APPENDIX D3 HERITAGE

APPENDIX D3A ***ARCHAEOLOGICAL***

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ARCHAEOLOGICAL IMPACT ASSESSMENT THE PROPOSED MOUNT ROPER ROMA ENERGY SOLAR PLANT ON FARM 321 NEAR KURUMAN NORTHERN CAPE PROVINCE

Prepared for:

ENVIROAFRICA
Att: Mr Bernard de Wit
PO Box 5367
Helderberg
7135
E-mail: Bernard@enviroafrica.co.za

On behalf of:

ROMA ENERGY MOUNT ROPER (PTY) LTD

By

Jonathan Kaplan
Agency for Cultural Resource Management
5 Stuart Road
Rondebosch
7700
Ph/Fax: 021 685 7589
Mobile: 082 321 0172
E-mail: acrm@wcaccess.co.za

MARCH
2012

Executive summary

The Agency for Cultural Resource Management was appointed to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 10 MW Concentrated Photovoltaic (CPV) Energy Generation Facility on Farm 321 Mount Roper, northwest of Kuruman in the Northern Cape.

The proposed activity entails the construction of solar panels covering a footprint area of about 20 ha. The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but much of the vegetation on the site will need to be cleared. Associated infrastructure includes internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The electricity generated from the project will be fed into the national grid at the Eskom Riries substation which is situated about 600 m north of the site.

The proposed site for the solar farm is located about 31 kms northwest of Kuruman alongside the R31. A large portion of the site is covered in dense thornveld vegetation, resulting in very poor archaeological visibility. This is particularly so across most of the northern portion of the footprint area, where access was severely constrained. There are, however, a number of gravel farm roads and game tracks that intersect the site, allowing for some movement across the landscape.

In terms of Section 38 (1) (c) (iii) of the National Heritage Resources Act 1999 (Act 25 of 1999), a Heritage Impact Assessment of the proposed project is required if the footprint, area of the proposed development is more than 5000 m².

The AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica cc.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate any impacts.

A 1 day survey of the proposed site was undertaken by J. Kaplan on 3 March 2012, in which the following observations were made:

Thirty-one archaeological occurrences were mapped with a hand held GPS device. Most of the tools recorded during the survey are assigned to the Middle and Later Stone Age. Only one Early Stone Age biface (a possible handaxe) was recovered. The tools are spread fairly thinly and unevenly over the landscape, but tend to cluster across the northern portion of the property which is overlain by extensive sheets of ironstone gravels. The southern portion of the farm is covered in red sands where surface stone is virtually absent.

Most of the lithics recorded comprise modified (i. e. retouched and utilized) flakes and pieces of stone, but several retouched blade tools, and two pointed flakes were also found. Four scrapers were recovered, including one end scraper on a long blade, and three convex scrapers. Some of the tools are burnished, while others are also abraded (having been rolled about natural processes).

Several low density scatters of tools were documented on the gravels across the northern portion, while a very thin scatter of MSA flake tools (in indurated shale and ironstone) was recovered from alongside small, dry pan.

The western portion of the site is very degraded due to extensive grazing, trampling and infrastructure and a few dispersed flake tools were also found in this area. However, no evidence of any factory or workshop site, or the result of any human settlement was identified.

More than 90% of the tools found are made on banded ironstone with the remainder in indurated shale, chalcedony and quartzite. Sheets of ironstone gravels are prolific across the vegetated northern portion of the footprint area. Banded ironstone is known to have been a desirable raw material for making stone artefacts and occurs on a number of sites throughout the Northern Cape.

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. The collection recovered, however, most likely represents only a very small sample of what is expected to be present on the site, with many more tools hidden among the ironstone gravels under the vegetation cover across the northern footprint area.

Despite the relatively small number of tools counted, and the disturbed context in which many of them were found (gravel roads), the archaeological remains on Farm 321 Mount Roper have been provisionally rated as having medium-low (Grade 3B-3C) local significance, subject to further investigation of the site.

There are no visible graves with headstones, stone cairns, or any other burial ground, or cemetery on the affected property.

In terms of the built environment, the proposed site has no significance, as there are no old buildings, ruins, structures, public memorials or monuments in the footprint area.

Indications are that in terms of archaeological heritage, the proposed activity (i. e. the construction of a solar energy farm) is viable, subject to further archaeological mitigation.

With regard to the proposed development of the Roma Energy Mount Roper Solar Energy Plant on Farm 321, the following recommendations are made:

1. The footprint area across the northern portion of the site should be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be much higher and many more stone tools are likely to be encountered on the ironstone gravels which overlie this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological remains.

2. Should any unmarked human burials/remains or buried ostrich eggshell caches be uncovered, or exposed during construction activities, these must immediately, be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Mariagrazia Galimberti 021 462 4502). Burials, etc must not be removed or disturbed until inspected by the archaeologist.

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1. INTRODUCTION

1.1 Background and brief

Roma Energy Mount Roper (Pty) Ltd, appointed the Agency for Cultural Resource Management to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 10 MW Concentrated Photovoltaic (CPV) Energy Generation Facility on Farm 321 Mount Roper northwest of Kuruman in the Northern Cape Province (Figures 1 & 2). The proposed development is situated within the Ga-Segonyana Local Municipality.

The Northern Cape has the highest levels of Solar Irradiance in South Africa, which makes the location of the proposed development ideal for solar energy generation. The renewable energy industry is currently experiencing an explosive growth worldwide. In South Africa, while such energy sources are not expected to replace the country's traditional reliance and dependency on coal-generated power, the National Energy Regulator of South Africa (NERSA) has published a favourable feed-in tariff structure for renewable energy that allows for independent clean energy producers to invest in renewable energy resources. The growing alternative energy industry is considered to be of national importance in anticipation of its contribution to electricity supply and reduced reliance of non-renewable energy sources.

It is in this context that the applicant proposes to construct a solar energy facility north west of Kuruman. The proposed activity entails the construction of about 140 CPV solar panels covering a footprint area of about 20 ha (Figure 3). The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but much of the vegetation on the site will need to be cleared. Associated infrastructure includes single track internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The electricity generated from the project will be fed directly into the national grid at the Eskom Riries 66/11 kV substation which is situated about 600 m further to the north, alongside the R31. An existing powerline is located alongside the northern boundary of the footprint area, so no new transmission line is required for the project.

The AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica cc.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate the impacts.

2. HERITAGE LEGISLATION

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m² is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

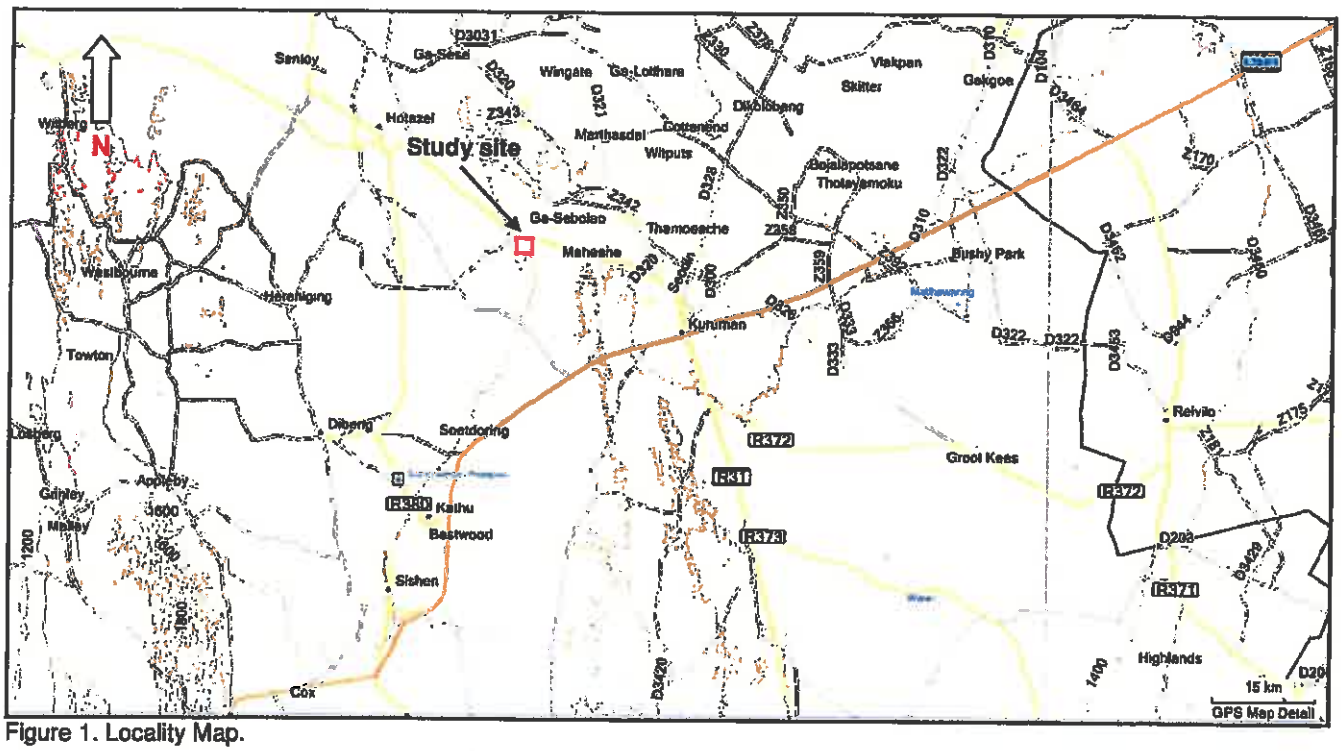

Figure 1. Locality Map.

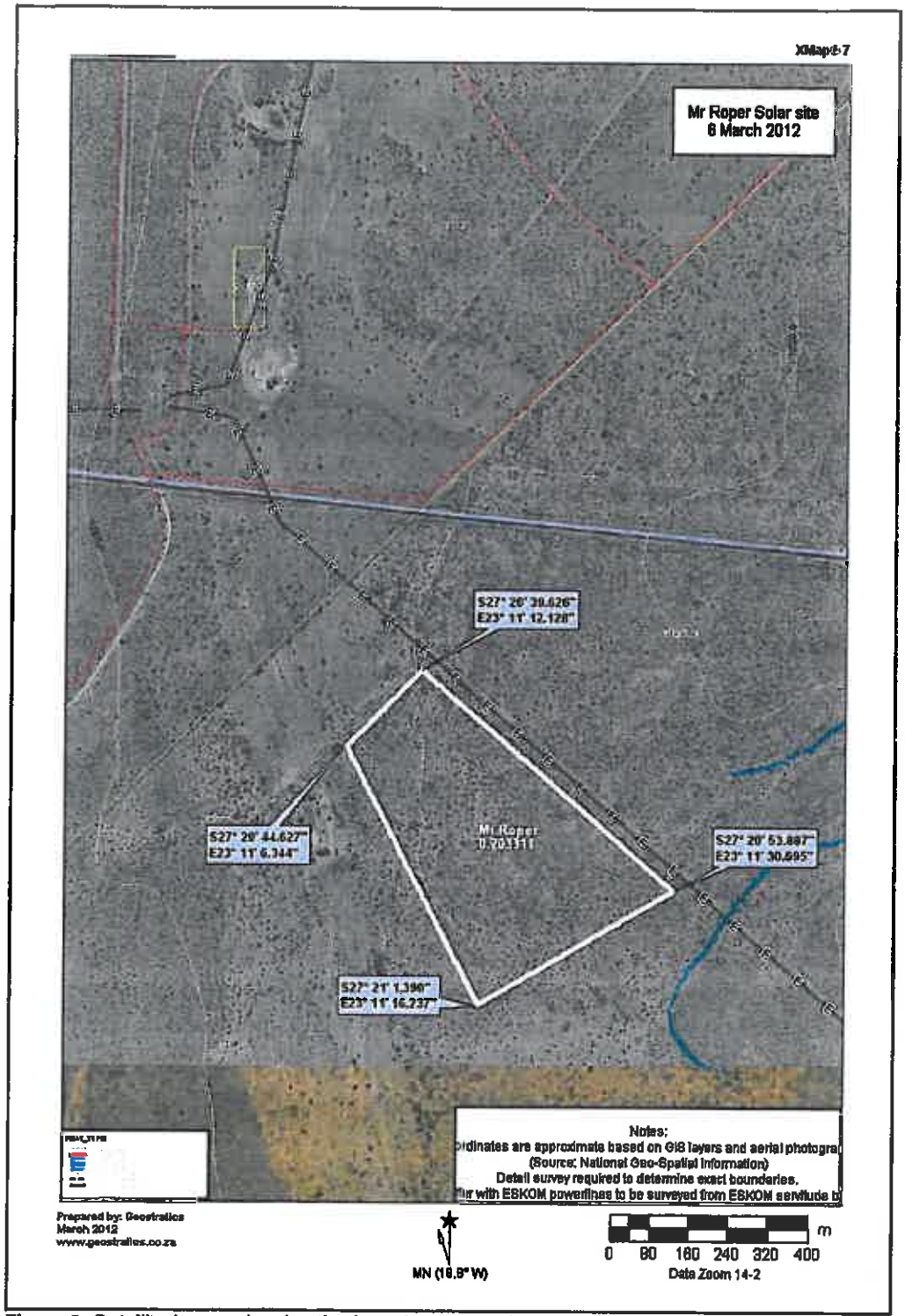

Figure 2. Satellite image showing the footprint area of the proposed Mount Roper Solar Energy Plant

Figure 3. Aerial photographing illustrating the proposed layout of the CPV panels for the Mount Roper Solar Energy Plant

3. TERMS OF REFERENCE

The terms of reference for the study were to.

