

MAKOANENG SOLAR POWER PLANT



SITE ASSESMENT FOR THE DEVELOPMENT OF MAKOANENG SOLAR POWER PLANT ON PORTION 1 OF THE FARM AVONDZON NO. 278 AND THE FARM NAKOB NO. 750, THE REMAINING EXTENT OF THE FARM SELBORNE NO. 392, THE FARM BUXTON NO. 581, AND THE FARM GOEDEHOOP NO. 251, BRANDFORT REGISTRATION DIVISION AND THABA 'NCHU REGISTRATION DIVISION, FREE STATE, SOUTH AFRICA

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1. Executive Summary

Makoaneng Solar Power Plant (RF) (Pty) Ltd is proposing the development of a photovoltaic solar energy facility located approximately 43 km east of the town of Excelsior in the Free State province. The proposed farm portions which are owned by CORPCLO 2173 (Pty) Ltd are located within the Free State Province, Brandfort Registration Division and Thaba 'Nchu Registration Division, South Africa (Figure 1). The study area falls within Mangaung Local Municipal area of jurisdiction.

The landscape consists of level plains with some relief. Access will be obtained via N1 onto a public gravel road providing direct access to the property and solar facility. For connection to the grid a Loop-In-Loop-Out line will connect the solar power plant to the Harvard/Merapi 1 275/22kV overhead line, It is expected that generation from the facility will feed in to the national grid via the Merapi 275/22 KV MTS Substation.

The site has Very Low to Very-Moderate agricultural potential as well as low-moderate potential grazing capacity. This site has favourable conditions for a solar power plant due to its environmental conditions, weather conditions (i.e., Salmonsiaa has good solar radiation levels) as well as good site access.

The site has good solar radiation, ecology, and relative flat terrain (refer to Figures below). Some parts of this site may not be suitable due to issues found such as large portions being within an Ecological Support Area.

2. Portion 1 of The Farm Avondzon No. 278 and The Farm Nakob No. 750, The Remaining Extent Of The Farm Selborne No. 392, The Farm Buxton No. 581, and The Farm Goedehoop No. 251

Portion 1 of the farm Avondzon No. 278 and the farm Nakob No. 750, Brandfort Registration Division; the Remaining Extent of the farm Selborne No. 392, the farm Buxton No. 581, the farm Goedehoop No. 251, Thaba 'Nchu Registration Division, Free State Province.

