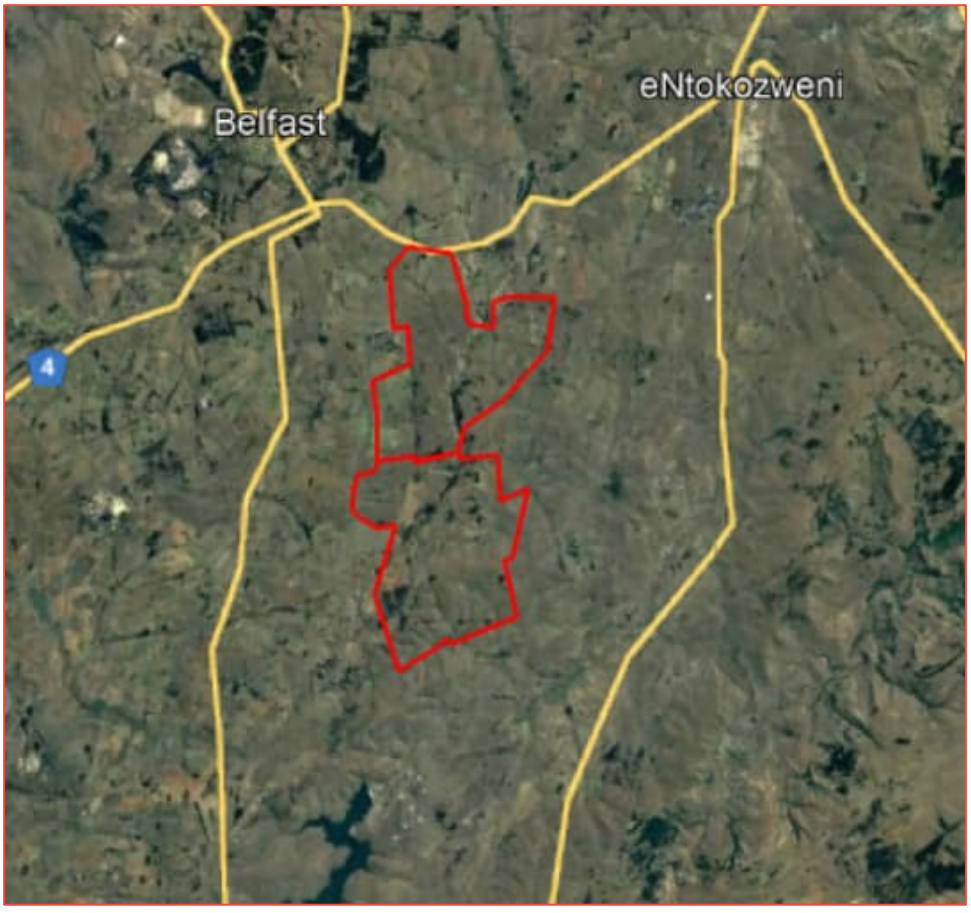
ENERTRAG SOUTH AFRICA

DALMANUTHA WIND ENERGY FACILITY, MPUMALANGA

TRANSPORT SCOPING REPORT

01 DECEMBER 2022

PUBLIC



DALMANUTHA WIND ENERGY FACILITY, MPUMALANGA

TRANSPORT SCOPING REPORT

ENERTRAG SOUTH AFRICA

TYPE OF DOCUMENT (2.0)
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PROJECT NO.: 41103722 -DALMANUTHA WEF SCOPING
DATE: DECEMBER 2022

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Our ref.: 41103722 -DALMANUTHA WEF SCOPING

1 December 2022

PUBLIC

Ashlea Strong
ENERTRAG SOUTH AFRICA
WSP Environment

Dear Madam:

Subject: Dalmanutha Wind Energy Facility: Transport Scoping Report - Final

Please find attached herewith the revised Final Transport Scoping Report.