- Determine whether there are likely to be any important archaeological resources that may potentially be impacted by the proposed project, including the erection of the solar panels, internal access roads, trenches for underground cables, and any other associated infrastructure;
- Indicate any constraints that would need to be taken into account in considering the development proposal;
- Identify potentially sensitive archaeological areas, and
- Recommend any further mitigation action.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

An aerial photograph indicating the location site of the proposed Mount Roper Solar Energy Plant is illustrated in Figure 4.

The proposed site is situated about 31 kms northwest of Kuruman on the R31 between Kuruman and Hotazel. The site is located on the south side of the road, alongside the Eskom servitude. The Kuruman hills are located north and west of the proposed site. The proposed site is on fairly flat terrain. The northern portion is very heavily vegetated, and overlain by extensive sheets of ironstone gravels (Figures 5-13). The eastern portion is less vegetated, and covered in mostly soft red sands with little visible surface stone. The northern portion of the farm is severely degraded, overgrazed and heavily trampled by game (mainly antelope). Existing infrastructure comprises several dams/water holes, concrete drinking troughs, feeding bins, and dry pans. Gravel farm roads cross the property in the west and through the centre, and there are also numerous small game tracks that intersect the site. There are no significant landscape features in the footprint area. There are no streams, or water courses and surrounding land use is agriculture, game farms and vast tracts of vacant agriculture land.

There is some existing infrastructure related to game farming, but there are no old buildings, stone ruins, old structures or features on the proposed site.

There are no visible graves, burials sites or stone cairns in the footprint area

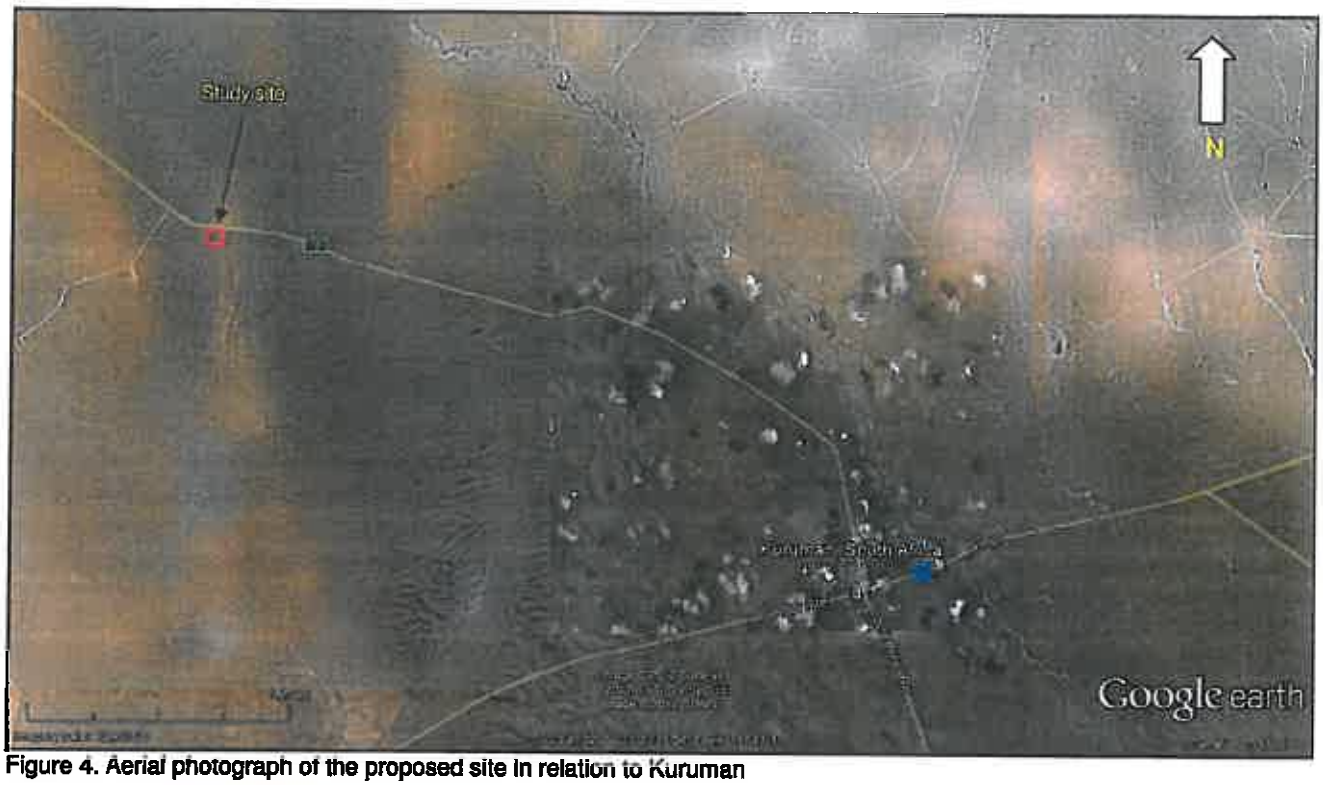

Figure 4. Aerial photograph of the proposed site in relation to Kuruman

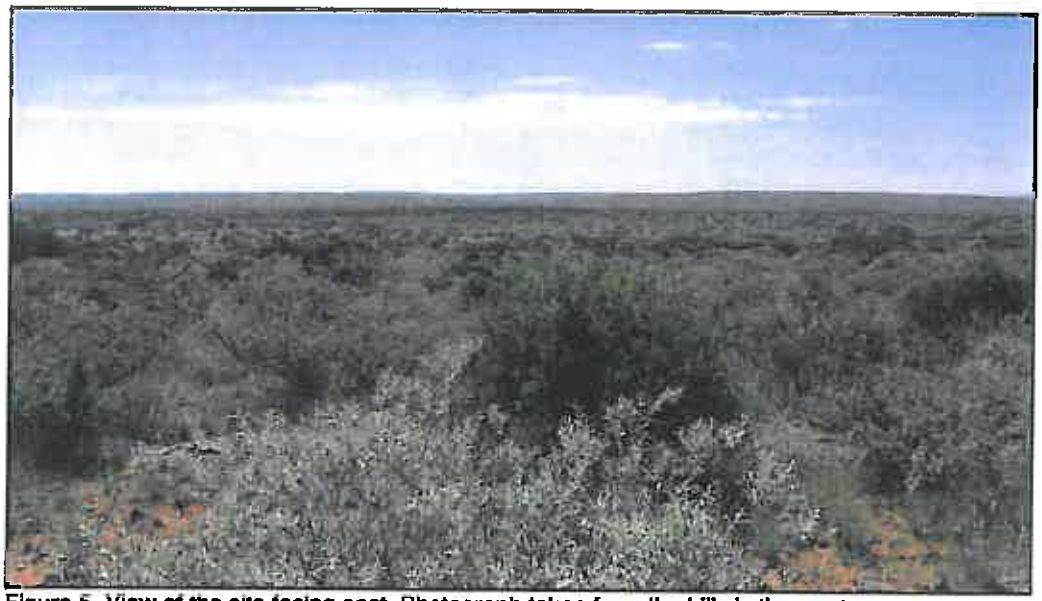

Figure 5. View of the site facing east. Photograph taken from the hills in the west.

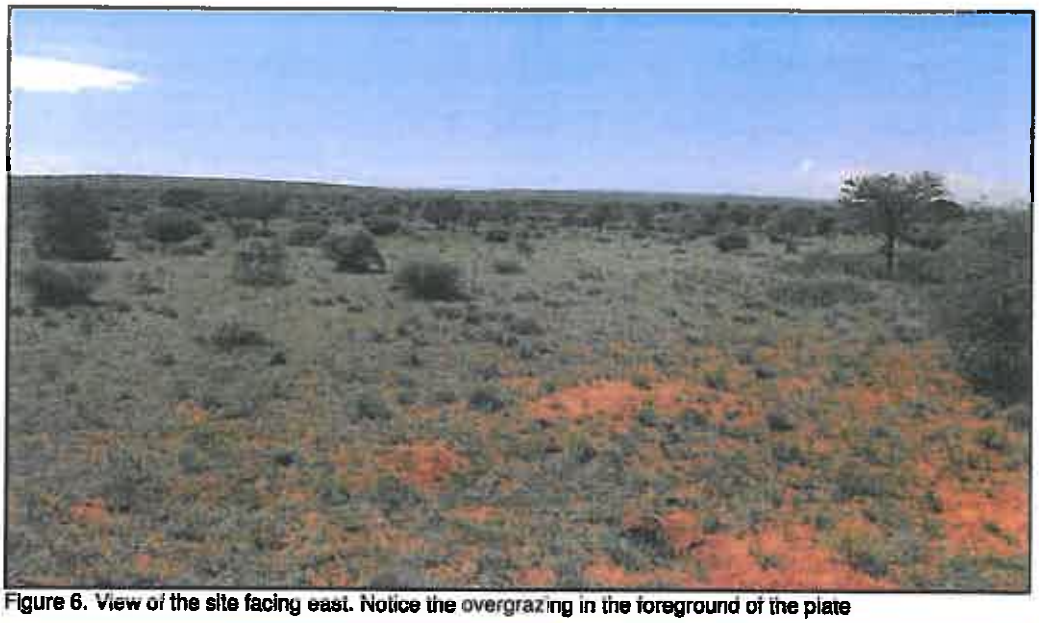

Figure 6. View of the site facing east. Notice the overgrazing in the foreground of the plate

Figure 7. View of the site facing east

Figure 8. View of the site facing east. Note the powerline servitude (the northern boundary of the site) to the left of the plate

Figure 9. View of the site facing south west

Figure 10. Ironstone gravels in the powerline servitude

Figure 12. Ironstone gravels on edge of dam/waterhole

Figure 11. Ironstone gravels in road

Figure 13. Ironstone gravels in northern portion of the site

5. STUDY APPROACH

5.1 Method of survey

A survey of the proposed footprint area was undertaken by J Kaplan on 3 March, 2012.

A trackpath of the survey was created (refer to Figure 10).

All archaeological occurrences documented during the study were mapped in-situ using a hand-held Garmin Oregon 300 GPS device set on the map datum WGS 84.

A collection of tools were photographed, including the context in which some of the artefacts were found.

A desk top study was also done.

5.2 Constraints and limitations

The northern portion of the footprint area is covered in dense Kuruman Thornveld vegetation resulting in very low archaeological visibility. Access to this area was therefore severely restricted, and this was a major constraint when approaching the study. While the southern portion of the site is also covered in vegetation, this is not so dense, and access was therefore easier in places and archaeological visibility consequently much better. As a result of grazing, open grassland vegetation also covers portions of the farm in the south.

5.3 Identification of potential risks

Potentially important archaeological heritage (i. e. stone implements) may be impacted by the proposed development. Vegetation clearing operations in the northern portion of the site, in preparation of the site for development, will very likely expose scatters of stone implements on the surface which is overlain by gravels of banded ironstone, where stone implements are likely to be found.

5.4 Results of the desk top study

The archaeology of the Northern Cape is rich and varied covering long spans of human history. According to Beaumont et al (1995:240) "thousands of square kilometres of Bushmanland are covered by a low density lithic scatter". Webley & Halkett (2008) have noted that there has been very little archaeological work undertaken north of Kuruman, but there are reports of rock engravings to the north of the town. Most of our knowledge of the archaeology of the region is largely dependent on the work undertaken by Humphreys & Thackeray (1983) to the south of Kuruman, and on the Ghaap escarpment, as well as that of Beaumont (1990). J. Kaplan (2012) has recently undertaken an AIA for a proposed solar power farm about 13 kms northwest of Kuruman. While the footprint area for the proposed solar facility is covered in extremely dense Thornveld vegetation dispersed scatters of Middle and some Early Stone Age implements were encountered.