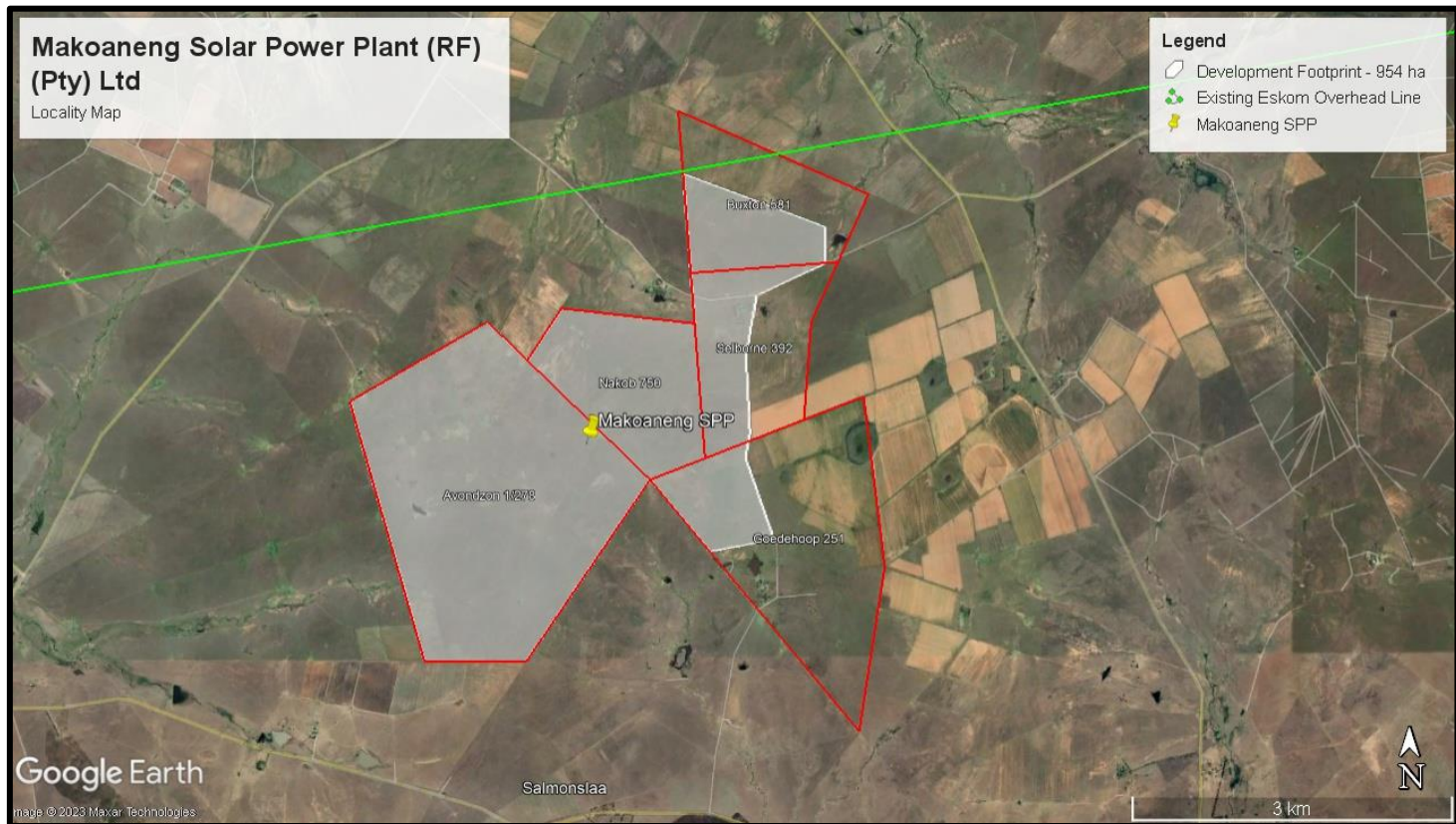


Figure 1: Proposed affected farm portion

3. Power lines and Substations

3.1 Substations near the site

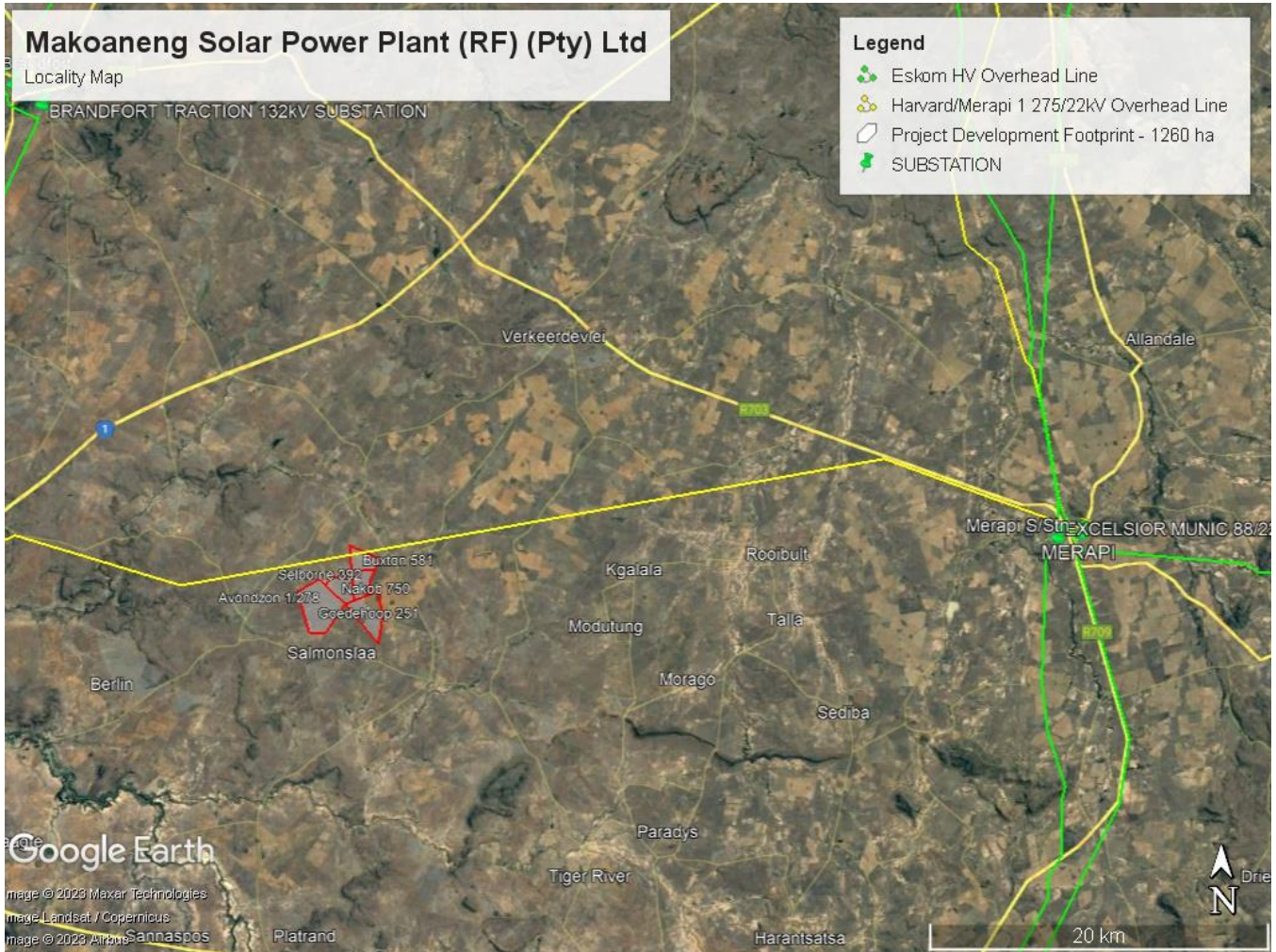


Figure 2: Excelsior Munic 88kV Substation, Merapi 275kV MTS Substation

Merapi MTS statistics:

- Supply Area: Free State province
- Local Area: Excelsior
- Transformer Voltage: 275/132/22 kV
- Transformers installed: 2
- REIPPPP Generation allocation to date: 0MW
- Load at Merapi MTS: 51MW
- Transformer Limit: 526
- Substation Limit: 820
- Local Area Limit: 2440
- Supply Area Limit: 1260

