

Scoping Archaeological Impact Assessment

Proposed development of the AMDA Alpha PV (Solar Energy Facility) on Portion 1 of N'Rougas Zuid No 121, Strausheim, and Overhead Power Line Grid Connection to the Eskom Nieuwehoop MTS Sub-Station across Portion 3 of Gemsbok Bult No120, Kenhardt Registration Division, Northern Cape Province

prepared for

PERCEPTION Planning, P.O. Box 9995, George, 6530, Western Cape,
Cell: 082 568 4719, E-mail: perceptionenvplg@gmail.com, **Applicant: AMDA Alpha (Pty) Ltd**, Co Reg No 2015/300647/07, PO Box 2681, Cape Town, 8000,
charlie@amdadevelopments.co.za

by



Dr Peter Nilssen, PO Box 2635, Mossel Bay, 6500
044 691 0051 | 0827835896 | peter@carm.co.za

23 February 2016

Name, Expertise and Declaration

I, **Peter Nilssen** (PhD in archaeology, UCT 2000), herewith confirm that I am a Professional member - in good standing - of the Association of South African Professional Archaeologists (ASAPA), including the Cultural Resource Management section of the same association and am accredited to undertake the necessary archaeological studies required for the proposed development.

As the appointed independent specialist (archaeologist) for this project hereby declare that I:

- act as an independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct;
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- am aware that a false declaration is an offence in terms of regulation 48 of GN No. R. 982.



Signature of the specialist:

Date: **23 February 2016**

Introduction

This Scoping Archaeological Impact Assessment is based on a desktop level study, and therefore, more detailed descriptions of the receiving environment will be presented in the future Archaeological Impact Assessment following a comprehensive foot survey and assessment of the proposed development site.

AMDA Alpha (Pty) Ltd is proposing the establishment of a commercial solar photovoltaic energy facility (SEF) on Portion 1 of N'Rougas Zuid No 121, situated in the District of Kenhardt, Northern Cape Province. The entire property is 5232.8138 ha in extent, while the initial study area is 900 ha and the development lease area is approximately 250 ha in extent, and is located about 28 km NNE of Kenhardt in the Northern Cape Province (Figures 1 & 2).

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW (AC) with an installed capacity of 85 MW (DC). The proposed technology is Solar PV on fixed tilt structures or single axis tracking technology. The structure will be fixed-tilt in a north facing orientation or mounted on horizontal axis trackers, tracking from east to west. The dimensions or extents of the development components are as follows: Solar PV field footprint = 185ha, project sub-station = 1ha, collector sub-station = 1ha, buildings = 1.5ha, roads = 22km long at 6m wide = 13.2ha, permanent lay down areas = 7ha and construction lay down areas = 12ha. The solar field tracker structure height is approximately 3.5m, while the perimeter fence will be a 2.4m high multi-strand electric security fence.

The proposed SEF project will connect to the Eskom Nieuwehoop MTS sub-station near Kenhardt as indicated in Figure 2. The sub-station to connect the facility has a confirmed capacity of 245MW - Eskom letter for REIPPPP Bid window 4 accelerated programme & 750MW in GCCA 2022 June 2015. The project sub-station will connect to the collector sub-station via a single 132kV overhead line. The collector sub-station will connect to Nieuwehoop MTS sub-station via a single 132kV overhead line. The power line route will be approximately 5.5km in length and will run from the collector sub-station on the property, across Portion 3 of Gemsbok Bult No 120 to the Nieuwehoop MTS sub-station. The power line will be 25m in height with a servitude width of 50m.

Additional infrastructure includes; water transported from Municipal source or borehole, auxiliary electricity supply from Eskom, and sewerage by conservancy tank. A new access road will be built across the property from the Kenhardt - Louisvale district road.

While detailed specifications and development layouts of the proposed solar facility and associated infrastructure will be guided and determined by the Environmental Impact Assessment (EIA) process, the current preferred development layout plan is shown in Figure 2.

Activities associated with the proposed development trigger the National Heritage Resources Act (Act 25 of 1999), and therefore, this author was appointed to provide archaeological input for the broader integrated Heritage Impact Assessment that is being undertaken by Perception Planning in terms of Section 38(8) of the National Heritage Resources Act. Mr Dale Holder of Cape Environmental Assessment Practitioners (Cape EAPrac) is facilitating the EIA process.

