rondavel EGI

Organs of State
National Government Departments
Department of Forestry, Fisheries, and the Environment
Department of Mineral Resources and Energy
Department of Agriculture, Land Reform and Rural Development
Department of Human Settlements, Water and Sanitation
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Radio Astronomy Observatory (SARAO)
Telkom SA SOC Limited
Transnet SA SOC Limited
Provincial Government Departments
Free State Department of Economic Development, Tourism and Environmental Affairs
Free State Department of Police, Roads and Transport
Free State Department of Agriculture and Rural Development
Free State Heritage Resources Authority
Local Government Departments
Fezile Dabi District Municipality
Moqhaka Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Commenting Stakeholders
Agriforum
Agri Free State
Agri SA
Air Traffic and Navigation Services (ATNS)
Black Farmers Associated of South Africa
BirdLife South Africa
Endangered Wildlife Trust (EWT)
SENTECH
Wildlife and Environment Society of South Africa (WESSA)
Landowners
Affected landowners, tenants, and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded

parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[3] of:

- All persons who requested to be registered on the database through the use of the online stakeholder engagement platform or in writing and disclosed their interest in the project.
- All Organs of State which hold jurisdiction in respect of the activity to which the application relates.
- All persons who submitted written comments or attended virtual meetings and viewed the narrated presentations on the Savannah Environmental online platform during the public participation process.

I&APs have been encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the BA process. The database of I&APs will be updated throughout the BA process and will act as a record of the I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47D of the Act, to – (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) The municipality which has jurisdiction in the area; (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and (vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in – (i) One local newspaper; or (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and
40.(2)(e)	Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to – (i) Illiteracy; (ii) Disability; or (iii) Any other disadvantage.

[3] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

The BA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners (including occupiers) and general public to register as I&APs and to actively participate in the process. This was achieved through the following:

- Compilation of a background information document (BID) (refer to **Appendix C3**) providing technical details on the project, details of the EIA process being undertaken and how I&APs can become involved in the BA process. The BID and the BA process notification letter announcing the BA process and inviting I&APs to register on the project database were distributed via email on **18 November 2020**. The evidence of the distribution is contained in **Appendix C** of the BA Report. The BID is also available electronically on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/).
- Placement of site notices announcing the BA process at visible points along the boundary of the project site (i.e., the boundaries of the affected property), in accordance with the requirements of the EIA Regulations. The site notices were placed on **18 November 2020**, and photographs of the site notices are included in **Appendix C2** of the BA Report.
- Placement of an advertisement in the Volksblad Newspaper on **30 July 2021** at the commencement of the 30-day review and comment period (refer to **Appendix C2**) of the BA Report. This advert:
  - Announced the commencement of the BA process.
  - Announced the availability of the BA Report, the review period, and where it is accessible for review, and invited comment on the BA Report.
  - Provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.

  A copy of the newspaper advertisement as sent to the newspaper, as well as the newspaper advert tear sheet are included in **Appendix C2** of the BA Report.
- Notification letters announcing the availability of the BA Report for a 30-day review and comment period were distributed on **06 August 2021**. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.
- The BA Report <u>was</u> made available to I&APs for a 30-day review and comment period from **Friday, 06 August 2021 until Monday, 06 September 2021.** The BA Report <u>was</u> made available on the Savannah Environmental website and all registered I&APs <u>were</u> notified of the availability on **06 August 2021** via email which included the link to access the report on the Savannah Environmental website. The evidence of distribution of the BA Report <u>has been</u> included in this final BA Report <u>(refer to **Appendix C**)</u>.
- <u>Virtual Focus Group Meetings FGMs) were conducted with the relevant local and district municipalities as well as Moqhaka for the People on **19 August 2021** and **20 August 2021**, respectively. In addition, a key stakeholder workshop was held on **19 August 2021**. Notes for the record of the various meetings held are included in **Appendix C7** of this final BA Report.</u>
- <u>An email reminder to all registered I&APs and Organs of State on the project database regarding the review and comment period of the BA Report was distributed on **31 August 2021**.</u>

iii. <u>Public Involvement and Consultation</u>

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 4.4: Public involvement for the Rondavel EGI

Activity	Date
Distribution of the BID, process notification letters and stakeholder reply form announcing the BA process and inviting I&APs to register on the project database. The BID and electronic reply form was also made available on the online stakeholder engagement platform.	18 November 2020
Placement of site notices along the affected property boundary at a visible and accessible location.	18 November 2020
Announcement of the availability of the BA Report for a 30-day review and comment period, including details on how to access the BA Report via the online stakeholder engagement platform, in one local newspaper: Volksblad Newspaper	30 July 2021
Distribution of notification letters announcing the availability of the BA Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	06 August 2021
30-day review and comment period of the BA Report.	Friday, 06 August 2021 until Monday, 06 September 2021
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations. » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting, telephonic discussions (including WhatsApp video call where available) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions. » Face-to-face meetings could be held where sanitary conditions can be assured.	19 and 20 August 2021
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout BA process

iv. Registered I&APs entitled to Comment on the BA Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;

(b) Disability; or

(c) Any other disadvantage;
Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database were notified via notification letter of the release of the BA Report for a 30-day review and comment period, invited to provide comment on the BA Report, and informed of the manner in which, and timeframe within which such comment must be made. The report was made available in soft copies to I&APs due to restrictions and limitations on public spaces during the national state of disaster related to COVID-19. No hard copies of the report have been made available for review and comment in accordance with the approved public participation plan.

The BA Report was also made available on the Savannah Environmental website (i.e., online stakeholder engagement platform) (https://savannahsa.com/public-documents/grid-infrastructure/). The notification was distributed prior to the commencement of the 30-day review and comment period, on **06 August 2021**. Where I&APs were not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions were used to provide the I&APs with a platform to verbally raise their comments on the proposed development.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period have been recorded and included in **Appendix C8** of this final BA Report.

v. Identification and Recording of Comments

Comments raised by I&APs to date have been collated into the Comments and Responses (C&R) Report which is included in **Appendix C8** of the BA Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised.

Meeting notes of all virtual meetings and discussions undertaken during the 30-day review and comment period are included in **Appendix C7** of this final BA Report.

The C&R Report has been updated with all comments received during the 30-day review and comment period and is included as **Appendix C8** of this final BA Report submitted to the DFFE for decision-making.

4.4. Outcomes of the DFFE Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix M** of the BA Report) for the Rondavel EGI is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 5.5** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the project site under consideration.

Table 5.5: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of Rondavel EGI (all alternatives).

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)			Project Team Response
	Option 1	Option 2	Option 3	
Agricultural Impact Assessment	High	Medium	High	An Agricultural Impact Assessment was not undertaken for the project as the footprint for the EGI infrastructure is relatively minor and therefore does not conflict with the current agricultural practices (i.e., grazing).
Visual Impact Assessment	Not rated	Not rated	Not rated	A Visual Impact Assessment was undertaken for the EGI and is included in this BA Report as **Appendix G**.
Archaeological and cultural heritage impact assessment	Low	Very high	Very high	A Heritage Assessment Report was undertaken for the EGI to comply with the requirements of the Heritage Resources Act. This report also considers archaeology and cultural heritage and is included in this BA Report as **Appendix F**.
Palaeontological impact assessment	Very High	Very high	Very high	A Heritage Assessment Report was undertaken for the EGI to comply with the requirements of the Heritage Resources Act. This report also considers palaeontology and is included in this BA Report as **Appendix F**.
Terrestrial biodiversity impact assessment	Very high	Very high	Very high	An Ecological Impact Assessment (including flora and fauna) was undertaken for the EGI and is included in this BA Report as **Appendix D**.
Aquatic biodiversity impact assessment	Very high	Very high	Very high	A Freshwater Resource Study & Assessment was undertaken for the EGI and is included in this BA Report as **Appendix D**.
Avian impact assessment	Not rated		Not rated	An avifaunal impact assessment was undertaken for the EGI and is included in this BA Report as **Appendix E**.
Civil Aviation Assessment	Low	High	High	No Civil Aviation Assessment was conducted given the small extent and height of the proposed infrastructure. Efforts were made to obtain comment towards an assessment of unacceptable impact on civil aviation installations during the Public Review Phase of the project. Although no written comments were received from the SACAA, the authority did provide comment during the Key Stakeholder Workshop held on 19 August 2021 (refer to **Appendix C7**). An obstacle application for this project was submitted by the proponent to the SACAA on 05 August 2021.
Defence Assessment	Low	Low	Low	As per GNR 320 (of 20 March 2020), no requirement for a Defence Assessment is required where a low sensitivity is determined.
RFI Assessment	Not rated	Not rated	Not rated	The Rondavel EGI is not located within any sensitive regions in terms of RFI and therefore no study is deemed necessary. The South African Radio Astronomy Observatory (SARAO) and Sentech were consulted during the 30-day review and comment period of the BA Report to provide written comment on the proposed development. No comments were

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)			Project Team Response
	Option 1	Option 2	Option 3	
				received from either of these authorities requiring an RFI assessment.
Geotechnical Assessment	Not rated	Not rated	Not rated	A Geotechnical Assessment will be undertaken by the developer after the project has been granted EA by the Competent Authority and the project has been awarded preferred bidder status under the DMRE's REIPPP programme. This assessment is considered to be technical in nature and not environmental.
Socio-economic Assessment	Not rated	Not rated	Not rated	A Social Impact Assessment was undertaken for the EGI and is included in this BA Report as **Appendix H**.
Plant species assessment	Low	Low	Low	An Ecological Impact Assessment (including flora and fauna) was undertaken for the EGI and is included as **Appendix D** of the BA Report.
Animal species assessment	Medium	Medium	Medium	

4.6. Assessment of Issues Identified through the BA Process

Specialist consultants involved in the assessment of the impacts requiring investigation are indicated in **Table 4.6** below.

Table 4.6: Specialist consultants appointed to evaluate the potential impacts associated with the Rondavel EGI

Specialist Study	Specialist Company	Specialist Name	Appendix
Ecological impact assessment	Nkurenkuru Ecology & Biodiversity	Gerhard Botha	**Appendix D**
Wetland delineation and impact assessment	Nkurenkuru Ecology & Biodiversity	Gerhard Botha	**Appendix D**
Avifaunal Impact Assessment	Chis Van Rooyen consulting	Chris Van Rooyen	**Appendix E**
Heritage – Archaeological and paleontological impact assessments	CTS Heritage	Jenna Lavin	**Appendix F**
Visual impact assessment	LOGIS	Lourens du Plessis	**Appendix G**
Social impact assessment	Tony Barbour Consulting	Tony Barbour	**Appendix H**

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the Rondavel EGI. In addition, all specialists considered the full extent of the development area, including all associated infrastructure.
Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;

- The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
- Medium-term (5–15 years) – assigned a score of 3;
- Long term (> 15 years) - assigned a score of 4;
- Permanent - assigned a score of 5.

» The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
- 0 is small and will have no effect on the environment;
- 2 is minor and will not result in an impact on processes;
- 4 is low and will cause a slight impact on processes;
- 6 is moderate and will result in processes continuing but in a modified way;
- 8 is high (processes are altered to the extent that they temporarily cease);
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
- Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
- Assigned a score of 2 is improbable (some possibility, but low likelihood);
- Assigned a score of 3 is probable (distinct possibility);
- Assigned a score of 4 is highly probable (most likely);
- Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
» The **status**, which is described as either positive, negative or neutral;
» The degree to which the impact can be reversed;
» The degree to which the impact may cause irreplaceable loss of resources; and
» The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P; where

S = Significance weighting.
E = Extent.
D = Duration.
M = Magnitude.
P = Probability.

The **significance weightings** for each potential impact are as follows:
» **< 30 points:** Low (i.e., where this impact would not have a direct influence on the decision to develop in the area);
» **30-60 points:** Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated); and
» **> 60 points:** High (i.e., where the impact must have an influence on the decision process to develop in the area).

Specialist studies also considered cumulative impacts associated with similar developments within a 30km radius of the proposed project. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will

increase the impact). In this regard, specialist studies considered whether the construction of the proposed development will result in:

» Unacceptable risk
» Unacceptable loss
» Complete or whole-scale changes to the environment or sense of place
» Unacceptable increase in impact

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As the proponent has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. An assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. Environmental Management Programmes (EMPr) that include all the mitigation measures recommended by the specialists for the management of significant impacts are included as **Appendix I & J**. The EMPrs are in line with GN R.453 of March 2019 and the Generic Environmental Management programme (EMPr) for the Development and Expansion of Substation Infrastructure for the Transmission and Distribution of Electricity has been used for the on-site substation (**Appendix J**). The Generic EMPr for the Development and Expansion of Overhead Power Line Infrastructure for the Transmission and Distribution of Electricity has been used for the132kV double- or single-circuit overhead power line (**Appendix I**).

4.7 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this BA process:

» All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
» It is assumed that the project site and development footprint identified by the developer represents a technically suitable site for the establishment of the Rondavel EGI which is based on the design undertaken by technical consultants for the project.
» This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other power generation alternatives.

The specialist studies in **Appendices D – H** include specialist study-specific limitations.

4.8. Legislation and Guidelines that have informed the preparation of this Basic Assessment Report

The following legislation and guidelines have informed the scope and content of this BA Report:

» National Environmental Management Act (Act No. 107 of 1998)
» EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended)
» Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations
» Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability
» 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

» International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines)

Table 4.7 provides an outline of the legislative permitting requirements applicable to the Rondavel EGI as identified at this stage in the project process.

Table 4.7: Applicable Legislation, Policies and/or Guidelines associated with the development of the Rondavel EGI

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* * *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. Considering the capacity of the proposed the Rondavel EGI (i.e. 132kV on-site substation and 132kV overhead power line) and the triggering of Activity 11 of Listing	DFFE – Competent Authority Free State Department of Economic Development, Tourism and Environmental Affairs – Commenting Authority (DEDTEA)	The listed activities triggered by the proposed project have been identified and are being assessed as part of the BA process currently underway for the project. The BA process will culminate in the submission of a final BA Report to the competent authority in support of the application for EA.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Notice 1 (GNR 327) a BA process is required in support of the Application for EA.		
	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DFFE Free State DEDTEA	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, and prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DFFE Free State DEDTEA Moqhaka Local Municipality	Noise impacts are expected to be associated with the construction phase of the project. As the site is located away from noise sensitive receptors and communities, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if the water uses falls within the General Authorisation limits. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).	Regional Department of Human Settlements, Water and Sanitation	The project site considered for the establishment of the electrical grid infrastructure is associated with the presence of wetland features as identified in the Aquatic Impact Assessment (**Appendix D**). In addition, construction water is proposed to be obtained from two boreholes present within the project site. As a result, a water use authorisation for the project will be required from DHSWS for water uses 21(a),21(c)&21(i); however, the process will only be completed once a positive EA has been received and the project selected as Preferred Bidder by the DMRE. This is in line with the requirements from DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely		In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources and Energy to ensure

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	to impede any such object must apply to the Minister for approval in the prescribed manner.		that the proposed development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GN R827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dust fall rates for residential and non-residential areas. In accordance with the Regulations (GN R827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dust fall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dust fall monitoring programme. Any person who has exceeded the dust fall standard set out in Regulation 03 must, within three months after submission of the dust fall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	Free State DEDTEA / Fezile Dabi District Municipality	In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dust fall monitoring programme would be required for the project, in which case dust fall monitoring results from the dust fall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, the Rondavel EGI is not anticipated to result in significant dust generation.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.	South African Heritage Resources Agency (SAHRA) Free State Heritage Resources Authority (FSHRA)	A full Heritage Impact Assessment (HIA) (with field work) has been undertaken as part of the BA process (refer to **Appendix F** of this BA Report). No heritage resources of significance were identified within the Project site. Should a heritage resource be impacted upon, a permit may be required from SAHRA in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened	DFFE Free State DEDTEA	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. An Ecological Impact Assessment has been undertaken as part of the EIA Phase (refer to **Appendix D**). No protected species which require a permit under this Act were identified within the development area however, a pre-construction search and for protected flora is recommended. Please note, a few provincially protected species were found within the development area which will require provincial permits prior to removal, destruction or damaging.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).		
	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DFFE Free State DEDTEA	An Ecological Impact Assessment has been undertaken as part of the EIA Phase to identify the presence of any alien and invasive species present on site. In terms of weeds and invasive alien plants, *Bidens Pilosa, Tagetes minuta and Zinnia peruviana* were the most frequent recorded. The invasive alien succulent plant *Opuntia ficus-indica* was also frequently encountered. Other noteworthy invasive alien and weedy plants recorded includes; *Schkuhria pinnata, Physalis viscosa, Verbena aristigera, Opuntia humifusa* and *Portulaca oleraceae*. (refer to **Appendix D**).
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	Department of Agriculture, Land Reform and Rural Development (DALRD)	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. The Ecological Impact Assessment undertaken as part of the BA process included a site visit which allowed for the identification of any protected trees which

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			may require a license in terms of the NFA within the project site (refer to **Appendix D**). No plant species protected under this Act were identified within the project site.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Rondavel EGI, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		be obtained from the Department of Health (DoH).
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:	DFFE – Hazardous Waste Free State DEDTEA	No waste listed activities are triggered by the Rondavel EGI, therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	South African National Roads Agency (SANRAL) – national roads Free State Department of Police, Roads and Transport	An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include: » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the project components may not meet specified dimensional limitations (height and width).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
Astronomy Geographic Advantage Act (Act No. 21 of 2007)	The Astronomy Geographic Advantage (AGA) Act (No. 21 of 2007) provides for the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas and for matters connected thereto. Chapter 2 of the Act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following: * Restrictions on use of radio frequency spectrum in astronomy advantage areas * Declared activities in core or central astronomy advantage area * Identified activities in coordinated astronomy advantage area; and * Authorisation to undertake identified activities.	Department of Science and Technology	The site proposed for the development of the Rondavel EGI is located within the Free State Province and therefore falls outside of the area considered to be uniquely suited in terms of nationally significant astronomy advantage areas.
Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997	Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure. Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified. Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their	Civil Aviation Authority (CAA)	This Act will find application during the operation phase of Rondavel EGI. Appropriate marking on the project infrastructure is required to meet the specifications as detailed in the CAR Part 139.01.33. An obstacle approval for the higher structures associated with the power line may be required to be obtained from the CAA.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft.		
Spatial Planning and Land Use Management Act 16 of 2013	SPLUMA aims to confirm and regulate the role of municipalities in land-use planning and land-use management. Two of the most relevant objectives of the SPLUMA are to ensure that the system of spatial planning and land use management promotes social and economic inclusion and to provide for the sustainable and efficient use of land. The Act provides that spatial planning consists of: • Spatial development frameworks adopted at each level of government; • Development principles, norms and standards; • The management and facilitation of land use through land-use schemes; and • Procedures to deal with and decide on development applications provided for in national and provincial legislation. The Bill contains a list of development principles which apply to a municipality when it compiles its spatial development framework or zoning scheme or when it decides on an application. The Bill further instructs the national, provincial and local governments to adopt spatial development frameworks (SDFs). SDFs must 'guide planning and development decisions across all sectors'.	The Moqhaka Local Municipality and the Fezile Dabi District Municipality	The proponent must take cognisance of the objectives prescribed in the relevant SDFs and ensure the proposed development addresses, as far as possible, these strategic goals. Where required, the proponent must submit the appropriate land development application.
Provincial Policies / Legislation			
The Free State Nature Conservation Bill 2007	The above-mentioned Nature Conservation Bill accompanied by all amendments is regarded by Free State Department of Economic, Small Business Development, Tourism & Environmental Affairs as the	Free State DEDTEA	Development of the Rondavel EGI must be planned with due recognition of protected species that may be present within the

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	legally binding, provincial documents, providing regulations, guidelines and procedures with the aim of protecting game and fish, the conservation of flora and fauna and the destruction of problematic (vermin and invasive) species.		development footprint, and the protections afforded these species.
The Free State Nature Conservation Ordinance (Act 8 of 1969) in its entirety	This Act provides for the sustainable utilisation of wild animals, biota and plants; provides for offences and penalties for contravention of the Act; and provides for the issuing of permits and other authorisations. Schedule 1 and 4 of the Free State Nature Conservation Ordinance (Act 8 of 1969) specify protected species and prohibition of alien species requirements.	Free State DEDTEA	An Ecological Impact Assessment has been undertaken as part of the EIA Phase (refer to **Appendix D**). Four provincially protected species were recorded, as listed within the Free State Nature Conservation Bill (2007), namely, Boophone disticha, Crinum bulbispermum, Orbea lutea and Olea europaea subsp. africana. It is recommended that a pre-construction walk-through is done by a registered botanical specialist, prior to the start of the construction phase, during which, these protected plants are identified and mapped. This information should then be used to apply for the necessary floral permits (from DESTEA) in order to gain permission for the removal, relocation, disturbance or destruction of these species

4.8.1 The IFC EHS Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the Rondavel EGI:

- IFC EHS General Guidelines
- IFC EHS Guidelines for Electric Power Transmission and Distribution

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines. The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- Environmental:
  - Air Emissions and Ambient Air Quality
  - Energy Conservation
  - Wastewater and Ambient Water Quality
  - Water Conservation
  - Hazardous Materials Management
  - Waste Management
  - Noise
  - Contaminated Land
- Occupational Health and Safety:
  - General Facility Design and Operation
  - Communication and Training
  - Physical Hazards
  - Chemical Hazards
  - Biological Hazards
  - Radiological Hazards
  - Personal Protective Equipment (PPE)
  - Special Hazard Environments
  - Monitoring
- Community Health and Safety:
  - Water Quality and Availability
  - Structural Safety of Project Infrastructure
  - Life and Fire Safety (L&FS)
  - Traffic Safety
  - Transport of Hazardous Materials
  - Disease Prevention
  - Emergency Preparedness and Response
- Construction and Decommissioning:
  - Environment

- Occupational Health & Safety
- Community Health & Safety

4.8.2 IFC EHS Guidelines for Electric Power Transmission and Distribution (April 2007)

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. These should be applied to all life-cycle stages of such developments.

The guidelines list issues associated with Electric Power Transmission and Distribution developments which need to be considered. These include:

- Construction site waste generation.
- Soil erosion and sediment control from materials sourcing areas and site preparation activities.
- Fugitive dust and other emissions (e.g., from vehicle traffic, land clearing activities, and materials stockpiles).
- Noise from heavy equipment and truck traffic.
- Potential for hazardous materials and oil spills associated with heavy equipment operation and fuelling activities.
- Habitat alteration and biodiversity impacts.
- Occupational Health and Safety considerations.

CHAPTER 5: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment that will be affected by the development of the Rondavel EGI. This information is provided to assist the reader in understanding the features present within the project site and the possible effects of the project on the environment within which it is proposed. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the project site, as well as the broader environment, are described and considered within this chapter and includes the following:
	» The regional setting within which the project site is located is described in **Section 5.2.**
	» The climatic conditions of the area within which the project site is located is discussed in **Section 5.3**.
	» The biophysical characteristics of the project site and the surrounding areas is described in **Section 5.4**. This includes the topography and terrain, geology, and the ecological profile of the site (i.e., broad-scale vegetation patterns, fine-scale vegetation patterns, critical biodiversity areas and broad-scale processes, surface water features, terrestrial fauna, and avifauna).
	» The heritage of the project site and the surrounding areas (including the archaeology and palaeontology) is discussed in **Section 5.5**. » The visual quality of the affected environment is discussed in **Section 5.6**.
	» The social and socio-economic context within which the project site is located is described in **Section 5.7**.

A more detailed description of each aspect of the affected environment is included in the specialist reports included as **Appendices D - H**.

5.2. Regional Setting

The Rondavel EGI project site is located approximately 7km south-west of Kroonstad and 47km north-east of Welkom in the Free State Province. Other nearby towns include Hennenman, Edenville, Steynsrus and Odendaalsrus. Kroonstad serves as a stop-over en-route between Johannesburg and Bloemfontein, as it is located approximately halfway between the two towns.

Kroonstad is an important agricultural service centre in the Free State with a predominantly agricultural-orientated economy served by a modern toll-road. Kroonstad is the centre of a rich agricultural district, producing maize, wheat, dairy, meat products and wool. The Bloemhoek Dam lies just east of the town and supplies much of its water needs. Kroonstad is located on the banks of the Vals River, a tributary of the Vaal, and is situated within an area characterised by open spaces and an abundant variety of vegetation. A regional map of the project site relative to Kroonstad town is provided in **Figure 5.1.**

The closest main access road to the proposed site is via direct access from the Rondavel SEF site, which is reached directly from the existing, tarred R34 regional road, which links Kroonstad with Welkom. Alternative 2 may be accessed similarly through the Rondavel SEF site, or where maintenance activities are required via the existing tarred Chris Esterhuyse and 10th Street intersection, located in the Kroonstad Industria suburb. The location of these roads in relation to the site is provided in **Figure 5.1.**

Land use in the broader study area is predominantly agricultural, with cattle grazing and croplands being the most prevalent. The substation development footprint and power corridors are themselves characterised by flat topography, comprised mainly of old, fallow croplands with the remainder of the site comprising mixed grassland and woodlands. The Rondavel EGI is, however, located very close to the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV line and the Kroonstad Municipality 132kV substation.

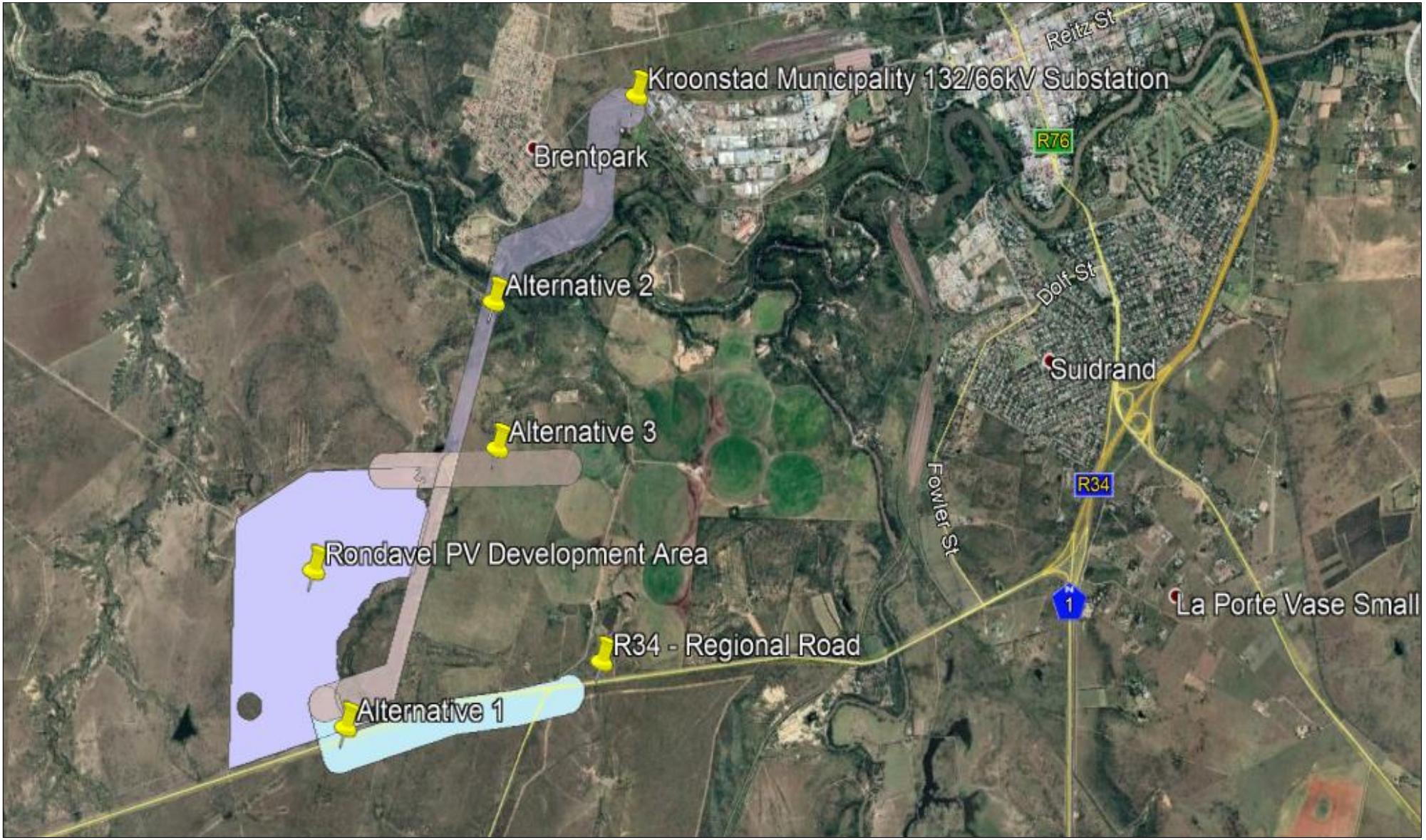

Figure 5.1: Regional map showing the location of the Rondavel EGI and the Rondavel SEF it will cater to relative to Kroonstad town and main roads in the area.

5.3. Climatic Conditions

The climate for the site is expected to be most similar to that of Kroonstad, located approximately 7km south-west of the study area. Kroonstad lies ~1 374m above sea level and is considered to have a local steppe climate. The area is considered semi-arid with little rainfall during the year, averaging 604mm annually. Over the course of the year, the temperature typically varies from -0°C to 29°C and is rarely below -4°C or above 33°C. Rainfall is greatest in January (average of 99mm), whereas the least precipitation falls within June (average of 8mm).

5.4. Biophysical Characteristics of the Study Area

5.4.1. Topographical Profile

The region within which the project site is located can be described as flat and homogenous. Elevation across the area ranges from 1350m above sea level in the north-western corner to 1383m above sea level in the south-eastern corner of the development area. There are no prominent hills within the project site, with the highest areas of elevation situated to the south-east of the project site.

5.4.2. Geology

The geology of the study area on the Rondawel property can be seen on the 1: 250 000 geology sheet 2726 Kroonstad (Schutte 1993) (Figure 3.2). These properties are situated in the northern edge of the Main Karoo Basin of South Africa and are underlain by Late Permian shallow marine / lacustrine to continental sediments of the Karoo Supergroup (Johnson et al. 2006). According to the 1: 250 000 geological maps, the Rondawel site mainly comprises Karoo sediments belonging to the predominantly fluvial Lower Beaufort Group (Adelaide Subgroup; Pa) that is of latest Permian age with some Middle to Late Permian lacustrine to deltaic sediments of the Ecca Group beneath the Lower Beaufort continental rocks in the very South-West corner (basinal mudrocks of the Volksrust Formation; Pvo) and intrusive Jurassic dolerite dykes (Jd) in the very South-East corner (**Figure 5.2**).

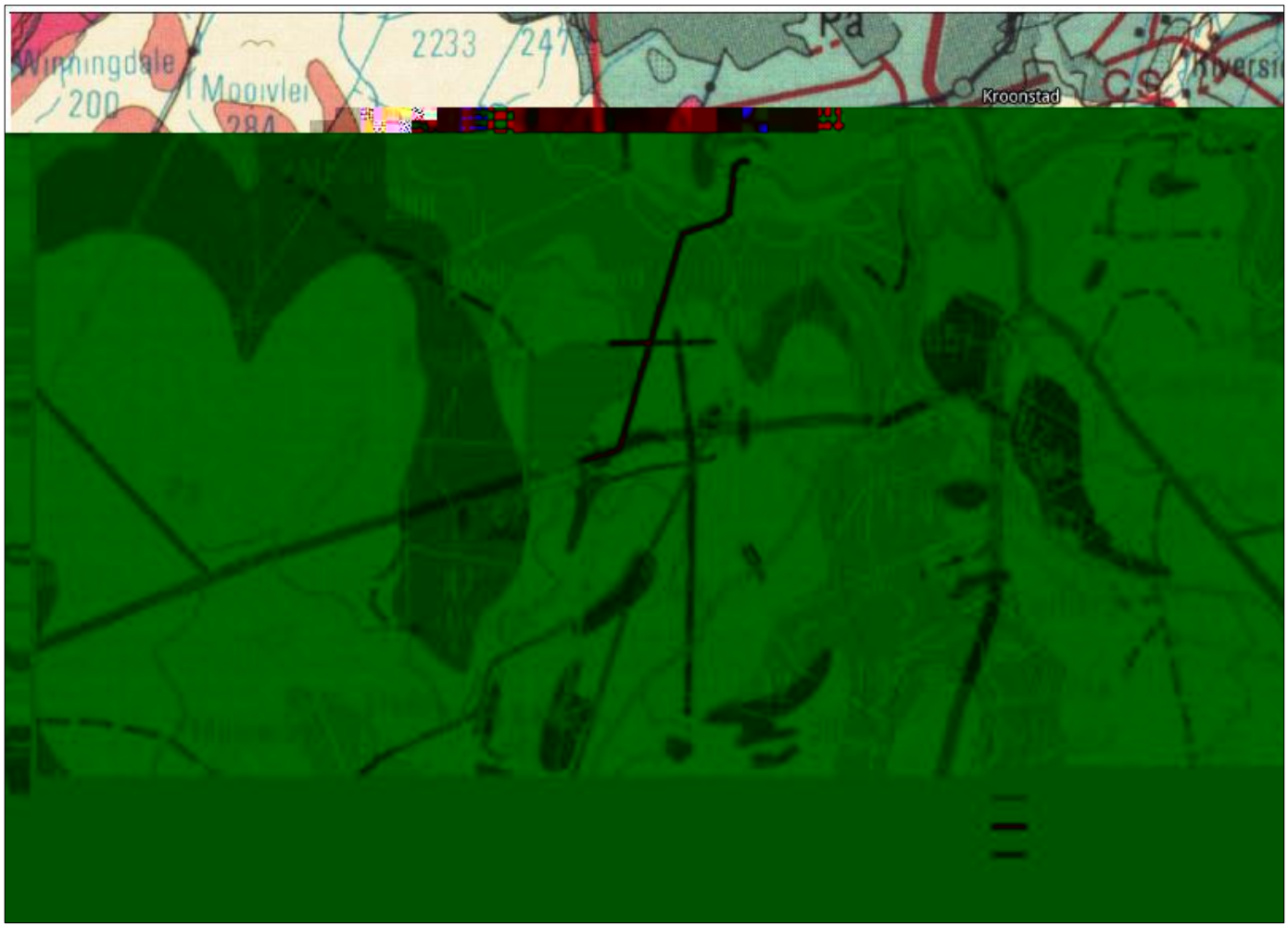

Figure 5.2: Geological maps of the development area for the Rondavel SEF and EGI.

5.4.3. Ecological Profile of the Broader Study Area and the Project Site

5.4.3.1. Vegetation

The development area and broader project site is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006).

Major macroclimatic traits that characterise the grassland biome include:

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

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. Therefore, trees are typically absent, except in a few localised habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

The grassland biome comprises many different vegetation types. The project site is however wholly located within only one vegetation type, namely the Central Free State Grassland vegetation type (Gh6) according to Mucina & Rutherford (2006) (refer **Figure 5.3**).

Central Free State Grassland

The Central Free State Grassland vegetation type is found in the Free State and marginally into Gauteng Province. This vegetation type typically comprises of undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia karroo* encroachment (Mucina & Rutherford, 2006).

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the Central Free State Grassland:

- Graminoids: *Aristida adscensionis (d), A. congesta (d), Cynodon dactylon (d), Eragrostis chloromelas (d), E. curvula (d), E. plana (d), Panicum coloratum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus koelerioides (d), Agrostis lachnantha, Andropogon appendiculatus, Aristida bipartita, A. canescens, Cymbopogon pospischilii, Cynodon transvaalensis, Digitaria argyrograpta, Elionurus muticus, Eragrostis lehmanniana, E. micrantha, E. obtusa, E. racemosa, E. trichophora, Heteropogon contortus, Microchloa caffra, Setaria incrassata, Sporobolus discosporus* (Mucina & Rutherford, 2006).
- Herbs: *Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Conyza pinnata, Crabbea acaulis, Geigeria aspera var. aspera, Hermannia depressa, Hibiscus pusillus, Pseudognaphalium luteo-album, Salvia stenophylla, Selago densiflora, Sonchus dregeanus* (Mucina & Rutherford, 2006).
- Geophytic Herbs: *Oxalis depressa, Raphionacme dyeri* (Mucina & Rutherford, 2006).
- Succulent Herb: *Tripteris aghillana var. integrifolia* (Mucina & Rutherford, 2006).
- Low Shrubs: *Felicia muricata (d), Anthospermum rigidum subsp. pumilum, Helichrysum dregeanum, Melolobium candicans, Pentzia globosa* (Mucina & Rutherford, 2006).

Based on the Plants of Southern Africa (BODATSA-POSA, 2020) database, 491 plant species are expected to occur in the project site. The list of expected plant species is provided in the ecological specialist assessment. Of the 491 plant species, only one species is listed as being a Species of Conservation Concern (SCC), namely *Anacampseros recurvata subsp. buderiana*. It is likely that this individual has been wrongfully identified as this species is Endemic to the quartz plains and outcrops of the Richtersveld. As such the Likelihood of Occurrence for this species within the project area is highly unlikely.

Due to the low land capability of the dominant soil forms within the project site, the area has never been cultivated and as such the vegetation within the project area can be regarded as primary.

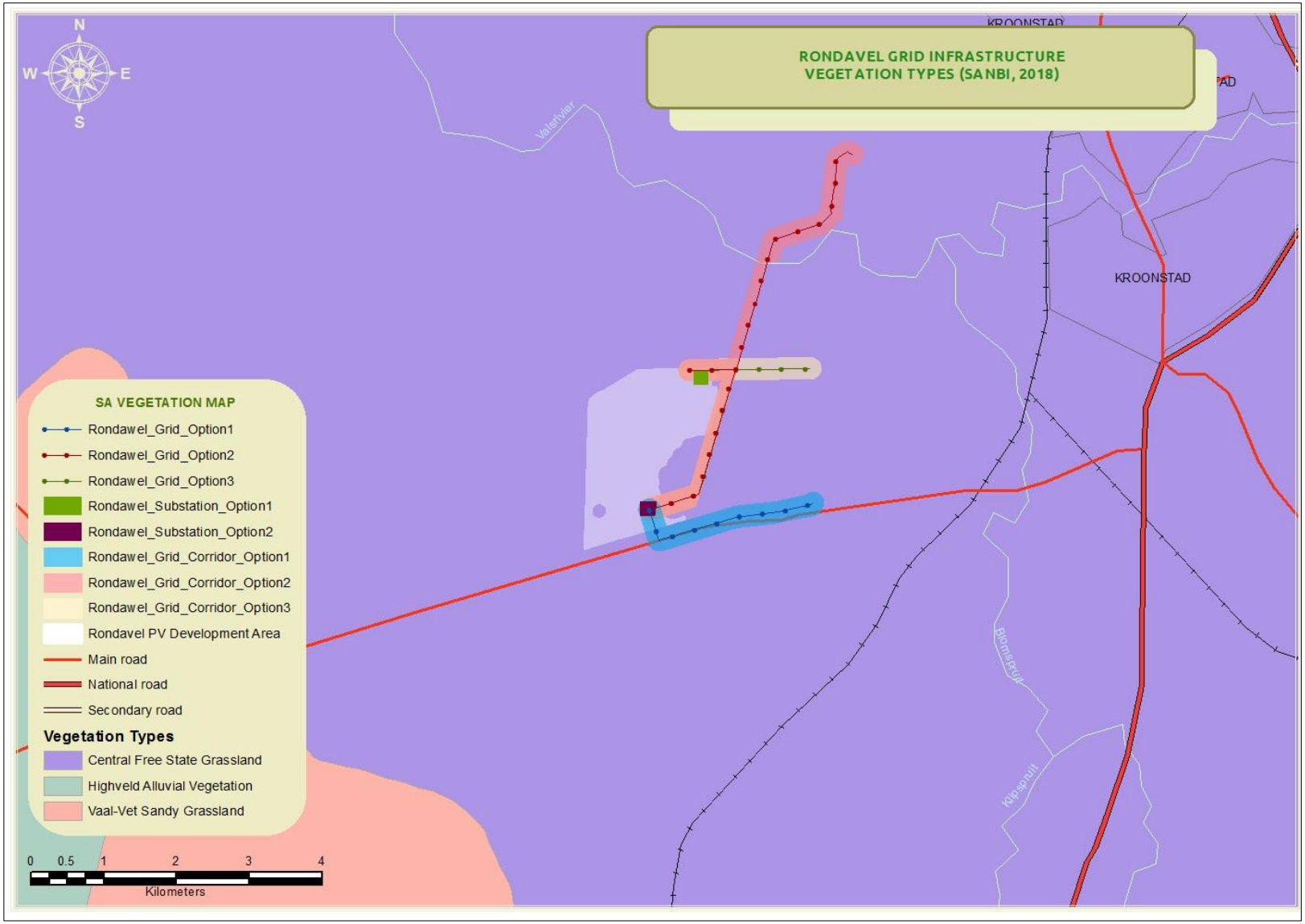

Figure 5.3: Vegetation map of the project site (SANBI, 2018).

i. Fine-scale vegetation habitats

Communities and sub-communities identified within the project area are as follows (refer to **Figure 5.4**).