3.2 Power Lines near the site

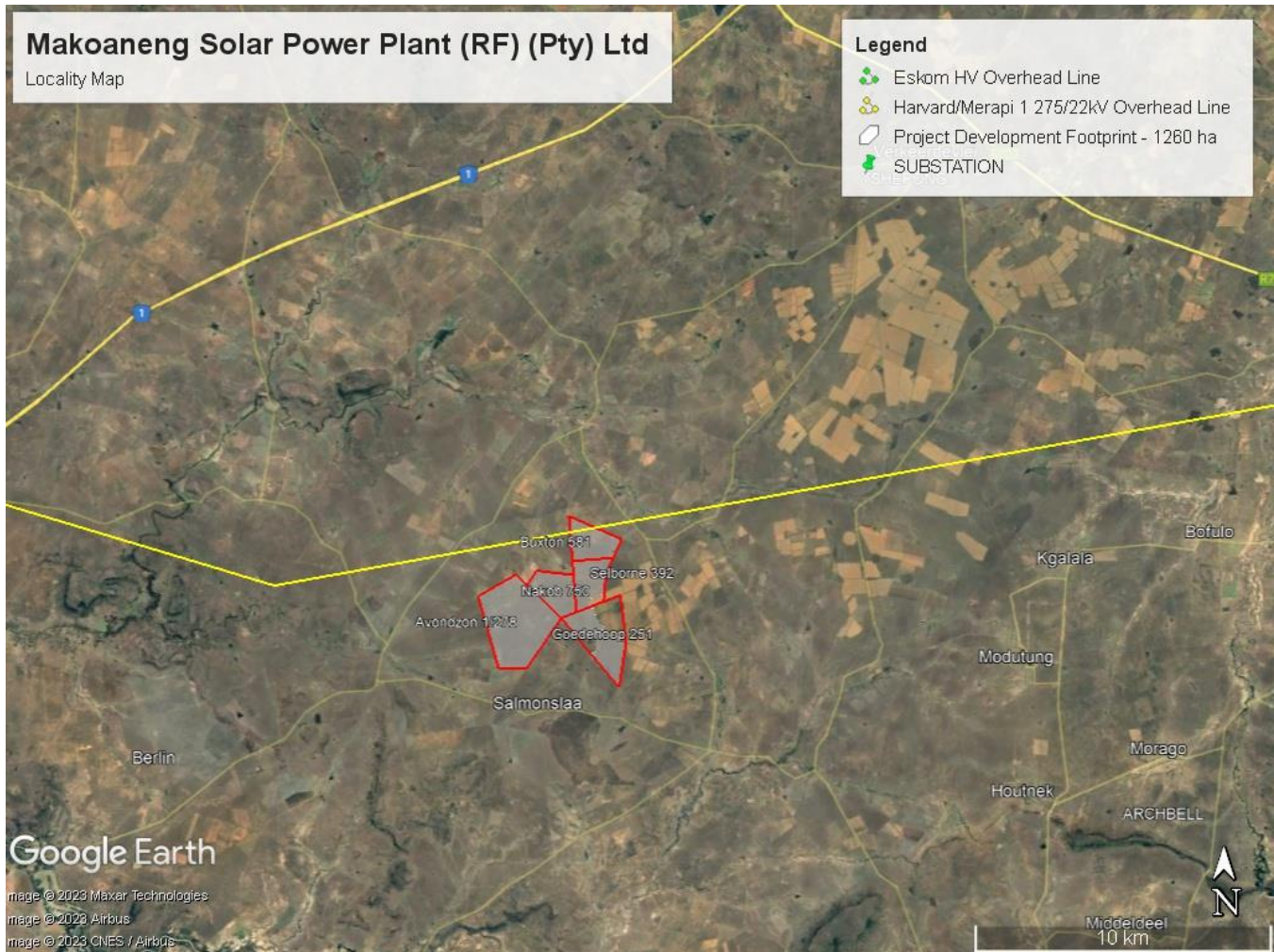


Figure 3: Illustration of Affected powerlines

- Harvard/Merapi 1 275/22kV Overhead Line

4. Environmental impact assessments done in the area

Two (2) other EIAs have been conducted within a 30km radius of the farm portions:

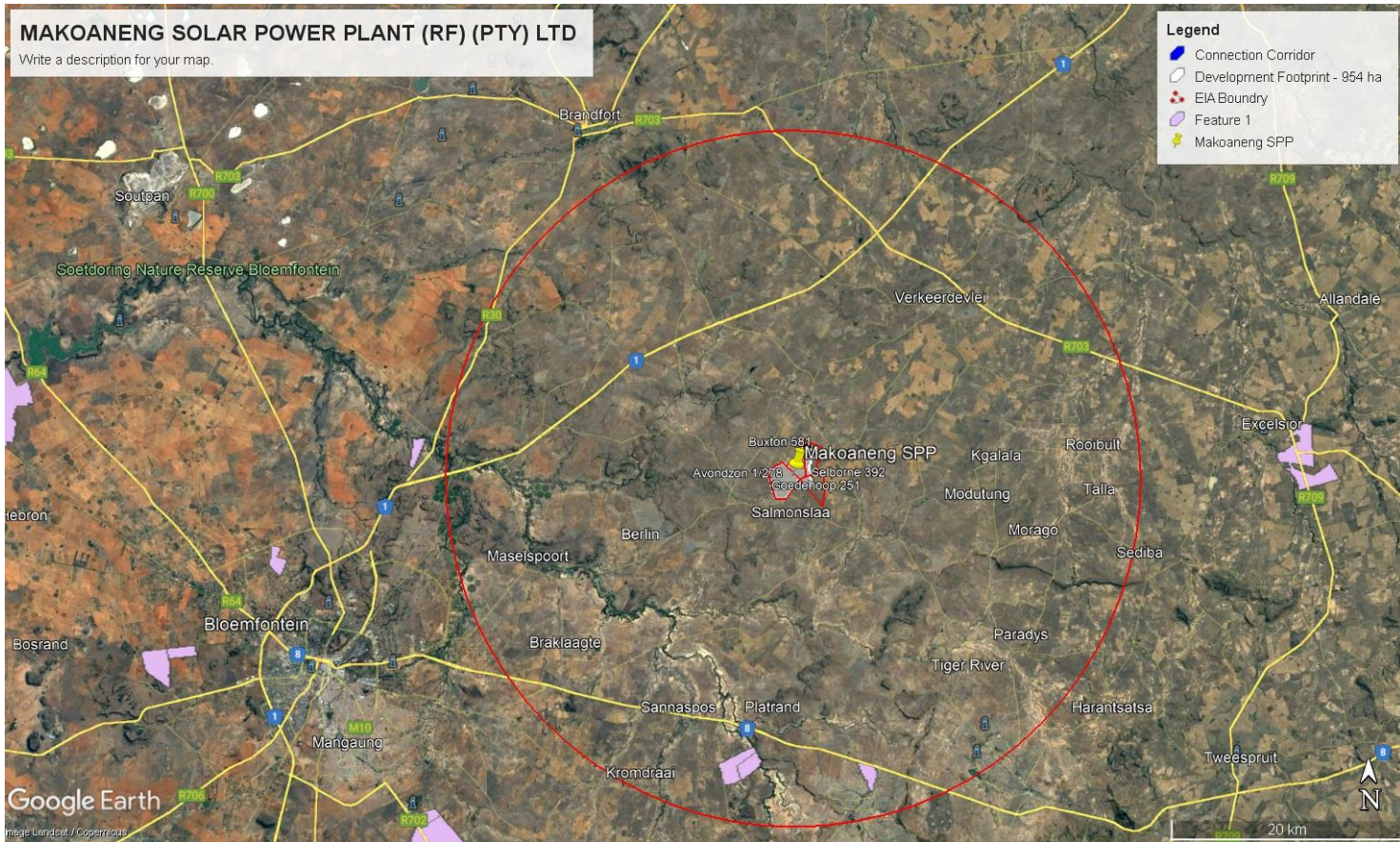


Figure 4: EIA's within 30km of The Farm Avondzon No. 278 and The Farm Nakob No. 750, The Remaining Extent of The Farm Selborne No. 392, The Farm Buxton No. 581, and The Farm Goedehoop No. 251