6. FINDINGS

A description of the archaeological finds located during the study is presented in Table 2 in Appendix I.

Thirty-one archaeological occurrences were mapped with a hand held GPS device (refer to Figure 10). Most of the tools recorded during the survey are assigned to the Middle and Later Stone Age and only one Early Stone Age biface, a possible handaxe (154), was recovered. Most of the tools are spread fairly thinly and unevenly over the surrounding landscape but tend to cluster across the northern portion of the property among deposits of ironstone gravels. By far the largest collection of tools (164-166) was recorded in a gravel road that cuts through northern portion of the farm which has exposed gravels below a thin sandy overburden.

Most of the lithics comprise modified (i. e. retouched and utilized) flakes and pieces of stone, but several retouched blade tools, and two pointed flakes (159 & 168) were also found. Four scrapers were recovered, including one end scraper on a long blade (144) and three convex scrapers (157, 160 & 167). A few round cores were found.

Several very low density scatters of a few flake tools were documented on the gravels across the northern portion while a thin scatter of weathered and burnished indurated shale and ironstone flakes (172) were recovered from alongside small dry pan. As indicated the western portion of the site is severely degraded due to extensive grazing, trampling and infrastructure and a few dispersed flakes and chunks were also found near the dam (150) and alongside the road. However, no evidence of any factory or workshop site, or the result of any human settlement was identified in the footprint area.

More than 90% of the tools found are made on banded ironstone with the remainder in indurated shale, chalcedony and quartzite. Some of the tools are also burnished and weathered (indurated shale), while others are abraded (rolled about by natural processes). Extensive gravels of ironstone occur across the vegetated northern portion of the footprint area and banded ironstone is known to have been a desirable raw material for making stone artefacts (refer to Kaplan 2012).

As archaeological sites are concerned, however, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. The collection recovered most likely represents only a very small sample of what is expected to be present on the site, with many more tools hidden under the vegetation cover across the northern portion of the footprint area.

A collection of tools documented during the study and the context in which some of them were found are illustrated in Figures 11-16.

6.1 Significance of the archaeological remains

Despite the fairly small numbers counted, and the disturbed context in which many of the tools were found (such as gravel roads), the archaeological remains on Farm 321 Mount Roper have been provisionally rated as having medium-low (Grade 3B-3C) local significance, subject to further investigation of the site.

6.2 The built environment

In terms of the built environment, the area has no significance, as there are no old buildings, structures, stone ruins, or features in the footprint area.

There are several structures such as concrete drinking troughs but these modern structures do not constitute heritage resources.

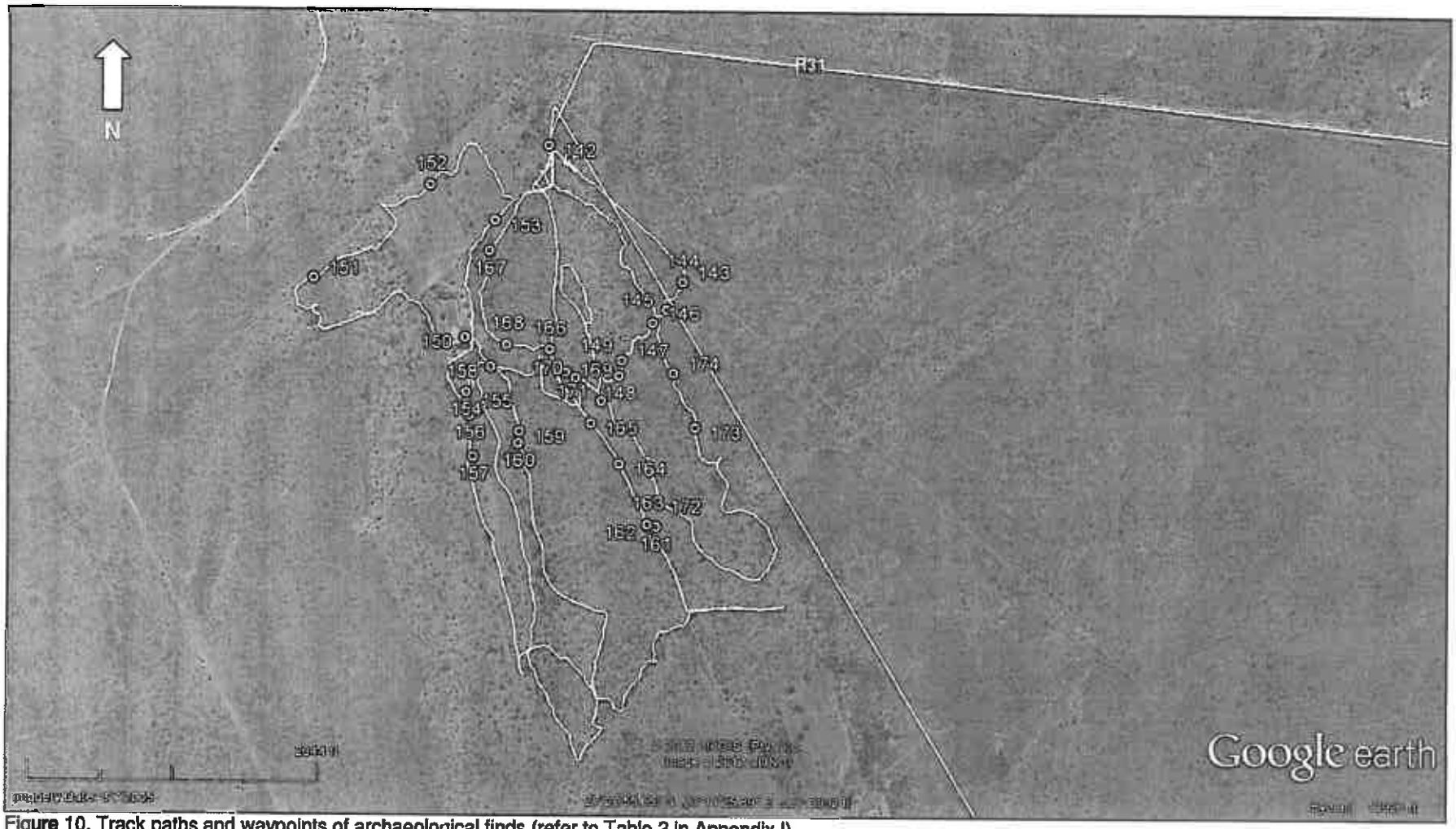

Figure 10. Track paths and waypoints of archaeological finds (refer to Table 2 in Appendix I)

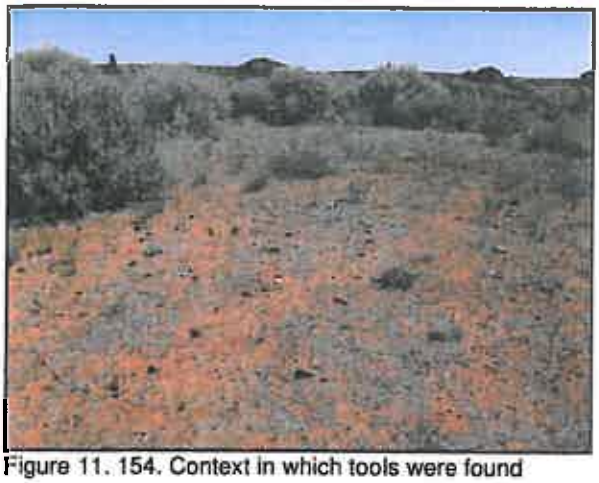

Figure 11. 154. Context in which tools were found

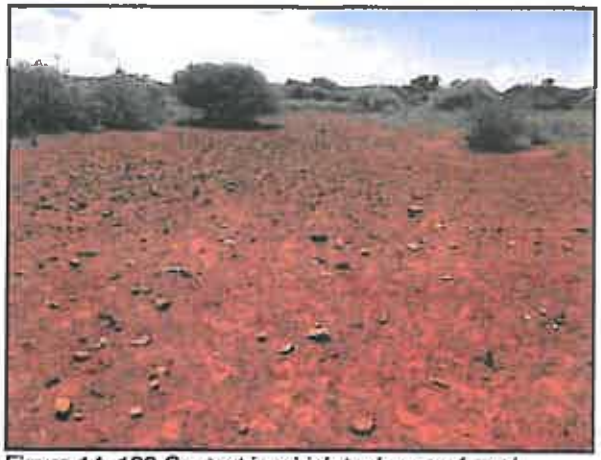

Figure 14. 132 Context in which tools were found

Figure 12. 155. ESA biface & MSA flakes. Scale is in cm

Figure 15. 144. Collection of tools. Scale is in cm

Figure 13. 172. MSA burnished flakes. Scale is in c m

Figure 16. Collection of tools. Scale is in cm

7. ASSESSMENT OF IMPACTS

The proposed Roma Energy Mount Roper Solar Energy Plant may potentially impact on important archaeological remains across the northern portion of the footprint area, which is overlain by deposits of ironstone gravels (Table 1). It is known that banded ironstone was a desirable raw material for making stone artefacts, by Stone Age people. Quarry/workshop sites and activity areas may possibly be identified as well.

Potential impacts on archaeological heritage	
Extent of impact:	Site specific
Duration of impact;	Permanent
Intensity	Low
Probability of occurrence:	Probable
Significance without mitigation	Medium-high
Significance with mitigation	Positive
Confidence:	High

Table 1. Assessment of archaeological impacts.

8. CONCLUSION

Development of the proposed Roma Energy Mount Roper Solar Energy Plant will possibly impact on potentially significant pre-colonial archaeological heritage. Stone implements will likely be exposed during vegetation clearing operations in the northern portion of the site. Such tools are likely to occur in-situ as very little disturbance has taken place in this area. Evidence for workshop sites, activity areas, or human settlement may also be identified.

Indications are, however, that in terms of the archaeological heritage the proposed activity is viable, subject to further archaeological investigation.

9. RECOMMENDATIONS

With regard to the proposed development of the Roma Energy Mount Roper Solar Energy Plant on Farm 321, near Kuruman, the following recommendations are made:

1. The footprint area across the northern portion of the site should be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be much higher and many more stone tools are likely to be encountered on the ironstone gravels which overlie this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological remains.

2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Mariagrazia Galimberti 021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

10. REFERENCES

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Appendix I

Name of Site	Name of Farm	Lat/Long	Finds
	Remainder Farm 321 Mount Roper		
142		S27 20.613 E23 11.185	MSA flake
144		S27 20.771 E23 11.366	Low density scatter of a few flakes, including retouched and utilized pieces and **end scraper** on long blade, on patch of ironstone gravels
145		S27 20.805 E23 11.346	2-3 flakes on patch of ironstone gravels
146		S27 20.821 E23 11.328	Retouched flake
147		S27 20.866 E23 11.287	Flaked chunk, retouched triangular shaped flake
148		S27 20.884 E23 11.284	1-2 flakes, retouched MSA blade, on patch of ironstone gravels
149		S27 20.874 E23 11.253	Chunk and flake on patch of ironstone gravel
150		S27 20.843 E23 11.078	A few flakes and chunks on gravels alongside dam. 1 weathered MSA flake in **indurated shale**
151		S27 20.775 E23 10.878	Flake and chunk on slopes covered in banded ironstone
152		S27 20.662 E23 11.028	**Indurated shale** MSA flake in road
153		S27 20.703 E23 11.115	Utilized and retouched flake
154		S27 20.907 E23 11.081	ESA handaxe/biface, 2 MSA flakes in ironstone and **indurated shale** on thin patch of ironstone and red sands
155		S27 20.920 E23 11.082	Retouched and utilized MSA flake
156		S27 20.934 E23 11.086	MSA flake blade in **indurated shale**
157		S27 20.983 E23 11.092	Flake and convex and utilized **scraper**
158		S27 20.877 E23 11.113	Blade flake retouched on both ends/scraper retouch
159		S27 20.952 E23 11.152	Snapped MRP flake, broken point, **quartzite flake**
160		S27 20.966 E23 11.152	**Convex scraper**
161		S27 21.062 E23 11.337	Chunk and flake next to Aardvark hole
162		S27 21.063 E23 11.329	Broken utilized flake in gravel roads
163		S27 21.059 E23 11.325	Thick chunky blade and flake in gravel road
164-165		S27 20.988 E23 11.287 S27 20.941 E23 11.248	**Gravel road** – broken utilized flake, chunk, MRP, thick weathered end retouched blade, large side retouched flake, flake, blade, large cobble side retouched flake, retouched flake
166		S27 20.855 E23 11.191	Large, thick double sided **blade with adze-like step retouch in indurated shale** in road, 1 x small round **core**, utilized flake, weathered retouched flake
167		S27 20.739 E23 11.108	**Convex scraper**
168		S27 20.850 E23 11.134	Retouched and utilized **pointed flake**
169		S27 20.881 E23 11.213	Large chunk/minimal core
170		S27 20.887 E23 11.226	Gravel patch – 1 large chunky step retouched blade, 1 utilized flake, 1 retouched flake
171		S27 20.914 E23 11.261	Weathered **indurated shale core**
172		S27 21.032 E23 11.336	**MSA burnished flakes** (x 2), chunk, blade misc retouched flake, large chunk, retouched blade – in **dry pan**
173		S27 20.943 E23 11.387	Small chunk
174		S27 20.880 E23 11.357	Patch of ironstone gravel – chunk, x 2 flakes,

Table 2. Spreadsheet of waypoints and description of archaeological finds. Unless otherwise stated, all implements are in banded iron stone

APPENDIX D3B PALAEONTOLOGICAL

RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES & MITIGATION:

PROPOSED MOUNT ROPER ROMA SOLAR PLANT, FARM MOUNT ROPER 321 NEAR KURUMAN, GA-SEGONYANA LOCAL MUNICIPALITY, NORTHERN CAPE

John E. Almond PhD (Cantab.)
***Natura Viva* cc,**
PO Box 12410 Mill Street,
Cape Town 8010, RSA
naturaviva@universe.co.za

March 2012

1. OUTLINE OF DEVELOPMENT

Roma Energy Mount Roper (Pty) Ltd is proposing to construct a 10 MW Concentrating Photovoltaic (CPV) Energy Generation Facility, the Mount Roper Roma Solar Plant, on Farm 321 Mount Roper situated on the south side of the R31 and 13.2 km WNW of Kuruman, Ga-segonyana Local Municipality, Northern Cape (Fig. 2). The land is currently zoned for agriculture and is owned by Poper Moore CC.