The current phase of the archaeological component of the broader Heritage Impact Assessment and EIA process involves a Scoping Archaeological Impact Assessment (SAIA) of the affected environment. Because the proposed development activities - construction and installation - may have a permanent negative impact on archaeological resources in the

development footprint, this SAIA provides a summary of the findings of previous heritage related studies in the surrounding environment. The latter provide a guide as to what archaeological resources are expected to occur in the proposed development area. Following a comprehensive foot survey of the affected property, a detailed Archaeological Impact Assessment (AIA) report will be provided, and will form part of the integrated Heritage Impact Assessment.

Study Area

A detailed description of the receiving environment will be given in the future AIA report following the archaeological foot survey. This will include topography, vegetation cover, geological sediments, archaeological visibility, exposed and disturbed surfaces and existing recent disturbances to the landscape. Nevertheless, Google Earth imagery suggests that vegetation cover is sparse and open, and therefore, archaeological visibility will be good and adequate for an assessment. Several small - likely intermittent - drainage lines are visible in Google Earth imagery, and therefore, it is anticipated that archaeological resources may occur in association with such existing and/or ancient water sources. It is also noted that a few recent disturbances occur within the study area including dams and possible structures of recent origin as well as single vehicle tracks. No major disturbances to surface sediments is evident. The topography appears mostly flat to slightly undulating.

Overview of Previous Studies

To the best of my knowledge, no archaeological or heritage related study has been undertaken on the affected property. Most of the information concerning the history and archaeology of the surroundings was obtained through heritage and archaeological studies associated with environmental impact assessments for a variety of development activities. More recently, the bulk of these assessments are associated with the development of alternative energy facilities and particularly solar energy facilities and associated infrastructure.

The Northern Cape Province has a rich and long archaeological record that spans the entire Stone Age, includes a few potential remnants of Iron Age sites further to the east, rock art sites with both engraved and painted rock surfaces, traces of the Anglo-Boer war, indigenous and colonial contact sites and more recent historic occupation and development of the region. A detailed and general account of the history, heritage resources and associated hominin and human behaviours in this portion of South Africa has already been written and is not repeated here (e.g. Küsel and Küsel 2015). Of relevance here is the nature of the archaeological record in the surroundings of the present study area, which give an indication of the type of heritage resources that are expected to occur in the proposed development site.

Overall, there is a widespread, but ephemeral scatter of Stone Age stone artefacts across the landscape that are of low heritage value due to their temporally mixed nature and the absence of faunal and other cultural remains. Higher density scatters of stone artefacts are commonly associated with pans, drainage lines and rocky outcrops or ridges. The entire range of the Stone Age sequence is found in varying proportions of representation, but includes Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) materials. MSA and ESA artefacts are more common than materials of LSA origin, Stone artefact scatters are usually located in areas with exposed gravels, and are less common to absent in areas with sandy surface sediments (Kaplan 2011a, 2011b, 2012a & 2012b, Nilssen 2015, Orton 2011a, 2011b, 2014a & 2014b, Orton & Webley 2013a, Pelsner 2011 and

Webley & Halkett 2010 & 2012). Archaeological resources are particularly rare in the surroundings of Kenhardt. A study along the Hartebeest River near Kenhardt, a setting where such resources are expected to be more common, found very few archaeological traces (Morris 2009). This pattern of very low hominin and human occupation of the surrounding environment is almost certainly due to the lack of predictable water sources. Although rock art has been documented in the region, there are no known rock art sites in the immediate surroundings of Kenhardt (Morris 1988, Morris & Beaumont 1994, Orton 2013, Orton & Webley 2012a and Rudner & Rudner 1968).

As in prehistoric times, historic occupation of the surroundings is very scanty, and very large farms result in farmsteads being widely separated in the landscape. The bulk of the farmsteads, as well as the majority of structures in the town of Kenhardt, are of recent 20th century origin (Orton 2014a). The only proclaimed heritage site in the surroundings of the present study area is a pioneer house, one of the oldest buildings in Kenhardt, built in 1897, which is a registered Provincial Heritage Site (Orton 2014a).