» **Association 1**: Channel valley-bottom wetland and associated riparian fringe
  - Association 1 A: Grass and forb dominated wetland areas
    - Community 1.A.1: *Cyperus eragrostis – Marsilea macrocarpa* Permanent Inundated Channels
    - Community 1.A.2: *Paspalum diladatum – Persicaria decipeins* Seasonal Saturated Channels
    - Community 1.A.3: *Eragrostis planiculmis – Echinochloa holubii* Seasonal Saturated Wetland Terrace
    - Community 1A.4: *Eragrostis plana – Eragrostis chloromelas* Temporary Saturated Wetland Terrace
  - Association 1 B: Riparian wetland
    - Community 1.B: *Searsia pyroides – Celtis africana* Riparian Woodland

» **Association 2**: Upland shrub-grassland
  - Community 2.1: Acacia karroo – Asparagus laricinus Shrub Grassland on Low Lying Hills and Plains.
  - Community 2.1: *Acacia karroo – Aristida diffusa* Shrub Grassland of Dolerite Outcrops.

» **Association 3**: Severely Degraded and Transformed Grassland
  - Community 3: Acacia karroo – Asparagus laricinus Shrub Grassland on Low Lying Hills and Plains.
  - Community 2.1: *Acacia karroo – Aristida diffusa* Shrub Grassland of Dolerite Outcrops.

A. Shrub Grassland on Low Lying Hills and Plains:

The majority of the project area's vegetation cover can be described as a low shrub grassland with a highly varying (height and density) woody component. The lower vegetative layer is also varying in terms of the grass – forb – dwarf shrub relationship. The woody component is dominated by *Acacia* (*Vachellia karroo*) and *Asparagus laricinus, although Gymnosporia heterophylla, Searsia lancea, S. pyroides and Diospyros lycioides* were also relatively frequently observed. The plateau, eastern slope and dolerite ridge tend to be more open with the woody coverage varying between 25-40%. The shrub layer is quite low and seldomly exceeds 4m. The western portion of the project area (gentle westerly slope) is much more densely covered by low growing shrubs with an average coverage of between 40% and 60% and with a maximum coverage of 70%. The lower strata are typically dominated by medium tall (1.3 – 1.5m) grass species such as *Eragrostis chloromelas, Themeda triandra, Eragrostis trichophora, E. obtusa*, and *Aristida congesta*. Other common grass species of the area includes; *Cynodon hirsutus, C. dactylon, Elionurus muticus, Panicum coloratum, Eragrostis lehmanniana* and *E. gummiflua, E. barbinodis, E. curvula, E. superba* and *Sporobolus ioclados*. Coverage of the grass layer may vary between 55 and 80%. The forb and dwarf shrub layer are also well represented within the area and is characterized by *Barleria obtusa, Pentzia globosa, Berkheya pinnatifida, Bidens pilosa, Monsonia burkeana, Achyranthes aspera, Tagetes minuta* and *Indigofera comosa*. Other common forbs and dwarf shrubs includes; *Crabbea acaulis, Geigeria aspera, Nidorella resedifolia, Tagetes minuta, Zinnia peruviana, Hermannia depressa, Hibiscus pusillus, Physalis viscosa, Lippia javanica, Delosperma floribundum, Kalanchoe rotundifolia, Portulaca oleraceae,* and *Felicia muricata.* No SCC were recorded within the area, however the provincially protected *Boophone disticha* and *Olea europaea* subsp.

africana was recorded. In terms of weeds and invasive alien plants, *Bidens Pilosa, Tagetes minuta* and *Zinnia peruviana* were the most frequent recorded. The invasive alien succulent plant *Opuntia ficus-indica* was also frequently encountered. Other noteworthy invasive alien and weedy plants recorded includes *Schkuhria pinnata, Physalis viscosa, Verbena aristigera, Opuntia humifusa* and *Portulaca oleraceae*.

As described above, this area has been subjected to a relative long term, heavy grazing regime and has resulted in the replacement and reduction in the coverage of palatable decreaser grass species, with less palatable Increaser II and II species and has allowed for the encroachment of woody (*Acacia karroo* and especially *Asparagus laricinus*) and karroid species (*Pentzia globosa, Felicia muricata* and *Indigofera comosa*).

Bredenkamp et al. (1991) states that continued grazing and harvester termite infestation, within the north-eastern Free State Province results in the dominance shift, successively from *Themeda triandra* to *Panicum coloratum* and to *Eragrostis chloromelas* and then finally to *Sporobolus ioclados var. usitatus*. They furthermore state that these stages in the retrogression of originally good stands of *Themeda* veld are not, at first, accompanied by marked reduction in basal cover as prominence is assumed by one grass at the expense of another. However, the productivity and palatability of the pasture drops steadily with retrogression. Despite its high basal cover and palatability, *Panicum coloratum* produces a smaller mass of herbage than *Themeda triandra*. *Eragrostis chloromelas* produce relatively small quantities of forage of indifferent to poor quality. *Sporobolus ioclados var. usitatus* may have a high basal cover, but it produces little herbage. Together with species of *Cynodon* and *Aristida*, dominance by *Sporobolus ioclados* var. *usitatus* represents the last perennial grass stage before the veld commences to break down to a critical level of denudation and degradation. This critical threshold level is heralded by the incursion of short-lived grasses, karoo bushes and weeds, such as *Aristida* species, *Chloris virgata, Tragus racemosus, Pentzia globosa, Chrysocoma ciliata. Chamaesyces inequilatera* and *Nidorella resedifolia*. If site degradation continues beyond this critical threshold, it may be extremely difficult or impossible to reverse the trend, except by applying costly measures. According to the above statement, the project area is in moderately to advanced stage of retrogression (disturbance), however a moderately stable vegetation cover still persists allowing services and functions to continue albeit in a modified and somewhat restricted manner.

B. Shrub Grassland on Dolerite Outcrops:

Towards the south-eastern corner, a relative low dolerite outcrop persists. Soils tend to be very sallow and are mostly of a sandy loam to sandy clay loam texture with some gravel and overlies hard rock and lithic material. An abundance of surface rocks and boulders cover the entire area. This outcrop is covered by a dry open grassland. The woody component is still quite prominent and is characterized by low growing trees and shrubs covering between 15 and 30% of the total surface area. The dominant tree/shrub species is *Acacia karroo*. Other noteworthy trees/shrubs are *Gymnosporia heterophylla* and *Searsia pyroides.* As in the case of the previous described habitat/vegetation assemblage, the grass layer of the rocky outcrop shows signs of moderate degradation (overgrazing) and is dominated by wiry, tufted, medium to short (0.7m) grasses such as *Aristida congesta, A diffusa, Eragrostis lehmanniana, E. chloromelas* and *E. superba*. Other graminoids frequently observed within this habitat was *Eragrostis racemosa, E. curvula, Heteropogon contortus, Panicum coloratum, Themeda triandra, Enneapogon desvauxii* and *Triraphis andropogonoides*. The grass layer is the dominant layer of this habitat and may cover between 70 and 80% of this habitat, of which the combination of *A. diffusa, E. lehmanniana*, *E. superba and A. congesta* make up between 55 and 70%. Even though this habitat type is characterized by numerous dwarf shrubs and forbs, it is especially weed and alien plants, such as *Bidens pilosa, Zinnia peruviana* and *Helichrysum rugulosum*, that are prominent. The forb layer rarely exceeds 30% and is typically between 15 and 20%. Other noteworthy forbs

and dwarf shrubs include, *Pentzia incana, Achyranthes aspera, Monsonia burkeana, Corchorus confuses, Hermannia depressa, Hibiscus aethiopicus, H. pusillus, Felicia muricata* and *Indigofera comosa*.

No SCC were recorded within the area, however the provincially protected *Orbea lutea* was recorded. In terms of weeds and invasive alien plants, *Bidens pilosa, Tagetes minuta, Schkuhria pinnata, Portulaca oleraceae* and *Zinnia peruviana* were the most frequent recorded.

C. Highly Transformed and Disturbed Grassland:

This vegetation unit is associated with fire breaks, access roads, kraals, watering and feeding points for cattle and areas where the vegetation has been recently disturbed. This unit comprise of a mixture of short grasses and forb, of which most are regarded as weeds such as *Cynodon dactylon, Urochloa panicoides, Aristida congesta, Eragrostis barbinodis, Eragrostis lehmannana, Verbena aristigera, Conyza bonariensis, Nidorela resedifolia, Schkuhria pinnata, Tagetes minuta, Bidens pilosa* and *Physalis viscosa.* Other species frequently observed within this grassland were Cotula podocephala, Corchorus confuses, *Atriplex semibacata, Felicia muricata, Indgofera comosa,* I*. daleoides, Eragrostis chloromelas, E. superba,* and *E. trichophora*

No SCC were recorded within the area.

D. Valley-Bottom Wetlands

The valley-bottom areas to the east contains natural wetland features fed predominantly by overland flow (surface flow) from the surrounding hills and slopes. These water inputs are then drained, predominantly as contained surface flow along a primary channel, in a northern direction towards the Vals River. These channelled valley bottom wetlands are of a seasonal to temporary nature (saturation), however a few patches of permanent saturated area exist and is mainly associated with the instream dams and other micro-depression found along the channel. These micro-depressions and the dam features are typically, seasonally inundated, however the larger dams may be inundated for extended periods of time. The soils of these wetlands tend to be moderately deep, dark grey to dark grey brown and are typically either clayey (vertic soils) or clay-loam (duplex soils). Shallower portions, typically overly lithic material. This wetland features are relative heterogenous and is a result of the varying saturation zones and the varying geomorphology of the wetland. This has resulted in a mosaic pattern expressed by the vegetation communities.

No SCC were observed within the wetland habitat, however Crinum bulbispermum, a geophyte provincially protected, has been recorded at relative frequent intervals along the channels of the wetland features.

Both of these wetlands have undergone some form of modification with the larger of the two wetlands being the most significantly impacted. It is important to note that the layout proposed avoids these wetlands features. Modifications to the wetlands include:

<u>Larger Valley-Bottom Wetland Feature</u>

» The hydrological character has been moderately impacted mainly in terms of water distribution and retention.
  - The most significant factor contributing to these modifications/alterations are the modification to the existing channel.

- Especially the channel located north of the proposed development area has been significantly modified through erosion, which has widened and deepened the channel within this section. This has resulted in more confined flows and a reduction in lateral and overbank flow into the adjacent habitat areas.
- Within the development area erosion and trampling by livestock has resulted in localised deepening of the channel, creating pools which will retain surface water for longer periods of time and reduce potential overbank and lateral flow into the adjacent portions of the wetland (as a result of the lowering of the channel below the adjacent wetland areas.

» Numerous small to medium-small gravel dams have been constructed within the watercourse impacting/impeding the natural flow of water along the wetland.
- The R34 crossing has also slightly impacted local water distribution.
- Hardened surfaces within the catchment are regarded as relatively low (R34 and a few gravel roads) and along with the fact that a fairly dense vegetation is still present within the catchment, means that water inputs and flooding patterns have likely not been significantly modified (although the elevation of the R34 may impact surface flow somewhat at a local scale).

» The effects of instream dam construction, channel erosion (widening and deepening) as well as infilling has had a significant impact on the geomorphological integrity of the wetland and has resulted in moderate modification to the natural geomorphology of the channelled valley bottom wetland.

» The integrity of the vegetation structure has been moderately impacted.
- Grazing, trampling and erosion of the channel resulted in a general reduction in the vegetation coverage. Apart from a reduction in coverage, an alteration to the species composition has also occurred, to some extent, with micro-depression found along the channel (a result of trampling and erosion) now comprising of floating and submerged forbs and some sedges, the remaining channel is now characterized mainly by low growing grasses and a few sedges as well as some bare patches. Historically, these channels were likely covered by a much denser and taller sedge and grass cover.
- Natural vegetation within portions of the seasonal and temporary saturated zones have been completely taken over by the alien plant *Paspalum dilatatum*.
- The invasive alien plant (IAP); *Verbena officinalis* is a common feature within the temporary saturated zone.
- Other IAPs recorded within the wetland include *Cirsium vulgare; Xantium spinosum, Xantium strumarium* and *Verbena bonariensis*.
- Furthermore, *Asparagus laricinus*, and to a lesser extent *Acacia (Vachellia) karroo*, have become slightly encroaching within the temporary saturated zone (some locations).

Small Valley-Bottom Wetland Feature

» The hydrological character has been slightly to moderately impacted, also mainly with regards to water distribution and retention.
- Similarly, to CVB wetland 1 the most significant factor contributing to these modifications/alterations are the modification to the existing channel which has been exposed to trampling and erosion, deepening and slightly widening some portions of the channel. This in turn has resulted in more confined flows and a reduction in lateral and overbank flow into the adjacent habitat areas.
- Modifications/alterations within the catchment is minimal, with some hardened surfaces, and as such water input and flooding peaks has mainly remained natural.

» The effects of instream channel erosion (widening and deepening) and trampling have resulted in the moderate modification of the natural geomorphological integrity of the wetland.

» Modifications to the vegetation structure and composition are probably the most significant impact to this wetland feature and is mainly as a result of the modification of the geomorphology (soil disturbance through erosion and trampling).
- Grazing, trampling and erosion of the channel has resulted in a general reduction in vegetation coverage. Apart from a reduction in coverage, an alteration to the species composition has also occurred, to some extent, with micro-depression found along the channel (a result of trampling and erosion) now comprising of floating and submerged forbs and some sedges, the remaining channel is now characterized mainly by low growing grasses and a few sedges as well as some bare patches. Historically, these channels were likely covered by a much denser and taller sedge and grass cover.
- The alien plant, *P. dilatatum* has established itself, especially within the seasonal and temporary saturated portion of the wetland, forming local dense stands.
- IAPs recorded within the wetland include *Cirsium vulgare; Xantium spinosum, Xantium strumarium* and *Verbena bonariensis, V. officinalis*.
- Furthermore, *Asparagus laricinus*, and *Acacia (Vachellia) karroo*, have become slightly encroaching in temporary saturated zone (some locations).

i. Permanent saturated zones (Channels):

This hydro-geomorphological zone occurs as small, discontinuous patches, along the channel of the CVB wetlands where they form where there is a local drop in elevation (micro-depressions) along the channel, mainly created by a form of disturbance such as trampling, erosion and dam construction. These areas tend to collect and store surface water for moderately long periods of time (few months during the wet season). Soils tend to be dark to light grey clay to clay loam. The vegetation of these areas tends to be sparse and poor in diversity dominated by floating and submerged hydrophytic forbs and graminoids (Forbs: 15 – 30%; Grasses: 40 – 55% and Sedges: 10 – 20%) such as *Paspalum distichum, Persicaria decipiens* and *Schoenoplectus muricinux*. Other plants species frequently observed included *Marsilea macrocarpa, Cyperus Eragrostis, Falkia oblonga* and *Leersia hexandra*.

ii. Seasonal saturated zone (Channels):

This hydro-geomorphological zone occurs as small, discontinuous patches, along the channel of the CVB wetlands where they form where there is a local drop in elevation (micro-depressions) along the channel, mainly created by a form of disturbance such as trampling, erosion and dam construction. These areas tend to collect and store surface water for moderately long periods of time (few months during the wet season). Soils tend to be dark to light grey clay to clay loam. The vegetation of these areas tends to be sparse and poor in diversity dominated by floating and submerged hydrophytic forbs and graminoids (Forbs: 15 – 30%; Grasses: 40 – 55% and Sedges: 10 – 20%) such as *Paspalum distichum, Persicaria decipiens* and *Schoenoplectus muricinux*. Other plants species frequently observed included; *Marsilea macrocarpa, Cyperus Eragrostis, Falkia oblonga* and *Leersia hexandra*.

iii. Seasonal saturated zone (terrace):

Seasonal saturated zones fringing the channels tend to be narrow, however favourable underlying geology and local topography may result in larger seasonal saturated zone as was found to the north of the project area (near the north-eastern boundary of the project area) where the wetland had a fairly broad seasonal zone. The smaller CVB wetland contains a narrow seasonal zone throughout its extent. This zone is dominated by a tall, dense wet grassland (80-90%) on grey to dark grey, brown clay to clay-loam soils, and is characterised by *Eragrostis planiculmis, Paspalum dilatatum, Setaria nigrirostris, Eragrostis micrantha* and *Echinochloa holubii*. Other key species include *Berkheya radula, Haplocarpha scaposa, Verbena bonariensis, Cyperus longus, Setaria pallide-fusca* and *Sporobolus africanus*

iv. Temporary saturated zone (terrace):

The temporary saturated zone covers the largest extent of these wetland features and is characterized by a medium to medium-short mixed moisture grassland comprising a mixture of facultative wetland and facultative upland species. The grass component forms the dominant cover (70-90%). The highest diversity of plant species was recorded within this area with 53 species observed within this zone. This higher plant species diversity is a result of the transitional location of this zone resulting elements of both the wetland and terrestrial being present. Where the seasonal zone transitions into the temporary zone the grass layer tends to be taller with similarities with the seasonal zone and include species such as *Echinochloa holubii, Eragrostis micrantha, Eragrostis plans, Paspalum dilatatum* and *Setaria nigririostris*. As one moves to the outer edge the grass cover becomes a bit shorter and comprise a mixture of wetland and terrestrial plants such as *Themeda triandra, Eragrostis plana, Cynodon dactylon, Eragrostis chloromelas, E. gummiflua, Panicum coloratum, Sporobolus africanus* and *Eragrostis micrantha*. The forb layer also slightly increases in coverage towards the outer boundary and is characterized with *Verbena officinalis, Berkheya radula, Helichrysum aureonitens, Tagetes minuta, Monsonia burkeana*, *Buchnera reducta* and *Hermannia depressa*. Shrubs such as *Lycium laricinus* and *Acacia karroo*, are also scattered through sections of this zone and may in, some isolated localities become slightly encroaching.

v. Riparian Woodland:

Elevated (high terrace areas with a convex shape) areas along the channels and outer fringes of the wetland boundaries, where saturation is very seldom. However, saturation of soils occurs sufficient enough for the display of wetland indicators. Soils tend to be moderately deep, dark clay (vertic) to loam clay with fairly high concentrations of organic material and typically overly lithic material. The riparian habitat does not form a continuous plant community but display a patchy distribution, varying greatly in size, height, and vegetation structure. The tree and tall shrub layer are the dominant canopy cover (70 – 95%), whist the forb/herb layer forms the dominant ground cover (up to 40%). Low straggling and climbing shrubs forbs are also a prominent feature within these areas and may cover up to 40% of a plant releve within this habitat. Where the tree/tall shrub canopy becomes more open, grass species becomes a more significant feature. The tree/tall shrub layer is dominated by *Acacia karroo, Diospyros lycioides, Ziziphus mucronata, Asparagus laricinus* and *Searsia pyrioides*, whist the forb layer is characterized by *Achyranthes aspera, Bidens Pilosa, Tagetes minuta, Pavonia senegalensis*, and *Sida dregei.* Common straggling and climbing forbs and shrubs include *Pentharrhinum insipidum* and *Asparagus cooperi*. Occasionally the tree layer thins out and these areas are then typically dominated by *Searsia pyrioides* and *Asparagus laricinus* and to a lesser extent shrubby growth forms of *Acacia karroo*. Within these areas the grass coverage increases with the lower plant strata characterized by, *Cynodon dactylon, Themeda triandra, Sporobolus fimbriatus, Setaria verticillata, Paspalum dilatatum* and *Eragrostis plana*. Other common species recorded within this habitat includes: *Sida cordifolia, Solanum lichtensteinii, Verbena aristigera, Ehretia rigida, Gymnosporia heterophylla* and *Celtis africana.*

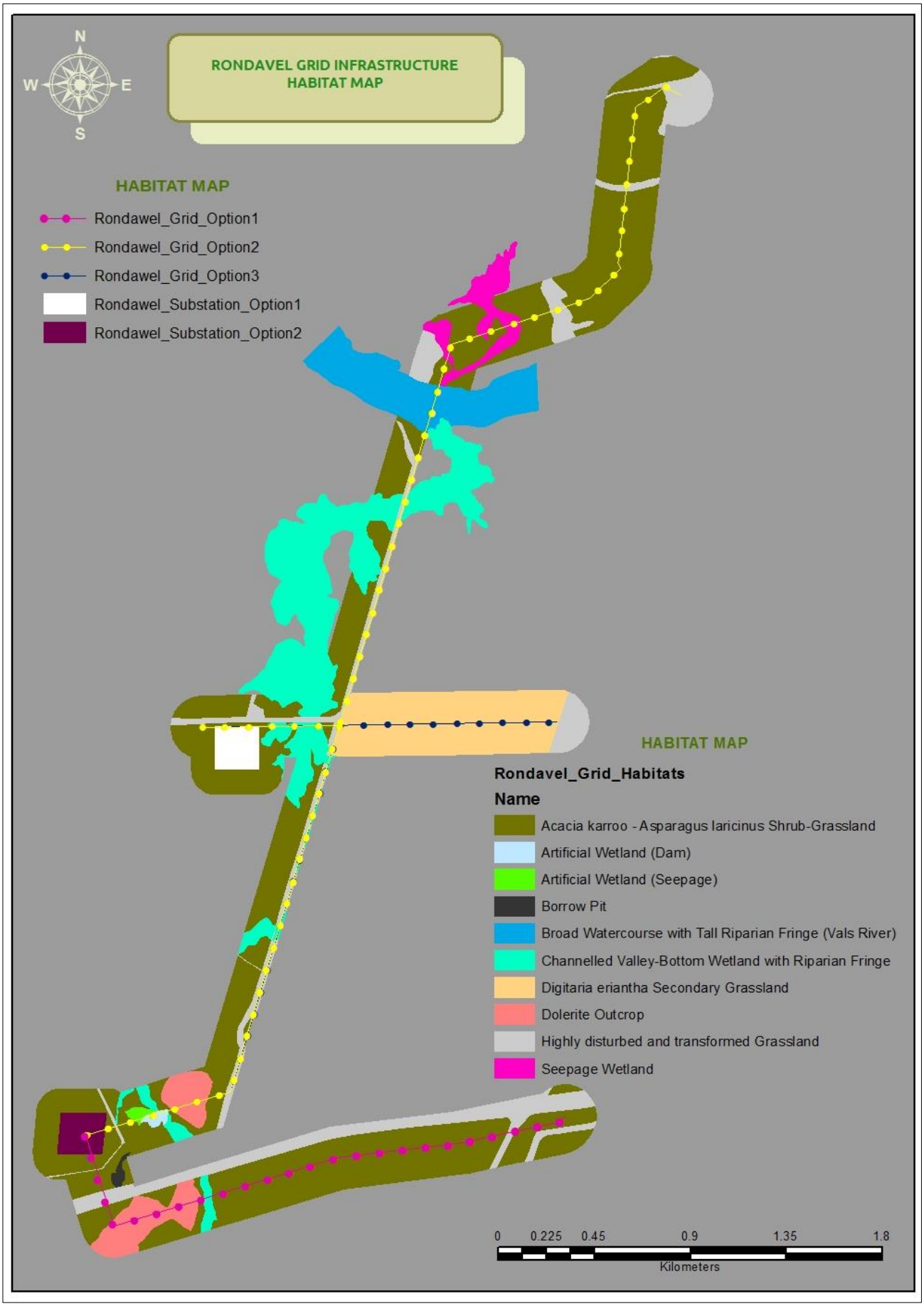

Figure 5.4: Delineated habitat units.

5.4.3.2. Fauna

Amphibians

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2017), twenty (20) amphibian species are expected to occur in the development area. One amphibian species of conservation concern could be present in the project area according to the above-mentioned sources, namely *Pyxicephalus adspersus* (Giant Bullfrog). The Giant Bull Frog is listed as near threatened on a regional scale. It is a species of drier savannahs. It is fossorial for most of the year, remaining buried in cocoons. They emerge at the start of the rains, and breed in shallow, temporary waters in pools, pans and ditches (IUCN, 2017). There appears to be moderate suitable habitat for this species in the development area and, therefore, the likelihood of occurrence is regarded as moderate.

Reptiles

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017), twenty-eight (28) reptile species are expected to occur in the development area. Two reptile species of conservation concern is expected to be present in the broader project site (and consequently the development area), namely *Smaug giganteus* (Sungazer or Ouvolk) and *Chamaesaura aenea* (Coppery Grass Lizard).

Smaug giganteus (Sungazer or 'Ouvolk') is categorised as Vulnerable on both a regional and an international scale. It is endemic to South Africa, where it is found only in the grasslands of the northern Free State and the southwestern parts of Mpumalanga (IUCN, 2017). Habitat loss due to agriculture is a continuing threat. Large portions of the grassland habitat are underlain by coal beds of varying quality and extent, and exploitation of coal for fuel has and will result in further habitat loss. The likelihood of finding the species in the development area is high.

Chamaesaura aenea (Coppery Grass Lizard) is categorised as near threatened on both an international and a regional scale. A population reduction of over 20% in the last 18 years (three generations) is inferred from the transformation of large parts of the Grassland Biome. They are threatened by transformation of land for crop farming and plantations, overgrazing by livestock, infrastructural development, frequent anthropogenic fires and use.

Mammals

The IUCN Red List Spatial Data lists 73 mammal species that could be expected to occur within the vicinity of the project site. Of these species, 8 are medium to large conservation dependant species, such as *Ceratotherium simum* (Southern White Rhinoceros) and *Equus quagga* (Plains Zebra) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the development area and are removed from the expected Species of Conservation Concern (SCC) list. Of the remaining 65 small- to medium-sized mammal species, ten (10) are listed as being of conservation concern on a regional or global basis.

The list of potential species includes (refer **Table 5.1**):

- One (1) that is listed as Endangered (EN) on a regional basis;
- Four (4) that are listed as Vulnerable (VU) on a regional basis; and
- Five (5) that are listed as Near Threatened (NT) on a regional scale.

Table 5.1: Mammal species of conservation concern with likelihood of occurrence within the development area.

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Red Data	IUCN	
Anonyx capensis	Cape Clawless Otter	NT	NT	Low
Atelerix frontalis	South African Hedgehog	NT	LC	High
Felis nigripes	Black-footed Cat	VU	VU	Low
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	High
Lycaon pectus	African Wild Dog	EN	EN	Low
Mystromys albicaudatus	White-tailed Rat	VU	EN	High
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyena	NT	NT	Moderate
Poecilogale albinucha	African Striped Weasel	NT	LC	Moderate

5.4.3.3. Critical Biodiversity Areas and Conservation Targets

The Rondavel EGI falls within the planning domain of the Free State Province Biodiversity Conservation Assessment which maps Critical Biodiversity Areas and Ecological Support Areas within the Free State Province. The assessment formed part of the Free State Provincial Spatial Development Plan (PSDP) and was intended to inform and facilitate broad scale land use classification, with the ultimate aim of facilitate land use planning for the entire province. The assessment utilised datasets available at the time of writing, in order to classify and depict areas that are important for the representation and persistence of terrestrial and aquatic species and ecosystems. The following three important classifications are made in the Free State Province Biodiversity Conservation Assessment:

» Critical Biodiversity Area 1: The Critical Biodiversity Area 1 regions constitute the planning units which if not included in the final portfolio (selection of planning units) for the assessment will result in the pre-defined targets not being achieved. In essence, loss of these regions may compromise achieving provincial conservation targets
» Critical Biodiversity Area 2: Areas that represent areas of high biodiversity significance but will not necessarily result in the target not being achieved if they were excluded from the final portfolio, i.e. they represent areas for which options exist.
» Ecological Support Area (ESA): Areas that are required to support the persistence of species.

The CBA map indicates that no CBAs are located within the proposed project site. The entire site is located within an ESA1 (**Figure 5.5**). The ESA 1 functions as a linkage/corridor (comprising of natural vegetation).

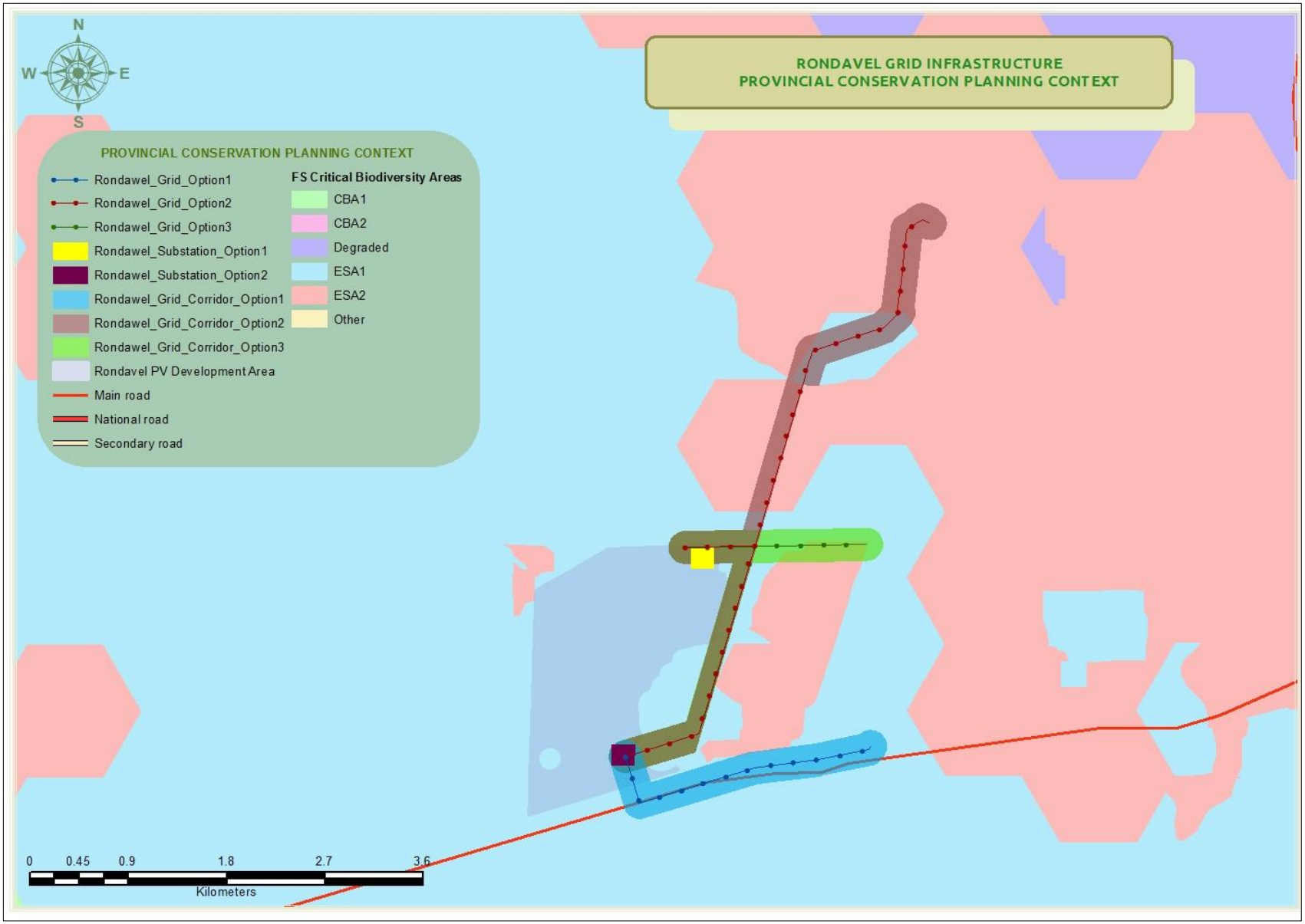

Figure 5.5: Provincial Level Conservation Planning Context – CBA Map (Free State Province Biodiversity Conservation Assessment).

5.4.3.5. Freshwater

Strategic Water Source Areas (SWSAs)

Strategic Water Source Areas (SWSAs) are defined as areas of land that:

- Supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important
- Have high groundwater recharge and where the groundwater forms a nationally important resource.
- That meet both criteria mentioned above.

They include transboundary Water Source Areas that extend into Lesotho and Swaziland.

The project site is located outside of any SWSA for surface water but is located within a SWSA for groundwater; namely the Kroonstad SWSA-gw. Due to the nature of Rondavel EGI (limited use of chemicals, hazardous and toxic materials), it is unlikely that such a development will have a significant impact on groundwater quality.

Freshwater Features

At a desktop level, a total of thirteen (13) natural freshwater features appear to be within the vicinity of the site, most of which were small seepage wetlands. The most prominent freshwater feature within the DWS 500m regulated area is a non-perennial watercourse located to the east. Portions of this watercourse traverse the SEF footprint. The watercourse is approximately 4.4km long and flows in a northern direction to eventually terminate into the Vals River. This watercourse comprises of a relative narrow main channel fringed by a relative dense, narrow Acacia karroo thicket-like riparian habitat along the upper reaches and as the watercourse flows northwards the channel becomes slightly more meandering and is fringed by floodplain wetlands. Major disturbance within this watercourse includes geomorphological, hydrological and vegetation modification due to the R34 road crossing, three instream dams and some erosional features.

From the fieldwork undertaken, a total of five wetland features were identified within the potential area of influence (500m DWS regulated area). Of these five wetland features, only two wetlands are at risk of being impacted by the proposed development as indicated below in **Figure 5.6.**

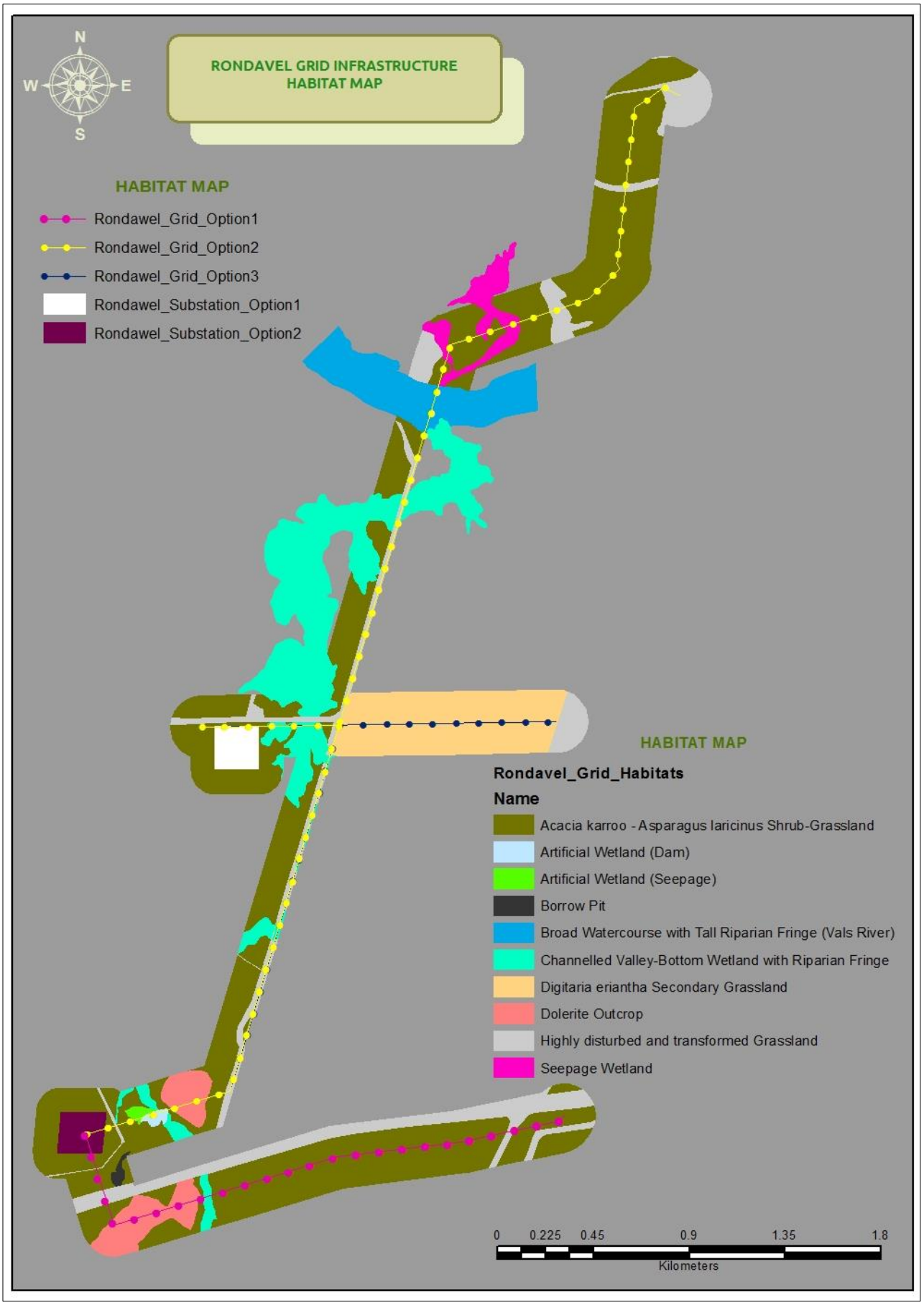

Figure 5.6: Delineated habitats, including wetland features, within the project site.

5.4.3.6. Avifauna

Supporting avifaunal habitat within the study area

There are no Important Bird Areas (IBA) within a 60km radius around the proposed Rondavel EGI. It is therefore highly unlikely that the proposed grid connection will have an impact on any IBA.

