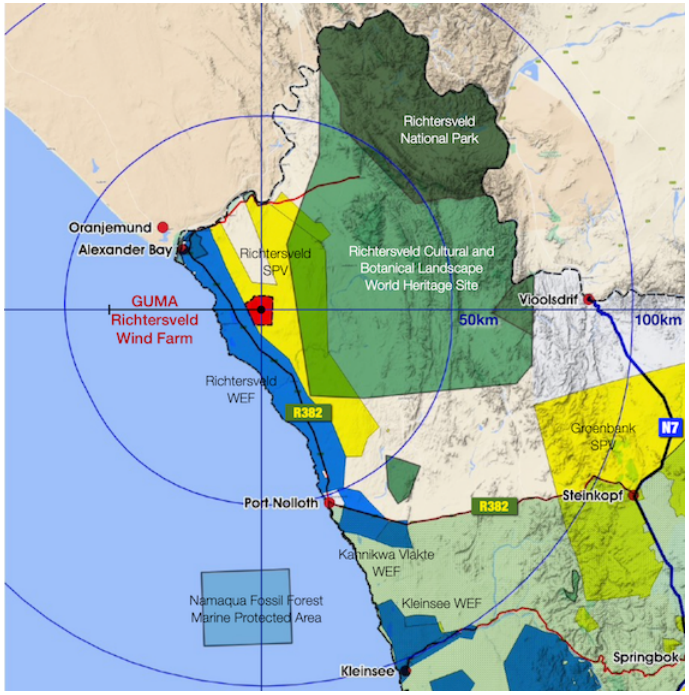
# Proposed Guma Richtersveld Wind Energy Facility near Alexander Bay, Northern Cape Province

By Richtersveld Wind Farm (Pty) Ltd

## Visual Impact Assessment

Amendment 30 June 2022

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*EXECUTIVE SUMMARY*

This Visual Impact Amendment Report for the proposed Guma Richtersveld Wind Energy Facility (WEF) provides an update of the previous Visual Impact Assessment (VIA) of 2013, based on the revised layout of the Wind Facility, and forms part of the amendment process.

The proposed WEF would create a distinct feature in the open, arid landscape of the Richtersveld, and is located about 8km from the Richtersveld Cultural and Botanical Landscape World Heritage Site. The proposed substations, with transformers, together with the various operations and management (O&M) buildings, being smaller in scale, and located on lower slopes, would be less visually significant.

Given the topography and nature of the landscape at the Richtersveld site, and its surrounding context, it is anticipated that the wind turbines would have a major visual impact significance both before and after mitigation during the operational phase, given that there is little opportunity for visual screening or further mitigation other than avoidance measures. Some mitigation is possible through micro-siting of turbines, Turbine number 10 in particular.

The potential visual impact of the proposed substation and operation and management (O&M) buildings would be lower, the visual significance ratings being minor before and after mitigation, the substation complex is located in a low-lying, visually unobtrusive area of the site.

The remoteness of the site, the considerable distance to sensitive receptors/human settlements and the previous disturbance of the local area from diamond mining, are mitigating factors. The proposed wind turbines would be some 3.5 km from the R382 arterial road.

Cumulative visual impacts need to be taken into consideration, as other wind farms and a solar PV Farm are also proposed in the area. The proposed Kannikwa Vlakte Wind Farm 1 near Port Nolloth is, however, some 50km away and would therefore not be in the same viewshed as the proposed Guma Richtersveld WEF. The cumulative visual impact significance is rated moderate, based on available information.

The fact that the currently proposed WEF has larger turbines is offset by the reduced number of turbines from that of the previously authorised WEF layout. The overall visual impact significance ratings would therefore be similar. No fatal flaws were identified in the visual assessment, and the amended WEF layout could be authorised from a visual perspective.

| NEMA requirements for Specialist Reports | | |
|---|---|---|
| | **Specialist Report content as required by the NEMA 2014 EIA Regulations, as amended** | **Section** |
| 1 (1)(a) | (i) the specialist who prepared the report; and | Appendix 1 |
| | (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae; | |
| (b) | a declaration that the specialist is independent in a form as may be specified by the competent authority; | TBP |
| (c) | an indication of the scope of, and the purpose for which, the report was prepared; | Sections 1 |
| (cA) | an indication of the quality and age of the base data used for the specialist report; | Section 2 |
| (cB) | a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Sections 6 and 7 |
| (d) | the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment; | Section 2 |
| (e) | a description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used; | Section 2 |
| (f) | details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative; | Sections 10, 11 and figure 6 |
| (g) | an identification of any areas to be avoided, including buffers; | Section 10 |
| (h) | a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | Figure 6 |
| (i) | a description of any assumptions made and any uncertainties or gaps in knowledge; | Section 1 |
| (j) | a description of the findings and potential implications of such findings on the impact of the proposed activity, or activities; | Section 14 |
| (k) | any mitigation measures for inclusion in the EMPr; | Section 12 |
| (l) | any conditions for inclusion in the environmental authorisation; | Section 12 |
| (m) | any monitoring requirements for inclusion in the EMPr or environmental authorisation; | Section 13 |
| (n) | a reasoned opinion- | Sections 12 and 14 |
| | (i) whether the proposed activity or portions thereof should be authorised; and | |
| | (iA) regarding the acceptability of the proposed activity or activities; and | |
| | (ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; | |
| (o) | a description of any consultation process that was undertaken during the course of preparing the specialist report; | Refer to EAP |
| (p) | a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | Refer to EAP |
| (q) | any other information requested by the competent authority. | N/A |
| 2 | Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply. | A verification report included in Appendix 3. |

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***List of Abbreviations***

| | |
|---|---|
| *DFFE* | *Department of Forestry, Fisheries and Environment* |
| *EIA* | *Environmental Impact Assessment* |
| *EMPR* | *Environmental Management Programme* |
| *GN* | *Government Notice* |
| *NEMA* | *National Environmental Management Act* |
| *O&M* | *Operations and maintenance* |
| *REDZ* | *Renewable Energy Development Zone* |
| *REEA* | *Renewable Energy EIA Application Database* |
| *VIA* | *Visual Impact Assessment* |
| *WEF* | *Wind energy facility* |

## *SECTION 1: INTRODUCTION*

### 1.1 SCOPE OF THE STUDY

The scope of work for the originally proposed Richtersveld WEF VIA, included the following:

1) A description of the approach and methodology used in the visual assessment.
2) A description of the proposed renewable energy facilities at the Richtersveld site.
3) A description of the existing visual characteristics of the site, together with their visual significance.
4) Identification of the area from which the proposed facilities would potentially be visible (or viewshed).
5) Identification of visual issues that need to be taken into account in the planning and implementation of the proposed facilities.
6) Mitigation measures for the siting and layout of the proposed energy facilities at the Richtersveld site.

This amendment also includes the above in relation to the change in turbine dimensions and layout.

### 1.2 LIMITATIONS AND ASSUMPTIONS

No detailed information about building finishes, as well as lighting and internal access roads were available during the visual assessment, and some assumptions had to be made regarding these elements. No information on the location and size of the construction camp, or the location of borrow pits, if required, was available.

### 1.3 LOCATION OF THE PROPOSED RICHTERSVELD WEF

The site is located 22km south of Alexander Bay in the Northern Cape Province. Access is via the R382 between Port Nolloth and Alexander Bay on the West Coast, (see Figure 1).

## *SECTION 2: APPROACH AND METHODOLOGY*

The methodology used for the VIA included the following steps:

- Preparation of a visual baseline report based on a field trip during October 2010. Base information has been updated during the preparation of this Report, based on available information at a desktop level;
- Mapping of the revised energy facilities, including distance circles and critical viewpoints, particularly those relating to intersections of major roads, arterial and scenic routes, as well as settlements and farmsteads;
- Determination of an updated viewshed, using a digital terrain model (DTM) to determine the area that would be visually affected, including comparison with the viewshed of the previously authorised WEF.

- Preparation of updated photomontages using panoramic photographs to determine the degree of visibility of the proposed wind energy facilities, and comparison with the montages of the previously authorised layout;
- Assessment of updated potential visual impacts, using quantitative criteria, such as visibility and exposure, as well as qualitative criteria such as compatibility with the surroundings and effect on landscape integrity.
- Finally, the significance of visual impacts was re-assessed, both before and after mitigation, then reviewed and updated based on the methodology provided by Rina (May, 2022).

**Field Work:**

A site visit was carried out 2010 for the earlier visual assessment, and no further field work was considered necessary, as photographic coverage was adequate for the updated assessment. The season was not a consideration for the visual assessment, but clear visibility was required for the photographic survey.

## *SECTION 3: DESCRIPTION OF THE PROJECT IN TERMS OF VISUAL CONSIDERATIONS*

Table 1 below provides a comparison of the previously approved and the currently proposed turbine specifications. A list of the proposed project infrastructure with visual implications is summarised in Table 2. The proposed facility would require an electrical substation, operations and maintenance (O&M) buildings, internal access roads and internal powerline connections.

The large scale of the wind turbines means that these will have the greatest visual significance in the landscape. An indication of the size and nature of the original and currently proposed turbines is given in Figures 2 and 2a. The turbines will have a hub height of 130m, with a rotor diameter of 175m, increased from the previous 100m hub height and 117m rotor diameter. Each turbine has an electrical transformer. The layout of the WEF is indicated on Figures 4 and 4a.

*Table 1: Comparison of Turbine Specifications*

| Specification | Approved | Proposed |
|---|---|---|
| Hub Height | 100m | 130m |
| Rotor diameter | 117m | 175m |
| Number of turbines | 70 | 32 |
| Output | 2 to 3MW per turbine.<br>Total output 225MW | 7MW per turbine.<br>Total output 224MW |

*Table 2: Description of Current WEF Components*

| ***Facility*** | ***Footprint*** | ***Height*** | ***Comments*** |
|---|---|---|---|
| Total area of the site | 49,8 km² | n/a | |
| Area covered by turbines | 17,58 ha | - | Includes hardstand |
| No. of wind turbines | 32 x 7MW | - | Total output 224MW. |
| Size of wind turbine | - | Hub ht. 130m<br>Rotor diam. 175m | Light grey painted steel tapered tubular tower. |
| Electrical transformer | 6m² (2x3m) each turbine | 2.5m | Green painted steel mini container. |
| Disturbance footprint<br>Lay-down area footprint | 362m² x 32 turbines<br>2500m² x 32 turbines | n/a | At each turbine; gravel surface |
| Internal access roads | | n/a | 5 to 12m wide, gravel surface + side drains |
| Electrical substation | One main 220kV station 160x160m | Single storey buildings, plus transformers. | Transformers next to substation buildings. |
| Electrical pylons of connecting transmission line | Approx. 24,05 km | 32m | Links to Oranjemund Eskom Substation |
| Operations and maintenance buildings (O&M building) | 960m² site area (40 x 24m) included in the 160x160m of the 220kV substation | Single storey | Steel portal frame structures.<br>Parking included in the O&M area. |
| Wind measuring mast | 2 masts | 80m | Steel mast (now dismantled with only small masts remaining).<br>Additional wind measuring to be erected before erection of turbines. |
| Security fencing | As required | 2m | Galv. weldmesh around substation and O&M buildings only. |
| Security Lighting<br>Navigation lights | n/a<br>2 on each turbine nacelle | 5m<br>100m | Painted steel lighting mast<br>Flashing red light (to CAA requirements) fitted with reflectors to screen lights when seen from below. |
| *Construction Phase:* | | | |
| Construction camp | 2 500m² | - | Temporary prefab structures |
| Borrow pits | - | - | Site to be determined - could be from existing sources in the area instead. |

***SECTION 4: DESCRIPTION OF THE AFFECTED ENVIRONMENT***

A description of the Richtersveld site is summarised in Table 3 below, including visual/scenic significance, along with visual opportunities and constraints in relation to the siting of energy facilities. Viewpoints and viewsheds are indicated on Figures 4a and 5, and photographic panoramas are given in Figures 7 to 10.

*Table 3: Landscape Description of the Richtersveld Site*

| | |
|---|---|
| *Location* | The site is located on three farms, (Rooibank Farm 7/2, Witbank Farm 6/2 and part of Farm 1 Re/1), 22km south of Alexander Bay in the Northern Cape Province. Access is via the R382 between Port Nolloth and Alexander Bay on the West Coast. |
| *Geology* | The general area consists of sand, being old dunes, possibly the Sandveld Group, overlying phyllites, quartzites, conglomerates, schists etc. which are clearly exposed at the Holgat River bridge crossing to the south. Highpoints of the site, such as Visagiesfonteinkop, are granite intrusions (Figure 3). |
| *Physical Landscape* | The area consists of gently undulating hilly topography reaching 319m alt. above MSL at Visagiesfonteinkop, with a flattish, dune-covered coastal plain to the west of the R382. The low-lying Visagiespan lies immediately to the west of the R382, while further west along the coast are the prospecting trenches and open cast diamond mines. The twin hills, Boegoeberg North and Boegoeberg South, are prominent features rising from the otherwise flat coastal plain, some 8km to the west of the site. |
| *Vegetation Cover and Land Use* | The vegetation type is classified as *Northern Richtersveld Yellow Dunefield*, which consists of low, sparse scrub, including succulents. The only farming activity in the arid landscape appears to be grazing by goats. Ostriches and gemsbok were also observed in the area. The coastal margin to the west of the site has been severely impacted by diamond prospecting trenches in the past, now abandoned without any reclamation having taken place. |
| *Visual Significance* | The site is visible from the R382 main road to Alexander Bay, being both a commuter and tourist route. The high-lying hills on which the proposed wind turbines would be located are visible over long distances in the open, arid landscape. |
| *Opportunities and Constraints* | The area is extremely sparsely populated, a goat herder being the only person encountered during the site visit. Farmsteads are few and scattered and do not seem to be permanently occupied. The view from the R382 main road may be a consideration in the planning of the wind farm. |

## *SECTION 5: IDENTIFICATION OF APPLICABLE POLICIES, LEGISLATION, STANDARDS AND GUIDELINES*

At the national level the following legislation would apply to visual assessments:

The National Environmental Management Act (NEMA) and the Regulations in terms of Chapter 5 of NEMA. (Act No. 107 of 1998).

The Protected Areas Act (PAA) (Act 57 of 2003, Section 17), intended to, inter alia, protect natural landscapes.

The National Heritage Resources Act (NHRA) (Act No. 25 of 1999) and the associated provincial regulations provide legislative protection for listed or proclaimed sites, such as urban conservation areas, nature reserves and proclaimed scenic routes.

## *SECTION 6: SPECIFICATION OF RELEVANT VISUAL THRESHOLDS*

As visual assessment involves both qualitative as well as quantitative criteria, it is not easy to establish environmental thresholds for the proposed energy facilities. It is therefore suggested that the criteria given in Table 8 be used as a general guide.

## *SECTION 7: IDENTIFICATION OF KEY VISUAL ISSUES*

The public participation process (PPP) during the previous assessment process provided a number of visual issues. These have been incorporated with issues identified by the visual specialists, and are summarised in Table 4 below. The issues are not seen as impacts, but more as concerns that will need to be addressed in the visual impact assessment.

*Table 4: Richtersveld WEF Visual Issues*

| | |
|---|---|
| *Potential visual intrusion on sense of place* | The site is located in an arid wilderness area noted for diamond prospecting along the coastal belt. The proposed wind farm of 32 turbines would be located partly on a ridge with low sparse vegetation. The semi-industrial type energy facilities would be a significant feature in the expansive silent landscape. |
| *Potential effect on landscape features and scenic resources* | The proposed wind turbines would be visible from the surroundings for a considerable distance. The wilderness landscape has, however, been disturbed in the past by diamond prospecting trenches and open cast mines along the coast. An existing 220kV Eskom power line skirts the site to the north-east. |
| *Potential effect on local inhabitants, visitors to the area and on tourism* | Although the proposed wind turbines would be visible to a small number of scattered farmsteads, the area is largely uninhabited. The wind turbines would be visible from the R382 linking Port Nolloth with Alexander Bay at a distance of about 3.5km at the closest point, over a travelling distance of about 15 km along the R382. |

| | |
|---|---|
| *Potential effect of the scale of the project* | The scale of the proposed energy facilities involving 32 wind turbines, along with associated infrastructure, would have visual implications for the surrounding area. |
| *Potential effect of lights at night* | Security and navigational lights at night could have an effect on the characteristic 'dark skies' of the Richtersveld. These could be particularly visible on the ridgelines. |
| *Potential effect of construction and de-commissioning* | The scale of the project could have significant visual effects relating to the construction of access roads, haul roads, borrow pits, as well as the use of cranes and other heavy construction machinery. At the end of the life of the project, foundations and roads may remain visible in the relatively arid landscape. |

## *SECTION 8: ALTERNATIVES CONSIDERED IN THE IMPACT ASSESSMENT*

Alternative layouts within the site were developed in the past, the current preferred layout being a response to the specialist studies and engineering requirements. Alternative layouts have considered bat, bird and ecological sensitivities. The current application is an amendment to a previously authorised layout. This layout may be subject to micro-siting considerations based on the current EIA process.

## *SECTION 9: SITE SENSITIVITY VERIFICATION*

The Screening Report for an Environmental Authorisation by the DFFE is attached as Appendix 3, and includes a map of Relative Landscape Sensitivity for wind energy (DFFE 2021). The sensitivity map was prepared at the regional scale and is disputed / refined, based on the more detailed desktop study and field work by the visual specialists at the project scale, as represented in the Visual Sensitivity map (Figure 6) in this Report.

The sensitive features include steep slopes, mountain ridges, and proximity to a protected area. Buffers have been added to scenic features and sensitive receptors, and the proposed layout overlaid on the sensitivity map. All no-go areas have been avoided in the layout.

## *SECTION 10: VISUAL ASSESSMENT CRITERIA*

A series of both quantitative and qualitative criteria are used to determine potential visual impacts. These are rated to determine both the expected level and significance of the visual impacts.

**(1) Viewpoints** (Figure 5a, Table 5)

Viewpoints were selected based on prominent viewing positions in the area, where uninterrupted views of the proposed energy facilities could be obtained, including potentially sensitive viewpoints. The proposed facilities would be potentially visible from the R382 arterial road, and a number of farmsteads.

**(2) Visibility** (Figure 5a)

Visibility tends to be determined by distance between the proposed energy facilities and the viewer, as well as by the location of turbines on ridgelines. Given the size of the wind turbines, visibility tends to be significant up to distances of 10km. Distance radii are shown in Figures 4a and 5a to assist in quantifying visibility of the proposed facilities.