Project name	Proposed generation capacity (MW)	DFFE Reference	Project Status
The proposed Eskom switching station and grid connection infrastructure as part of the Sannaspos photovoltaic (PV) solar energy facility phase 1, Free State Province	0	14/12/16/3/3/2/360/AM5/2	Approved
The Proposed Establishment Of A Photovoltaic Solar Plant In Batshabelo, Mangaung Local Municipality, Free State	5	12/12/20/2514	Approved

5. Natural resources

5.1 Geology

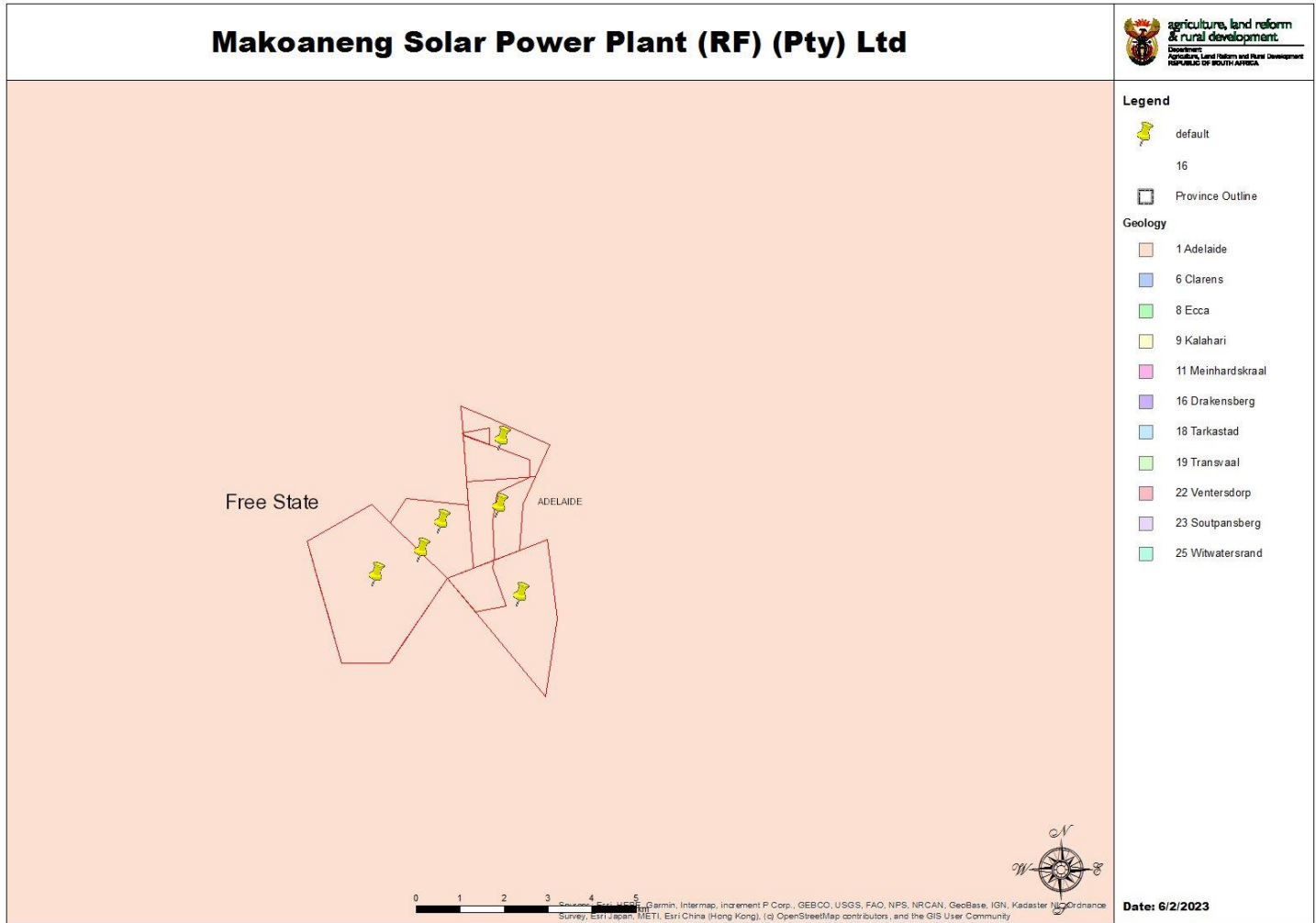


Figure 5: The proposed development is underlain by Adelaide group.

