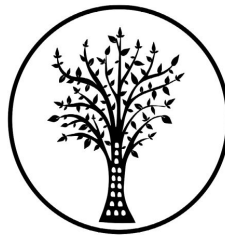


HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for a

Proposed development of a 132kV powerline near Olifantshoek,
Northern Cape

Prepared by



CTS HERITAGE

In Association with

Savannah Environmental Services

February 2020



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THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I, Jenna Lavin, as the appointed independent specialist hereby declare that I:

- act/ed as the 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, and
- 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, 2010 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, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Jenna Lavin

Signature of the specialist

CTS Heritage

Name of company

February 2020

Date



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EXECUTIVE SUMMARY

The Gamagara Local Municipality proposes the construction and operation of a grid connection infrastructure between the existing Elim Substation and the authorised Olifantshoek Substation near the town of Olifantshoek in the Northern Cape Province. The grid infrastructure will be used to strengthen the grid network in the area in order to ensure an adequate supply of electricity for the residents within the Municipality's jurisdictional area.

This application is for the proposed establishment of a 132kV powerline from the Olifantshoek Substation to the Elim Substation located 13 km west of Kathu. The town of Kathu was established in the 1960's and 1970's as a result of the iron ore mining taking place at the neighbouring Sishen mine. It is important to note that the northern portion of the development lies in close proximity to the Grade I Kathu Pan Archaeological site. At Kathu Pan, north west of the town, evidence of early hominin occupation has been observed at multiple sinkhole sites within the pan, and the results of scientific investigation into these sites has been broadly published. These sites are known for its rich collection of Early Stone Age artefacts, and several Archaeological and Heritage Impact Assessments have recorded the area (see Figure 4 Appendix 3). These archaeological resources occur in areas associated with outcrops of banded ironstone, and the localised natural pan, with most coming specifically from sinkholes in the pan itself. Based on the geology and fossil record, a field scoping study is recommended in the Kalahari Group deposits, specifically the surface limestones, before excavation takes place in order to confirm the absence of Kathu Pan-like deposits that may contain Pleistocene fossil faunal assemblages.

However, the archaeological field assessment did not identify any archaeological resources of significance within the proposed alignment. Two sets of unmarked graves were identified within the proposed alignment, and these may not be impacted by the proposed development. It is recommended that a 50m no-go buffer is established around sites NLN002 and MRR002.

For the remainder of the power line, there is very little chance of significant fossil finds being made. Any fossil finds (in stromatolitic Mooidraai and Lucknow formations) are to be reported by the developer. Should important fossil material be found during excavations, the attached Fossil Finds Procedure must be implemented (Appendix 2).

As such, there is no objection to the proposed development on condition that:

- A 50m no-go buffer is established around sites NLN002 and MRR002, and these sites are clearly marked as no-go areas on all development maps.
- Surface limestones of the Mokalanen Formation are inspected before excavation takes place in order to confirm the absence of Kathu Pan-like deposits that may contain Pleistocene fossil faunal assemblages.
- Should any human remains or evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be impacted during the proposed development, work must cease and SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted to determine a way forward.



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Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management, heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 50 Heritage Impact Assessments throughout South Africa.



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1. INTRODUCTION

1.1 Background Information on Project

The Gamagara Local Municipality proposes the construction and operation of a grid connection infrastructure between the existing Elim Substation and the authorised Olifantshoek Substation near the town of Olifantshoek in the Northern Cape Province. The grid infrastructure will be used to strengthen the grid network in the area in order to ensure an adequate supply of electricity for the residents within the Municipality's jurisdictional area.

The grid connection infrastructure will only include a single circuit power line with capacity of up to 132kV and a two-way and 4m wide haul road within the corridor for the duration of the construction phase only. The power line is being assessed within a 300m wide and 36km long corridor which will allow for the optimisation of the infrastructure to be developed and to avoid identified environmental sensitivities. The height of the power line pylons will be up to 20m. The servitude of the power line will be 31m in width.

The grid connection corridor traverses the following affected properties, namely:

- » Remaining Extent of the Farm Fritz 540
- » Portion 1 of the Farm Fritz 540
- » Portion 2 of the Farm Fritz 540
- » Portion 4 of the Farm Fritz 540
- » Portion 5 of the Farm Fritz 540
- » Portion 8 of the Farm Fritz 540
- » Portion 9 of the Farm Fritz 540
- » Portion 10 of the Farm Fritz 540
- » Remaining Extent of the Farm Gamagara 541
- » Portion 1 of the Farm Gamagara 541
- » Portion 7 of the Farm Gamagara 541
- » Portion 2 of the Farm Dingle 565
- » Remaining Extent of the Farm Dingle 565
- » Remaining Extent of the Farm Smythe 566
- » Remaining Extent of the Farm Murray 570
- » Portion 2 of the Farm Murray 570
- » Remaining Extent of the Farm Cox 571
- » Portion 1 of the Farm Cox 571
- » Portion 3 of the Farm Cox 571
- » Portion 4 of the Farm Cox 571
- » Remaining Extent of the Farm Hartley 573
- » Remaining Extent of the Farm Diegaart's Heuwel 765
- » Portion 1 of the Farm Neylan 574
- » Portion 3 of the Farm Neylan 766



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- » Portion 7 of the Farm Neylan 766
- » Portion 2 of the Farm Neylan 766
- » Portion 4 of the Farm Neylan 766
- » Portion 3 of the Farm Hartley 573
- » Remaining Extent of the Farm Neylan 766
- » Remaining Extent of Erven 155

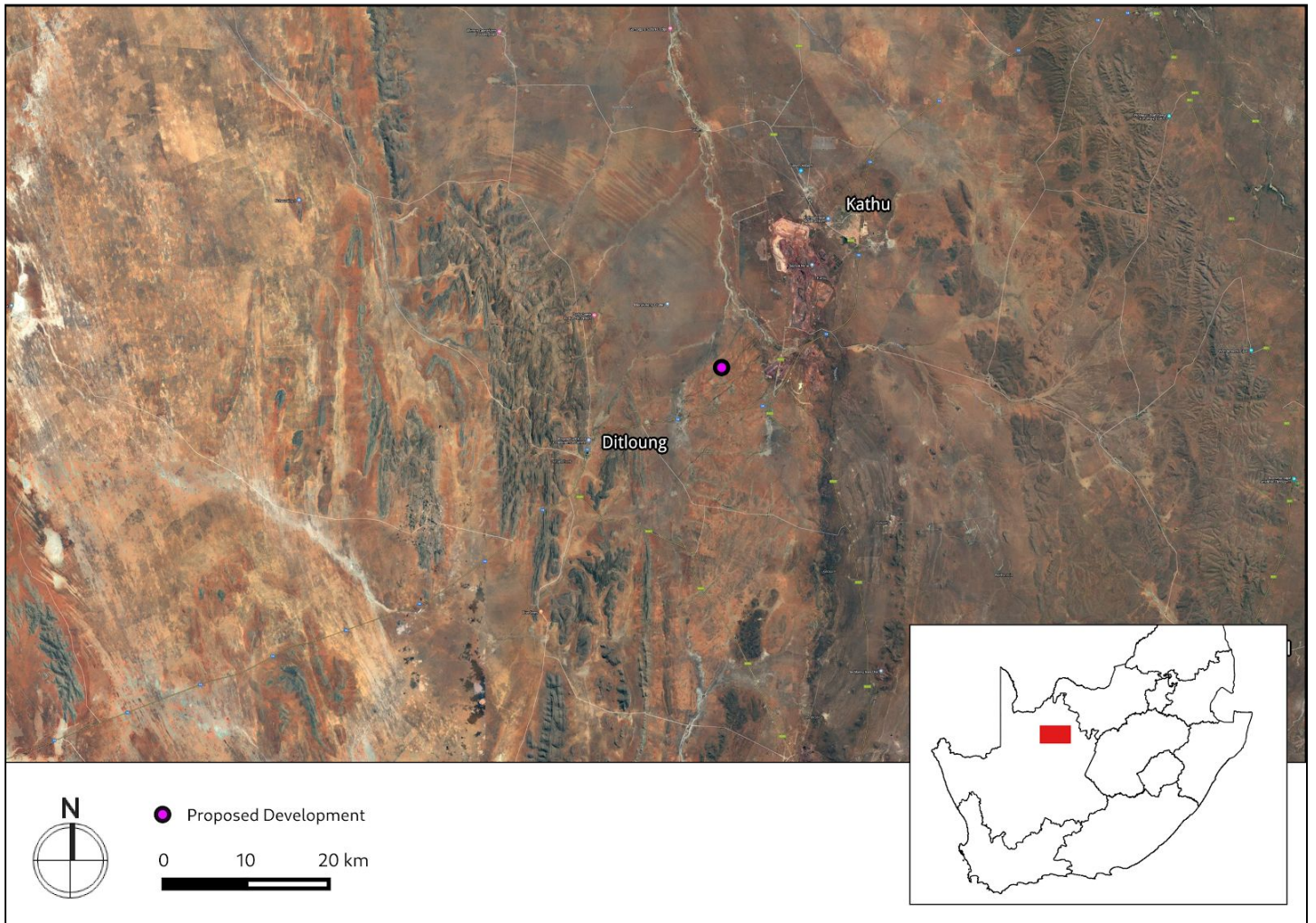


Figure 1.1: Google Earth© satellite image of the proposed development area



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1.2 Description of Property and Affected Environment

The landscape of the study area is typical Olifantshoek Plains Thornveld and Kathu Bushveld (Mucina & Rutherford 2006). It ranges from wide plains with open trees and shrub layers and sparse grass layers, to medium-tall tree layers, with extensive shrub and variable grass cover. Flat red aeolian sand plains with minor dunes interspersed with gravel pavements constitute the majority of the terrain. Vegetation noted across the development footprint include Camel Thorn trees (*Acacia erioloba*), Black Thorn trees (*Acacia mellifera*), Three Thorn/Driedoring (*Rhigozum trichotomum*), Skaapbossie (*Aizoon schellenbergii*), Shepherd tree (*Boscia albitrunca*), Suurgras (*Enneapogon desvauxii*), Tall Bushman grass (*Stipagrostis hirtigluma*), Silky Bushman grass (*Stipagrostis uniplumis*), Kortbeen Boesmangras (*Stipagrostis obtuse*), Pencil milk bush (*Euphorbia lignose*) and Hereroland aloe (*Aloe hereroensis*). The Langeberg mountain range is visible towards the western horizon. Several dry riverine beds are present on the site flowing from north to south and from west to east, but no perennial rivers or riverine were crossed.

