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**ARCHAEOLOGICAL IMPACT ASSESSMENT THE PROPOSED VREDEFORT RTO REPEATER SITE**

No significant archaeological remains were located during a detailed foot survey of the proposed Vredefort RTO Repeater Site, near Touws River, in the Western Cape.

The proposed Transnet Repeater Site is located on a high kopje on the farm Vredefort about 5 kms south-west of the Klein Karoo town of Touws River.

The site was searched for both archaeological and fossil remains.

The study area falls within the Ecca Group of deposits, which are known rich fish and plant fossil-bearing deposits. Extensive outcroppings of these deposits occur around the Matjiesfontein and the De Doorns area<sup>1</sup>.

No stone tools were located within the proposed development footprint, nor in a small access track leading to the site.

A few quartzite Middle Stone Age<sup>2</sup> (MSA) tools were located along the southern ridge of the kopje overlooking the farm. These included three flakes (one snapped), and one core.

A thin scatter of Later Stone Age<sup>3</sup> (LSA) tools were found on an flat eroded gravel patch in the north eastern portion of the kopje. These included three retouched hornfels flakes, and two unmodified hornfels flakes. One MSA flake in quartzite was also noted.

According to the Manager of the farm Vredefort, (Mr Lee Winter, pers. comm.), Bushman paintings are known to occur on the lower north eastern slopes of the kopje; a considerable distances from the Repeater site, and will not be impacted by the proposed project.

No fossils were located on the site.

<sup>1</sup> Dr Roger Smith, Department of Karoo Palaeontology, South African Museum, personal communication, December 2001.

<sup>2</sup> A term referring to the period between 200 000 and 20 000 years ago.

<sup>3</sup> A term referring to the last 20 000 years of precolonial history in southern Africa.

Overall, the archaeological remains located during the study are not considered to be significant or important.

The impact of the proposed project on archaeological remains is likely to be low to negligible.

The probability of locating any significant archaeological and fossil remains during implementation of the project is also likely to be low.

In general the receiving environment is not considered to be archaeologically sensitive, vulnerable, or threatened.

No archaeological mitigation is required.

Yours sincerely

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**VREDEFORT FARM**

**PROPOSED TRANSTEL 18m UHF RADIO REPEATER  
MAST**

**SCREENING CHECKLIST,  
AND APPLICATION FOR AUTHORISATION  
IN TERMS OF THE ENVIRONMENTAL CONSERVATION ACT  
(ACT 73 OF 1989)**

Report No 01323

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# Table of Contents

<b>1. INTRODUCTION.....</b>	<b>1</b>
<b>2. BACKGROUND AND MOTIVATION FOR SITE.....</b>	<b>1</b>
<b>3. PROJECT DESCRIPTION.....</b>	<b>2</b>
3.1 DESIGN PROPOSAL.....	2
3.2 COVERAGE PLOTS.....	2
3.3 EMISSION LEVELS.....	2
<b>4. SITE DESCRIPTION.....</b>	<b>3</b>
4.1 Location.....	3
4.2 Site Details.....	4
4.3 Vegetation.....	4
4.4 Archaeology.....	4
4.5 Surrounding Land Use.....	4
<b>5. ALTERNATIVES ASSESSED.....</b>	<b>5</b>
<b>6. PUBLIC PARTICIPATION PROCESS.....</b>	<b>5</b>
<b>7. POTENTIAL ENVIRONMENTAL IMPACTS.....</b>	<b>6</b>
7.1 Biophysical impact.....	6
7.2 Visual impact.....	6
7.3 Cultural impact.....	7
7.4 Socio-economic impact.....	7
7.5 Cumulative impact.....	7
<b>8. CONCLUSION AND RECOMMENDATIONS.....</b>	<b>8</b>
<b>9. LIST OF ANNEXURES.....</b>	<b>9</b>

## **1. Introduction**

The purpose of this document is to make application for the proposed activity to the Department of Environment Affairs and Development Planning (DEA&DP). The authorities are provided with information in the form of a Screening Checklist (Annexure 1) and additional information, to allow for an assessment of environmental impacts that may be associated with the proposed activity.

Construction or upgrading of structures associated with communication networks has been identified as an activity that may potentially cause substantial detrimental harm to the environment. It is thus subject to the regulations under Section 21, 22 and 26 of the Environmental Conservation Act, 1989 (Act 73 of 1989). The regulations are underpinned by the principles of Integrated Environmental Management, which have therefore been applied to the project. This document also serves to fulfill the requirements of the National Environmental Management Act (Act 107 of 1998), known as NEMA.