"The Anglo-Boer War played an important role in the central parts of South Africa leaving many traces of its events. Block houses, battlefields and graves litter the region. Kenhardt only saw a small amount of action. On 25th February 1900 Koos Jooste and Andries de Wet occupied Kenhardt with 12 men. They fired on the town guard when ordered to halt, but eventually took over the town and locked the town officials in jail for a few days before ordering them to leave town. On 1 March 1900, 200 recruits joined the Boer forces in Kenhardt. They were addressed by Commandant Lucas Steenkamp, after which they went into training. On hearing of the British approach, a group of 130 men under Field Cornet Borrius moved to Rietfontein, 2 km south of Kenhardt, to defend the town from British forces who were on their way to the lower Orange River Valley to suppress the Boers in the area. However, before the arrival of the British, the forces at Kenhardt decided to surrender due to a decision made by a Boer war council in Upington on 20th March to disband the rebel force. By the end of March the 6 week uprising of the Cape Afrikaners in the region had ended. On 31st March the British reoccupied Kenhardt, stationing a small garrison in the town. After a failed Boer uprising in the North Western Cape, many rebels were detained by the British and, with the jail in Upington totally full by April 1900, more than 100 rebel Boers were detained in a camp outside Kenhardt. As part of a string of executions across the Cape, two Boer rebels, H.L. Jacobs and A.C. Jooste, were executed in Kenhardt by the British on 24 July 1901, on accusations of treason. In January 1902 a British force of about 800 men began gathering at Kenhardt. They left on 10 January to quell the Boer force in Kakamas. On 11 January the battle of Kakamas began and ended with a victory for the Boers when the British departed on 13 January" (Orton 2014a, pages 9 & 10).

Heritage related finds made during heritage and archaeological impact assessments in the surroundings of the present study area include the following (arranged alphabetically by report authors): cultural materials of Stone Age and historic origin were identified in certain parts of the studied area, but none were located in the development footprints, due to the potential presence of significant heritage resources it is recommended that the selected development areas undergo a detailed ground truthing investigation prior to commencement of construction, Gaigher noted that most studies in the area reported a general scarcity of heritage resources in the surrounding environment and that scatters of Stone Age implements are the most common (Gaigher 2013); very low density scatters of Stone Age implements mainly in quartz that are considered to be of low significance, quartz outcrops with evidence of flaking for the procurement of raw materials to make stone artefacts, the best archaeological resources are stone artefact scatters of mainly LSA origin and that are associated with pans (water sources), some of these scatters included ostrich eggshell fragments and a few pieces of bone, a single ESA hand axe was identified, one historical, rock lined stock post including a few pieces of historic material culture such as metal,

ceramics and glass, a possible grave, the LSA sites around pans are considered to be of medium significance and would require mitigation in the event that they will be impacted by development (Orton 2014a); very low density scatters of Stone Age implements mainly in quartz, but also in quartzite and other raw materials, that are considered to be of low significance, most of these artefacts appear to be of MSA origin, due to their low significance it is recommended that no mitigation is required, a few quartz outcrops with evidence of flaking for the procurement of raw materials to make stone artefacts, a pan lying outside the study area was fringed by four probably LSA stone artefact scatters in quartz including a lower grindstone, due to the absence of fauna or other cultural remains these scatters were considered to be of low significance, the larger of two rocky hills on the property contained heritage resources in the form of quartz stone artefact scatters, a historical stock post, and a small rock shelter contained a few stone artefacts, fragments of bottle glass and a piece of metal, items of historic age, mainly glass, were found elsewhere in the study area (Orton 2014b); very low densities of MSA artefacts identified at quartz outcrops, flake and blade technology suggests MSA age and the dominant artefact type are irregular scrapers, due to their very low densities these finds are considered to be of low significance and it is recommended that they can be disturbed without a permit from SAHRA (van Ryneveld 2007); a few stone tools were observed but do not constitute any major sites (Williams 2014).