The development footprint is bounded in the north by mine activities (Khumani/Sishen/Dingleton) mines and the existing Elim Eskom substation, and in the south by the N14 National road and open farmland. The Olifantshoek townscape and Langeberg mountain range frame the development in the west, while the N14 National road and mining activities bound the development in the east. Anthropogenic disturbances occur predominantly along existing roads within the development footprint, at the new substation location at Olifantshoek, and near Elim substation, where some trenches traverse the footprint.



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Figure 1.2: Close up satellite image indicating proposed location of development

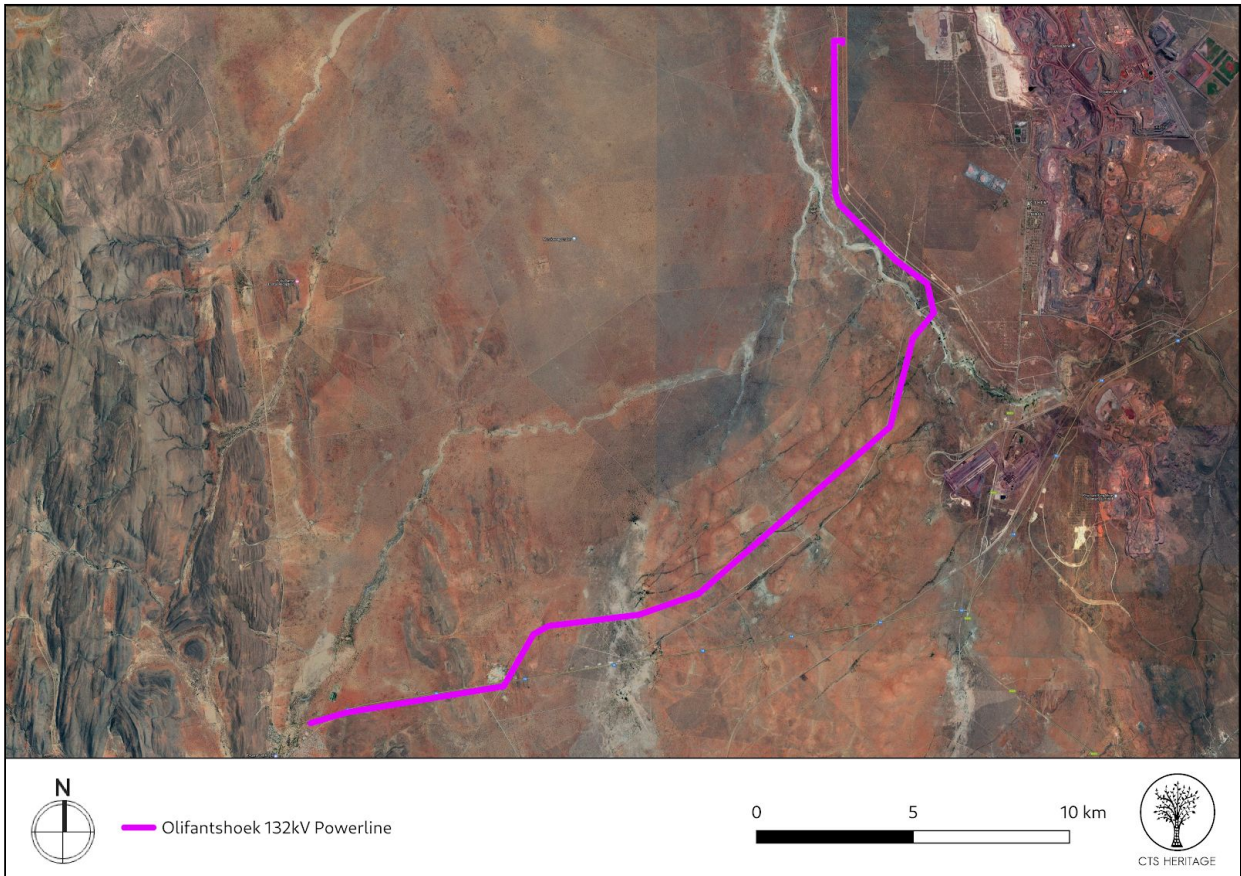


Figure 1.3: Close up satellite image indicating proposed location of development



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2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on 6, 7 and 8 February 2020 to determine what archaeological resources are likely to be impacted by the proposed development.
- A Desktop Palaeontological Assessment was completed
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

2.3 Constraints and Limitations

The archaeological field assessment was constrained by access restrictions to some of the farms along the proposed alignment. The EAP was informed of the times of the site visit and endeavoured to inform all relevant landowners of the site visit. Furthermore, contact details were provided for relevant landowners however these proved unhelpful in some instances, as several farmers do not reside on the affected properties. Some farmers were not available on their mobile phones due to bad cell service or were busy and unable to assist, while others were unwilling to provide access due to general negativity towards the development on their farms. All effort has been made to cover as much ground as possible in the circumstances (see the Track Paths map below).

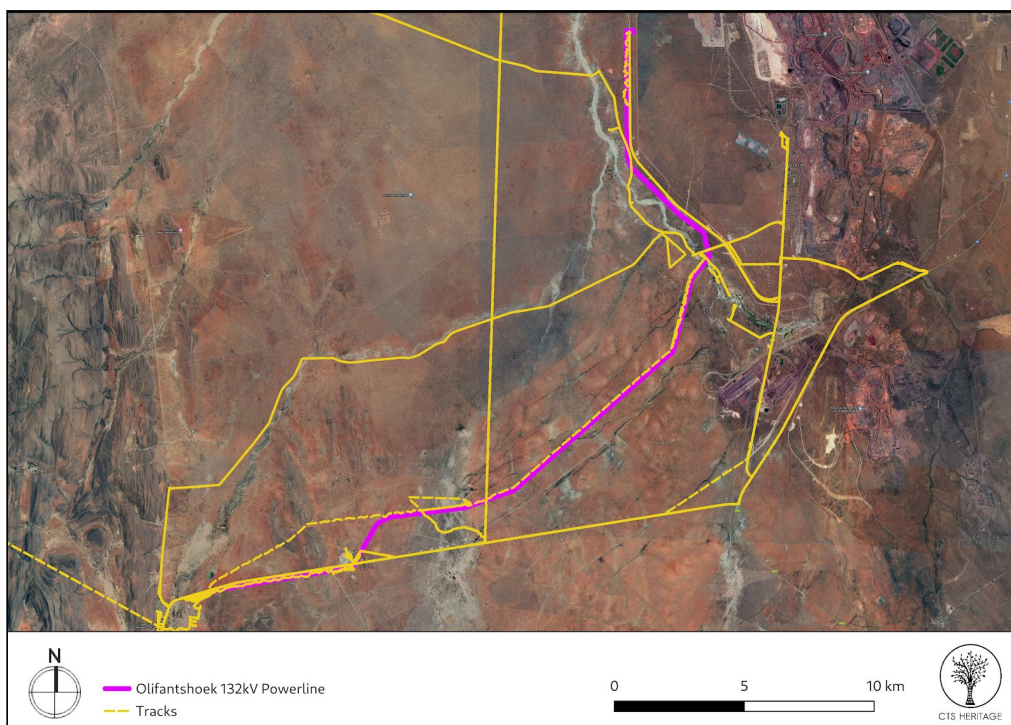


Figure 2. Map of track paths relative to the proposed development



3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Historical Background of the Area

This application is for the proposed establishment of a 132kV powerline from the Olifantshoek Substation to the Elim Substation located 13 km west of Kathu. The town of Kathu was established in the 1960's and 1970's as a result of the iron ore mining taking place at the neighbouring Sishen mine. It is important to note that the northern portion of the development lies in close proximity to the Grade I Kathu Pan Archaeological site. At Kathu Pan, north west of the town, evidence of early hominin occupation has been observed at multiple sinkhole sites within the pan, and the results of scientific investigation into these sites has been broadly published. These sites are known for its rich collection of Early Stone Age artefacts, and several Archaeological and Heritage Impact Assessments have recorded the area (see Figure 4 Appendix 3). These archaeological resources occur in areas associated with outcrops of banded ironstone, and the localised natural pan, with most coming specifically from sinkholes in the pan itself.