Degrees of visibility in relation to distance tend to be as follows for the wind turbines (see also Table 5).

| | |
|---|---|
| Highly visible: | Clearly noticeable within the observer's viewframe 0 to 5km |
| Moderately visible: | Recognisable feature within observer's viewframe 5 to 10km |
| Marginally visible: | Not particularly noticeable within observer's viewframe 10 to 20km |
| Hardly visible: | Practically not visible unless pointed out to observer 20km+ |

*Table 5: Potential Visibility*

| View Pt | Location | Distance | Comments |
|---|---|---|---|
| **VP1** | R382 at access road to wind farm | 3,74 km | Clearly visible on the ridgeline. |
| **VP2** | Visagiesfontein Kop | 420 m | Highly visible in close proximity. |
| **VP3** | Pagvlei | 5,17 km | Clearly visible in the distance. |
| **VP4** | Witbank farmstead | 3,43 km | Clearly visible in the middle distance. |
| **VP5** | R382 southwest of the site | 6,25 km | Clearly visible in the distance. |

**(3) Visual Exposure** (Figure 5a)

Visual exposure is determined by the viewshed (or view catchment), being the geographic area within which the project would be visible. Some areas fall within a view shadow, and would therefore not be affected by the proposed WEF. The larger turbines of the current proposal would have a slightly increased extent than of the previous authorised proposal.

**(4) Visual Sensitivity**

Visual sensitivity is determined by topographic features, steep slopes, protected areas and arterial routes. These have been mapped together with visual buffers, as indicated on Figure 6.

**(5) Landscape Integrity**

Visual quality is enhanced by intactness of the landscape, and lack of other visual intrusions. The Richtersveld site currently has few visual intrusions, with an existing 220kV Eskom power line skirting the NE corner of the site. The site has a wilderness character, although it has been disturbed by grazing.

**(6) Cultural Landscape**

Besides natural attributes, landscapes have a cultural value, enhanced by the presence of historical settlements, old routes, graves and farmsteads. See detailed heritage impact assessment by others.

**(7) Visual Absorption Capacity**

This is the potential to screen the project. Given the scale of the proposed facilities and the open nature of the landscape, which provides little opportunity for screening, the screening potential is low.

The criteria above are considered in combination to give an indication of the potential visual impact intensity in Table 6 below.

*Table 6: Visual Impact Intensity*

| Criteria | Comments | Wind turbines | Substations / O&M bldg. |
|---|---|---|---|
| **Visibility of facilities** | Views of wind turbines from the R382 (3.5km away). Nearest farmstead 2km. | High (5) | Medium-low, (2) |
| **Visibility of lights at night** | Depends on number of turbines with nav lights, and amount of security lighting. | Medium-high (4) | Medium (3) |
| **Visual exposure** Zone of visual influence | Extensive viewshed because of the location of the turbines on mountain ridgeline. | High (5) | Medium-low (2) |
| **Visual sensitivity** Scenic value | Exposed arid landscape and visually sensitive skyline. | Medium-high (4) | Medium-low (2) |
| **Landscape integrity** Character of the area | Contrasts with wilderness landscape. Existing mining disturbance. | Medium-high (4) | Medium (3) |
| **Cultural landscape** Heritage value | Isolated farmsteads within the viewshed. | Medium (3) | Medium-low (2) |
| **Visual absorption capacity (VAC)** | Low potential of exposed ridgeline to visually absorb wind turbines. | High (5) | Medium (3) |
| **Overall visual intensity** | | High (30) | Medium (20) |

**Recommended Buffers for Wind farms:**

Guidelines prepared in the past on buffers for wind energy farms are indicated in Table 7 below. These are intended for regional scale mapping purposes and need to be adapted at the local project scale.

*Table 7: Visual Guidelines for Wind Turbine Buffers*

| *Landscape features* | *PGWC Guidelines [1]* | *SEA Visual Guidelines [2]* | *Comment* |
|---|---|---|---|
| *Project area boundary* | - | - | *Usually 1.5 times tip height of the proposed turbines.* |
| *Prominent topographic features* | *500m* | *500m* | *Includes prominent ridgelines and peaks.* |
| *Steep slopes* | *>1:4* | *>1:4* | *Generally avoid slopes >1:10.* |
| *Provincial / arterial roads* | *500m* | *500m* | *Depends on local context, e.g. rural or urban areas.* |
| *National parks/ protected areas* | *2 km* | *5 km* | *Could be less if in a view shadow.* |
| *Private reserves/ game farms* | *500m* | *2 km* | *Could be less if in a view shadow.* |
| *Farmsteads* | *400m (noise)* | *500m* | *General literature recommends 500m to 2 km.* |
| *Cultural landscapes/ heritage* | *500m* | *Feature* | *Subject to heritage assessments.* |

[1] *Provincial Government of the Western Cape, 2006. Recommended Criteria Thresholds for Regional and Site Level Assessment.*
[2] *CSIR, 2018. SEA for Wind and Solar Photovoltaic Energy in SA, Phase 2. Visual and Scenic Resources Chapter prepared by B. Oberholzer and Q. Lawson.*

Scenic resources and sensitive receptors within the study area have been categorised into very high sensitivity (no-go), high, medium and low visual sensitivity zones, as indicated in Table 8 below, based on more detailed mapping at the project scale (Figure 6).

*Table 8: Visual Sensitivity Mapping Categories for Wind Turbines*

| **Scenic Resources** | **Very high visual sensitivity (no-go areas)** | **High visual sensitivity** | **Medium visual sensitivity** | **Low visual sensitivity** |
|---|---|---|---|---|
| Topographic feature: peaks | within 250m | within 500m | - | - |
| Steep slopes | Slopes > 1:5 | Slopes 1:10 - 1:5 | - | - |
| Coastal Zone | within 1 km | within 2 km | within 4 km | - |
| Cultural landscapes (Refer to HIA) | - | - | - | - |
| **Protected Landscapes / Sensitive Receptors** | | | | |
| World Heritage Site / National Parks | within 5 km | within 10 km | within 15 km | - |
| Farmsteads outside site | within 1 km | within 2 km | within 3 km | - |
| Farmsteads inside site | within 500m | within 1 km | within 2 km | - |
| Main Arterial Route R382 | within 1 km | within 2 km | within 3 km | |

## *SECTION 11: VISUAL IMPACT ASSESSMENT*

The assessment of overall visual impact significance for the proposed WEF is based on the methodology provided by Rina (May, 2022), as used in Tables 9 to 13 below. The assessment criteria are included in Appendix 2 of this report.

*Table 9: Visual Impact Assessment – Construction Phase*

| **Description of Impact** | | |
|---|---|---|
| Visual intrusion of cranes, heavy vehicles and construction activities.<br>Temporary construction areas e.g. camps and batching plants.<br>Visual scarring from earthworks for assembly platforms.<br>Noise, dust and litter generated from construction site. | | |
| Criteria | Without Mitigation | With Mitigation |
| Type of Impact | Direct | Direct |
| Intensity (see Table 6) | High | Medium |
| Duration | Short-term | Short-term |
| Extent | Local | Local |
| Scale of impact | Approx. 20km | Approx. 20km |
| Frequency of impact | Continuous | Continuous |
| Likelihood | Likely | Likely |
| Magnitude | Medium | Medium |
| Sensitivity of receptor | Medium | Medium |
| Significance | Moderate | Moderate |
| | | |
| Degree to which impact can be reversed | The impact is reversible by means of site rehabilitation after construction and removal of construction equipment. | |
| Degree to which impact may cause irreplaceable loss of resources | Scenic resources are not damaged irreparably. Receptors (residents and visitors) would be affected over the short term. | |
| Degree to which impact can be mitigated | There is some scope for mitigation as per the recommended mitigation measures below. | |
| Mitigations | Disturbed areas to be rehabilitated / revegetated as soon as possible during and after the construction phase.<br>Temporary laydown and areas and batching plants to be located away from the R382 arterial road.<br>Stockpiles to be located within approved construction footprints.<br>Visual mitigations to form part of the EMPr. | |

*Table 10: Visual Impact Assessment – Operation Phase (Wind Turbines)*

| **Description of Impact** | | |
|---|---|---|
| Potential visual intrusion of the tall wind turbines on the rural landscape, scenic resources and sensitive receptors. Change in the wilderness/pastoral character and sense of place of the local area. | | |
| Criteria | Without Mitigation | With Mitigation |
| Type of Impact | Direct | Direct |
| Intensity (see Table 6) | High | High |
| Duration | Long-term | Long-term |
| Extent | Local | Local |
| Scale of impact (ZVI) | Approx. 20km | Approx. 20km |
| Frequency of impact | Continuous | Continuous |
| Likelihood | Likely | Likely |
| Magnitude | High | High |
| Sensitivity of receptor | High | High |
| Significance | Major | Major |
| | | |
| Degree to which impact can be reversed | The impact would be reversible at the decommissioning phase by means of dismantling the turbines and site rehabilitation. | |
| Degree to which impact may cause irreplaceable loss of resources | Scenic resources are not damaged irreparably. Receptors (residents and visitors) would be affected over the long term. | |
| Degree to which impact can be mitigated | Mitigation only achievable by means of avoidance in the siting of turbines. No potential for screening of the tall turbines. | |
| Mitigations | Mitigation only achievable by means of avoidance of no-go and high visual sensitivity areas in the siting of turbines, including turbines on prominent peaks. Turbine no. 10 to be micro-sited to avoid hillcrest. | |

*Table 11: Visual Impact Assessment – Operation Phase (Infrastructure)*

| **Description of Impact** | | |
|---|---|---|
| Visual effect of industrial-type substations and O&M buildings.<br>Visual intrusion of overhead powerlines, including silhouette effect on skylines of ridges.<br>Visual intrusion of internal access roads and hardstands in the local area. | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| Type of Impact | Direct | Direct |
| Intensity (see table 6). | Medium | Low |
| Duration | Long-term | Long-term |
| Extent | On-site | On-site |
| Scale of impact (ZVI) | Approx. 5km | Approx. 5km |
| Frequency of impact | Continuous | Continuous |
| Likelihood | Likely | Likely |
| Magnitude | Medium | Medium |
| Sensitivity of receptor | Low | Low |
| Significance | Minor | Minor |
| | | |
| Degree to which impact can be reversed | The impact would be reversible at the decommissioning phase by means of dismantling the infrastructure and implementing site rehabilitation. | |
| Degree to which impact may cause irreplaceable loss of resources | Scenic resources are not damaged irreparably. Receptors (residents and visitors) would be affected over the long term. | |
| Degree to which impact can be mitigated | Some mitigation is achievable through careful siting and screening of infrastructure. | |
| Mitigations | Substations and O&M Buildings to be located in unobtrusive low-lying areas not visible from R382 if possible, as currently proposed.<br>On-site signage to be discrete, and billboards prohibited. Signage to be fixed as low as possible.<br>Powerlines to follow valleys and avoid peaks/ridges where possible.<br>Security and other outdoor lighting to be fitted with reflectors to conceal the light source and minimise light spillage. | |

*Table 12: Visual Impact Assessment – Operation Phase: Lighting at night*

| **Description of Impact** | | |
|---|---|---|
| Visual effect on the dark skies of the Richtersveld created by lights on turbines for aircraft navigation. Visual intrusion of area and security lighting around the substation and O&M buildings. | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| Type of Impact | Direct | Direct |
| Intensity | Medium | Low |
| Duration | Long-term | Long-term |
| Extent | Local | Local |
| Scale of impact (ZVI) | Approx. 30km | Approx. 30km |
| Frequency of impact | Continuous | Continuous |
| Likelihood | Likely | Likely |
| Magnitude | Medium | Medium |
| Sensitivity of receptor | Medium | Medium |
| Significance | Moderate | Moderate |
| | | |
| Degree to which impact can be reversed | The impact would be reversible at the decommissioning phase through dismantling the turbines and other infrastructure and site rehabilitation. | |
| Degree to which impact may cause irreplaceable loss of resources | Scenic resources are not damaged irreparably. Receptors (residents and visitors) would be affected over the long term. | |
| Degree to which impact can be mitigated | Some mitigation achievable for navigation lights by means of technological advances. Security and other outdoor lighting can be fitted with reflectors. | |
| Mitigations | Use of available technology to minimise the visual effect of navigation lights, conforming with CAA requirements. Use of reflectors on general area and security lighting to conceal light sources. | |

*Table 13: Visual Impact Assessment – Decommissioning Phase*

| **Description of Impact** | | |
|---|---|---|
| Visual effect of construction activities to remove infrastructure at the end of the life of the project, including wind turbines, substation, buildings, internal overhead powerlines and access roads. | | |
| Criteria | Without Mitigation | With Mitigation |
| Type of Impact | Direct | Direct |
| Intensity | High | Medium |
| Duration | Temporary | Temporary |
| Extent | Local | Local |
| Scale of impact (ZVI) | Approx. 5km | Approx. 5km |
| Frequency of impact | Continuous | Continuous |
| Likelihood | Likely | Likely |
| Magnitude | Medium | Medium |
| Sensitivity of receptor | Medium | Medium |
| Significance | Moderate | Moderate |
| | | |
| Degree to which impact can be reversed | The impact is reversible by means of site rehabilitation after construction and removal of construction equipment. | |
| Degree to which impact may cause irreplaceable loss of resources | Scenic resources are not damaged irreparably. Receptors (residents and visitors) would be affected over the short term. | |
| Degree to which impact can be mitigated | There is some scope for mitigation as per the recommended mitigation measures below. | |
| Mitigations | Disturbed areas to be rehabilitated / revegetated as soon as possible after the decommissioning phase.<br>Wind turbines and building structures removed at the end of the life of the project.<br>Hardstands and access roads no longer required to be ripped and regraded.<br>Exposed or disturbed areas to be revegetated and returned to grazing pasture or natural veld to blend with the surroundings. | |

### Cumulative Visual Impact

This is the accumulation of visual impacts in the area, particularly in relation to other existing or proposed renewable energy facilities. Other proposed wind and solar facilities within a 30km radius, obtained from the DFFE's data base (REEA 2021, Quarter 4), are indicated in Figure 1. These would potentially be seen in combination with the proposed Guma Richtersveld WEF. The nature of the topography may result in some visual screening between the various

proposed facilities. The proposed Kannikwa Vlakte Wind Farm 1 near Port Nolloth is some 50km away, and would therefore not be in the same viewshed as the proposed Guma Richtersveld WEF. The cumulative visual impact significance is rated medium, based on available information. The Springbok Renewable Energy Development Zone (REDZ) is located some 50km to the south of the proposed WEF site (Figure 1).

## *SECTION 12: VISUAL MITIGATION MEASURES*

The purpose of this section is to recommend practical management actions and alternatives to the project design, which will avoid, minimise, mitigate or compensate for potential negative impacts and enhance benefits. A number of mitigation guidelines were recommended in the previous VIA, (Oberholzer and Lawson, 2013). These include visual buffers along the R382 arterial route and around farmsteads, keeping turbines off the crests of the main landforms, clustering turbines as far as possible and avoiding isolated turbines that extend the viewshed. The proposed substation and O&M buildings have been located in a low-lying, unobtrusive position.

### *12.1 ESSENTIAL MITIGATION MEASURES*

There are few opportunities for visual mitigation of the wind turbines in the open landscape. However, the following mitigation measures are recommended:

1) Turbine 10 to be micro-sited to avoid the no-go visual buffer of the hillcrest.
2) Internal access roads to generally follow the contours of the land to minimise cut and fill earthworks.
3) Steep or pristine areas to be avoided because of the difficulty of landscape rehabilitation in the arid landscape.
4) Substation and O&M buildings to be grouped together as far as possible.
5) Signage related to the project to be discrete. No advertising signage, particularly billboards, to be permitted.
6) Navigation lights on the wind turbines to be fitted with reflectors so that the lights are not directly visible from below, although these need to conform to CAA requirements.

### *12.2 CONSTRUCTION MITIGATION MEASURES*

1) The construction camp, material stores and lay-down area to be located as far as possible out of sight of the R382, possibly in the vicinity of the proposed substation and O&M buildings.
2) The extent of the construction camp and stores should be limited to the essential required area.
3) Disturbed areas rather than pristine or intact landscape areas to preferably be used for the construction camp.
4) Measures to control wastes and litter to be included in the EMPr.
5) Rehabilitation/ re-vegetation of areas damaged by construction activities to form part of the EMPr.
6) Borrow pits for the construction, if required, to be subject to permits from the relevant authorities.

### *12.3 OPERATIONAL MITIGATION MEASURES*

1) The footprint of the operations and maintenance facilities, as well as parking and vehicular circulation, to be clearly defined, to limit the area of disturbance.
2) The proliferation of vehicular and pedestrian tracks in the fragile desert landscape to be strictly controlled.

### *12.4 DECOMMISSIONING MITIGATION MEASURES*

1) Disturbed areas to be rehabilitated / revegetated as soon as possible after the decommissioning phase.
2) Wind turbines and building structures removed at the end of the life of the project.
3) Hardstands and access roads no longer required to be ripped and regraded.
4) Exposed or disturbed areas to be revegetated and returned to grazing pasture or natural veld to blend with the surroundings.

## *SECTION 13: RECOMMENDATIONS FOR MONITORING*

**Environmental Management Programme**
Visual input into the Environmental Management Programme (EMPr) is discussed below. This should be included in the Environmental Authorisation for the project.

**Construction Phase Monitoring:**
Ensure that visual management measures are included as part of the EMPr, monitored by an Environmental Control Officer (ECO), including siting of any construction camps, stockpiles, temporary laydown areas and batching plants outside of identified no-go areas unless otherwise approved by the visual specialists, as well as the implementation of dust suppression and litter control measures. Rehabilitation efforts to commence immediately after construction activities are completed.
**Responsibility:** ECO / Contractor.
**Timeframe:** Preparation of EMPr during the planning phase. Monitoring during the construction phase.

**Operation Phase Monitoring:**
Ensure that visual mitigation measures are monitored by management on an on-going basis, including the maintenance of rehabilitated areas, as well as control of any signage, lighting and wastes at the proposed wind farm, with interim inspections by the environmental officer based on site.
**Responsibility:** Wind Farm Operator and ECO.
**Timeframe:** During the operational life of the project.

