

05 July 2021

The Environmental Assessment Practitioner
Modderfontein Wind Energy Facility
c/o Terramanzi Group
5 Devon Air Close
Crofters Valley
Noordhoek
7975

Attention: Fabio Venturi

201101 – Technical Specification Upgrades to the Modderfontein Wind Energy Facility, located in the Beaufort West REDZ - Part 2 Amendment Application: AGRO-ECOSYSTEMS ASSESSMENT

Your request for a specialist agricultural assessment of the potential impact of the amended Modderfontein WEF development plan dated 25 May 2021, has reference. Herewith please find my summary of findings as described below.

Introduction

An Environmental Authorisation (EA) was issued on 22/02/2012 (Register nr.: 12/12/20/1993/3) for the installation of up to 67 wind turbines with a total generating capacity of 201 MW using turbines with a generating capacity of up to 3 MW each, for which a total of 30.06 ha has been allowed for permanent transformation. This *status quo* authorisation is regarded as the “no-go alternative” to the proposed amendments. Due to advances in wind generation technology a new development plan is now proposed for the installation of only 34 wind turbines, each with a generating capacity of 5.6 MW, in two clusters of 140 MW (cluster 1) and 50.4MW (cluster 2) in total.

The Scoping Study for the original Environmental Assessment found that “prevailing unfavourable climatic conditions for arable agriculture as well as prevalence of soils with limited depth” did not necessitate further detailed Agricultural Potential and Land Capability investigation.

The development site for the WEF is situated in Renewable Energy Development Zone 11.

Scope of this Assessment

The aim of this assessment was (i) to confirm the limited agricultural potential of the study area, as described in the original EIR and (ii) to assess the probable change in impact of the wind energy facility (WEF) on the agro-ecosystems of the farms of the study area.

Results

The relief map (attached) indicates the new proposed positions of the two clusters of wind turbines, relative to the original layout. The new layout is mostly confined to the elevated positions in the landscape, namely the ridge lines of the hills, relative to the flatter areas used in the original layout.

The climate of the area is arid (mean annual precipitation = 237 mm and annual evaporation = 2379 mm), with severe frost during the winter months (see climate summary, attached). The grazing capacity is low at ± 25 ha per large stock unit (DAFF, 2018) while the soils are predominantly very shallow or rocky and non-arable (see Land Type map attached).

Table 1: The Land Type data confirms the prevalence of rock or very shallow non-arable soils. (Note, that no turbine positions are planned on Land Type Fb489).

Land Type	Dominant Soil Type (% of area)	Sub-dominant Soil Type (% of area)	Non-arable Soils (% of Land Type)
Fb485	Rock (22.3%)	Mispah (57.5%)	79.8%
Fb486	Rock (37.7%)	Mispah (36.7%)	74.4%
<i>Fb489</i>	<i>Rock (13.2%)</i>	<i>Mispah (41.2%)</i>	54.4%
Ib397	Rock (75.5%)	Hutton <200mm (5.5%)	81.0%

The Land Capability map (attached) also reflects the low agricultural potential of the study area. All proposed turbines are positioned on land capability values of 5 or lower. These areas have a Low Sensitivity for renewable energy generation facilities (Protocol for the assessment of environmental impacts on agricultural resources, Government Notice 648, Government Gazette 45421, May 2019). The guidelines of this protocol propose a maximum allowable development footprint of 2.5 ha per MW generating capacity for areas with Low Sensitivity and outside of field crop boundaries.

Discussion

The limitations of the agricultural resources of the study area as mentioned in the original EIR, have been confirmed, as outlined above. The reduction in the number of wind turbines, from the approved 67 to the proposed 34 will have a proportionately lower footprint and thus similarly reduced impact on the agro-ecosystems.

The new turbine layout is regarded as more favourable from an agro-ecological point of view, as it is mostly confined to the ridgelines of the hills, where the soils are rocky or very shallow and thus contributes marginally to the grazing capacity of the land.

In terms of the guidelines of the Protocol, the Modderfontein WEF with a total generating capacity of 190.4 MW, has potentially up to 476 ha available for the development footprint of the facility, including roads and all related infrastructure. The total surface area of all access roads and hard standing areas of the proposed amended WEF amounts to ± 80 ha.