Species composition, distribution and abundance within the project site is largely influenced by the broad vegetation type, however species behaviour and fine scale distribution is linked to the avifaunal habitats present. The following bird habitats were determined for the project site:

- **Grassland:** The study area and immediate surrounding environment consist mainly of tall, dense, grassland with high levels of encroachment of thorny shrubs, probably due to heavy cattle grazing.
- **Woodland:** The study area and immediate surrounding environment contains many areas of dense thorny shrubs. Two minor ephemeral drainage lines are present in the study area. Drainage lines are important corridors for woodland species because the woodland along the banks is a refuge for species associated with this habitat. The largest concentration of shrubs and a few small trees in the study area is found along the banks of drainage lines. The banks of the Valsch River also contain dense woodland, most of which is made up of alien trees.
- **Dams and rivers:** The study area contains several dams which are situated in drainage lines. When the dams hold water (which is only likely after sustained rainfall events), it may temporarily attract a variety of waterbirds, as well as other birds which use them to drink and bath. Rivers are important flyways for waterbirds. A major drainage line, the Valsch River, runs through the study area from east to west.
- **Fences:** The study area contains a number of fences. Farm fences provide important perching substrate for a wide range of birds, as a staging post for territorial displays by small birds and also for perch hunting by some raptors.

Each of the main habitat types have been surveyed independently for bird species richness and bird abundance as required for Regime 1 development sites.

Avian species richness and red data species

The SABAP2 data indicates that a total of 192 bird species could potentially occur within the study area and immediate surroundings. The avifaunal specialist study (refer to **Appendix E**) provides a comprehensive list of all the species. Of these, 37 species are classified as priority species, and 2 of these are South African Red Data species. Of the priority species, 20 are likely to occur regularly at the study area and immediate surrounding area, and another 17 could occur sporadically. **Table 5.2** below lists all the priority species and the possible impact on the respective species by the proposed infrastructure.

Priority species with a high likelihood of occurrence on site included, African Sacred Ibis (*Threskiornis aethiopicus),* African Spoonbill (*Platalea alba),* Amur Falcon (*Falco amurensis),* Black-headed Heron (*Ardea melanocephala),* Black-shouldered Kite (*Elanus caeruleus),* Common Buzzard (*Buteo vulpinus),* Common Moorhen (*Buteo vulpinus),* Common Moorhen (*Gallinula chloropus),* Egyptian Goose (*Alopochen aegyptiacus),* Glossy Ibis (*Plegadis falcinellus),* Grey Heron (*Ardea cinerea),* Hadeda Ibis (*Bostrychia hagedash),* Helmeted Guineafowl (*Numida meleagris),* Lesser Kestrel (*Falco naumanni),* Little Egret (*Egretta garzetta),* Little Grebe (*Tachybaptus ruficollis),* Northern Black Korhaan (*Afrotis afraoides),* Red-billed Teal (*Anas erythrorhyncha),* Red-knobbed Coot (*Fulica cristata),* Reed Cormorant (*Phalacrocorax africanus),*

South African Shelduck (*Tadorna cana),* Spur-winged Goose (*Plectropterus gambensis),* Western Cattle Egret (*Bubulcus ibis),* White-breasted Cormorant (*Phalacrocorax carbo),* White-faced Duck (*Dendrocygna viduata)* and Yellow-billed Duck (*Anas undulata)*. Of the priority species with a high likelihood of occurrence on site, only the Egyptian Goose (*Alopochen aegyptiacus),* Helmeted Guineafowl (*Numida meleagris),* Northern Black Korhaan (*Afrotis afraoides),* South African Shelduck (*Tadorna cana),* and Western Cattle Egret (*Bubulcus ibis)* were actually observed during the avifaunal field assessment.

Of the priority species with moderate likelihood of occurrence on site, only the Pale Chanting Goshawk (*Melierax canorus)* was observed during the avifaunal field assessment. The habitats within which each priority species is likely to utilise is also detailed in **Table 5.2** below. A strong preference for surface water habitats is shown across the priority species, with roughly equal utilisation of the grassland and woodland habitats.

Species recorded through on-site surveys

On-site surveys were conducted from 20 - 22 July 2020 by means of transect counts. The Index of Kilometre Abundance (IKA) indicated in **Figure 5.7** expresses the ratio of the total number of individuals (or of signs of presence) observed along a transect by the total transect length covered, and is a common measure used in avifaunal studies as it allows a straightforward comparison of species abundance in different sites or at different times. The species of greatest abundance as determined by on site observations was that of the Helmet Guineafowl followed by the Egyptian Goose, Northern Black Korhaan, Hadeda, the South African Shelduck, following which the Western Cattle Egret and the Pale Chanting Goshawk shared equal abundance values.

The abundance of avifauna recorded during the transect counts are displayed in **Figure 5.7** and **5.8**.

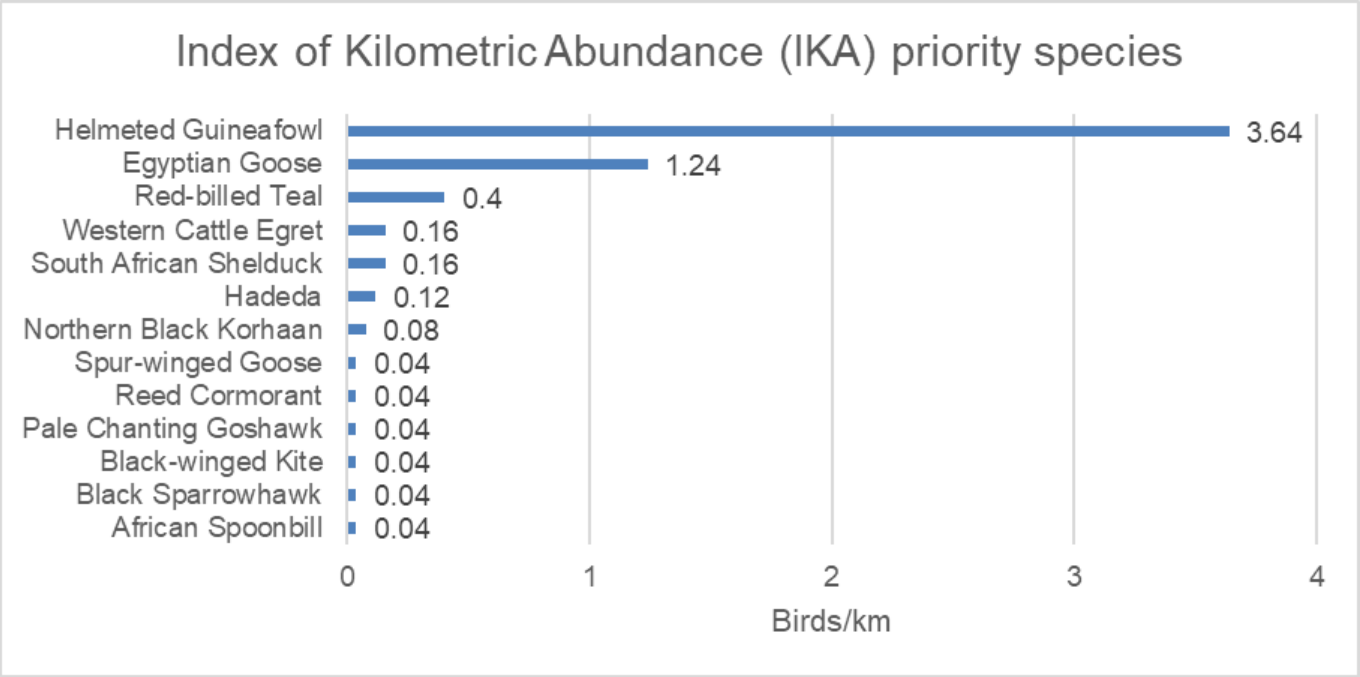

Figure 5.7: Index of kilometric abundance (IKA) for all priority species recorded by means of transect counts during the surveys in the study area, conducted in July 2020.

Figure 5.8: Index of kilometric abundance (IKA) for all non-priority species recorded by means of transect counts during the surveys, conducted in July 2020.

Table 5.2: Priority species potentially occurring at the site and immediate surroundings (NT = Near threatened; End = South African Endemic; N-End = South African near endemic; H = High; M = Medium; L = Low).

Species	Taxonomic name	Full protocol	Ad hoc protocol	Powerline priority species	Red Data status: International	Red Data status: Regional	Endemic/near endemic - South Africa	Raptor	Waterbird	Terrestrial	Possibility of regular occurrence	Recorded during surveys: Rondavel	Grassland	Woodland	Surface water	Fences	Displacement – disturbance and habitat transformation	Electrocution (substations)	Collisions
African Black Duck	*Anas sparsa*	1.75	0.00	x					x		L				x				x
African Darter	*Anhinga rufa*	10.53	0.00	x					x		M				x				x
African Fish-eagle	*Haliaeetus vocifer*	1.75	0.00	x				x	x		L				x			x	x
African Openbill	*Anastomus lamelligerus*	1.75	0.00	x					x		L				x				x
African Sacred Ibis	*Threskiornis aethiopicus*	26.32	0.00	x					x		H				x				x
African Spoonbill	*Platalea alba*	7.02	0.00	x					x		H				x				x
Amur Falcon	*Falco amurensis*	28.07	4.76	x				x			H		x			x		x	
Black Sparrowhawk	*Accipiter melanoleucus*	1.75	0.00	x				x			L			x					
Black-headed Heron	*Ardea melanocephala*	47.37	6.35	x					x		H		x		x				x
Black-necked Grebe	*Podiceps nigricollis*	1.75	0.00	x					x		L				x				x
Black-shouldered Kite	*Elanus caeruleus*	45.61	9.52	x				x			H		x			x		x	
Blue Korhaan	*Eupodotis caerulescens*	1.75	1.59	x	NT	LC	x			x	L		x				x		x
Cape Shoveler	*Anas smithii*	8.77	0.00	x					x		M				x				x
Cape Teal	*Anas capensis*	1.75	0.00	x					x		L				x				x
Common Buzzard	*Buteo vulpinus*	7.02	0.00	x			x	x			H		x			x		x	
Common Moorhen	*Gallinula chloropus*	22.81	0.00	x					x		H				x				x
Egyptian Goose	*Alopochen aegyptiacus*	49.12	1.59	x					x		H	x			x				x
Fulvous Duck	*Dendrocygna bicolor*	10.53	0.00	x					x		M				x				x
Glossy Ibis	*Plegadis falcinellus*	12.28	0.00	x					x		H				x				x
Goliath Heron	*Ardea goliath*	1.75	0.00	x					x		L				x			x	x
Greater Flamingo	*Phoenicopterus ruber*	1.75	1.59	x	LC	NT			x		L				x				x
Grey Heron	*Ardea cinerea*	14.04	1.59	x					x		H				x				x
Hadeda Ibis	*Bostrychia hagedash*	84.21	11.11	x					x		H				x			x	x
Hamerkop	*Scopus umbretta*	5.26	1.59	x					x		L				x				x
Helmeted Guineafowl	*Numida meleagris*	66.67	3.17	x						x	H	x	x	x			x	x	x
Lesser Flamingo	*Phoenicopterus minor*	1.75	0.00	x	NT	NT			x		L				x				x
Lesser Kestrel	*Falco naumanni*	35.09	1.59	x				x			H		x			x		x	

Species	Taxonomic name	Full protocol	Ad hoc protocol	Powerline priority species	Red Data status: International	Red Data status: Regional	Endemic/near endemic - South Africa	Raptor	Waterbird	Terrestrial	Possibility of regular occurrence	Recorded during surveys: Rondavel	Grassland	Woodland	Surface water	Fences	Displacement – disturbance and habitat transformation	Electrocution (substations)	Collisions
Little Egret	*Egretta garzetta*	12.28	0.00	x					x		H				x				x
Little Grebe	*Tachybaptus ruficollis*	38.60	1.59	x					x		H				x				x
Maccoa Duck	*Oxyura maccoa*	1.75	0.00	x					x		L				x				x
Marsh Owl	*Asio capensis*	7.02	0.00	x				x			M		x			x		x	x
Northern Black Korhaan	*Afrotis afraoides*	82.46	12.70	x						x	H	x	x				x		x
Pale Chanting Goshawk	*Melierax canorus*	5.26	0.00	x				x			M	x	x	x	x	x		x	x
Purple Heron	*Ardea purpurea*	8.77	0.00	x					x		M				x				x
Red-billed Teal	*Anas erythrorhyncha*	28.07	0.00	x					x		H				x				x
Red-knobbed Coot	*Fulica cristata*	59.65	7.94	x					x		H				x				x
Reed Cormorant	*Phalacrocorax africanus*	43.86	3.17	x					x		H				x				x
South African Shelduck	*Tadorna cana*	7.02	0.00	x			x		x		H	x			x				x
Southern Pochard	*Netta erythrophthalma*	10.53	0.00	x					x		M				x				x
Spur-winged Goose	*Plectropterus gambensis*	24.56	3.17	x					x		H				x			x	x
Western Cattle Egret	*Bubulcus ibis*	77.19	19.05	x					x		H	x	x		x				x
White Stork	*Ciconia ciconia*	1.75	0.00	x					x		L		x		x				x
White-breasted Cormorant	*Phalacrocorax carbo*	28.07	1.59	x					x		H				x				x
White-faced Duck	*Dendrocygna viduata*	33.33	0.00	x					x		H				x				x
Yellow-billed Duck	*Anas undulata*	68.42	1.59	x					x		H				x				x

5.5. Integrated Heritage including Archaeology, Palaeontology, and the Cultural Landscape

5.5.1 Historical and Archaeological Background

Known heritage resources within the broader study area were determined as part of the heritage assessment (refer to **Figure 5.9**).

The area proposed for development is located approximately 7km southwest of the historic core of Kroonstad. Kroonstad was established as a town in 1855. During the Second Boer War, from 13 March to 11 May 1900, the city became the capital of the Orange Free State, and subsequently the site of a British concentration camp to contain Boer women and children. Kroonstad still boasts much of the inherent rugged beauty which led the Voortrekkers to establish the town where they did and it is situated in an area characterised by open spaces and an abundant variety of vegetation that makes it particularly beautiful. According to Van Schalkwyk (2013), "Most farmsteads were burned down during the Anglo-Boer War, with the result that very little of the built environment dates to the 19th century." According to Matenga (2019), the Black and Coloured townships are significant as landscapes of segregation occupying the north-western fringe of the CBD, while the exclusive white suburbs were located northeast of the town and south of the Valsch River.

According to Van Schalkwyk (2013), "The cultural landscape qualities of the region essentially consist of a rural setup. In this the human occupation is made up of a pre-colonial element consisting of limited Stone Age and Iron Age occupation, as well as a much later colonial (farmer) component. This was soon followed by the development of a number of urban centres or towns. Originally these mostly served the surrounding farming communities, but with the discovery of the Free State Gold Fields, they expanded rapidly in order to serve this industry as well." The proposed Solar Energy Facilities and their associated grid connections are located some distance from the historic core of Kroonstad town. Furthermore, the areas proposed for development are located more than 5km away from the site of the Boer War concentration camps and associated burial grounds.

Prior to colonial settlement in 1855, the area proposed for development formed part of a landscape that was occupied by indigenous Khoe herders and San hunter-gatherers. These indigenous communities were displaced by Bantu-speaking people who began to occupy the area in the Iron Age. According to Van Schalkwyk (2013), "Sites dating to the Late Iron Age are known to occur in the region, especially in the vicinity of the Sandrivier, whereas some are known to occur to the northwest of Ventersburg, These are typical stone walled sites that are linked with Sothospeakers and date to the period after 1600." As such, it is possible that Early, Middle or Later Stone Age artefacts may be located within the proposed development footprint. Furthermore, it is possible that evidence of Iron Age settlement may also be located within the proposed development areas.

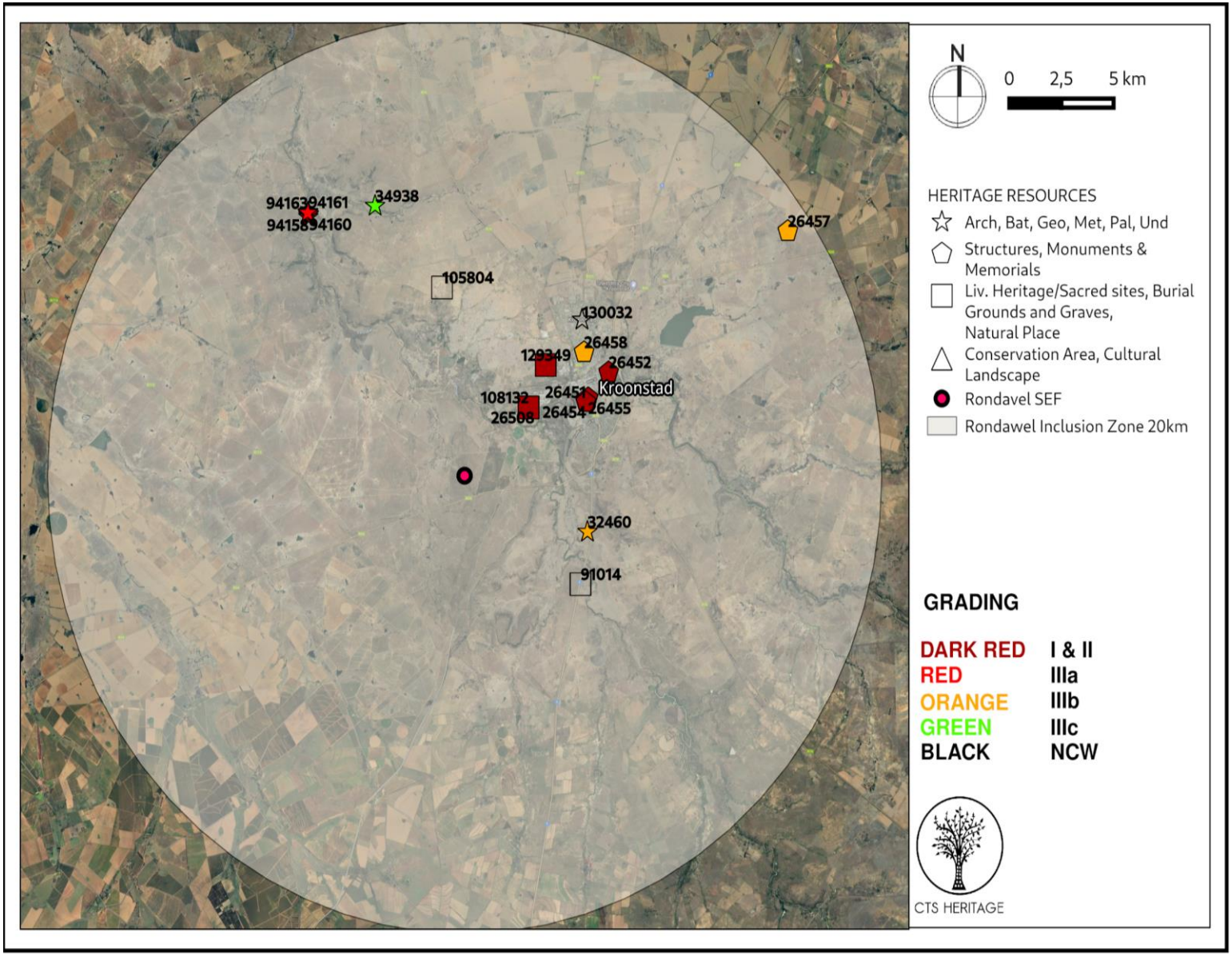

Figure 5.9: Heritage Resources previously identified within the study area.

No significant heritage resources were identified within any of the proposed grid alignment options. Four heritage resources were however identified within the development area proposed for the Rondavel SEF (including the two on-site substation alternatives), located adjacent to the proposed grid connection corridors (refer to **Figure 5.10**), namely RDW001, RDW002, RDW003 and RDW004.

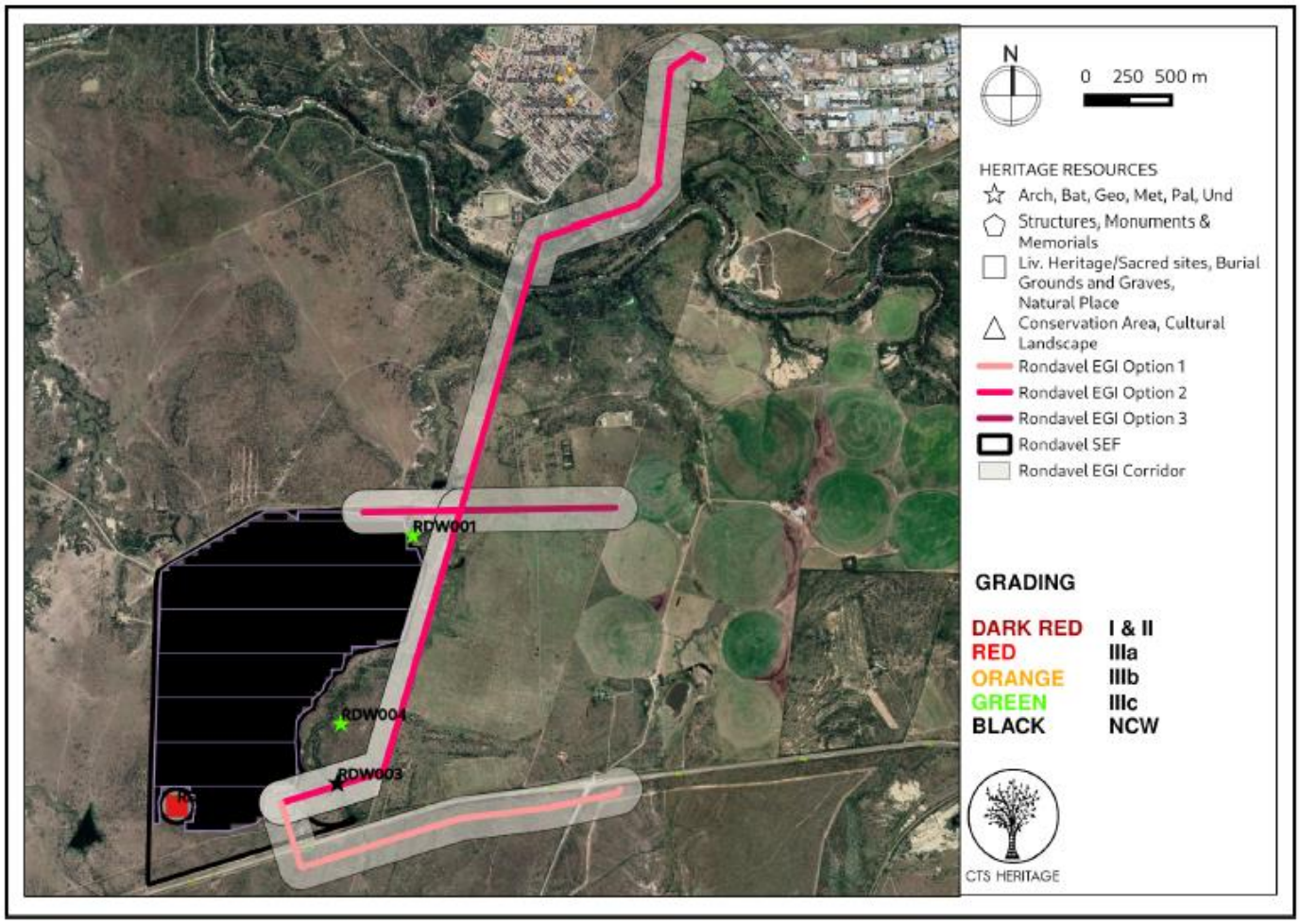

Figure 5.10: Heritage resources identified during the field assessment conducted for the Rondavel EGI.

5.5.2 Palaeontology

According to the SAHRIS Palaeosensitivity Map (**Figure 5.11**), the areas proposed for development are underlain by sediments of moderate to very high palaeontological sensitivity. According to the Council of GeoScience 2726 Kroonstad Map, the development area for the Rondavel EGI is underlain by sediments of the Karoo Supergroup including the Adelaide Subgroup (Pa), the Volksrust Formation (Pvo).

The most palaeontologically sensitive formation underlying the development areas is the Adelaide Subgroup of the Beaufort Group. This formation forms part of the Dicynodon and Lystrosaurus assemblage zones and is known to include fossils of fish, amphibians, reptiles, therapsids and vertebrate burrows. Diverse terrestrial and freshwater tetrapods of Pristerognathus to Dicynodon Assemblage Zones (amphibians, true reptiles, synapsids – especially therapsids) have been found in this formation, as well as palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways), sparse to rich assemblages of vascular plants (Glossopteris Flora, including spectacular petrified logs) and insects.

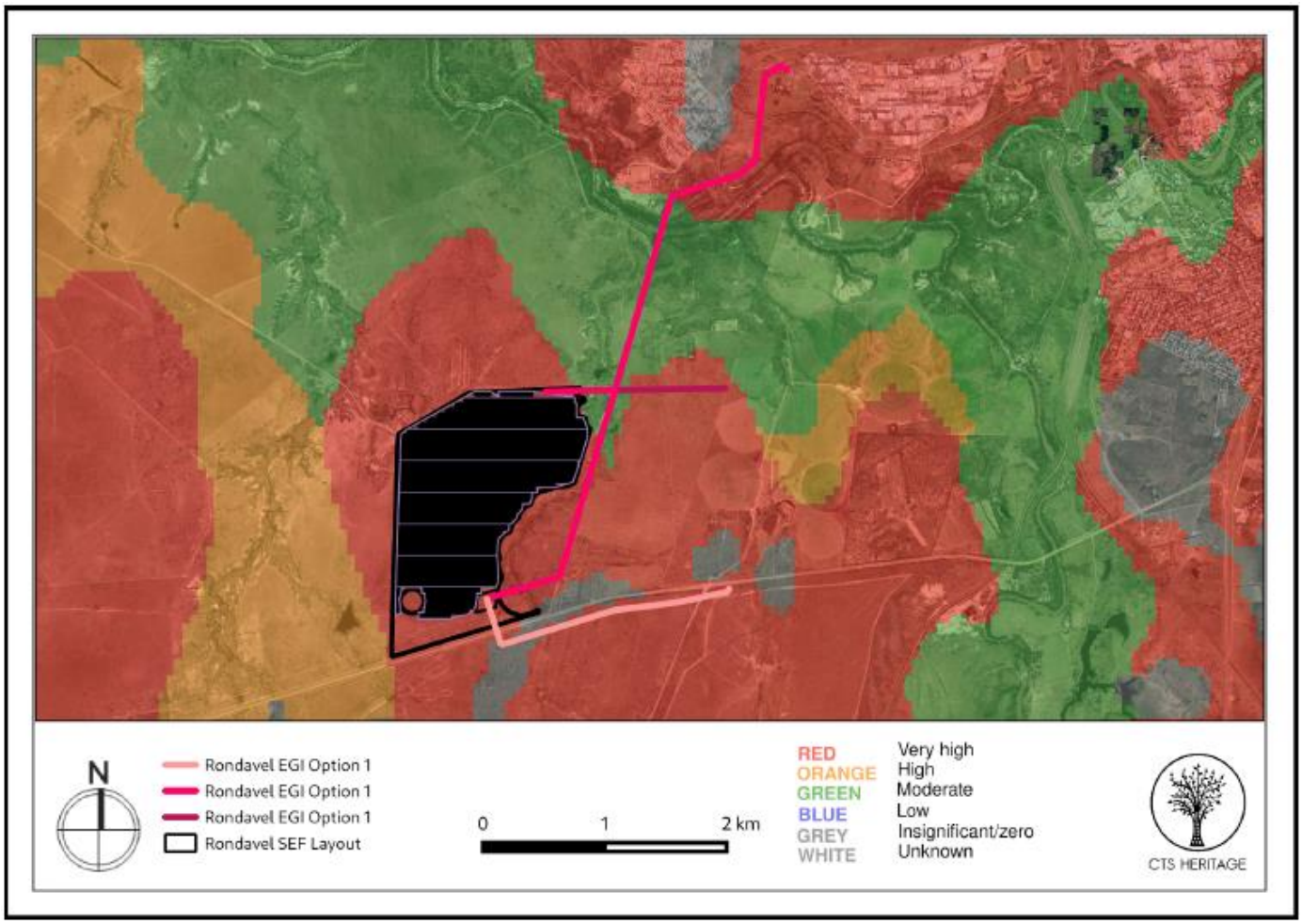

Figure 5.11: Palaeontological sensitivity of the proposed development area.

5.6. Visual Context

5.6.1. Landscape Character

The study area has a rural and predominantly natural character and the main land use activity, outside of the Kroonstad city limits, is maize farming. The region is similarly sparsely populated outside of the Kroonstad urban centre, with a population density of less than ten people per km2. Farm residences, or homesteads, dot the landscape at an irregular interval. These homesteads are generally located at great distances from each other (i.e. more than 2.5km apart).

The project site is easily accessible from the N1 national and R34 arterial roads. The R34 traverses south of the proposed development site and also provide access to the only protected area in the study area, located approximately 1.3km south of the project site. This is the Boslaagte Private Nature Reserve that includes the Lechwe Lodge, the only tourist facility or destination identified within the study area (excluding Kroonstad itself). This lodge functions as a venue that can accommodate up to 300 people and provides overnight lodging.

In spite of the rural and natural character of the study area, there is a large number of overhead power lines associated with the Kroonstad Municipal Substation. These include:

- Kroonstad Municipal/Theseus 1 132kV
- Serfontein Traction/Virginia Terminal 1 88kV
- Kroonstad Municipal/Kroonstad SW Station 1 132kV

The Serfontein Traction/Virginia Terminal 1 88kV power line traverses along the eastern boundary of the proposed development site. Other than these power lines there is also a railway line crossing the study area to the industrial area west of the Kroonstad CBD.

The photographs below aid in describing the general environment within the study area and surrounding the proposed Rondavel Solar PV Facility

Figure 5.12: The eastern boundary of the project site as seen from the R34.

Figure 5.13: Lechwe Lodge. (*Photo*: *Jan Venter*).

Figure 5.14: Access road to the Rondavel EGI project site.

5.6.2. Potential Visual Exposure

The potential visual exposure (visibility) of the Rondavel EGI is shown on **Figure 5.15**, **Figure 5.16** and **Figure 5.17**. The visibility analyses were undertaken along the power line alignments at an offset of 32m above average ground level (i.e., the approximate height of the Grid Connection Infrastructure), for a distance of 3km from the infrastructure. The viewshed analysis was restricted to a 3km radius due to the fact that visibility beyond this distance is expected to be negligible/highly unlikely for the relatively constrained vertical dimensions of this type of power line (i.e., a 132kV power line) and substation.

It is expected that the power line (all three alternatives) may theoretically be visible within the 3km visual corridor and potentially highly visible within a 500m radius of the power line structures due to the generally flat terrain it traverses. Beyond 500m the visibility becomes more scattered due to the undulating nature of the topography. The power line structures are unlikely to be visible beyond a 3km radius of the structures.

Although the majority of the exposed areas fall within vacant open space, generally devoid of observers or potential sensitive visual receptors, specific receptors sites are discussed per alternative below.

It is expected that the power line (all three alternatives) may theoretically be visible within the 3km visual corridor and potentially highly visible within a 500m radius of the power line structures due to the generally flat terrain it traverses. Beyond 500m, the visibility becomes more scattered due to the undulating nature of the topography. The power line structures are unlikely to be visible beyond a 3km radius of the structures.

Although the majority of the exposed areas fall within vacant open space, generally devoid of observers or potential sensitive visual receptors, specific receptors sites are discussed per alternative below.

<u>Power Line Alternative 1</u>

The power line may be exposed to observers travelling along the R34 arterial road and the Hennenman secondary road, as it will cross these roads, as well as traverse adjacent to the R34 for almost 2km.

The visual exposure will not be in isolation but will occur in conjunction with the existing Kroonstad-Theseus 1 132kV, the Serfontein Traction-Virginia Terminal 1 88kV and Kroonstad Municipal-Kroonstad Switching Station 1 132kV power lines.

The power line may be exposed to observers (residents or visitors) at the Fraaiuitsig homestead (500m away) as well as potentially from the northern section of the Boslaagte Nature Reserve at distances exceeding 1.5km and once again in combination with the existing power lines mentioned above.

Power Line Alternative 2

This alternative may be visible from the R34 arterial road, the southern outlying areas of the Brent Park residential area, as well as from the Nasenby Thorns, Blomtuin and Retreat homesteads.

The visibility of this alternative is also in conjunction with the visibility of the Serfontein Traction-Virginia Terminal 1 88kV, Kroonstad Municipal-Kroonstad Switching Station 1 132kV and Kroonstad Municipal-Theseus 1 132kV power lines, as it will traverse adjacent to each of these lines at varying sections.

Power Line Alternative 3

This alternative may be visible from the R34 arterial road and from the Fraaiuitsig homestead at a distance of 970m at the closest. Once again, the visual exposure will be in conjunction with the exposure of the existing power lines mentioned previously.

5.6.3. Viewer Incidence / Viewer Perception

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed grid connection infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer: regularity of sighting, cultural background, state of mind, purpose of sighting, etc. which would create a myriad of options.

Viewer incidence is calculated to be the highest along the arterial and secondary roads within the study area. Travellers using these roads may be negatively impacted upon by visual exposure to the Grid Connection Infrastructure.

Additional sensitive visual receptors are located at the farm residences (homesteads) throughout the study area. It is expected that the viewer's perception, unless the observer is associated with (or supportive of) the solar energy facility and associated infrastructure, would generally be negative.

Due to the generally remote location of the proposed Grid Connection Infrastructure, there are only a few potential sensitive visual receptors located within a 6km radius of the proposed facility. These are residents of, or visitors to:

» Southern outlying parts of Brent Park

- Nasenby Thorns
- Blomtuin
- Retreat
- Fraaiuitsig
- Northern part of the Boslaagte Nature Reserve

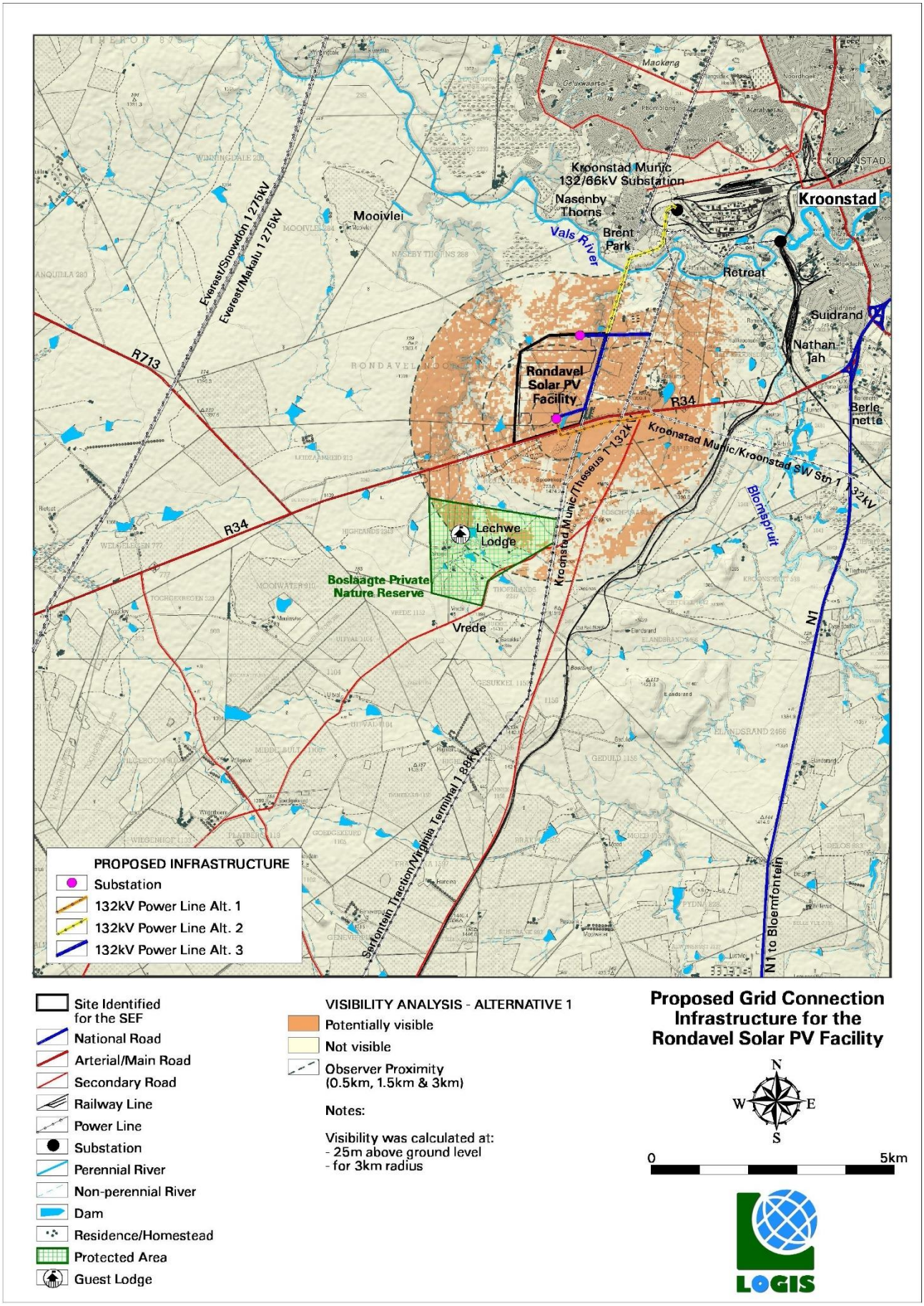

Figure 5.15: Viewshed analysis of the proposed Substation and Grid Connection Infrastructure – Alternative 1.