3.2 Previous Impact Assessments Conducted

Gaigher (2014) conducted an assessment for the Solar-Ferrum 400kV Power Line (NID 161472) which runs through part of the proposed 132kV alignment. His report concluded that only ephemeral scatters of Stone Age artefacts of low significance were located in the vicinity of the power line, and he recorded no rock engravings or built environment sites - common site types to be found in this region. The only burial grounds site that Gaigher mentions is the Olifantshoek Cemetery (Site ID 95604), which lies roughly 500m to the west of the southern-most tip of the power line (see Figure 3d), but which will not be impacted. Beaumont's (2007) HIA located a burial ground (Site ID 44581) that he concluded to be from the early 1950's or late 1940's. He located some ephemeral stone age artefacts of low significance which he did not record, but found no archaeological or palaeontological sites of value. In his assessment, Kruger (2012, NID 108970) noted that "a few Middle Stone Age (MSA) artefacts, generally made from fine grained specularite and jaspilite, were recorded at three locations around small water pans in the area. These lithics include only rough core and flake artefacts with smoothed surfaces, and no formal stone tools were observed. However, larger amounts of Earlier and Middle Stone Age artefacts including handaxes, cores and flakes were noted."

According to the SAHRA Palaeosensitivity map, the area is underlain by formations of moderate, high and unknown palaeontological significance. However Almond and Pether (2009) describe these specific formations as having a low sensitivity for fossils: both the Hartley and the Lucknow Formations have a low fossil sensitivity, and the sensitivity of the Volwater Formation is unknown. The Gordonia Formation of the Kalahari Group consists of aeolian sands and fossils (bones, teeth, petrified wood, palynomorphs) mainly associated with ancient pans, lakes and river systems, however in a Palaeontological Impact Assessment by Almond (2012, NID 114648), it is stated that "*while a wide spectrum of vertebrate remains, invertebrates, trace fossils, plant fossils and microfossils have been recorded from these Kalahari Group sediments, in general they are of low palaeontological sensitivity and of considerable lateral extent so impacts on fossil heritage here are likely to be of low significance*". Considering these factors, and the fact that no deep excavation is anticipated to occur, it is unlikely that palaeontologically sensitive sediments will be impacted by the proposed development.



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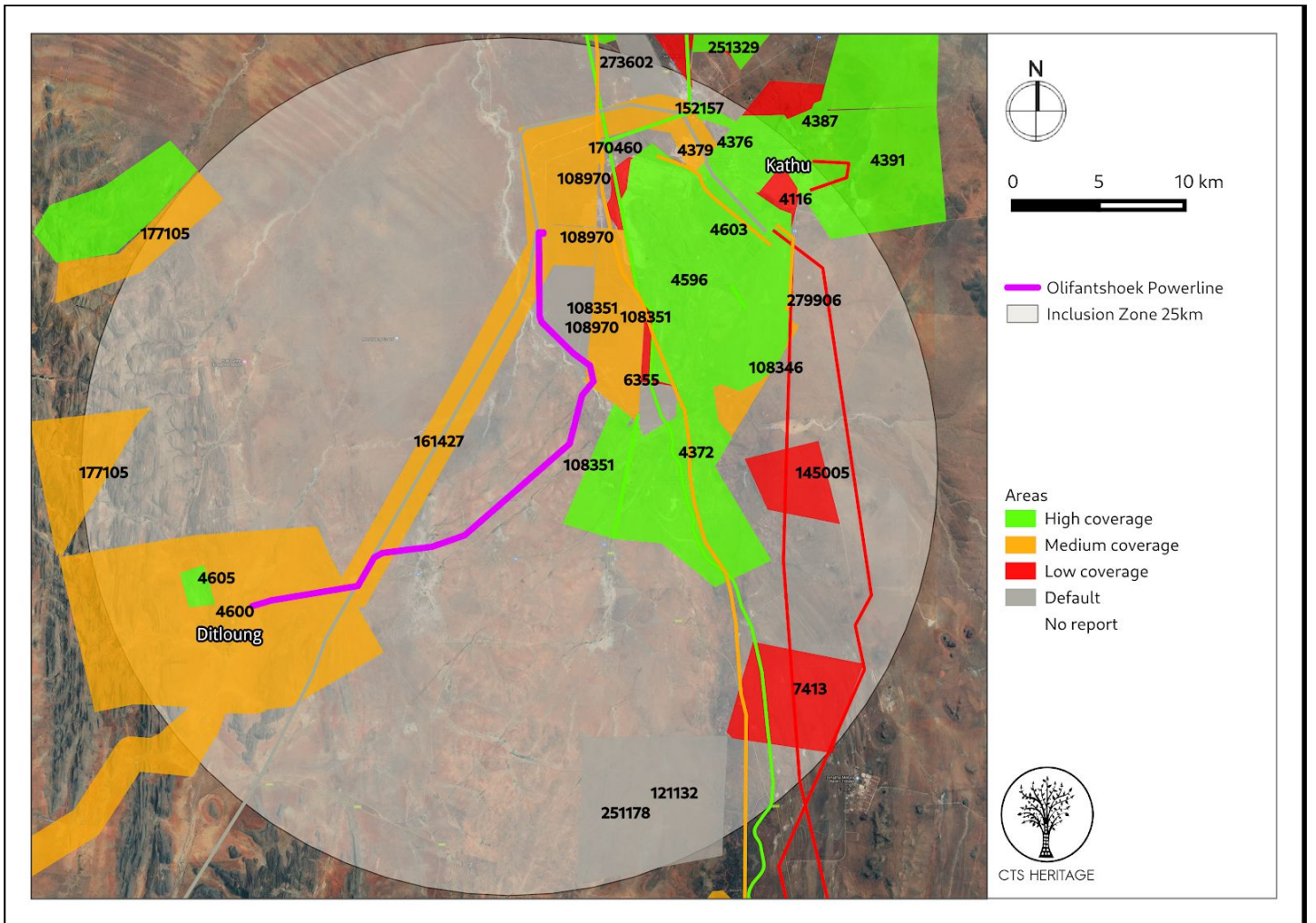


Figure 3: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

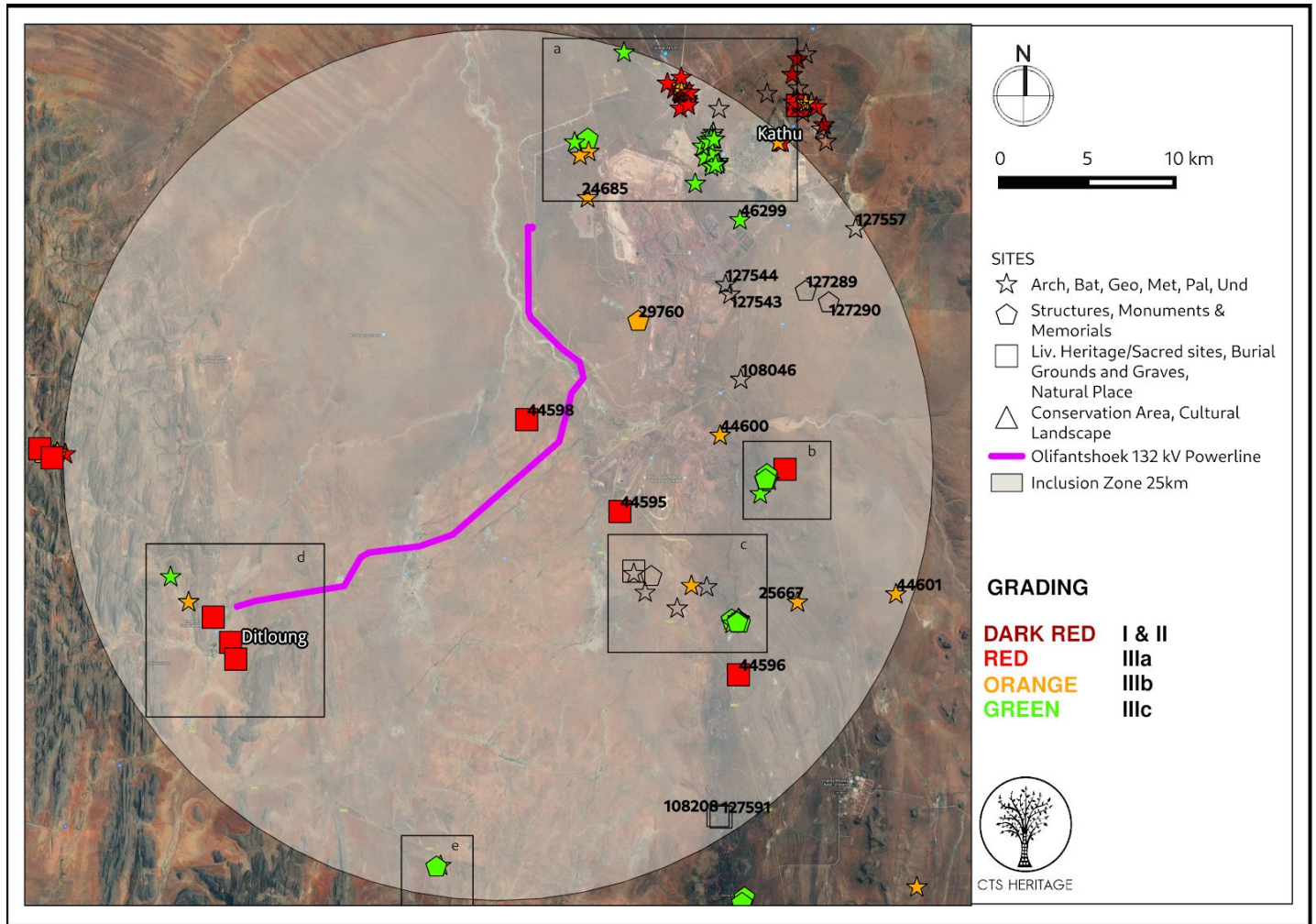


Figure 4. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated (see attached screening assessment for insets)

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of specialist findings

Archaeology

Surprisingly, Stone age material was very scarce along the alignment, and no artefacts were recorded except for one LSA bladelet/trimmed flake (DNG001). Higher concentrations of Stone Age (predominantly ESA/MSA) material are located at Kathu Pan and surrounding areas. The presence of subsurface Stone Age material is always possible, but during the survey, no stone stone artefacts were identified.