5.2. Terrain

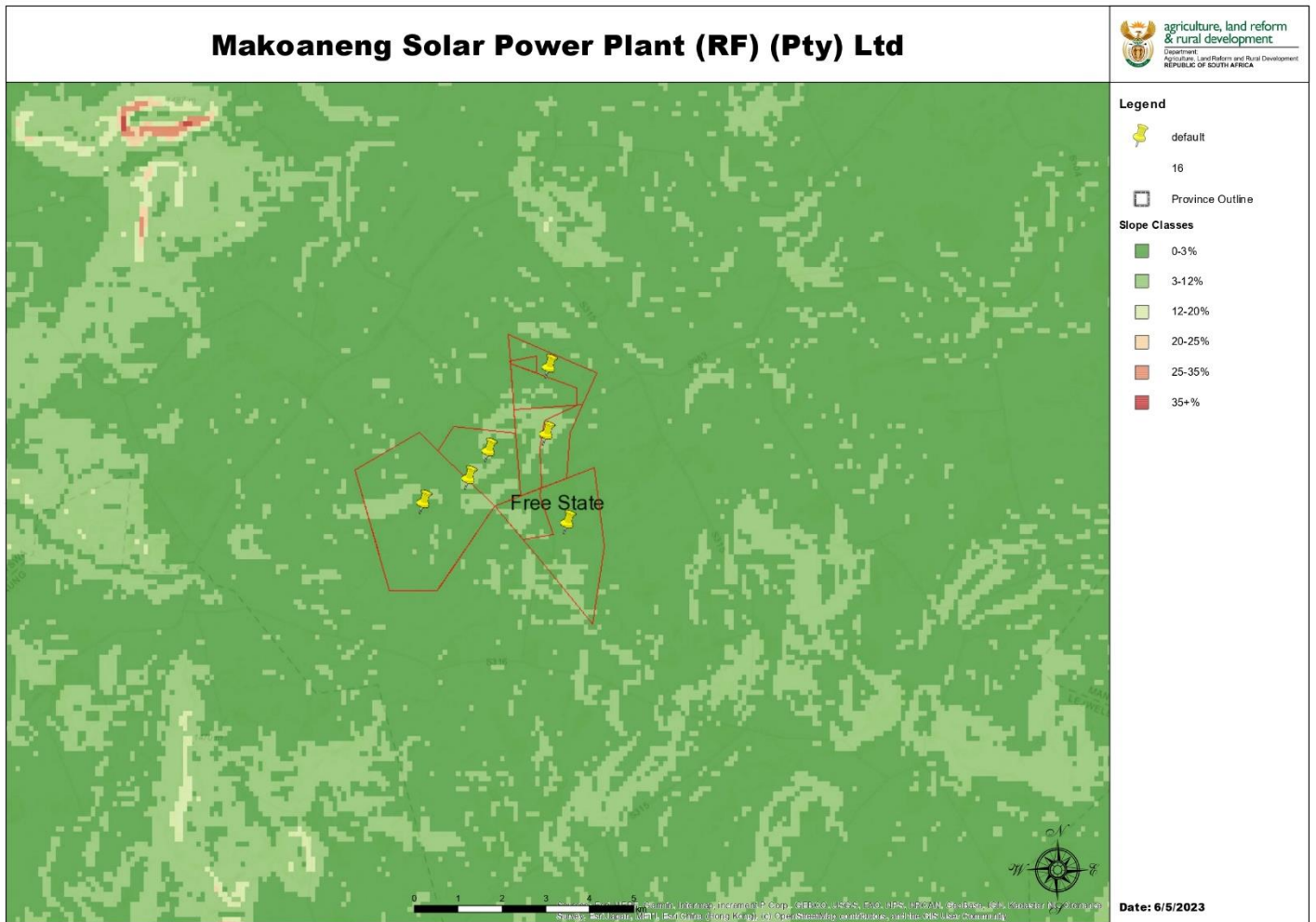


Figure 6: The slope class of the study area consists of the lowest slope class: 0-3% and 3-12%. The terrain is therefore considered relatively flat and suitable for a solar PV development.

