

- the container and the solar panel array would be placed out of the way of other farm activities, and could be relocated if required by the farmer but will be placed as closely to the RX antennae as possible to minimize the amount of trenching required for the RX cables;
- the structures are not visually intrusive in a farm setting; surfaces will be painted to blend into the background, and
- all structures would be temporary, and once removed there will be no evidence of their former presence.

The item list below gives the maximum/worst case estimate of ground areas and volumes to be disturbed. The length of coaxial cabling required to link the container/work station to the antennae is not finalised. Please note that where necessary the coaxial cables can be laid on the soil surface so that no ground or indigenous vegetation would need to be disturbed.

#### 4.1.1 Areas affected

- i) Four TX antennae plus twelve RX antennae with cattle-proofing = 16 antennae at <1 m<sup>2</sup> footprint each (includes the entire grass area enclosed in the cattle proofing triangle). Total area = 16 m<sup>2</sup>;
- ii) Coaxial cables (each maximum 10 mm thick outer diameter) from each antenna to the container laid in a single 200-300 mm wide trench over a distance of ~ 630-1000 m. Total area = maximum 300 m<sup>2</sup>;
- iii) Three 4 m radials from each antenna, for grounding the signal, dropped into a 300 mm wide groove in the soil. For each radial the footprint would be 0.12 m<sup>2</sup> (4 m long x 0.03 m wide). One antenna with three radials = ~ 0.36 m<sup>2</sup>. Total maximum area = 5.76 m<sup>2</sup>;
- iv) 60 m<sup>2</sup> solar panel (maybe on a concrete plinth);
- v) Maximum 2 x 4 m container/work station (maybe on a concrete plinth). Total area = 8 m<sup>2</sup>;

#### 4.1.2 Volumes involved

- i) The 38 x 70 mm poles carrying the antennae will either be attached to an angle iron hammered into the ground or treated the same as a fence pole but with concrete if necessary for stability. The triangular cattle proofing will be wooden fence poles dug into the ground in the same way as the surrounding farm fences. A hole is 200 x 200 mm x 600 mm deep = 0.024 m<sup>3</sup>. Sum is 4 x 16 = 48 x 0.024 m<sup>3</sup> = total maximum volume of 1.54 m<sup>3</sup>;
- ii) The coaxial cable trench will be 300 mm deep x 300 mm wide x 630-1000 m long = 0.3 m x 0.3 m x length which could equal a maximum volume of earth moved at 90 m<sup>3</sup>;
- iii) One radial will need a groove 200 mm deep using the tip of a shovel in the soil i.e. 4 m long x ~ 0.03 m wide x ~ 0.2 m deep = 0.024 m<sup>3</sup>. For one antenna with three radials = 0.072 m<sup>3</sup> x 16 = total maximum volume of 1.15 m<sup>3</sup>.

### 4.1.3 Summary of nature of development

- Total maximum surface area of land affected = 390 m<sup>2</sup>
- Total maximum volume of soil moved = 93 m<sup>3</sup>
- Maximum depth of excavation = 0.3 m
- Height of structures = 2.4 m container and 16 antennae approximately 5 m high (height will vary slightly with topography).

## 5 DESCRIPTION OF RADAR SITE

From the outset, technical and broad environmental issues were considered together to select a site which would optimise radar performance and minimise risks to and from the environment.

This radar site is located entirely within transformed grazing areas on a large dairy farm called Ouwerf. According to the Clarkson topographical map referenced in Figure 5.1, the Farm comprises the erven Klip Drift Oost 649 and Klip Drift 638. This site is approximately 47 km from the Stormsrivier Bridge and 42 km from the town of Humansdorp, and falls into the Sarah Baartman District Municipality of the Eastern Cape Province.

The radar site is located at Latitude -34.099453°, Longitude 24.338907°, with elevation ranges between 85 to 95 m above the sea, and the distance from the sea is ±240 to 260 m.

The proposed layout of the radar infrastructure on this farm is illustrated in Figure 5.2, and the land cover in the area where the antennae would be located is shown in Figure 5.3, Figure 5.4 and Figure 5.5.