The proposed activity entails the construction of about 140 CPV solar panels with a footprint of about 20 ha. The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared from the site. Associated infrastructure includes a perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp. Connection with the grid will be *via* the Riries 66/11kV substation 0.75 km to the northwest on the far side of the R31.

The present palaeontological heritage comment has been commissioned by EnviroAfrica cc, Somerset West as part of a comprehensive Heritage Impact Assessment of the proposed development (Contact details: Mr Bernard de Witt, EnviroAfrica cc, P. O. Box 5367, Helderberg, 7135; 29 St James St, Somerset West; mobile: +27 82 4489991; tel: +27 21 851 1616; fax: 086203308).

2. GEOLOGICAL BACKGROUND

The proposed solar plant study area (27° 21' S, 23° 11' E) is situated in on flat terrain at c. 1200 m amsl on the floor of a shallow, N-S trending valley within the northern portion of the Kurumanheuwels between Kuruman and Hotazel, Northern Cape. The site lies on the south side of R31 road connecting these two settlements.

The geology of the study area near Kuruman is shown on the 1: 250 000 geology

map 2722 Kuruman (Council for Geoscience, Pretoria; Fig. 1 herein). A very short sheet explanation is printed on the map. The proposed Mount Roper Solar Plant is underlain at depth by ancient Precambrian sediments of the **Asbestos Hills Subgroup** (also referred to in the older literature as the Asbesheuwels Subgroup). This succession forms the upper part of the Late Archaean to Early Proterozoic **Ghaap Group (Transvaal Supergroup)** of the Griqualand West Basin (Ghaap Plateau Sub-basin). Useful reviews of the stratigraphy and sedimentology of these Transvaal Supergroup rocks have been given by Moore *et al.* (2001) and Eriksson *et al.* (2006). The Ghaap Group represents some 200 Ma of chemical sedimentation - notably iron and manganese ores, cherts and carbonates - within the Griqualand West Basin that was situated towards the western edge of the Kaapvaal Craton.

The Precambrian sediments present at depth beneath the Mount Roper study site belong to the iron–rich succession of the **Daniëlskuil Formation** (**Vad** in Fig. 1). This unit is up to 200m-thick and is interpreted as a current- or wave-reworked banded iron formation (BIF), as suggested by the abundance of BIF intraclasts and sedimentary structures (Beukes 1983, Klein & Beukes 1989, Beukes & Klein 1990). The base of the Danielskuil Formation has been radiometrically dated to 2.43-2.49 Ga, *i.e.* Early Proterozoic (Eriksson *et al.* 2006). BIF rocks generally consist of rhythmically bedded, thinly composition- and colour-banded cycles of fine-grained mudrock, chert and iron minerals (siderite, magnetite, haematite) that were deposited in an offshore, intermittently anoxic basin. BIF deposition characterizes the Late Archaean – Early Proterozoic interval (2600-2400 Ma) before the onset of well-oxygenated atmosphere and seas. There are a number of asbestos mines in the region, including one 1.4 km southeast of the study site and another 2.2 km to the north.

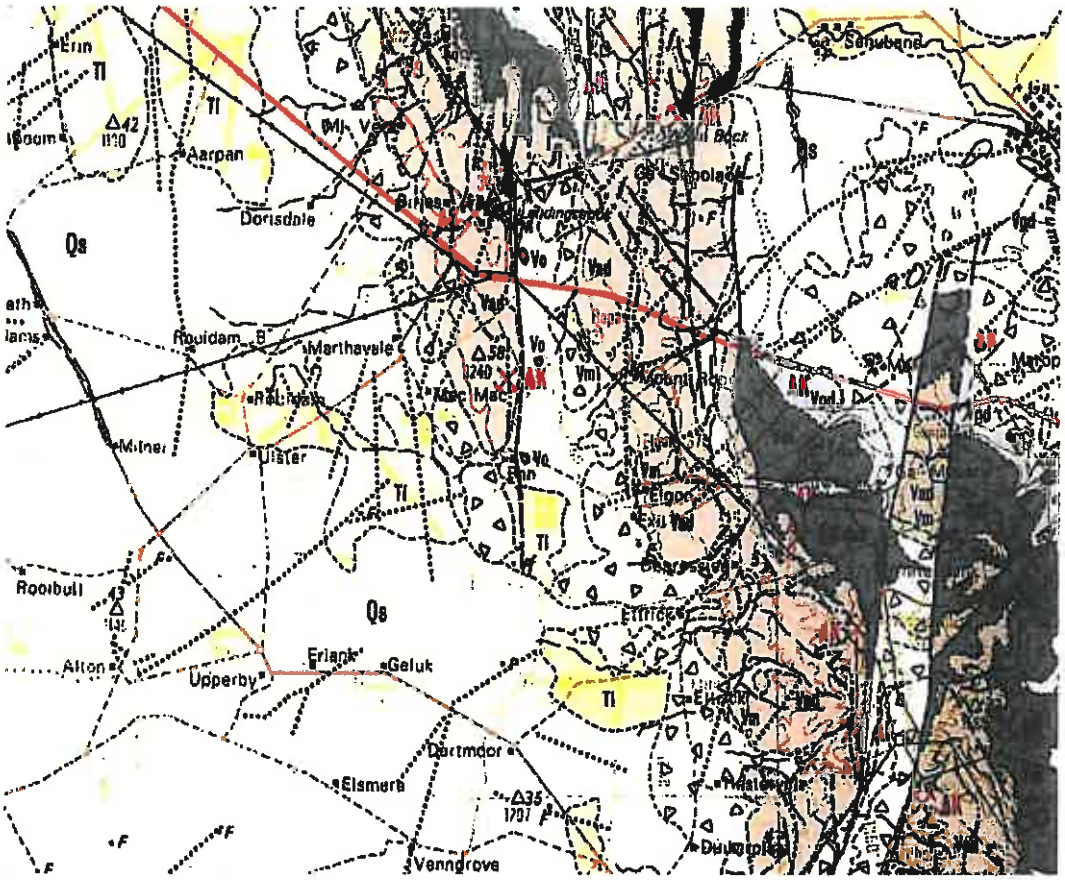

Fig. 1. Extract from 1: 250 000 geological map 2722 Kuruman (Council for Geoscience, Pretoria) showing approximate location of proposed Mount Roper Roma Solar Plant study area within a valley eroded into the northern Kurumanheuwels 27.5 km WNW of Kuruman, Northern Cape Province (small red rectangle). The study area is underlain at depth by Precambrian (Early Proterozoic) sedimentary rocks of the Daniëlskuil Formation (Asbestos Hills Subgroup, Ghaap Group, Transvaal Supergroup) (Vad). The Precambrian bedrocks of the floor of the valley are blanketed with colluvial and alluvial rock rubble (triangular symbols) as well as wind-blown sand (Qs, white). The mining symbol marked AK refers to crocidolite (asbestos) mines in the region.

The Precambrian basement rocks within the study area are mantled with various **superficial deposits** that are mapped as rubble (triangular symbols in Fig. 1), probably consisting of an admixture of colluvium, downwasted surface gravels and coarse alluvium of intermittently flowing streams, as well as **wind-blown sand (Qs)**. These deposits are mainly of local origin and are generally young (Quaternary to Recent).

3. PALAEONTOLOGICAL HERITAGE

The deep water BIF facies of the Asbestos Hills Subgroup (Kuruman and Daniëlskuil Formations) are not known to contain macroscopic fossils. They have not yielded stromatolites which are normally restricted to the shallow water photic zone since they are constructed primarily by photosynthetic microbes. However, there are

several reports of microfossils from cherty sediments within the Kuruman Formation, just below the Daniëlskuil Formation, according to MacRae (1999) and Tankard *et al.* (1982 – see refs. therein by Fockema 1967, Cloud & Licari 1968, La Berge 1973. N.B. the stratigraphic position of these older records may require confirmation). It is likely that cherts within the Daniëlskuil Formation also contain scientifically interesting Early Proterozoic microfossil assemblages.

The superficial rock rubble and wind-blown sands mantling the Precambrian bedrocks are unlikely to be fossiliferous.

The palaeontological sensitivity of the Mount Roper Solar Plant study area is accordingly assessed as LOW.

4. CONCLUSIONS & RECOMMENDATIONS

The overall fossil heritage impact significance of the proposed Mount Roper Roma Solar Plant development is considered to be LOW because:

- The study area is underlain by Precambrian banded iron formations of low palaeontological sensitivity (microfossils only);
- The Precambrian rocks are deeply buried beneath unfossiliferous rock rubble and wind-blown sands;
- Extensive, deep bedrock excavations are unlikely to be involved in this sort of solar park project.

It is therefore recommended that exemption from further specialist palaeontological studies and mitigation be granted for this solar plant development.

Should any substantial fossil remains (*e.g.* vertebrate bones and teeth, shells, petrified wood) be encountered during excavation, however, these should be reported to SAHRA for possible mitigation by a professional palaeontologist.

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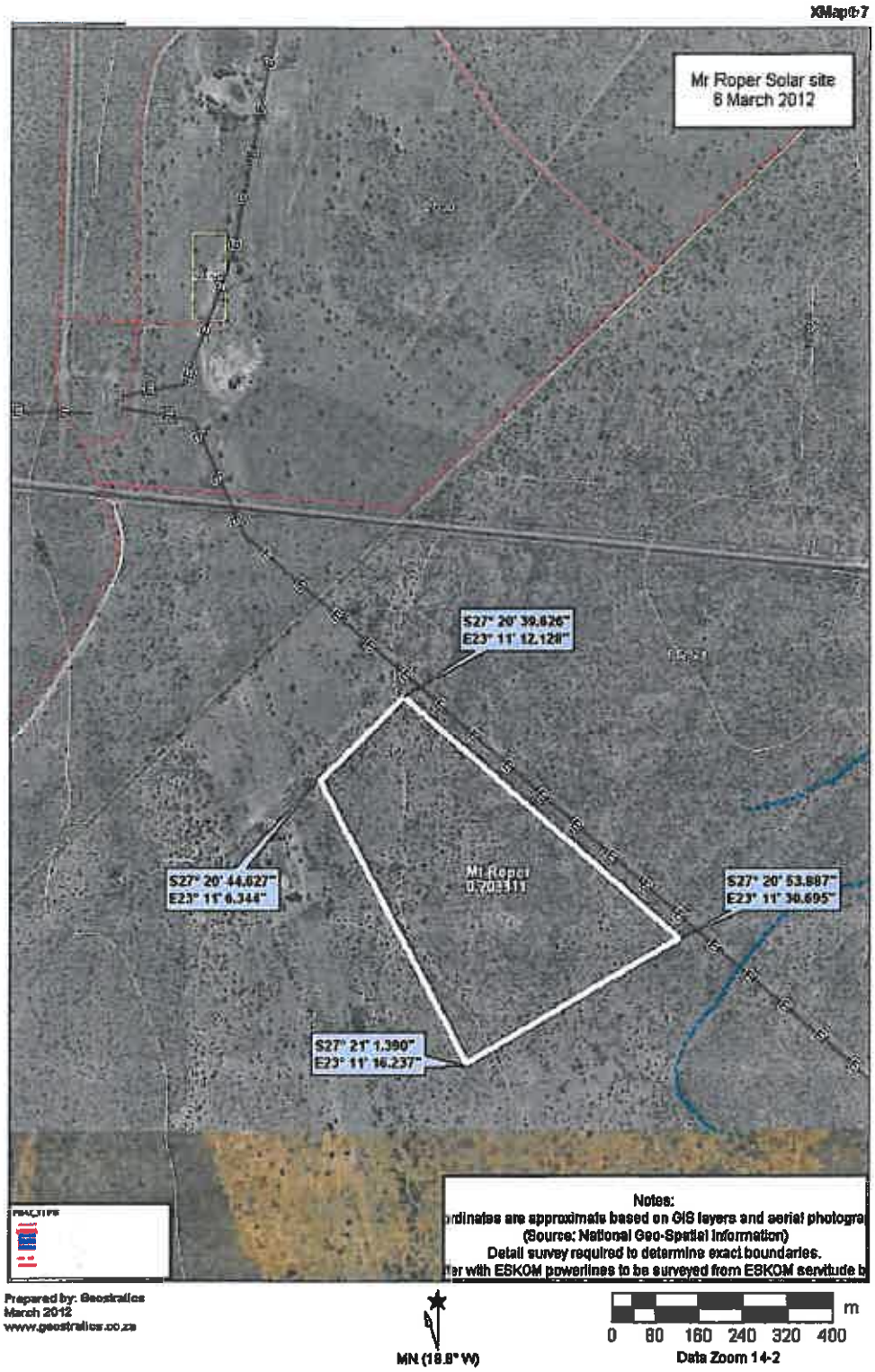