An interesting Historical occupation site was identified on Murray farm (MRR001). The cultural material associated with this site can be relatively dated to 1890, 1910 and later. There is a possibility that this site has had multiple occupations and that it had served as a livestock post/overnight camp for farmers moving stock between farms or regions. It might even have served as a source of water during the South African War. The site has however been disturbed in the recent past.



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Four official municipal cemeteries were recorded as well as two unmarked graves at Olifantshoek close to the proposed Olifantshoek substation. Another two unmarked graves were identified on Murray farm in close proximity to the historical site noted above (MRR002). All of the burials identified are located far enough from the proposed alignment that impact is very unlikely.

Palaeontology

The proposed powerline is mainly underlain by the Kalahari Group sands and calcretes as well as the Ongeluk Formation volcanic rocks. The powerline does however also traverse small exposures of Voëlwater Formation, Lucknow Formation and Hartley Formation volcanic rocks.

Based on the geology of the proposed development area as well as the current palaeontological record, it is anticipated that the impact of the development will mainly be LOW to MODERATE. However, the north-east section of the power line traversing the Kalahari Group deposits may have HIGH impact due to the close proximity of the Kathu Pan deposits.

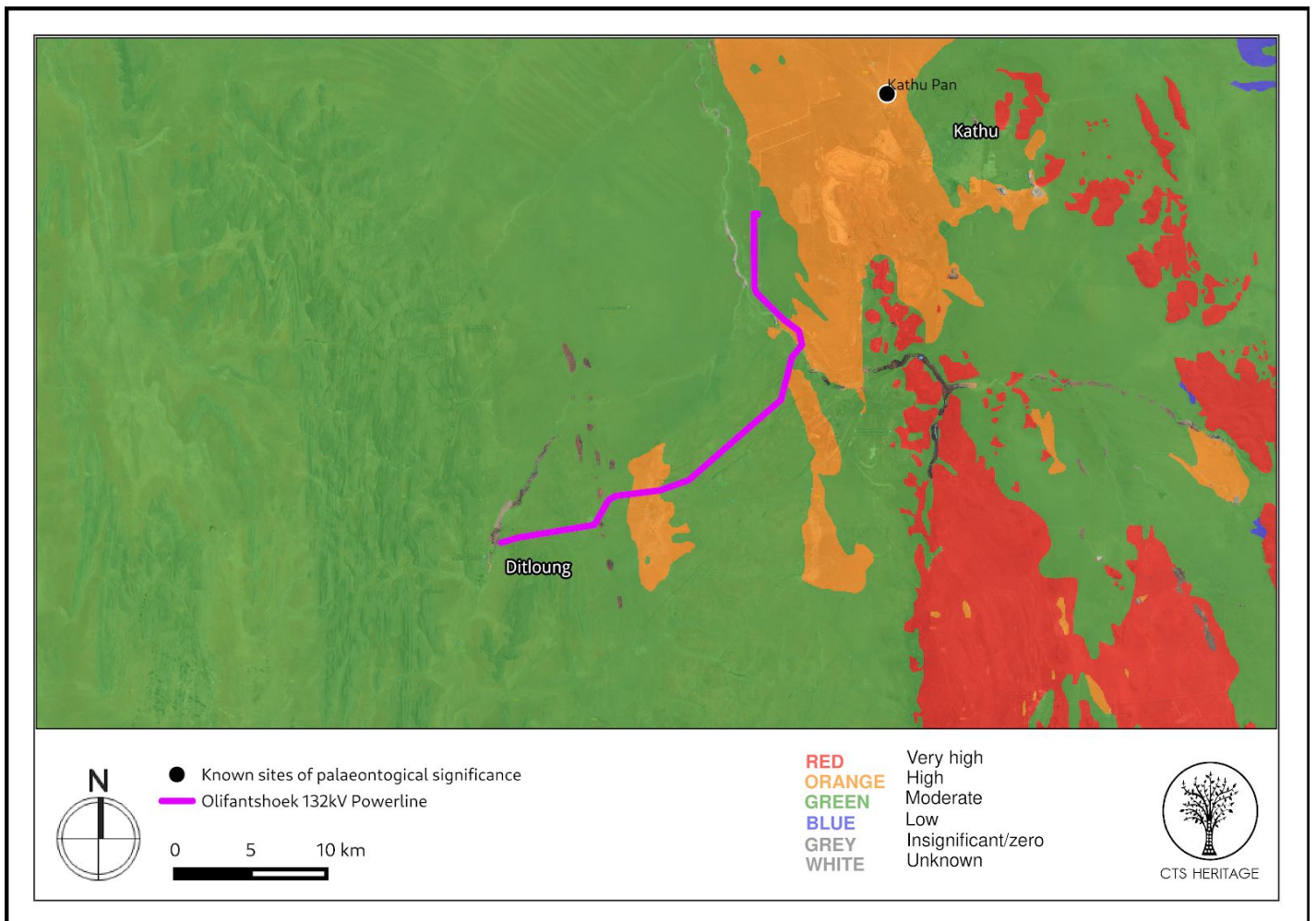


Figure 5: Palaeosensitivity Map. Indicating Unknown to Moderate to High fossil sensitivity underlying the study area.



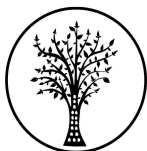
4.2 Heritage Resources identified

Archaeology

Only five incidences of heritage resources were documented along the 36km development corridor. NLN001 and NLN002 are situated on the Farm Neylan No. 574 Portion 1 in the vicinity of the proposed location of the new to-be-constructed substation at Olifantshoek, MRR001 and MRR002, are located to the east on the farm Murray No. 570 Portion 2, and DNG001 is situated towards the north-east on the Remainder of the farm Dingle No. 565.

Table 1: Archaeological and heritage resources identified along the alignment. Sites falling within the proposed footprint are highlighted in purple. Please see the full AIA in Appendix 1 for more detailed information. Sites mapped in Figure 6 below

Point ID	Site No.	Site Name	Description	Grading	Mitigation
002	NLN002	Neylan No. 574/1-002	Two unmarked graves in the vicinity of a proposed new substation at Olifantshoek	Grade IIIA	The site should be included in the heritage register and may not be impacted. A 50m no-go buffer area must be established.
003	NLN001	Neylan No. 574/1-002	Collapsed stone wall orientation east to west. Approximately 100m in length. Possible fencing wall, linear without any angles or kraal shaped.	NCW	Phase 1 is seen as sufficient recording, and it may be demolished
006	OFH006	Welgelee cemetery	Welgelee informal settlement official municipal cemetery	Grade IIIA	The site should be included in the heritage register and may not be impacted
007	OFH007	Ditlounge cemetery	Ditlounge informal settlement official municipal cemetery	Grade IIIA	The site should be included in the heritage register and may not be impacted
008	OFH008	Diepkloof cemetery	Diepkloof informal settlement official municipal cemetery	Grade IIIA	The site should be included in the heritage register and may not be impacted
009	OFH009	Olifantshoek cemetery	Olifantshoek town official municipal cemetery	Grade IIIA	The site should be included in the heritage register and may not be impacted
017	MRR001	Murray No. 570/2-001	Colonial/historical settlement ca. 1910-1950. Next to a natural water source, currently dry. Evidence of stone walls, crib, possible kraal, old Fig tree (<i>Ficus carica</i>) and material culture such as glass, ceramics and metal objects. Multiple occupations are evident. Disturbed by natural erosion.	Grade IIIC	Phase 1 is seen as sufficient recording, and it may be demolished, low heritage significance
019	DNG001	Dingle No. 565/RE/001	Isolated LSA CCS bladelet. N=1 in 100m ² .	NCW	Phase 1 is seen as sufficient recording, and it may be demolished
020	MRR002	Murray No. 570/2-002	Two unmarked graves on "Murray" farm. Possibly older than 100 years. Soldered tin and ammunition rest found in superficial association with the burials.	Grade IIIA	The site should be included in the heritage register and may not be impacted. A 50m no-go buffer area must be established.