Overall, a pattern emerges showing that archaeological resources are most commonly clustered around existing and ancient drainage lines, pans, and ridges with rocky outcrops, and that heritage resources are generally absent from flatlands that are some distance from existing or ancient water sources. Further, Stone Age occurrences are more common among gravels as opposed to sandy surface sediments. Based on the findings of the above impact assessments, it is likely to find mainly Stone Age materials in the affected area with lesser potential for the occurrence of historic heritage resources.

Potential Impacts on Archaeological Resources

Because tangible heritage resources are non-renewable and each archaeological occurrence is unique, it is important that areas affected by development are assessed for the presence and sensitivity of such resources prior to development. The proposed development will involve both area and linear developments that could have a permanent negative impact on archaeological resources if they were to occur in the affected areas. This scoping study has shown that archaeological resources do occur in the surrounding environment. The purpose of the broader EIA process is to assess the sensitivity of environmental resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. The future AIA will serve the same purpose concerning archaeological resources.

Because the planning and design phase of the development is being informed by the broader EIA, any direct negative impacts on significant environmental resources can be avoided or minimized by altering the design and layout plans accordingly. A construction phase Environmental Management Plan (EMP) will further avoid or minimize direct negative impacts.

Potential direct negative impacts on archaeological and tangible heritage resources will occur during the construction and installation phase of the proposed development. Indirect and cumulative impacts may occur during the operational phase, but these can be avoided or minimized by means of an EMP that should be implemented during the operational phase of the development.

Previous studies, as detailed above, have shown that archaeological resources occur in the surrounding environment and that they are most commonly associated with existing and/or ancient water sources such as pans, drainage lines, rivers and river valleys, as well as ridges with rocky outcrops. Since existing and ancient water sources occur in the study area, it is anticipated that Stone Age materials will occur with a lower likelihood of significant historic materials being present. Google Earth imagery indicates that, apart from modern dams and vehicle tracks, historic occupation is absent. This, however, can only be confirmed through ground truthing.

Methodology for the Archaeological Impact Assessment

The purpose of an AIA is to conduct survey of the affected areas in order to identify, record and rate the significance of archaeological resources, to assess the impact of the proposed area and linear developments on such resources, and to recommend mitigation measures where necessary.

To assess the nature and significance of the archaeological record in the affected areas, it is necessary to conduct a comprehensive foot survey. The latter will cover the entire affected property, proposed access road location and alignment, as well as the power line route from the on-site sub-station to the Eskom Nieuwehoop MTS sub-station (Figure 2).

The potential for different landforms, sediments or landscape features to contain archaeological traces is assessed according to type, such as rocky surfaces, sandy surfaces, cultivated areas, previously developed or disturbed areas, rock shelters, and so on. Overall, the significance of archaeological occurrences or sites are evaluated in terms of their content and context. Attributes to be considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, aesthetic appeal, potential for future research, density of finds and the context in which archaeological traces occur.

Based on previous work conducted in the immediate surroundings, it is likely that open vegetation and large expanses of exposed ground surfaces will provide good archaeological visibility that will allow for a good understanding of the archaeological record in the area. Initially, the field work will focus on existing and potential ancient water sources and thereafter survey walk tracks will be spaced about 200m apart. In the event that archaeological sources are common or unpredictable in the study area, the distance between survey walk tracks will be narrowed to about 50m or less apart.

Walk tracks will be fixed with a hand held GPS to record the search area. The position of archaeological occurrences, observations and photo localities will also be fixed by GPS. Digital audio notes of observations and a comprehensive, high quality digital photographic record will also be made.

Once archaeological traces have been identified, recorded and assessed in terms of their significance, the aim of the AIA is to assess the potential negative impacts of the proposed developments on such resources and to make recommendations in mitigation. The end product of the AIA is a report that forms part of the broader Integrated Heritage Impact Assessment undertaken by Perception Planning and that meets standards required by the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act, No. 25 of 1999. The AIA report will give detailed results from fieldwork, will assess potential negative impacts associated with the proposed development, and will make recommendations in mitigation where necessary.