Fig. 2. Satellite image showing the study area for the Roma Energy Mount Roper Solar Plant situated on Farm 321 Mount Roper 13.2 km WNW of

Kuruman, Northern Cape (Image prepared by Geostratics 2012).

6. QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape under the aegis of his Cape Town-based company *Natura Viva* cc. He is a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape as well as Limpopo, Free State and Gauteng for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

John E. Almond

Dr John E. Almond
Palaeontologist
***Natura Viva* cc**

APPENDIX D3C VISUAL

MT ROPER, PORTION FARM 321: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT

For consideration in the Basic Assessment
For
EnviroAfrica
PO Box 5367
Helderberg
7135
info@enviroafrica.co.za

Final Report
11 May 2012

Compiled by:
S.C. Lategan
GeoStratics

PO Box 1082
Strand
7139

Report history:

Version	Date	Amendments
Draft Report: Version 1	26 March 2012	
Final Report	11 May 2012	

CONTENT

Tables:

Figures:

Relevant Qualifications & Experience of the Author

Ms Sarien Lategan holds a Honours Degree in Geography as well as a Masters Degree in Town and Regional Planning from the University of Stellenbosch. She has 7 years experience as Town planner at a local government, 3 years with South African national Parks as planner and project manager of various GEF and World Bank managed, tourist facilities in the Table Mountain National Park and since 2004 as private practitioner involved in inter alia Site Analysis and Visual Impact assessments for various types of developments ranging from housing, tourism to infrastructure developments.

Ms Lategan is registered as a professional Town and Regional Planner as well as Environmental Assessment Practitioner.

Declaration of Independence

I, Sarah C. Lategan, fully authorized by Geostratics CC, declare that I am an independent consultant to EnviroAfrica and neither myself nor Geostratics, has any business, financial, personal or other interest in the proposed project or application in respect of which I was appointed, other than fair remuneration for work performed in connection with the application. There are furthermore no circumstances which compromise my objectivity in executing the task appointed for.

SC Lategan

EXECUTIVE SUMMARY

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the national Environmental management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 321, Mt Roper in the Kuruman district.

The site is situated on the R31 approximate 30km northwest of Kuruman.

The aim of the assessment is to identify view receptors and assess the impact of the development on these receptors. In this regard the larger site was screened and based on this findings as well as inputs by other specialists, a most suitable area of 20ha was identified on which the final assessment focus.

At the time of assessment a final decision has not yet been taken on the exact technology or mix of technology to be used in the development. In this regard the worst case scenario has been followed by assessing the technology most probably going to have the most visual impact in terms of size of structures. Should a different technology thus been decided on which involve smaller units, the visual impacts will certainly be less than what is assessed in this report. For the purposes of this study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed.

The assessment established that the receiving environment comprise an area dominated by low intensity agriculture and game farming. The site is in close proximity to an ESKOM substation and HV power lines. The development will change the character of the area but the assessment establishes that due to the scale and absorption capacity of the environment, the change is within acceptable levels.

The only sensitive receptor identified is the R 31. It was however determined that the positioning of the facility a distance away from the road reduce the intrusion level. The R31 southbound however may experience an issue with glare off the panels, which may require mitigation measures to ensure road safety. Given the screening properties of the topographical features, the exposure level and intrusion factor reduce the impact to within the acceptable levels and with the necessary mitigation measures in place it does not to have a significant visual impact on the identified sensitive receptors.

The overall conclusion is that the visual impact is within acceptable levels and could thus be recommended.

1 BACKGROUND

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the national Environmental management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 321, Mt Roper in the Kuruman district.

The site is situated on the R31 approximate 30km northwest of Kuruman.

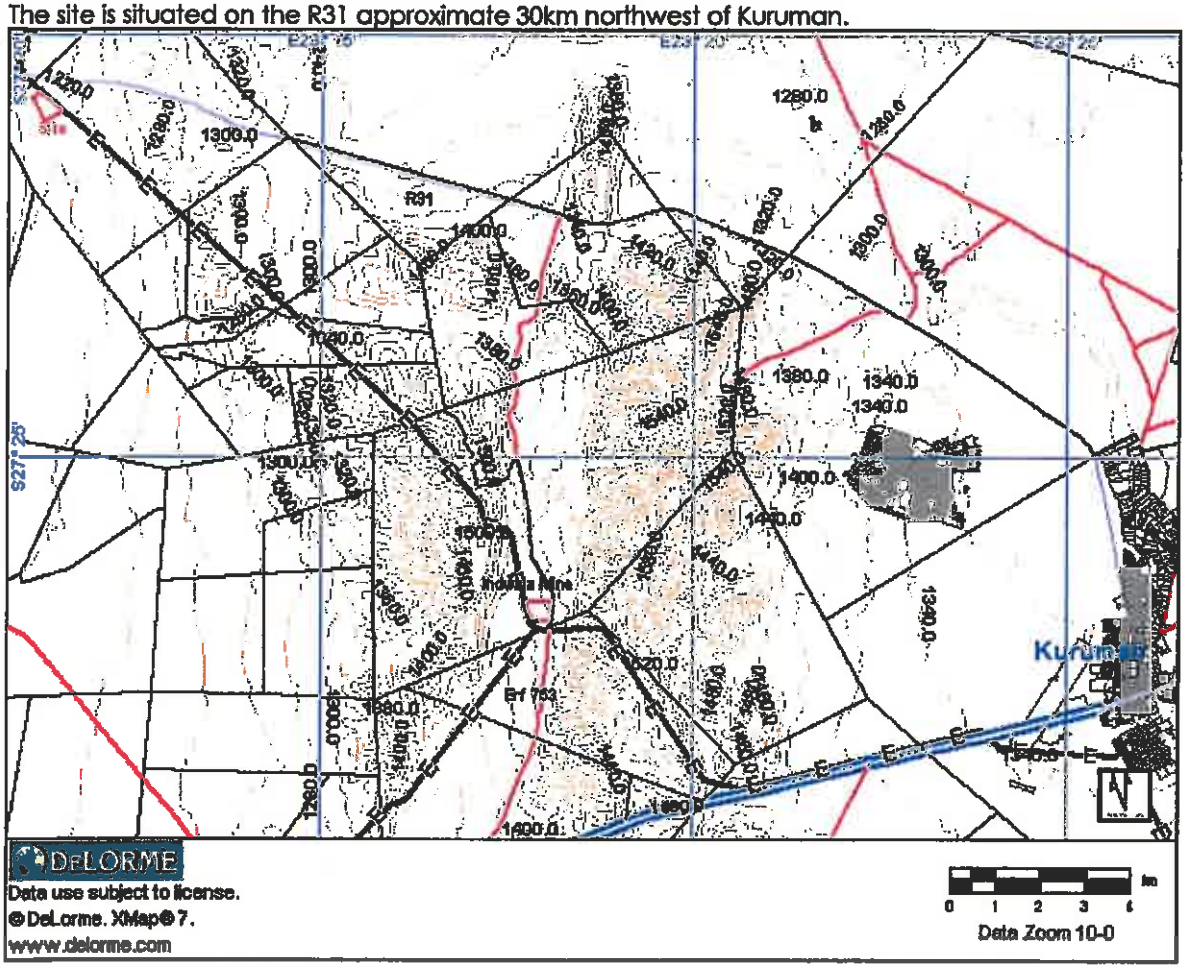


Figure 1: Locality

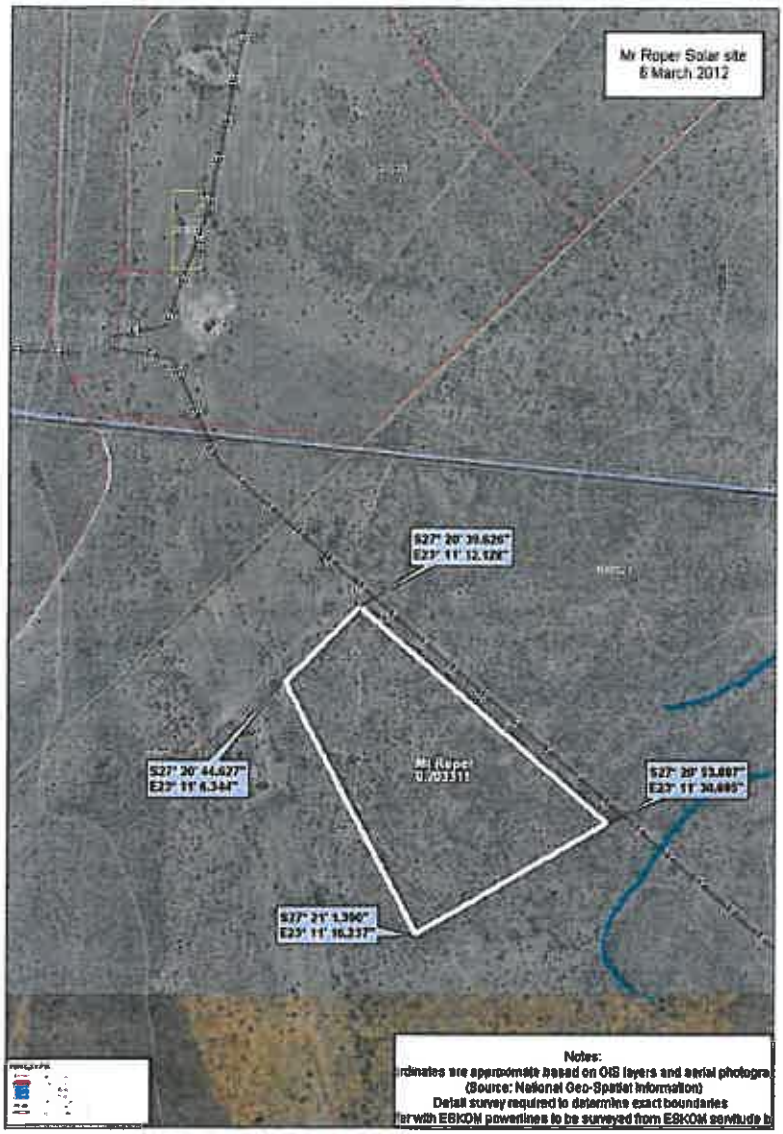


Figure 2: Site boundary

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm on a portion of Farm 321, Mt Roper, Kuruman district. The site gain access off the R31 between Kuruman and Hotazel, approximately 30km from Kuruman.

The objective of the Visual Impact assessment is to determine the significance of any visual impact. This assessment will indicate whether from a visual perspective the development constitute and acceptable level of change and if so what potential mitigation measures can reduce any visual impact as to limit

To determine the potential extent of the VIA required the following broad criteria are considered.