## **2. Background and Motivation for Site**

Transtel Western Cape is busy installing an UHF radio communication network between Worcester and De Aar for train management and control. This radio network is critical to Spoornet as it will be the only means of communication with trains while trains are in this section. There is no cellular phone network to provide sufficient coverage along the rail network and no suitable existing structure that can be used that will give coverage into the "dead" areas. The existing sites leave dead or badly covered areas between the area north of Touwsrivier and the Hex River Tunnel. The coverage test done show that the proposed site will be well placed as a gap filler for this area.

### 3. Project Description

#### 3.1 Design Proposal

Transtel propose to erect the 18m UHF mast on Vrededorf Farm, immediately south of the town of Touwsriver in the Karoo (See attached Maps 1 & 2 in Annexure 2). A description of the proposed structure is given below, while diagrams of the design are included in

Annexure 3:

- An 18-meter lattice mast is proposed, to be supported by stay wires anchored at three points by concrete slabs.
- Two antennae systems will be mounted on the mast to receive and transmit signals. These systems are Dual UHF Corner reflector antennae for the train control system and a UHF Yagi antenna for a radio link for the train control system.
- The VHF Collinear antennae, and the VHF Dipole antennae belonging to the landowner and used for the alarm system in the ostrich hatchery will also be mounted on the mast.
- It is also proposed to mount antennae on the mast to allow for a radio system for security for the farmers in the area.
- The ancillary equipment for all the antennae systems will be stored in a 2.4m by 2.4m insulated container at the base of the mast.
- Due to the remoteness of the site, the mast will not be fenced.
- Solar panels will be placed on the top of the container to act as a power source for the required equipment.
- Access will be from the existing vehicular access to a point half way up the hill. Access from this point will be by foot. A helicopter will be used during the construction phase to bring equipment to the site.

#### 3.2 Coverage Plots

The coverage plots in the Annexure 5 indicate the coverage from the proposed site.

#### 3.3 Emission Levels

Radio communications operates as two-way radios and as a result produce radio-frequency radiation (RF). People close to the antennae may be exposed to radio-frequency (RF) radiation. However, because antennae operate at low power (short range) in the 450 to

470MHz band, the RF radiation exposure levels from them are generally very low. This radio-frequency radiation is "non-ionizing", and its biological effects are fundamentally different from the "ionizing" radiation produced by x-ray machines.

There are national and international safety guidelines for exposure of the public to the RF radiation produced by antennae. South Africa complies with the guidelines set by the International Commission on Non-ionizing Radiation Protection (ICNIRP), which are endorsed by the Department of Health. These radio-frequency standards are expressed in "plane wave power density", which is measured in  $mW/cm^2$  (milliwatts per square centimeter). A conservative public exposure guideline that is set at a level that is only 2% of the level where replicated biological effects have been observed in laboratory tests. The maximum effective radiating power from any single antenna at any time will not exceed 20 watt (43 dBm), which is within the license specifications for Transtel.

The information used was taken from a facts sheet was written by Dr. John Moulder, Professor of Radiation Oncology, Radiology and Pharmacology/Toxicology at the Medical College of Wisconsin. Web site <http://www.amta.org.au/issues/faq.htm>

There is thus no current conclusive scientific evidence that there are adverse health risks associated with living or working close to a communications structure. Health issues do not fall within the ambit of the Environmental Conservation Act, as long as the EMF levels comply with the guidelines of the Department of Health. The authority is therefore not in a position to take a decision based on the emission levels, while there is compliance with the accepted safety standards.

#### **4. Site Description**

##### **4.1 Location:**

The site is located on Vredefort Farm in the Karoo, to the south of Touwsrivier (See Map 1, Annexure 2). The map co-ordinates are 33° 22' 22.8" S and 20° 01' 33.8" E. The site is owned by Kalani Investments (Pty) Ltd. The contact is Mr. C. D. G. Wolf (021) 447 5887. The farm Manager is Mr. Lee Winter, whose contact number is (023) 358 2115.

#### 4.2 Site Details:

The land use in the immediate vicinity of the proposed site is natural undisturbed veld. A botanical and archaeological preliminary scan of the site was undertaken (Annexures 6 & 7). There is a small mast used by the landowner at the top of the koppie, with a power cable leading to the site. Access to the mast site is by means of a path made by the antelope in the area from a parking area approximately 150 to 200m from the site. A gravel farm road exists to the parking area, which will be upgraded where necessary by Transtel.

#### 4.3 Vegetation:

The site is located in an area that is transitional between Mountain Renosterveld, False Fynbos and Succulent Karoo scrub on shale- and granite-derived soils. This vegetation mosaic is fairly commonly found in these Karoo areas on top of koppies where the average annual precipitation is higher than the surrounding plains. Dominated by members of the daisy family (Asteraceae) the vegetation on the site and top of the koppie is in good condition and species diversity is moderate to high. Plant families represented on the site and its surrounds include Asteraceae, Ericaceae, Restionaceae, Thymeleaceae, Rutaceae, Polygalaceae and Poaceae.