Yours sincerely,

Digitally signed by Christo Bredenhann
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Prepared by	Christo Bredenhann Pr Eng	Christo Bredenhann Pr Eng	Christo Bredenhann Pr Eng	
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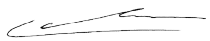
SIGNATURES

PREPARED BY



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Wayne Petersen, Director

PRODUCTION TEAM

CLIENT

WSP Environment & Energy on behalf of ENERTRAG SOUTH AFRICA	Ashlea Strong

WSP

Project Director	Wayne Petersen *Pr. Eng*
Project Leader/Engineer	Christo Bredenhann *Pr. Eng*

SUBCONSULTANTS

N/a

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1 INTRODUCTION

1.1 BACKGROUND

WSP Group Africa (Pty) Ltd (WSP) has been appointed by ENERTRAG South Africa to undertake a Transport Scoping report and Transport Impact Assessment (TIA) of the proposed Dalmanutha Wind Energy Facility (WEF), to be located south-east of Belfast in Mpumalanga Province.

1.1 SCOPE

This scoping report assesses the expected transport related impacts of the facility during the construction, operation, and potential subsequent decommissioning phase.

The report is structured as follows:

- A Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of Baseline Environment – including sensitivity mapping
- Identification and high-level screening of impacts
- Plan of Study for the subsequent EIA

1.2 PREVIOUS SUBMISSIONS

No prior Traffic related Scoping report or Traffic Impact Assessment (TIA) has been undertaken for this proposed WEF.

2 PROJECT DESCRIPTION

2.1 TYPE AND EXTENT OF THE DEVELOPMENT

The Dalmanutha Wind Energy Facility will be located approximately 7km southeast of Belfast in the Emakhazeni Local Municipality, Mpumalanga Province. Site access is proposed via National Road N4, which is located along the northern border of the site.

The Dalmanutha WEF will be located over eighteen farm portions covering approximately 4370 ha. These portions are detailed in **Error! Reference source not found.**.

Table 2-1: Affected farm portions

Farm No.	Portion No.	Farm name
378	1	Berg-en-Dal
385	24 (A portion of portion 7)	Waaikraal 3F5JT
378	9	Tropical Paradise Trading 271
384	7	Blyvoor Boerdery
385	6	P C Van Wyk Trust
385	7	P C Van Wyk Trust
385	8	Ben Vilikazi
385	10	Francois van Rooyen
385	12	Ben Vilikazi
385	13	Ben Vilikazi
385	24	Weltervreden Holdings
403	3	Wessel Hendrik Pieters
403	4	Wessel Hendrik Pieters
404	1	Lihle Group
404	2	Lihle Group
405	3	Zena Pieters
412	1	Simunye CPA
467	0	Wessel Hendrik Pieters

2.2 PROJECT INFRASTRUCTURE

A summary of the details of the facility and associated infrastructure is included in **Error! Reference source not found.**.

Table 2-2: Technical details of the Dalmanutha WEF & associated Infrastructure

Extent	9 400ha
Buildable area	400 ha
Capacity	Capacity Up to 300MW
Number of turbines	up to 80
Turbine hub height	Up to 200m

Rotor Diameter	Up to 200m
Foundation	• Approximately 25m diameter x 3m deep = +/- 1500m³ concrete. • Dimensions may vary as required by the geotechnical conditions. • Excavation approximately 1000m², in sandy soils due to access requirements and safe slope stability requirements.
Operations and Maintenance (O&M) building footprint:	• Located near the substation. • Septic tanks with portable toilets • Typical areas include: o Operations building – 20m x 10m = 200m² o Workshop – 15m x 10m = 150m² o Stores - 15m x 10m = 150m²
Construction camp laydown	• Typical area 100m x 50m = 5000m². • Sewage: Conservancy tanks and portable toilets
Cement batching plant (temporary):	Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. The footprint will be +/- 0.5ha. The maximum height of the silo will be 20m.
Internal Roads:	• Width of the internal roads: 8m to 10m, this can be increased to 12m on bends. • Length of the internal road: Approximately 60km.
Cables	The medium voltage collector system will comprise of cables up to and include 33kV that run underground, except where a technical assessment suggests that overhead lines are required, connecting the turbines to the onsite IPP substation.
Independent Power Producer (IPP) site substation and battery energy storage system (BESS):	The total footprint will be up to 4ha in extent. The substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The associated BESS storage capacity will be up to 100MW/400MWh with up to four hours of storage. It is proposed that Lithium Battery Technologies, or Vanadium Redox flow technologies will be considered as the preferred battery technology. The main components of the BESS include the batteries, power conversion system, and transformer which will all be stored in various rows of containers.