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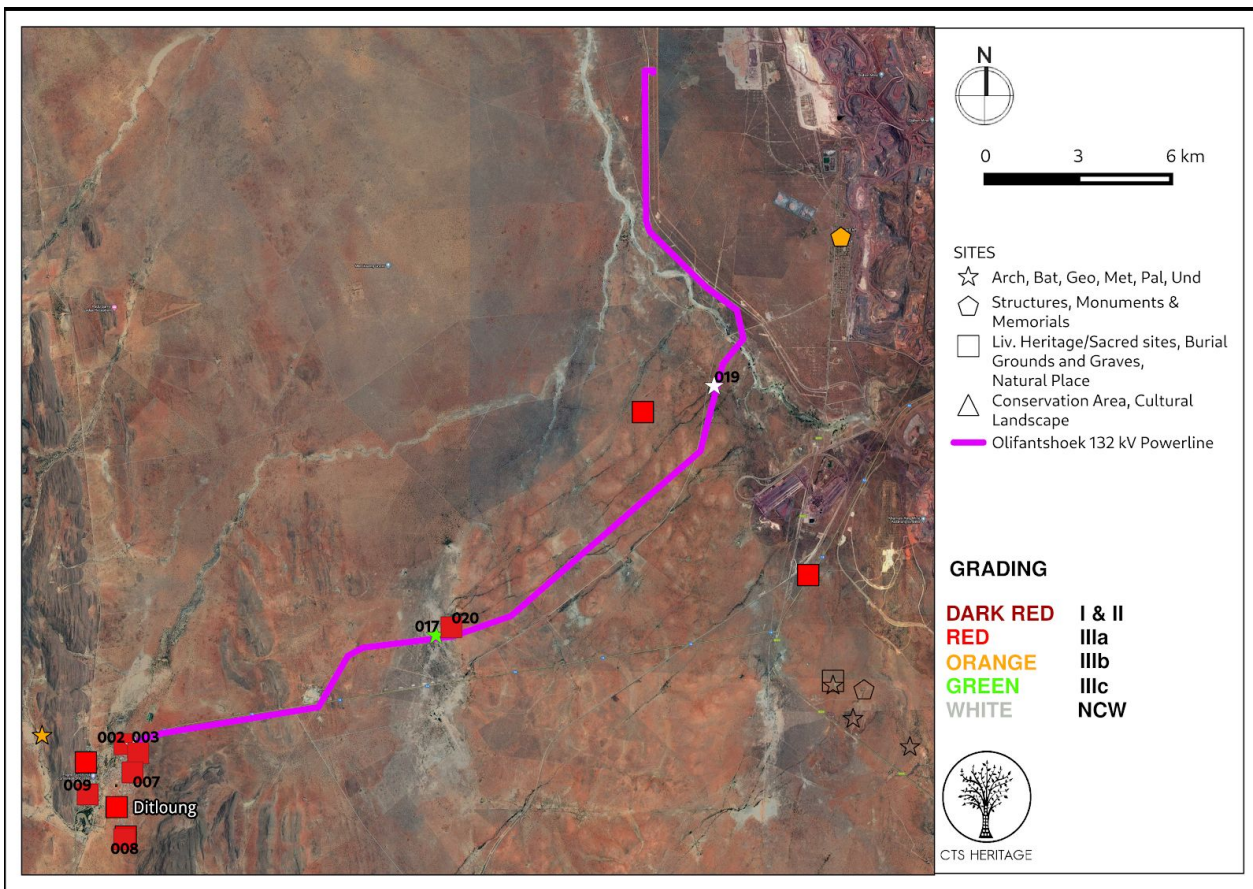


Figure 6: Sites identified during the field assessment - insets below

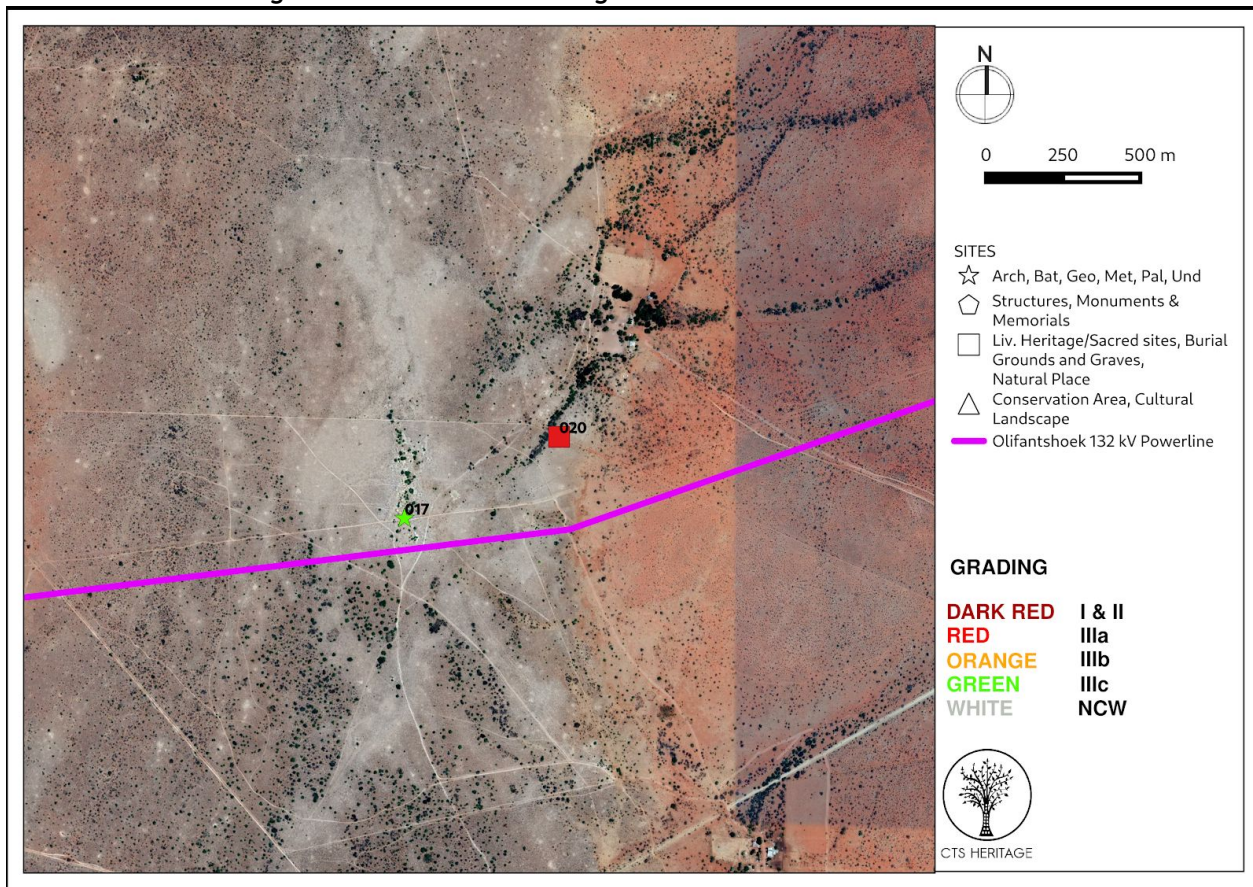


Figure 6.1: Sites identified during the field assessment on Murray Farm



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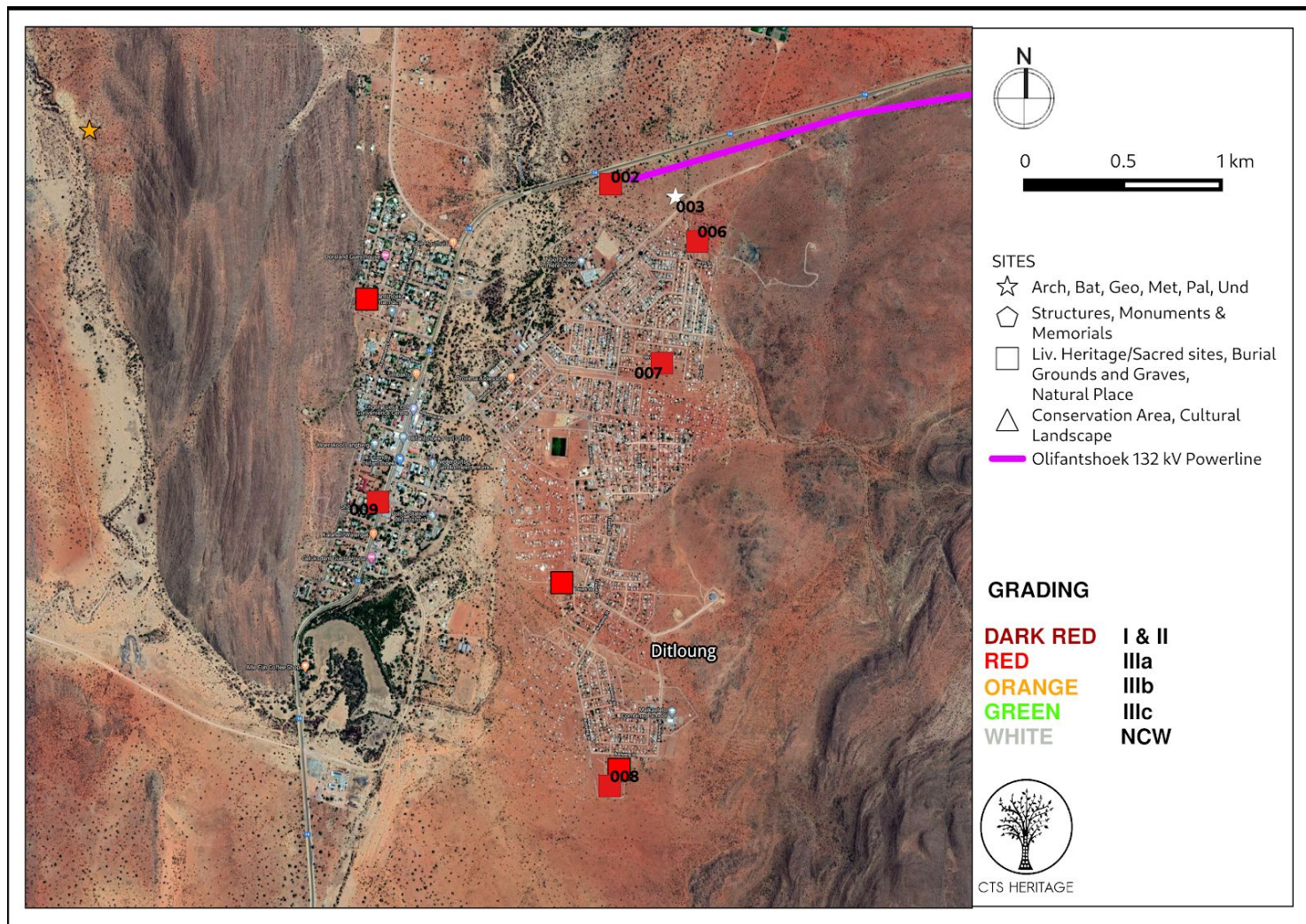


Figure 6.1: Sites identified during the field assessment on Murray Farm

Palaeontology

The proposed powerline is mainly underlain by the Kalahari Group sands and calcretes as well as the Ongeluk Formation volcanic rocks. The powerline does however also traverse small exposures of Voëlwater Formation, Lucknow Formation and Hartley Formation volcanic rocks.