**Decommissioning Phase Monitoring:**
Ensure that procedures for the removal of wind turbines and building structures during decommissioning are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard, and signed off by the delegated authority.
It is assumed that some access roads and concrete pads would remain. Those that are not required should be ripped and vegetation or cropland reinstated to match the surroundings.
The revegetation measures are not described here as they would fall under the auspices of the vegetation/ biodiversity specialist.
**Responsibility:** ECO / Contractor / qualified rehabilitation ecologist or horticulturist.
**Timeframe:** During the decommissioning contract phase, as well as a prescribed maintenance period thereafter (usually one year).

## *SECTION 14: CONCLUSION AND RECOMMENDATION*

The visual assessment indicates that the potential visual impact significance for the proposed wind turbines would be major before and after mitigation. Given the nature of the site, with its ridgelines and the large size of the wind turbines, there is little opportunity for screening of the wind turbines. Some micro-siting of wind turbines should be made to minimise visual impacts, particularly Turbine 10 on a hillcrest (see Figure 6). The siting of the turbines is generally constrained by wind measurements and technical considerations. Further mitigation is therefore limited to reducing the number of turbines, which is in turn related to project feasibility.

The potential visual impact significance for the associated infrastructure, including substation, connecting power lines and operations and maintenance buildings would be minor before mitigation and remain minor after mitigation. The potential cumulative visual impact significance would be Moderate.

The proposed site for the WEF lies about 50km to the north of the Springbok REDZ. However, the remoteness of the site, the considerable distance to sensitive receptors/human settlements, and the previous disturbance of the region from mining, would have a moderating effect on visual impact significance.

The fact that the currently proposed WEF has larger turbines is offset by the reduced number of turbines from that of the previously authorised WEF layout. The overall visual impact significance ratings would therefore be similar. No major fatal flaws were identified in the visual assessment, and the amended WEF layout could be authorised from a visual perspective provided the recommended mitigations are implemented.

***References***

DFFE, 2021. Screening Report for an Environmental Authorisation - Proposed Site Environmental Sensitivity, Richtersveld Wind Farm.

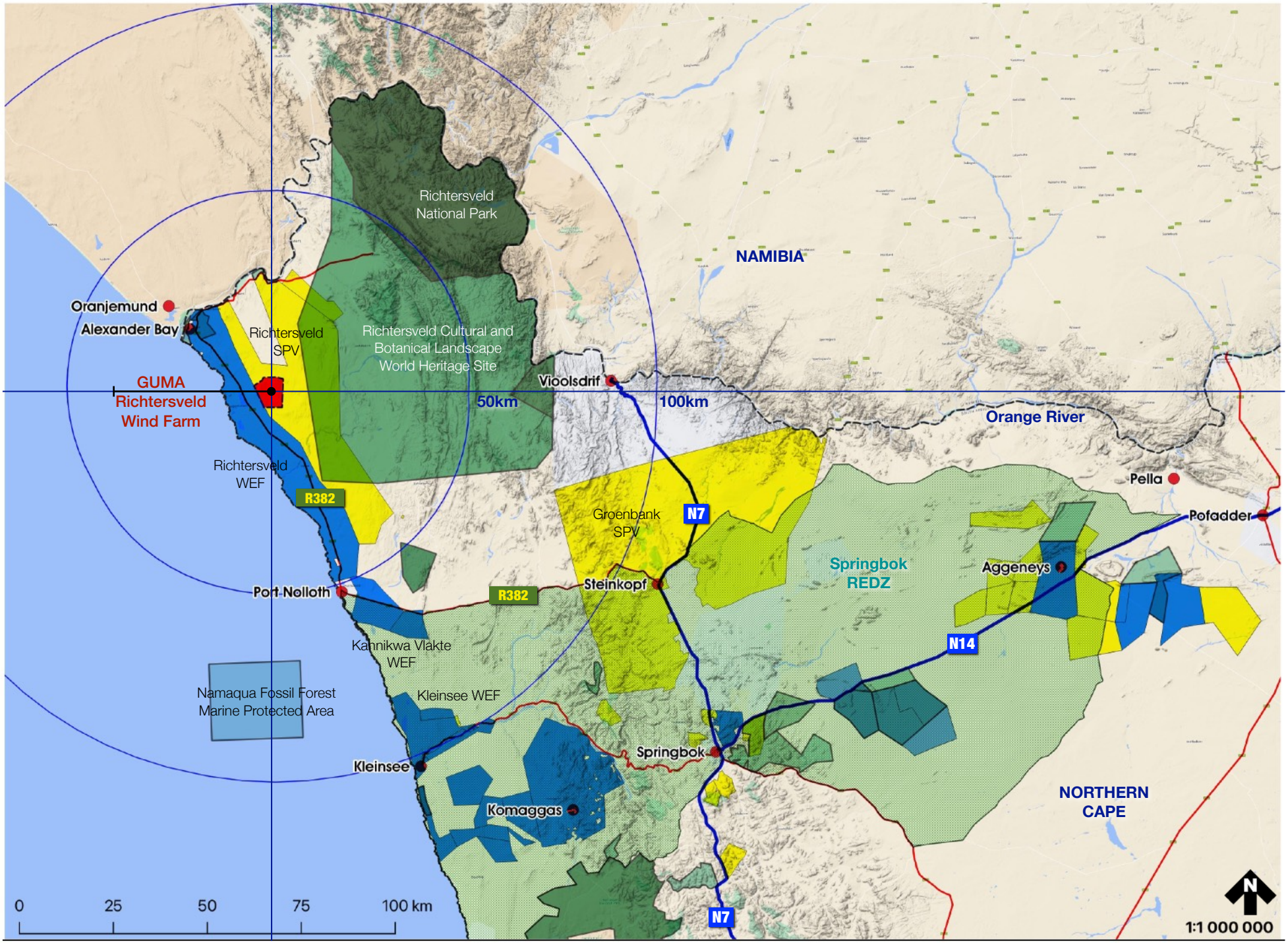
ERM, 2010. Notes on issues raised by interested and affected parties.

Mucina L. and Rutherford MC, (eds), 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia 19*. South African National Biodiversity Institute, Pretoria.

Oberholzer, B. 2005. Guideline for Involving Visual and Aesthetic Specialists in EIA Processes. Edition 1. CSIR Report No. ENV-S-C 2005 053 F. Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

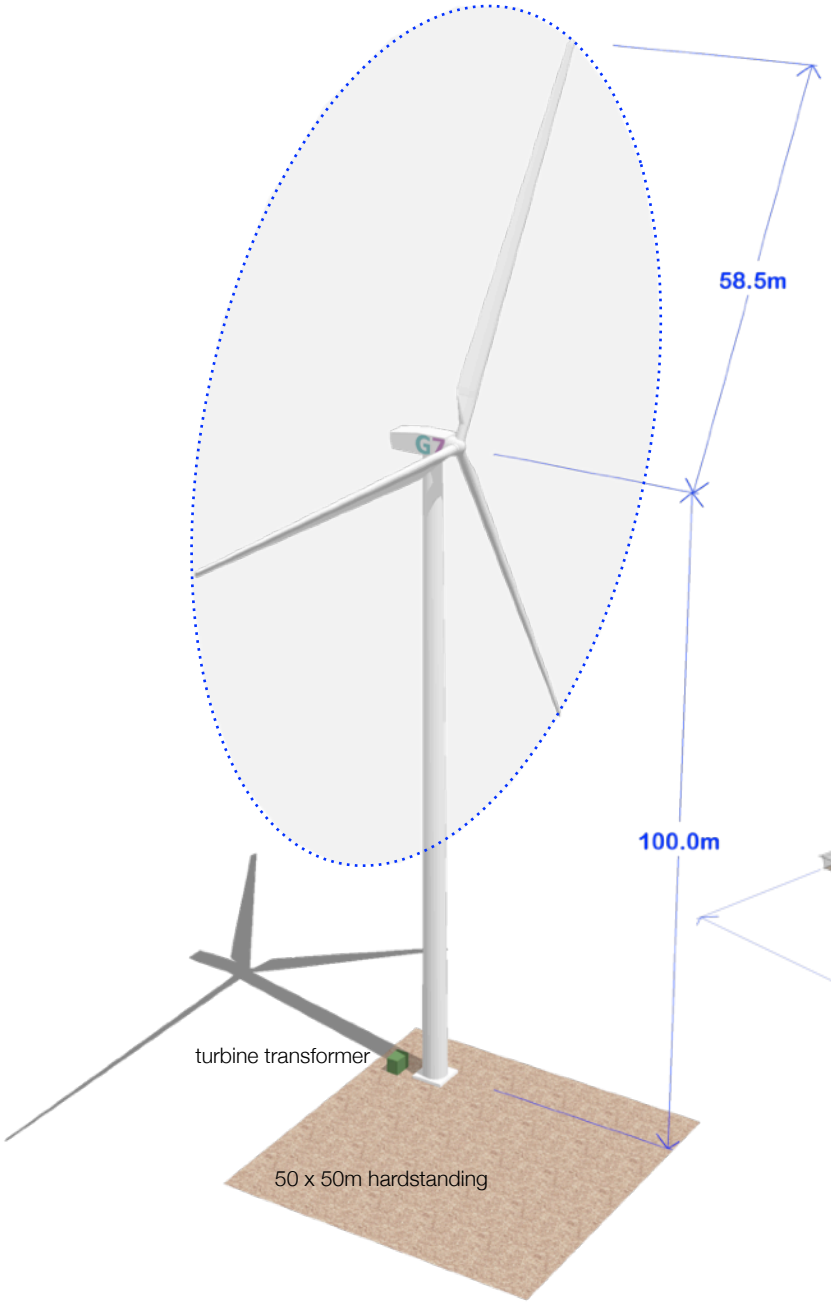
Oberholzer B. and Lawson Q, 2013. Proposed Renewable Energy Facilities At the Richtersveld Site
By G7 Renewable Energies (Pty): Visual Impact Assessment.

RINA, May 2022. Specialist Briefing Note for the Richtersveld Windfarm Part 2 Amendment Process

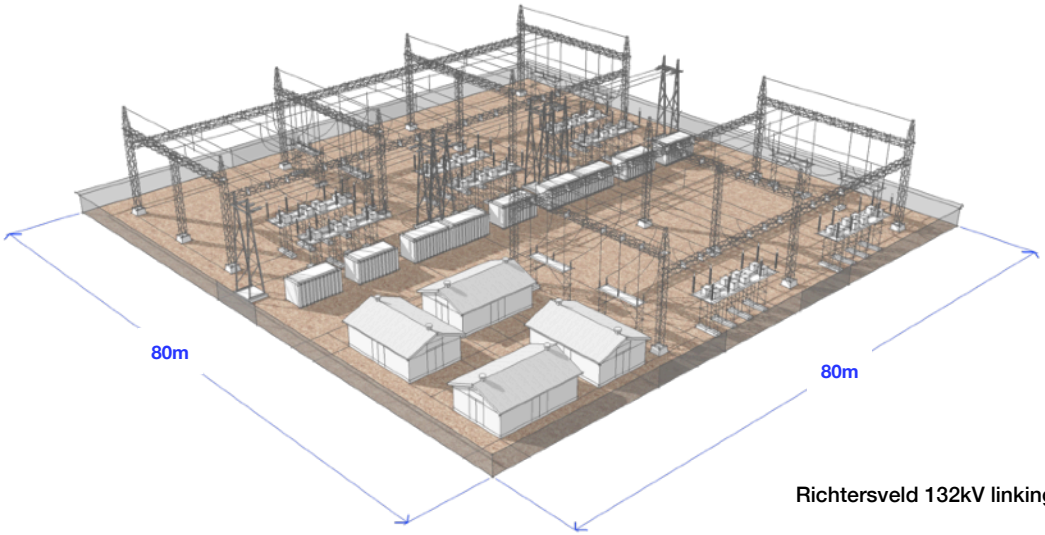



*Base Map Source : Google Maps 2022*

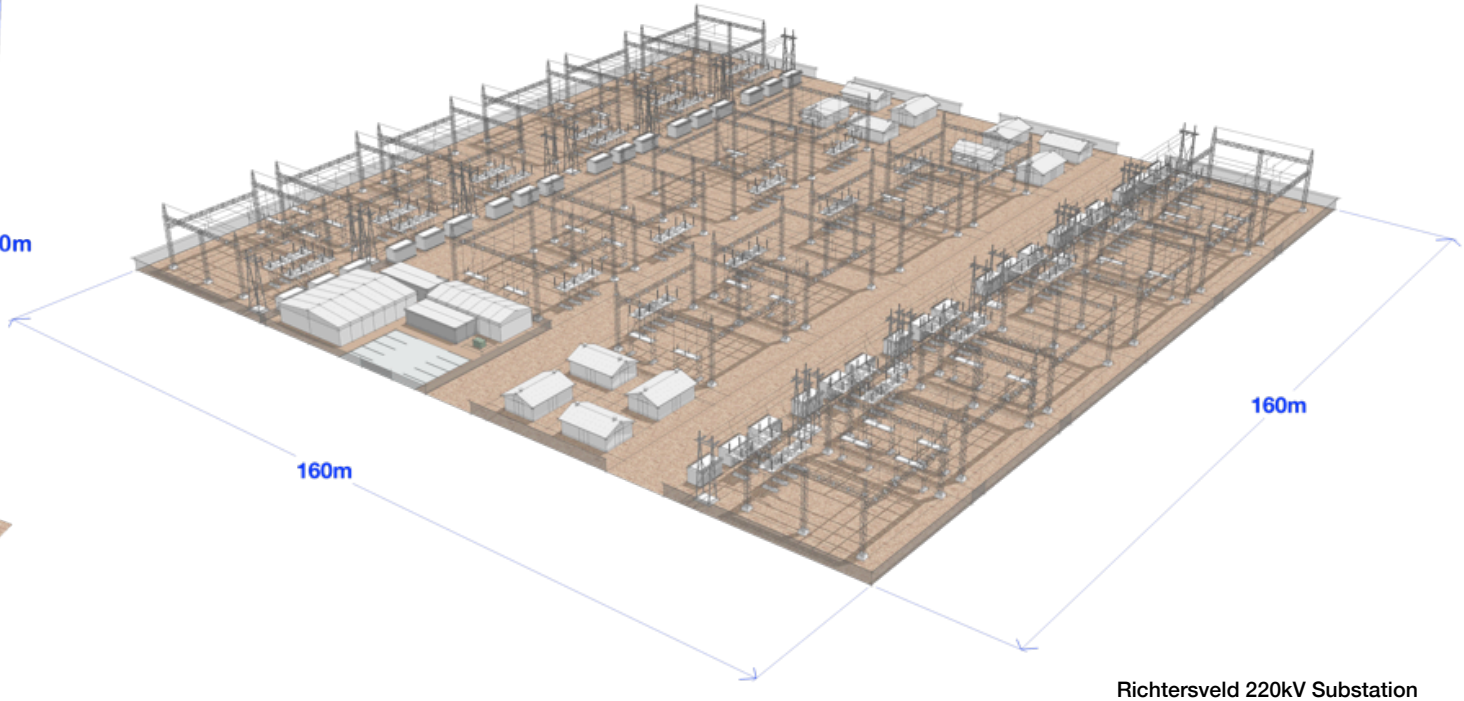
***Figure 1 • GUMA Richtersveld Wind Energy Facility Locality Map, REEA Q4 2021 Cumulative Projects, SAPAD Q4 2021 Protected Areas***




3MW Wind Turbine




Richtersveld 132kV linking Substation
(alternative)

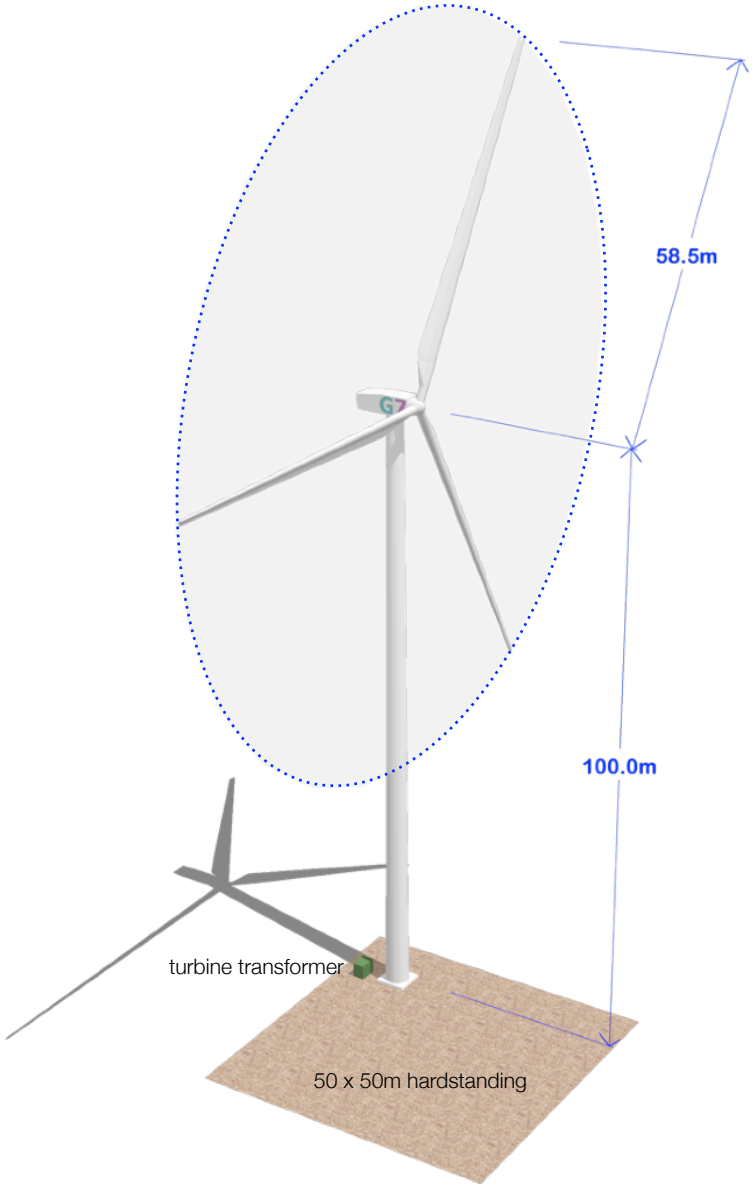



Richtersveld 220kV Substation
including Operations and Maintenance
buildings and parking