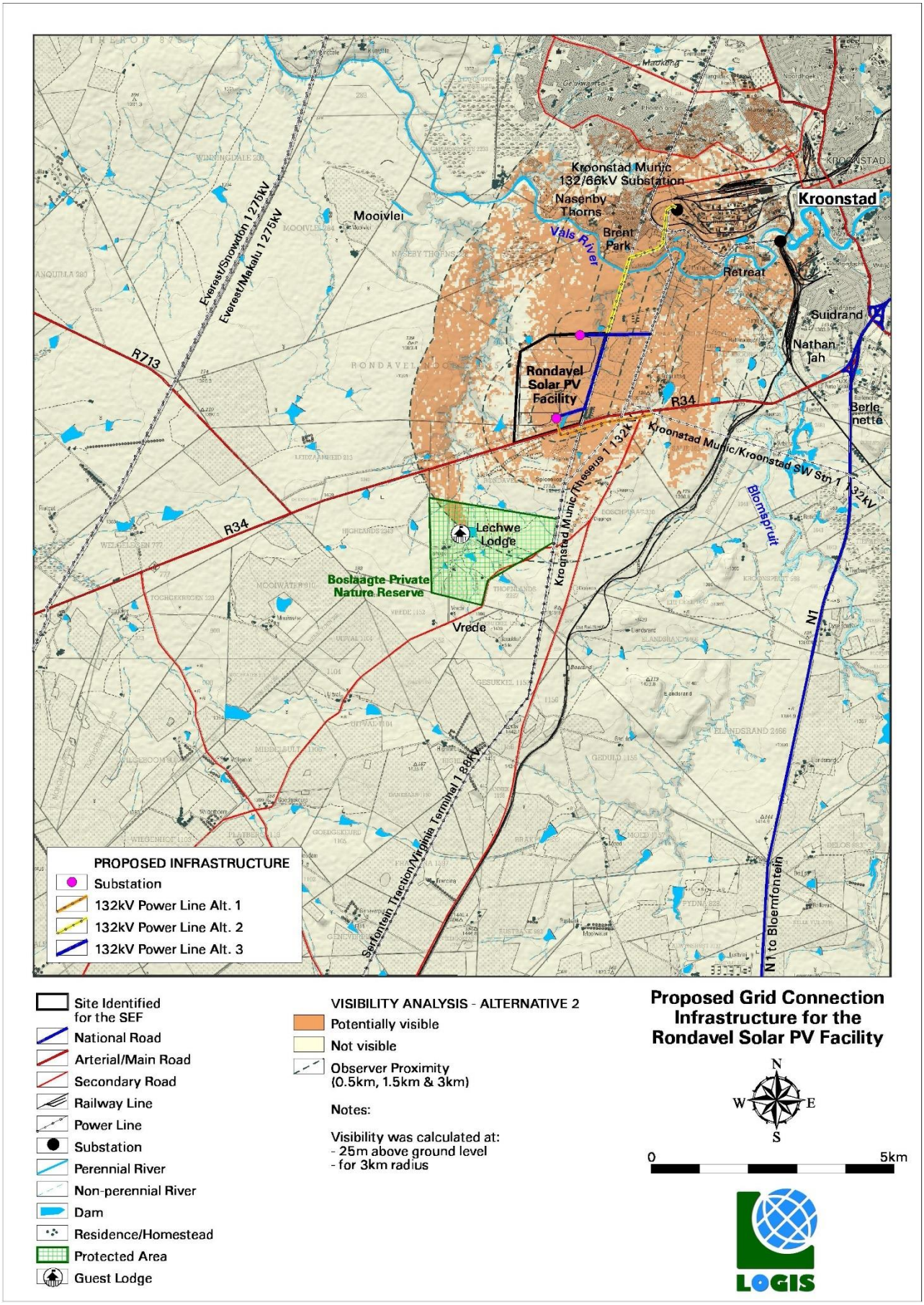

Figure 5.16: Viewshed analysis of the proposed Substation and Grid Connection Infrastructure – Alternative 2.

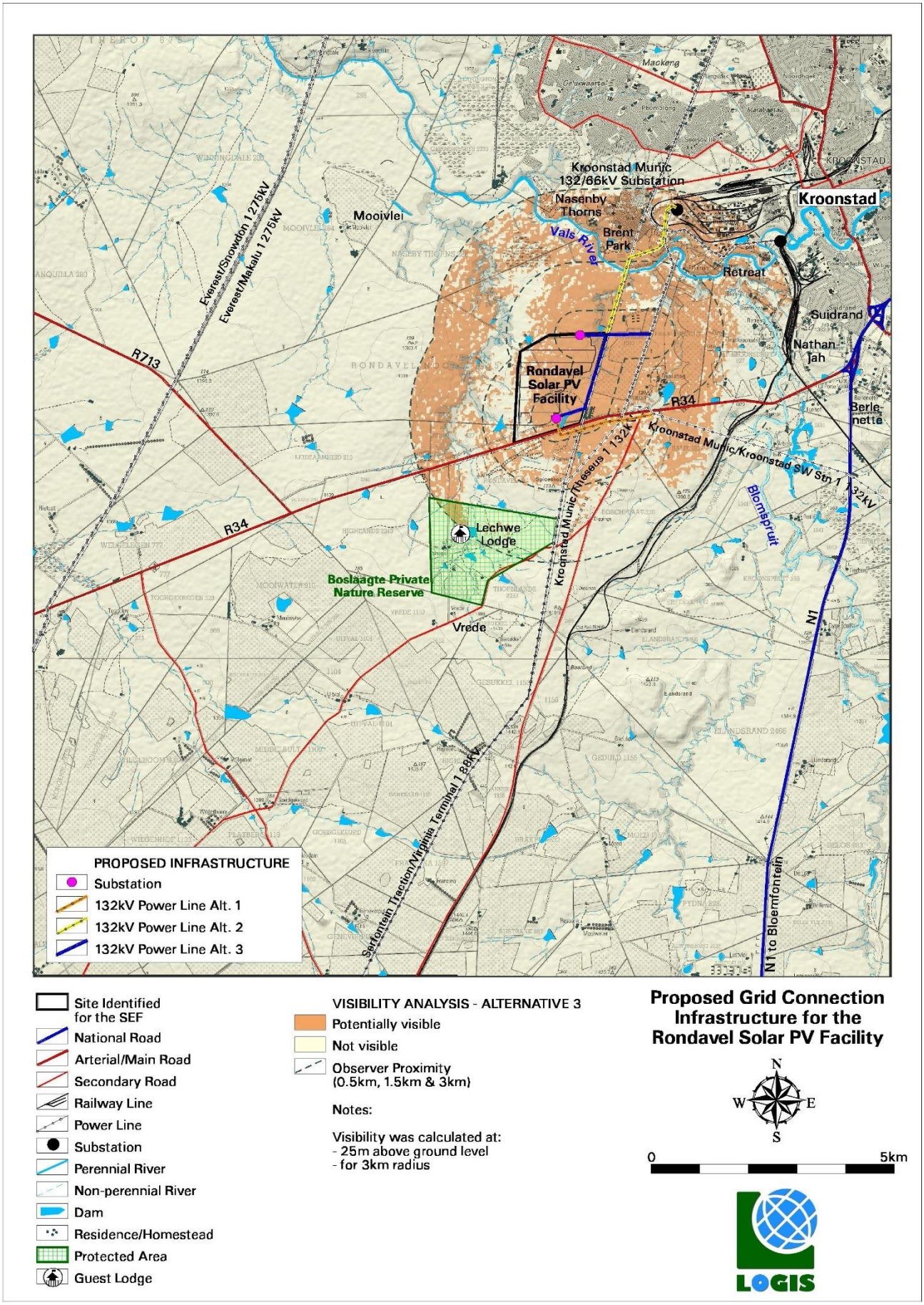

Figure 5.17: Viewshed analysis of the proposed Substation and Grid Connection Infrastructure – Alternative 3.

5.7. Socio-Economic Context

The Free State Province lies in the centre of South Africa, located between the Vaal River in the north and the Orange River in the south. The region is one of flat, rolling grassland and fields of crops, rising to mountains in the north-east. The province is the granary of South Africa, with agriculture central to its economy, while mining in the goldfield reefs is its largest employer.

Economic towns include Welkom, Kroonstad, Parys, QwaQwa, and Bethlehem. The Free State is the third-largest Province in South Africa, but it has the second-smallest population and the second-lowest population density. The culture is centred on traditional cultures but built on the influences of the early European settlers. Close to 2.8-million people live in the Free State, with two-thirds speaking Sesotho, followed by Afrikaans, Zulu, Tswana, Xhosa and English.

The Free State is strategically placed to take advantage of the national transport infrastructure. Two corridors are of particular importance: the Harrismith node on the N3 corridor between Gauteng and KwaZulu-Natal, and the N8. The N1 connects Gauteng to the Western Cape. Bram Fischer International Airport in Bloemfontein handles about 250 000 passengers and 221 000 tons of cargo a year. Manufacturing also features in the provincial economic profile. This sector makes up 14% of the provincial output, with petrochemicals (via Sasol) accounting for more than 85% of the output.

The Free State Province comprises four (4) Districts, of which the Rondavel Solar PV Facility is located within the Fezile Dabi District Municipality. This is a Category C municipality, formerly known as the Northern Free State District Municipality, situated in the north of the Free State. It is bordered by the North West, Gauteng and Mpumalanga Provinces to the north, Thabo Mofutsanyana District to the south, and Lejweleputswa District to the west. The municipality is the smallest district in the province, making up 16% of its geographical area. The main attraction site, the Rondavelfort Dome, being the third-largest meteorite site in the world, is located within the district.

Various towns are situated within the municipal area which includes Cornelia, Deneysville, Edenville, Frankfort, Heilbron, Koppies, Kragbron, Kroonstad, Oranjeville, Parys, Renovaal, Sasolburg, Steynsrus, Tweeling, Vierfontein, Viljoenskroon, Villiers and Rondavelfort.

The main economic sectors of the area include trade (22%), community services (20%), manufacturing (13%), households (13%), agriculture (12%), finance (7%), construction (6%) and transport (5%).

Fezile Dabi District comprises four Local Municipalities (LMs) namely, Moqhaka, Metsimaholo, Ngwathe and Mafube LMs, where the project site is located within the Moqhaka Local Municipality.

5.7.1. Demographic Profile of the Moqhaka Local Municipality

The Moqhaka Local Municipality (LM) is a Category B municipality situated within the southern part of the Fezile Dabi District and covers an area of land 7 925km² in extent. It is the largest of four municipalities in the district, making up over a third of its geographical area. The former Kroonstad, Steynsrus and Viljoenskroon Transitional Local Councils and sections of the Riemland, Kroonkop and Koepel Transitional Rural Councils are included in the municipality. The seat of local government is Kroonstad. The Moqhaka LM has a total population of 154 735, with a total of 53 601 households. In terms of the age structure 24.5% of the population is under 15 years of age, 67.8% of the population falls between 15 and 64, with 7.7% of the population being

over 65. The Municipality is female dominated, with females comprising approximately 50.49% of the LM population, while the Felize Dabi DM is comprised of 50% males and 50% females. In terms of race, Africans are 87.19% and Coloured 2.865 of the total population. Indian/Asian are 0.33% and whites make out 9.32% of the total population of the Moqhaka LM.

The most spoken language is Setsotho, followed by Afrikaans, Isixhosa, Isizulu, English and Setswana. The Moqhaka LM, Feliz Dabi DM, Free State provincial, and South African national population age structures are all youth dominated. A considerable proportion of the respective populations therefore comprise individuals within the economically active population between the ages of 15 and 64 years of age.

The Moqhaka LM has a dependency ratio of 47.6, which correlates to some extent with the Feliz Dabi District Municipality (DM). Education levels within the Moqhaka LM are low with approximately 31.5% of the population over 20 years of age not having completed Grade 12 / Matric. This means that the majority of the population can be expected to have a relatively low-skill level and would either require employment in low-skill sectors, or skills development opportunities in order to improve the skills level of the area. The unemployment rate of the Moqhaka LM is high (35.2%) which places strain on the municipal services delivery as people cannot afford to pay for municipal services. The unemployment rate of the Feliz Dabi DM is 33.9%. The Moqhaka LM has approximately 39.5% females as household heads, and the primary economic activities within the Moqhaka LM comprise agriculture, commercial transport, business services and mining. The majority of households within the Moqhaka LM comprise formal dwellings (85.9%) and the average household size is 2.9.

5.7.2. Economic Profile of the Moqhaka Local Municipality (MLM)

The Greater Kroonstad area is the centre of a large agricultural community that plays an important role in the economy of the district. Subsequently, industrial activities contribute significantly to the district's economy. The Department of Correctional Services and the School of Engineers military bases are situated in the town. The urban area is situated adjacent to the N1 National Road and located adjacent to one of the largest and most important four-way railway junctions in South Africa.

The Viljoenskroon/Rammulotsi urban area is located within an area of extreme agricultural significance. The urban area plays a significant role in providing residential opportunities to the adjacent goldfields and mining activities in the North West Province. The Provincial Roads P15/1 and P15/2 from Kroonstad to Klerksdorp in the North West Province extend through the area from north to south and plays a significant role.

The Steynsrus/Matlwangtlwang urban area is situated approximately 45km east of Kroonstad and 92km west of Bethlehem. The major link road between Bethlehem and Kroonstad stretches adjacent to the urban area. The main economic sectors in the area include agriculture, commercial transport, business services and mining.

The population of the MLM in 2016 was 154 731. Of this total, 32% were under the age of 18, 60.3% were between 18 and 64, and the remaining 7.7% were 65 and older. The MLM therefore has a relatively large young population. This creates challenges in terms of creating employment opportunities.

In terms of race groups, Black Africans made up 87.9% of the population on the MLM, followed by Whites, 9.2% and Coloureds, 2.6%. The main first language spoken in the MLM was Sesotho (87.9%) followed by Afrikaans (11.1%) and IsiXhosa (2.2%).

The high percentage of young people also means that a large percentage of the population is dependent on a smaller productive sector. The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, similar to that of the e Free State Province (52.9%). The dependency ratio for the MLM 2011 was 51%. The traditional approach is based people younger than 15 or older than 64. The 2016 information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e., they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratio for the MLM (2016) was 65.8%. This figure is significantly higher than the national, provincial, and municipal levels in 2011. The higher dependency ratio reflects the limited employment opportunities in the area and represent a significant risk to the district and local municipality.

Based on the information from the 2011 Census most of the households in the MLM reside in formal houses (77.1%). This figure is similar to the district (76.8%) and Provincial (74.4%) figures. Approximately 13.1% of the households in the MLM reside in informal structures.

Based on the information from the 2016 Community Household Survey and 2011 Census 40.9% of the households in the MLM are headed by females. The high number of female-headed households at the local municipal and ward level reflects the lack on formal employment and economic opportunities in the MLM. As a result, job seekers from the MLM need to seek work in the larger centres, specifically Gauteng. The majority of the job seekers are likely to be males. This is due to traditional rural patriarchal societies where the role of the women is usually linked to maintaining the house and raising the children, while the men tend to be the ones that migrate to other areas in search of employment.

Based on the data from the 2011 Census, 8.6% of the population of the MLM had no formal income, 5% earned less than R 4 800, 7.4% earned between R 5 000 and R 10 000 per annum, 22.6% between R 10 000 and R 20 000 per annum and 23.8% between R 20 000 and 40 000 per annum (2016).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 67.4% of the households in the MLM live close to or below the poverty line. The low-income levels reflect the limited employment opportunities and dependence on the agricultural sector. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the MLM. This in turn impacts on the ability of the NLM to maintain and provide services. The official unemployment figure for the MLM was 18.3%. The figures also indicate that the majority of the population are not economically active, namely 44.2%. These figures are similar to the official unemployment rate for the Free State Province (17.5%) and FDDM (18.8%). This reflects the limited employment opportunities in the area, which in turn are reflected in the low income and high poverty levels.

In terms of education levels, the percentage of the population over 20 years of age in the MLM with no schooling was 5.4% in 2011, compared to 3% for the Free State Province. The percentage of the population over the age of 20 with matric was 27.8%, compared to 30.5% for the province.

5.7.3. Settlement and infrastructure

The study area has a rural and predominantly natural character, and the main land use activity is dryland maize farming and grazing for livestock and game. The majority of adjacent properties are used for extensive grazing (cattle) or game farming. Stock theft is not currently problematic in the area. This is linked to cattle being farmed instead of more vulnerable small stock, most owners residing in proximity to the properties, and managers or caretaker staff residing on the properties. Lechwe Lodge is currently primarily used for game breeding and hunting. The Properties Uitval and Highlands (Crous) are both primarily used for breeding (antelope, lion), with only limited hunting taking place. A small riding school is located on Oshoek 47/2 (Sharif Arabiere).

In addition, two hospitals are available within the Moqhaka LM, which includes the Boitumelo Hospital and the Kroon Private Hospital. Ten clinics area available within the municipal area.

The majority of households within the Moqhaka LM are well serviced with regards to flush toilets connected to sewage, refuse removal and electricity. However, only 48.6% of households have piped water inside the dwelling.

CHAPTER 6: ASSESSMENT OF POTENTIAL IMPACTS

This Chapter serves to assess the significance of the positive and negative environmental impacts (direct, indirect, and cumulative) expected to be associated with the development of the Electrical Grid Infrastructure (EGI) for the Rondavel SEF and its associated infrastructure. This assessment has considered a 132 kV double- or single-circuit overhead power line and an on-site 132kV substation, connecting to the national grid via a loop in and loop out into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line, or directly into the existing Kroonstad Municipality 132kV substation, depending on which alternative is implemented. The following infrastructure is included:

- **On-site substation which consists of:**
  - 33/132kV portion of the substation (adjacent to the Independent Power Producer (IPP) substation within the PV facility footprint).
  - Associated equipment, infrastructure, and buildings.
  - Temporary and permanent laydown areas.

- **Distribution Line:**
  - The 132kV distribution line from the onsite 33/132kV Eskom portion of the substation will loop in and loop out into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line, or directly into the existing Kroonstad Municipality 132kV substation, depending on which alternative is implemented.

Three (3) alternative corridors are assessed in this Chapter, each comprising varying widths of up to 320m. Regardless of which alterative corridor is implemented, a 4 – 6m servitude service road under each of the power line is also required. These alternatives are detailed below and illustrated in **Figure 6.1**:

- **Alternative 1 (Preferred):** On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~2.33km long.
- **Alternative 2**: **Alternative 2**: On-site substation directly connecting to the existing Kroonstad Municipality 132kV substation. This corridor is ~6.11km long
- **Alternative 3**: On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~3.68km long.

In addition, two alternative, viable substations were assessed and considered in the Rondavel SEF EIA, and therefore both are considered feasible alternatives for the purposes of this application. These alternatives are therefore:

Preferred Substation (Alternative 1) (PS), comprising the following infrastructure:
- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

Alternative Substation (Alternative 2) (AS), comprising the following infrastructure:
- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

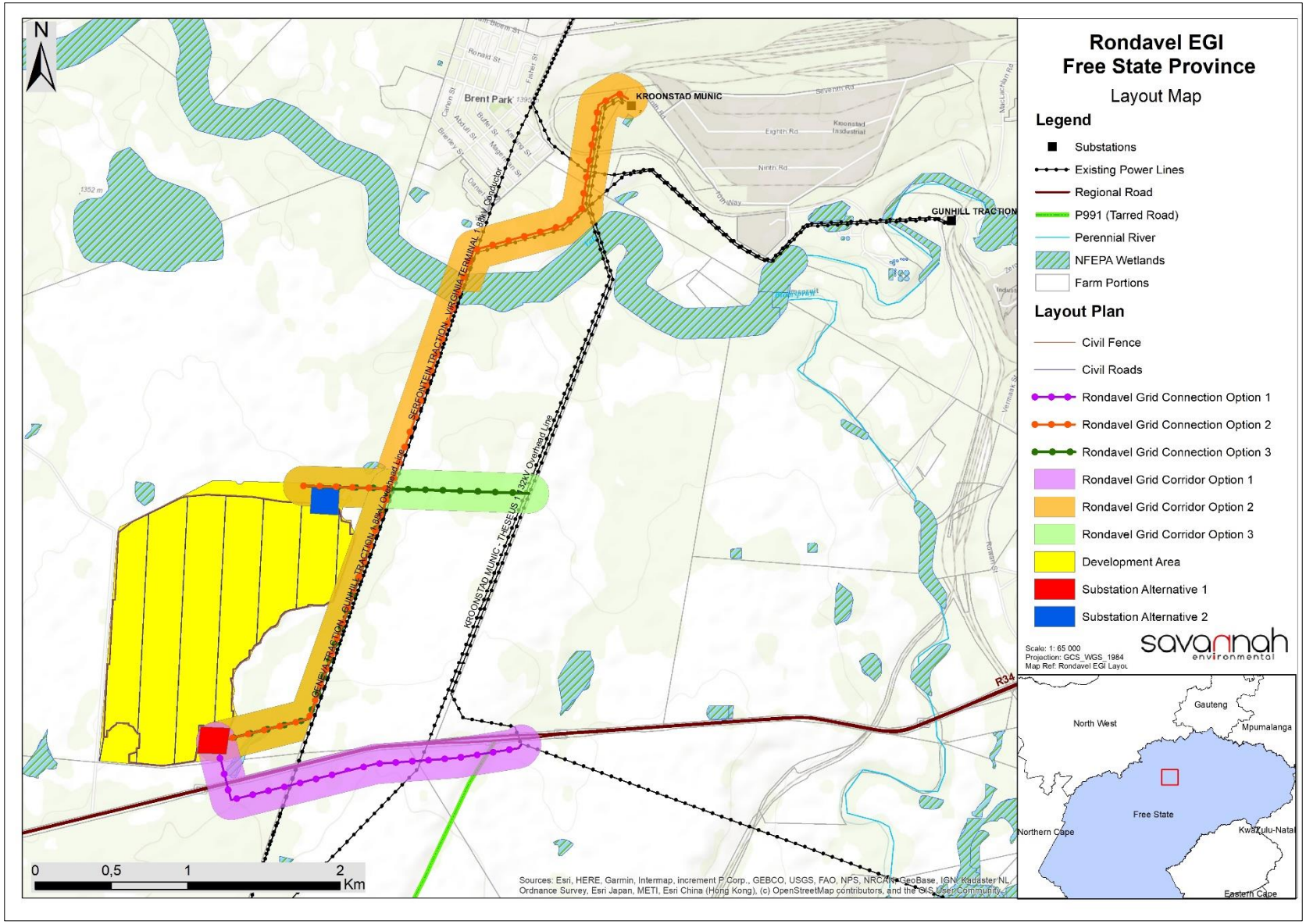

Figure 6.1: Map illustrating the Rondavel EGI, including all power line alternatives and the on-site substation alternatives, located within the study area.

These alternatives represent technically feasible options and therefore allow for the avoidance of environmental sensitivities as far as possible. Where impacts differ for these alternatives, these have been identified separately within this chapter.

The full extent of the grid connection corridor alternatives and the development footprint for the on-site substation alternatives were considered through the BA process by the independent specialists and the EAP. On-site sensitivities were identified through the review of existing information, desk-top evaluations, and field surveys. Development corridors for the EGI and a development footprint for each on-site substation alternative were determined by the proponent through consideration of the sensitive environmental features, technical connection points and areas identified following the commencement of the BA process.

The grid corridors are assessed as up to 320m wide corridors (the corridors vary in width) anywhere within which the EGI will be located in order to allow for avoidance of very high environmentally sensitive areas not considered suitable for development or infringement. The grid corridors therefore allow for avoidance of environmentally sensitive features where possible while representing technically feasible routes for connection. In addition to the above, two alternative development footprints for the substation of approximately 3.3ha and a laydown area of ~1ha within a 25ha assessment area are proposed within the Rondavel PV footprint in order to allow for avoidance of very high environmentally sensitive areas not considered suitable for development or infringement.

The proposed development will comprise the following phases:

» *Pre-Construction and Construction*
Construction of the power line will include the following steps:
- Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs to inform permitting requirements and micro-siting of the pylon infrastructure.
- Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and identified environmental sensitivities.
- Step 3: Search-and-rescue activities, vegetation clearance and construction of access roads/tracks (where required) and watercourse crossings (where required).
- Step 4: Construction of tower foundations.
- Step 5: Assembly and erection of infrastructure on site.
- Step 6: Stringing of conductors.
- Step 7: Rehabilitation of disturbed areas.
- Step 8: Continued maintenance.

Similarly, the following simplified sequence is conducted for the construction of the substation:
- Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs to inform permitting requirements.
- Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and potential environmental sensitivities.
- Step 3: Search-and-rescue activities, vegetation clearance and construction of access roads/tracks (where required), including installation of fencing.
- Step 4: Trenching and ground grid conduit installation.
- Step 5: Installation of concrete foundations.
- Step 6: Assembly and installation of steel structures and isolators.
- Step 7: Control building assembly.
- Step 8: Gravel placement and commissioning.

- Step 9: Rehabilitation of disturbed areas.
- Step 10: Continued maintenance.

The construction phase for the Rondavel EGI is estimated at 9 - 12 months.

» *Operation* – will include the operation of the EGI and the transmission of electricity, which will be fed into the national grid via a loop in and loop out into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. The operation phase of the grid is expected to be approximately 20 years (with maintenance).
» *Decommissioning* – Decommissioning of the power line and switching station may occur at the end of its economic life and that of the Rondavel SEF, unless the infrastructure is required by Eskom. An expected lifespan of at least 20 years (with maintenance) before decommissioning is required is anticipated for the EGI. Decommissioning activities will comply with the legislation relevant at the time.

Environmental issues associated with construction and decommissioning activities may include, among others, creation of employment opportunities, and nuisance from the movement of vehicles transporting equipment and materials. Environmental impacts associated with the operation phase includes potential invasion by alien and invasive plant species and collision of avifauna with the 132kV power line and electrocution of avifauna due to the on-site substation. Other impacts associated with the operation phase include visual impacts.

6.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of the Basic Assessment Report:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risks associated with the development of the Rondavel EGI including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in **Sections 6.3 – 6.11** of this chapter.
3(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the development of the Rondavel EGI are included in **Sections 6.3 – 6.11** of this chapter.
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the Rondavel EGI are included in **Sections 6.3 – 6.11** of this chapter.
3(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk	A description of all environmental impacts identified for the Rondavel EGI during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in **Sections 6.3 – 6.11** of this chapter.

Requirement	Relevant Section
could be avoided or addressed by the adoption of mitigation measures.	
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of the Rondavel EGI, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in **Sections 6.3 – 6.11** of this chapter.
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in **Sections 6.3 – 6.11** of this chapter.

6.2. Quantification of Areas of Disturbance within the Development Area

In order to quantitively assess the impacts associated with the development of the Rondavel EGI, it is necessary to consider the extent of the planned infrastructure, including all the grid corridors and the substation components. As only one of the grid assessment corridors will be developed, the worst-case scenario of the longest grid connection corridor (alternative 2) was utilised for the purposes of calculating the expected disturbance footprint. A 40m wide servitude, across the ~6.11km length of alternative 2, within which an access and maintenance road will be situated, is required for the purposes of operation. However only the tower footprints will be cleared during construction. An estimated number of 30 towers is anticipated, spaced approximately 200m apart, with each tower footprint requiring approximately 25m^2 clearance (5mx5m). Collectively, the anticipated clearance required for the tower footprints may therefore be ~750m^2 depending on the final design, tower spacing, and structure employed. In addition, a substation area of approximately 3.3ha and a laydown area of ~1ha is proposed within a 25ha assessment area is envisaged for the EGI. An access/maintenance road of between 4 – 6m wide will also be required for operation and maintenance of the grid connection. The entirety of this disturbance area is thus regarded as being impacted by the development and is assessed in this Chapter.

6.3. Assessment of Impacts on Ecology (Fauna and Flora)

Potential ecological impacts resulting from the proposed development of the Rondavel EGI would stem from a variety of different activities and risk factors associated with the pre-construction, construction and operation phases of the project. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details).

The ecological specialist determined the following ecological sensitivities on site (**Figure 6.2**), based on the respective ecological contribution and delineation of the various habitat types present on site:

- All wetland features were deemed very high ecological sensitivity and a 30m no-go buffer around them is recommended.
- Dolerite outcrops and Acacia karroo – Asparagus laricinus Shrub-Grassland were considered to be of medium sensitivity.

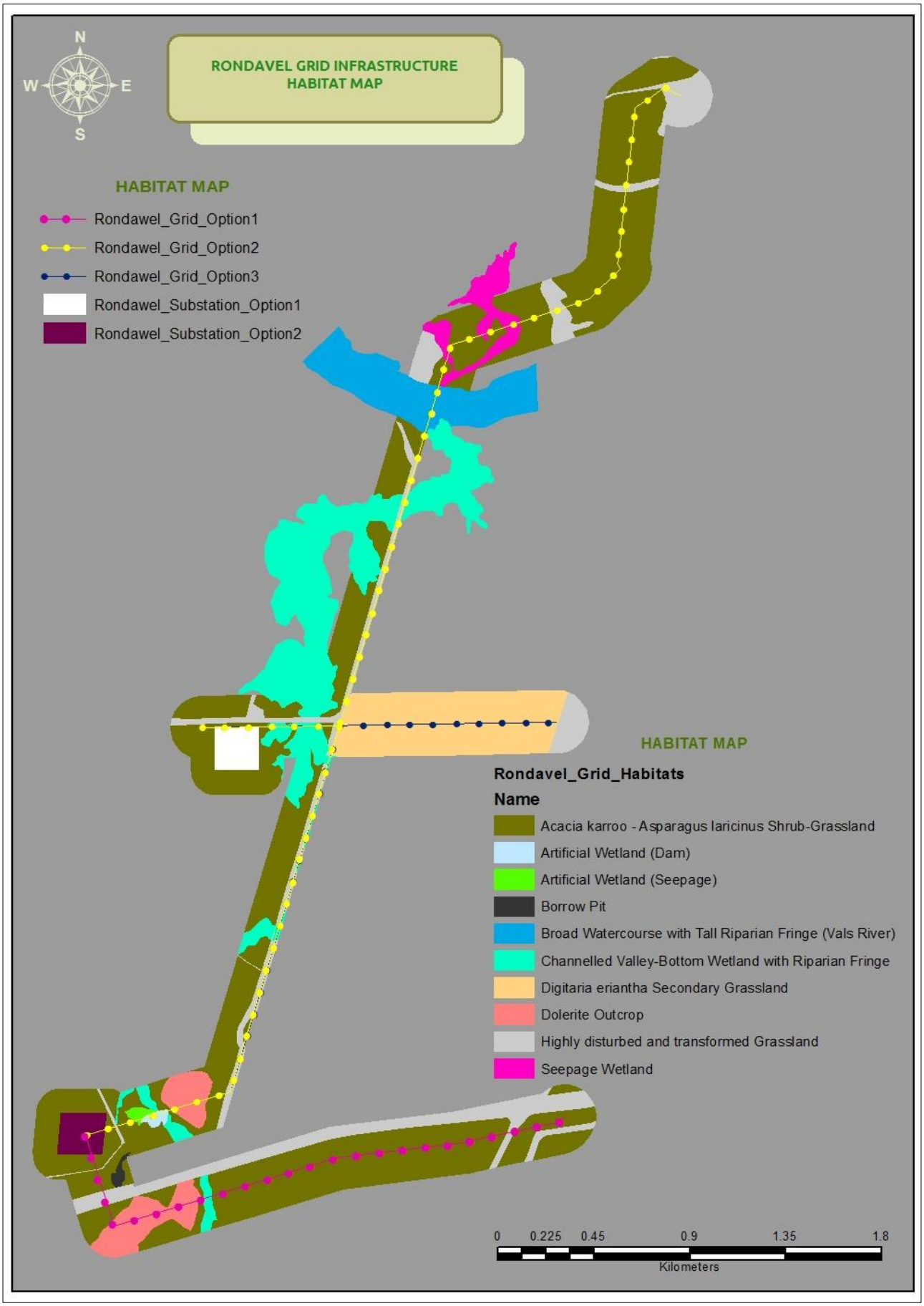

Figure 6.2: Combined ecological and aquatic sensitivity map for the Rondavel EGI.

6.3.1 Description of Ecological Impacts

Potential impacts resulting from the proposed project would stem from a variety of different activities and risk factors associated with the site-establishment and operation phases of the project including the following:

Construction and Operation Phase:

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purposes.
- Site clearing for site establishment of the construction camp and for the construction of the foundations for the pylons required for the power line.
- Vegetation clearing could impact locally listed plant species. Vegetation clearing would also lead to the loss of vegetation communities and habitats for fauna and potentially the loss of faunal species, habitats, and ecosystems. On a larger and cumulative scale (if numerous and uncontrolled power line developments are allowed to occur in the future) the loss of these vegetation communities and habitats may potentially lead to a change in the conservation status of the affected vegetation type, as well as the ability of this vegetation type and associated features to fulfil its ecological responsibilities (functions).
- Soil compaction and increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may potentially impact the downstream watercourses and aquatic habitats. These potential impacts may result in a reduction in the buffering capacities of the landscape during extreme weather events.
- Invasion by alien plants may be attributed to excessive disturbance to vegetation, creating a window of opportunity for the establishment of these alien invasive species. Also, regenerative material of alien invasive species may be introduced to the project site by machinery traversing through areas with such plants or materials that may contain regenerative materials of such species.
- The power line will require management and if this is not done effectively, it could impact adjacent intact areas through impacts such as erosion and the invasion of alien plant species.

6.3.2 Impact tables summarising the significance of impacts on ecology during construction, operation and decommissioning

6.3.2.1. On-site/ Facility Substation

Both substation options are located within similar habitats, and it is therefore envisaged that the potential impacts associated with the development of these substations will be very similar. As such, these two options are assessed separately, but a single impact assessment has been done which is applicable to both options.

Construction, Operation and Decommissioning Phase

Impact Nature: Potential impacts on vegetation and listed protected plant species. Vegetation clearing will lead to the loss of current habitat and is an inevitable consequence of this type of activity. The extent of the proposed footprint, is however, small and located within a secondary grassland (historically cultivated area). Furthermore, no species of conservation concern were recorded within the proposed footprint.

The loss of local vegetation within the footprint is expected to be of relatively minor significance when considered on a broad scale.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Minor (1)
Probability	Highly Probable (4)	Improbable (2)
Significance	**Medium (32)**	**Low (12)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» Pre-construction environmental induction for all construction staff on-site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas, etc.
» Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.
» Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.
» Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity and are properly fenced or demarcated as appropriate and practically possible.
» All vehicles to remain within demarcated construction areas and no unnecessary driving in the veld outside these areas should be allowed.
» Regular dust suppression during construction, if deemed necessary, especially along access roads.
» No fires should be allowed on-site.

Residual Impacts

Some residual vegetation loss will result from the development, equivalent to the operational footprint.

Impact Nature: Potential faunal impacts.

Disturbance, transformation, and loss of habitat will have a negative effect on resident fauna during construction.

There are fauna residents within the site, and these will be impacted during the construction of the on-site substation. However, faunal diversity and density within the site were very low, and post-mitigation impacts are likely to be Low and of Local significance only.

Increased levels of noise, pollution, disturbance, and human presence during the construction and decommissioning phases may affect the local fauna. Sensitive and shy fauna would move away from the area during these phases and may only move back and inhabit the area post-decommission. Some slow-moving species would not be able to avoid the activities and might be killed.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (5)	Small (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (30)**	**Low (14)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No

Can impacts be mitigated?	Noise and disturbance during the construction, decommission and during maintenance phases cannot be avoided but would be transient in nature and with appropriate mitigation; no long-term impacts from the construction phase can be expected.

Mitigation

- Site access should be controlled and no unauthorised persons should be allowed onto the site.
- Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site.
- Fires should not be allowed on site.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.
- Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual Impacts

Due to the nature of this development, there will be a permanent loss of habitat and forage for fauna. However, due to the relatively small footprint of the development and the fact that this area has historically been disturbed and also contain a very low faunal diversity this potential residual impact can be regarded as low.

Impact Nature: Potential increased erosion risk during construction and decommissioning.

During construction/decommissioning, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

	Without Mitigation	**With Mitigation**
Extent	Local to neighbouring areas (2)	Local (1)
Duration	Medium-term (3)	Short-term (1)
Magnitude	Moderate (6)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (44)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- An erosion control management plan should be utilised to prevent erosion
- There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.
- Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities
- Stormwater from the substations and other hard stand areas, must be managed using appropriate channels and swales when located within steep areas.

- Storm water run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the substation sites.
- Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.
- Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.
- Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation.
- Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

Impact Nature: Altered runoff patterns due to rainfall interception by infrastructure and compacted areas resulting in high levels of erosion.

The presence of an extensive area of hardened surface during operation will generate a lot of runoff which will pose a significant erosion risk, if not managed. Erosion is one of the greater risk factors associated with this type of development, and it is therefore essential that proper erosion control structures are built and maintained over the lifespan of the project.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Short-term (1)
Magnitude	Minor (2)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Regular monitoring of the site (minimum of twice annually) to identify possible areas of erosion is recommended, particularly after large summer thunder storms have been experienced.
- All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Alternatively, soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind- and water erosion.
- Monitor the area below and around the panels regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation efforts accordingly.
- Due to the nature and larger runoff surfaces, the development area should be adequately landscaped and rehabilitated to contain expected accelerated erosion.
- Runoff may have to be specifically channelled or storm water adequately controlled to prevent localised rill and gully erosion.
- Any erosion problems observed should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring to assess the success of the remediation.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

Impact Nature: Potential increased alien plant invasion during the construction, operational and decommissioning phase.

The presence of an extensive area of hardened surface during operation will generate a lot of runoff which will pose a significant erosion risk, if not managed. Erosion is one of the greater risk factors associated with this type of development, and it is therefore essential that proper erosion control structures are built and maintained over the lifespan of the project.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Short-term (1)
Magnitude	Minor (2)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Regular monitoring of the site (minimum of twice annually) to identify possible areas of erosion is recommended, particularly after large summer thunder storms have been experienced.
- All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Alternatively, soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind- and water erosion.
- Monitor the area below and around the panels regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation efforts accordingly.
- Due to the nature and larger runoff surfaces, the development area should be adequately landscaped and rehabilitated to contain expected accelerated erosion.
- Runoff may have to be specifically channelled or storm water adequately controlled to prevent localised rill and gully erosion.
- Any erosion problems observed should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring to assess the success of the remediation.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

6.3.2.2. Grid Connection Options

For all grid options (1 – 3), the impacts relating to terrestrial ecology are very similar and as such, the impact assessment conducted below, relating to terrestrial ecology, is applicable to all three gridline alternatives.

Construction, Operation and Decommissioning Phase

Impact Nature: Potential Impacts on vegetation and listed protected plant species.

Vegetation clearing will lead to the loss of current habitat within the grid connection corridor and is an inevitable consequence of this type of activity. The extent of this grid connection corridor, is however, relatively small and the vegetation types within the affected area have a relatively wide distribution and are regarded as Least Concern.

The most likely consequences include:

- local loss of habitat (to an extent as a natural ground covering will be maintained where possible);
- very small and local disturbance to processes maintaining local biodiversity and ecosystem goods and services; and
- a potential loss of a few local protected species.

The development footprints for both options are primarily homogenous in terms of habitat types and vegetation cover thus providing for easier and more accurate calculation of potential impacts, more effective recommendations and implementation of management and mitigation measures, and furthermore lowering the impact and beta diversity. Only a very small portion of natural to near-natural Vaal Vet Sandy Grassland will be traversed by both options. Gridline alternative 2 will largely traverse historically cultivated lands (secondary grassland). The loss of local vegetation within the footprint is expected to be of relatively minor significance when considered on a broad scale.

	ALTERNATIVE 1, 2 & 3	
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Small (3)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (36)**	**Low (24)**
Status	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Pre-construction walk-through of the power line route/corridor to locate species of conservation concern that can be translocated or avoided.
- Vegetation clearing to commence only after walkthrough has been conducted and necessary permits obtained.
- Pre-construction environmental induction for all construction staff on-site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas, etc.
- Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.
- Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.
- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity and are properly fenced or demarcated as appropriate and practically possible.
- All vehicles to remain within demarcated construction areas and no unnecessary driving in the veld outside these areas should be allowed.
- Existing tracks should be used for access wherever possible.
- The morphology and hydrology of the wetland features not be altered by unnecessary excavations, dumping of soil or other waste.
- No fires should be allowed on-site.

Residual Impacts

Some residual vegetation loss will result from the development, equivalent to the operational footprint of the power line.

Impact Nature: Potential Faunal Impacts.

Disturbance, transformation, and loss of habitat will have a negative effect on resident fauna during construction.

There are fauna residents within the site, and these will be impacted during the construction of the power line. However, faunal diversity and density within the site are low, and post-mitigation impacts are likely to be Low and of Local significance only.