References

- Gaigher, S. 2013 (and addendum). Heritage Impact Assessment Report: Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province (as well as a letter concerning) Alignment variations to the proposed Solar Integration Distribution Network - Heritage Impact Component.
- Kaplan, J. 2011a. Archaeological impact assessment the proposed Solar Cape 10MW Photovoltaic Energy Generation Facility near Kenhardt Northern Cape Province.
- Kaplan, J. 2011b. Archaeological impact assessment the proposed Solar Cape 100MW Photovoltaic Energy Generation Facility near Kenhardt Northern Cape Province.
- Kaplan, J. 2012a. Archaeological impact assessment the proposed Green Continent Partners 75 MW Photovoltaic Electricity Generation Facility on Portion 8 of the farm Olyvenkolk No. 187 Kenhardt District Northern Cape Province.
- Kaplan, J. 2012b. Archaeological impact assessment the proposed Wine Estate Capital Management 75 MW Photovoltaic Electricity Generation Facility on Portion 8 of the farm Olyvenkolk No. 187 Kenhardt District Northern Cape Province.
- Küsel, U.S. and Küsel, U.S. 2015. Phase II Cultural Heritage Resources Impact Assessment for the Vaalharts Irrigation Project Canal North West Province with Phase 2 Documentation for the North Canal.
- Morris, D. 1988. Engraved in Place and Time: A Review of Variability in the Rock Art of the Northern Cape and Karoo. *South African Archaeological Bulletin* 43: 109-120.
- Morris, D. 2009. Archaeological Specialist Input with regard to the proposed Aries-Garona Eskom Transmission Power Line, Northern Cape: Inspection along the transect between Tower Positions 1 and 146.
- Morris, D. & Beaumont, P. 1994. Portable rock engravings at Springbokoog and the archaeological contexts of rock art of the Upper Karoo. In: Dowson, T.A. & Lewis-Williams, D. (eds) *Contested Images: diversity in southern African rock art research*: 11-28. Johannesburg: Witwatersrand University Press.
- Nilssen, P. 2015. Phase 1a Archaeological Impact Assessment: Proposed development of Ephraim Sun Solar PV Development near Upington on Remainder of portion 62 (portion of portion 9) (Vryheid) of Farm Vaalkoppies no 40. Including Potential Grid Connections Across Portions of the Farm Vaalkoppies 40/3, 9, 52 & 66; Farm 555/7; and Erven 73 & 19951, //Khara Hais Municipality, Kenhardt District, Northern Cape Province
- Orton, J. 2011a. Heritage impact assessment for a proposed photovoltaic energy plant on the farm Hoekplaas near Copperton, Northern Cape.
- Orton, J. 2011b. Heritage impact assessment for a proposed photovoltaic energy plant on the farm Klipgats Pan near Copperton, Northern Cape.
- Orton, J. 2013. Geometric rock art in western South Africa and its implications for the spread of early herding. *South African Archaeological Bulletin* 68: 27-40.

Orton, J. 2014a. Heritage Impact Assessment for the Proposed Boven Solar PV1 Facility, Kenhardt Magisterial District, Northern Cape.

Orton, J. 2014b. Heritage Impact Assessment for the Proposed Boven Solar PV2 Facility, Kenhardt Magisterial District, Northern Cape.

Orton, J. & Webley, L. 2012a. Heritage impact assessment for the proposed Kangnas Wind and Solar Energy Facilities, Namakwa Magisterial District, Northern Cape.

Orton, J. & Webley, L. 2013a. Heritage impact assessment for multiple proposed solar energy facilities on the Remainder of Farm Klipgats Pan 117, Copperton, Northern Cape.

Pelser, A.J. 2011. A report on an archaeological impact assessment (AIA) for the proposed solar energy plant on Klein Zwart Bast 188, Kenhardt District, Northern Cape.

Rudner, J. & Rudner, I. 1968. Rock-Art in the Thirstland Areas. South African Archaeological Bulletin 23: 75-89.

Van Ryneveld, K. 2007. Phase 1a Archaeological Impact Assessment: Portion of the Farm Boksputs 118, Groblershoop District, Northern Cape, South Africa.

Webley, L. & Halkett, D. 2010a. An archaeological impact assessment Report 4): proposed construction of a substation between Aries-Garona and associated loop in and loop out lines, north-west of Kenhardt in the Northern Cape.

Webley, L. & Halkett, D. 2012. Heritage impact assessment: proposed Kenhardt Photo-Voltaic Solar Power Plant on Remainder of the farm Klein Zwart Bast 188, Northern Cape Province.