5.3 Vegetation:

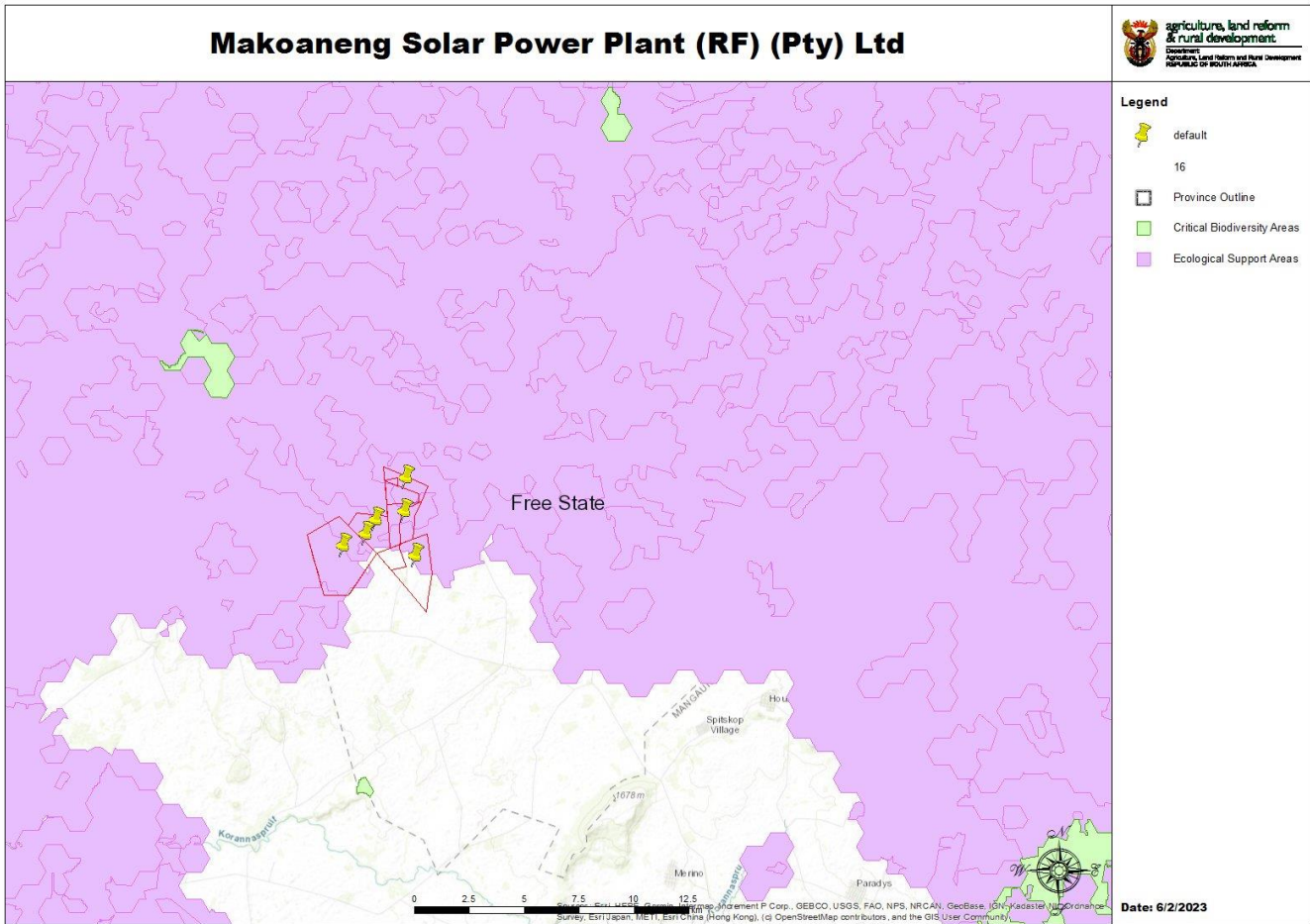


Figure 7: The study area falls within an Ecological Support Area (ESA) but none of the portions fall within a Critical Biodiversity Area (CBA). Sections of the site are not classified as an ESA or CBA and is therefore considered less sensitive.

5.4 Water

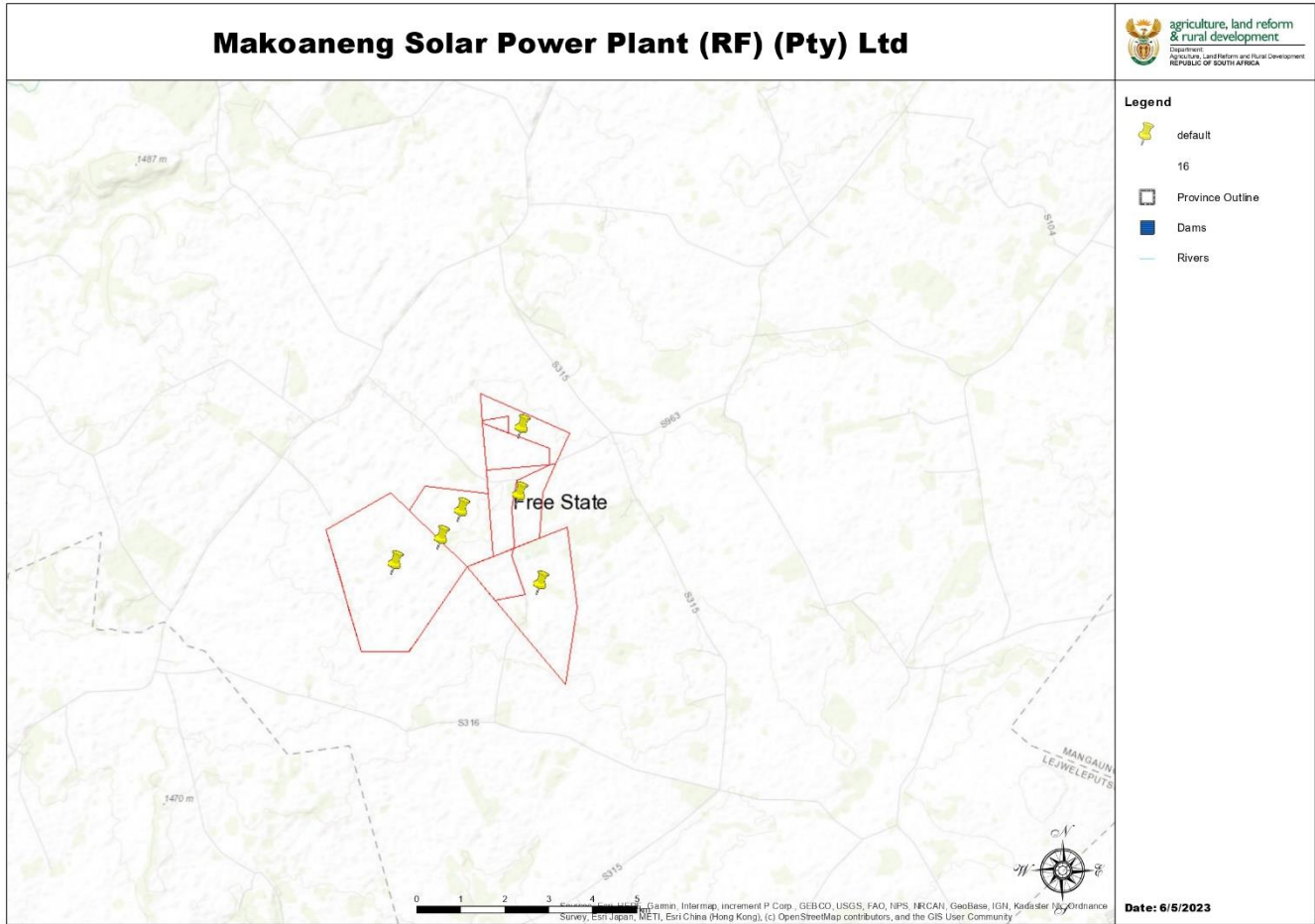


Figure 8: There are no NFEPA rivers present near the farms.