Increased levels of noise, pollution, disturbance, and human presence during the construction phase may affect the local fauna. Sensitive and shy fauna would move away from the area during the construction phase and may move back into the area upon completion of the construction phase. Some slow-moving species (i.e. tortoise & snakes) would not be able to avoid the activities and might be killed.
Faunal diversity and density within the site are low and post-mitigation impacts are likely to be Low and of Local significance only.

	ALTERNATIVE 1, 2 & 3	
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Minor (4)	Small (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	Negative
Reversibility	Moderate	Moderate to High
Irreplaceable loss of resources	Unlikely	Unlikely
Can impacts be mitigated?	Noise and disturbance during the construction, decommission and during maintenance phases cannot be avoided but would be transient in nature and with appropriate mitigation; no long-term impacts from the construction phase can be expected.	

Mitigation

» All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises which are often persecuted out of superstition, or Giant Girdled Lizards/Ouvolk which is traded illegally.
» Site access should be controlled and no unauthorised persons should be allowed onto the site.
» Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site.
» Fires should not be allowed on site.
» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
» All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.
» Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual Impacts

There will be minimal residual impact as the facility will have low operational impacts on fauna, after the construction phase.

Impact Nature: Potential increased erosion risk during construction and decommissioning.

During construction/decommission, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. It is critically important that proper erosion control structures are built and maintained over the lifespan of the project.

	ALTERNATIVE 1 & 2	
	Without Mitigation	**With Mitigation**

Extent	Local (2)	Local (1)
Duration	Medium-term (3)	Short-term (1)
Magnitude	Moderate (5)	Small (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (40)**	**Low (12)**
Status	Negative	Negative
Reversibility	Low	Moderate to High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» Any erosion problems observed to be associated with the access road and/or hardened/engineered surfaces should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
» An erosion control management plan should be utilised to prevent erosion
» There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.
» Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.
» Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.
» Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation.
» Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

Impact Nature: Potential increased alien plant invasion during the construction, operational and decommissioning phase.

The disturbed and bare ground that is likely to be present at the site during and after construction would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

	ALTERNATIVE 1 & 2	
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Short-term (1)
Magnitude	Minor (4)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (44)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» A site-specific eradication and management programme for alien invasive plants must be implemented during construction.

» Regular monitoring by the operation and maintenance team for alien plants at the within the power line servitude must occur and could be conducted simultaneously with erosion monitoring. » When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels. » Clearing methods must aim to keep disturbance to a minimum. » No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.
Residual Impacts If the above recommended mitigation measures are strictly implemented and some re-establishment and rehabilitation of natural vegetation is allowed the residual impact will be very low.

6.3.3 Comparative assessment of the corridor and substation alternatives

A summary of the assessment of impacts done for the substation options/alternatives is detailed below and includes the identification of the preferred alternative, in terms of its potentials impacts on terrestrial ecology features. The overall impact significance provided in the table below is essentially a combination of the aspects assessed above and their impact significance ratings, with the implementation of mitigation measures.

Take note that "not-preferred" does not necessarily mean that such an option contains a fatal flaw and may not be considered at all (unless specified as such). If not specified otherwise, it merely means that in terms of the available options this is not the most preferable and may need some layout adjustments/amendments in order to avoid any sensitive features.

<u>On-site Substation Alternatives</u>

Alternative	**Preference**	**Overall Impact Significance in terms Terrestrial Ecological Features**	**Reasons**
Substation Option 1	Favourable	Both options are very similar in terms of their potential impacts on terrestrial features. Mainly Low to Medium prior to Mitigation.	» Both substation options are located in very similar habitat types which is not regarded as sensitive. » Furthermore, both substation options are located outside of any conservation important areas (Threatened Ecosystems, and Critical Biodiversity Areas). » No Plant or Animal Species of Conservation Concern were recorded within the proposed footprint areas of the substation options. » Due to the above provided reasons, both options are regarded as favourable, however, it is when one takes into account the power line route options from these substations, that Option 2, edges out the first option as the preferred location. This is because substation option 2, along with grid route option 3 when combined have the least significant impact on the environment
Substation Option 2	Most Favourable/Preferred		

Alternative	Preference	Overall Impact Significance in terms Terrestrial Ecological Features	Reasons
			as majority of the power line route will traverse a secondary grassland (historically cultivated area).

Grid Corridor Alternatives

Alternative	Preference	Overall Impact Significance in terms Terrestrial Ecological Features	Reasons
Grid Option 1	Favourable	All three options are more or less similar in terms of their potential impacts on terrestrial features. Mainly Low to Medium prior to Mitigation and Low with Mitigation considered.	» All grid route options are located outside of any conservation important areas (Threatened Ecosystems, and Critical Biodiversity Areas). » No Plant or Animal Species of Conservation Concern were recorded within the proposed footprint areas of the grid route options. » If grid option 3 were to be selected along with substation option 2, potential impacts on terrestrial resources will be the lowest as; * the majority of the power line route will traverse a secondary grassland (historically cultivated area). » Due to the reasons provided above, Grid Route Option 3 is regarded as the Preferred option.
Grid Option 2	Not Preferred		
Grid Option 3	Most Favourable/Preferred		

6.3.4 Implications for Project Implementation

Overall, no significant terrestrial ecological flaws that could pose a problem to the proposed project were identified during the BA process. All impacts were determined to be low negative with the implementation of mitigation measures, with no remaining high or moderate significance impacts determined for the project post-mitigation.

Based on the outcomes of the Ecological Impact Assessment, it is the specialist's opinion that the proposed Rondavel EGI development be authorised.

6.4. Assessment of Impacts on Avifauna

Potential impacts on avifauna and the relative significance of the impacts associated with the construction and operation of the Rondavel EGI are summarised below (refer to **Appendix E** for more details).

Species composition, distribution and abundance within the project site is largely influenced by the broad vegetation type, however species behaviour and fine scale distribution is linked to the avifaunal habitats present. Four bird habitats were determined for the project site, namely, Grassland, Woodland, Dams and Rivers, as well as Fences.

The SABAP2 data indicates that a total of 192 bird species could potentially occur within the study area and immediate surroundings. Of these, 37 species are classified as priority species, and 2 of these are South African Red Data species. Of the priority species, 20 are likely to occur regularly at the study area and immediate surrounding area, and another 17 could occur sporadically.

On-site surveys were conducted from 20 - 22 July 2020 by means of transect counts. The Index of Kilometre Abundance (IKA) indicated in **Figure 6.3** expresses the ratio of the total number of individuals (or of signs of presence) observed along a transect by the total transect length covered, and is a common measure used in avifaunal studies as it allows a straightforward comparison of species abundance in different sites or at different times. The species of greatest abundance as determined by on site observations was that of the Helmet Guineafowl followed by the Egyptian Goose, Northern Black Korhaan, Hadeda, the South African Shelduck, following which the Western Cattle Egret and the Pale Chanting Goshawk shared equal abundance values.

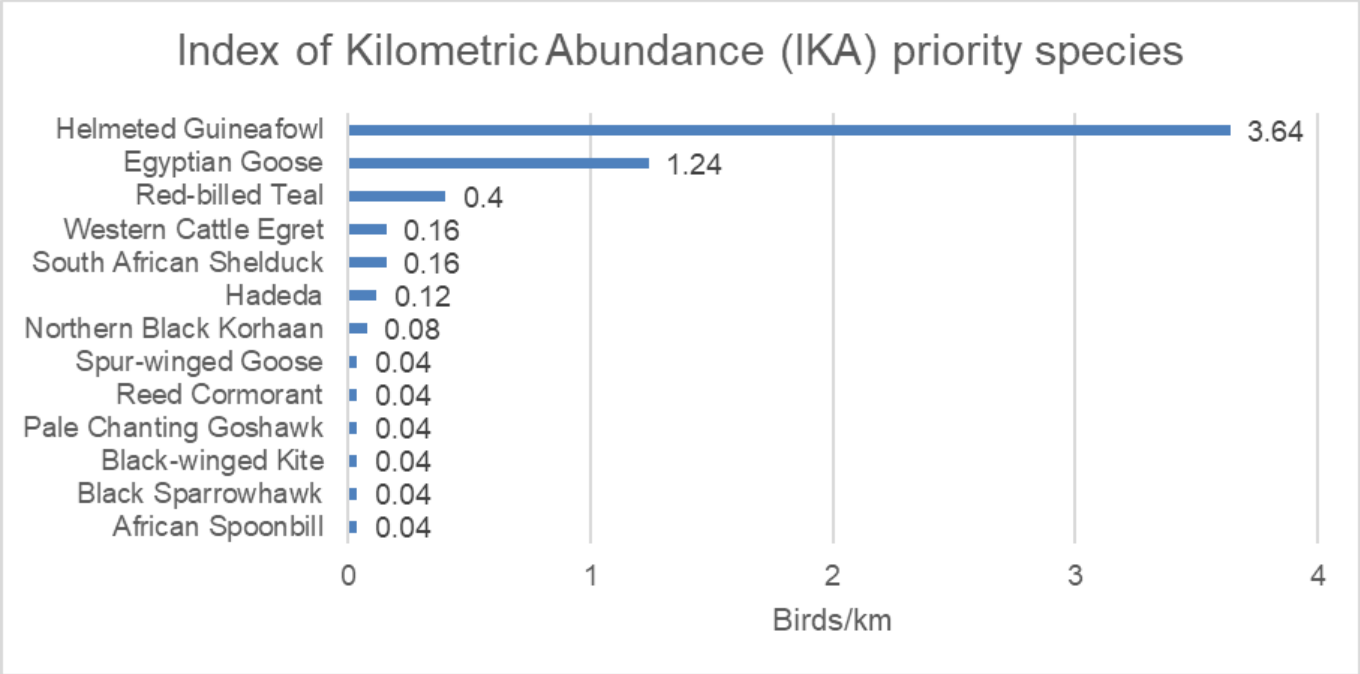

Figure 6.3: Index of kilometric abundance (IKA) for all priority species recorded by means of transect counts during the surveys in the study area, conducted in July 2020.

The following environmental sensitivities were identified from an avifaunal perspective (refer to **Figure 6.4**):

» **High sensitivity – Mark with Bird Flight Diverters: Flight paths associated with surface water.**
  * Rivers and drainage lines are used by birds as flight paths, particularly waterbirds that commute up and down channels. Dams are also a large attraction for waterbirds, and birds commuting between dams may be at risk of collisions.

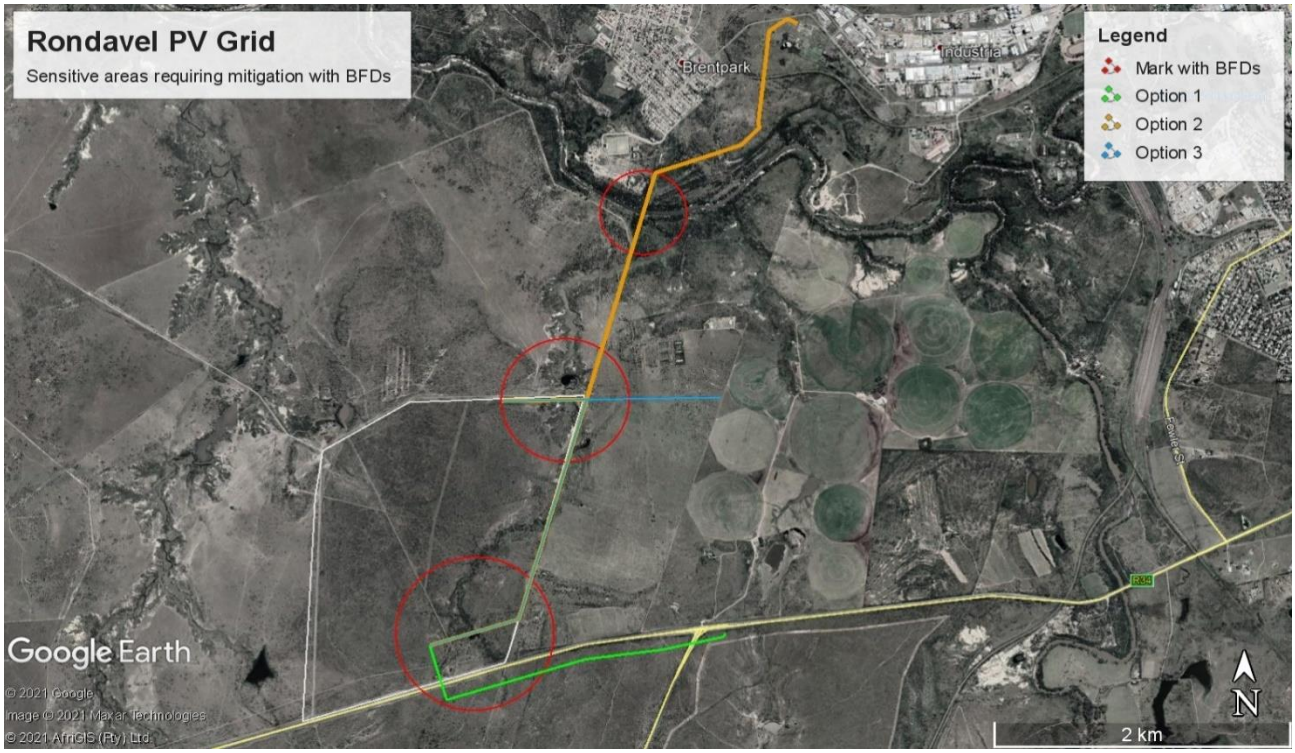

Figure 6.4: Avifaunal sensitivities identified for the grid connection infrastructure associated with the Rondavel SEF.

6.4.1 Description of Avifaunal Impacts

The main impacts of grid connection infrastructure on avifauna which have been identified from the avifaunal study include the following:

Construction Phase

» Displacement of priority species due to disturbance associated with construction of the grid and on-site substation.

Operational Phase

» Displacement of priority species due to habitat transformation associated with the operation of the overhead power line and onsite substation.
» Mortality of priority species due to collisions with the 132kV overhead power line.
» Electrocution of priority species in the onsite substation.

Decommissioning Phase

» Displacement of priority species due to disturbance associated with decommissioning of the grid and onsite substation.

6.4.2 Impact tables summarising the significance of impacts on avifauna during construction, operation, and decommissioning

The following impacts were determined by the specialist for the respective corridor alternatives and on-site substation alternatives. Separate impact tables have been provided for the grid corridor and on-site substation, and each table provides an assessment of impacts for each alternative.

Construction Phase

Nature: Displacement of priority species due to disturbance associated with construction of the grid and onsite substation						
	Option 1		**Option 2**		**Option 3**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Very Short (1)	Very Short (1)	Very Short (1)	Very Short (1)	Very Short (1)	Very Short (1)
Magnitude	High (8)	High (8)	High (8)	High (8)	High (8)	High (8)
Probability	High Probable (4)	Improbable (2)	High Probable (4)	Improbable (2)	High Probable (4)	Improbable (2)
Significance	**Medium (40)**	**Low (20)**	**Medium (40)**	**Low (20)**	**Medium (40)**	**Low (20)**
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Medium	High	Medium	High	Medium	High
Irreplaceable loss of resources?	No	No	No	No	No	No
Can impacts be mitigated?	Yes		Yes		Yes	
Mitigation: » Construction activity should be restricted to the immediate footprint of the infrastructure. » Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. » Measures to control noise and dust should be applied according to current best practice in the industry. » Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.						
Residual Risks: The residual risk of displacement will be reduced to a low level after mitigation, if the proposed mitigation is implemented.						

Operation Phase

Nature: Displacement of priority species due to habitat transformation associated with the operation of the OHL and onsite substation.						
	Option 1		**Option 2**		**Option 3**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)	Low (4)	Low (4)	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	**Low (27)**	**Low (18)**	**Low (27)**	**Low (18)**	**Low (27)**	**Low (18)**
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High	High	High
Irreplaceable loss of resources?	No	No	No	No	No	No
Can impacts be mitigated?	To a limited extent	To a limited extent	To a limited extent	To a limited extent	To a limited extent	To a limited extent
Mitigation:						

» Vegetation clearance should be limited to what is absolutely necessary. » The mitigation measures proposed by the vegetation specialist must be strictly enforced.
Residual Risks: The residual risk of displacement, which is already low, will be further reduced after mitigation

Nature: Mortality of priority species due to collisions with the 132kV OHL						
	Option 1		**Option 2**		**Option 3**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	High (8)	Moderate (6)	High (8)	Moderate (6)	High (8)	Moderate (6)
Probability	High Probable (4)	Probable (3)	High Probable (4)	Probable (3)	High Probable (4)	Probable (3)
Significance	**Medium (52)**	**Medium (33)**	**Medium (52)**	**Medium (33)**	**Medium (52)**	**Medium (33)**
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	high	high	high	high	high	high
Irreplaceable loss of resources?	yes	yes	yes	yes	yes	yes
Can impacts be mitigated?	To a limited extent	To a limited extent	To a limited extent	To a limited extent	To a limited extent	To a limited extent
Mitigation: » The avifaunal specialist must conduct a walk-through prior to implementation to demarcate sections of powerline that need to be marked with Eskom approved bird flight diverters. The bird flight diverters should be installed on the full span length on the earthwire (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.						
Residual Risks: There will be an ongoing residual risk of collisions with the OHL, but mitigation should make a material difference.						

Nature: Electrocution of priority species in the onsite substation.				
	Option 1		**Option 2**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (1)	Local (2)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	High (8)	High (8)	High (8)	High (8)
Probability	Improbable (3)	Very Improbable (2)	Improbable (3)	Very Improbable (2)
Significance	**Medium (42)**	**Low (26)**	**Medium (42)**	**Low (26)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes		Yes	
Mitigation:				

» The hardware within the proposed transmission substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red Data priority species is unlikely to frequent the substation and be electrocuted.
Residual Risks: The residual risk of electrocution will be low once mitigation is implemented.

Decommissioning Phase Impacts

Nature: Displacement of priority species due to disturbance associated with decommissioning of the grid and onsite substation				
	Option 1		**Option 2**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Very Short (1)	Very Short (1)	Very Short (1)	Very Short (1)
Magnitude	High (8)	High (8)	High (8)	High (8)
Probability	High Probable (4)	Improbable (2)	High Probable (4)	Improbable (2)
Significance	**Medium (42)**	**Low (20)**	**Medium (42)**	**Low (20)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Medium	High	Medium	High
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: » Decommissioning activity should be restricted to the immediate footprint of the infrastructure as far as possible. » Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. » Measures to control noise and dust should be applied according to current best practice in the industry. » Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum. » The existing transmission lines must be inspected for active raptor nests prior to the commencement of the decommissioning activities. Should any active nests be present, decommissioning activities during the breeding season should be avoided if possible.				
Residual Risks: The residual risk of displacement will be reduced to a low level after mitigation, if the proposed mitigation is implemented.				

6.4.3 Comparative Assessment of the corridor and substation alternatives

Corridor Alternatives

From an avifaunal perspective, Alternative 1 is the preferred power line alternative because it is the shortest alternative. However, Alternative 2 and 3 are not fatally flawed and can be utilised with appropriate mitigation.

RONDAVEL GRID INFRASTRUCTURE		
Alternative	**Preference**	**Reasons**
Grid Option 1	Preferred	This is the shortest option.
Grid Option 2	Acceptable	This option is the longest, but still acceptable with mitigation.
Grid Option 3	Acceptable	This option is the second longest, but still acceptable with mitigation.

Substation Alternatives

From an avifaunal perspective, Alternative 1 and 2 are not fatally flawed and either can be utilised with appropriate mitigation.

6.4.4 Implications for Project Implementation

The expected impacts of the Rondavel PV grid and associated infrastructure on avifauna were rated to be of Moderate significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to Low negative (see Table 3 above). No fatal flaws were discovered in the course of the investigation. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the impact tables and the EMPr (**Appendices I & J**) are strictly implemented.

6.5. Assessment of Impacts on Aquatic Resources

The impacts on freshwater features associated with the development was assessed to ascertain the significance of potential impacts on the key drivers and receptors (hydrology, water quality, geomorphology, habitat, and biota) of these freshwater features. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details).

A total of five wetland features were identified within the potential area of influence (500m DWS regulated area). Of these five wetland features, only two wetlands are at risk of being impacted by the proposed development. Both are channelled valley-bottom wetland features. Channelled valley-bottom (CVB) wetland 1 is regarded as an important drainage feature within the micro-catchment area and flows primarily in a north-to-north-east direction to terminate directly into the Vals River. Channelled valley-bottom wetland 2 is a small wetland feature feeding into CVB wetland 1.

These freshwater resource features are mostly, naturally ephemeral systems, however artificial (anthropogenically) modifications to the morphology of sections of CVB wetland 1 are mainly due the construction of small, instream gravel dams, which tend to be inundated extended periods of time.

A dominant feature of the channelled valley bottom wetland is the patches of woody riparian habitats lining sections the outer edges of these valley bottom wetlands and portions of the channel. The height and density of the forb and tree/shrub layer is highly variable throughout the extent of the valley-bottom wetland.

The identified wetland features and the associated buffer are considered to be of high sensitivity and are demarcated as no-go areas, with a 32m no-go buffer implemented around them.

The proposed layout avoids all identified wetlands and their associated 30m buffer area. All wetlands and associated buffer are considered to be of high sensitivity and are demarcated as no-go areas (refer to **Figure 6.5**), with a 30m no-go buffer around them implemented.

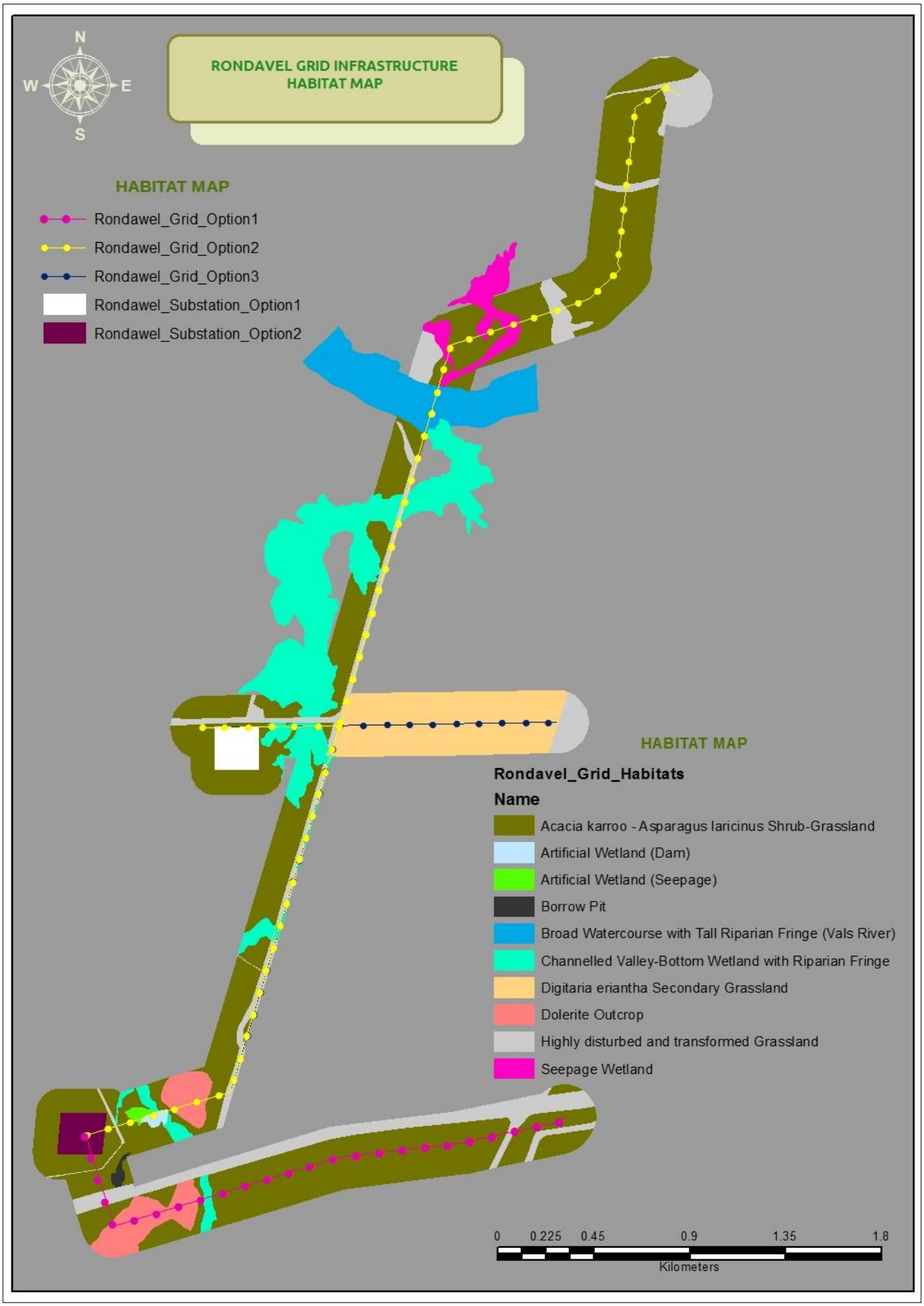

Figure 6.5: Combined ecological and aquatic sensitivity map for the Rondavel EGI.

6.5.1 Description of Aquatic Impacts

Potential impacts resulting from the proposed project would stem from a variety of different activities and risk factors associated with the site-establishment and operation phases of the project including the following:

Construction and Operation Phase:

- Site clearing for site establishment of the construction camp and for the construction of the foundations for the pylons required for the power line.
- Soil compaction and increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may potentially impact the downstream watercourses and aquatic habitats. These potential impacts may result in a reduction in the buffering capacities of the landscape during extreme weather events.
- Invasion by alien plants may be attributed to excessive disturbance to vegetation, creating a window of opportunity for the establishment of these alien invasive species. Also, regenerative material of alien invasive species may be introduced to the project site by machinery traversing through areas with such plants or materials that may contain regenerative materials of such species.
- The power line will require management and if this is not done effectively, it could impact adjacent intact areas through impacts such as erosion and the invasion of alien plant species.

6.5.2 Impact tables summarising the significance of impacts on aquatic resources during construction, operation, and decommissioning

6.5.2.1. On-site/Facility Substation

All wetland features are located outside of the development footprints for both substation options and wetland vegetation will thus not be directly impacted. However due to these substations' proximity to wetland features, these wetlands may however be impacted indirectly. Please note that impact tables below are applicable to both substation options.

Construction, Operation and Decommissioning Phase

Impact Nature: Impact on localized surface water quality due to construction, decommissioning and maintenance activities.

During pre-construction, construction, decommissioning and to a limited degree the operational phase, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet concrete, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope into the nearby wetland features.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (30)**	**Low (10)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	Low	Low

Can impacts be mitigated?	Yes, to a large extent.

Mitigation

» Implement appropriate measures to ensure strict use and management of all hazardous materials used on site
» Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter hydrocarbons from vehicles and machinery, cement during construction, etc.)
» Implement appropriate measures to ensure the containment of all contaminated water through careful run-off management on the development site.
» Implement appropriate measures to ensure strict control over the behaviour of construction workers.
» Working protocols incorporating pollution control measures (including approved method statements by the Contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.

Residual Impacts

Residual impacts will be negligible after appropriate mitigation.

Impact Nature: Increase in sedimentation and erosion within the freshwater resource features during construction, operation decommissioning.

For the construction and decommissioning phases this refers to the alteration in the physical characteristics of freshwater resource features as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks, within the wetland features' catchments, that are associated with construction activities. Possible ecological consequences associated with this impact may include:

» Deterioration in freshwater ecosystem integrity; and
» Reduction/loss of habitat for aquatic dependent flora & fauna.

For the wetlands, the primary threat related to such development (total clearing of vegetation and construction of hard standing surfaces), is increased run-off, sediment inputs, as well as turbidity. This is especially during vegetation clearing and excavation activities. An increase in volume and velocity of surface water flow from the cleared construction areas and hard standing surfaces, into the wetlands, may result in erosion and an increase in sediment inputs into the wetlands in the vicinity of the development area.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Very Short (1)
Magnitude	Moderate (6)	Small (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (33)**	**Low (8)**
Status	Negative	Slightly negative
Reversibility	Moderate	High
Irreplaceable loss of resources	Local and potential loss of downstream resources	Unlikely
Can impacts be mitigated?	Yes, to a large extent.	

Mitigation

As all identified wetlands are located outside of the development footprint, most potential impacts on the wetlands will be of an indirect nature and as such the following mitigation measures, although not directly associated with the wetlands, are recommended in order to avoid the encroachment of erosion into these habitats or a reduction in water quality due to an increase in sedimentation into these systems:

» Any erosion observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
» Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.

» Topsoil should be removed and stored separately and should be re-applied where appropriate as soon as possible, to encourage and facilitate the rapid regeneration of the natural vegetation on cleared areas. » Where practical, phased development and vegetation clearing should be applied so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods. » Construction of gabions and other stabilisation features to prevent erosion if deemed necessary. » There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased. » All wetland features and their recommended buffer areas are regarded as No-Go areas in terms of this aspect of the grid infrastructure development. » Vegetation within the buffer areas should be preserved and maintained.
Residual Impacts Due to the extent and nature of the development, residual impacts are unlikely to occur if the recommended mitigation measures are implemented.

6.5.2.2. Grid Connection Options

In terms of impacts on freshwater resource/aquatic features; grid options 1 and 3 will have very similar potential impacts on freshwater resource features and as such, these options have been grouped together. However, due to the extent of important and sensitive freshwater resource features that will be crossed by Grid Option 2, this option will have a more significant impact on freshwater resource features and as such, this option has been assessed separately.

Impact Nature: Loss of riparian systems and disturbance of the alluvial water courses during the construction, operation, and decommissioning phase.

The physical removal/disturbance of the narrow strips of riparian zones and disturbance of any alluvial watercourses by pylon construction and road crossings, being replaced by hard engineered surfaces during construction. This biological impact would however be localised, as a large portion of the remaining catchment would remain intact.

According to the current layouts/routes, Options 1 and 3 will only cross a few smaller freshwater resource features, whilst Option 2 will cross numerous freshwater resource features including the Vals River and its associated riparian fringe.

These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in loss and/or damaged vegetation.

	Alternatives 1 and 3		**Alternative 2**	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Small (2)	Moderate (6)	Small (3)
Probability	Highly Probable (4)	Probable (3)	Highly Probable (4)	Probable (3)
Significance	**Medium (36)**	**Low (21)**	**Medium (44)**	**Low (24)**
Status	Negative	Negative	Negative	Negative
Reversibility	Low – Destruction of drainage systems and associated vegetation will not be remedied easily.	Low – Destruction of drainage systems and associated vegetation will not be remedied easily.	Low – Destruction of drainage systems and associated vegetation will not be remedied easily.	Low – Destruction of drainage systems and associated vegetation will not be remedied easily.

Irreplaceable loss of resources	Local loss of resources	Very limited loss of local resources	Local loss of resources	Very limited loss of local resources
Can impacts be mitigated?	Yes, to a large degree			

Mitigation:

» No pylons must be placed within the delineated wetland/riparian habitats; however, the power line may span these features.
» Use as far as possible the existing roads.
» Where watercourse crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint).
» No vehicles must refuel within watercourses/ riparian vegetation.
» With micro adjustments of the pylon positions, it is possible to place pylons outside of any wetland habitats.
» Any activities within the wetlands apart from the spanning of the powerline should be avoided and the wetland features should, for all other activities be regarded as no-go areas.

Residual Impacts

Possible impact on the remaining catchment due to changes in run-off characteristics in the development site. However, due to the extent of this development this potential residual impact is regarded as low.

Impact Nature: Impact on localized surface water quality during the construction, operation, and decommissioning phase.

During pre-construction, construction, decommissioning and to a limited degree the operational phase (during maintenance), chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet concrete, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems.

	Alternatives 1 and 3		**Alternative 2**	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Extent	Local (2)	Local (1)	Local (2)	Local (1)
Duration	Long-term (2)	Short-term (2)	Long-term (2)	Short-term (2)
Magnitude	Minor (4)	Small (2)	Moderate (6)	Small (2)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	**Low (24)**	**Low (10)**	**Medium (30)**	**Low (10)**
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	High	Moderate	High
Irreplaceable loss of resources	Local and potential loss of downstream resources	Unlikely	Local and potential loss of downstream resources	Unlikely
Can impacts be mitigated?	Yes, to a large degree			

Mitigation:

» Implement appropriate measures to ensure strict use and management of all hazardous materials used on site
» Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter hydrocarbons from vehicles and machinery, cement during construction, etc.)
» Implement appropriate measures to ensure the containment of all contaminated water through careful run-off management on the development site.
» Implement appropriate measures to ensure strict control over the behaviour of construction workers.

» Working protocols incorporating pollution control measures (including approved method statements by the Contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.

Residual Impacts

Residual impacts will be negligible after appropriate mitigation.

Impact Nature: Increase in sedimentation and erosion during the construction, operational and decommissioning phase.

For the construction and decommissioning phases this refers to the alteration in the physical characteristics of freshwater resource features as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks that are associated with construction activities. Possible ecological consequences associated with this impact may include:

» Deterioration in freshwater ecosystem integrity; and
» Reduction/loss of habitat for aquatic dependent flora & fauna.

This may furthermore, influence water quality downstream.

	Alternatives 1 and 3		**Alternative 2**	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Very Short (1)	Long-term (4)	Very Short (1)
Magnitude	Minor (3)	Small (1)	Moderate (5)	Small (1)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Improbable (2)
Significance	**Medium (32)**	**Low (6)**	**Medium (40)**	**Low (6)**
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources	Very limited loss of local resources	No irreplaceable loss of local resources	Very limited loss of local resources	No irreplaceable loss of local resources
Can impacts be mitigated?	Yes, to a large extent			

Mitigation:

» Use only the existing service roads when crossing any watercourses/wetlands.
» Any erosion observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
» Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
» Topsoil should be removed and stored separately and should be re-applied where appropriate as soon as possible, to encourage and facilitate the rapid regeneration of the natural vegetation on cleared areas.
» Where practical, phased development and vegetation clearing should be applied so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods.
» Construction of gabions and other stabilisation features to prevent erosion if deemed necessary.
» There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.

Residual Impacts

Due to the extent and nature of the development, residual impacts are unlikely to occur if the recommended mitigation measures are implemented.

Impact Nature: Impact on riparian systems through the increase in surface runoff on riparian form and function during the operational phase.

The addition of hardened and compacted areas around the pylons. Service roads have the potential to further increase areas of hardening. The aforementioned will increase the runoff generated on site due to the addition of areas of hard surfaces and could lead to increased erosion risk, potentially reducing or disturbing important/sensitive downstream riparian habitats.

	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Small (1)	Moderate (5)	Small (2)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Improbable (2)
Significance	**Medium (36)**	**Low (12)**	**Medium (40)**	**Low (14)**
Status	Negative	Negative	Negative	Negative
Reversibility	Low – Destruction of drainage systems and associated vegetation will not be remedied easily.	Low – Destruction of drainage systems and associated vegetation will not be remedied easily.	Low – Destruction of riparian vegetation will not be remedied easily.	Low – Destruction of riparian vegetation will not be remedied easily.
Irreplaceable loss of resources	Local loss of resources	Very limited loss of local resources	Local loss of resources	Very limited loss of local resources
Can impacts be mitigated?	Yes, to a large degree			

Mitigation:

» Any erosion observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» Construction of gabions and other stabilisation features to prevent erosion if deemed necessary.

Residual Impacts

Altered streambed morphology. Due to the extent and nature of the development this residual impact is unlikely to occur.

6.5.3 Comparative assessment of the corridor and substation alternatives

A summary of the assessment of impacts done for the substation options/alternatives is detailed below and includes the identification of the preferred alternative, in terms of its potentials impacts on freshwater/aquatic features. The overall impact significance provided in the table below is essentially a combination of the aspects assessed above and their impact significance ratings, with the implementation of mitigation measures.

Take note that "not-preferred" does not necessarily mean that such an option contains a fatal flaw and may not be considered at all (unless specified as such). If not specified otherwise, it merely means that in terms of the available options this is not the most preferable and may need some layout adjustments/amendments in order to avoid any sensitive features.

On-site Substation Alternatives

Alternative	Preference	Overall Impact Significance in terms Freshwater/Aquatic Features	Reasons
Substation Option 1	Most Favourable/Preferred	Both options are very similar in terms of their potential impacts on freshwater resource features. Mainly Medium prior to Mitigation and Low/Unlikely with Mitigation considered.	» Both substation options are located outside of the boundaries of delineated wetland features, however both options are located in relatively close proximity to such features (still outside of the recommended buffer areas). » Due to the above reason, both options are regarded as favourable; however, it is when one takes into account the power line route options from these substations, that Option 1, edges out the second option as the preferred location. This is because substation option 1, along with grid route option 1 when combined have the least significant impact on the environment as the least amount of freshwater resources will have to be crossed (only once).
Substation Option 2	Favourable		

Grid Corridor Alternatives

Alternative	Preference	Overall Impact Significance in terms Freshwater/Aquatic Features	Reasons
Grid Option 1	Most Favourable/Preferred	Both options are very similar in terms of their potential impacts on freshwater resource features. Mainly Low to Medium prior to Mitigation and Low/Unlikely with Mitigation considered.	» All three grid options will cross freshwater resource features; however, options 1 and 3 will cross only smaller features with option 1 crossing such features the least amount. » Route option 2 will cross freshwater resource features numerous times, including a broad section of the Vals River. » If grid route option 1 were to be selected, along with substation option 1, potential impacts on freshwater will be the lowest as; * The least amount of freshwater resource will have to be crossed (only once). » Due to the reasons provided above, Grid Route Option 1 is regarded as the Preferred option
Grid Option 2	Not Preferred		
Grid Option 3	Favourable	Medium prior to mitigation and low with mitigation considered.	

6.5.4 Implications for project implementation

The Freshwater Resources Assessment identified a number of wetland areas within the project site and were defined as no-go areas together with their defined 30m buffer zones. All impacts were determined low negative with the implementation of mitigation measures, with no remaining high or moderate significance

impacts determined for the project post-mitigation. Based on the outcomes of the study, it is the specialist's opinion that the proposed Vrede EGI be authorised from a surface water resource perspective.

6.6. Assessment of Impacts on Heritage (including archaeological and palaeontological resources)

Impacts on heritage resources may occur due to loss of archaeological and palaeontological resources during construction activities associated with the Rondavel EGI. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix F**).

Archaeology and Heritage Resources

The area proposed for the development of the Rondavel SEF and EGI has yielded some cultural remains but with varied value and preservation (refer to **Figure 6.6**). The isolated and scattered lithic artefacts (RDW001, RDW003 and RDW004) are typical of a deflated landscape and have very limited cultural value given that they have been accumulated and modified by various natural processes to their current ex situ state. The stone piles found in the southwest of the property (RDW002) are more noteworthy (Grade IIIA) and require sensitive treatment. The dense vegetation on site limited comprehensive coverage of the landscape during the heritage survey and so caution should be practiced when clearing the vegetation during construction. As such, it is recommended that a no development buffer of 100m is implemented around RDW002 in order to mitigate the risk of disturbing the possible human remains identified here.

However, the generally shallow nature of the soils and heavy disturbance of the landscape for previous use (in dam and road construction) limit the potential for long, in situ sequences of archaeological significance. No archaeological resources were identified in any of the proposed power line routes.