Williams, A.C. 2014. Distribution Environmental Screening Document (DESD) for Reticulation Powerlines and Ancillary Services, Groblershoop, Northern Cape.

Figures and Plates (on following pages)

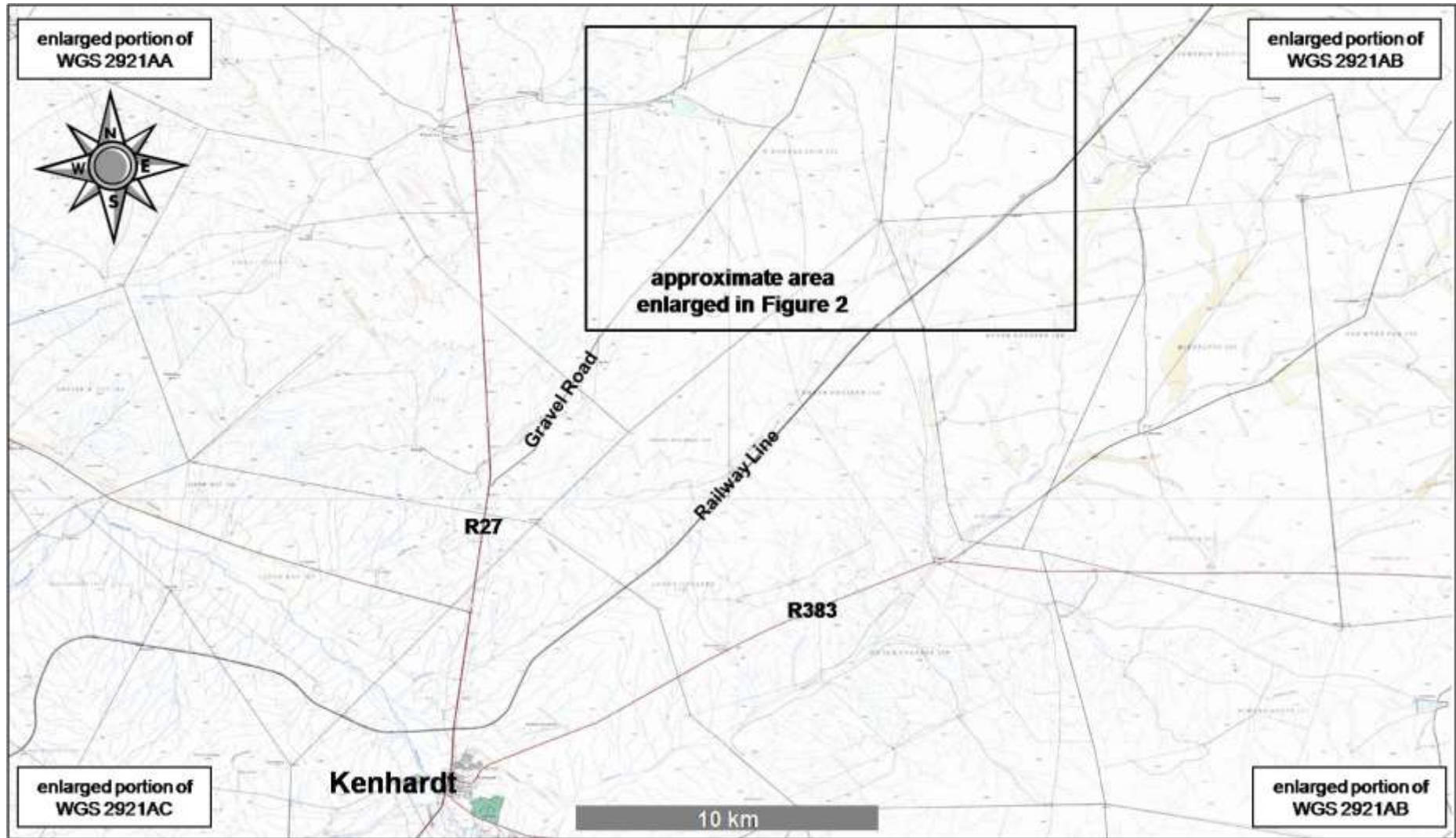


Figure 1. General location of study area relative to Kenhardt, Northern Cape Province. Courtesy of the Chief Directorate Surveys and Mapping, Mowbray.