Table 1: Geology and fossil heritage of the proposed Olifantshoek Powerline area, Northern Cape. Palaeontological sensitivity (Almond and Pether (2008) indicated by colour: Red - Very High, Orange - High, Green - Moderate, Blue - Low, Grey - Insignificant, Clear - Unknown)

Geological Unit	Age	Lithology	Symbol Fig. 7	Fossil Heritage	Mitigation
Kalahari Group, Wind-blown sand (Gordonia Formation)	2.6 mya to 0 mya	Informally kalahari sand, red (haematite coated) and white (lacking haematite) aeolian sand, usually deposited on underlying calcrete surface but can rest directly on pre kalahari deposits. 30m thick	Qs	Calcretised insect burrows (including termites) and root casts (rhizoliths), ostrich egg shells (Struthio), shells of land snails (e.g. Trigonephrus), bivalves and gastropods (e.g. Corbula, unio) and ostracods (seed shrimps), charophytes (stonewort algae), diatoms,	No action required (any fossil finds to be reported by developer)



				Stromatolites, mammalian ichnofossils	
Kalahari Group, Surface limestone (Mokalanen Formation)	5.3 mya to 0 mya	Sandy limestones and Overlying conglomerates with a calcareous matrix. 30m Possibility of dolines infilled with Pleistocene and Holocene deposits	Tl	Calcretised burrows (including termites), root casts (rhizoliths) as well as Mammalian Ichnofossils. Possible fragmented, mainly dental remains of Pleistocene mammals (including equids, rhinoceros, zebra and bovines).	Field scoping study recommended before excavation takes place
Olifantshoek Supergroup, Hartley Formation	1.9 ga	Basaltic lava, tuffs with Interbedded lenses of Quartzite, conglomerate as well as rare quartz porphyry. 300 to 762m thick	Vh	None	No action required (any fossil finds to be reported by developer)
Olifantshoek Supergroup, Lucknow Formation	Between 2.2 ga and 2.1 ga	Shales (deposited in open marine environment), micritic and stromatolitic Dolostones (deposited in a shallow protected carbonate lagoon environment), wackes (deposited in possibly tidal sand and mud flats), quartz arenites (deposited in fluvio-marine channels) and dolarenites and Dolorudites (deposited in Fluvio-marine channels). 500m thick	VI	Nodular and laminated domal and columnar stromatolites	No action required (any fossil finds to be reported by developer)
Transvaal Supergroup, Postmasburg Group, Voëlwater Subgroup, Moidraai Formation	2.4 ga	Dolomites	Vv	Smoothly laminated stromatolites	No action required (any fossil finds to be reported by developer)
Transvaal Supergroup, Postmasburg Group, Voëlwater Subgroup, Hotazel Formation	Paleo-proterozoic	Jaspillites and volcanic-Exhalative manganese deposits. 200-250m thick	Vv	None	No action required (any fossil finds to be reported by developer)
Transvaal Supergroup, Postmasburg Group, Voëlwater Subgroup, Ongeluk Formation	Between 2.2 ga and 2.43 ga	Extrusive tholeiitic basaltic-andesitic lavas that formed as part of a larger flood-basalt volcanic event. Depositional environment is believed to vary from subaqueous (pillow lavas, Hyaloclastites and massive flows) to subaerial (pipe amygdaloids and flow structures). 500-600m thick	Vo	2.4 billion year old microscopic (2-12µm wide) Fungus-like mycelial fossils	No action required (any fossil finds to be reported by developer)



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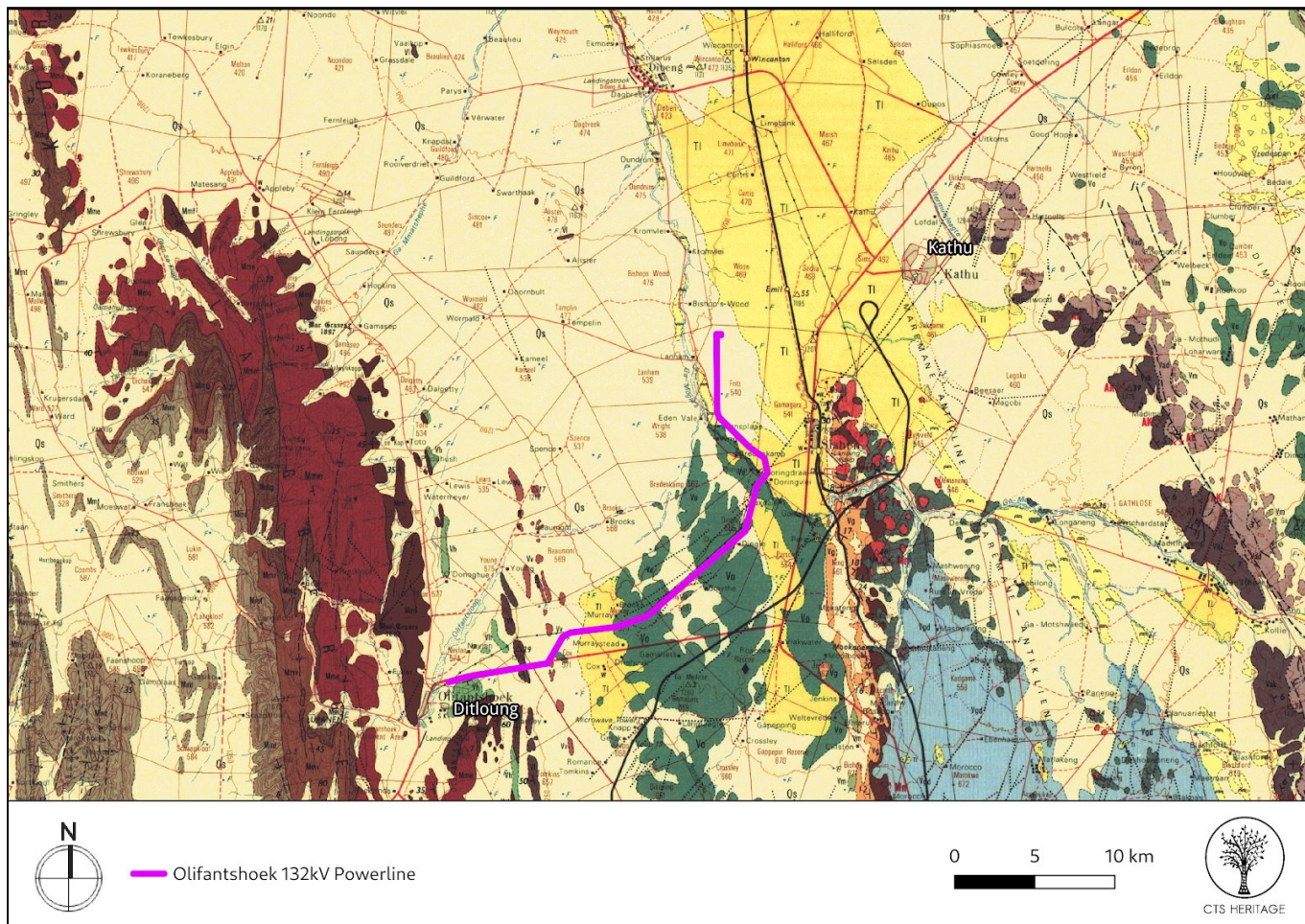


Figure 7. Geology Map. Indicating the underlying geology across the study area through overlaying the geology maps from the CGS series 2722 Kuruman (Qs: Quarternary Sands; Tl: Tertiary Surface Limestone; Vh: Hartley Formation volcanic rocks; Vl: Lucknow Formation; Vv: Voelwater Formation; Vo: Ongeluk Formation volcanic rocks)

4.3 Selected photographic record

See Archaeological Report in Appendix 1 for additional contextual images



Figure 8.1: Unmarked graves at NLN002 and 8.2: Collapsed stone walling at NLN001



Figure 8.3 and 8.4: LSA Flake from DNG001



Figure 8.5: Historical artefacts from MRR001 and 8.6: Graves from MRR002

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

Archaeology

Very few archaeological resources of significance were identified during the field assessment. This is surprising due to the proximity of the proposed development to Kathu Pans. The one Later Stone Age artefact identified was located without context and as such, is not conservation-worthy (DNG001). Similarly, the collapsed stone wall identified as site NLN001 has no heritage significance and is not conservation-worthy. Site MRR001 includes historical evidence of occupation and use, however this site has been disturbed through erosion and has low local significance (Grade III C). Sites DNG001, NLN001 and MRR001 have been sufficiently recorded for the purposes of this assessment.



Both sites NLN002 and MRR002 consist of two sets of unmarked graves. By their nature, human remains have high social significance and as such, have been given a grading of Grade IIIA. These sites both fall within the proposed alignment corridor, however these sites may not be impacted by the proposed development.