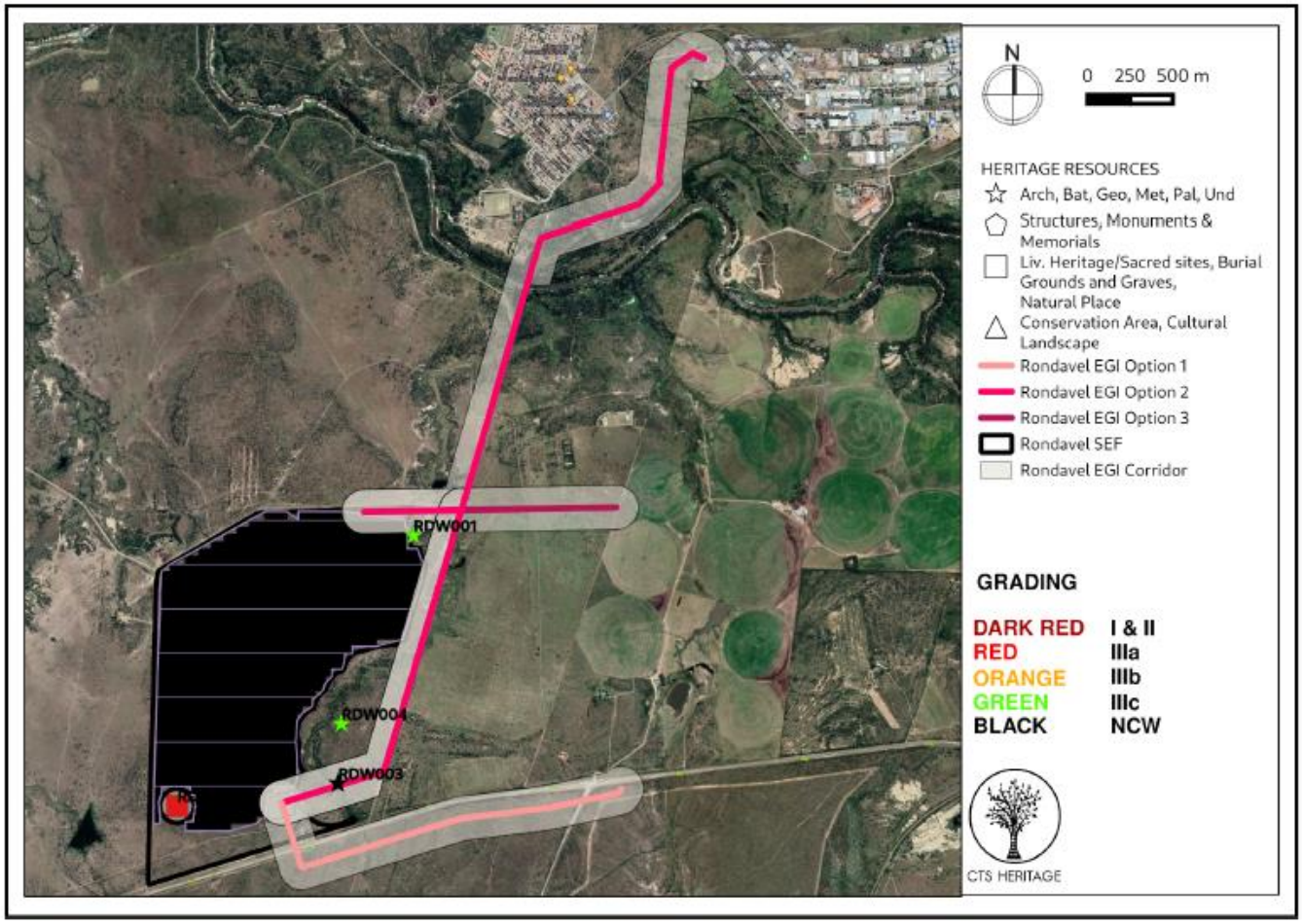

Figure 6.6: Heritage resources p identified within the development area.

Palaeontology

No fossils were identified on site, except for a few possible fragments of petrified wood. These were ex situ, and their stratigraphic origin could not be determined. Based on the geology of the proposed development area as well as the current palaeontological record, it is anticipated that the impact of the development will be HIGH to VERY HIGH due to the likely presence of highly fossiliferous Adelaide Subgroup and Volksrust Formation mudstones and shales underlying almost the entirety of both properties, underneath the reworked soil layers.

There is very little probability that fossils will be present in the Jurassic dolerites. However, the majority of the Rondavel properties are underlain by highly fossiliferous sediments (the Adelaide Subgroup and Volksrust Formation) of high palaeontological sensitivity. The land, having been reworked extensively, is covered by a thick layer of soil, making the underlying bedrock and geology difficult to identify. However, the presence of fresh outcropping Adelaide mudstones on the Rondavel property and this layer being exposed at the bottom of a porcupine den, indicates the high likelihood of these highly fossiliferous layers being disturbed with construction requiring excavation exceeding 1m in depth. It is therefore recommended that palaeontological monitoring of excavations takes place during the construction phase of the proposed development of the Rondavel SEF grid connection. Please refer to **Figure 6.7** for a depiction of the palaeontological sensitivity of the proposed project site.

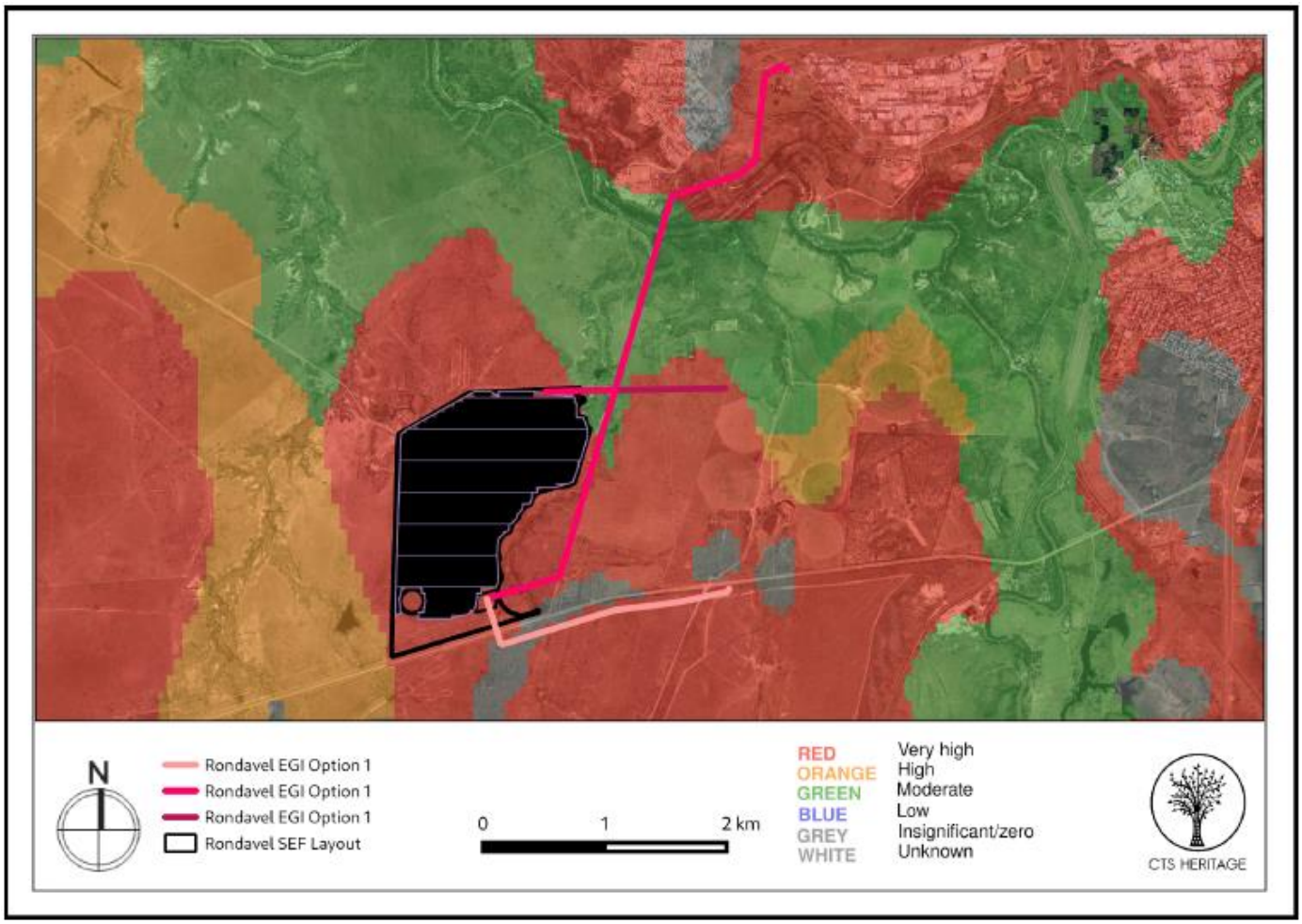

Figure 6.7: Palaeontological sensitivity of the project site.

6.6.1 Description of Heritage Impacts (including archaeology and palaeontology)

The heritage specialist study concluded that the area proposed for the Rondavel EGI has low archaeological sensitivity and high to very high palaeontological sensitivity. No archaeological and palaeontological resources of significance were recorded within the area proposed for the EGI. As such, no impact to significant archaeological resources is anticipated for the EGI. The presence of fresh outcropping Adelaide mudstones on the Rondavel property and this layer being exposed at the bottom of a porcupine den, indicates the high likelihood of these highly fossiliferous layers being disturbed with construction requiring excavation exceeding 1m in depth

It must be noted that archaeological and palaeontological impacts are only expected to occur during the construction phase when groundworks are undertaken. No impacts are expected during the operation and decommissioning phases.

6.6.2 Impact table summarising the significance of the impact on heritage and palaeontological resources during construction

The following impacts were determined by the specialist for the corridor alternatives. Please note these impacts include consideration of the substation component of the EGI as applicable. The impact tables provided in this section apply to all alternatives, as do the mitigation measures.

Nature: It is possible that buried archaeological and palaeontological resources may be impacted by the proposed development.		
	Archaeology	**Palaeontology**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local (1)	Local (1)
Duration	Long-term (5)	Long-term (5)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Definite (5)
Significance	**Medium (36)**	**High (70)**
Status (positive or negative)	Negative	Negative
Reversibility	Low - any impacts to heritage resources that do occur are irreversible	Low - any impacts to heritage resources that do occur are irreversible
Irreplaceable loss of resources?	Unlikely	Likely
Can impacts be mitigated?	Yes – with mitigation, significance is reduced to **Low (11)**	Yes – with mitigation, significance is reduced to **Low (14)**
Mitigation: » A no-go buffer of 100m must be implemented around RDW001 and RDW004. » All excavations into bedrock must be monitored by a suitably qualified palaeontologist and a report on the outcomes of the monitoring activities must be submitted to SAHRA on completion of the development of the EGI.		
Residual Risks: » All other excavation activities are subject to the Palaeontological Chance Finds Procedure. » Should any previously unrecorded archaeological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.		

6.6.3 Comparative assessment of the corridor and substation alternatives

Corridor Alternatives

There is no preferred alternative in terms of impacts to heritage resources. All three proposed options are likely to have similar impacts to heritage resources on condition that the recommended mitigation measures are adhered to.

Substation Alternatives

There is no preferred alternative in terms of impacts to heritage resources. All two proposed options are likely to have similar impacts to heritage resources on condition that the recommended mitigation measures are adhered to.

6.6.4 Implications for Project Implementation

The area proposed for the development of the Rondavel EGI was assessed, and it was noted that the area proposed for development is somewhat overgrown which limited archaeological visibility. However, the generally shallow nature of the soils and heavy disturbance of the landscape for previous use (in dam and road construction) limit the potential for long, in situ sequences of archaeological significance. Four observations of varied cultural significance were recorded, two of which are located in close proximity to the proposed grid connection corridors. Based on the outcomes of this assessment, it is not anticipated that the proposed development of the EGI will negatively impact on any archaeological heritage resources on condition that the recommendations articulated below are implemented.

The overall palaeontological sensitivity of the areas proposed for the Rondavel EGI is HIGH to VERY HIGH. The palaeontological field survey identified a number of areas of possibly fossiliferous outcrops of the underlying bedrock. In addition, examples of fossilised wood were identified associated with Outcrop 2 located within the area proposed for the Rondavel SEF. Although ex situ, these findings corroborate the high palaeontological sensitivity of the area. In general, it is preferred that excavations take place into fossiliferous bedrock rather than avoiding impact as this allows palaeontologists access to otherwise inaccessible palaeontological resources. The negative impacts of such excavations to palaeontological resources are managed through careful monitoring of excavations into bedrock by a suitably qualified palaeontologist. It is therefore preferable that excavations do indeed take place on condition that these excavations are properly monitored.

There is no objection to the proposed development on heritage grounds on condition that:
» There is no preferred alternative in terms of impacts to heritage resources.
» A no-development buffer zone of 100m is implemented around RDW001 and RDW004.
» All excavations into bedrock are monitored by a suitably qualified palaeontologist and a report on the outcomes of the monitoring activities must be submitted to SAHRA on completion of the development of the facility.
» All other excavation activities are subject to the Palaeontological Chance Finds Procedure.
» Should any previously unrecorded archaeological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.

6.7. Assessment of Visual Impacts

Impacts on visual receptors will occur during the undertaking of construction activities and the operation of Rondavel EGI. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix G**).

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed grid connection infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer: regularity of sighting, cultural background, state of mind, purpose of sighting, etc. which would create a myriad of options.

Viewer incidence is calculated to be the highest along the arterial and secondary roads within the study area. Travellers using these roads may be negatively impacted upon by visual exposure to the Grid Connection Infrastructure.

Additional sensitive visual receptors are located at the farm residences (homesteads) throughout the study area. It is expected that the viewer's perception, unless the observer is associated with (or supportive of) the solar energy facility and associated infrastructure, would generally be negative.

Due to the generally remote location of the proposed Grid Connection Infrastructure, there are only a few potential sensitive visual receptors located within a 6km radius of the proposed infrastructure (refer to **Figure 6.8).** These are residents of, or visitors to:

- Southern outlying parts of Brent Park
- Nasenby Thorns
- Blomtuin
- Retreat
- Fraaiuitsig
- Northern part of the Boslaagte Nature Reserve

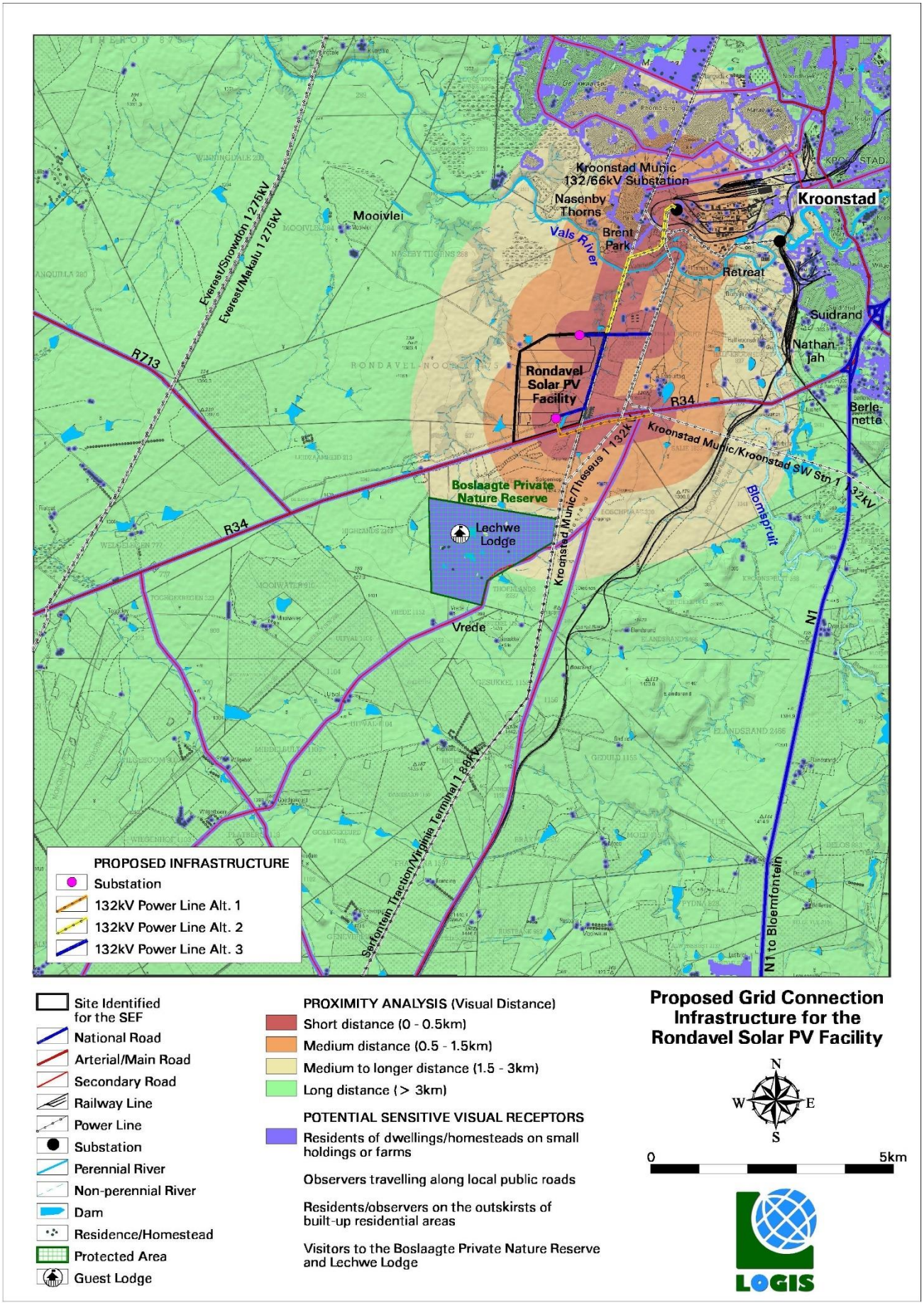

Figure 6.8: Proximity analysis and potential sensitive visual receptors.

A visual impact index was generated taking into account visual exposure, viewer incidence/perception and visual distance of the proposed Rondavel EGI. The index indicates that potentially sensitive visual receptors within a 0.5km radius of the Grid Connection Infrastructure may experience visual impacts of high magnitude. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; moderate within a 0.5 – 1km radius (where/if sensitive receptors are present) and low within a 1 – 3km radius (where/if sensitive receptors are present). Receptors beyond 3km are expected to have a very low potential visual impact.

The magnitude of potential visual impact is provided below for the three alternative grid corridors. The visual impact indexes and potentially affected sensitive visual receptors are indicated in **Figure 6.9** to **Figure 6.11**.

Power line Alternative 1

The Grid Connection Infrastructure may have a visual impact of high magnitude on the following observers:

» Observers travelling along the:
  * R34 arterial road south of the substation and north of the power line

The Grid Connection Infrastructure may have a visual impact of moderate magnitude on the following observers:

» Residents of/or visitors to:
  * Fraaiuitsig
  * Northern section of the Boslaagte Nature Reserve

Power line Alternative 2

The Grid Connection Infrastructure may have a visual impact of high magnitude on the following observers:

» Residents of/or visitors to:
  * Southern outlying area of the Brent Park residential area

The Grid Connection Infrastructure may have a visual impact of moderate magnitude on the following observers:

» Residents of/or visitors to:
  * Nasenby Thorns
  * Blomtuin
  * Retreat

Power line Alternative 3

The Grid Connection Infrastructure may have a visual impact of moderate magnitude on the following observers:

» Residents of/or visitors to:
  * Fraaiuitsig

No visual impact of high magnitude is envisaged for this alternative.

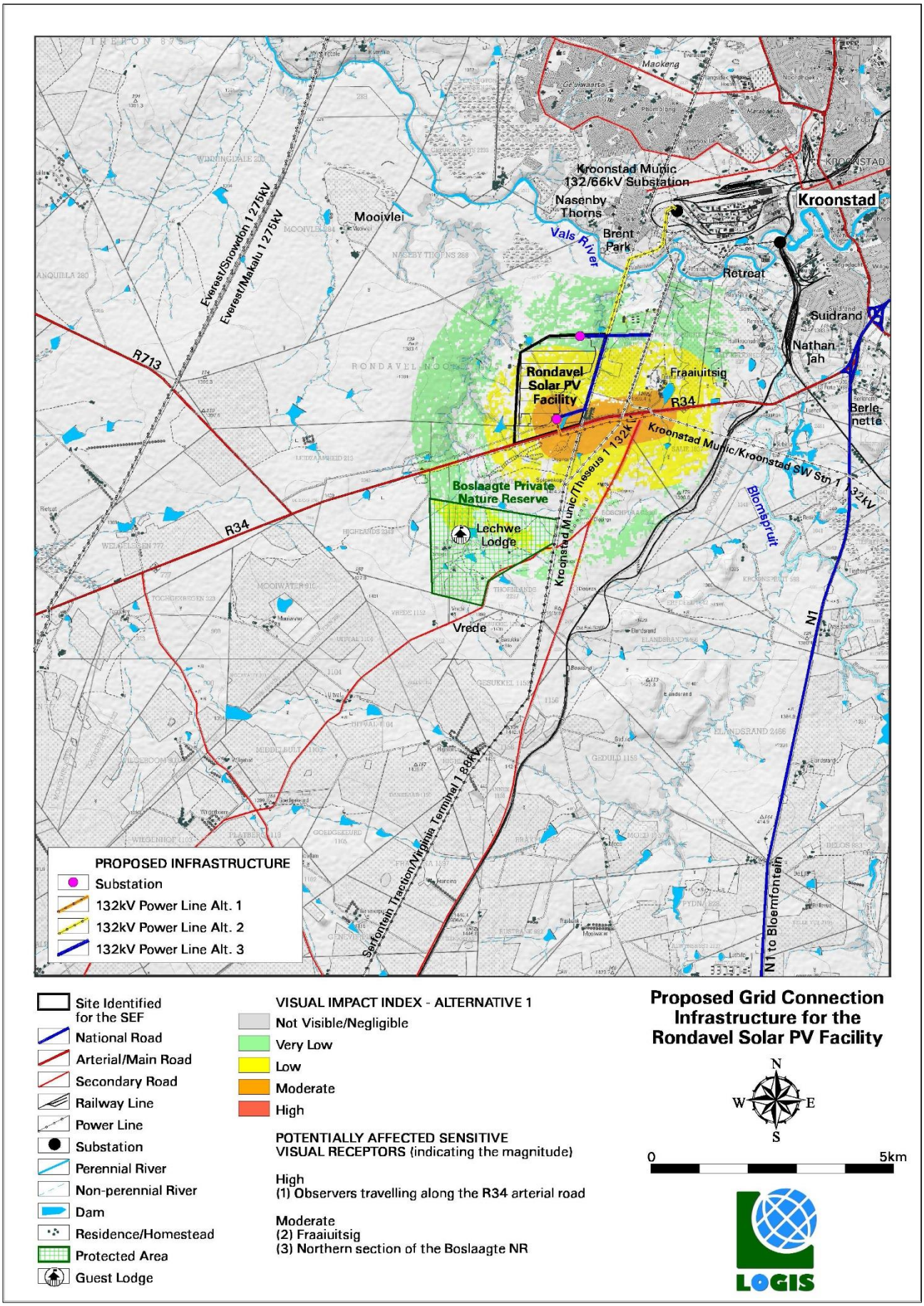

Figure 6.9: Visual impact index and potentially affected sensitive visual receptors – Alternative 1.

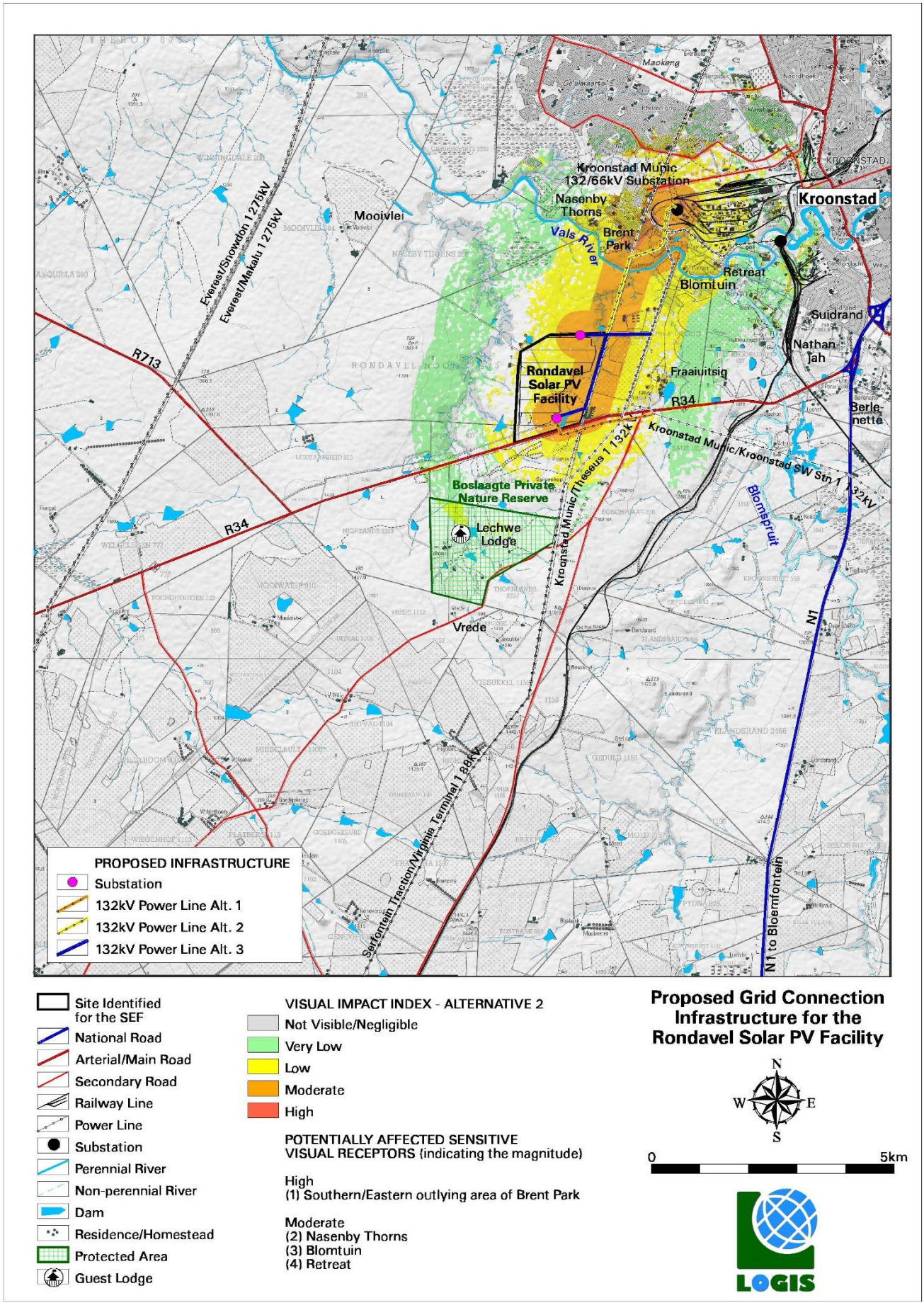

Figure 6.10: Visual impact index and potentially affected sensitive visual receptors – Alternative 2.

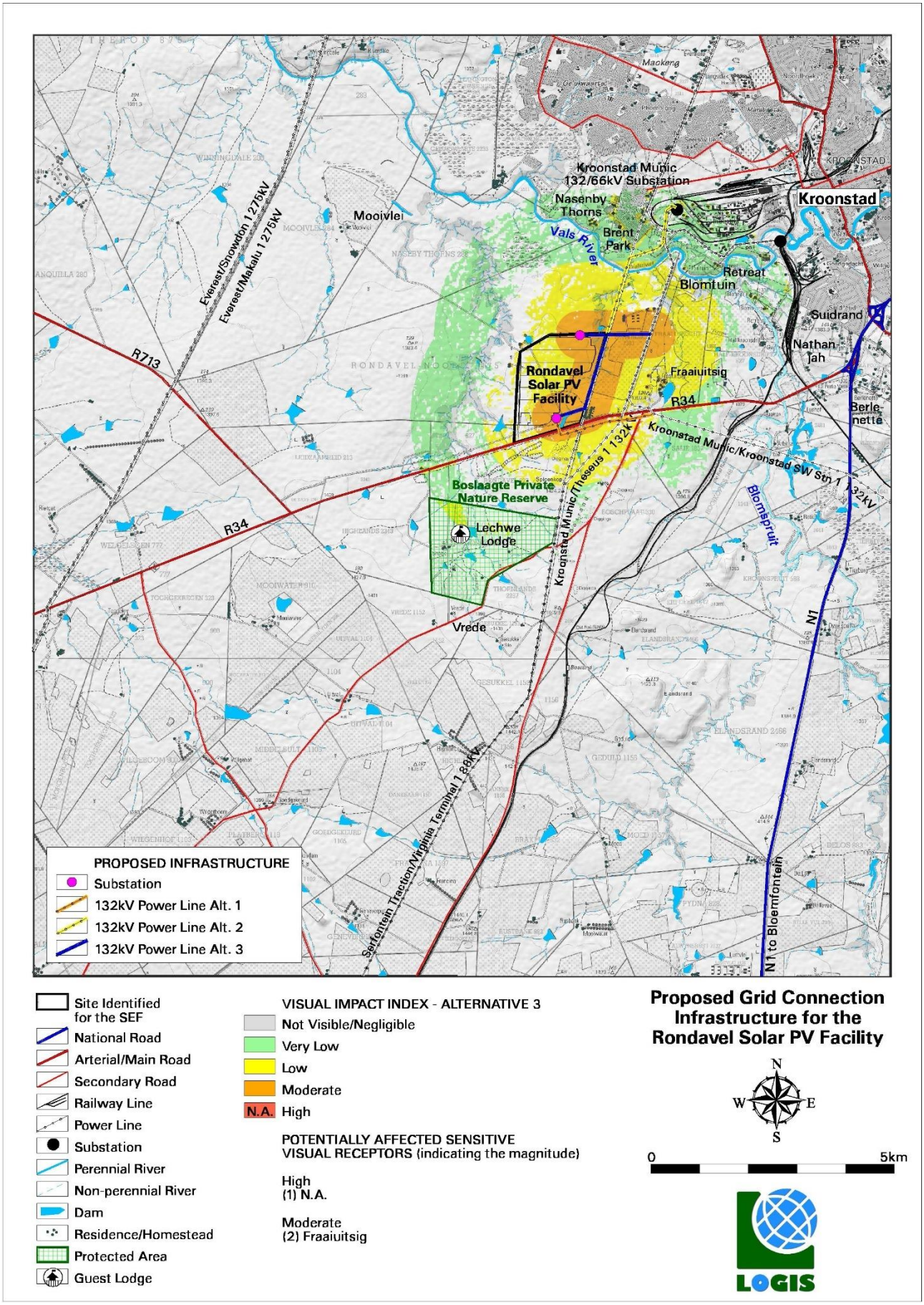

Figure 6.11: Visual impact index and potentially affected sensitive visual receptors – Alternative 3.

6.7.1 Description of the Visual Impacts

Visual impacts associated with the development of the Rondavel EGI include the following:

» Potential impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.
» Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase.
» Potential visual impact on sensitive visual receptors within the region (0.5 – 3km) radius) during the operational of the grid connection infrastructure.
» The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.

6.7.2 Impact tables summarising the significance of the visual impacts during construction, operation, and decommissioning

The impacts assessed below apply to the development area assessed for Rondavel EGI. The impacts were determined by the specialist for the respective corridor alternatives. Please note these impacts include consideration of the substation component of the EGI as applicable.

Construction, Operation and Decommissioning Phase

Nature of Impact: Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed Grid Connection Infrastructure.

During construction, there may be an increase in heavy vehicles utilising the roads to the power line that may cause, at the very least, a visual nuisance to other road users and landowners in the area.

Construction activities may potentially result in a low (significance ratings = 16 and 20) temporary visual impact both before and after mitigation.

	Alt. 1	***Alt. 2***	***Alt. 3***
Extent	Local (2)	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)	Low (4)
Probability	Improbable (2)	Improbable (2)	Improbable (2)
Significance	**Low (20)**	**Low (20)**	**Low (16)**
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	Yes		

Mitigation:

Planning:

» Retain and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Construction:

» Ensure that vegetation is not unnecessarily removed during the construction phase.
» Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.

» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
» Reduce and control construction dust using appropriate and effective dust suppression techniques as and when required (i.e., whenever dust becomes apparent).
» Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
» Rehabilitate all disturbed areas immediately after the completion of construction works.

Residual impacts:
None, provided rehabilitation works are carried out as specified.

Nature of Impact: Visual impact on observers travelling along the roads and residents at homesteads in close proximity to the power line structures.

The Power Line Alternatives 2 and 3 are expected to have a low visual impact (significance rating = 28 and 24) on observers within a 0.5km radius of the power line structures.

Power Line Alternative 1 (including the substation) may have a visual impact of moderate significance (rating = 42) as this alternative will be located adjacent to the R34 arterial road.

No mitigation of this impact is possible (i.e., the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

	Alt. 1	***Alt. 2***	***Alt. 3***
Extent	Local (2)	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Improbable (2)
Significance	**Moderate (42)**	**Low (28)**	**Low (24)**
Status (positive, neutral or negative)	Negative	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	No		

Mitigation / Management:
Planning:
» Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint.
Operations:
» Maintain the general appearance of the infrastructure.
Decommissioning:
» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual impacts:
The visual impact will be removed after decommissioning, provided the power line infrastructure is removed. Failing this, the visual impact will remain.

Nature of Impact: Visual impact on observers travelling along the roads and residents at homesteads in close proximity to the power line structures.

The 132kV power line (including substation) will have a low visual impact (significance rating = 22) on observers travelling along the roads and residents of homesteads within a 0.5 - 3km radius of the Grid Connection Infrastructure.

No mitigation of this impact is possible (i.e., the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

	Alt. 1	***Alt. 2***	***Alt. 3***
Extent	Local (2)	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Improbable (2)
Significance	**Moderate (42)**	**Low (28)**	**Low (24)**
Status (positive, neutral or negative)	Negative	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	No		

Mitigation / Management:

Planning:

» Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint.

Operations:

» Maintain the general appearance of the infrastructure.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual impacts:

The visual impact will be removed after decommissioning, provided the power line infrastructure is removed. Failing this, the visual impact will remain.

Nature of Impact: The potential impact of the development of the proposed Grid Connection Infrastructure on the sense of place of the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The greater environment has a mixed rural and developed character, with limited natural land remaining due to agricultural activities, power lines and urban development, especially to the north-east.

The anticipated visual impact of the proposed Grid Connection Infrastructure on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance.

	Alt. 1	***Alt. 2***	***Alt. 3***
Extent	Regional (3)	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)	Improbable (2)
Significance	**Low (22)**	**Low (22)**	**Low (22)**
Status (positive, neutral or negative)	Negative	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented		

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.
Residual impacts: The visual impact will be removed after decommissioning, provided the Grid Connection Infrastructure is removed. Failing this, the visual impact will remain.

6.7.3 Comparative assessment of the corridor and substation alternatives

Corridor Alternatives

All three of the assessed alternatives are considered acceptable from a visual impact perspective. However, of the three alternatives Alternative **3** is marginally preferred as its impact significance ratings were consistently lower than those of Alternatives 1 and 2.

Substation Alternatives

Both assessed substation alternatives are considered acceptable from a visual perspective.

6.7.4 Implications for Project Implementation

The findings of the Visual Impact Assessment undertaken for the proposed Grid Connection Infrastructure for the Rondavel Solar PV Facility indicates that the visual environment surrounding the power line and substation, especially within a 0.5km radius, may be visually impacted upon for the anticipated operational lifespan of the grid connection infrastructure.

This impact is applicable to the proposed Grid Connection Infrastructure and to the potential cumulative visual impact of the power line in association with existing power line infrastructure within the region.

The following is a summary of impacts remaining, assuming mitigation as recommended is exercised:

- During construction, there may be an increase in heavy vehicles utilising the roads to the power line that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in a low temporary visual impact after mitigation (all alternatives).
- Power Line Alternatives 2 and 3 are expected to have a low visual impact on observers within a 0.5km radius of the power line structures. The visual impact will largely be absorbed by the presence of existing power lines.
- Alternative 1 may have a visual impact of moderate significance on observers within a 0.5km radius as this alternative will be located adjacent to the R34 arterial road.
- The Grid Connection Infrastructure (all alternatives) is expected to have a low visual impact on observers travelling along the roads and residents of homesteads within the region (within a 0.5 - 3km radius of the structures).
- The anticipated visual impact of the proposed Grid Connection Infrastructure on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance (all alternatives)

The anticipated visual impacts listed above (i.e., post mitigation impacts) range from moderate to low significance. No visual impacts of a high significance are expected to occur. Anticipated visual impacts on sensitive visual receptors in close proximity to the power line are not considered to be fatal flaws for the proposed project.

Considering all factors, it is recommended that the development of the Grid Connection Infrastructure as proposed be supported; subject to the implementation of the recommended mitigation measures and EMPrs.

6.8. Assessment of Social Impacts

Impacts on the social environment are expected during both the construction and operation phases. Potential social impacts and the relative significance of the impacts associated with the development of the Rondavel EGI are summarised below (refer to **Appendix H**).

The development of renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy and associated energy distribution infrastructure is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The development of the proposed EGI is therefore supported by key policy and planning documents.

The social impacts associated with substations will be negligible. The focus of the SIA is therefore on the 132 kV power lines. The findings of the SIA also indicate that the negative social impacts associated with the construction and operation of each of the three overhead power line alternatives will be similar. The significance ratings therefore apply to all three alternatives.

6.8.1 Description of the Social Impacts

The following positive and negative impacts have been identified and assessed for the project. The nature and significance of the social impacts associated with the grid infrastructure and proposed alternatives will be similar due to the proximity of both alternatives to one another. Separate assessments have therefore not been undertaken. The significance ratings therefore apply to all alternatives considered for the grid infrastructure.

<u>Construction Phase:</u>
Positive:

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Negative:

- Impacts associated with the presence of construction workers on local communities.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Risks posed to farming activities by construction workers.

<u>Operations Phase:</u>
Positive:

- Improve energy security and establishment of energy infrastructure.
- Creation of employment opportunities.

Negative:

- The visual impacts and associated impact on sense of place.
- Risks posed to farming activities by maintenance workers.
- Impact on Tourism.

6.8.2 Impact tables summarising the significance of the social impacts during construction, operation, and decommissioning (with and without mitigation)

Construction Phase

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local-Regional (1)	Local-Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Low (20)**	**Low (28)**
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	

Enhancement:

In order to enhance local employment and business opportunities associated with the construction phase, the following measures should be implemented:

Employment

- Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
- Before the construction phase commences the proponent should meet with representatives from the MLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should liaise with the MLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.
- Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.

» The MLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

Residual impacts:
Opportunity to up-grade and improve skills levels in the area.