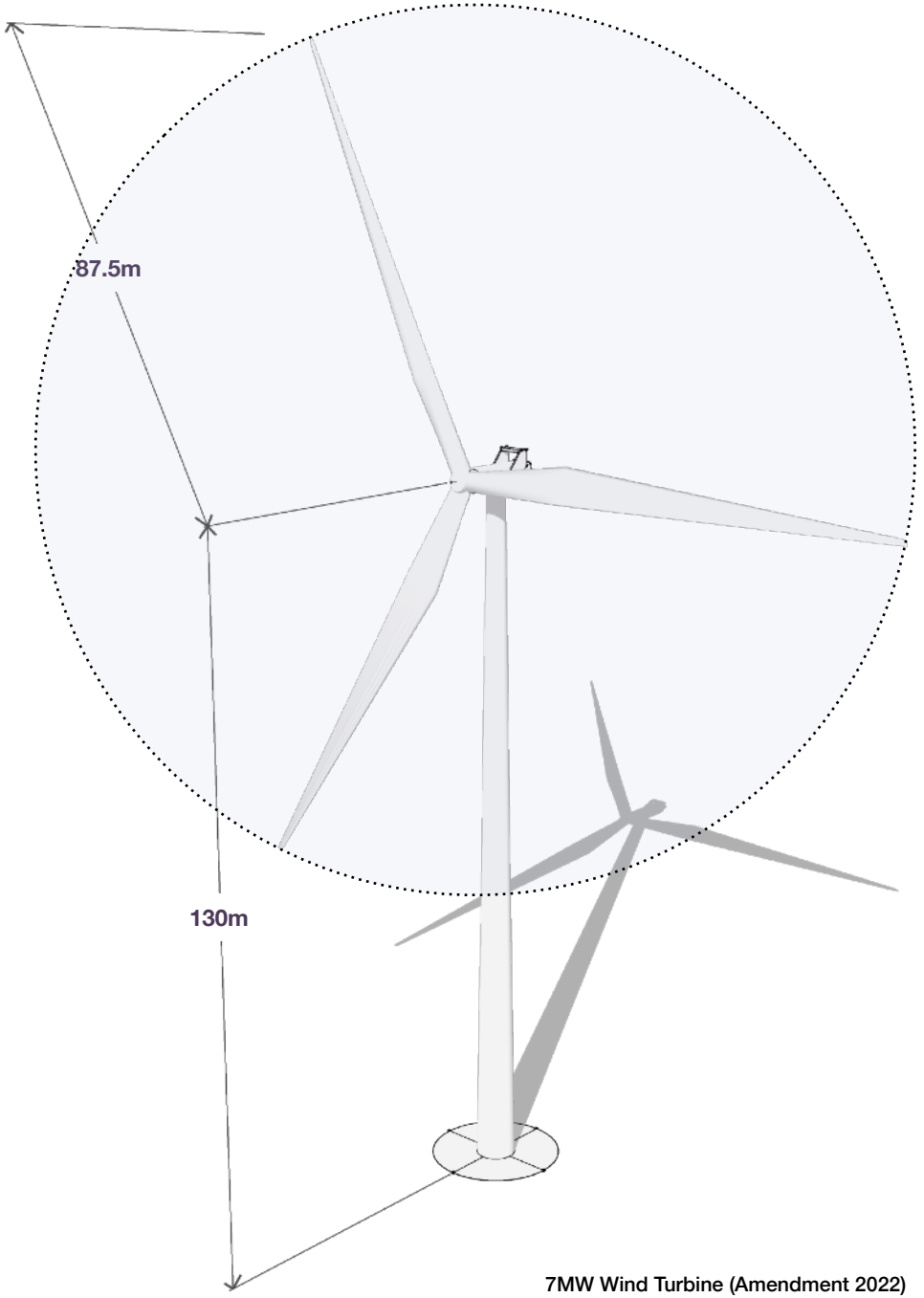
*Based on information provided by ERM/G7, 3D models by mlb*

**no scale**

***Figure 2 • GUMA Richtersveld • Illustration of Facilities • AUTHORISED LAYOUT 2013***




3MW Wind Turbine (Authorised 2013)

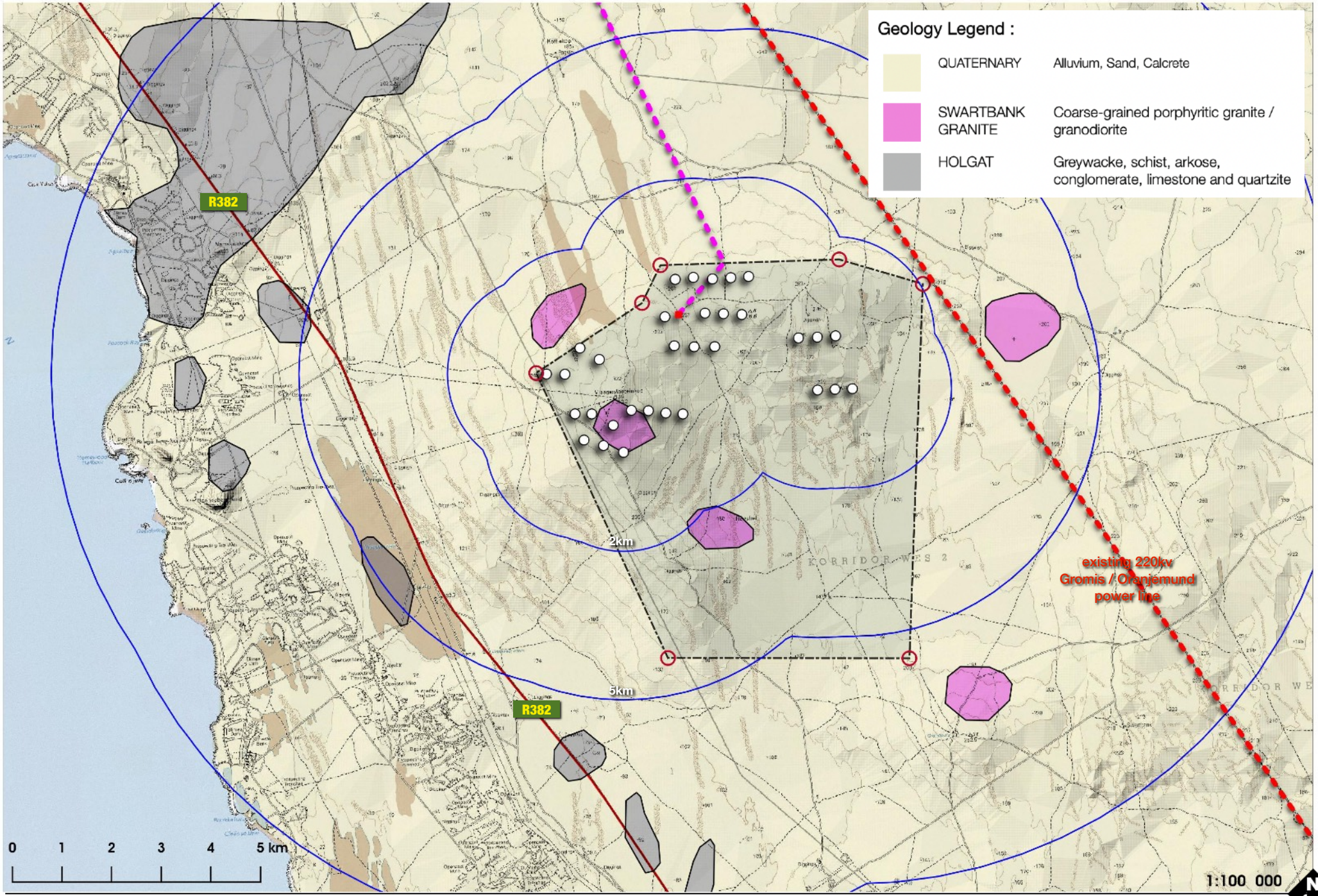



7MW Wind Turbine (Amendment 2022)

*Based on information provided by RINA, 3D models by qarc*

**not to scale**

***Figure 2a • GUMA Richtersveld • Wind Turbine Size Amendment***




Base Map Source : Google Earth 2013, overlays by BOLA/qarc

scale 1 : 100 000

*Figure 3 • GUMA Richtersveld AMENDED layout 2022 • Site Geology*

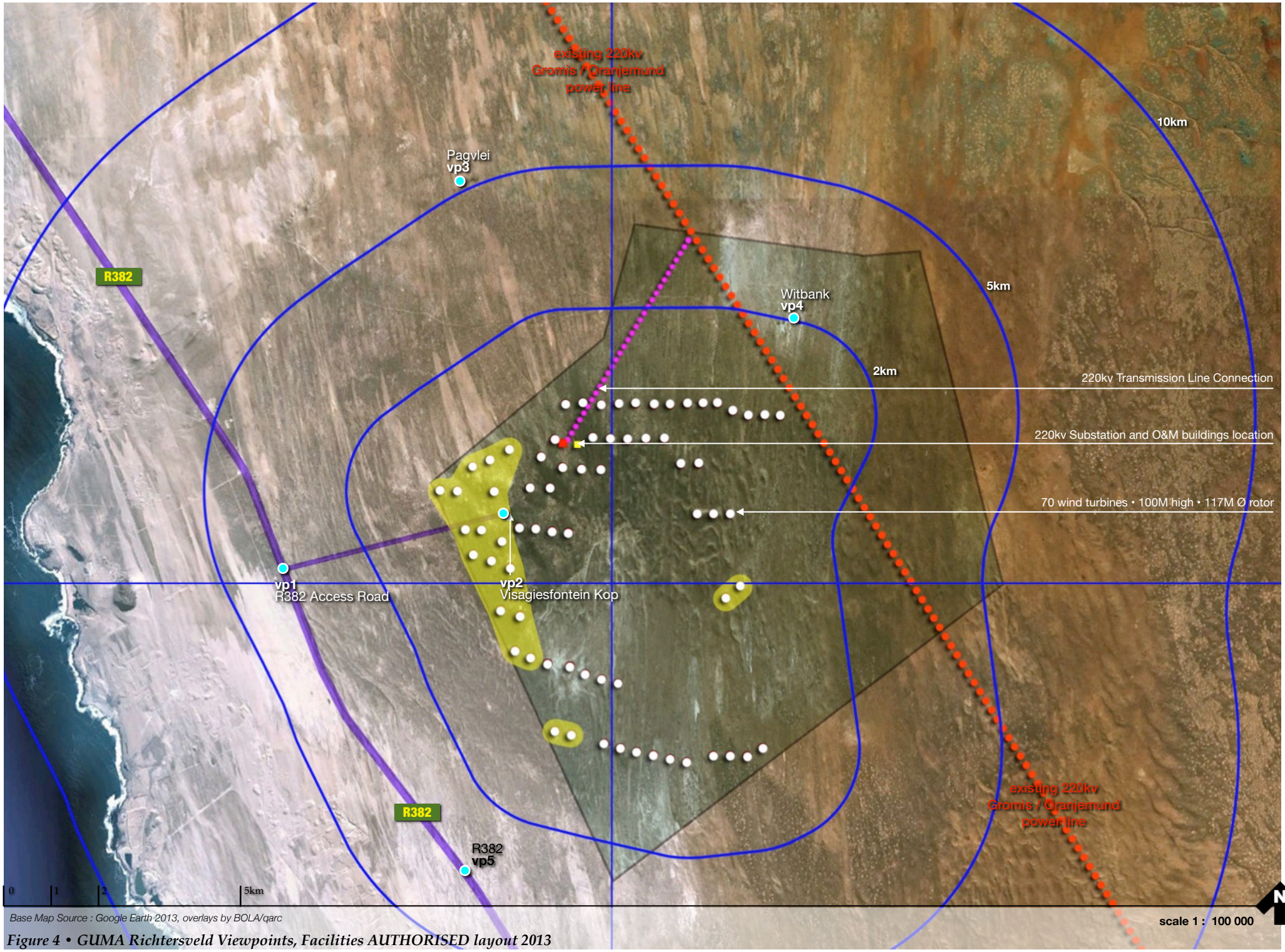
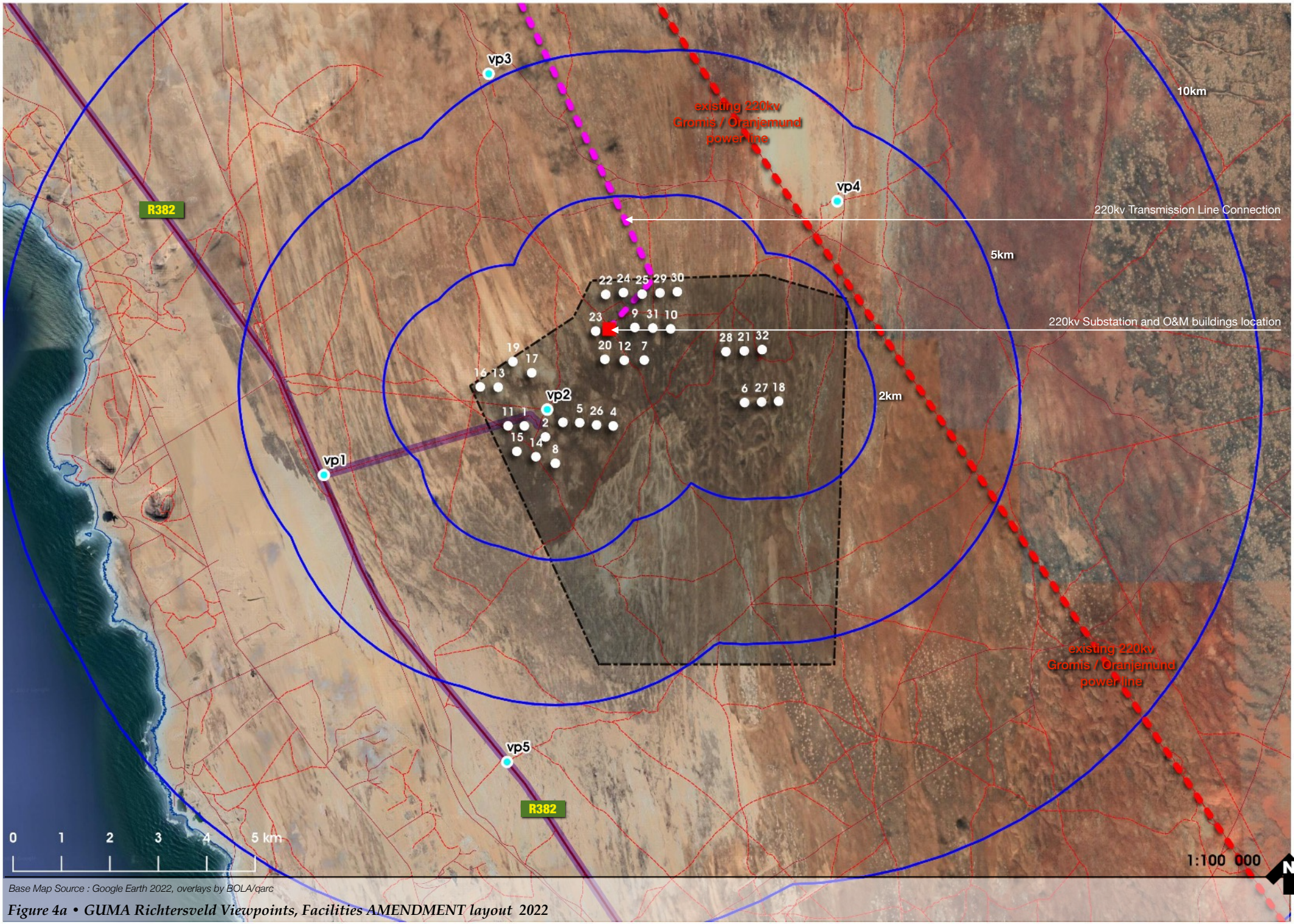



*Figure 4 • GUMA Richtersveld Viewpoints, Facilities AUTHORISED layout 2013*




Base Map Source : Google Earth 2022, overlays by BOLA/qarc

*Figure 4a • GUMA Richtersveld Viewpoints, Facilities AMENDMENT layout 2022*

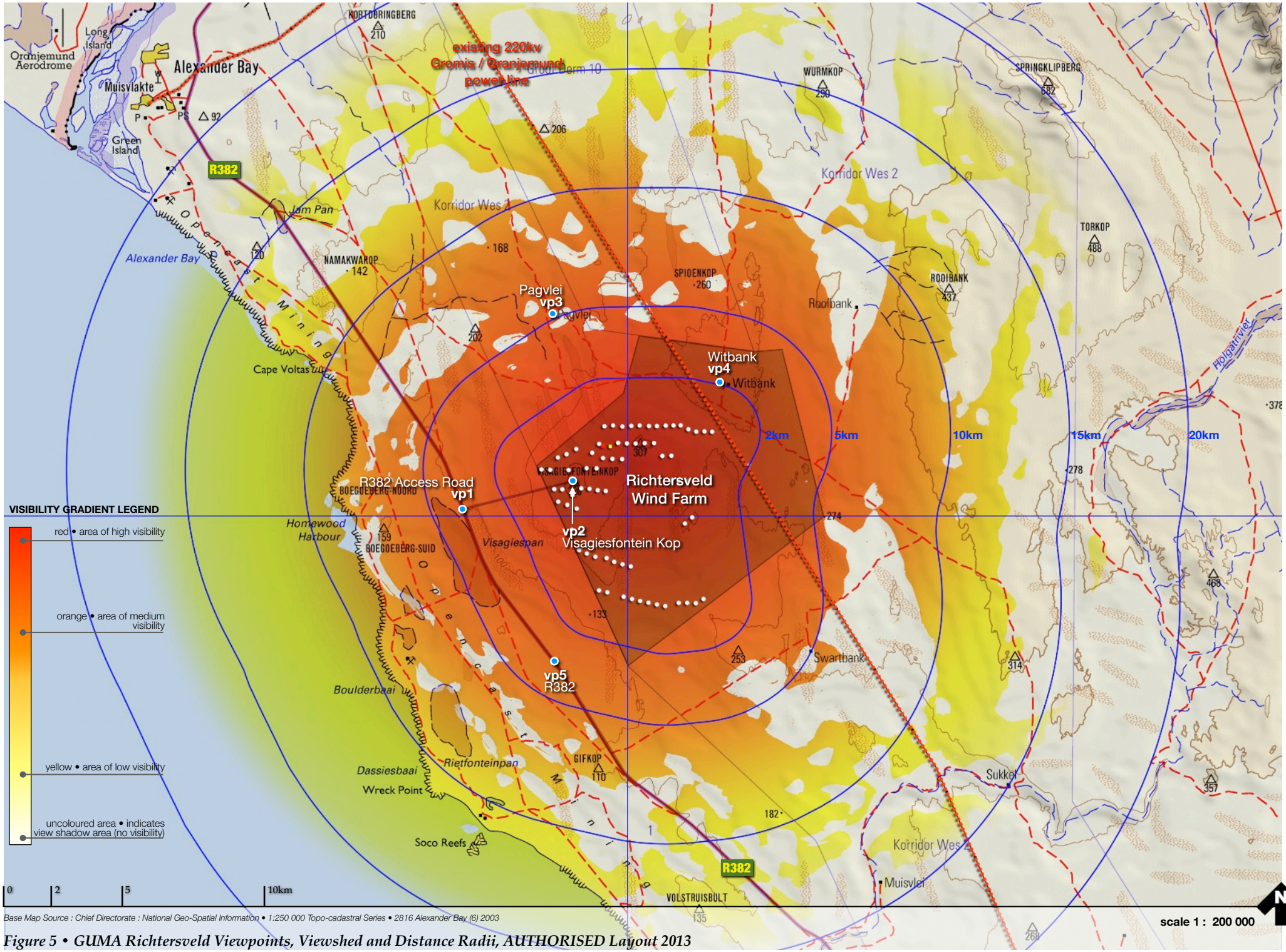



*Figure 5 • GUMA Richtersveld Viewpoints, Viewshed and Distance Radii, AUTHORISED Layout 2013*