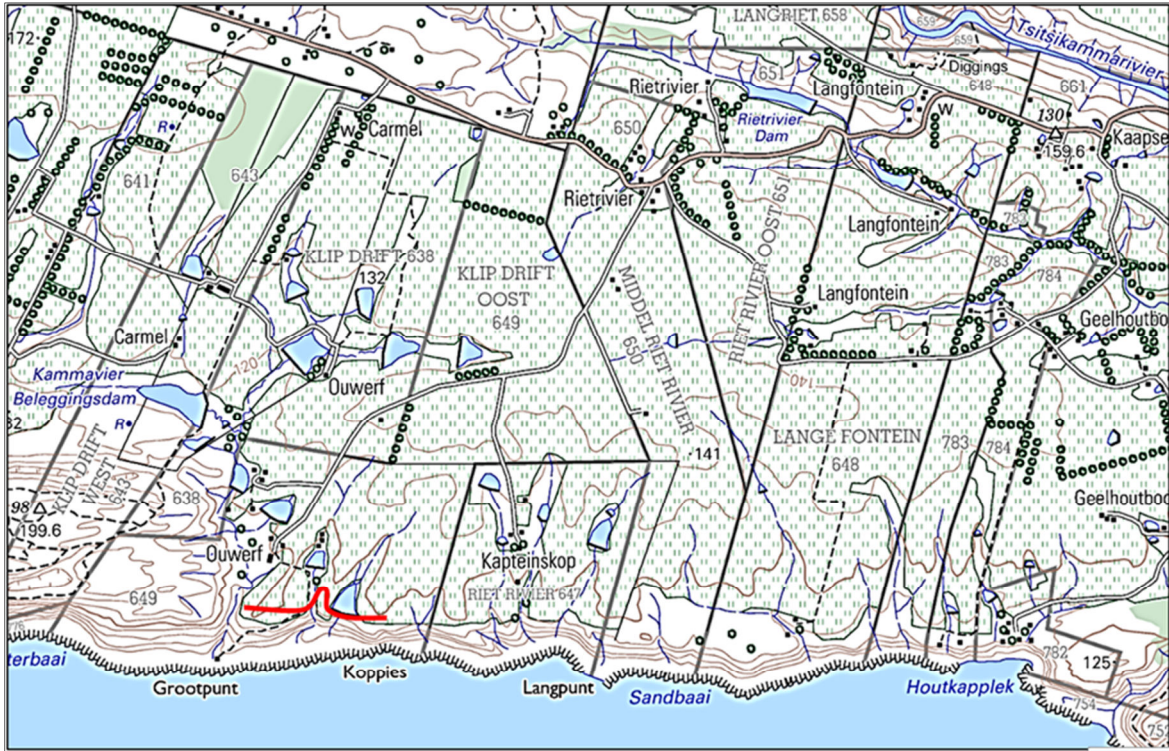


Figure 5.1: Topographical map 3424AB Clarkson 2000 showing the farm called Ouwerf on Klip Drift 638 and Klip Drift Oost 649. The red line near the coast indicates where the radar infrastructure will be located. Contour interval 20m. (Map: Department of Land Affairs, Chief Directorate Surveys and Mapping: 1:50 000 raster images, 2007).



Figure 5.2: Proposed layout of the radar system on Ouwerf farm. The yellow line at bottom left represents a row of 12 receiver antennae placed about 28meters apart, and the small yellow diamond to the right hand side of the image is the 4 transmitter arranged at the corners of a 8.5 x 28.5 rectangle. The blue line shows the route for cables connecting antennae to the container and solar panel at the purple mark towards the centre of the image. The cables can either be buried or laid on the surface as required.



Figure 5.3: View eastwards on Ouwerf over the area in the foreground where the transmitter antennae would be located. Cables would, unless running on the surface along a fenceline, be sunken about 30 cm into the soil to protect them from trampling by cattle.



Figure 5.4: View westwards on Ouwerf down the line of the receiver antennae which would be along the right hand side of the photograph.

**The following points are considered pertinent to note at this site:**

- The natural, dark green vegetation covering the cliffs, in Figure 5.3 for example, falls into what is classified as a Critical Biodiversity Area. This forms part of a natural coastal corridor which links surrounding protected areas and is important in enabling the persistence of ecological

and evolutionary processes. The proposed radar infrastructure will be located in the adjoining transformed farm land, and will not impinge on the natural vegetation at all.

- Because the farm land is used for grazing cattle (Figure 5.5) the radar antennae would need to be fenced off to protect them from being damaged by the cattle.
- There are no neighbours to whom the infrastructure would be visible, furthermore dairy farms in surrounding areas have recently had visually intrusive windfarms installed on them.
- Maintenance of the veld may require mowing of the grass around radar facilities.



Figure 5.5: Cattle in the area where the four “bull proof” transmitter antennae would be located on the farm Ouwerf.