2.3 PHASING OF THE DEVELOPMENT

For the purpose of the impact assessment, it was assumed that the facility will be developed in a single phase with an estimated construction period of 2 years.

2.4 APPROVAL OF SUBMISSIONS

This report will be subject to approval from the relevant authorities and will be submitted as part of the Environmental Impact Assessment process.

2.5 SITE LOCATION & SURROUNDING ROAD NETWORK

2.5.1 SITE LOCATION

The WEF will be located on 18 farm portions, as detailed in Section 2.1. Refer to **Error! Reference source not found.** for the locality map, **Error! Reference source not found.** for the aerial image of the farm portions and Figure 2-2 for the proposed wind turbine locations.

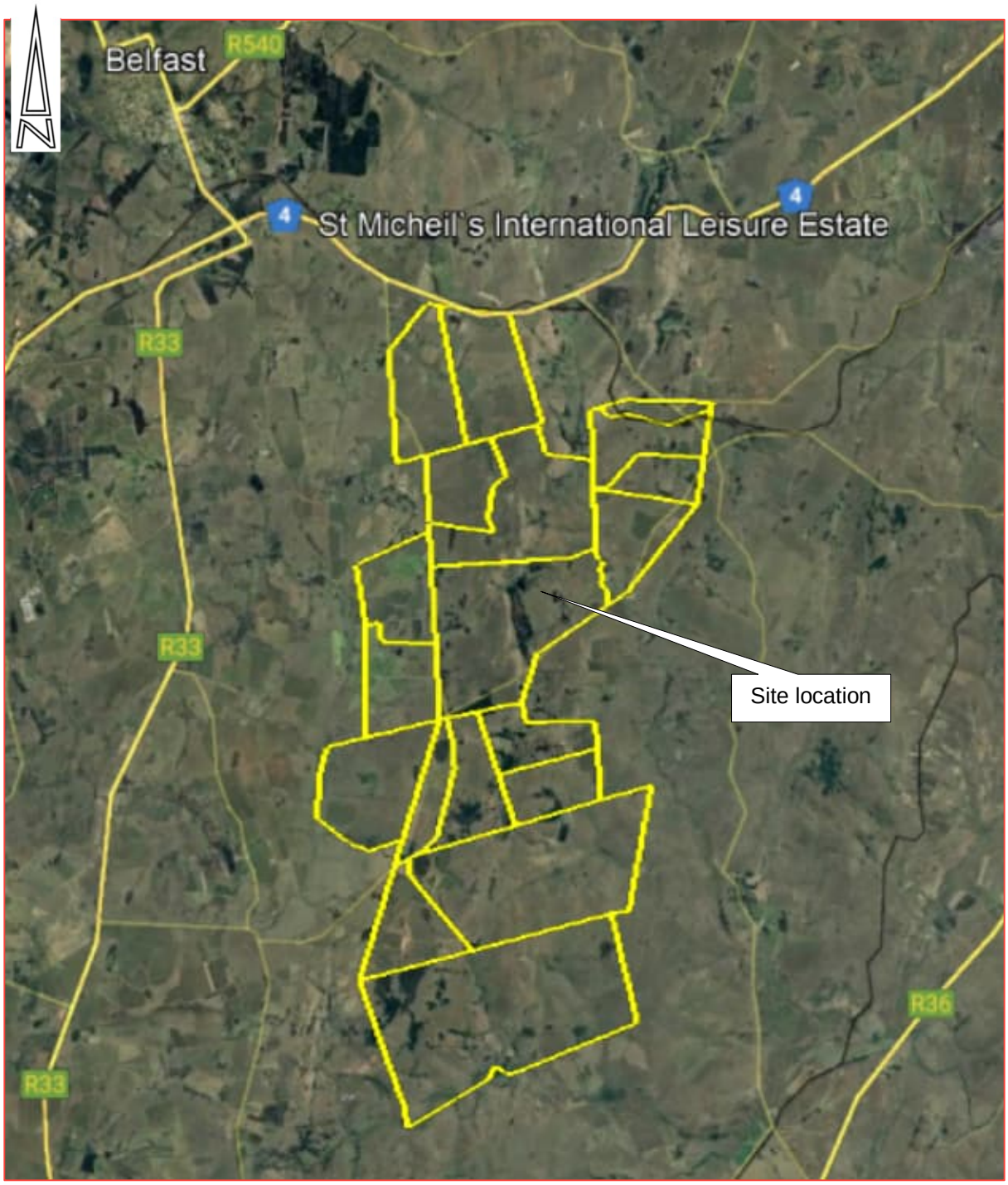

Figure 2-1 Locality map and farm portions

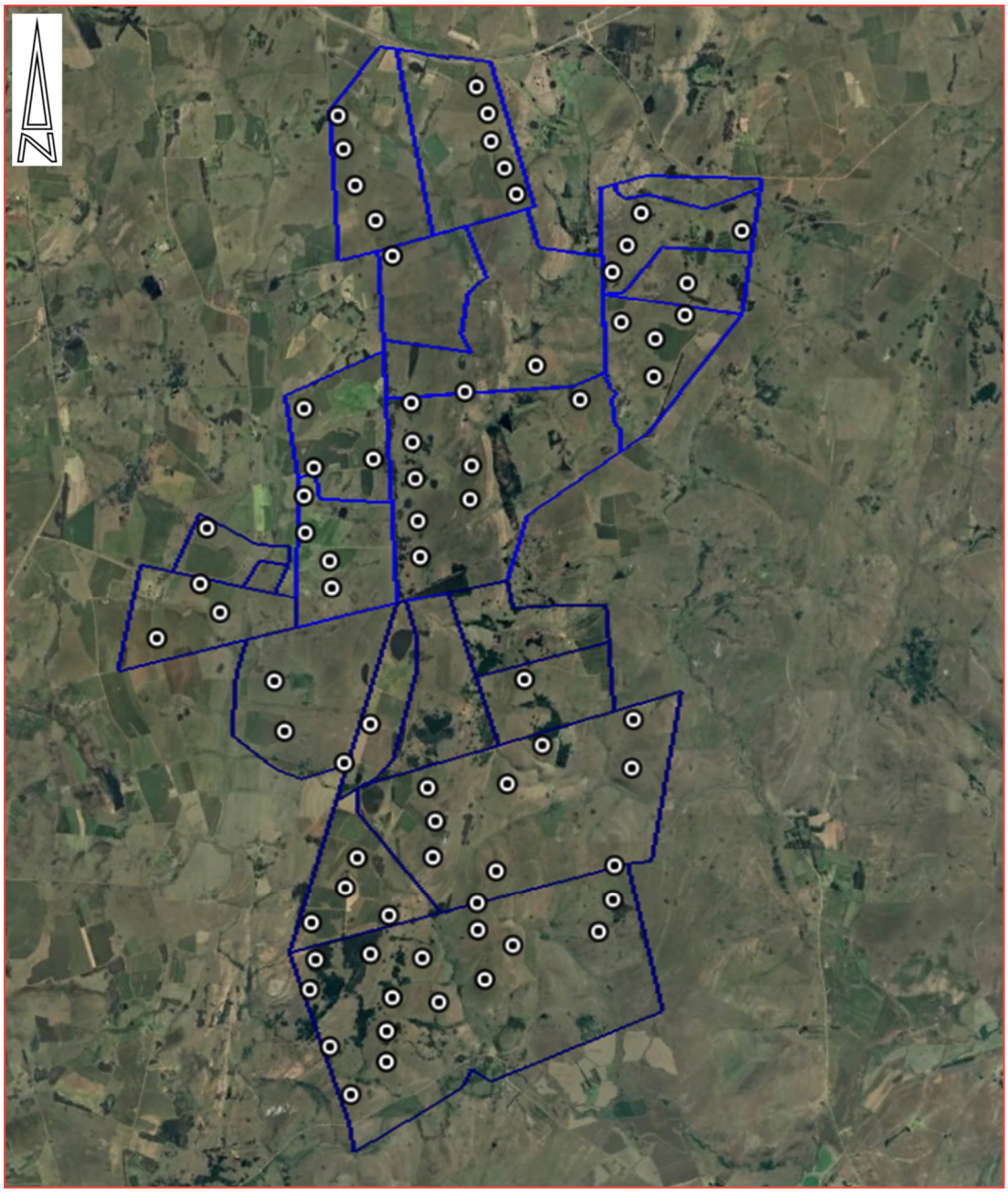

Figure 2-2 Proposed Turbine locations

2.5.2 ROAD NETWORK & SITE ACCESS

The public roads and accesses in the vicinity of the site that may be impacted by the WEF are briefly described herewith.