Areas with protection status, e.g. nature reserves	None

Areas with proclaimed heritage sites or scenic routes	None.
Areas with intact wilderness qualities, or pristine ecosystems	Natural areas, low intensity agriculture and game farming.
Areas with intact or outstanding rural or townscape qualities	None
Areas with a recognized special character or sense of place	None
Areas with sites of cultural or religious significance	None
Areas of important tourism or recreation value	The site is in a region where such elements exists and are important in the Green Kalahari tourist route, although the specific route, namely R31 has not been identified as a scenic drive or tourist route, it is an alternative route from Kuruman to the Kgalagadi Transfrontier Park.
Areas with important vistas or scenic corridors	To assess.
Areas with visually prominent ridgelines or skylines.	None

Table 1: Requirements for visual assessment

High intensity type projects including large-scale infrastructure	yes
A change in land use from the prevailing use	Yes
A use that is in conflict with an adopted plan or vision for the area	No
A significant change to the fabric and character of the area	Yes
A significant change to the townscape or streetscape	No
Possible visual intrusion in the landscape	Potentially
Obstruction of views of others in the area	Potentially

Table 2: Nature of intended development

From the above it is clear that the receiving environment holds certain visual elements which may be impacted upon by development of the site.

It is thus clear that the potential exist that development of the site may have a visual impact. In order to assist authorities thus to make an informed decision, the input of a specialist is required to assist in the project design and assess the visual impact of the preferred project proposal.

The term visual and aesthetic is defined to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. The terms of reference for the specialist are to:

- Provide the visual context of the site with regard to the broader landscape context and site specific characteristics.
- Provide input in compiling layout alternatives.

- To describe the affected environment and set the visual baseline for assessment
- Identify the legal, policy and planning context
- Identifying visual receptors
- Predicting and assessing impacts
- Recommending management and monitoring actions

3 Methodology and principles

3.1 Methodology

Table 4: Summary of methodology

Task undertaken	Purpose	Resources used
A screening of the site and environment	To obtain an understanding of the site and area characteristics and potential visual elements	Photographs Site visits
Identify visual receptors	To assess visual impact from specific view points	Photographs, profiles
Contextualize the site within the visual resources	To present an easy to understand context of the site within the visual resource baseline	Specialist: S Lategan Graphic presentation Superimposed photo's Model in case of high significance
Propose possible mitigation measures	To present practical guidelines to reduce any potential negative impacts.	Specialist: S. Lategan

Throughout the evaluation the following fundamental criteria applied:

- Awareness that "visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- Consideration of both the natural and cultural (urban) landscape, and their inter-connectivity.
- The identification of all scenic resources, protected areas and sites of special interest, as well as their relative importance in the region.
- Understanding of the landscape processes, including geological, vegetation and settlements patterns which give the landscape its particular character or scenic attributes.
- The inclusion of both quantitative criteria, such as visibility and qualitative criteria, such as aesthetic value or sense of place.
- The incorporation of visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design and quality of the project.
- To test the value of visual/aesthetic resources through public involvement.

3.1.1 Principles

The following principles to apply throughout the project:

- The need to maintain the integrity of the landscape within a changing land use process
- To preserve the special character or 'sense of place' of the area
- To minimize visual intrusion or obstruction of views
- To recognize the regional or local idiom of the landscape.

3.1.2 Fatal flaw statement

A potential fatal flaw is defined as an impact that could have a "no-go" implication for the project. A "no-go" situation could arise if the proposed project were to lead to (Oberholzer, 2005):

1. Non-compliance with Acts, Ordinance, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.

3. Impacts that may be evaluated to be of high significance and that are considered by the majority of stakeholders and decision-makers to be unacceptable.

The screening of the site and initial project intentions did not reveal any of the above issues which may result in a fatal flaw.

3.1.3 Gaps, limitations and assumptions

The assessment has to be read with the following in mind:

1. No information is available on the alignment of transmission lines linking the solar facility with the ESKOM substation. The site is on the opposite side of the R31 than the ESKOM substation and transmission lines will have to be constructed. This assessment could however not assess the impact thereof due to a lack of information.
2. Access is obtained via existing roads and no road upgrades or new roads will be constructed.

3.1.4 Assessment explained

The assessment of visual impact is done on two levels namely the absorption rate of the receiving environment and the individual view receptors. The absorption rate of the receiving environment is determined by various elements e.g. topography, land use etc and the assessment will focus on the acceptable level of change of the area.
Visual receptors are assessed individually based on the sensitivity of the receptor, exposure to the development and intrusion rate.
The following framework is used in order to assess view receptors:

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

A sensitive receptor with a low exposure and/or low intrusion rate can be regarded as a low significance rating. A receptor of low sensitivity but with high exposure can be of high significance if the intrusion rate is also high but is reduced if the intrusion rate is medium or low.
The overall significance therefore depends not only on the sensitivity of the receptor but also on the exposure and intrusion rate and thus a combination of the criteria.

3.2 Legal Framework, Guidelines and policies

3.2.1 National Environmental Management Act, 107, 1998 and relevant Guidelines:

An assessment in terms of any activity that required an EIA or Basic Assessment may be subjected to a specialist visual assessment in order to determine the significance of the potential impacts to result from a proposed activity.

The National Dept has subsequently determined that all applications for solar farms are subject to a visual impact assessment.

3.2.2 Northern Cape PSDF

The PSDF provides guidance to ensure that

- development is of a quality that promotes environmental integrity.
- based upon the principles of 'critical regionalism" which promotes a return to the development of high-quality settlements.
- remised upon "The Big Five" principles that guide the planning, design and management of development namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.

3.2.3 Green Kalahari tourism

The Green Kalahari tourist plan is an initiative to promote tourism in the region. The protection of cultural and heritage resources as well as the active involvement and empowerment of local communities through tourism is a core theme through the tourism plan. The R31 from Kuruman northward provide an alternative access to the Kgalagadi Transfrontier Park.

4 DEVELOPMENT PROPOSAL

4.1 General Description

Construction of Solar energy production facility ("Solar Farm") with a maximum capacity of 10Megawatt, consisting of approximately 140 tracking CPV units, on approximately 20ha. The exact technology to be used has not been determined and this assessment is based on the following typical parameters. Units are typically positioned in rows with access roads between every second row. Unit spacing typically varies between 43x37 and 33x30m.

Figure 3: Typical Solar Farm layout

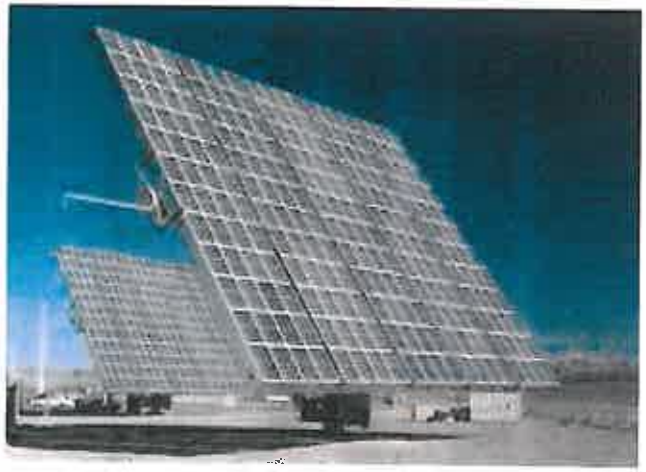


Figure 4: Typical CPV Unit

The Solar Farm includes supportive infrastructure which consists of 2 -4 concrete transformer pads approximately 20x15m respectively, a fenced construction staging area, maintenance shed and a switch panel for connection to the grid and transmission lines from the transformers to the closest ESKOM substation.

4.2 Project Elements

4.2.1 Extent and layout

The Solar farm will occupy approximately 20ha. The nature of the tracking CPV units are such that the property has to be leveled to less than 1:5 gradient in order to prevent the units to touch the ground when turning on the pedestal. CPV units are positioned in a grid with the active panel side facing north. The units will rotate from east (morning) to west (afternoon). Back of units facing south. Units are position in rows of two with access roads in between.

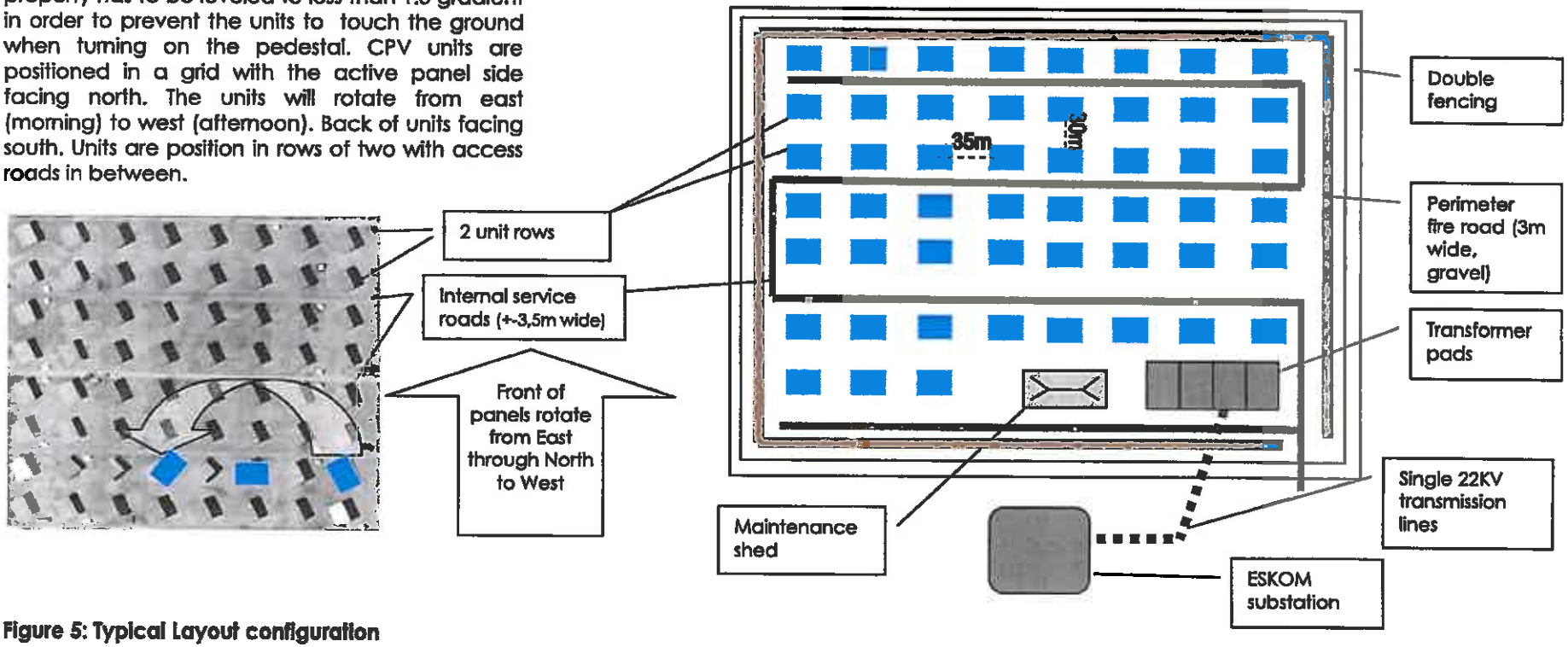


Figure 5: Typical Layout configuration

4.2.2 Tracking CPV Units

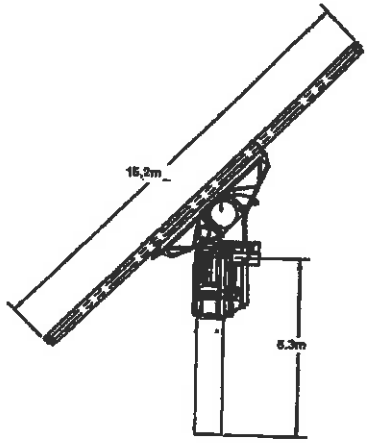
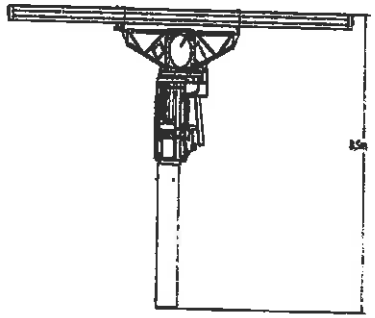
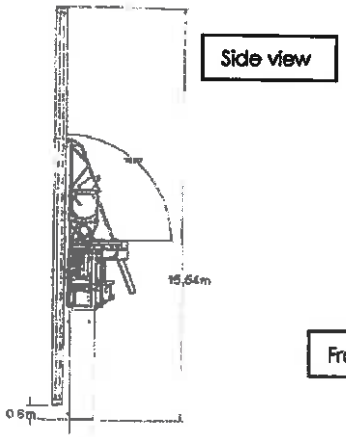


Figure 7: Typical Operational position



In stow: >28 mph, > 10 sec, Out of stow : <26 mph, >300 sec.