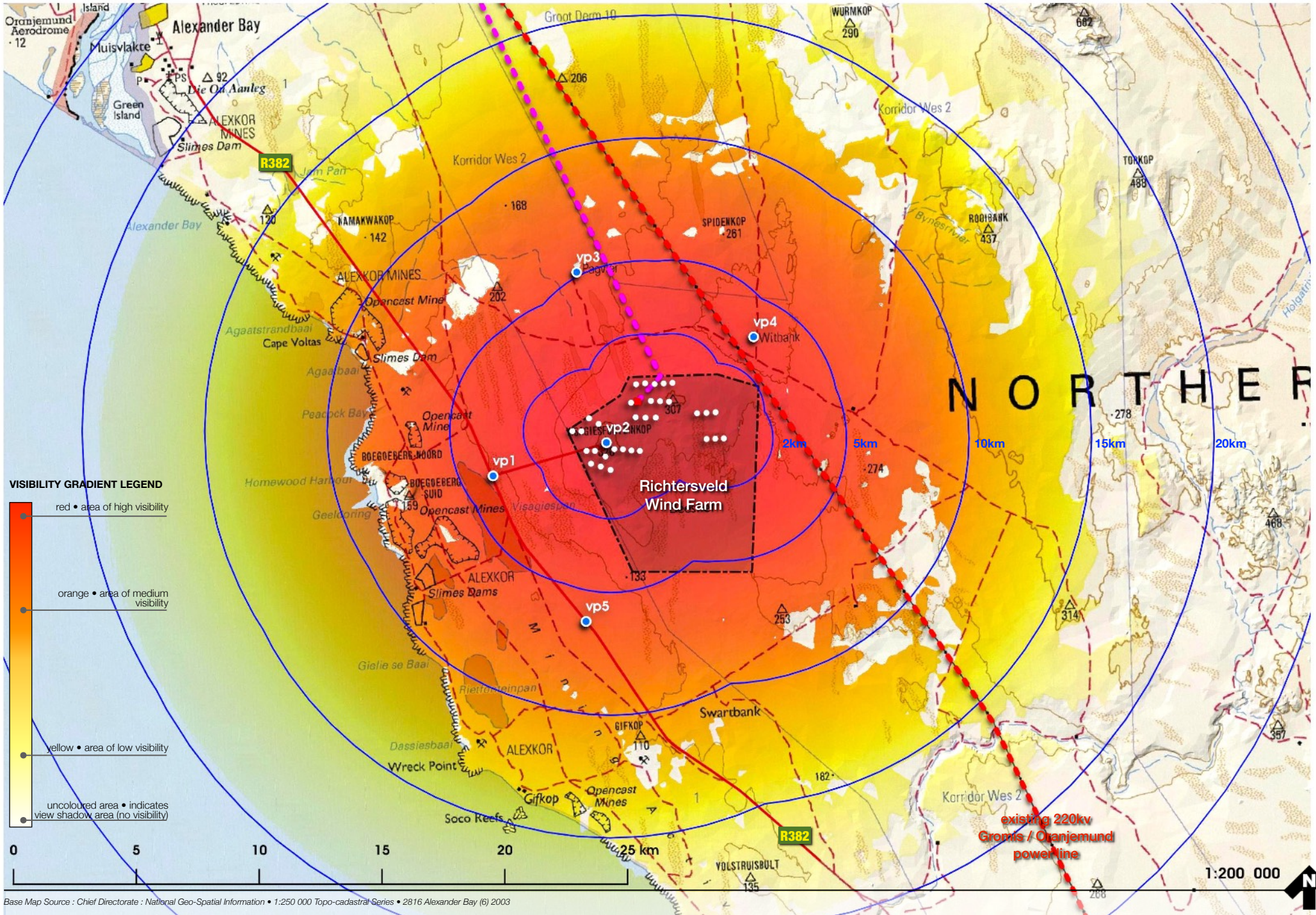
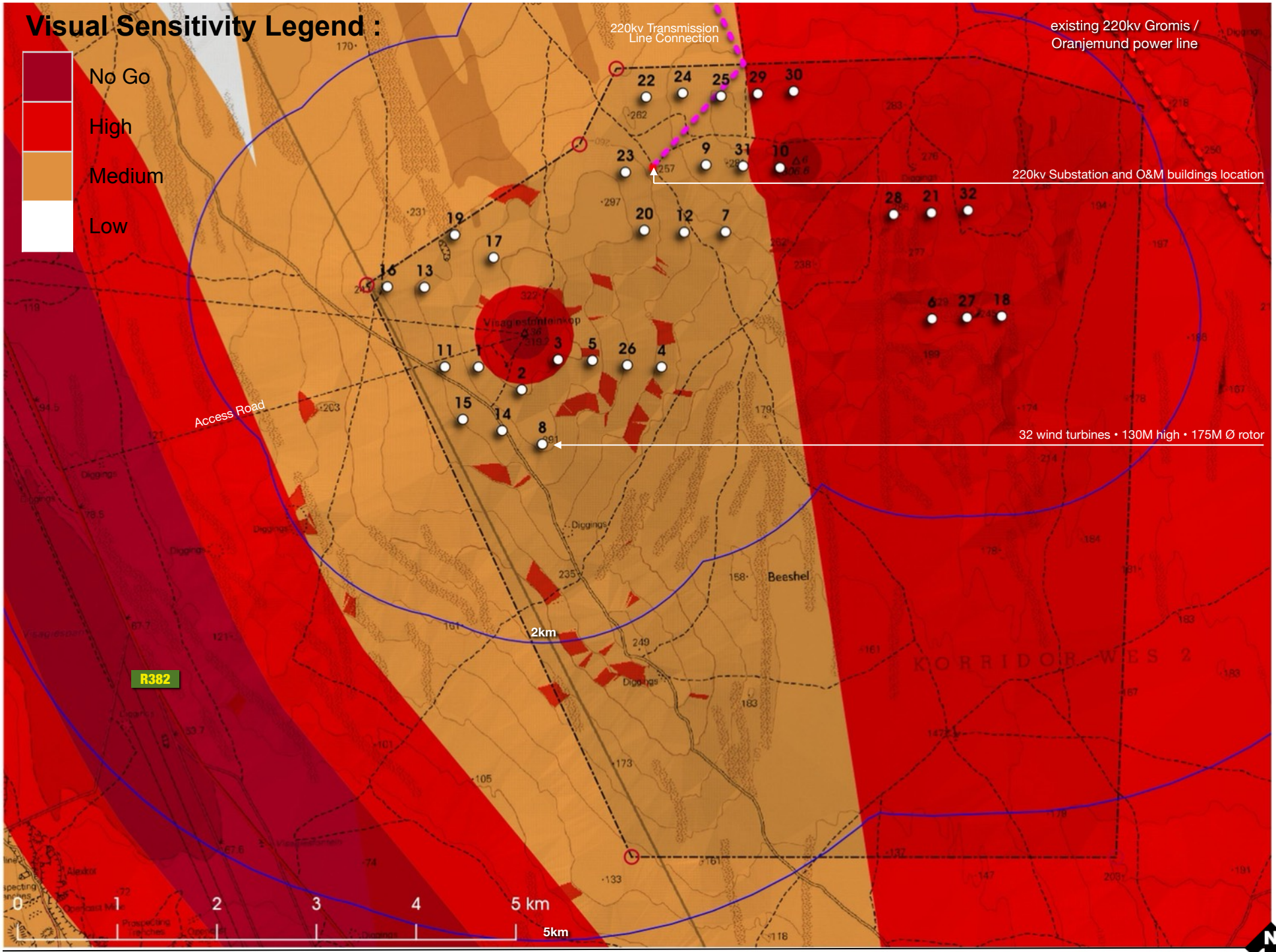



*Figure 5a • GUMA Richtersveld Viewpoints, Viewshed and Distance Radii, AMENDMENT Layout 2022*




Base Map Source : NGI Topographic Series : 2816DB Rooibank, 2816DC Visagiesfontein

scale 1 : 50 000

*Figure 6 • GUMA Richtersveld Local Context • WEF AMENDMENT layout 2022 • Visual Sensitivity*


**Viewpoint 1** • looking east from R382 access road
distance to nearest turbine • 3.75km

28.7687S, 16.6199E • 18/09/2010 • 10h25


**Viewpoint 1** • looking east from R382 access road
*distance to nearest turbine • 3.74km*

*28.7687S, 16.6199E • 18/09/2010 • 10h25*

*Photomontages by mlb/BOLA : October 2011 / qarc 2022*

**no scale**

***Figure 7 • GUMA Richtersveld Photomontage • Viewpoint 1***


**Viewpoint 3** • looking south from Pagvlei outpost
distance to nearest turbine • 5.17km

28.6952S, 16.6580E • 18/09/2010 • 11h19


**Viewpoint 3** • looking south from Pagvlei outpost
*distance to nearest turbine • 5.17km*

*28.6952S, 16.6580E • 18/09/2010 • 11h19*

*Photomontages by mlb/BOLA : October 2011 / qarc 2022*

**no scale**

***Figure 8 • GUMA Richtersveld Photomontage • Viewpoint 3***


**Viewpoint 4** • looking south-west from Witbank farmstead
distance to nearest turbine • 2.02km

28.7212S, 16.7304E • 18/09/2010 • 11h46


**Viewpoint 4** • looking south-west from Witbank farmstead
*distance to nearest turbine • 3.43km*

*28.7212S, 16.7304E • 18/09/2010 • 11h46*

*Photomontages by mlb/BOLA : October 2011 / qarc 2022*

**no scale**

***Figure 9 • GUMA Richtersveld Photomontage • Viewpoint 4***


**Viewpoint 5** • looking north-east from the R382
distance to nearest turbine • 3.48km

28.8260S, 16.6587E • 18/09/2010 • 13h22


**Viewpoint 5** • looking north-east from the R382
*distance to nearest turbine • 6.25km*

*28.8260S, 16.6587E • 18/09/2010 • 13h22*

*Photomontages by mlb/BOLA : October 2011 / qarc 2022*

**no scale**

***Figure 10 • GUMA Richtersveld Photomontage • Viewpoint 5***

## Appendix 1:

## CV of Visual Specialists

Bernard Oberholzer, Landscape Architect
PO Box 471, Stanford, Western Cape, 7210
Email: bernard.bola@gmail.com

Quinton Lawson, Architect
8 Blackwood Drive, Hout Bay 7806
Email: quinton@openmail.co.za

### Expertise

Bernard Oberholzer has a Bachelor of Architecture (UCT) and Master of Landscape Architecture (U. of Pennsylvania), and has more than 25 years' experience in undertaking visual impact assessments. He has presented papers on *Visual and Aesthetic Assessment Techniques*, and is the author of *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes,* prepared in association with the CSIR for the Dept. of Environmental Affairs and Development Planning, Provincial Government of the Western Cape, 2005.

Quinton Lawson has a Bachelor of Architecture Degree (Natal) and has more than 15 years' experience in visual assessments, specialising in 3D modelling and visual simulations. He has previously lectured on visual simulation techniques in the Master of Landscape Architecture Programme at UCT.

The authors have been involved in visual assessments for a wide range of residential, industrial and renewable energy projects. They prepared the 'Landscape/Visual Assessment' chapter in the report for the *National Wind and Solar PV Strategic Environmental Assessment (SEA)*, as well as the *National Electricity Grid Infrastructure SEA* in association with the CSIR, for the Department of Environmental Affairs in 2014-2015

# Appendix 2:

## Impact Assessment Methodology (Rina, May 2022)

The impact assessment should be undertaken in line with RINA's impact assessment methodology, which is presented below:

An 'impact' is any change to a resource or receptor caused by the presence of a project component or by a project- related activity. Impacts can be negative or positive and are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). Impact characteristics are defined in the subsections below.

### Type of Impact

- ✓ Direct: applies to an impact which can be clearly and directly attributed to a particular environmental or social parameter (e.g. dust generation directly affects air quality)
- ✓ Indirect: applies to impacts which may be associated with or subsequent to a particular impact on a certain environmental or social parameter (e.g. high levels of dust could entail nuisance and health effects to workers on site).
- ✓ Induced: applies to impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project.
- ✓ Cumulative: applies to impacts that arise as a result of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect.

### Duration of Impact

- ✓ Temporary-applies to impacts whose effects are limited to a period of less than 3 years, or only associated with Project pre-construction or construction phases.
- ✓ Short-term: applies to impacts whose effects are limited to a five-year period.
- ✓ Long-term: applies to impacts whose effects last longer than a period of five years, but limited to within the project lifetime.
- ✓ Permanent: applies to impacts whose effects last longer than the life of project – i.e. irreversible.

### Extent of Impact

- ✓ On-site: impacts that are limited to the Project site.
- ✓ Local: impacts that are limited to the Project site and adjacent properties.
- ✓ Regional: impacts that are experienced at a regional scale.
- ✓ National: impacts that are experienced at a national scale.
- ✓ Trans-boundary/International: impacts that are experienced outside of RSA.

### Scale of Impacts

The scale of an impact is a quantitative measure, such as the size of the area damaged / impacted or the fraction of a resource that is lost / affected, etc. It is generally described using numerical values and units rather than assigned fixed designations.

### Frequency of Impacts

The frequency of an impact the measure of the constancy or periodicity of an impact, described using numerical values or a qualitative description.

### Likelihood

Likelihood is a measure of the degree to which the unplanned event (e.g. incidents, spills) is expected to occur. The likelihood of an unplanned event occurring is determined qualitatively, or when data is available, semi- quantitatively. Definitions of likelihood as applied in the ESIA are provided as follows:

- ✓ Unlikely: The event is unlikely but may occur at some time during normal operating conditions
- ✓ Possible: The event is likely to occur at some time during normal operating conditions.
- ✓ Likely: The event will occur during normal operating conditions (i.e. it is essentially inevitable).

A consistent approach to the assessment of impacts will be followed to enable E&S impacts to be broadly compared across the ESIA. A set of generic criteria are used to determine significance and are applied across the various environmental and social parameters.

Assessment of Impact Significance

As far as possible, E&S impacts will be quantified. Where it is not possible to quantify impacts, a qualitative assessment will be conducted using professional judgement, experience and available knowledge, and including the consideration of stakeholder views. Where there are limitations to the data, and/or uncertainties, these will be recorded in the relevant chapters, along with any assumptions made during the assessment.
In order to determine the significance of each impact, two overall factors are considered:

- ✓ magnitude and nature of impacts;
- ✓ the importance and/or sensitivity of the environmental and social receiving parameter, as determined during the assessment of baseline conditions.

**Magnitude of Impact**

Once impacts are characterised (see section above) they are assigned a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource / receptor in question) of the following impact characteristics:

- ✓ extent;
- ✓ duration;
- ✓ scale;
- ✓ frequency.

Magnitude (from small to large) is a continuum. Evaluation along the continuum requires professional judgement and experience. Each impact is evaluated on a case-by-case basis and the rationale for each determination is noted. Magnitude designations for negative effects are: negligible, small, medium and large. The magnitude designations themselves are universally consistent, but the definition for the designations varies by issue. In the case of a positive impact, no magnitude designation is assigned as it is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is used.The likelihood factor is also considered, together with the other impact characteristics, when assigning a magnitude designation.

**Sensitivity of Receiving Parameter**

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity of the receptor. There are a range of factors to be taken into account when defining the sensitivity of the receptor, which may be physical, biological, cultural or human. As in the case of magnitude, the sensitivity designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity of receptor is set as either negligible, low, medium or high.

For ecological impacts, sensitivity is assigned as low, medium or high based on the conservation importance of habitats and species. For socio-economic impacts, the degree of sensitivity of a receptor is defined as the level of resilience (or capacity to cope) with sudden social and economic changes. Comment needs to be provided as to whetheran irreplaceable loss of a resource is anticipated or not.

**Assessing the Significance of Impacts**

In order to assess the significance of an impact, the sensitivity of the receiving environmental or social parameter is considered in association with the magnitude of the impact, according to the matrix shown in the table below.

Figure 3-1 Matrix for Assessing Impacts Significance

| Magnitude of Impact | Sensitivity of Receiving Receptor | | |
|---|---|---|---|
| | Low | Medium | High |
| Negligible | Negligible | Negligible | Negligible |
| Low | Negligible | Minor | Moderate |
| Medium | Minor | Moderate | Major |
| High | Moderate | Major | Major |

While the above matrix provides a framework for the determination of significance and enables comparison across environmental and social parameters, a degree of professional judgement must be used and some parameter- specific factors considered in making a determination of impact significance. The ESIA will provide additional guidance to the degrees of significance. Note that positive impacts are defined, but not rated for significance.

**Mitigation Measures and Residual Impacts**

A key objective of an ESIA is to identify and define socially, environmentally and technically acceptable and cost effective measures to manage and mitigate potential impacts. Mitigation measures are developed to avoid, reduce, remedy or compensate for potential negative impacts, and to enhance potential environmental and social benefits. The approach taken to define mitigation measures is based on a typical hierarchy of decisions and measures, as described in the table below.

The priority is to first apply mitigation measures to the source of the impact (i.e. to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e. to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).
Once mitigation measures are applied, the next step in the impact assessment process is to assign residual impact significance. This means a repetition of the impact assessment steps reported above.