5.5 Agriculture

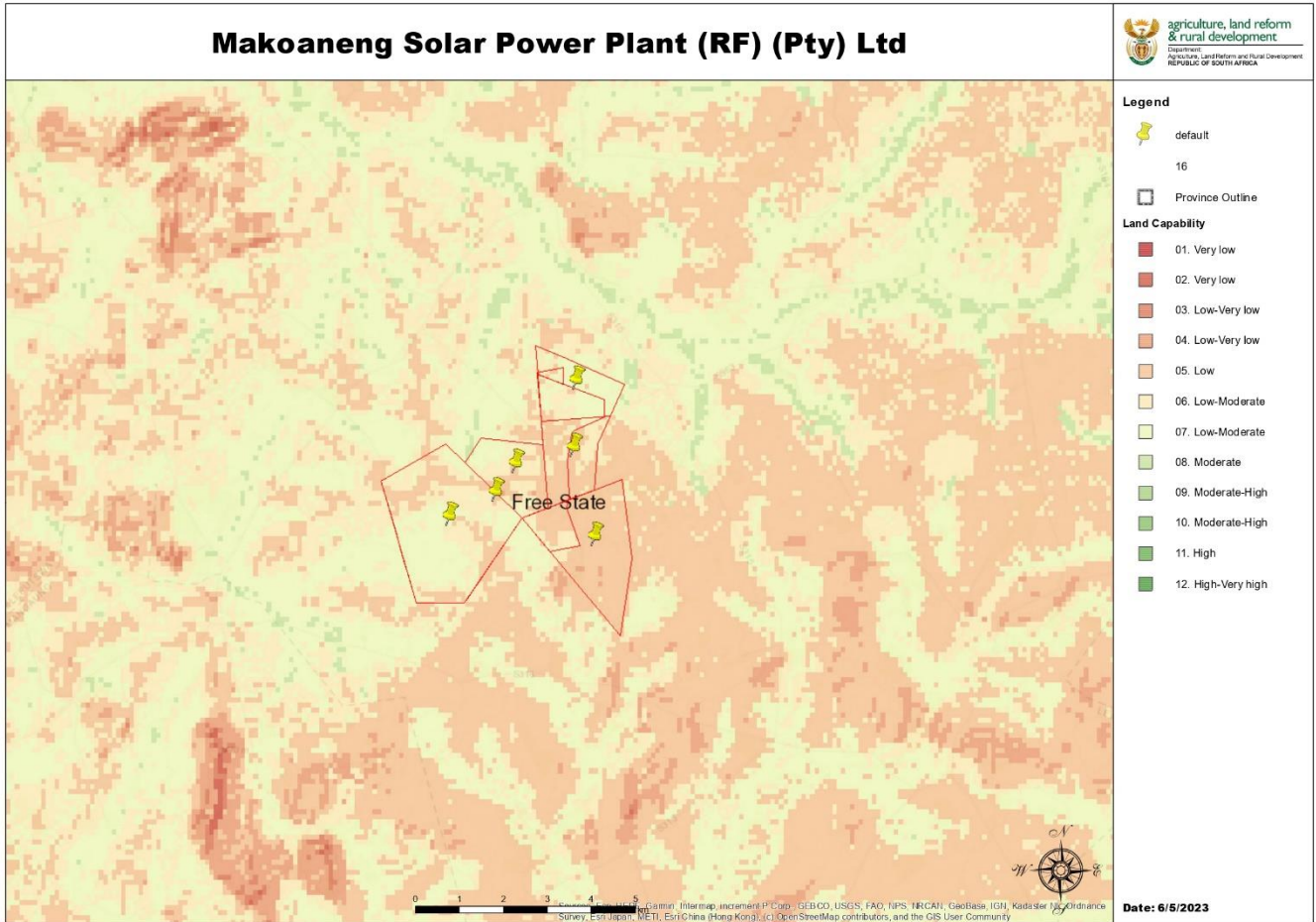


Figure 9: The land capability in the study area consists of Very Low to Very-Moderate land capability

Makoaneng Solar Power Plant (RF) (Pty) Ltd



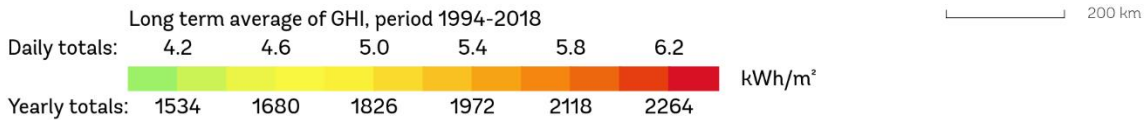
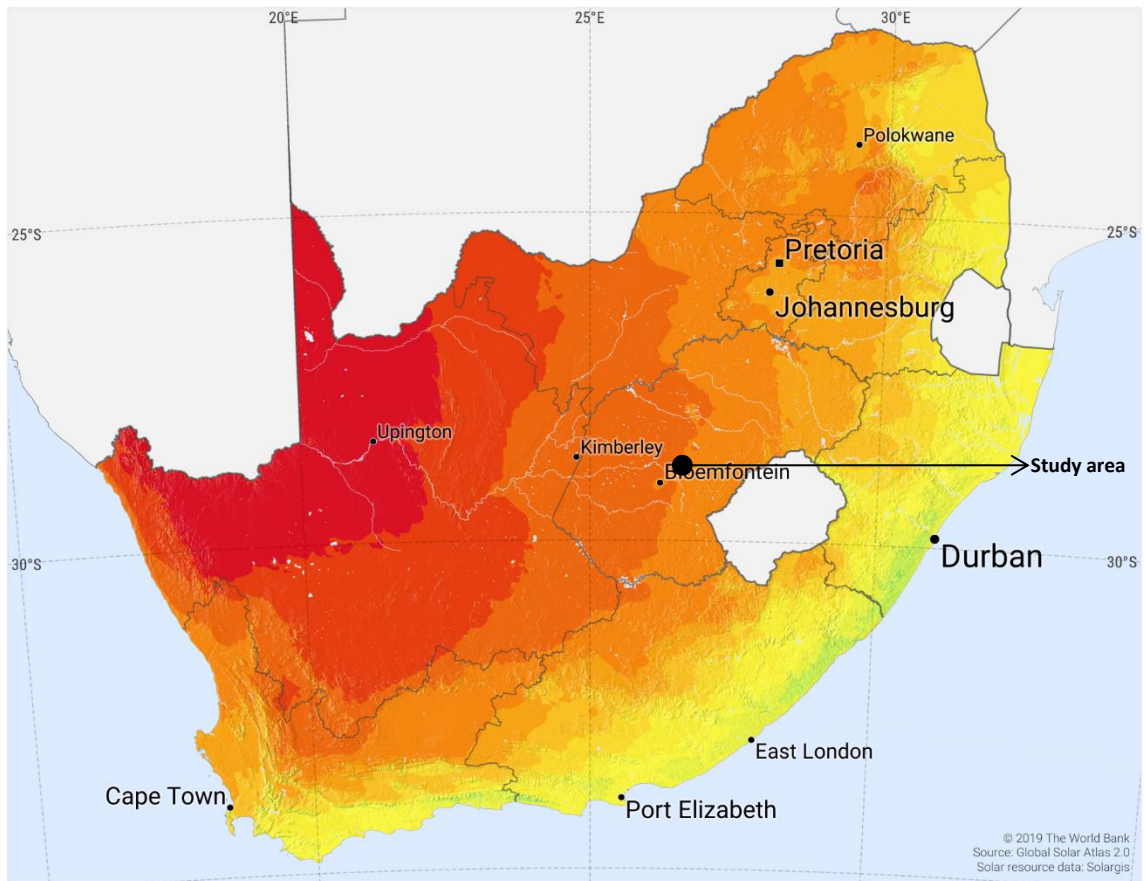
Figure 10: The grazing capability in the study area has a value of has a value of 4 to 6.5, this is considered a low-moderate grazing capacity.