Figure 6: Storm Stow position



Side view

Front view

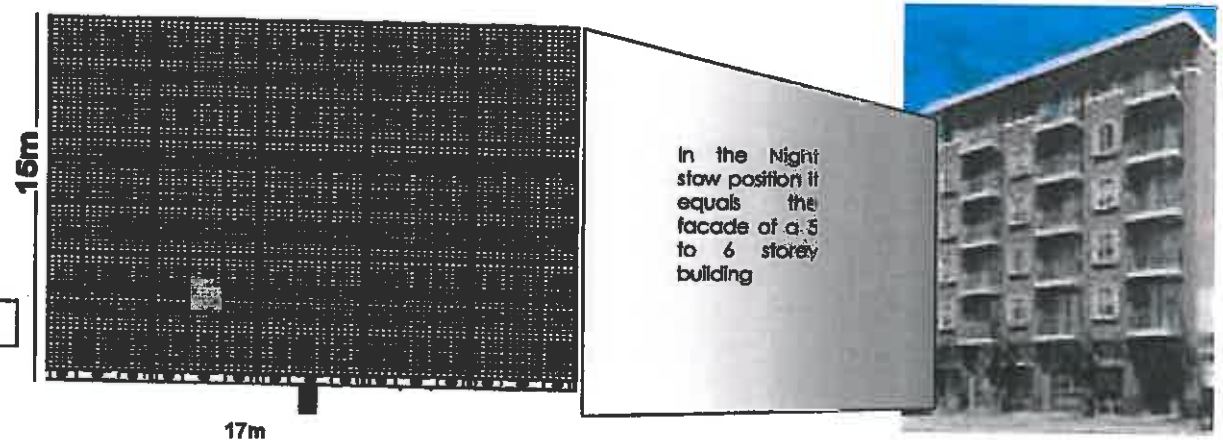


Figure 8: Night stow position

4.2.3 Project perimeter

Double fencing with inner fence consisting of galvanized palisade fence and outer an electrified fence of 2.4m in height.

Figure 9: Typical electrical fence

Figure 10: Typical galvanized palisade fence

4.2.4 Supportive Infrastructure

Typically 20 x 15m respectively.
Black top surface

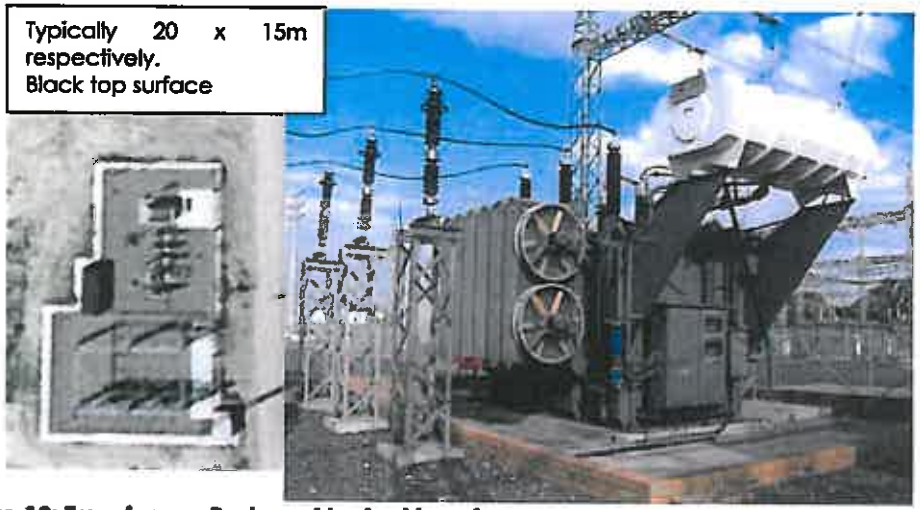


Figure 12: Transformer Pads and typical transformer

Single 22KV Power lines will feed from the transformers to the ESKOM

Figure 11: Typical 22KV single Power line

4.2.5 Operational elements
Depending on the exact technology the operational activities can vary. Tor the typical units described above, teams will access the site and physically clean panels. This is done either by rope access or the use of "cherry pickers". In areas of high dust conditions, cleaning can be more regular.

4.3 Construction elements
For the construction of the typical units describe above, large earth moving equipment will be used as well as high lift equipment and cranes. Large transport trucks for delivery will enter the site during construction. For technology that uses smaller units or static units the scale of equipment required for construction will be less.
Construction process entails:

- clearing and leveling of the site,
- construction of pedestals which involve concrete bases and
- fitting of panels
- construction of internal and access roads
- Fencing and security infrastructure
- Construction of support facilities such as maintenance sheds, etc
- Construction of transmission lines

5 RECEIVING VISUAL ENVIRONMENT
5.1 Description
Understanding the potential impact of a proposed development, an understanding of the receiving environment is important. In this regard the main elements of the receiving environment relates to the character of the current surrounding land use and the absorption capacity of the area. The character of the area entails the sense of place created by the current land use and the scale and type of infrastructure or physical elements within the immediate area. The absorption capacity relate to the density of physical elements and topographical variations of the landscape, which will determine the catchment area. The human eye will observe the horizon on a perfectly flat surface at a distance of 30km. This is however significantly reduced by landscape elements which obstruct the view.

5.1.1 Catchment area
The landscape consists of undulating hills which restrict the catchment area and present a high absorption level. The site slope slightly in a western direction towards the valley. Due to the topographical nature of the landscape the catchment is restricted to approximately 2km in all directions (Figure 13).

5.1.2 Sense of Place:
The site is situated in a rural to natural landscape and although low intensity farming occurs and electrical infrastructure exists, the overall sense of place display a natural character. The traveler on the R31 is halfway between towns and will thus have a lower capacity to accept urban infrastructure than within a town. The region is however known for mining and intermittent observation of mining activities again increase the travelers capacity slightly. The presence of infrastructure is thus not totally foreign to the area, as long as it does not create a high level of intrusion.

5.2 Findings
The proposed site is situated in the rural area with natural vegetation. The area displays a rural character with low intensity farming, game farming and natural areas. An ESKOM substation is in close proximity to the site and HV power lines cross the property and the R31.

The area is characterized by hills and valleys which creates a high absorption capacity. This high absorption rate restricts the catchment area to below 5km radius.

Statement 1: The property, on which the development is proposed, is currently used for low intensity farming but HV power lines do cross the site. The proposed solar farm will change the character of the immediate surrounds.

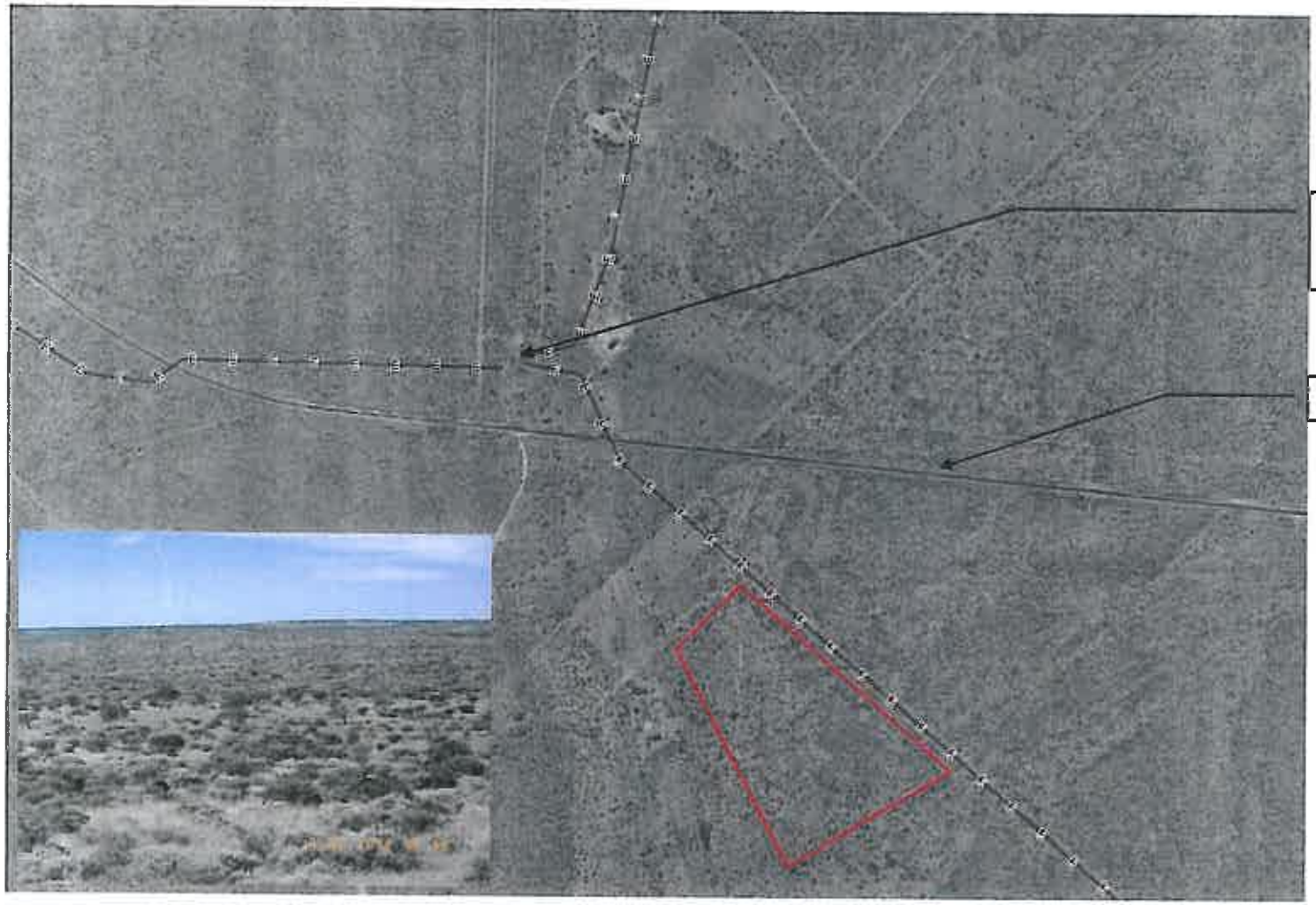


Figure 13: Receiving Environment

6 VISUAL RECEPTORS

Visual receptors are those positions from where the development site is potentially visible. Based on the character of the locality of the receptor its sensitivity can be rated. Generally residential areas and tourism related destinations and routes are sensitive to visual intrusions as they relate to the well-being of residents and the tourism quality of the area.

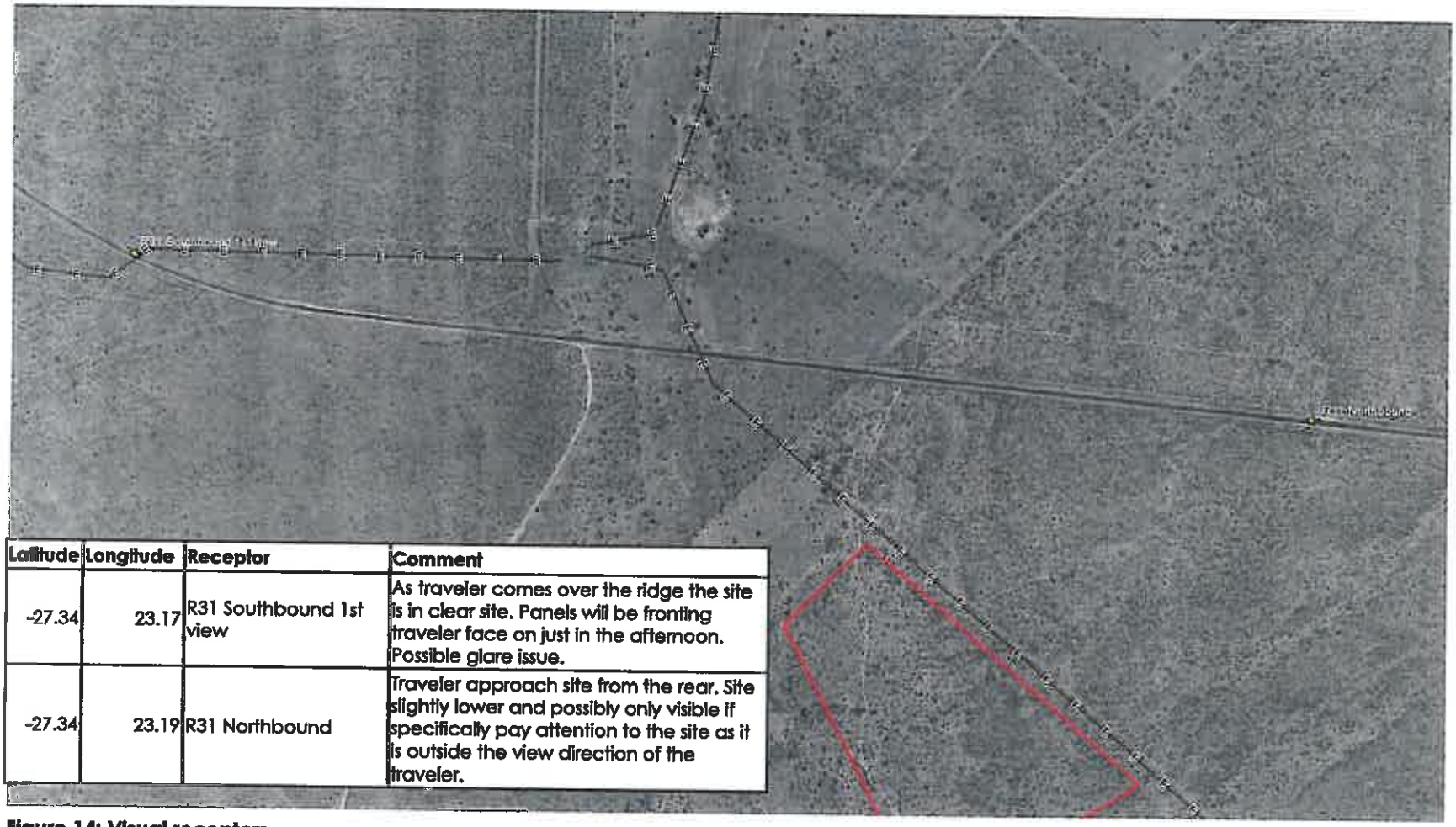
6.1 Potential Receptors

The only identified receptor is the R31 both north and south bound.