Conclusion

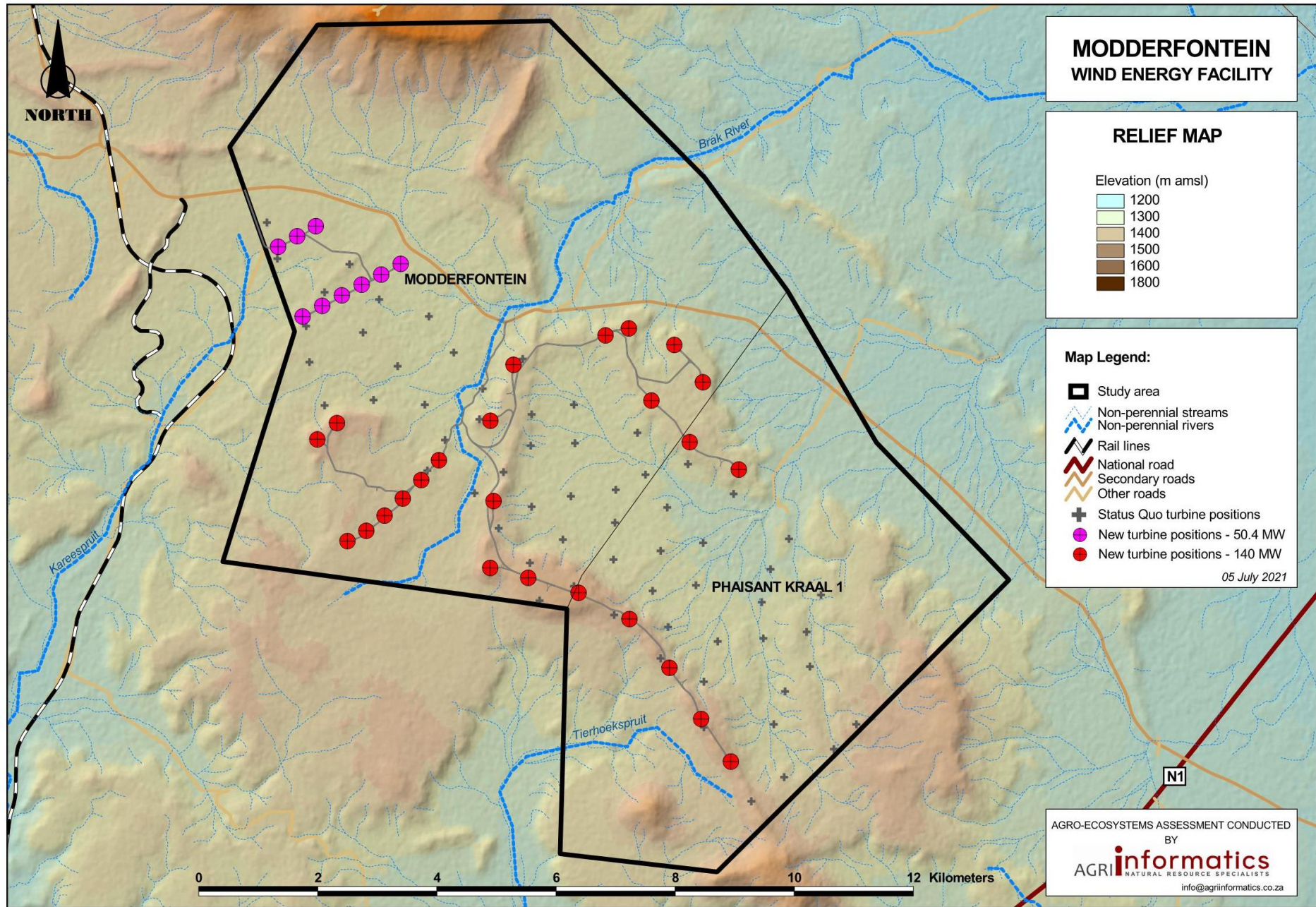
The proposed amended Modderfontein WEF will have a reduced footprint relative to the *no-go* alternative and the turbine positions are more favourably placed compared to the *no-go* alternative. The total footprint amounts to less than 20% of the maximum allowable development footprint of 2.5 ha per MW generating capacity. The potential impact of the amended plan on the agro-ecosystem is therefore lower than that of the previously authorised alternative and regarded as negligible to the agro-ecological receiving environment.

I trust that these findings address your requirement in terms of the Part 2 Amendment Application.