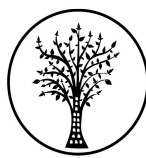
Palaeontology

- The volcanic nature of the Ongeluk Formation makes it unlikely that it will yield fossils. Although mycelial fungus-like fossils have been recorded, these are microscopic and came from a site over 100km south of the proposed power line.
- The volcanic nature of the Hotazel Formation (Voëlwater Subgroup) makes it unlikely that it will yield fossils.
- The Moidraai Formation (Voëlwater Subgroup) could preserve stromatolites.
- The dolostones of the Lucknow Formation are known to yield stromatolites (from cm to dm wide).
- The volcanic nature of the Hartley Formation makes it unlikely that it will yield fossils.
- The Kalahari Group has a sparse and poorly diverse fossil record. However, the close proximity of the Kathu Pan deposits (11km) from the north-east terminal point of the proposed power line as well as the fact that the power line traverses the same geological formations as that of the Kathu Pan, make it that there is a possibility of fossil faunal assemblages being present.

Based on the geology of the proposed development area as well as the current palaeontological record, it is anticipated that the impact of the development will mainly be LOW to MODERATE. However, the north-east section of the power line traversing the Kalahari Group deposits may have HIGH impact due to the close proximity of the Kathu Pan deposits.

Table 3: Impacts of the proposed Olifantshoek 132kV powerline to heritage resources

NATURE: No archaeological resources of significance were identified during the field assessments for archaeology and the desktop assessment for palaeontology within the development footprint. Two sites consisting of unmarked burials were identified within the development footprint.				
		Archaeology		Palaeontology
MAGNITUDE	L (4)	No significant archaeological resources were identified within the development area, however a number of archaeological resources of low significance were identified. Two sites consisting of unmarked burials were identified within the development footprint (NLN002 and MRR002.)	L (4)	The palaeontological sensitivity of the bedrocks and superficial sediments within the study area is rated as low to very low .The impact would be very unlikely. However the north-east section of the power line traversing the Kalahari Group deposits may have HIGH impact due to the close proximity of the Kathu Pan deposits.
DURATION	H (5)	Where manifest, the impact will be permanent.	H (5)	Where manifest, the impact will be permanent.
EXTENT	L (1)	Limited to the development footprint	L (1)	Limited to the development footprint
PROBABILITY	P (3)	Probable - distinct possibility	I (2)	Improbable - some possibility
SIGNIFICANCE	M	$(4+5+1) \times 3 = 30$	L	$(4+5+1) \times 2 = 20$
STATUS		Neutral with mitigation		Neutral with mitigation
REVERSIBILITY	L	Any impacts to heritage resources that do occur are irreversible	L	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE	L	Unlikely with mitigation	L	Unlikely with mitigation



LOSS OF RESOURCES?			
CAN IMPACTS BE MITIGATED		Yes	Yes
MITIGATION: A 50m no-go buffer is established around sites NLN002 and MRR002, and these sites are clearly marked as no-go areas on all development maps. Surface limestones of the Mokalanen Formation, before excavation takes place in order to confirm the absence of Kathu Pan-like deposits that may contain Pleistocene fossil faunal assemblages.			
RESIDUAL RISK: Should any significant resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources			

5.2 Sustainable Social and Economic Benefit

Olifantshoek will be developed further with Gamagara Municipality selling an additional R 15m worth of electricity per annum. This proposed development has high potential to result in secondary job opportunities due to the availability of additional services.

5.3 Proposed development alternatives

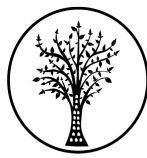
No alternatives are proposed for this development and as such, the only Alternative considered is the no-go alternative.

5.4 Cumulative Impacts

“Cumulative Impact” means the past, current and reasonably foreseeable future impact of an activity that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar activities. As per Figure 3, the area proposed for development is by no means pristine. From a heritage impact perspective, it is preferable to group such developments together rather than have them spread across the landscape. As such, the proposed development will not result in unacceptable risk or loss, or an unacceptable increase in impact and it will not result in complete or wholesale changes to the environment or sense of place.

Table 4: Cumulative Impact Table

NATURE: Cumulative Impact to the sense of place				
		Overall impact of the proposed project considered in isolation		Cumulative impact of the project and other projects in the area
MAGNITUDE	L (4)	Low	L (4)	Low
DURATION	M (3)	Medium-term	H (4)	Long-term
EXTENT	L (1)	Low	L (1)	Low
PROBABILITY	L (2)	Improbable	H (3)	Probable
SIGNIFICANCE	L	$(4+3+1) \times 2 = 16$	L	$(4+4+1) \times 3 = 27$
STATUS		Neutral		Neutral
REVERSIBILITY	H	High	L	Low
IRREPLACEABLE LOSS OF RESOURCES?	L	Unlikely	L	Unlikely
CAN IMPACTS BE MITIGATED		NA		NA
CONFIDENCE IN FINDINGS: High				



MITIGATION: No impacts are anticipated and as such, no mitigation is required

6. RESULTS OF PUBLIC CONSULTATION

Consultation for this project is being undertaken as part of the EIA requirements by the EAP. No heritage-related comments have been received thus far in the process.

7. CONCLUSION AND RECOMMENDATIONS

This application is for the proposed establishment of a 132kV powerline from the Olifantshoek Substation to the Elim Substation located 13 km west of Kathu. The town of Kathu was established in the 1960's and 1970's as a result of the iron ore mining taking place at the neighbouring Sishen mine. It is important to note that the northern portion of the development lies in close proximity to the Grade I Kathu Pan Archaeological site. At Kathu Pan, north west of the town, evidence of early hominin occupation has been observed at multiple sinkhole sites within the pan, and the results of scientific investigation into these sites has been broadly published. These sites are known for its rich collection of Early Stone Age artefacts, and several Archaeological and Heritage Impact Assessments have recorded the area (see Figure 4 Appendix 3). These archaeological resources occur in areas associated with outcrops of banded ironstone, and the localised natural pan, with most coming specifically from sinkholes in the pan itself. Based on the geology and fossil record, a field scoping study is recommended in the Kalahari Group deposits, specifically the surface limestones, before excavation takes place in order to confirm the absence of Kathu Pan-like deposits that may contain Pleistocene fossil faunal assemblages.

However, the archaeological field assessment did not identify any archaeological resources of significance within the proposed alignment. Two sets of unmarked graves were identified within the proposed alignment, and these may not be impacted by the proposed development. It is recommended that a 50m no-go buffer is established around sites NLN002 and MRR002.

For the remainder of the power line, there is very little chance of significant fossil finds being made. Any fossil finds (in stromatolitic Mooidraai and Lucknow formations) are to be reported by the developer. Should important fossil material be found during excavations, the attached Fossil Finds Procedure must be implemented (Appendix 2).

As such, there is no objection to the proposed development on condition that:

- A 50m no-go buffer is established around sites NLN002 and MRR002, and these sites are clearly marked as no-go areas on all development maps.
- Surface limestones of the Mokalanen Formation must be inspected before excavation takes place in order to confirm the absence of Kathu Pan-like deposits that may contain Pleistocene fossil faunal assemblages.
- Should any human remains or evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be impacted during the proposed development, work must cease and SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted to determine a way forward.



8. REFERENCES

Impact Assessment References				
Nid	Report Type	Author/s	Date	Title
4116	AIA	Peter Beaumont	06/02/2008	Phase 1 Heritage Impact Assessment Report on a Portion of the Remainder of the Farm Sekgame 461, Kathu, Gamagara Municipality, Northern Cape Province
4117	AIA	Peter Beaumont	07/02/2008	Phase 1 Heritage Impact Assessment Report on Portion 463/8 of the Farm Uitkoms 463, near Kathu, Kgalagadi Municipality, Northern Cape Province
4372	AIA	David Morris	01/02/2005	Report on a Phase 1 Archaeological Assessment of Proposed Mining Areas of the Farms Bruce, King, Mokaning and Parson, Between Postmasburg and Kathu, Northern Cape
4376	AIA	Peter Beaumont	30/04/2006	Phase 1 Heritage Impact Assessment Report on Erf 1439, Remainder of Erf 2974 and Remainder of Portion 1 of the Farm Uitkoms No 463, and Farms Kathu 465 and Sims 462 at and near Kathu in the Northern Cape Province
4378	AIA	Peter Beaumont	30/05/2006	Phase 1 Heritage Impact Assessment Report on Portion 5 of the Farm Uitkoms 463, Kgalagadi District, Northern Cape Province
4379	AIA	Peter Beaumont	31/05/2006	Phase 1 Heritage Impact Assessment Report on Portions A and B of the Farm Sims 462, Kgalagadi District, Northern Cape Province
4387	AIA	Peter Beaumont	12/06/2008	Phase 1 Archaeological Impact Assessment Report on Portion 459/49 of the Farm Bestwood 459 at Kathu, Kgalagadi District Municipality, Northern Cape Province
4391	AIA	Cobus Dreyer	11/08/2008	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at a Portion of the Remainder of the Farm Bestwood 459 Rd, Kathu, Northern Cape
4596	AIA	Peter Beaumont	01/05/2004	Heritage EIA of Two Areas at Sishen Iron Ore Mine
4597	AIA	Peter Beaumont	01/10/2005	Heritage Impact Assessment of an Area of the Sishen Iron Ore Mine that may be Covered by the Vliegveldt Waste Dump
4598	HIA	Peter Beaumont	15/10/2005	Heritage Impact Assessment for EMPR Amendment for Crusher at Sishen Iron Ore Mine
4600	AIA	Peter Beaumont	24/05/2007	Phase 1 Heritage Impact Assessment Report on a 15 Ha Portion of the Allotment Area That Borders on the Skerpdraai and Diepkloof Townships at Olifantshoek, Gamagara Municipality, Northern Cape Province
4603	AIA	David Morris	01/09/2008	Archaeological and Heritage Phase 1 Impact Assessment for Proposed Upgrading of Sishen Mine Diesel Depot Storage Capacity at Kathu, Northern Cape
4605	AIA	Peter Beaumont	03/04/2007	Phase 1 Heritage Impact Assessment Report on a Portion of the Farm Fuller 578 near Olifantshoek, Siyanda District Municipality, Northern Cape Province
6355	AIA	Cobus Dreyer	10/12/2008	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Bourke Project, Ballast Site and Crushing Plant at Bruce Mine, Dingleton, near Kathu, Northern Cape
6639	AIA	Jonathan Kaplan	01/09/2008	Phase 1 Archaeological Impact Assessment: Proposed Housing Development, Erf 5168, Kathu, Northern Cape Province
6804	AIA	Peter Beaumont	01/04/2000	Archaeological Impact Assessment: Archaeological Scoping Survey for the Purpose of an EMPR for the Sishen Iron Ore Mine