## 6 RESULTS OF ENVIRONMENTAL SCREENING

### 6.1 Overall Suitability of the Site

This farm appears to be suitable for testing the proposed HF Radar system from a technical and environmental point of view for the following major reasons:

- Field tests of the radio frequencies demonstrate that there is no interference from/with others on the site, as is required by ICASA;
- The farmer is amenable to having the radar installed for testing on his land, *inter alia* because there is adequate space to house the linear infrastructure without interfering with other users of the farm, and
- The radar system will have a “disturbance footprint” compatible with existing farm infrastructure in that:
  - existing roads and tracks would be used for access;
  - the antennae would be secured by wooden fence poles of the same type as already used on the farms;
  - the antennae would be spaced about 28 m apart so movement of farm machinery or animals would not be restricted;

- cabling would be unobtrusive as it would be buried in areas trampled by cattle and otherwise fed on the surface between plants and rocks or along existing fence-lines;
  - the container and the solar panel array would be placed out of the way of other farm activities, and could be relocated if required by the farmer;
  - the structures are not visually intrusive in a farm setting; surfaces will be painted to blend into the background, and
  - all structures would be temporary, and once decommissioned no evidence of their presence on site would remain.
- It was confirmed during discussions with government agencies that, no permits should be required from the Department of Agriculture.

## 6.2 Duty of Care to Avoid Causing Adverse Effects

Despite the fact that listed activities under NEMA are not triggered, ‘duty of care’ will be exercised to ensure that this project does not affect the ecological integrity or heritage value of the area. This will be achieved through implementation of the duty of care agreement with the farmer which contractually binds both parties to implement best environmental practice during all phases of the radar test. This also means that once the infrastructure is uninstalled there would be no remaining disturbance footprint, i.e. the environment will be fully rehabilitated.

This approach may also assist the parties concerned in resolving any environmental disputes, should any arise.

The applicable duty of care statement is Annexed to this report.

In addition, the contractor who is to install the radar infrastructure may need to obtain approval for so-called “minor building work” from the local authority’s building control officer before work commences. This is usually a straight forward procedure and is required so the local authority knows all structures are safe, and will not be used for accommodation etc. This is required in terms of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977) as amended. Building plans are not required. Once the materials and designs are finalised for use the local authority who should be contacted is Kou-Kamma Local Municipality, in Kareedouw.

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## APPENDIX A. DUTY OF CARE STATEMENT

### INTRODUCTION

This duty of care statement<sup>2</sup> follows on from environmental screening reports for this project (LT-304B, 2015 and 2017).

It allocates actions and responsibilities for environmental management and mitigation measures necessary to achieve duty of care during installation, operation and uninstallation of an HF radar facility.

This duty of care statement will be used to contractually bind the parties concerned to implement best environmental practice during all phases of the radar test.

*Note that licencing requirements in terms of the Electronic Communications Act No. 36 of 2005, and notifications in terms of the National Building Regulations and Building Standards Act No. 103 of 1977, are not dealt with herein.*

### PROJECT OUTLINE

The project aims to test the feasibility of gathering data about the ocean surface using high frequency radar located on the coast. The number of sites where the radar needs to be installed on the coast can vary between 1-3, depending on the resolution of data required. This statement applies to any one site.

The site concerned will house 4 radar transmitters and 12 receiver antennae, connected by cables, controlled by a computer and powered by a solar panel array with battery backup. Once operational, the system will be manually checked each month.

### POTENTIAL ENVIRONMENTAL IMPACTS

Potential negative environmental impacts which have to be avoided or mitigated could include:

- Loss of habitat in certain areas from digging trenches for cables and holes for fence poles, or covering ground with solid materials, or unnatural compaction of ground;

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<sup>2</sup> The provision for this is found in Section 28(1)&(2) of the National Environmental Management Act no. 107 of 1998 (NEMA) which places a duty of care on persons who have a right to 'use' any land or premises where they could cause significant pollution or degradation of the environment. The "duty of care" means one is to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring. This provision is extended in the National Environmental Management: Integrated Coastal Management Act no. 24 of 2008 (NEM:ICMA), in Section 58(1)&(2), where the duty of care is aimed to avoid "any adverse effect" on the coastal environment.

- Visual disturbance from littering, untidy workmanship, or installing unsightly infrastructure;
- Disturbance or destruction of archaeological sites or artefacts, and
- Blocking access or movement of people and animals on the farm.