6.2 Assessment of Receptors

1. R31 southbound (Figure 17): As the traveler approach over the ridge the site is in clear site. Panels will be fronting the traveler face on in the afternoon and this can create a possible glare with potential reduction in road safety. This will only occur in the afternoon and probably more significant during the winter when the sun is low on the horizon and the panels are in a more upright position. This issue can however be mitigated to reduce the glare or even eliminate. The visual significance without mitigation is thus high, but with mitigation it can be reduced to low.

2. R31 northbound (Figure 16): The view direction of the traveler is parallel to the site and not towards the site. The site slope away from the road, diminishing the exposure of the site. The site is more than 600m from the road reducing the intrusion level. The traveler is at a lower level than the site and dense vegetation reduce view in the direction of the site. The visual significance on the northbound traveler is thus low.



Latitude	Longitude	Receptor	Comment
-27.34	23.17	R31 Southbound 1st view	As traveler comes over the ridge the site is in clear site. Panels will be fronting traveler face on just in the afternoon. Possible glare issue.
-27.34	23.19	R31 Northbound	Traveler approach site from the rear. Site slightly lower and possibly only visible if specifically pay attention to the site as it is outside the view direction of the traveler.

Figure 14: Visual receptors

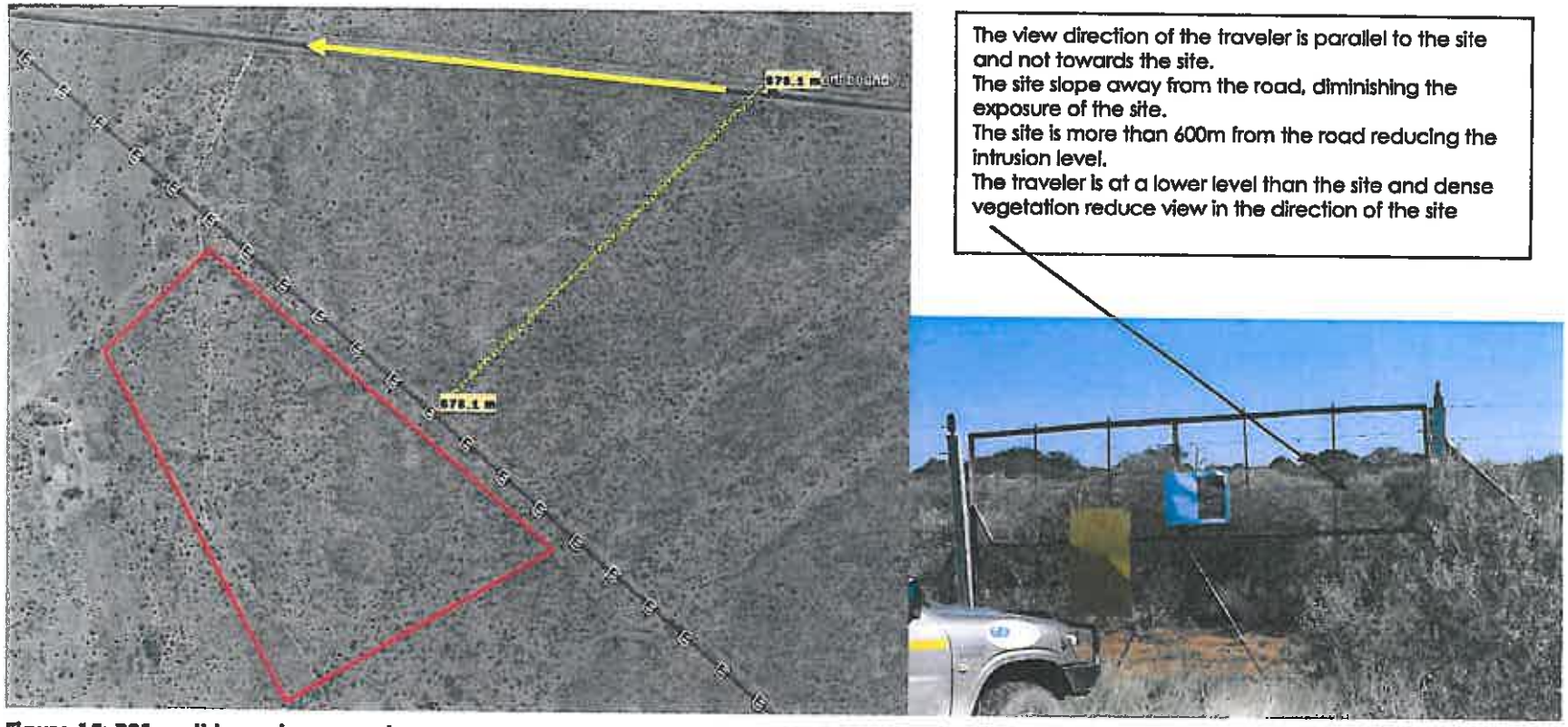


Figure 15: R31 northbound as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[redacted]	sporting, recreational, places of work	industrial, mining, degraded areas
Intrusion/Obstructive	noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 3: R31 northbound receptor assessed

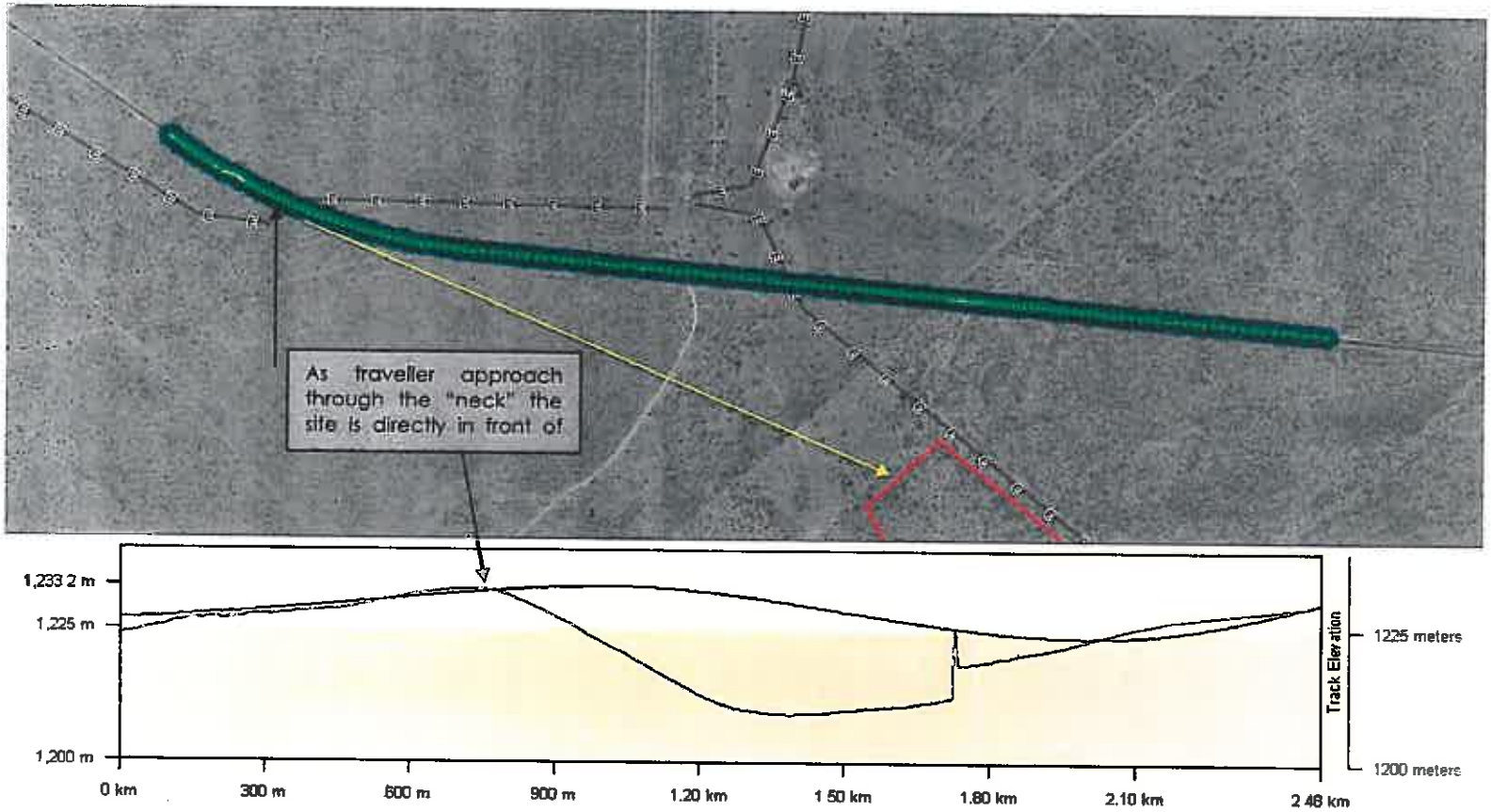


Figure 16: R31 southbound assessed

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserve, scenic route;	sporting, recreational, places of work	industrial, mining, degraded areas
Intrusion/Obstructive	noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 4: R31 southbound receptor assessed

Table 5: Summary of Visual Receptor assessment

Latitude	Longitude	Receptor	Comment	Exposure	Sensitivity	Intrusion/Obstructive	Finding
-27.34	23.17	R31 Southbound 1st view	As traveler comes over the ridge the site is in clear site. Panels will be fronting traveler face on just in the afternoon. Possible glare issue.	Rating: High	Rating: High	Rating: High	Due to the full exposure when crossing the hill to the north travelling south and the elevation in comparison to the site, possible glare may occur. This will only occur in the afternoon and probably more significant during the winter when the sun is low on the horizon and the panels are in a more upright position. This has potential road safety issue. Significance: high
-27.34	23.19	R31 Northbound	Traveler approach site from the rear. Site slightly lower and possibly only visible if specifically pay attention to the site as it is outside the view direction of the traveler.	Rating: Low	Rating: High	Rating: Low	The position of the site to the traveler is such that the site is almost outside the view line of the traveler. Should the traveler take specific notice of the area the site will be visible. The site is however slightly lower and sloping away from the road. Significance: Low

7 CONSTRUCTION

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.
Rating: Low

8 FINDINGS

The site is situated in an area with a rural character. The immediate area however does host an electrical substation and HV lines. The solar farm will thus change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

The possible glare impact on the southbound traffic may have road safety implication. Therefore the impact from this receptor is high and should either be avoided or mitigated.

As the CPV units are across the road from the substation and therefore additional 22KV power lines will have to cross the R31. As long as these lines are combined with the alignment of the existing lines crossing the road it will have no significant additional visual impact.

Apart from the glare issue from the R31, the proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended, subject to the prevention of any road safety issues.

9 MITIGATION MEASURES

The nature of the development is such that very little mitigation measures is possible.
It is however recommended that the transmission lines follow the alignment of the existing power lines as to reduce additional intrusion of infrastructure into the area.
The operational management program should include a monitoring mechanism of potential glare issues and should such issues occur, the positioning of panels during the problematic period should be changed. This may impact slightly on the energy output sufficiency.