The site is located directly west of National Road N4, and in between the Provincial Road R33 to the west and the R36 to the east. The N4 is the primary east-west road link from the Botswana border via Pretoria and Mbombela to the Mozambique border. In the vicinity of the site, the N4 is a single carriageway road with 1 lane per direction and gravel shoulders. Refer to Figure 2-3 for the Provincial Road network located in the greater site area.

Figure 2-3 Provincial road network

The planned local access roads on-site will take access off the N4 and local unsurfaced roads that takes access off the N4 and R36. Refer to Figure 2-4 for the provisional layout of the on-site access roads. The access routes and access points off the primary and secondary road network will be assessed in detail in the TIA.

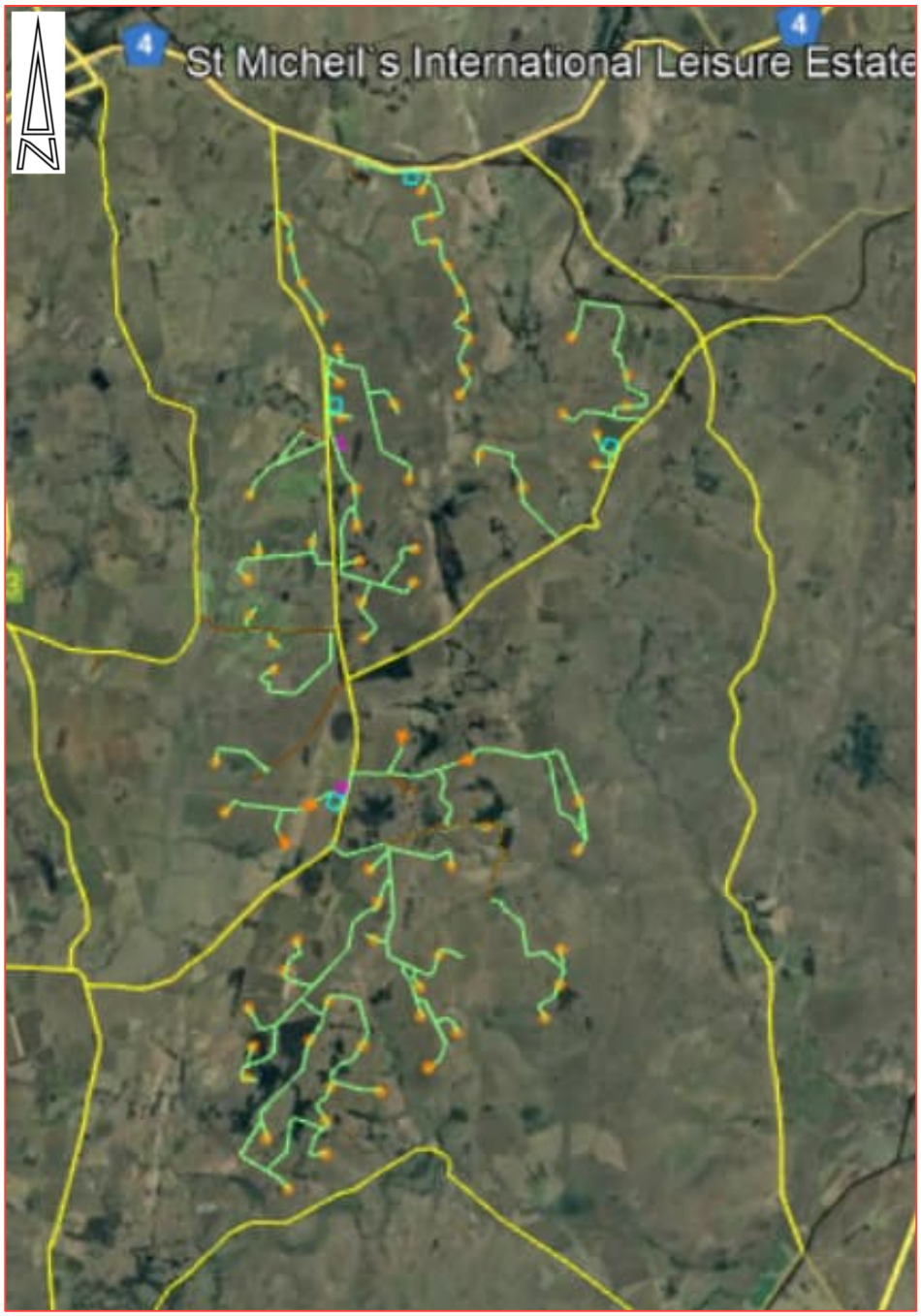

Figure 2-4 On-site access roads – Provisional alignments

3 LEGISLATIVE CONTEXT

The Scope of the TIA is based on the requirements of the South Africa Committee of Transport Officials, South African Traffic Impact and Site Traffic Assessment Manual, TMH16, Vol. 1, Version 1, August 2012 and will be supplemented by the relevant requirements of Appendix 2 of GNR 982, as amended, which requires the identification of the significance of potential impacts during the scoping phase.

4 ASSUMPTIONS AND LIMITATIONS

4.1 TRAFFIC FLOWS & TRIP GENERATION

4.1.1 EXISTING TRAFFIC FLOWS

The existing traffic volumes on the National and District roads will be surveyed as part of the full TIA to undertake a capacity analysis of affected intersection.

4.1.2 LATENT TRAFFIC

There are no know large scale developments in the greater study are that requires assessments.

4.1.3 DEVELOPMENT TRIP GENERATION

The South African Trip Data Manual (TMH17) does not contain estimates for expected trip generation of a wind power facility of this nature. The following sections estimates the expected trip generation from Client provided information. This will be expanded in the TIA.

4.1.4 CONSTRUCTION PHASE TRAFFIC

The construction phase of the facility will generate the only notable traffic that requires assessment. Construction traffic will include vehicles for material and component deliveries, construction staff and all other associated personnel. Trips will include the delivery of over-sized components such as the rotor blades, mast sections and generators. The route/s between the origin of the material and components and the facility may be National, Provincial or Local roads, and each authority will be required to provide the necessary permits for the transportation of any oversized or weight components.

The construction phase traffic will be estimated based on the assumptions listed per traffic generator source.

CONSTRUCTION STAFF TRANSPORT TRIP GENERATION