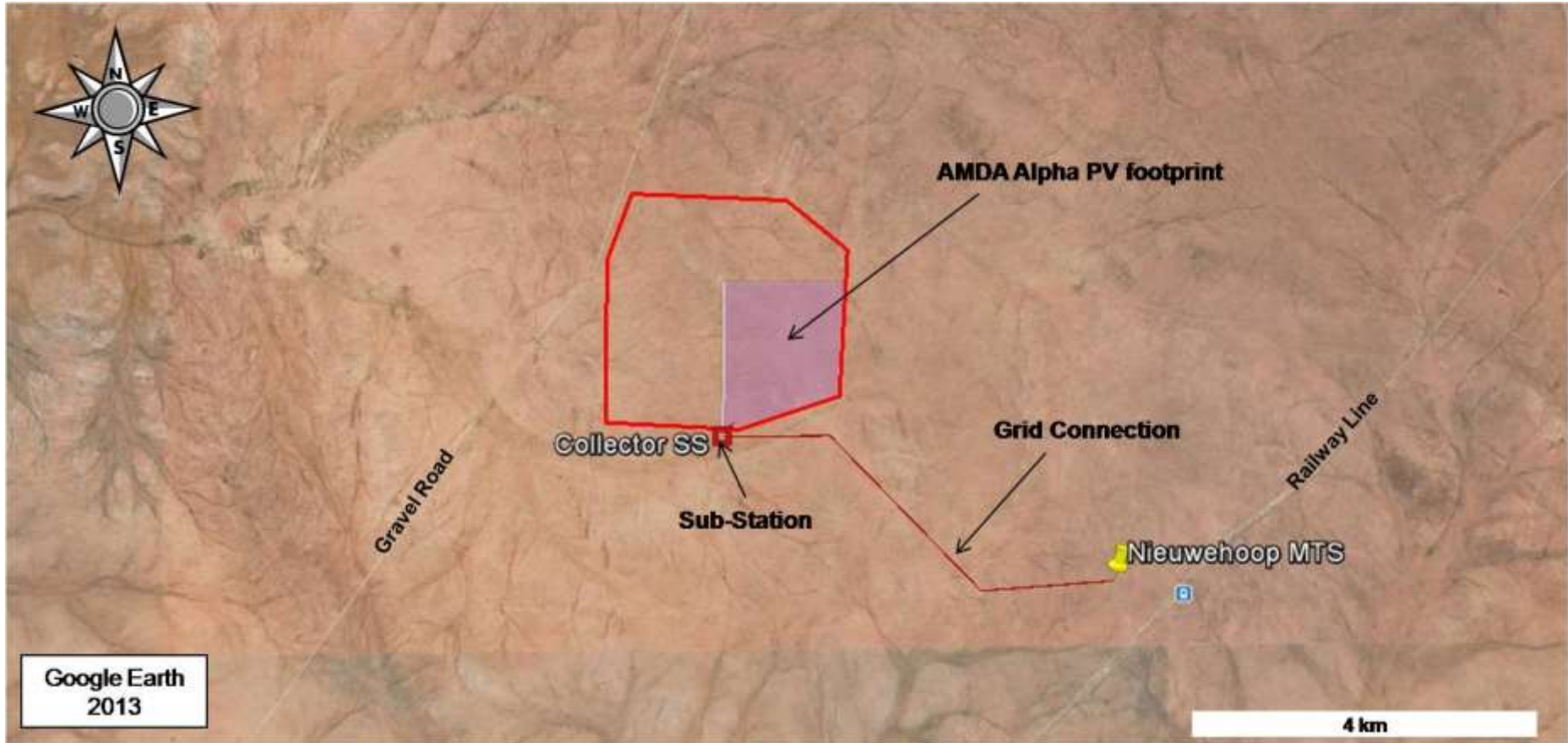


Figure 2. Provisional development layout on the affected property showing the AMDA Alpha PV footprint (solar panels), on-site sub-station and grid connection to the Eskom Nieuwehoop MTS sub-station. Information courtesy of the applicant via Cape EAPrac.