## OBJECTIVE AND PURPOSE

The overall objective of exercising duty of care is to ensure that this project does not inconvenience the farmer or affect the ecological integrity or heritage value of any given site, and that once the infrastructure is uninstalled there is no permanent disturbance footprint. Sub-divisions of this are:

- To facilitate compliance with the law;
- To facilitate compliance with Lwandle's requirements (HSE, quality control, etc.);
- To manage project activities to prevent, and where this is not possible to minimise, negative effects on the environment;
- To provide a measurable and implementable guide to planning and conducting activities on a given site.

## RELATED DOCUMENTS AND LEGISLATION

The key documents applicable in this instance are:

- Project specific environmental screening reports LT-304B 2015 and LT-304B 2017.
- Conservation of Agriculture Resources Act 43 of 1983
- National Environmental Management Act 107 of 1998
- National Heritage Resources Act 25 of 1999
- National Environmental Management: Protected Areas Act 57 of 2003
- National Environmental Management: Integrated Coastal Management Act 24 of 2008, and
- The lease agreement between Lwandle and the land owner concerned.

## RESPONSIBILITIES AND APPROVALS

The responsible person is the project manager:

Contact number:

Signature \_\_\_\_\_



## PROCEDURE

The ultimate responsibility for implementation of all environmental controls and mitigation measures lies with Lwandle via the project manager.

	ACTIVITY	MITIGATION AND ENVIRONMENTAL CONTROLS
1	<b>Project component</b>	<ul style="list-style-type: none"> <li>The HF radar infrastructure will be positioned and installed over a number of days.</li> <li>4-6 personnel will be accommodated off-site, in a nearby town, and</li> <li>Personnel will drive to site each day to work during daylight hours.</li> </ul>
2	<b>Start date &amp; duration</b>	The start date and duration will be agreed with the land owner as per point 5 below.
3	<b>Site location</b>	Refer to maps and images of the site in the environmental screening report number LT-304B_Expanded_Rev-0103 dated 25 <sup>th</sup> May 2017.
4	<b>Design of installation, and setting of objectives</b>	<ul style="list-style-type: none"> <li>All structures are designed to be temporary, i.e. readily removable when required.</li> <li>Installation activities are designed to disturb the absolute minimum ground surface area possible and to have the least negative impact possible on the social and natural environment.</li> <li>Best environmental practice will also be observed throughout the life of the project.</li> </ul>
5	<b>Approval for undertaking work</b>	<ul style="list-style-type: none"> <li>Details of activities and timing are to be communicated to the landowner at least one week before visiting the site so agreement can be reached before starting any installation, maintenance or decommissioning work.</li> <li>Emergency visits to site require 24 hours' notice to the land owner.</li> <li>No unauthorised personnel will be allowed on site.</li> </ul>
6	<b>Working hours</b>	<ul style="list-style-type: none"> <li>Working days of the week and hours in the day are to be agreed with the landowner.</li> <li>Only work on site during daylight hours.</li> </ul>
7	<b>Record keeping</b>	<ul style="list-style-type: none"> <li>A photographic record of the preconstruction condition of the site will be used to guide the restoration process.</li> <li>Maintain a Site Diary including photographs of work undertaken, and include a record of compliments, comments and complaints.</li> <li>Update the diary regularly, along with records of responses to comments.</li> </ul>
8	<b>Blocking of access or movement on the farm</b>	<ul style="list-style-type: none"> <li>Space antennae about 28 m apart so movement of farm machinery or animals will not be restricted.</li> <li>Bury cables when necessary to render them unobtrusive or to protect them from trampling by cattle.</li> <li>Locate poles and tension lines well away from hiking trails and cycle tracks so trail users will not be obstructed.</li> <li>The container and the solar panel array must be placed out of the way of other farm activities.</li> </ul>