#### 4.4 Archaeology:

Archaeologically speaking, the study area falls within the Ecce Group of deposits, which are known for rich fish and plant fossil-bearing deposits. Extensive outcroppings of these deposits occur around the Matjiesfontein and the De Doorns area.

#### 4.5 Surrounding Land Use:

There are farm buildings for the ostrich hatchery and incubation areas, a farmhouse and office at the foot of the hill. The surrounding area is used for farming purposes, and there are a number of farmhouses dotted around the low-lying areas. Some areas are ploughed, while the remaining area is used for grazing. The mountainous area to the southeast is undeveloped. The closest town of Touwsrivier is less than 10km away. Photographs indicating the proposed site and the surrounding area are attached in Annexure 4.



## 5. *Alternatives Assessed*

The mast needs to be placed within the “dead” area for it to provide effective coverage for the system to work. This site was selected as it is one of the few technically suitable sites in the area. The mountains in the area block the signal from most areas, while the existing Eskom and cell phonemasts in the Touwsrivier area do not provide the required coverage. It would be necessary to erect more than one mast, if the current site cannot be used. An alternative site is the Konstable site, which would also only give limited coverage and require a second mast in the area (See Annexure 5 for Coverage Plots). The area will be accessed by helicopter during construction and by foot for maintenance, so no access road will be required. Power will be provided by solar panels on the top of the container so that a cable to the site is not required. These alternatives have been selected to lessen the impact on the environment, as opposed to building an access road and putting in either an overhead or underground cable for power.

The site is not close to any major routes linking towns and its visibility will be restricted to parts of the farm and parts of the neighbours’ property. Based on the above exemption is therefore requested from assessing alternative sites.

## 6. *Public Participation Process*

The following methods were used to notify the public of the proposals:

- o The neighbours were contacted telephonically and a notification of the project was also faxed through (See Annexure 8). They were:
  - i. Mr. W. Orth: AROMA FARM(Tel: 023-358 1856);
  - ii. Mr. J. van der Bank: SPES BONA-A FARM (Tel: 023-358 1900; Fax: 023-358 1501)
  - iii. Mr. D. van der Bank: SPES BONA-B FARM (Tel: 023-358 1112; Fax: 023-358 1700)
  - iv. Mr. W. Bothma: SANDDAM/MERWEDA FARM(Tel: 023-358 2009; Fax: 023-358 2009)
  - v. Mr. Coen Buizenhout : EXCELSIOR FARM (Tel: 021-881 3878; Fax: 021-881 3296).
- o Notices were placed in the Sentra, at the Spar and Post Office, at the Central Market and in the Library in Touwsrivier (Annexure 8).
- o The site was advertised in the local newspaper, The Courier, on the 16 May 2003 (Annexure 8).

- The closing date for comment was the 9 June 2003, allowing for 21 days for comment.
- No objections were received.

## **7. Potential Environmental Impacts**

### **7.1 Biophysical impact**

Minimal biophysical impacts are associated with the construction and operation of the proposed site as the proposed activity is extremely limited in scale. Given the small area proposed for construction of the tower facility, the proposal to develop the tower facilities, on the southwest plateau of the koppie, is considered to have a low overall ecological impact. No species within the area proposed for construction are unique since these are well represented throughout the remainder of the surrounding areas.

No Red Data Book plant species were identified during the initial site visit although an unidentified species (family Rutaceae) was found within several metres of the general working area. This plant (not in flower or in fruit) was pointed out to those present. It is requested that this plant be protected at all times during and after any construction work on this site. A clearly visible barrier (e.g. four metal poles with barrier tape or wire attached to the top around the perimeter) must be erected a minimum of 500mm (½m) from the base of the plant around the whole plant. The barrier must in no way impede sunlight to the plant (E. Jones, Annexure 6).

### **7.2 Visual impact**

The proposed activity will have a limited visual impact when viewed from within a kilometer, due to the height of the 18-meter structure. However, this is mitigated to an extent by the fact that the mast is low and will be placed within a hollow at the top of the hill, between two higher points. This will ensure that the base of the mast and the container will not be visible except when on the top of the hill. The study area is not densely populated and does not form part of general tourism route. Furthermore, the landscape is one of rolling hills and the mast will therefore not be exposed to view for long periods. The people of the area have raised no concerns in this regard. This indicates that

the visual expectations of the viewers in this area will not be negatively affected. Therefore the low height of the mast, the isolated nature of the site within the landscape and the limited number and nature of people viewing the mast combine to indicate that this structure will not have a significant negative visual impact. The Photographs in Annexure 4 indicate the landscape of the receiving environment.