- An estimated construction period of 24 months, with a variable number of staff required depending on the construction phase.
- An estimated maximum of 250 workers will be on-site every day during the peak construction period.
- Workers will not be accommodated on-site.
- 85% of the work force (unskilled and semi-skilled workers) will utilise public transport to site from neighbouring towns, most notably Belfast which is less than 10 km away.
- Skilled personnel will travel by private car with an average occupancy of 1.5 persons.
- The availability of bus services for staff transport cannot be confirmed, therefore it is conservatively assumed that all Public Transport trips will be with mini-bus taxis, with a 16 person per vehicle occupancy.

- Staff will not utilise non-motorised transport (NMT) to travel to site due to the excessive distances to the closest towns.
- It is assumed that the public transport vehicles will not remain on-site during the workday, therefore all these vehicles will arrive and again depart during the AM and PM peaks.

CONSTRUCTION MATERIAL DELIVERY TRIP GENERATION

- It is proposed to construct a maximum of 80 wind turbines and support buildings.
- The turbine towers are expected to have a hub height of up to 200m, with a rotor diameter of up to 200m.
- Each 200m diameter turbine rotor will require 3 blades of up to 100m long each (maximum). Rotor blades will be manufactured abroad and imported via the most suitable Port. The dimensions of the blades, their point of origin and the resultant route between the Port and the site will determine the vehicle type and special permits that may be required for the transportation of these blades.
- The most feasible import point is the Port of Richards Bay, approximately 515km away via the N4, R33, N17 and N2.
- The tower masts will be constructed of tubular steel, manufactured off-site in sections up to 30m, and are lifted into place on site. Similar to the blades, the type of tower mast components (steel, concrete, hybrid) will determine their origin, port of entry (if imported) and delivery route to the site.
- The route/s between the origin (port of entry) of the oversize/weight components and the site may be National, Provincial or Local roads. The transportation of any oversized or overweight freight along these routes will require authorisation from all the relevant road authorities.
- It is recommended that an abnormal vehicle route management plan be undertaken when the port/s of entry are confirmed. This plan will cover all aspects such as horizontal and vertical vehicle requirements, bridges along the route, speed limits, etc. These plans and the application for the abnormal permits is normally the responsibility of the logistics company that will transport the components to site.