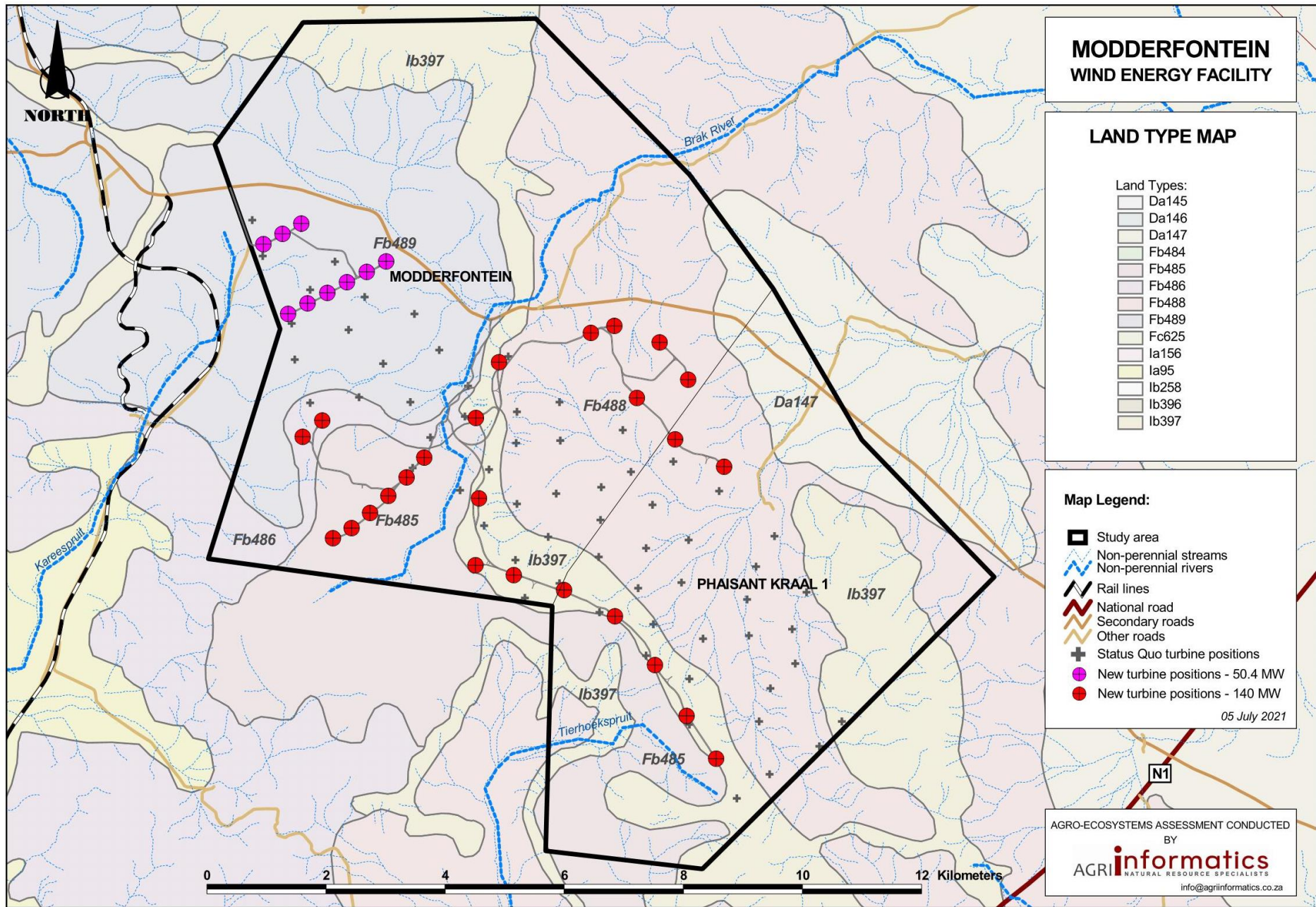
Kind regards



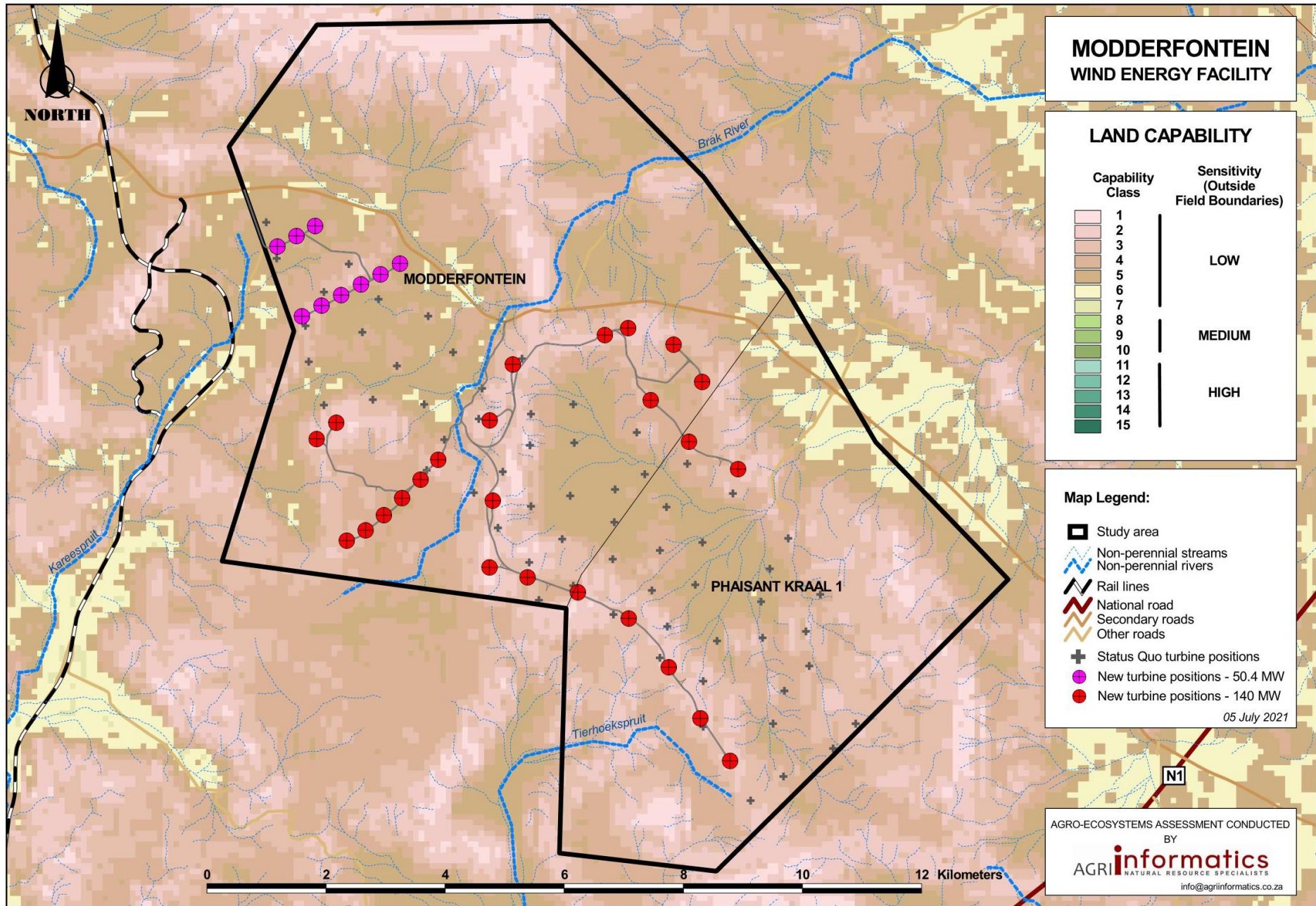
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Climate data summary