	ACTIVITY	MITIGATION AND ENVIRONMENTAL CONTROLS
9	Limiting areas of disturbance and promoting site rehabilitation	<ul style="list-style-type: none"> <li>Once the sites for antennae etc. are established all activity will be restricted to the areas concerned.</li> <li>Previously disturbed areas will be used where ever possible and ground surface disturbance and vegetation disturbance will be minimised at all times.</li> <li>The excavation of holes and trenches should be undertaken so that they only stand open for the shortest time possible before they are covered. Topsoil from each hole or trench should be kept aside for backfilling, and should not be buried at the bottom of the fill pile.</li> <li>Any bulbs/geophytes that are encountered while digging holes for poles and cables must be carefully moved and replanted in the same habitat type. The top soil from digging cable trenches must be replaced back on top of the trenches so embedded seeds can regrow over time.</li> <li>Fill material is to be replaced in same work area from which it originated as far as possible, and is to be compacted to its approximate original density.</li> <li>No paths are to be created through sensitive areas</li> <li>If possible, natural vegetation should not be removed but rather cut back in the immediate zone of work. Where vegetation trimming is necessary, any bushes should be carefully pruned to ensure that they can re-sprout</li> <li>When any equipment or materials are removed, the disturbed area must be rehabilitated so that vegetation regrowth is enhanced so that there will be no evidence of disturbance in the end.</li> </ul>
10	Cleanliness & waste management	<ul style="list-style-type: none"> <li>Only leave equipment on site as agreed with the landowner</li> <li>All waste must be removed from site every day, after being stored safely during the day so that it cannot be dispersed by wind, rain or wildlife.</li> <li>All waste materials including those spilled on roads must be cleaned up and disposed of at a registered municipal waste site</li> <li>There is to be no burning or burying of refuse on site</li> <li>All structures, equipment materials and facilities are to be removed from site on completion of the project.</li> <li>Limit to the absolute minimum the amount of cementing necessary to secure posts. Any cement effluent must be strictly contained.</li> <li>All goods containers should be animal proof as well as wind and rain proof, to avoid unwanted dispersal into other areas on site</li> </ul>
11	Protection of equipment from damage	<ul style="list-style-type: none"> <li>Cables should be buried where necessary for protection against damage from cattle trampling, vehicles or baboon curiosity.</li> </ul>
12	Fire control	<ul style="list-style-type: none"> <li>Required fire-fighting equipment shall be available on site, and kept in working order and in an accessible location.</li> <li>No open fires are to be lit on site</li> </ul>
13	Material handling and storage	<ul style="list-style-type: none"> <li>Impervious materials are to be used to prevent contamination of the ground from oil leaks, refuelling or during cementing operations.</li> </ul>
14	Storm water management and Erosion control	<ul style="list-style-type: none"> <li>Take care to prevent any storm-water runoff from causing erosion.</li> <li>Where erosion is detected, suitable mitigation methods are to be employed as soon as possible to halt erosion and repair the ground.</li> <li>All cleared ground is to be suitably stabilized to prevent dust.</li> </ul>

	ACTIVITY	MITIGATION AND ENVIRONMENTAL CONTROLS
15	Traffic management and farm gates	<ul style="list-style-type: none"> <li>• Movement of vehicles must be limited to approved roads, tracks and other access routes as agreed with the land owner.</li> <li>• All farm gates are to be closed after entry, and fences must not be damaged.</li> </ul>
16	Visual / aesthetics	<ul style="list-style-type: none"> <li>• By nature, the radar facility is visually permeable. Despite this the colours and textures of the surfaces of the installed equipment shall be painted either to blend in with the environment to further reduce visibility as much as possible, or as required by the landowner.</li> <li>• Treated wooden poles must be used for support and protection of the antennae.</li> <li>• During construction, the site shall be kept clean and tidy at all times, with no litter lying around.</li> </ul>
17	Heritage and archaeology	<ul style="list-style-type: none"> <li>• Being relatively close to the shoreline the site may have in situ archaeological material below the ground surface. Accordingly, it is required that in the event of finding any archaeological material (shell middens, stone tools, bones etc.) or human remains during the course of installation, work must cease immediately and the project manager (or environmental officer) must be informed as soon as possible.</li> <li>• Before work resumes Heritage Western/Eastern Cape, who is the relevant heritage authority, must be informed about the discovery and an archaeologist contracted to investigate and record the finding.</li> <li>• A report will be provided to the landowner and the Heritage authority.</li> </ul>
18	Signage	<ul style="list-style-type: none"> <li>• Educational information about the HF Radar data collection system and its uses will be erected on signboards, to be located where required by the landowner. E.g. on the container-workstation</li> </ul>
19	Noise	<ul style="list-style-type: none"> <li>• Limit any drilling, or other noisy activity, to the smallest area and the shortest time possible.</li> </ul>
20	Toilet / sanitary facilities	<ul style="list-style-type: none"> <li>• Suitable toilet facilities are to be arranged for all staff</li> <li>• Ablutions are to be restricted to the facilities provided</li> <li>• Toilets are to be secured so they can't blow over, and be kept in a hygienic condition and emptied regularly to an approved facility</li> </ul>

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