6. Global horizontal irradiation (SolarGIS)

The Global Horizontal Irradiation for the area derived from the World Bank Group’s Global Solar Atlas is approximately 2319.96kWh/m². The site falls within a region that is considered to be suitable for solar energy development and the irradiation level is sufficient for the operation of a solar PV facility. This will enable the proposed project to compete competitively in the Department of Mineral Resources and Energy’s (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other programmes/opportunities to generate power in South Africa.

SOLAR RESOURCE MAP

GLOBAL HORIZONTAL IRRADIATION SOUTH AFRICA



This map is published by the World Bank Group, funded by ESMAP, and prepared by Solargis. For more information and terms of use, please visit <http://globalsolaratlas.info>.

Figure 12: GHI of the study area is approximately 2113.6 kWh/m².

7. Possible areas for development

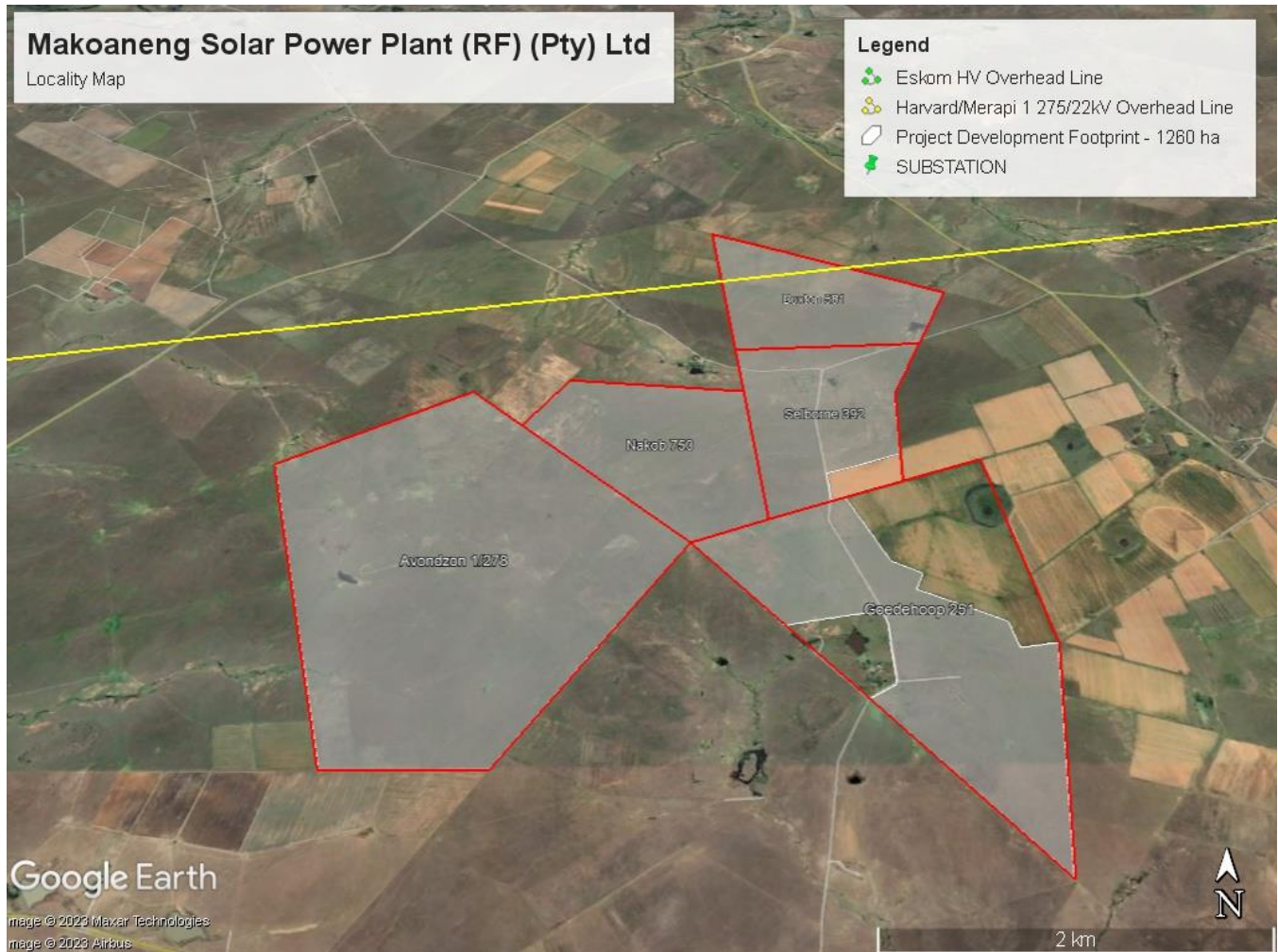


Figure 13: Proposed development area for a solar power plant

A proposed development footprint was identified for a proposed solar plant, this footprint is 1 404,892ha in extent.

Preferred development site (grey portion): This is the preferred option since there are no major issues to be avoided near the site and the terrain is flat. This proposed development footprint has an overhead long power line route to the *Merapi MTS*.

Keeping all the above information into consideration, the proposed development footprint would be the preferred option for the development of a solar plant. This area was identified due to the low impact on the environment and infrastructure of the land portion.

8. Reference:

Natural Agricultural Resources Atlas of South Africa, NAR Atlas Website:

<https://ndagis.nda.agric.za/portal/apps/webappviewer>

Photovoltaic Geographical Information System Website:

<https://ndagis.nda.agric.za/portal/apps/webappviewer>