MODDERFONTEIN WEF

31°45'S 23°16'E

Altitude (approx) 1325 m

Record length 30 Yrs

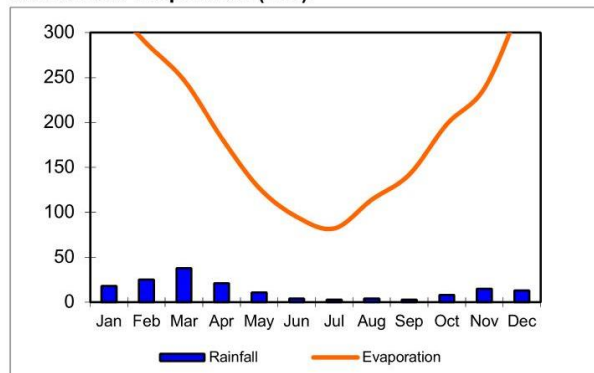
	Temperature °C										Degree Days above 10°C									
	Av. Mthly Days	Av. Mthly Lowest	Av. Mthly Min.	Av. Min. minus	Daily Mean	Daily Range	Av. Mthly Max.	Av. Mthly Highest	Av. Mthly Highest minus	Temp. Variability	Unadj. without	Unadj. with	Adj. for Lat. & Day	Av. Sunshine Hours	Av. Number Rain Days	Av. Rainfall mm	Av. A-pan Evap. mm	Av. Windrun km	Av. Daily Min. % R.H.	Av. Daily Max. % R.H.
	T < 0 °C	Min.	Lowest	Lowest Min.			Max.	Max.	Av. Max.	Index	Cutt-off	19°	Cutt-off	Length	Hours	Rain Days	mm	Evap. mm	km	% R.H.
January	0.0	10.5	13.3	2.8	21.9	17.2	30.5	34.1	3.6	40.8	369	279	274	0	0.0	18	333	0	30	81
February	0.0	10.3	13.2	2.9	21.4	16.3	29.5	33.3	3.8	39.3	318	252	248	0	0.0	25	288	0	33	83
March	0.0	8.1	11.3	3.2	19.0	15.4	26.7	30.8	4.1	38.1	279	279	274	0	0.0	38	247	0	38	88
April	0.0	3.5	7.0	3.5	14.7	15.4	22.4	26.5	4.1	38.4	141	146	143	0	0.0	21	183	0	38	88
May	0.0	0.2	3.4	3.2	11.0	15.1	18.5	22.3	3.8	37.2	29	29	29	0	0.0	11	127	0	39	90
June	0.0	-2.8	0.5	3.3	8.0	14.9	15.4	18.9	3.5	36.6	-62	-62	-60	0	0.0	4	95	0	37	87
July	0.0	-3.5	-0.2	3.3	7.7	15.8	15.6	19.2	3.6	38.5	-71	-71	-70	0	0.0	3	82	0	35	87
August	0.0	-2.5	1.1	3.6	9.5	16.7	17.8	22.3	4.5	41.5	-17	-17	-17	0	0.0	4	114	0	32	82
September	0.0	0.2	4.0	3.8	12.7	17.3	21.3	26.4	5.1	43.5	80	80	78	0	0.0	3	142	0	29	78
October	0.0	3.2	7.0	3.8	15.4	16.7	23.7	28.7	5.0	42.2	166	166	163	0	0.0	8	198	0	32	82
November	0.0	6.5	9.9	3.4	18.3	16.8	26.7	31.1	4.4	41.4	249	249	245	0	0.0	15	238	0	30	78
December	0.0	9.1	11.9	2.8	20.4	17.0	28.9	32.9	4.0	40.8	322	279	274	0	0.0	13	332	0	30	80
Annual					15.0	16.2			4.1	39.9	1782	1583	1556	0	0	163	2379	0	33	84

* (adapted from Gladstones, 1993)

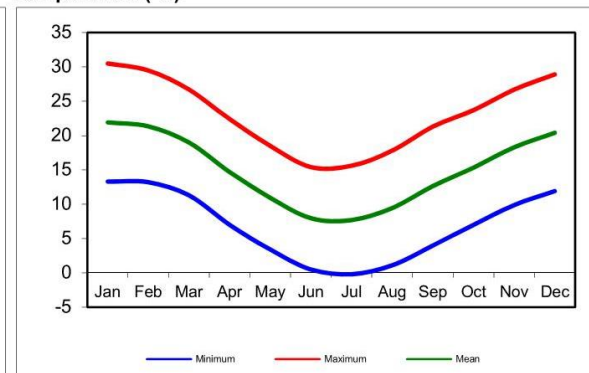
NOTE: 1. Degree days calculated for Sep to Mar (S Hemisphere) & Apr to Sep (N Hemisphere)

2. A column of zero values is an indicator of an element not recorded at this weather station

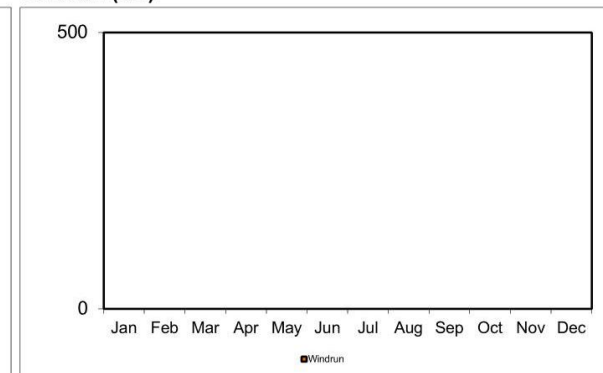
Rainfall and Evaporation (mm):



Temperature (°C):



Windrun (km):



Tonietto & Carbonneau's multicriteria climatic index:

Heliothermal Index	Cold Night Index	Dryness Index
Hot	Cold nights	Very dry
HI+2	CI+2	DI+2

Data sheet compiled by **Agri Informatics**

All data are provided free of charge. Fees apply to data processing and extraction only.

Data sources: Agromet, division of ARC

FAO: Environment and Natural Resources Services

WRC: Atlas for Agro Meteorology

WDC for Meteorology; Müller & Hennings

WorldClimate.com

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