Figure 3-2 Mitigation Hierarchy

| |
|---|
| **Avoid / reduce at source:** avoiding or reducing at source through the design of the Project (e.g. avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity). |
| **Abate on Site**: add something to the design to abate the impact (e.g. pollution control equipment). |
| **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g. traffic measures) |
| **Repair or Remedy**: some impacts involve unavoidable damage to a resource (e.g. material storage areas) and these impacts require repair, restoration and reinstatement measures |
| **Compensate in Kind/Compensate Through Other** Means where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g. financial compensation for degrading agricultural land and impacting crop yields) |

**Appendix 3:**

**Screening Report for an Environmental Authorisation**

# SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE ENVIRONMENTAL SENSITIVITY

**EIA Reference number:** DEAT/EIA/12668/2011

**Project name:** Richtesveld Wind Farm

**Project title:** Richtesveld Wind Farm

**Date screening report generated:** 11/08/2021 07:09:02

**Applicant:** Richtesveld Wind Farm

**Compiler:** Bukhali Environmental Resource Consulting

**Compiler signature:**

.....

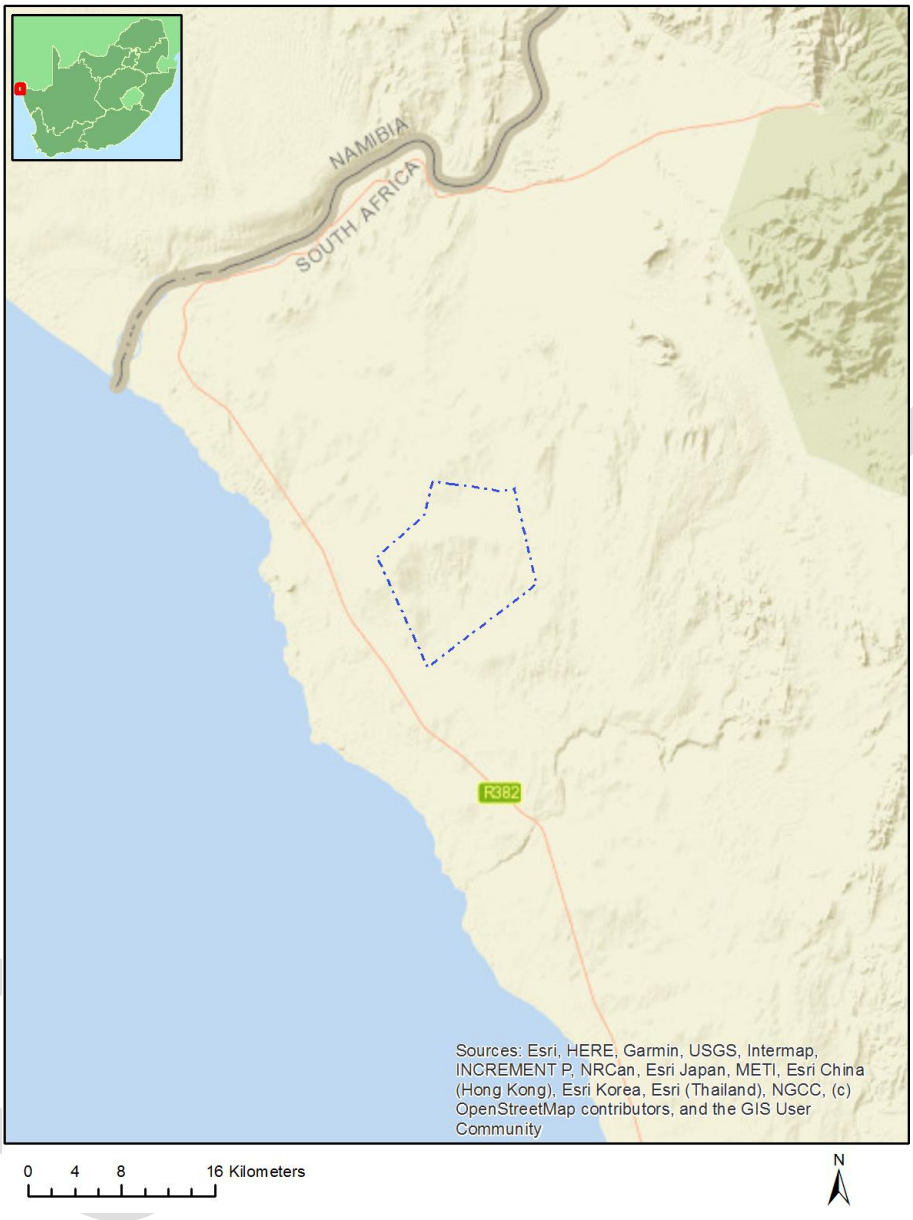
**Application Category:** Utilities Infrastructure|Electricity|Generation|Renewable|Wind

# Table of Contents

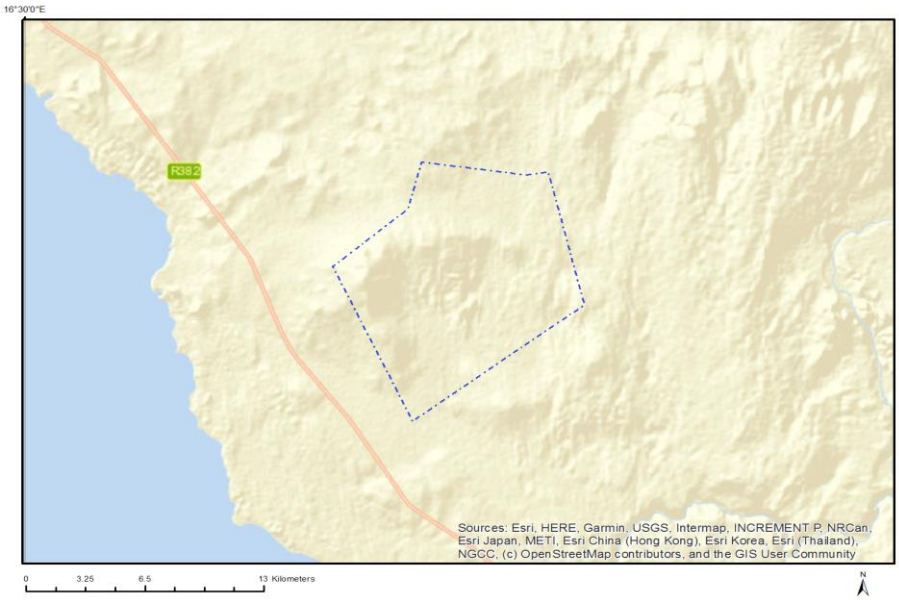
# Proposed Project Location

## Orientation map 1: General location

**General Orientation: Richtesveld Wind Farm**



# Map of proposed site and relevant area(s)




## Cadastral details of the proposed site

Property details:

| No | Farm Name | Farm/ Erf No | Portion | Latitude | Longitude | Property Type |
|---|---|---|---|---|---|---|
| 1 | KORRIDOR WES | 2 | 0 | 28°47'26.28S | 16°48'9.84E | Farm |
| 2 | KORRIDOR WES | 2 | 18 | 28°45'29.56S | 16°40'2.7E | Farm Portion |
| 3 | KORRIDOR WES | 2 | 6 | 28°45'30.03S | 16°42'39.5E | Farm Portion |

Development footprint[1] vertices:
No development footprint(s) specified.

## Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No nearby wind or solar developments found.

## Environmental Management Frameworks relevant to the application

No intersections with EMF areas found.

[1] "development footprint", means the area within the site on which the development will take place and incudes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

# Environmental screening results and assessment outcomes

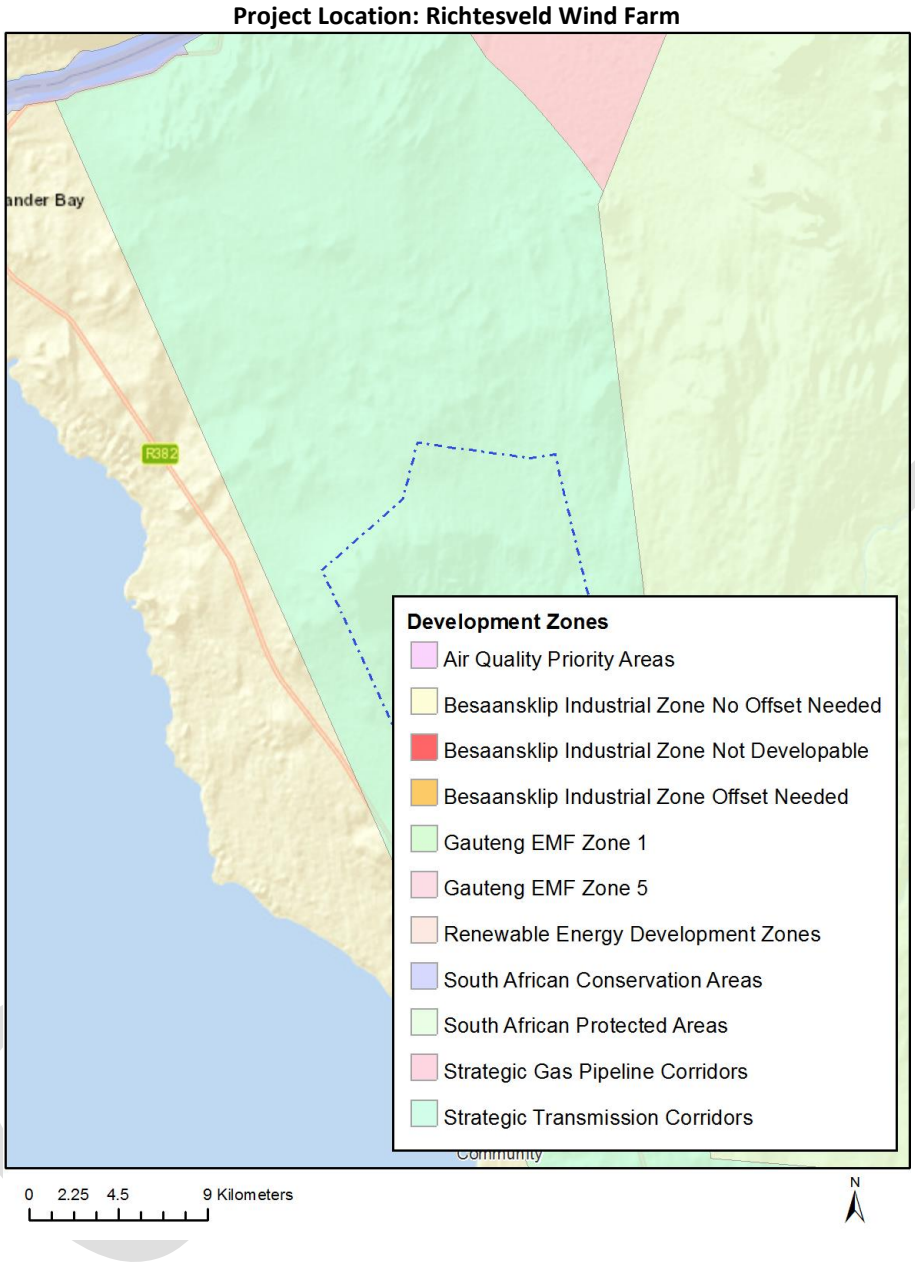
The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development site as well as the most environmental sensitive features on the site based on the site sensitivity screening results for the application classification that was selected. The application classification selected for this report is: **Utilities Infrastructure|Electricity|Generation|Renewable|Wind**.

## Relevant development incentives, restrictions, exclusions or prohibitions

The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this site are indicated below.

| Incentive, restriction or prohibition | Implication |
|---|---|
| Strategic Transmission Corridor-Expanded Western Corridor | https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Expanded_EGI_Corridors_GN383__GG44504_of_29April2021.pdf |

## Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones




## Proposed Development Area Environmental Sensitivity

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

| Theme | Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|---|
| Agriculture Theme | | | X | |
| Animal Species Theme | | | | X |

| | | | | |
|---|---|---|---|---|
| Aquatic Biodiversity Theme | X | | | |
| Archaeological and Cultural Heritage Theme | X | | | |
| Avian (Wind) Theme | | | | X |
| Bats (Wind) Theme | | X | | |
| Civil Aviation (Wind) Theme | | | | X |
| Defence (Wind) Theme | | | | X |
| Flicker Theme | X | | | |
| Landscape (Wind) Theme | X | | | |
| Paleontology Theme | X | | | |
| Noise Theme | X | | | |
| Plant Species Theme | | | X | |
| RFI (Wind) Theme | | X | | |
| Terrestrial Biodiversity Theme | X | | | |

## Specialist assessments identified

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

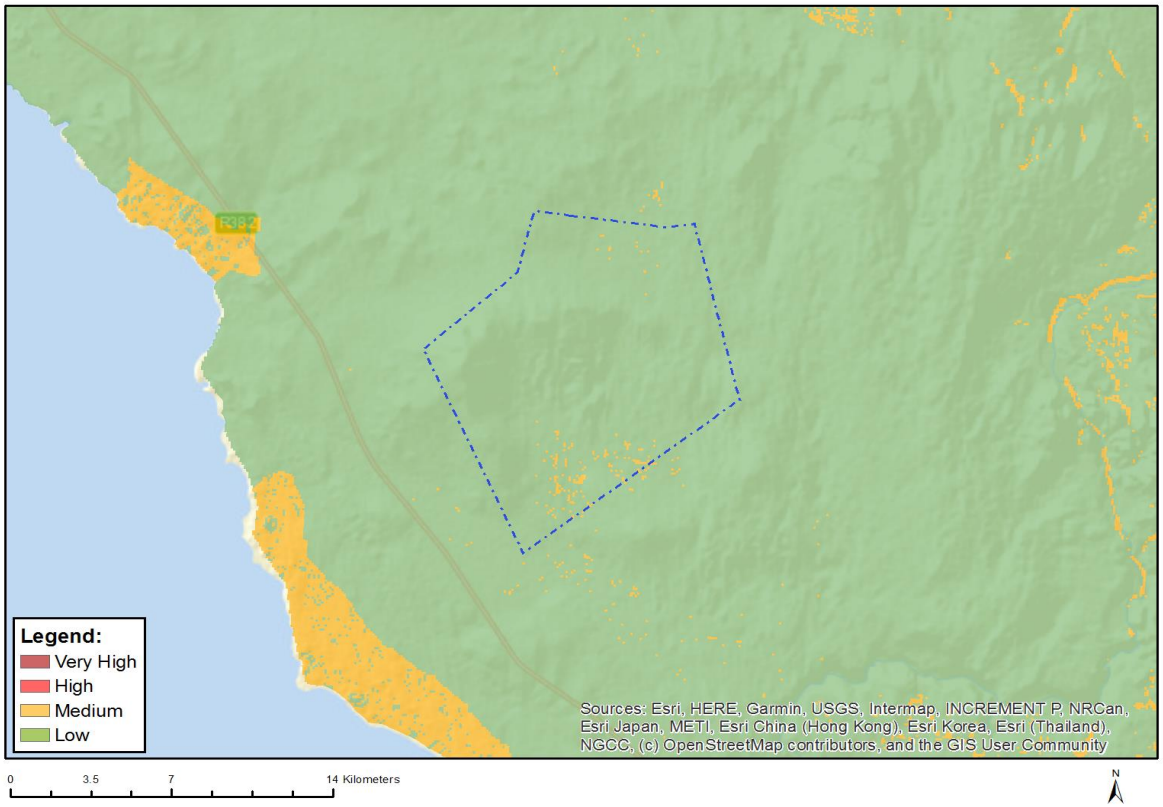
| No | Specialist assessment | Assessment Protocol |
|---|---|---|
| 1 | Agricultural Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_WindAndSolar_Agriculture_Assessment_Protocols.pdf |
| 2 | Landscape/Visual Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 3 | Archaeological and Cultural Heritage Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 4 | Palaeontology Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 5 | Terrestrial Biodiversity Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf |

| | | |
|---|---|---|
| 6 | Aquatic Biodiversity Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Aquatic_Biodiversity_Assessment_Protocols.pdf |
| 7 | Avian Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Avifauna_Assessment_Protocols.pdf |
| 8 | Civil Aviation Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Civil_Aviation_Installations_Assessment_Protocols.pdf |
| 9 | Defense Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Defence_Installations_Assessment_Protocols.pdf |
| 10 | RFI Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 11 | Noise Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Noise_Impacts_Assessment_Protocol.pdf |
| 12 | Flicker Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 13 | Traffic Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 14 | Geotechnical Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 15 | Socio-Economic Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf |
| 16 | Plant Species Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Plant_Species_Assessment_Protocols.pdf |
| 17 | Animal Species Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Animal_Species_Assessment_Protocols.pdf |

# Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

## MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

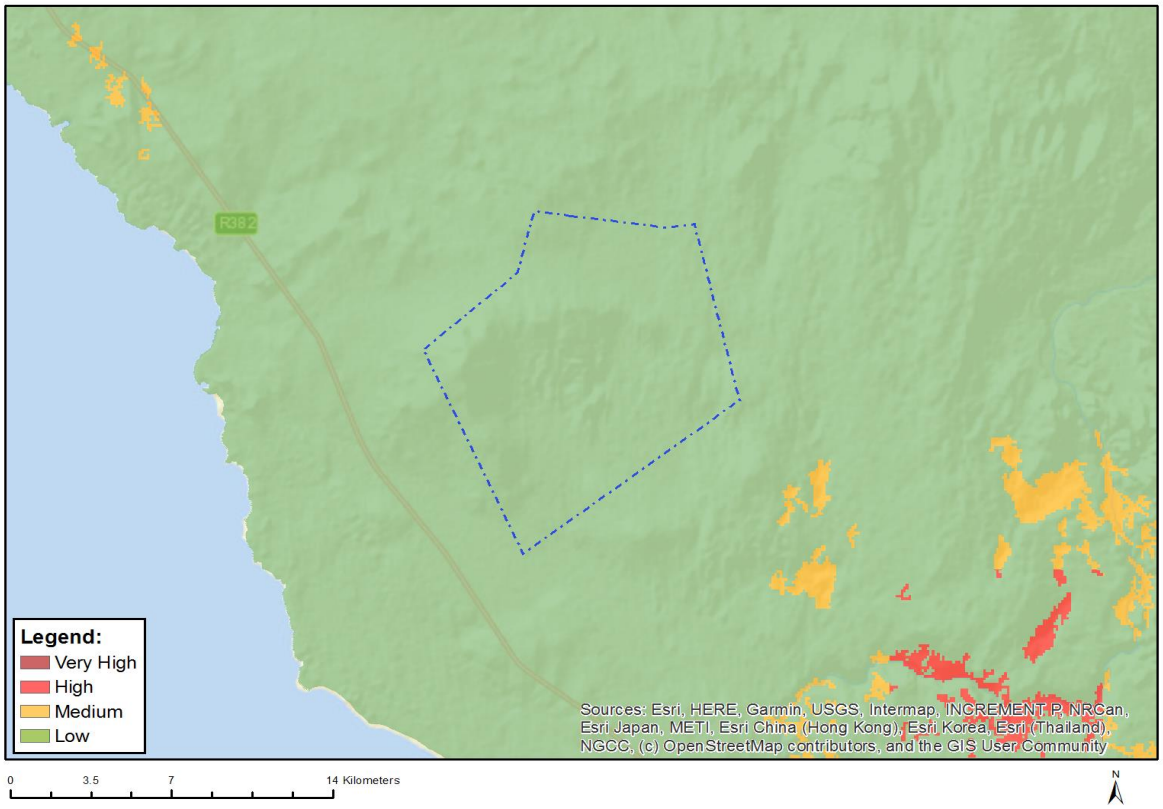



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | | X | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low |
| Medium | Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate |

## MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



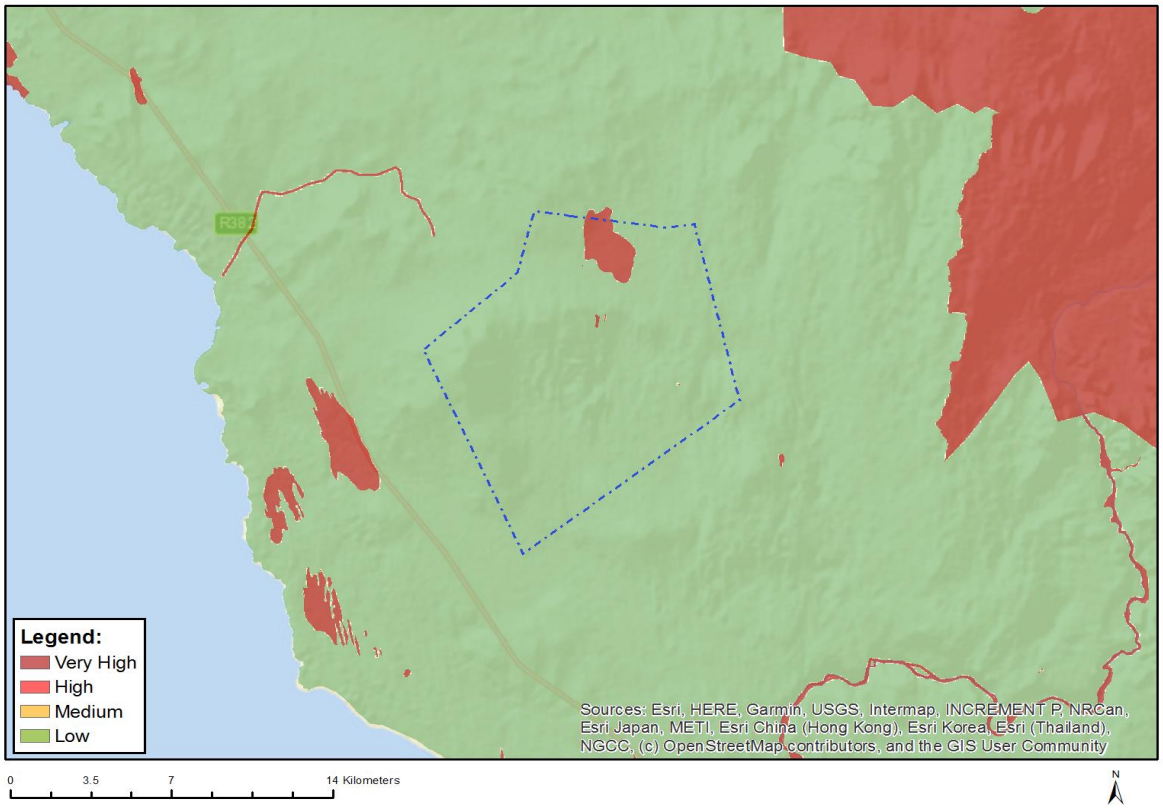

Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | | | X |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low sensitivity |

## MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY

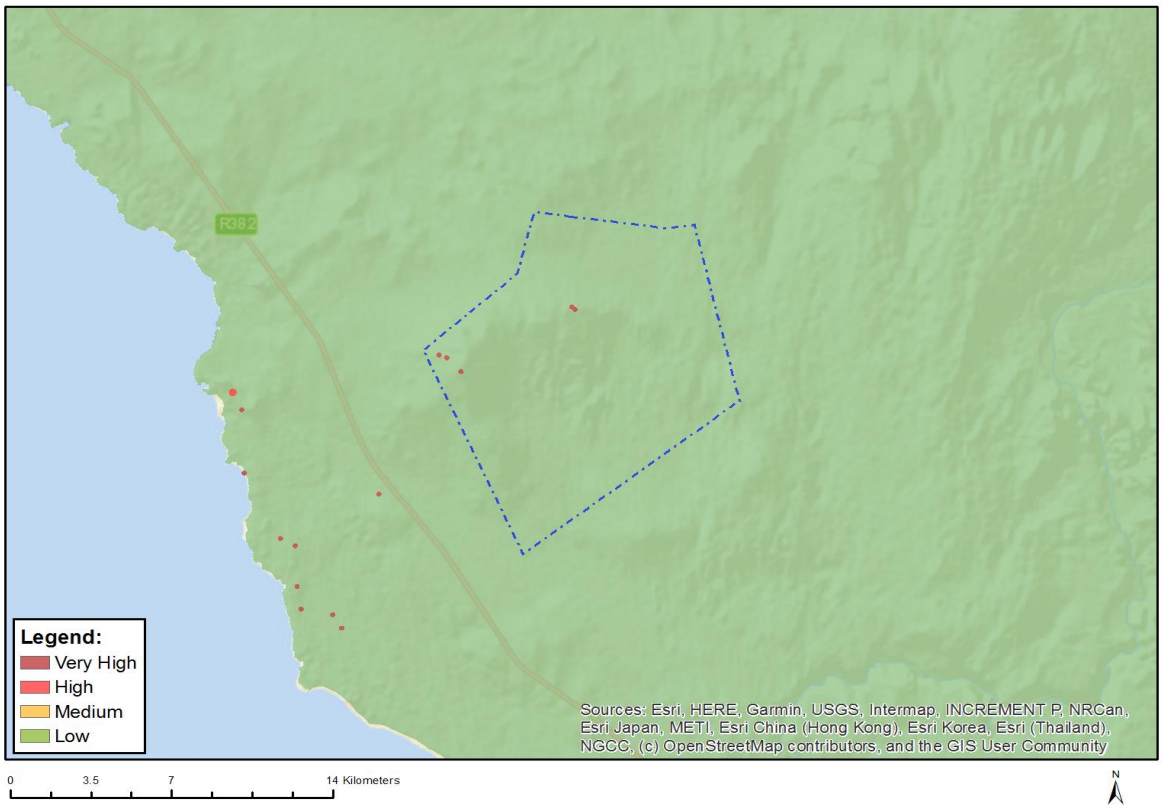



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low sensitivity |
| Very High | Wetlands and Estuaries |

## MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY




| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low sensitivity |
| Very High | Within 100m of an Ungraded Heritage site |

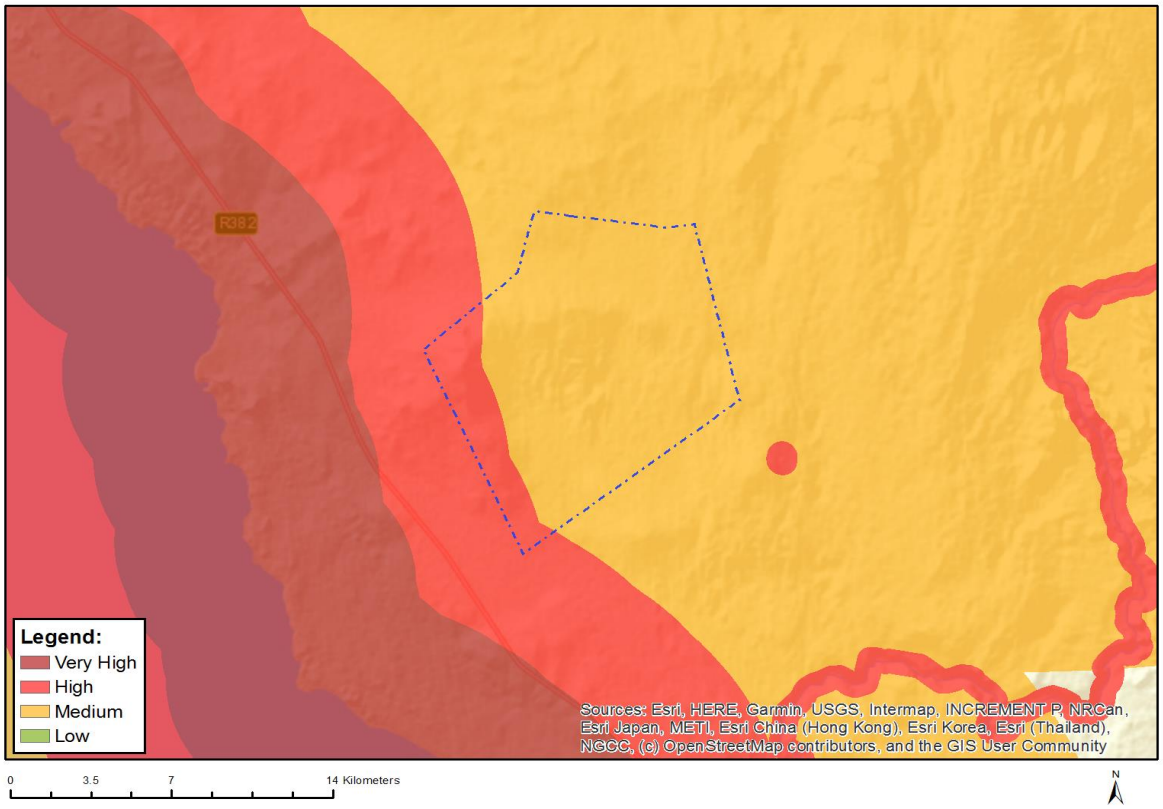
## MAP OF RELATIVE AVIAN (WIND) THEME SENSITIVITY


| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | | | X |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Area Outside Sensitivities |

## MAP OF RELATIVE BATS (WIND) THEME SENSITIVITY

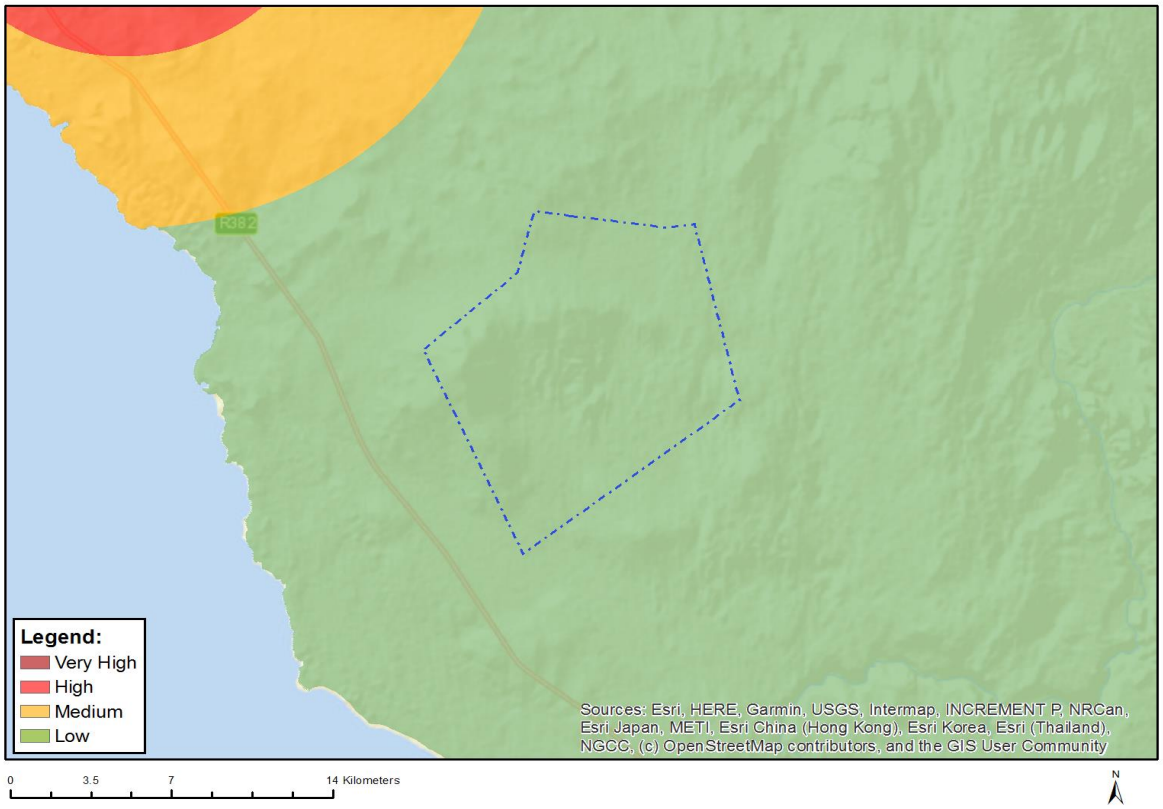



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | X | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| High | Between 5 and 10 km from coastline |
| Medium | Between 10 and 20 km from coastline |
| Medium | Between 20 and 50 km from a large bat roost |

## MAP OF RELATIVE CIVIL AVIATION (WIND) THEME SENSITIVITY




| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | | | X |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low sensitivity |

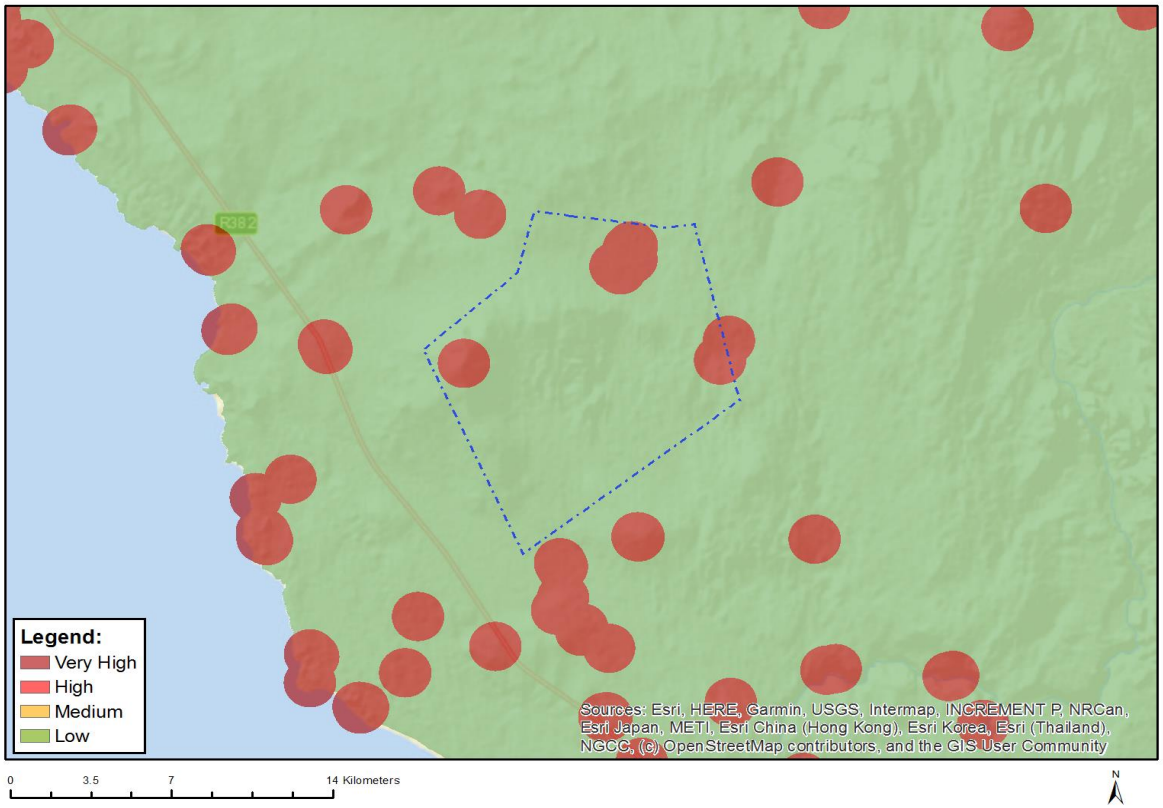
## MAP OF RELATIVE DEFENCE (WIND) THEME SENSITIVITY


| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | | | X |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low sensitivity |