### **7.3 Cultural impact**

No stone tools were located within the proposed development footprint, nor in a small access track leading to the site. Overall, the archaeological remains located during the study are not considered to be significant or important. The impact of the proposed project on archaeological remains is likely to be low to negligible. The probability of locating any significant archaeological and fossil remains during implementation of the project is also likely to be low. In general the receiving environment is not considered to be archaeologically sensitive, vulnerable, or threatened and no archaeological mitigation is required (J. Kaplan, Annexure 7).

### **7.4 Socio-economic impact**

There is no conclusive evidence of significant health impacts from the proposed development, as emission levels fall within the safety guidelines of the Health Department. The proposed site mast is located at least 250m from the residential building and this falls within the safety guidelines for such structures. The development will benefit communications for the train system in the area.

### **7.5 Cumulative impact**

There is no significant cumulative impact that will result from the proposed development when considered in relation to the area in general, because of the limited scale of the proposals and the lack of significant negative impacts.

## 8. *Conclusion and Recommendations*

It is not anticipated that any significant environmental impacts will result from the proposed development. Should the proposed mast be approved, the following recommendations are made to ensure that potential impacts associated with the construction and operation of the site are minimized:

- The mast must be left unpainted.
- An Environmental Management Plan must be drawn up prior to the commencement of activities on site to control construction activities, and must include the following points:
  - ✓ The working area must be clearly demarcated prior to commencement of activities;
  - ✓ all access to the site must be made by four-wheel drive vehicles only and may only go as far as the existing road;
  - ✓ all surrounding vegetation should be clearly demarcated as a no go area and, with the exception of placement of mast stays (cable supports), no further impacts to any of the natural vegetation should be allowed;
  - ✓ A clearly visible barrier (e.g. four metal poles with barrier tape or wire attached to the top around the perimeter) must be erected a minimum of 500mm (½m) from the base of the Rutaceae plant (identified on site) around the whole plant, as discussed on site with the Transtel and farm representatives.
  - ✓ a helicopter should be used to drop all construction supplies;
  - ✓ provision of adequate, well-serviced toilet facilities must be made at the parking area, and all personnel must be required by contract to use these facilities;
  - ✓ ready-mix cement should be used to build the slab, in order that no mixing of cement takes place on site;
  - ✓ the area where the helicopter drops the supplies must be clearly marked and should excessive damage to vegetation occur then this vegetation must be restored, based on recommendations from a suitability qualified specialist, called in to make such recommendations;

- ✓ a dedicated path route for access by personnel must be selected and marked prior to commencement of any activities on site. This path must be adequately protected from erosion during and after construction;
- ✓ the area surrounding the proposed concrete slab must be protected from erosion of runoff rainwater through appropriate design of the slab that ensures rain runoff is spread onto rocky or stabilised areas and not onto bare soil;
- ✓ where rocks or stones are removed (for path or site stabilisation) all of these rocks and stones must be removed from areas where removal does not expose bare earth;
- ✓ it is strongly advised that an environmental control officer be appointed to oversee construction; and,
  - Public access to the site must be restricted.
  - All safety standards set out by the ICNIRP must be complied with.
  - Transtel must be responsible for removal of all cellular infrastructure from the site should the site be decommissioned.

## 9. *List of Annexures*

ANNEXURE 1. SCREENING CHECKLIST

ANNEXURE 2. MAPS

ANNEXURE 3. DIAGRAMS OF THE PROPOSALS

ANNEXURE 4. PHOTOGRAPHS OF THE PROPOSED SITE

ANNEXURE 5. COVERAGE PLOTS

ANNEXURE 6. BOTANICAL SCAN

ANNEXURE 7. ARCHAEOLOGICAL SCAN

ANNEXURE 8. DOCUMENTATION REGARDING PUBLIC PARTICIPATION

ANNEXURE 9. LANDOWNER'S CONSENT

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**Annexure 1. Screening Checklist**

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**Annexure 2. Maps**

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**Annexure 3. Diagrams of the Proposals**

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**Annexure 4. Photographs of the proposed site**

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**Annexure 5. Coverage Plots**

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**Annexure 6. Botanical Scan**

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**Annexure 7. Archaeological Scan**

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**Annexure 8. Documentation regarding public participation**

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- Advertisement in The Courier newspaper.
- Notices used in public places to notify of the proposals
- Correspondence regarding the project.

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**Annexure 9. Landowner's Consent**

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