Nature: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site

	Without Mitigation	**With Mitigation**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local (3)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (33)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

» The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area.
» The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
» Traffic and activities should be strictly contained within designated areas.
» Strict traffic speed limits must be enforced on the farm.
» All farm gates must be closed after passing through.
» Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties.
» The proponent should consider the option of establishing a MF that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.
» The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors' and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
» The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
» Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.

» Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation. » It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.
Residual impacts: None, provided losses are compensated for.

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local (4)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	Yes, compensation paid for stock and crop losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: » The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. » The option of establishing a fire-break around the perimeter of the site prior to the commencement of the construction phase should be investigated. » Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. » Smoking on site should be confined to designated areas. » Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are effectively managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months. » Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. » Contractor to provide fire-fighting training to selected construction staff. » No construction staff, with the exception of security staff, to be accommodated on site overnight. » As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
Residual impacts: None, provided losses are compensated for.		

Nature: Potential noise, dust and safety impacts associated with construction related activities and traffic		
	Without Mitigation	**With Mitigation**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local (2)	Local (1)
Duration	Short-term (2)	Short-term (2)

Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (15)**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

» The movement of heavy vehicles associated with the construction phase should be timed to avoid times of the week, such as weekends, when the volume of traffic travelling along the R34 may be higher.
» Construction operations should be planned to minimise the total area cleared at any given time.
» Cleared areas should be rehabilitated once the construction phase has been completed.
» Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
» All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

Residual impacts:

If damage to local farm roads is not repaired, then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage.

Operation Phase

Nature: Development of infrastructure to improve energy security and reduce reliance on coal		
	Without Mitigation	**With Mitigation**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	**Medium (56)**	**High (70)**
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO_2 emissions and impact on climate change
Can impact be enhanced?	Yes	

Enhancement:

» Implement a skills development and training programme aimed at maximising the number of employment opportunities for local community members.
» Maximise opportunities for local content, procurement, and community shareholding.

Residual impacts:

Improved energy security and benefit for economic development and investment, reduction in CO_2 emission and reduction in water consumption for energy generation.

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Very Low (1)	Very Low (1)

Probability	Probable (3)	Highly Probable (4)
Significance	**Low (18)**	**Low (28)**
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	

Enhancement:

Employment

» Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
» Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
» Before the construction phase commences the proponent should meet with representatives from the MLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.
» The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

» The proponent should liaise with the MLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.
» Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
» The MLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the operations phase.

Residual impacts:
Creation of employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area.

Nature: Potential risk to safety to farming operations and livestock associated with the presence of maintenance workers on the site.

	Without Mitigation	**With Mitigation**
	Option 1, 2 and 3 (Grid Corridors) and Substation Alternatives 1 and 2	
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	**Low (28)**	**Low (20)**
Status	Negative	Negative

Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

» Affected property owners should be notified in advance of the timing and duration of maintenance activities.
» Maintenance teams must ensure that all farm gates must be closed after passing through.
» Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities.
» Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations.
» Strict traffic speed limits must be enforced on the farm.
» No maintenance workers should be allowed to stay over-night on the affected properties.

Residual impacts:

None provided losses are compensated for.

Nature: Visual impact associated with the proposed grid connection infrastructure and the potential impact on the area's rural sense of place.

	Without Mitigation	**With Mitigation**
Extent	Local-Regional (3)	Local-Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (22)**	**Low (22)**
Status	Negative	Negative
Reversibility	Yes, lines can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

The recommendations contained in the Final VIA should also be implemented.

Residual impacts:

The visual impact will be removed after decommissioning, provided the Grid Connection Infrastructure is removed. Failing this, the visual impact will remain

Nature: Potential impact of the power lines on local tourism operations, specifically the Boslaagte Private Nature Reserve and Lechwe Lodge. The impact will be linked to the potential visual impacts and the perception of people visiting the reserve and lodge.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes, EGI can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Enhancement:

The recommendations contained in the Final VIA should be implemented.

Residual impacts:

Potential impact on current rural sense of place. Impact will however be removed when EGI is decommissioned.

6.8.3 Comparative assessment of the corridor and substation alternatives

Corridor Alternatives

The preference of EGI alternatives from a social perspective is informed mainly by the visual impact of the infrastructure. Based on the findings of the VIA, all three of the assessed alternatives are considered acceptable. However, of the three alternatives, Alternative **3** is marginally preferred as its impact significance ratings were consistently lower than those of Alternatives 1 and 2. This finding is supported by the SIA. The establishment of proposed 132 kV overhead power line (Alternative 3) is therefore supported by the findings of the SIA.

Substation Alternatives

Based on the VIA, both assessed substation alternatives are considered acceptable. This finding is supported by the SIA.

6.8.4 Implication for Project Implementation

The energy security benefits associated with the proposed Rondavel SEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure.

The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed 132 kV overhead power line are **Low** Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. This applies to all three alternatives. However, based on the findings of the VIA, Alternative 3 is the marginally preferred alternative. This finding is supported by the SIA. The establishment of proposed 132 kV overhead power line (Alternative 3) is therefore supported by the findings of the SIA. Based on the VIA, both assessed substation alternatives are considered acceptable. This finding is supported by the SIA.

All negative social impacts are within acceptable limits with no impacts considered as unacceptable from a social perspective. The recommendations proposed for the project are considered to be appropriate and suitable for the mitigation of the negative impacts and the enhancement of the positive impacts. The establishment of the proposed project is therefore supported by the findings of the SIA.

6.9. Assessment of the 'Do Nothing' Alternative

The do-nothing' alternative (i.e., no-go alternative) is the option of not constructing the Rondavel EGI. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities associated with the grid connection infrastructure.

a) Land use

The owner of the properties within which the substation and grid corridor alternatives are located indicated that crop farming is not a viable option and that he will not return the fields to crop fields again. The farm is currently used for commercial cattle production of 35 head of cattle and can at most provide employment for two farmworkers. The development of the Rondavel EGI provides an opportunity to undertake an efficient and productive land use activity (by supporting the associated Rondavel SEF) on properties which are currently restricted in use. In addition, the proposed Rondavel Solar PV Facility, which the Rondavel EGI will cater for, will contribute a significant amount of expenditure to the area and employ more than 230

workers during the construction phase and more than 17 workers during the operational phase. In the light of the high number of employment opportunities that will be created per hectare of land, the proposed Rondavel solar PV facility and its associated EGI is considered an acceptable land use change.

The implementation of the 'do-nothing' alternative would leave the land-use restricted to the current land use (i.e., grazing) losing out on the opportunity to support generative capacity from renewable energy in addition to current land use activities. Therefore, from a land-use perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of a viable and compatible land use for the broader study area which allows the current land-use activities to continue.

b) Socio-economic impact

The proposed grid connection infrastructure is essential to enable the Rondavel SEF to connect to the national electricity grid to address the current energy supply constraints and reduce South Africa's reliance on coal generated energy. As indicated above, energy supply constraints and associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions.

The 'do-nothing' alternative would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant negative social cost. In addition, all of the socio-economic benefits (employment opportunities, local economic development etc.) associated with the grid connection and the Rondavel SEF would be foregone.

Therefore, from a socio-economic perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of socio-economic benefits, when considering the current socio-economic conditions of the area.

c) Regional scale impact

At a broader scale, the benefits of supporting additional capacity to the national electricity grid and those associated with the introduction of renewable energy would not be realised should the 'do-nothing' alternative be considered and implemented. Although the Rondavel EGI is only proposed to support the associated Rondavel SEF, this facility would assist in meeting the electricity demand throughout the country and would also assist in meeting the government's goal for renewable energy and the energy mix. In addition, the development of the EGI further supports the growth and investment into grid connectivity nationally. Without the Rondavel EGI, the benefits derived from generation of renewable energy sources will not be obtained as the facility will not be able to export to the grid. The benefits being lost by virtue of halting renewable energy generation would include:

Increased energy security: Load shedding presents a challenge with regards to reliability and security of supply. Given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. According to the Council for Scientific and Industrial Research's (CSIR) latest published latest annual statistics on power generation in South Africa for the period

2020, load shedding occurred for 859 hours of the year (9.8%) with an upper limit of 1,798 GWh relative to actually achieved energy shed of 1,269 GWh. An urgent response is therefore necessary to ensure adequate short-term electricity supply and to set South Africa on a path towards long-term adequacy in the 2020s. Eskom's energy availability factor has been on a declining trend since 2001, and after a brief spike in 2016, has continued down this path over the last year (2019-2020).

According to the DoE IPPPP Overview (March 2019), 35669GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational. Renewable energy IPPs have proved to be very reliable. Of the 64 projects that have reached COD (as at March 2019), 62 projects have been operational for longer than a year. The energy generated over the period 2018 -2019 for these 62 projects is 10 648GWh, which is 96% of their annual energy contribution projections (P50) of 11 146GWh over a 12-month delivery period. Twenty-eight (28) of the 62 projects (45%) have individually exceeded their P50 projections.

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free compared to the continual purchase of fuel for conventional power stations. According to the DoE IPPPP Overview (March 2019), water savings of 42.8 million kilolitres has been realised by the programme from inception until the end of March 2019.

Exploitation of our significant renewable energy resource: At present, valuable renewable resources including biomass by-products, solar radiation and wind power remain largely under-exploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

By the end of March 2019, the REIPPPP had made the following significant impacts in terms of energy supply:

- 6 422MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds;
- 3 976MW of electricity generation capacity from 64 IPP projects has been connected to the national grid;
- 35 669 GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational. Renewable energy IPPs have proved to be very reliable. Of the 64 projects that have reached commercial operation, 62 projects have been operational for longer than a year. The energy generated over the 12 month period (as at 31 March 2019) for these 62 projects is 10 648 GWh , which is 96% of their annual energy contribution projections of 11 146 GWh over a 12 month delivery period. Twenty eight (28) of the 62 projects (45%) have individually exceeded their projections.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation has a particularly hazardous impact on human health and contributes to ecosystem degradation. The use of solar radiation or wind for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is

estimated to be currently responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. The overview of the Independent Power Producers Procurement Report (March 2019) indicates that carbon emission reductions of 36.2 Mton CO_2 has been realised by the IPP programme from inception to end of March 2019.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol and the Paris Agreement, and for cementing its status as a leading player within the international community.

Investment, economic and social impacts: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. The construction phase will create temporary employment opportunities and the operation phase will create limited full-time employment opportunities. The overview of the Independent Power Producers Procurement Report (March 2019) indicates that all IPP projects, as at 31 March 2019, have created 40 134 job years for South African citizens.

The overview of the Independent Power Producers Procurement Report (March 2019) indicates the following contributions from the REIPPPP projects in terms of investment, socio-economic development, and contributions to enterprise development:

- Investment (equity and debt) to the value of R209.7 billion, of which R41.8 billion (20%) is foreign investment, was attracted.
- Socio-economic development contributions of R860.1 million to date, of which R81.1 million was spent in this 2019 reporting quarter.
- Enterprise development contributions of R276.7 million to date, of which R26.5 million was spent in this 2019 reporting quarter.

Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health, the use of clean energy and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities and result in community upliftment for the affected areas.

Protecting the natural foundations of life for future generations: Actions to reduce the disproportionate carbon footprint can play an important part in ensuring the human role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come; this is the basis of sustainable development.

At present, South Africa is some way off from fully exploiting the diverse gains from renewable energy and from achieving a considerable market share in the renewable energy industry. South Africa's electricity supply remains heavily dominated by coal-based power generation, with the country's significant renewable energy potential largely untapped to date.

The Integrated Resource Plan (IRP) 2019 developed by the Department of Energy indicates that South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. Renewable energy, including Solar PV, wind and CSP with storage present an opportunity to diversify the energy mix, to produce grid connected or distributed off-grid electricity. In order to achieve this diversified mix and harness the benefits of renewable energy, the IRP 2019 includes an allocation of 6000MW of new capacity to large scale PV, and a further 6000MW allocated to embedded generation.

d) Avifaunal

The 'do-nothing' alternative will result in no additional impacts on avifauna and will result in the ecological status quo being maintained, which will be to the advantage of the avifauna. However, no fatal flaws were identified during the investigations.

e) Heritage

In terms of the no-go option, the anticipated impacts to heritage resources will not materialise. In general, it is preferred that excavations take place into fossiliferous bedrock rather than avoiding impact as this allows palaeontologists access to otherwise inaccessible palaeontological resources. Furthermore, the 'do-nothing' alternative will negate the anticipated socio-economic benefits indicated above and as such, this option is not preferred.

6.9.1. Costs and Benefits associated with the Rondavel EGI

Overall, the implementation of the Rondavel EGI at the proposed site is expected to result in a number of social and environmental costs and benefits.

Environmental **costs** identified for the project include:

- Loss of local vegetation and listed protected plant species.
- Impacts on fauna due to disturbance, transformation, and loss of habitat.
- Increased erosion risk and/or altered runoff patterns resulting in high levels of erosion.
- Increased alien plant invasion.
- Loss/disturbance of wetlands, watercourse and/or riparian systems.
- Impact on localized surface water quality.
- Increase in sedimentation and erosion within the freshwater features.
- Displacement of priority species due to disturbance associated with construction of the grid and onsite substation.
- Displacement of priority species due to habitat transformation associated with the operation of the OHL and onsite substations.
- Mortality of priority species due to collisions with the 132kV OHL.
- Electrocution of priority species in the onsite substation.
- Displacement of priority species due to disturbance associated with decommissioning of the grid and onsite substation.

- Impacts on buried archaeological and palaeontological resources due to the development.
- Potential visual impact on sensitive visual receptors within the region (up to 3km radius) during the operation of the grid connection infrastructure.
- The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.
- Impacts associated with the presence of construction workers on local communities.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Risks posed to farming activities by construction and maintenance workers.
- Impact on tourism.

The **positive** implications of establishing the project on the demarcated site include:

- Improve energy security and establishment of energy infrastructure.
- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The costs associated with the project are anticipated to occur at a site-specific level, the significance of which can be largely reduced through the application of appropriate mitigation measures. Due to the fact that the benefits of the project are expected to occur at a larger scale (i.e., national, regional and local level), the expected benefits of the project are expected to partially offset the localised environmental costs of the project.

6.9.2. Impacts of the 'Do-Nothing' Alternative

The following impacts are anticipated with the implementation of the 'do-nothing' alternative:

- Failure to support the provision of power generation capacity from clean, renewable energy in accordance with the Department of Mineral Resources and Energy's (DMRE's) National Integrated Resource Plan (IRP).
- Failure to contribute 100MW from the Rondavel PV facility to energy generation mix to the national electricity grid (should the project be selected as Preferred Bidder), which in turn has the opportunity to stimulate economic growth and development, by allowing for export to the grid of the production of the associated Rondavel SEF.
- Failure to realise the potential local economic development and social upliftment benefits associated with the implementation of project.

f) Conclusion

The 'do-nothing' alternative will do little to influence the renewable energy targets set by government due to competition in the sector, and the number of renewable energy projects being bid to the Department of Energy, as the supportive function of grid connection represented by this project would nullify the development of the associated Rondavel SEF. However, as the surrounding area experiences ample solar resource, not developing the Rondavel EGI (and the associated Rondavel SEF) would see such an opportunity being lost. As current land use activities can continue on the study area once the project is operational, the loss of the land to this project during the operation phase is not considered significant. In addition, the Free State Province will not benefit from additional generated power being evacuated directly into the province's grid. Therefore, from a regional perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of benefits for the regional area.

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the Rondavel EGI. All impacts associated with the project can be mitigated to acceptable levels. If the EGI project is not developed, the following positive impacts will not be realised:

- Job creation and skills development from the construction and operation phases.
- Economic benefit to participating landowners due to the revenue that will be gained from leasing the land to the developer.
- Meeting of the energy generation mix in a most economic and rapid manner.
- Support of the provision of clean, renewable energy in an area where the energy resource is optimally available.

As detailed above, the 'do-nothing' alternative will result in a number of lost opportunities. The 'do nothing' alternative is, therefore, not preferred and not proposed to be implemented for the development of the Rondavel EGI.

CHAPTER 7: ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

As identified and assessed in Chapter 6, the proposed Rondavel EGI project may have impacts (positive and negative) on natural resources, the social environment and on the people living in the area surrounding the project. The preceding impact assessment chapter has reported on the assessment of the impacts associated with the Rondavel EGI in isolation (from other similar developments).

The DMRE, under the REIPPP Programme, released a request for proposals (RFP) in 2011 to contribute towards Government's renewable energy target and to stimulate the industry in South Africa. The REIPPP Programme has been rolled out in bid windows (rounds) since 2011, in which developers submit planned renewable energy projects for evaluation and selection. The bid selection process considers a number of qualification and evaluation criteria. The proposed tariff and socio-economic development contributions by the project bidder are the main basis for selection after the qualification criteria have been met.

As a result of the REIPPP Programme, there has been a substantial increase in interest in solar PV facility developments in South Africa, each with associated grid infrastructure. In addition, the study area already contains a number of power lines. It is, therefore, important to follow a precautionary approach in accordance with NEMA to ensure that the potential for cumulative impacts[4] is considered and avoided where possible.

This chapter assesses the potential for the impacts associated with the Rondavel EGI to become more significant when considered in combination with other known or proposed electrical grid infrastructure projects within the area, commonly associated with other renewable energy facilities. The projects within the area under consideration in this cumulative assessment therefore include known all electrical grid infrastructure (EGI) projects.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the Basic Assessment Report includes the following information required in terms of Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of the Rondavel EGI are included and assessed within this chapter.

7.2 Approach taken to Assess Cumulative Impacts

The cumulative impacts that have the potential to be compounded through the development of the Rondavel EGI to other similar developments in the area include impacts such as those listed below:

[4] Cumulative impacts in relation to an activity are defined in the Environmental Impact Assessment Regulations (Government Notice R326) as the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

- Unacceptable loss of habitat or landscape connectivity through clearing, resulting in an impact on the conservation status of such flora, fauna, or ecological functioning.
- Unacceptable risk to avifauna through loss of avifaunal habitats and collision risks.
- Unacceptable risk to aquatic resources through disturbance associated with construction activities and increased runoff and erosion during the operation phase.
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources).
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion.
- Unacceptable impact to social factors and components.

The role of the cumulative assessment is to determine and confirm if such impacts are relevant to the Rondavel EGI within the study area being considered for the development.

It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required to ensure that the concentration of EGI projects do not lead to detrimental environmental impacts. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by EGI projects, and the related Solar PV facility developments throughout South Africa, while the significance of the cumulative impact on visual amenity and loss of land within a concentrated area may only be influenced by EGI developments that are in closer proximity to each other. For practical purposes, a sub-regional scale of 30km has been selected for this cumulative impact evaluation.

Figures 7.1 indicates the location of the Rondavel EGI in relation to all other known and viable (i.e., projects with a valid Environmental Authorisation) EGI projects located within a radius of 30km from the development area under assessment. These include existing grid connection infrastructure in the area, as well as other renewable energy developments, each of which will have associated grid connections. These renewable projects were identified using the DFFE Renewable Energy Database and current knowledge of projects being proposed and developed in the area.

Existing grid connection infrastructure in the surrounding area (within a 30km radius) of the Rondavel EGI development area include:

- Kroonstad Municipal/Theseus 1 132kV power line
- Serfontein Traction/Virginia Terminal 1 88kV
- Kroonstad Municipal/Kroonstad SW Station 1 132kV power line
- Everest/Snowdon 1 275kV power line
- Everest/Makalu 1 275kV power line

The potential for cumulative impacts is summarised in the sections that follow and has been considered within the specialist studies (refer to **Appendices D – H**).

It should be noted that not all the PV solar facilities and associated EGI presently under consideration by various IPPs will be built for operation. Not all proposed developments will be granted the relevant permits by the relevant authorities (DFFE, DMRE, NERSA and Eskom) due to any of the following reasons:

- There may be limitations to the capacity of the existing or future Eskom grid.
- Not all applications will receive a positive environmental authorisation.

- There are stringent requirements to be met by applicants in terms of the REIPPP Programme and a highly bidding competitive process that only selects the most competitive projects.
- Not all proposed facilities will be able to reduce the associated negative impacts to acceptable levels or be able to mitigate the impacts to acceptable levels (fatally flawed).
- Not all proposed facilities will eventually be granted a generation license by NERSA and sign a Power Purchase Agreement with Eskom.
- Not all developers will be successful in securing financial support to advance their projects further.

There is a level of uncertainty as to whether all the proposed and authorised facilities and associated EGI as indicated in **Figure 7.1** will be implemented. This results in it being difficult to quantitatively assess the potential cumulative impacts. The cumulative impacts of the existing grid connection infrastructure in the area as well as other known PV solar facilities in the surrounding area, along with their respective grid connection infrastructure, and the Rondavel EGI are therefore qualitatively assessed in this Chapter. The following potential impacts are considered (refer to **Appendices D – H** for more details):

- Cumulative impacts on ecological processes (including fauna and flora)
- Cumulative impacts on avifauna
- Cumulative impacts on freshwater resources
- Cumulative impacts on heritage resources (including archaeology and palaeontology)
- Cumulative visual impacts
- Cumulative social impacts

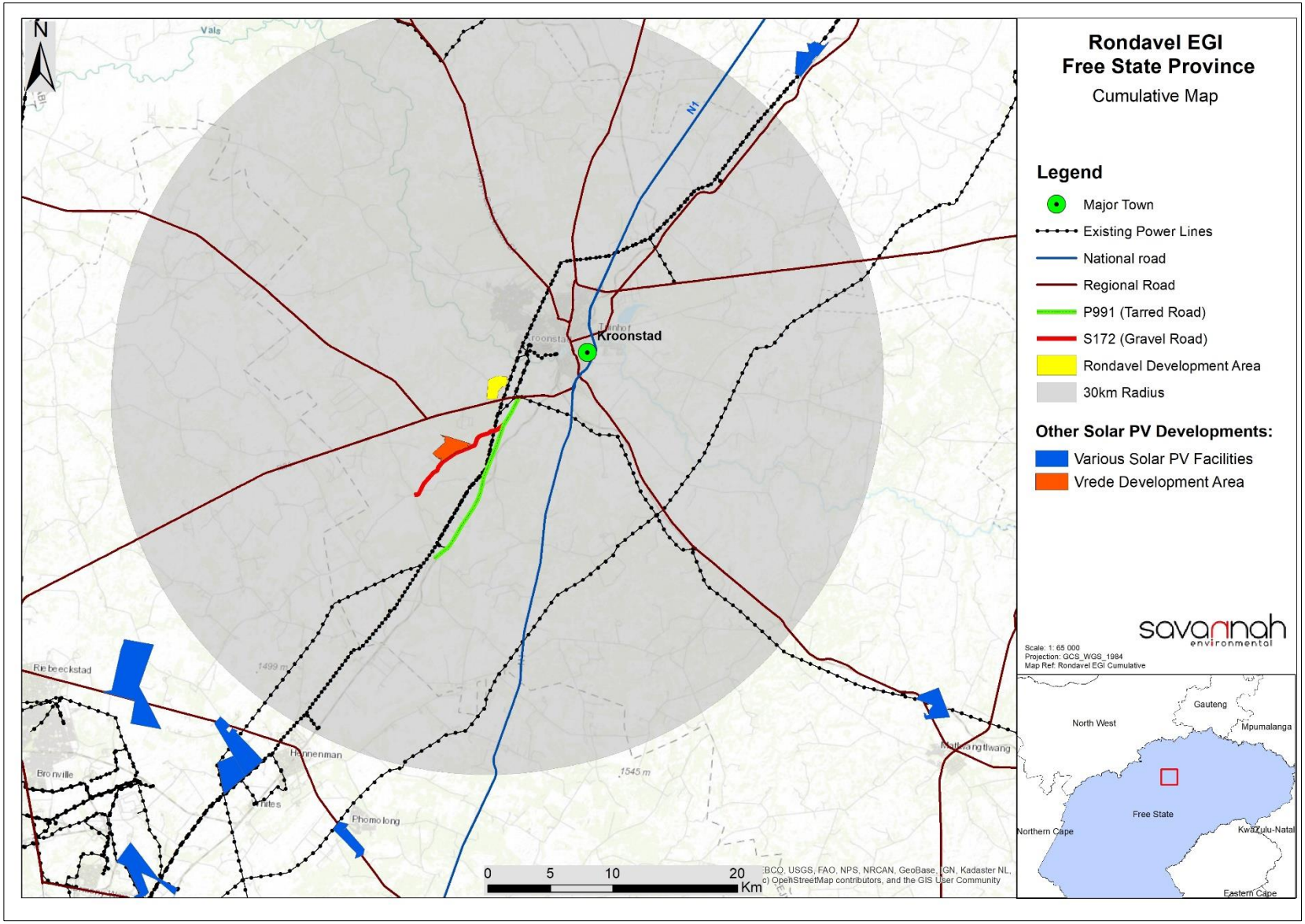

Figure 7.1: Identified solar energy facility projects and grid connection infrastructure located within a 30km radius of the Rondavel EGI development area that is considered as part of the cumulative impact assessment.

7.3 Cumulative Impacts on Ecological Processes

Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of development be kept as close together as possible.

The cumulative impact of the proposed development on ecological features is provided below:

Impact Nature: Reduced ability to meet conservation obligations and targets.

The loss of unprotected vegetation types on a cumulative basis from the broader area impacts the province's ability to meet its conservation targets.

	ON-SITE SUBSTATION AND GRIDLINE ALTERNATIVES	
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Regional (2)
Duration	Long Term (4)	Long-Term (4)
Magnitude	Small (0)	Minor (2)
Probability	Very Improbable (1)	Highly Improbable (2)
Significance	**Low (5)**	**Low (16)**
Status	Neutral	Slightly Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Highly unlikely	Unlikely
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
» Reduce the footprint of the facility within sensitive habitat types as much as possible.
» Mitigation measures of the current site should align with neighbouring sites and other developments in the area.

Impact Nature: Impact on broad-scale ecological processes.

Transformation of intact habitat could potentially compromise ecological processes of ESAs as well as ecological functioning of important habitats and would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

	ON-SITE SUBSTATION AND BOTH GRIDLINE ALTERNATIVES	
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Regional (2)
Duration	Long Term (4)	Long-Term (4)
Magnitude	Small (0)	Minor (2)
Probability	Very Improbable (1)	Highly Improbable (2)
Significance	**Low (5)**	**Low (16)**
Status	Neutral	Slightly Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Highly unlikely	Unlikely
Can impacts be mitigated?	Yes, to a large extent	
Mitigation		

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
- Mitigation measures of the current site should align with neighbouring sites and other developments in the area.

Impact Nature: Compromise ecological processes as well as ecological functioning of important terrestrial habitats.

Transformation of intact terrestrial habitats could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potential disruption of habitat connectivity and impair their ability to respond to environmental fluctuations. This in turn may lead to;

- A change in the status of impacted vegetation type, subsequently also reducing the ability to meet national conservation obligations and targets.
- A reduction in biodiversity and even the loss of some species from the area.
- Fracturing and isolation of landscapes may cut off important migration routes and prevent genetic variability thus reducing "genetic health" which may in turn lead to weaker species incapable to adapt and react to potential environmental changes and consequently also to a reduction in biodiversity and the extinction of some species from certain areas.
- The loss of CBA's which may lead to the province, being incapable to meet their required biodiversity pattern a process target.

The loss of important corridors essential for some species to allow for movement between important habitat types crucial for the survival of these species.

	ON-SITE SUBSTATION AND BOTH GRIDLINE ALTERNATIVES (1 & 2)	
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (1)	Small (1)
Probability	Highly Improbable (1)	Highly Improbable (1)
Significance	**Low (6)**	**Low (6)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.

7.4 Cumulative Impacts on Avifauna

According to the official database of DFFE, there were no registered applications for renewable energy projects within a 30km radius around the proposed development at the end of 2020. The only other planned facility is the 100MWac Vrede Photovoltaic (PV) Solar Energy Facility (SEF) and Battery Energy Storage System (BESS) (see **Figure 7.1**)

The proposed Rondavel PV grid equates to a maximum of 6.11km (worst case scenario), depending on which of the alternatives is used. There are approximately 300 kilometres of existing high voltage lines within the 30km radius around the Rondavel PV project (counting parallel lines as one). The Rondavel PV grid project will thus increase the total number of existing high voltage lines by approximately 2% or less. The contribution of the planned Rondavel PV grid connection to the cumulative impact of all the high voltage

lines is thus low. However, the combined cumulative impact of the existing and planned power lines on avifauna within a 30km radius is considered to be moderate.

The cumulative impact of displacement due to disturbance and habitat transformation in the onsite substation area associated with the Rondavel PV project is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions in the substation yard of the onsite substation is also likely to be low as it is expected to be a rare event.

The tables below summarise the cumulative impacts associated with the proposed development.

Nature: Powerline collision mortality of priority avifauna due to the construction of the grid connection.						
	Option 1		**Option 2**		**Option 3**	
	Overall impact of the proposed grid connection (post mitigation) within a 30km radius (post mitigation).	**The combined cumulative impact of the proposed grid connection and all the other high voltage lines within a 30km radius (post mitigation)**	**Overall impact of the proposed grid connection (post mitigation) within a 30km radius (post mitigation).**	**The combined cumulative impact of the proposed grid connection and all the other high voltage lines within a 30km radius (post mitigation)**	**Overall impact of the proposed grid connection (post mitigation) within a 30km radius (post mitigation).**	**The combined cumulative impact of the proposed grid connection and all the other high voltage lines within a 30km radius (post mitigation)**
Extent	Local (1)	Regional (2)	Local (1)	Regional (2)	Local (1)	Regional (2)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Moderate (6)	Minor (2)	Moderate (6)	Minor (2)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)	Highly Probable (4)	Highly Probable (4)	Highly Probable (4)	Highly Probable (4)
Significance	**Low (28)**	**Medium (48)**	**Low (28)**	**Medium (48)**	**Low (28)**	**Medium (48)**
Status (positive/negative)	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High	High	High
Loss of resources?	Yes	Yes	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Confidence in findings: Medium.						
Mitigation: » Marking of all high-risk sections of power line with Bird Flight Diverters.						

Nature: (1) Displacement of priority avifauna due to disturbance and habitat transformation, and (2) mortality (electrocution) of priority avifauna due to the construction of the onsite substation				
	Option 1		**Option 2**	
	Overall impact of the proposed onsite substation (post	**Cumulative impact of the proposed onsite substation and other**	**Overall impact of the proposed onsite substation (post**	**Cumulative impact of the proposed onsite substation and other**

	mitigation) within a 30km radius (post mitigation).	**planned and existing substations within a 30km radius (post mitigation)**	**mitigation) within a 30km radius (post mitigation).**	**planned and existing substations within a 30km radius (post mitigation)**
Extent	Local (1)	Regional (2)	Local (1)	Regional (2)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Low (4)	Minor (2)	Low (4)
Probability	Improbable (2)	Improbable (2)	Improbable (2)	Improbable (2)
Significance	**Low (14)**	**Low (20)**	**Low (14)**	**Low (20)**
Status (positive/negative)	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes, but only to some extent	Yes, but only to some extent	Yes, but only to some extent	Yes, but only to some extent
Confidence in findings: Medium.				
Mitigation: » Construction activity should be restricted to the immediate footprint of the infrastructure. » Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. » Measures to control noise and dust should be applied according to current best practice in the industry. » Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum. » The hardware within the proposed transmission substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red Data priority species is unlikely to frequent the substation and be electrocuted.				

The overall impact of the planned grid connections when considered in isolation was considered low from a potential bird collision perspective after mitigation. However, the combined cumulative impact of the existing and planned power lines within a 30km radius is considered moderate. The overall impact of displacement due to habitat transformation as a result of the construction of the onsite substation associated with the Rondavel SEF is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions in the substation yard of the onsite substation is also likely to be low as it is expected to be a rare event.
The avifaunal specialist determined that the Rondavel EGI project is acceptable from a cumulative avifaunal impact perspective.

7.5 Cumulative Impacts on Aquatic Resources

Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of development be kept as close together as possible.

The cumulative impact of the proposed development on freshwater/aquatic features is provided below:

Impact Nature: Compromise ecological processes as well as ecological function of important freshwater/aquatic habitats.

Transformation of intact freshwater resource habitats could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially

disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement		
	GRIDLINE ALTERNATIVE 1, 2 & 3	
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (2)	Moderate (6)
Probability	Highly Improbable (1)	Improbable (2)
Significance	**Low (7)**	**Low (22)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » Use existing service roads when crossing the watercourses. » Avoid placing pylons within the boundaries of the wetlands/watercourses. » Avoid any activities within the wetlands apart from the spanning of the powerline.		

7.6 Cumulative Impacts on Heritage (including archaeology and palaeontology)

The cumulative impact in terms of heritage was assessed by reviewing the renewable energy facilities and other development infrastructure that is proposed or developed within 30km of the development area. Three renewable energy facilities are proposed within 50km of the proposed development area. This includes the Vrede SEF proposed to be located approximately 5km from the Rondavel SEF.

In addition, impacts to heritage result from all kinds of development and as such, the assessment of cumulative impacts to heritage resources was not limited to impacts from renewable energy facilities. Of the 6 Heritage Assessments conducted within 20km of the proposed development area, four are for residential township developments. One is for a road upgrade, and one is for a filling station.

The cumulative impact from a heritage perspective was determined by the specialist for the respective corridor alternatives, all of which are considered to be similar (and are therefore not considered separately in the table below). Please note this impact includes consideration of the substation component of the EGI as applicable.

Nature: Cumulative Impact to the sense of place		
	Overall impact of the proposed project considered in isolation (with mitigation)	**Cumulative impact of the project and other projects in the area (with mitigation)**
Magnitude	Low (4)	Low (4)
Duration	Medium-term (3)	Long-term (4)
Extent	Low (1)	Low (1)
Probability	Improbable (2)	Probable (3)
Significance	**Low (16)**	**Low (27)**
Status	Neutral	Neutral

Reversibility	High	Low
Irreplaceable loss of resources?	Unlikely	Unlikely
Can impacts be mitigated?	N/A	N/A
Confidence in Findings: High		
Mitigation: » No impacts are anticipated and as such, no mitigation is required		

The overall impact of the proposed project, when considered in isolation, was determined to be of low significance. The cumulative impact of the proposed project and other similar projects within a 30km radius of the project area is likely to be low. Therefore, from a heritage perspective, the cumulative impact of the proposed Rondavel EGI is acceptable.

7.7 Cumulative Visual Impacts

Cumulative visual impacts have considered the current impacts of electrical infrastructure as well as the future proposed development of other renewable energy projects and planned infrastructure development.

The construction of the Grid Connection Infrastructure for the Rondavel Solar PV Facility may increase the cumulative visual impact of industrial type infrastructure within the region to some degree.

Power Line Alternative 1

The anticipated cumulative visual impact of the Power Line Alternative 1 is expected to be of moderate significance (significance rating = 45). This is considered acceptable from a visual impact perspective.

Nature of Impact: The potential cumulative visual impact of the grid infrastructure on the visual quality of the landscape.		
	Overall impact of the Alternative 1 considered in isolation (with mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Local (2)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Probable (3)	Probable (3)
Significance	**Moderate (42)**	**Moderate (45)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		

Power Line Alternative 2 and 3

The anticipated cumulative visual impact of the Power Line Alternative 2 is expected to be of moderate significance (significance rating = 39). This is considered acceptable from a visual impact perspective.

Nature of Impact: The potential cumulative visual impact of the grid infrastructure on the visual quality of the landscape.		
	Overall impact of the Alternatives 2 and 3 considered in isolation (with mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Local (2)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Improbable (2)	Probable (3)
Significance	**Low (24 and 28)**	**Moderate (39)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		

The anticipated cumulative visual impact of the proposed Grid Connection Infrastructure is expected to be of moderate significance, which is considered acceptable from a visual perspective. Power Line Alternatives 2 and 3 have a lower significance rating and are therefore favoured from a cumulative visual impact perspective.

Considering the existing number of power lines traversing to the Kroonstad Municipal Substation, the cumulative visual impacts are considered to be within acceptable limits. It is further recommended that potential future power line infrastructure, should it be required, also be contained within this corridor.

7.8 Cumulative Social Impacts

The Social Impact Assessment (refer **Appendix H**) determined the following cumulative impact related to the Rondavel EGI:

» Cumulative impact on sense of place and the landscape: A number of existing power lines are located in the study area. The potential for cumulative impacts associated with combined visibility (whether two or more power lines will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more power lines along a single journey, e.g., road or walking trail) does therefore exist. The findings of the VIA (Logis, August 2021) indicate that the anticipated cumulative visual impact of the Power Line Alternatives 2 and 3 is expected to be of Moderate significance (significance rating = 39).

This is considered to be acceptable from a visual impact perspective. The anticipated cumulative visual impact of the Power Line Alternative 1 is expected to be of Moderate significance (significance rating = 45). This is also considered to be acceptable from a visual impact perspective. Given the lower significance ratings, Alternative 2 and 3 and preferred over Alternative 1. However, the overall significance for all Alternatives is Moderate.

Please note that the cumulative assessment below is applicable to all alternatives (i.e., grid corridors and substations).

Nature: Visual impacts associated with the establishment of associated grid infrastructure and the potential impact on the area's rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	Local-Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Medium (39)**
Status (positive/negative)	Negative	Negative
Reversibility	Yes. Grid components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: » The recommendations of the VIA should be implemented.		

7.9 Contribution of the Project to Climate Change Mitigation

South Africa is a country with an economy dependent on coal for the majority of its electricity, an energy-intensive industrial sector and an energy sector responsible for 82% of total GHG emissions, making it the 12th highest world emitter of GHG[5].

It has been reported internationally that the move towards renewable energy for electricity generation needs has resulted in decreased greenhouse gas emissions. The International Energy Agency announced in March 2015 that 2014 carbon dioxide emissions from the energy sector levelled off for the first time in 40 years. This has happened without being linked to an economic downturn. This was attributed to the increase in the use of renewable energy sources by China and OECD countries[6]. As GHG emissions associated with the provision of energy services are a major cause of climate change, this move to renewable energy and subsequent reduction in CO_2 emissions is considered as a positive contribution towards climate change mitigation.

The South African Government recognises the need to diversify the mix of energy generation technologies within the country and to reduce the country's reliance on fossil fuels which contribute towards climate

[5] Greenhouse Gas Inventory for South Africa: 2000-2010
[6] http://ecowatch.com/2015/03/23/renewables-mitigate-climate-change/

change and are therefore not environmentally friendly. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997.

Consequently, the South African Government has recognised the need to move towards cleaner energy and has therefore set targets for cleaner energy technologies (including of 6000MW solar PV contribution to new power generation capacity) by 2030 (IRP, 2019). Renewable energy plays a key role in mitigating global greenhouse gas emissions by radically lowering the emissions profile of the global energy system (International Renewable Energy Agency (IRENA), 2015). The proposed EGI will facilitate the connection of the Rondavel PV facility to the grid, which will assist in reducing the country's CO_2 emissions associated with energy supply relative to fossil fuels (e.g., coal). Development of numerous such facilities will have a cumulative positive impact on CO_2 emissions as this will reduce reliance on power generation from fossil fuels. This will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government is a signatory.

This is considered to be a significant positive impact for the environment and society at an international level.

7.10 Conclusion regarding Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The most significant of these will be the contribution towards a reduction in greenhouse gas emissions and consequent assistance with climate change mitigation, in addition to energy security and reliability.