## MAP OF RELATIVE FLICKER THEME SENSITIVITY

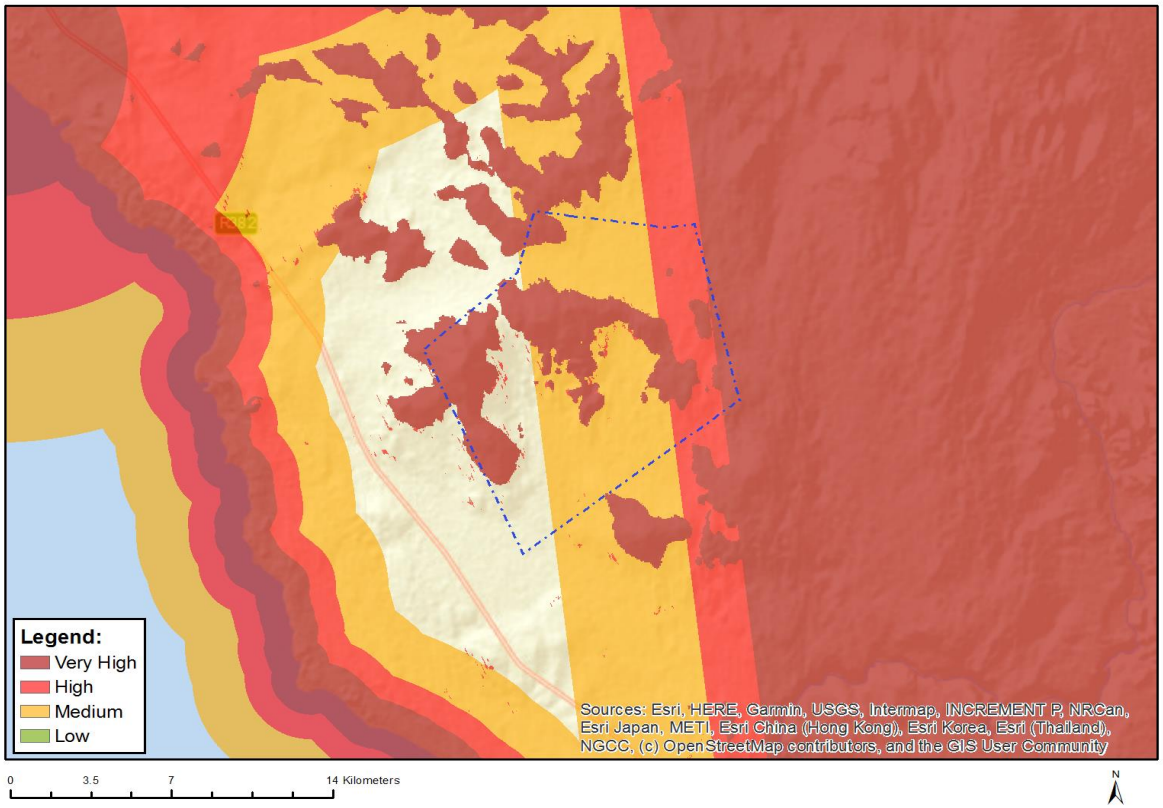



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Area of low sensitivity |
| Very High | Potential temporarily or permanently inhabited residence |

## MAP OF RELATIVE LANDSCAPE (WIND) THEME SENSITIVITY

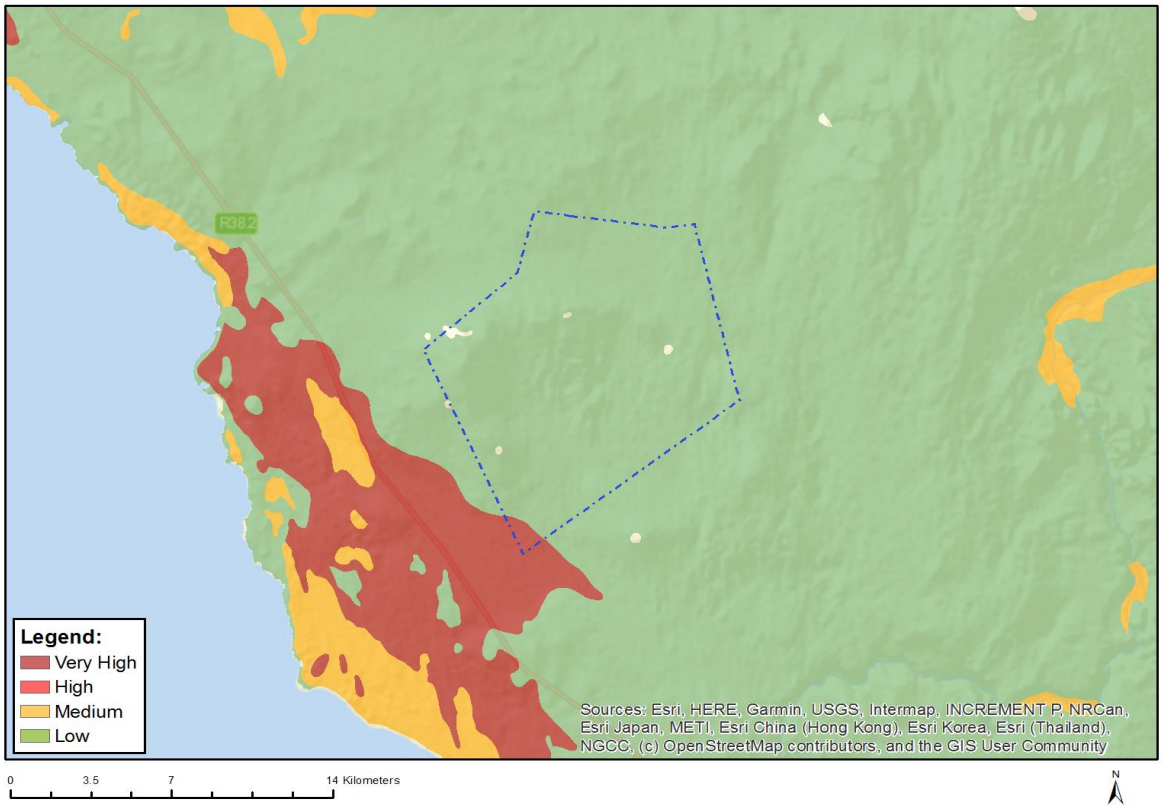



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| High | Slope between 1:4 and 1:10 |
| High | Between 3 and 5 km of a nature reserve, botanical garden or other protected area |
| Low | Slope less than 1:10 |
| Medium | Between 5 and 10 km of a nature reserve, botanical garden or other protected area |
| Very High | Mountain tops and high ridges |
| Very High | Slope more than 1:4 |
| Very High | Within 3 km of a nature reserve, botanical garden or other protected area |

## MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

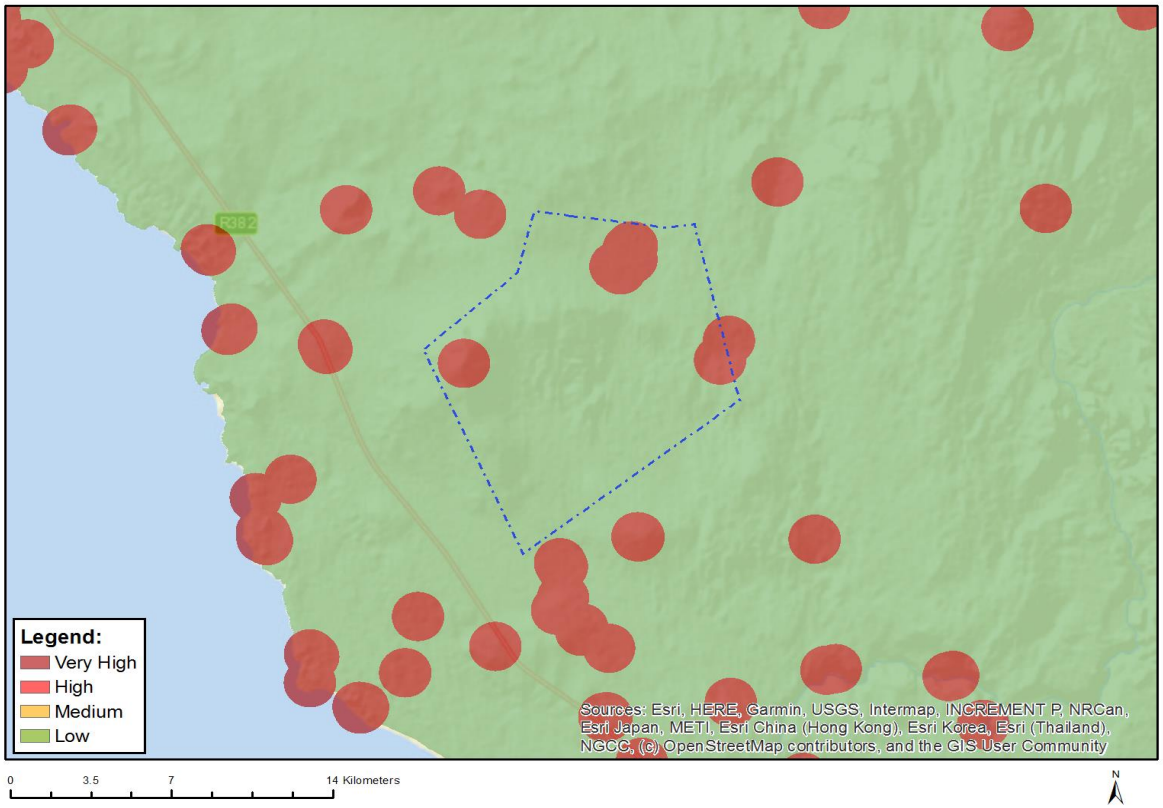



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Features with a Low paleontological sensitivity |
| Very High | Features with a Very High paleontological sensitivity |

## MAP OF RELATIVE NOISE THEME SENSITIVITY

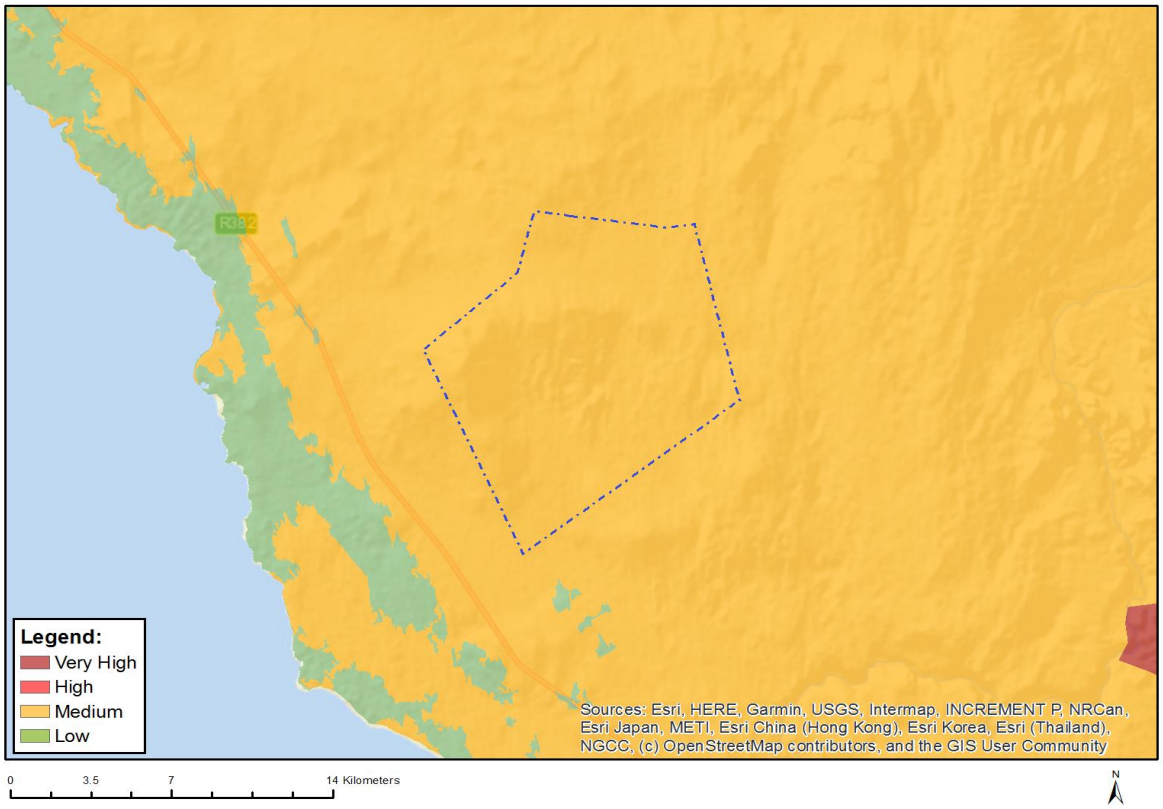



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Area of low sensitivity |
| Very High | Potential temporarily or permanently inhabited residence |

## MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

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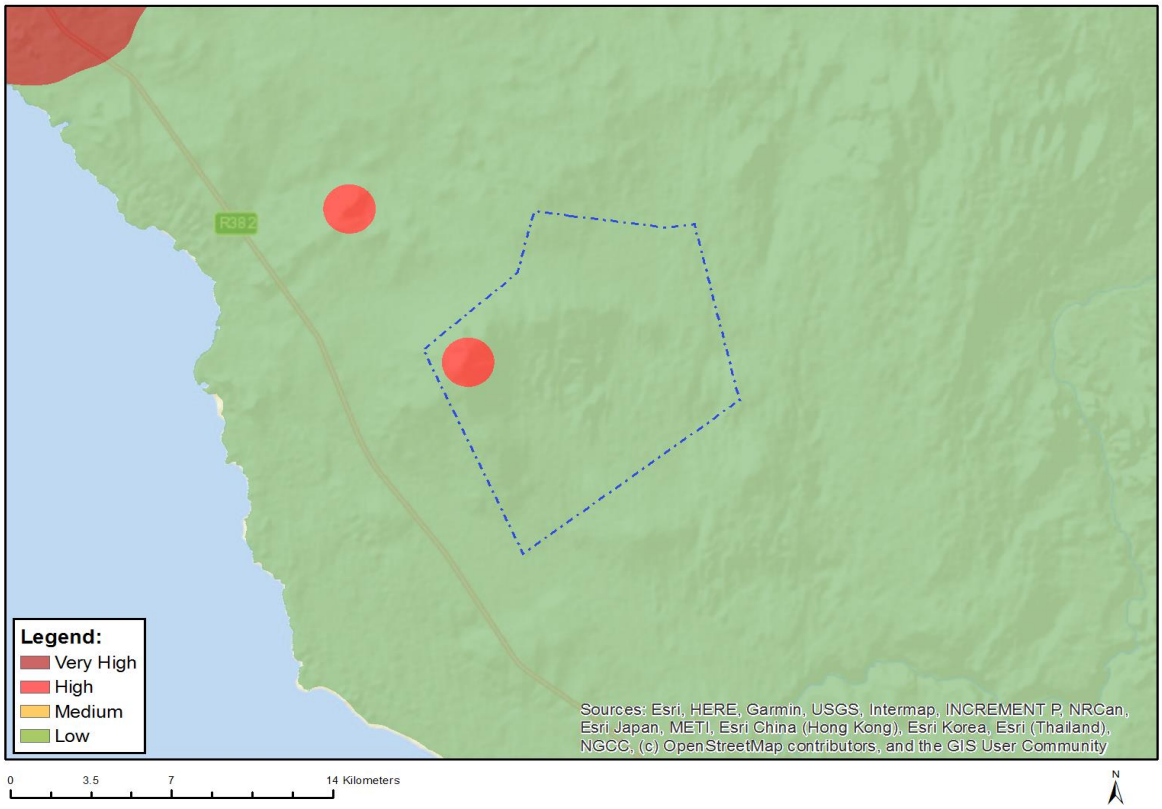
| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | | X | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low Sensitivity |
| Medium | Sensitive species 282 |
| Medium | Manulea cinerea |
| Medium | Sensitive species 827 |
| Medium | Sensitive species 1110 |
| Medium | Bassia dinteri |
| Medium | Sensitive species 720 |
| Medium | Sensitive species 1090 |
| Medium | Sensitive species 305 |
| Medium | Calobota acanthoclada |
| Medium | Helichrysum dunense |
| Medium | Nemesia saccata |

## MAP OF RELATIVE RFI (WIND) THEME SENSITIVITY

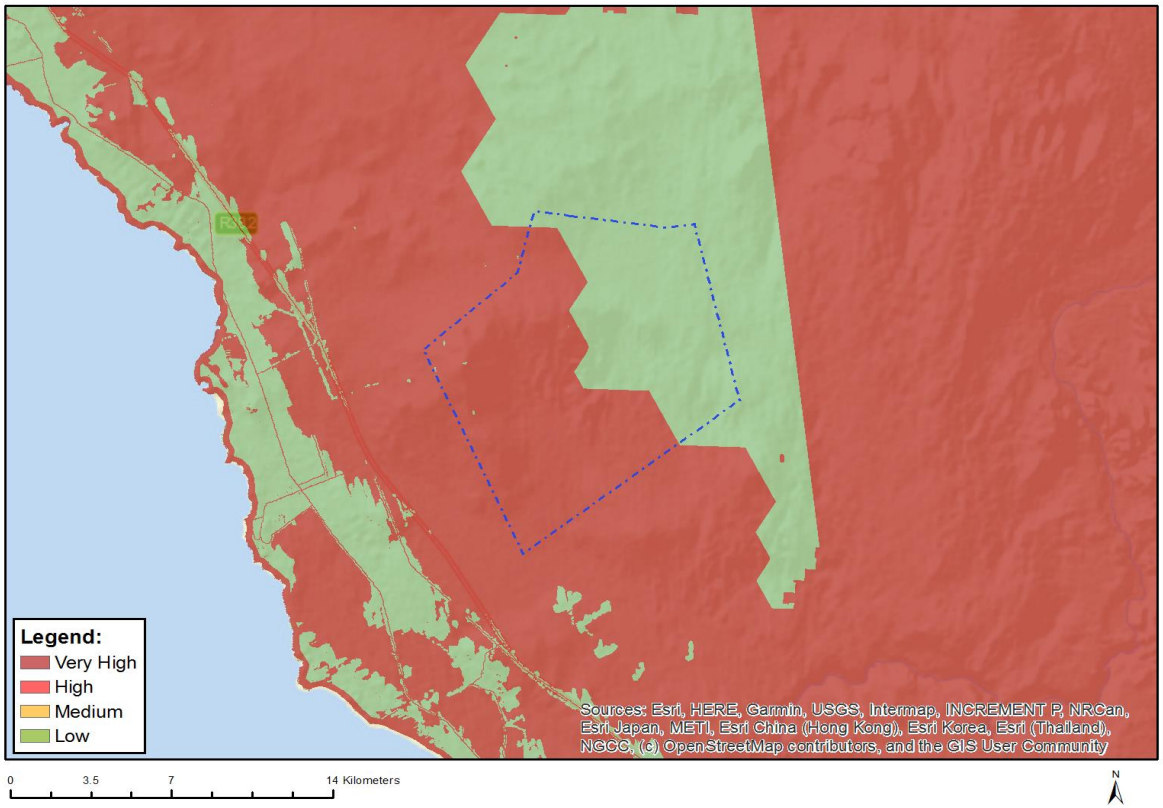



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | X | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| High | Within 1 km of a telecommunication facility;None;More than 60 km from a Weather Radar installation |
| Low | Low sensitivity for telecommunications;None;More than 60 km from a Weather Radar installation |

## MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY




| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| X | | | |

**Sensitivity Features:**

| Sensitivity | Feature(s) |
|---|---|
| Low | Low Sensitivity |
| Very High | Critical Biodiversity Area 1 |
| Very High | Critical Biodiversity Area 2 |
| Very High | Ecological Support Area |