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7413	AIA	David Morris	23/08/2001	Report on Assessment of Archaeological Resources in the Vicinity of Proposed Mining at Morokwa
8086	AIA	Johan Nel	14/11/2008	Final Report Heritage Resources Scoping Survey & Preliminary Assessment Transnet Freight Line EIA, Eastern Cape and Northern Cape
92575	HIA	Elize Becker	10/10/2012	Phase 1 Heritage Impact Assessment Kimberley to De Aar
108346	AIA	Christine Vivier	12/11/2009	Phase 1 archaeological impact assessment report on a portion of the farm Lylyveld 545 near Kathu, Kagalagadi District Municipality, Northern Cape province.
108351		Neels Kruger	01/04/2012	Archaeological impact assessment (AIA) of demarcated surface areas on the farms Fritz 540, Gamagara 541, Sishen 543 and Parsons 564, Sishen Iron Ore Mine Complex, Kgalagadi District Municipality, Northern Cape province.
108970	AIA	Nelius Kruger	01/09/2012	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE AREAS ON THE FARMS GAMAGARA 541, ONVERWACHT 540 (FRITZ 540 PORTION 1) AND NOOITGEDACHT 469 (WOON 469), SISHEN IRON ORE MINE, KGALAGADI DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.
114648	PIA	John E Almond	01/09/2012	Palaeontological specialist assessment: desktop study PROPOSED 16 MTPA EXPANSION OF TRANSNET'S EXISTING MANGANESE ORE EXPORT RAILWAY LINE & ASSOCIATED INFRASTRUCTURE BETWEEN HOTAZEL AND THE PORT OF NGQURA, NORTHERN & EASTERN CAPE. Part 1: Hotazel
121132	HIA	Peter Beaumont	26/11/2011	Baseline Archaeological Reconnaissance Report on the Farm Lomoteng 669, North of Postmasburg in the Siyanda District Municipality of the Northern Cape Province
123045	AIA	Cobus Dreyer	26/06/2013	Report Eskom Garona Ferrum Mercury
123399	AIA	Peter Beaumont	15/05/2013	PHASE 2 ARCHAEOLOGICAL PERMIT MITIGATION REPORT ON A ~0.7 HA PORTION OF THE FARM BESTWOOD 549, SITUATED ON THE EASTERN OUTSKIRTS OF KATHU, JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.
129366	HIA	Cobus Dreyer	28/08/2013	First Phase Archaeological & Heritage Assessment of the Proposed Garona-Ferrum Transmission Line, Northern Cape
129751	HIA	Elize Becker	20/02/2013	Phase 1 Heritage Impact Assessment Hotazel to Kimberley and De Aar to Port of Ngqura
145005	AIA	Munyadziwa Magoma	01/07/2013	Phase 1 Archaeological Impact Assessment specialist study report for the proposed development of prospecting rights of iron ore and manganese on remaining extent of Mashwening 557 in Kathu, within the Local Municipality of Gamagara, John Taolo Gaetsewe
151768	PIA	John E Almond	01/11/2013	Palaeontological specialist assessment: combined desktop and field-based study: PROPOSED 16 MTPA EXPANSION OF TRANSNET'S EXISTING MANGANESE ORE EXPORT RAILWAY LINE & ASSOCIATED INFRASTRUCTURE BETWEEN HOTAZEL AND THE PORT OF NGQURA, NORTHERN & EAS
152157	HIA	Johnny Van Schalkwyk	15/05/2012	Heritage impact assessment for the proposed estate development on the farm Kalahari Golf and Jag Landgoed 775, KATHU, NORTHERN CAPE PROVINCE
152170	HIA	Robert de Jong	03/09/2008	HERITAGE IMPACT ASSESSMENT REPORT: PROPOSED RESIDENTIAL DEVELOPMENT AND ASSOCIATED INFRASTRUCTURE ON A 200 HA PORTION OF THE FARM BESTWOOD 429 RD AT KATHU, NORTHERN CAPE PROVINCE
152171	AIA	Cobus Dreyer	11/08/2008	FIRST PHASE ARCHAEOLOGICAL AND CULTURAL HERITAGE ASSESSMENT OF THE PROPOSED RESIDENTIAL DEVELOPMENTS AT A PORTION OF THE



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				REMAINDER OF THE FARM BESTWOOD 459RD, KATHU, NORTHERN CAPE
156617	AIA	David Morris	01/02/2014	Rectification and/or regularisation of activities relating to the Bestwood Township development near Kathu, Northern Cape: Phase 1 Archaeological Impact Assessment
161427	HIA	Stephan Gaigher	15/04/2014	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
163959	HIA	Anton van Vollenhoven	17/03/2014	HIA Eskom Manganore to Ferrum Scoping Phase
167779	HIA	Jonathan Kaplan	30/06/2014	HERITAGE IMPACT ASSESSMENT PROPOSED MIXED USE DEVELOPMENT IN KATHU, NORTHERN CAPE PROVINCE Remainder & Portion 1 of the Farm Sims 462, Kuruman RD
170455	AIA	Neels Kruger	31/03/2014	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE PORTIONS ON THE FARMS SACHA 468, SIMS 462 AND SEKGAME 461 FOR THE PROPOSED STORMWATER INFRASTRUCTURE (CLEAN WATER CUT-OFF BERM & GROUNDWATER DAM) FOR THE SISHEN MINE, KATHU, NORTHERN CAPE PROVI
170460	AIA	Neels Kruger	31/01/2014	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE PORTIONS ON THE FARMS SACHA 468 AND WOON 469 FOR THE PROPOSED HIGH ENERGY FUEL PLANT AND RAILWAY SIDING, SISHEN IRON ORE MINE, JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE
170660	AIA	Cobus Dreyer	31/01/2014	FIRST PHASE ARCHAEOLOGICAL & HERITAGE ASSESSMENT OF THE PROPOSED VAAL-GAMAGARA WATER PIPELINE PROJECT, NORTHERN CAPE: HOTAZEL ALTERNATIVE WATER PIPELINE
170664	AIA	Cobus Dreyer	28/09/2012	FIRST PHASE ARCHAEOLOGICAL AND HERITAGE ASSESSMENT OF THE PROPOSED VAAL-GAMAGARA WATER PIPELINE PROJECT, NORTHERN CAPE
170666	AIA	Cobus Dreyer	31/12/2013	FIRST PHASE ARCHAEOLOGICAL & HERITAGE ASSESSMENT OF THE VAAL-GAMAGARA WATER PIPELINE PROJECT, NORTHERN CAPE: REVISIT TO THE KATHU PAN ARCHAEOLOGICAL SITE
174359	AIA	Neels Kruger	25/08/2014	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE PORTIONS ON THE FARMS SACHA 468 AND WOON 469 FOR THE PROPOSED HIGH ENERGY FUEL PLANT AND RAILWAY SIDING, SISHEN IRON ORE MINE, JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE
177105	HIA	Cobus Dreyer	10/05/2014	FIRST PHASE ARCHAEOLOGICAL & HERITAGE INVESTIGATION OF THE PROPOSED MINE PROSPECTING AT THE REMAINING EXTENT OF THE FARM INGLESBY 580 NEAR OLIFANTSHOEK, NORTHERN CAPE PROVINCE
251178	AIA	Peter Beaumont		Baseline Archaeological Reconnaissance Report on the Farm Lomoteng 669, North of Postmasburg in the Siyanda District Municipality of the Northern Cape Province
251329	AIA	Jayson Orton	20/02/2015	Heritage Impact Assessment for a Proposed 132 kV Power Line, Kuruman Magisterial District, Northern Cape
252975	HIA	Marko Hutten, Polke Birkholtz	18/07/2014	Heritage Impact Assessment for the Proposed Kathu Supplier Park on parts of the Remainder and on Portion 9 of the Farm Sekgame 461 on the southern side of the town of Kathu in the Gamagara Local Municipality, Northern Cape.
273602	HIA	Polke Birkholtz	20/04/2015	Heritage Impact Assessment for the Proposed Establishment of a Grazing



CTS HERITAGE

				Project on a Portion of the Farm Marsh 467, Dingleton, Gamagara Local Municipality, Northern Cape.
279906	AIA	Neels Kruger	02/12/2014	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE PORTIONS ON THE FARM SEKGAME 461 FOR THE PROPOSED SEKGAME ELECTRICITY INFRASTRUCTURE EXPANSION PROJECT, SISHEN MINE, NORTHERN CAPE PROVINCE
294454	AIA	Neels Kruger	05/04/2015	ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF AREAS DEMARACTED FOR THE PROPOSED LYLEVELD NORTH WASTE ROCK DUMP EXPANSION AND LYLEVELD SOUTH HAUL ROAD EXTENSION PROJECT, SISHEN MINE, NORTHERN CAPE PROVINCE