Assumptions were made to estimate the expected trip generation of the construction phase.

- It is assumed that masts will be manufactured of steel, and not hybrid masts with concrete sections.
- Each mast will consist of 7 x 29 m steel segments.
- One mast segment can be delivered per vehicle trip.
- One rotor blade can be transported on an abnormal size vehicle.
- Concrete foundations of approximately of 25m diameter x 3.0m deep are required, reinforced with 100 tons of steel.
- Approximately +/- 1500m^3 concrete per foundation (higher conservative volume used).
- The foundation dimensions may vary as required by the geotechnical conditions.
- Concrete foundation will be constructed to support a mounting ring.
- Excavation of approximately 1000m^2 per foundation will be required in sandy soils due to access requirements and safe slop stability requirements.
- Concrete will be batched on-site at a temporary plant. Gravel, sand, and cement will be transported to site via the local road network, in 45 ton loads per truck, and then stored on site until required.
- Steel is transported in 40 ton loads on standard flatbed vehicles.
- Component and material deliveries will take place over a period of 24 months. It is assumed that deliveries will take place on 80% of all working days for a conservative trip generation estimate.

4.1.5 OPERATIONAL PHASE TRAFFIC

The operational phase of the facility will require a low number of permanent staff. The vehicle trips that will be generated by the personnel accessing the site will therefore be low, and the associated transport impact on the surrounding road network will be negligible.

4.1.6 DECOMMISIONING PHASE TRAFFIC

Following the initial 20-year operational period of the facility, its continued economic viability will be investigated. If it is still deemed viable its life may be extended; if not, it will be decommissioned. If it is completely decommissioned, all the components will be disassembled, reused, and recycled or disposed of.

It is not possible to determine the volume of traffic that will be generated during the decommissioning phase. It is however expected that the volumes will be lower than during the construction phase, and the resultant transport impact on the local road network will be lower than during the Construction phase. Any damage to the unsurfaced access roads caused by the decommissioning phase traffic should be repaired at the cost of the developer.

4.2 ROAD NETWORK & MASTER PLANNING

There are no known local, provincial, or national roads planned in the vicinity of the site or the greater study area that will be impacted by the WEF or vice-versa.

5 DESCRIPTION OF BASELINE ENVIRONMENT & SENSITIVITY MAPPING

5.1 ENVIRONMENT

The local environment is a critical factor when it comes to the final site selection of this WEF. The Developer looks to ensure that the project is developed sustainably. All the environmental factors were considered in the area when the Developer was scoping for potential sites for the proposed WEF. After a thorough evaluation of the regional farms, the specific farm 18 farm portions were selected because they were already heavily disturbed by agricultural activities. Thus, it was concluded that the development of the wind turbines and support infrastructure on the farm portions would have a minimal impact on the region's flora and fauna.

5.2 TOPOGRAPHY AND SITE ACCESS

The surrounding landscape has a rolling hill topography which is suitable for the development of a WEF. The Project site is located on a flat high lying landscape that has the highest wind resource within the immediate area.

The WEF site can be accessed easily via either the surfaced R33, R36 or National Road N4 which is located along the western, eastern, and northern boundaries of the site respectively.

There are existing unsurfaced Provincial roads that traverse the site that will allow for direct access to the turbine and support infrastructure locations. It is recommended that these roads are used as much as possible to reduce the new for additional local access roads and their associated environmental impact on the site.

The existing traffic volumes on the potentially affected National and Provincial roads will be surveyed as part of the full TIA to assess the impacts on the accesses and road network. The estimated traffic volumes along the planned internal site access roads will be estimated in the TIA to inform the capacity analysis of the affected intersections.