The alignment of renewable energy developments, including their associated grid connection infrastructure, with the IRP and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The social and economic benefits of renewable energy developments at a local, regional, and national level have the potential to be significant. However, there is a lack of understanding of the cumulative impacts on other environmental and social receptors such as birds, visual amenity and landscape character of the affected areas largely due to limited information of impacts from existing facilities within the country. This assessment is therefore qualitative.

The assessment of the cumulative impacts was undertaken through the consideration of the Rondavel EGI impacts in isolation and compared to the cumulative impacts of the Rondavel EGI and other existing and proposed solar energy facilities and their associated electrical grid infrastructure, including the proposed Vrede SEF within a 30km radius from the development area. Cumulative impacts are expected to occur with the development of the Rondavel EGI throughout all phases of the project life cycle and within all areas of study considered as part of this BA Report. The main aim for the assessment of cumulative impacts considering the Rondavel EGI is to determine whether the cumulative impact will be acceptable within the landscape proposed for the development, and whether the cumulative loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The significance of the cumulative impacts associated with the development of the Rondavel EGI range from low to moderate, depending on the impacts being considered. A summary of the cumulative impacts is included in **Table 7.1**.

Table 7.1: Summary of the cumulative impact significance for the Rondavel EGI within the development area (please note impacts are rated separately in the table below).

Specialist assessment	Overall significance of impact of the proposed project considered in isolation (negative unless indicated otherwise) (with mitigation)	Cumulative significance of impact of the project and other projects in the area (negative unless indicated otherwise) (with mitigation)
Ecology	Low Low Low	Low Low Low
Avifauna	Low	Medium to Low
Aquatic resources	Low	Low
Heritage (archaeology and palaeontology)	Low	Low
Visual	Power Line Alternative 1 Medium Power Line Alternative 2 and 2 Low	Power Line Alternative 1 Medium Power Line Alternative 2 and 3 Medium
Social	Low (negative))	Medium (negative)

Considering the findings of the specialist assessments undertaken for the project, the cumulative impacts for the proposed Rondavel EGI will be acceptable, and the majority are rated as being of **low to moderate significance** with the implementation of appropriate mitigation. On this basis, the following can be concluded considering the Rondavel EGI:

- The proximity of the Rondavel EGI to the existing similar developments is seen as a positive aspect of the development and overall cumulative impacts associated with the Rondavel EGI development are considered acceptable.
- The construction of the project will not result in unacceptable impacts on ecological processes and aquatic features.
- The avifaunal cumulative impact of the planned EGI was considered low from a potential bird collision perspective after mitigation. However, the combined cumulative impact of the existing and planned power lines within a 30km radius is considered moderate. The cumulative impact of displacement due to habitat transformation as a result of the construction of the on-site substation associated with the Rondavel SEF is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions in the substation yard of the onsite substation is also likely to be low as it is expected to be a rare event. The avifaunal specialist determined that the Rondavel EGI project is acceptable from a cumulative avifaunal impact perspective.
- The construction of the project will not result in the complete or whole-scale change in sense of place and character of the area nor will the project result in unacceptable visual intrusion.
- The construction of the project will not result in unacceptable loss of or impact to heritage resources.
- The project will contribute towards a reduction in greenhouse gas emissions indirectly via the support of energy generation and will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government has committed to become a signatory.

Based on a detailed evaluation, the cumulative impacts associated with the construction and operation of the proposed Rondavel EGI and other proposed renewable energy facilities, including their associated grid connection infrastructure in the region will not result in unacceptable, high cumulative impacts and will not

lead to a whole-scale change of the environment, and is therefore considered acceptable from a cumulative perspective.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

South Africa Mainstream Renewable Power Developments (Pty) Ltd proposes the development of Electrical Grid Infrastructure (EGI) to support the Rondavel Photovoltaic (PV) Solar Energy Facility (SEF) (DFFE ref: 14/12/16/3/3/2/2039), which aims to export energy to the national electricity grid. The project (hereafter also referred to as 'Rondavel EGI') is located ~7km south-west of Kroonstad in the Free State Province within the Fezile Dabi District, in the Moqhaka Local Municipality, on the following affected properties:

» Farm Rondavel No. 627 (Remaining Extent, Portion 1 and Portion 0);
» Farm Boschplaat No. 330 (Remaining Extent);
» Farm Salie No. 1837 (Remaining Extent);
» Farm Rondavel-Noord No. 1475 (Remaining Extent);
» Farm Naseby Thorns No. 288 (Portion 1);
» Farm Leeuwkrantz No. 1384 (Portion 0);
» Farm Dorp Gronden Van Kroonstadt No. 460 (Remaining Extent, Portion 225 and Portion 226); and
» Farm Waterloo No. 1383 (Remaining Extent).

The Electrical Grid Infrastructure required includes a 132 kV double- or single-circuit overhead power line and an on-site 132kV side of the substation and will connect to the national grid via either a loop-in loop-out connection into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line near the site, or a direct connection to the existing Kroonstad Municipality 132kV substation, depending on which alternative is implemented.

Two alternative, viable substations were assessed and considered in the Rondavel SEF EIA, and therefore both are considered feasible alternatives for the purposes of this application. These alternatives are therefore:

Preferred Substation (Alternative 1) (PS), comprising the following infrastructure:
- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

Alternative Substation (Alternative 2) (AS), comprising the following infrastructure:
- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

In addition, three alternative grid corridors have been identified for assessment to allow for avoidance of environmental sensitivities as far as possible. The following grid corridors alternatives are provided for the Rondavel EGI (refer to **Figure 1.1**):

» **Alternative 1 (Preferred):** On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~2.33km long.
» **Alternative 2**: On-site substation directly connecting to the existing Kroonstad Municipality 132kV substation. This corridor is ~6.11km long

» **Alternative 3**: On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~3.68km long.

All the corridor options and substation alternatives represent technically feasible options, the preferred corridor may therefore be determined by the route incurring the least environmental impact.

A development area of ~750m^2 will be disturbed considering the longest route as a worst-case scenario, within which the development of the Rondavel EGI infrastructure will occur. This has been fully considered within this BA process and assessed in terms of its suitability from an environmental and social perspective. In addition, a substation area of approximately 3.3ha and a laydown area of ~1ha within a 25ha assessment area is envisaged for the EGI. An access/maintenance road of between 4 – 6m wide will also be required for operation and maintenance of the grid connection.

South Africa Mainstream Renewable Power Developments (Pty) Ltd has confirmed that each of the grid connection alternatives and substation alternatives is suitable for the development of the Rondavel EGI and associated infrastructure from a technical perspective due primarily to suitable and available land, geographical and topographical considerations, landowner support and the close proximity to grid connection points, notably through connection via either a loop-in loop-out connection into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line near the site, or a direct connection to the existing Kroonstad Municipality 132kV substation. The broader region is also highly suitable for the development of a Solar PV Facility, which the Rondavel EGI project will support by supplying the requisite grid connection for export to the national electricity grid.

A summary of the recommendations and conclusions for the proposed development as determined through the BA process is provided in this Chapter.

8.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of the Basic Assessment Reports:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the Rondavel EGI has been included in **Section 8.2**.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	An environmental impact statement containing the key findings of the environmental impacts of the Rondavel EGI has been included as **Section 8.6**. Sensitive environmental features located within the Rondavel EGI study area and development area, overlain with the proposed development footprint have been identified and are shown in **Figure 8.1.** A summary of the positive and negative impacts associated with the Rondavel EGI has been included in **section S.2**.

Requirement	Relevant Section
h (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	A concluding statement indicating the preferred alternatives and the preferred location of the activity is included in **Section 8.5**.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation of the Rondavel EGI have been included in **Section 8.6**.
3(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the Rondavel EGI should be authorised has been included in **Section 8.6**.

8.2. Evaluation of the Rondavel EGI

The preceding chapters of this BA Report, together with the specialist studies contained within **Appendices D – H,** provide a detailed assessment of the potential impacts that may result from the development of the Rondavel EGI. This chapter concludes the environmental assessment of the EGI by providing a summary of the results and conclusions of the assessment. In doing so, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the Environmental Assessment Practitioner (EAP) and presents a combined and informed opinion of the environmental impacts associated with the development.

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features as specified by the specialists.

The potential environmental impacts associated with the Rondavel EGI identified and assessed through the BA process include:

» Impacts on ecology, flora and fauna.
» Impacts on avifauna.
» Impacts on aquatic resources.
» Impacts on heritage resources, including archaeology and palaeontology.
» Visual impacts on the landscape as a result of the grid.
» Positive and negative social impacts.

8.2.1 Impacts on Ecology

Overall, no significant terrestrial ecological flaws that could pose a problem to the proposed EGI development were identified during the BA process.

The ecological specialist determined the following ecological sensitivities on site, based on the respective ecological contribution and delineation of the various habitat types present on site:

» All wetland features were deemed very high ecological sensitivity and a 30m no-go buffer around them is recommended.

» Dolerite outcrops and Acacia karroo – Asparagus laricinus Shrub-Grassland were considered to be of medium sensitivity.

The main impacts on ecological features which have been identified for the construction, operational and decommissioning phases include the following:

» Loss of local vegetation and listed protected plant species.
» Negative effects on fauna due to disturbance, transformation, and loss of habitat.
» Increased erosion risk due to increased disturbed and loose soil as the site.
» Altered runoff patterns, resulting in high levels of erosion.
» Potential increased alien plant invasion.

Based on the findings of the Ecological Impact Assessment, there is no objection to the authorisation of the proposed project, provided that the recommended mitigation measures are implemented.

8.2.2 Impacts on Avifauna

Species composition, distribution and abundance within the project site is largely influenced by the broad vegetation type, however species behaviour and fine scale distribution is linked to the avifaunal habitats present. Four bird habitats were determined for the project site, namely, Grassland, Woodland, Dams and Rivers, as well as Fences.

The SABAP2 data indicates that a total of 192 bird species could potentially occur within the study area and immediate surroundings. Of these, 37 species are classified as priority species, and 2 of these are South African Red Data species. Of the priority species, 20 are likely to occur regularly at the study area and immediate surrounding area, and another 17 could occur sporadically.

On-site surveys were conducted from 20 - 22 July 2020 by means of transect counts. The Index of Kilometre Abundance (IKA) expresses the ratio of the total number of individuals (or of signs of presence) observed along a transect by the total transect length covered, and is a common measure used in avifaunal studies as it allows a straightforward comparison of species abundance in different sites or at different times. The species of greatest abundance as determined by on site observations was the Helmet Guineafowl followed by the Egyptian Goose, Northern Black Korhaan, Hadeda, the South African Shelduck, following which the Western Cattle Egret and the Pale Chanting Goshawk shared equal abundance values.

There are no Important Bird Areas (IBA) within a 60km radius around the proposed Rondavel EGI. It is therefore highly unlikely that the proposed grid connection will have an impact on any IBA.

The main impacts of grid connection infrastructure on avifauna which have been identified from the avifaunal study (refer to **Appendix E** for more details) include the following:

<u>Construction Phase</u>

» Displacement of priority species due to disturbance associated with construction of the grid and on-site substation.

Operational Phase

» Displacement of priority species due to habitat transformation associated with the operation of the overhead power line and onsite substation.
» Mortality of priority species due to collisions with the 132kV overhead power line.
» Electrocution of priority species in the onsite substation.

Decommissioning Phase

» Displacement of priority species due to disturbance associated with decommissioning of the grid and onsite substation.

The following environmental sensitivities were identified from an avifaunal perspective (refer to **Figure 6.2**):

» **High sensitivity – Mark with Bird Flight Diverters: Flight paths associated with surface water.**
  * Rivers and drainage lines are used by birds as flight paths, particularly waterbirds that commute up and down channels. Dams are also a large attraction for waterbirds, and birds commuting between dams may be at risk of collisions.

The expected impacts of the Rondavel PV grid and associated infrastructure were rated to be of Moderate significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to Low negative. No fatal flaws were discovered in the course of the investigation. It is the opinion of the specialist that the activity be authorised on condition that the proposed mitigation measures, as detailed in the impact tables and the EMPr (**Appendices I & J**), are strictly implemented.

8.2.3 Impacts on Aquatic Resources

The Freshwater Impact Assessment (**Appendix D**) identified two wetland features close to the project site, which were at risk of impact. These were defined as no-go areas together with their defined 30m buffer zones. Impacts on wetland features due to the proposed project are possible during the construction and operational phases. With the implementation of mitigation measures, impacts will be localised, short-term and of low intensity and are expected to be of moderate-low to low overall significance.

Impacts on aquatic features associated with the Rondavel EGI include the following:

» Impact on localised surface water quality.
» Increase in sedimentation and erosion within the freshwater resource features.
» Loss of riparian systems and disturbance of alluvial water courses.
» Impact on riparian systems through the increase in surface runoff on riparian form and functioning.

Based on the findings of the Freshwater Impact Assessment, there is no objection to the authorisation of the proposed activities provided that the recommended mitigation measures are implemented.

8.2.4 Impacts on Heritage (including archaeology and palaeontology)

The area proposed for the development of the Rondavel SEF and EGI yielded some cultural remains but with varied value and preservation. The isolated and scattered lithic artefacts (RDW001, RDW003 and RDW004) are typical of a deflated landscape and have very limited cultural value given that they have been

accumulated and modified by various natural processes to their current ex situ state. The stone piles found in the southwest of the property (RDW002) are more noteworthy (Grade IIIA) and require sensitive treatment. The dense vegetation on site limited comprehensive coverage of the landscape during the heritage survey and so caution should be practiced when clearing the vegetation during construction.

No fossils were identified on site, except for a few possible fragments of petrified wood. These were ex situ, and their stratigraphic origin could not be determined. Based on the geology of the proposed development area as well as the current palaeontological record, it is anticipated that the impact of the development will be HIGH to VERY HIGH due to the likely presence of highly fossiliferous Adelaide Subgroup and Volksrust Formation mudstones and shales underlying almost the entirety of both properties, underneath the reworked soil layers.

The heritage specialist identified the following impact for the construction phase of the project, which was rated as low significance in the case of both impact to archaeology and palaeontology following implementation of the prescribed mitigation measures:

» Impact to buried archaeological and palaeontological resources due to the proposed development.

The specialist further determined that there is no objection to the proposed development on heritage grounds and the following mitigation was recommended:

» There is no preferred alternative in terms of impacts to heritage resources.
» A no-development buffer zone of 100m is implemented around RDW001 and RDW004.
» All excavations into bedrock are monitored by a suitably qualified palaeontologist and a report on the outcomes of the monitoring activities must be submitted to SAHRA on completion of the development of the facility.
» All other excavation activities are subject to the Palaeontological Chance Finds Procedure.
» Should any previously unrecorded archaeological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.

8.2.5 Visual Impacts

Due to the generally remote location of the proposed Grid Connection Infrastructure, there are only a few potential sensitive visual receptors located within a 6km radius of the proposed infrastructure. These are residents of, or visitors to:

» Southern outlying parts of Brent Park
» Nasenby Thorns
» Blomtuin
» Retreat
» Fraaiuitsig
» Northern part of the Boslaagte Nature Reserve

A visual impact index was generated taking into account visual exposure, viewer incidence/perception and visual distance of the proposed Rondavel EGI. The index indicates that potentially sensitive visual receptors within a 0.5km radius of the Grid Connection Infrastructure may experience visual impacts of high

magnitude. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; moderate within a 0.5 – 1km radius (where/if sensitive receptors are present) and low within a 1 – 3km radius (where/if sensitive receptors are present). Receptors beyond 3km are expected to have a very low potential visual impact.

The magnitude of potential visual impact is provided below for the three alternative grid corridors.

Power line Alternative 1

The Grid Connection Infrastructure may have a visual impact of high magnitude on the following observers:

- Observers travelling along the:
  - R34 arterial road south of the substation and north of the power line

The Grid Connection Infrastructure may have a visual impact of moderate magnitude on the following observers:

- Residents of/or visitors to:
  - Fraaiuitsig
  - Northern section of the Boslaagte Nature Reserve

Power line Alternative 2

The Grid Connection Infrastructure may have a visual impact of high magnitude on the following observers:

- Residents of/or visitors to:
  - Southern outlying area of the Brent Park residential area

The Grid Connection Infrastructure may have a visual impact of moderate magnitude on the following observers:

- Residents of/or visitors to:
  - Nasenby Thorns
  - Blomtuin
  - Retreat

Power line Alternative 3

The Grid Connection Infrastructure may have a visual impact of moderate magnitude on the following observers:

- Residents of/or visitors to:
  - Fraaiuitsig

No visual impact of high magnitude is envisaged for this alternative.

Visual impacts associated with the development of the Rondavel EGI include the following:

- Potential impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.
- Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase.
- Potential visual impact on sensitive visual receptors within the region (0.5 – 3km) radius) during the operational of the grid connection infrastructure.
- The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.

The anticipated visual impacts listed above (i.e., post mitigation impacts) range from moderate to low significance. No visual impacts of a high significance are expected to occur. Anticipated visual impacts on sensitive visual receptors in proximity to the power line are not considered to be fatal flaws for the proposed project. Considering all factors, it is the opinion of the specialist that the development of the Grid Connection Infrastructure as proposed be authorised; subject to the implementation of the recommended mitigation measures and EMPrs.

8.2.6 Social Impacts

Impacts on the social environment are expected in all phases of project development. The social impacts identified will be either of a low or medium for negative impacts following mitigation, with one high positive impact determined following implementation of enhancement measures. The following positive and negative impacts were identified and assessed for the project.

Construction Phase:

Positive:

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Negative:

- Impacts associated with the presence of construction workers on local communities.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Risks posed to farming activities by construction workers.

Operations Phase:

Positive:

- Improve energy security and establishment of energy infrastructure.
- Creation of employment opportunities.

Negative:

- The visual impacts and associated impact on sense of place.
- Risks posed to farming activities by maintenance workers.
- Impact on Tourism.

The findings of the SIA indicate that the nature and significance of the social impacts associated with each of the transmission line alternatives are similar. The social impacts associated with substations will be negligible. The significance of the potential negative social impacts for both the construction and operational phase are Low Negative with mitigation.

All negative social impacts are within acceptable limits with no impacts considered as unacceptable from a social perspective. The recommendations proposed for the project are considered to be appropriate and suitable for the mitigation of the negative impacts and the enhancement of the positive impacts. The establishment of the proposed project is therefore supported by the findings of the SIA.

8.2.7 Assessment of Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The most significant of these will be the contribution towards a reduction in greenhouse gas emissions and consequent assistance with climate change mitigation.

The alignment of renewable energy developments, including their associated grid connection infrastructure, with the IRP and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The social and economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant. However, there is a lack of understanding of the cumulative impacts on other environmental and social receptors such as birds, visual amenity and landscape character of the affected areas largely due to limited information of impacts from existing facilities within the country. This assessment is therefore qualitative.

The assessment of the cumulative impacts was undertaken through the consideration of the Rondavel EGI impacts in isolation and compared to the cumulative impacts of the Rondavel EGI and other existing and proposed solar energy facilities and their associated electrical grid infrastructure, including the proposed Rondavel SEF within a 30km radius from the development area. Cumulative impacts are expected to occur with the development of the Rondavel EGI throughout all phases of the project life cycle and within all areas of study considered as part of this BA Report. The main aim for the assessment of cumulative impacts considering the Rondavel EGI is to determine whether the cumulative impact will be acceptable within the landscape proposed for the development, and whether the cumulative loss, from an environmental and social perspective, will be acceptable without whole-scale change.

Considering the findings of the specialist assessments undertaken for the project, the cumulative impacts for the proposed the Rondavel EGI will be acceptable, and the majority are rated as being of **low to moderate significance** with the implementation of appropriate mitigation. On this basis, the following can be concluded considering the Rondavel EGI:

- The proximity of the Rondavel EGI to existing similar developments is seen as a positive aspect of the development and overall cumulative impacts associated with the Rondavel EGI development are considered acceptable.
- The construction of the project will not result in unacceptable impacts on ecological processes and aquatic features.
- The avifaunal cumulative impact of the planned EGI was considered low from a potential bird collision perspective after mitigation. However, the combined cumulative impact of the existing and planned power lines within a 30km radius is considered moderate. The cumulative impact of displacement due to habitat transformation as a result of the construction of the on-site substation associated with the Rondavel SEF is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions in the substation yard of the onsite substation is also likely to be low as it is expected to be a rare event. The avifauna

specialist determined that the Rondavel EGI project is acceptable from a cumulative avifaunal impact perspective.

» The construction of the project will not result in the complete or whole-scale change in sense of place and character of the area nor will the project result in unacceptable visual intrusion.
» The construction of the project will not result in unacceptable loss of or impact to heritage resources.
» The project will contribute towards a reduction in greenhouse gas emissions indirectly via the support of energy generation and will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government has committed to become a signatory.

Based on the detailed evaluation, the cumulative impact associated with the construction and operation of the proposed Rondavel EGI and other proposed renewable energy facilities, including their associated grid connection infrastructure in the region is considered acceptable.

8.3. Comparative Assessment of the Grid Corridor and Substation Alternatives

This assessment considered the development of a 132 kV double- or single-circuit overhead power line and an on-site Eskom substation, connecting to the national grid via either a loop-in loop-out connection into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line near the site, or a direct connection to the existing Kroonstad Municipality 132kV substation, depending on which alternative is implemented.

Two alternative, viable substations were assessed and considered in the Rondavel SEF EIA, and therefore both are considered feasible alternatives for the purposes of this application. These alternatives are therefore:

Preferred Substation (Alternative 1) (PS), comprising the following infrastructure:

- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

Alternative Substation (Alternative 2) (AS), comprising the following infrastructure:

- 33/132 kV Eskom substation
- Associated equipment, infrastructure and buildings
- Temporary and permanent laydown areas

In addition, three alternative grid corridors have been identified for assessment to allow for avoidance of environmental sensitivities as far as possible. The following grid corridors alternatives are provided for the Rondavel EGI (refer to **Figure 1.1**):

» **Alternative 1 (Preferred):** On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~2.33km long.
» **Alternative 2**: **Alternative 2**: On-site substation directly connecting to the existing Kroonstad Municipality 132kV substation. This corridor is ~6.11km long
» **Alternative 3**: On-site substation directly connecting into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line. This corridor is ~3.68km long.

All the corridor options and substation alternatives represent technically feasible options, the preferred corridor may therefore be determined by the route incurring the least environmental impact.

From the specialist studies undertaken, the following conclusions were made regarding the grid connection alternatives:

	Alternative 1	Alternative 2	Alternative 3
Ecology	Favourable/Acceptable	Not Preferred	Most Favourable/Preferred
Avifauna	Preferred	Acceptable	Acceptable
Aquatic Resources	Most Favourable/Preferred	Not Preferred	Favourable/Acceptable
Heritage	Acceptable	Acceptable	Acceptable
Visual	Acceptable	Acceptable	Preferred
Social	Acceptable	Acceptable	Preferred

From the above summary of the specialist findings, it was determined that grid corridor Alternative 3 is the most preferred connection option from an ecological, visual and social perspective as it consistently scored lower impact significance ratings than Alternatives 1 and 2. From an avifaunal and aquatic perspective, Alternative 1 is the preferred connection option as it is the shortest of the options and it crosses the least freshwater resources.

Considering the above findings, it can be concluded that Alternatives 1 and 3 are most favourable, and either option can be authorised.

From the specialist studies undertaken, the following conclusions were made regarding the on-site substation alternatives:

	Alternative 1	Alternative 2
Ecology	Favourable/Acceptable	Most Favourable/Preferred
Avifauna	Acceptable	Acceptable
Aquatic Resources	Most Favourable/Preferred	Favourable/Acceptable
Heritage	Acceptable	Acceptable
Visual	Acceptable	Acceptable
Social	Acceptable	Acceptable

Considering the above findings, it can be concluded that all on-substation options are considered acceptable. The preferred option will be informed by the final technical preference.

8.4. Environmental Sensitivity Mapping

As part of the specialist investigations undertaken within the project development area, specific environmental features and areas were identified. The environmental features identified within and directly adjacent to the development area and development footprint are illustrated in **Figure 8.1**. The features identified specifically relate to ecology, freshwater resources, avifaunal habitats, palaeontology and heritage features. The following points provide a description of those features of very high and high sensitivity identified within the development area:

- **Ecological features:**
  - All wetland features were deemed very high ecological sensitivity and a 30m no-go buffer around them is recommended.
  - Dolerite outcrops and *Acacia karroo – Asparagus laricinus* Shrub-Grassland were considered to be of medium sensitivity.
- **Freshwater features:**
  - All wetland features are deemed high sensitivity and a 30m no-go buffer around them is recommended. These are considered no-go regions.
- **Avifaunal features:**

  High sensitivity – Mark with Bird Flight Diverters: Flight paths associated with surface water.
  - Rivers and drainage lines are used by birds as flight paths, particularly waterbirds that commute up and down channels. Dams are also a large attraction for waterbirds, and birds commuting between dams may be at risk of collisions.
- **Palaeontological features:**
  - Although no palaeontological resources were identified within the development area, the palaeontological sensitivity of the study area is rated as high to very high for all corridor and substation alternatives. It is therefore recommended that palaeontological monitoring of excavations takes place during the construction phase of the grid connection infrastructure.
- **Heritage features:**
  - A heritage resource with a grading of IIIA (RDW002) was identified within the development area for the Rondavel SEF and on-site substation. It is recommended that a no-go buffer of 100m be implemented around these identified stone piles.

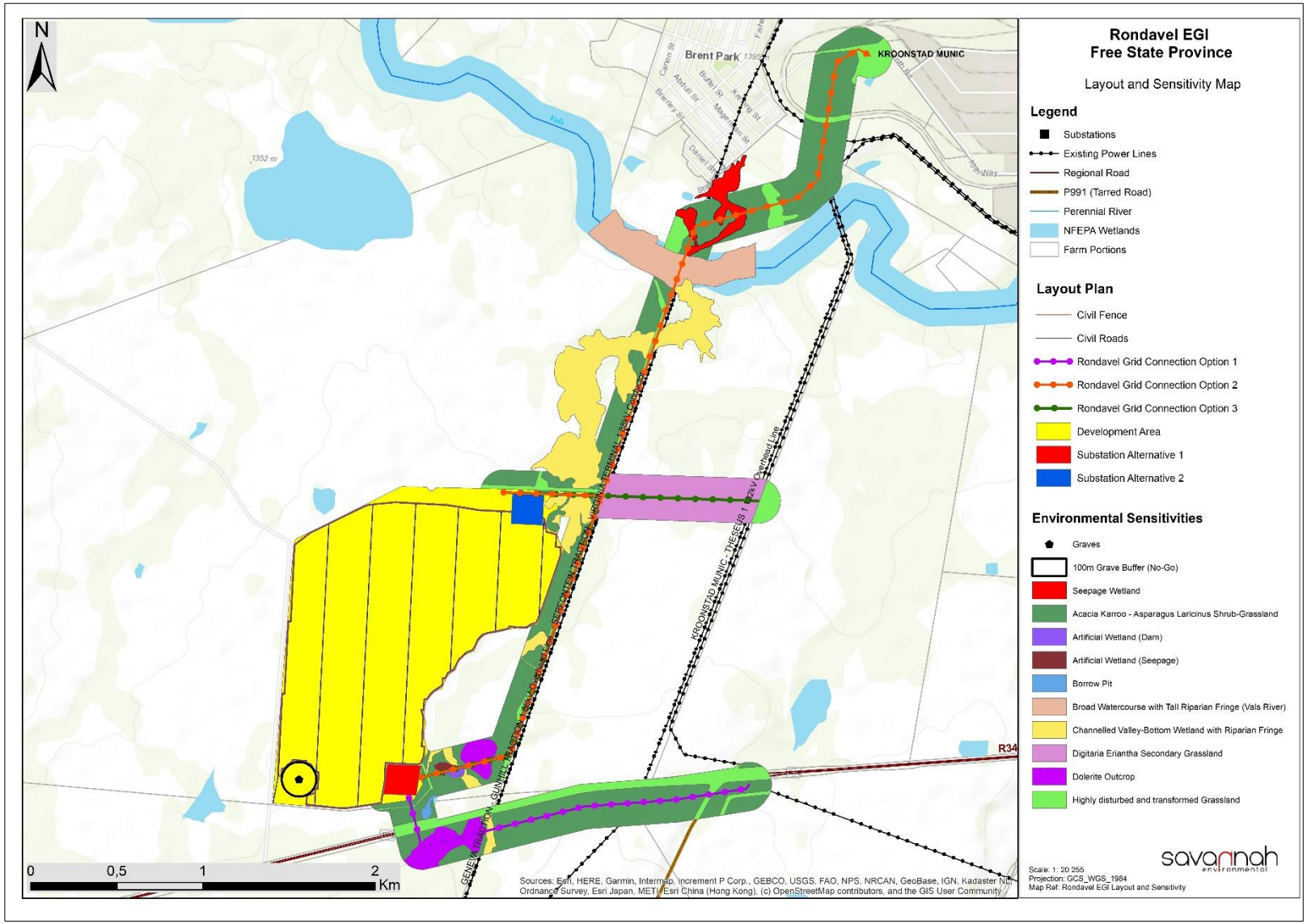

Figure 8.1: Environmental sensitivity and layout map of the Rondavel EGI development footprint including all corridor and substation alternatives (**A3 map is included in Appendix K**).

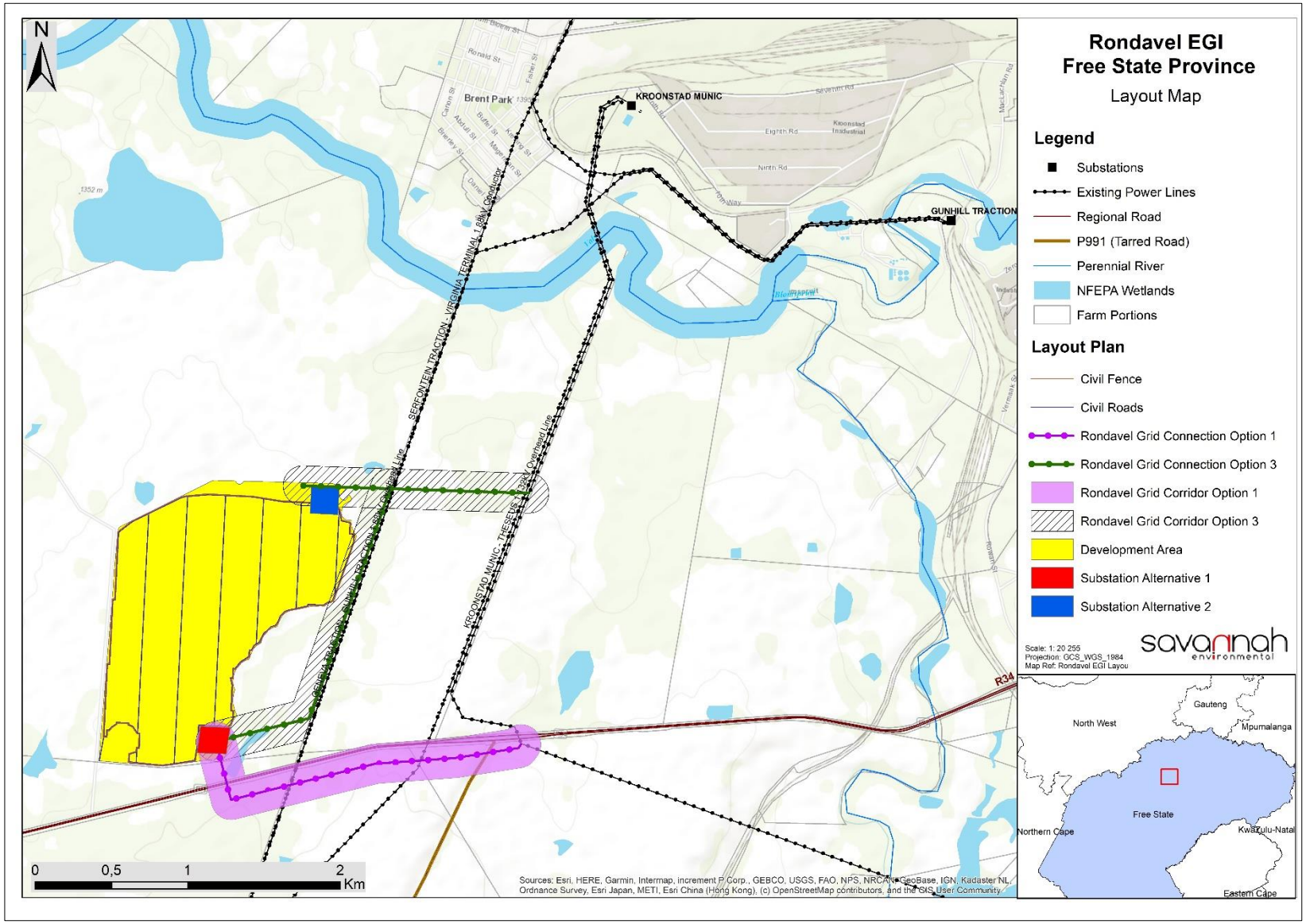

Figure 8.2: Preferred layout map for the Rondavel EGI (**A3 map is included in Appendix K**).

8.5. Overall Conclusion (Impact Statement)

Technically viable grid connection corridor alternatives for the Rondavel EGI were proposed by the developer and assessed as part of this BA Report. The environmental assessment of the development footprint (grid layout) within the development area was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with implementation of Rondavel EGI, should the mitigation measures provided be implemented, and the preferred alternative only be approved for development. Through assessment of these alternatives, Grid Corridor Alternative 1 and 3 were recommended as the preferred alternatives for authorisation, and both substation alternatives were rated as acceptable for authorisation.

The preferred grid corridor alternatives (Alternative 1 and 3) and both substation alternatives are considered as the most appropriate from an environmental perspective and are considered acceptable within all fields of specialist study undertaken for the project, provided mitigation, as required by the respective specialists, are implemented. All impacts associated with the proposed Rondavel EGI can be mitigated to acceptable levels or enhanced through implementation of the recommended mitigation or enhancement measures. The layout map included as **Figure 8.2** is therefore considered to be the preferred grid layout for the Rondavel EGI.

8.6. Overall Recommendation

Considering the findings of the independent specialist studies and the impacts identified, it is the reasoned opinion of the EAP that the development of the Rondavel EGI is acceptable within the landscape and can reasonably be authorised specifically for Grid Corridor Alternative 1 and/or 3. The period for which the Environmental Authorisation is required to remain valid is 10 years from the date of authorisation, with a period of 10 years for the design, planning, construction, and commissioning of the activity to be concluded.

The authorisation for Rondavel EGI would include the following key infrastructure and components:

- **On-site substation which consists of:**
  - 33/132kV portion of the substation (adjacent to the Independent Power Producer (IPP) substation).
  - Associated equipment, infrastructure, and buildings.
  - Temporary and permanent laydown areas.

- **Distribution Line:**
  - For the Rondavel PV solar energy facility, the 132kV distribution line from the onsite 33/132kV Eskom portion of the substation will loop in and loop out into the existing Kroonstad Municipality – Kroonstad Switching Station 1 132kV power line, or connect directly with the Kroonstad Municipality 132kV substation, depending on which alternative is implemented.

The following key conditions would be required to be included within an authorisation issued for the Rondavel EGI:

- The development of Grid Corridor Alternatives 1 and 3 as per the layout map in **Figure 8.2,** is the preferred alternative and nominated for approval.

- The period for which the Environmental Authorisation is required to remain valid is 10 years from the date of authorisation, with a period of 10 years for the design, planning, construction, and commissioning of the activity to be concluded to allow for a segmented construction approach.
- All mitigation measures detailed within this Basic Assessment Report, as well as the specialist reports contained within **Appendices D to H** are to be implemented.
- The EMPRs as contained within **Appendix I & J** of this Basic Assessment Report, should form part of the contract with the Contractors appointed to construct and maintain the Rondavel EGI in order to ensure compliance with environmental specifications and management measures. The implementation of these EMPRs for all life cycle phases of project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- Specialist recommendations regarding high sensitivity features and no-go zones as detailed in Section 8.4 of this Basic Assessment and **Appendices D to H** must be adhered to in the final layout.
- The proposed layout must be located within the identified development area, comprising the preferred grid corridor and on-site substation. The final layout must be submitted to DFFE for review and approval following detailed design.
- Pre-construction environmental induction for all construction staff on-site must be undertaken to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas, etc.
- Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
- A site-specific eradication and management programme for alien invasive plants must be implemented during construction
- Pre-construction walk-through of the power line route/corridor must be undertaken to locate species of conservation concern that can be translocated or avoided.
- No pylons must be placed within the delineated wetland/riparian habitats; however, the pylon may span these features.
- Any activities within the wetlands apart from the spanning of the powerline should be avoided and the wetland features should, for all other activities be regarded as no-go areas.
- An avifaunal specialist must conduct a walk-through prior to implementation to demarcate sections of the powerline that need to be marked with Eskom approved bird flight diverters. The bird flight diverters should be installed on the full span length on the earthwire (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.
- A no-go buffer of 100m must be implemented around RDW001 and RDW004.
- All excavations into bedrock must be monitored by a suitably qualified palaeontologist and a report on the outcomes of the monitoring activities must be submitted to SAHRA on completion of the development of the EGI.
- Should any previously unrecorded archaeological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
- The proponent should liaise with the Moqhaka Local Municipality with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers

(e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent should consider the option of establishing a Monitoring Forum that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities.
- Before construction commences, individuals of listed species within the on-site substation development footprint and power line corridor that would be affected, must be counted and marked and translocated, where deemed necessary by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant national and provincial authorities and/or the Department of Forestry, Fisheries, and the Environment (DFFE), must be obtained before the individuals are disturbed.
- The necessary water use authorisation must be obtained from the Department Human Settlements, Water and Sanitation (DHSWS) for impacts to a watercourse and for abstraction of water from natural resources (should this be required) prior to construction.
- The final project footprint must be kept as small as possible and must consider all sensitive environmental features not considered to be suitable for development (as identified by the respective specialists).
- Alien invasive species management at the site should take place according to the Alien Invasive Management Plan.

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5970	AIA Phase 1	Cobus Dreyer	29/05/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at the Farm Middenspruit 151, Kroonstad, Free State
5971	AIA Phase 1	Cobus Dreyer	12/07/2006	Archaeological and Historical Investigation of the Proposed Township Developments at Maokeng, Kroonstad, Free State
5972	AIA Phase 1	Cobus Dreyer	26/10/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at the Farm Boschpunt 2218 Kroonstad, Free State
129819	AIA Phase 1	Jaco van der Walt	30/08/2013	Archaeological Impact Assessment Report for the Proposed Steynsrus (19.5MW) Photovoltaic Plant, Free State Province
533640	HIA Phase 1	Edward Matenga	25/11/2019	PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEONTOLOGICAL DESKTOP ASSESSMENT) IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR THE PROPOSED PHASE II MAOKENG HOUSING DEVELOPMENT(5390 ERVEN MOAKENG) (KROONSTAD), FREE STATE PROVINCE
165622	HIA Phase 1	Johnny van Schalkwyk	04/06/2014	Cultural heritage impact assessment for the UPGRADE OF A SECTION OF NATIONAL ROUTE 1, BETWEEN KROONSTAD AND VENTERSBURG, FREE STATE PROVINCE

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