6 IDENTIFICATION AND HIGH-LEVEL SCREENING OF IMPACTS

6.1 INTRODUCTION

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability and consequence (Table 6-1), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and consequence are detailed in Table 6-2 and Table 6-3 respectively.

Table 6-1: Significance Screening Tool

		CONSEQUENCE SCALE			
PROBABILITY SCALE		**1**	**2**	**3**	**4**
	1	**Very Low**	**Very Low**	**Low**	**Medium**
	2	**Very Low**	**Low**	**Medium**	**Medium**
	3	**Low**	**Medium**	**Medium**	**High**
	4	**Medium**	**Medium**	**High**	**High**

Table 6-2: Probability Scores and Descriptors

SCORE	DESCRIPTOR
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur
2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable:** The possibility of the impact occurring is very low

Table 6-3: Consequence Score Descriptions

SCORE	NEGATIVE	POSITIVE
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper, and quicker, or some combination of these.

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e., beneficial) or negative (-ve) (i.e., harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (Table 6-4) has been applied according to the nature and significance of the identified impacts.

Table 6-4: Impact Significance Colour Reference System to Indicate the Nature of the Impact

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	**Negligible**
Very Low	**Very Low**
Low	**Low**
Medium	**Medium**
High	**High**

6.2 SCREENING RESULTS

– Refer to Table 6-5 for the Construction Phase traffic related environmental screening assessment of the proposed WEF.

Table 6-5: Impact Screening - Construction phase traffic

Impact number	Aspect	Description	Character	Probability	Consequence	Impact significance
1:	Noise, dust & exhaust pollution due to vehicle trips on-site	• Vehicle engine noise • Vehicle tyre noise • Dust generation on unsurfaced roads • Vehicle exhaust fumes	Negative Impacts (-ve)	4	1	**Medium**
2:	Noise, dust & exhaust pollution due to additional trips on the national and district roads	• Vehicle engine noise • Vehicle tyre noise • Dust generation on unsurfaced roads • Vehicle exhaust fumes	Negative Impacts (-ve)	4	1	**Medium**

– The Operational phase traffic impact was not assessed, as the trip generation during this phase will be negligible, with a negligible impact.
– The Decommissioning phase traffic impact is expected to be similar to the Construction Phase traffic and was not assessed separately.

7 PLAN OF STUDY FOR THE SUBSEQUENT EIA

The Traffic Impact Assessment in support of the EIA will be conducted as follows:

7.1 SITE INSPECTION

A site visit will be undertaken to obtain the following information:

- Existing layouts and traffic control measures of intersections considered in the study.
- Accesses to various properties surrounding the proposed development site.
- Appropriateness of proposed site accesses.
- Condition of the road network.
- Presence of existing public transport and non-motorised transport facilities.

7.2 DATA COLLECTION

A weekday 12-hour traffic counts (6am to 6pm) will be conducted at affected intersections in relation to the potential access positions off the major local road, National Road N4.

7.3 ACCESS ASSESSMENT

The access positions via local roads from the N4 and Provincial Roads will be assessed in terms of safety, operation, and capacity, if requires as per TMH16 standards. These accesses will be confirmed during the preparation of the study.

7.4 TRIP GENERATION

The South African Trip Data Manual (TMH17) does not contain estimates for expected trip generation of a wind power facility of this nature. The trip generation during the Construction, Operation and Decommissioning phases will be estimated from Client provided information and assumptions, refer to Section 4.1

7.5 BASELINE ASSESSMENT

A capacity analysis will be undertaken of the affected local intersections for the baseline conditions using SIDRA 8 software, to determine the current traffic conditions using the traffic volume information.

7.6 OPERATION ASSESSMENT

A capacity analysis will be conducted for the operating conditions of new and affected intersections using SIDRA 8 software, and to propose mitigating measures where required.

7.7 IMPACT ASSESSMENT

An environmental assessment rating will be undertaken for the construction, operational and decommission phase in relation to traffic impact.

7.8 CONCLUSIONS AND RECOMMENDATIONS

From the site inspections, SIDRA analysis and assessment as described above, conclusions and recommendations will be made in order to mitigate any possible traffic impacts of the proposed development on the local road network and environment.

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- South Africa Committee of Transport Officials TMH 17 South African Trip Data Manual, Version 1.01, September 2013.
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