

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed part 2 amendment to the existing Environmental Authorisation for the Modderfontein WEF, near Victoria West located in both the Northern and Western Cape

Prepared by



CTS HERITAGE

In Association with
Terramanzi Group

July 2021



CTS HERITAGE

EXECUTIVE SUMMARY

This application is for a proposed amendment to the layout of the authorised Modderfontein Wind Energy Facility located in both the Northern and Western Cape. The original Environmental Authorisation has authorised up to 67 wind turbines for the Modderfontein WEF with a total generating capacity of 201 MW using turbines with a generating capacity of up to 3 MW. The Applicant has proposed the following amendment to the existing Authorisation:

Up to 34 wind turbines with a total generating capacity of 200.4 MW using turbines with a generating capacity of up to 5.6 MW.

The field assessment was carried out by the archaeologist to cover both the original layout as well as the amended layout. A total of 85 additional observations were made during the field assessment and these were dominated by MSA open air artefact scatters. The MSA artefacts were predominantly derived from local hornfels and quarries at the base of the ridges and small hills were observed where exposures of rock were readily available.

LSA material was virtually absent on the farm but where it was found the bulk of the source material was sourced from elsewhere and introduced into the area rather than being sourced locally. The engravings found by Binneman (2011) and during this survey were historic and likely date to the 19th century when the diamond rush created a large increase in migrant work seeking opportunities in Kimberley.

A few built environment structures were found such as the ruined shepherd's building at site MDF 002 and the beautiful stonework found at the kraal and dipping pen at site MDF 020. Previously recorded structures by Binneman have already been reported on with the main cluster at SAHRIS Site ID 34629. While none of our recent findings contradicted the work done by Binneman (2011), it seems the original layout had not been provided for in the previous assessment and his study therefore provided a very good characterisation of the overall archaeological resources of the farm rather than an exhaustive survey of the impacted footprint of the original layout. This study has therefore filled the gaps in the survey of the original layout as well as firming up the sites that may be impacted by the revised and reduced layout.

Based on the outcomes of this report, it is not anticipated that the proposed development will negatively impact on significant archaeological heritage on condition that the following recommendations are implemented:

For the Authorised Layout:

- No development takes place within 100m of identified rock art sites or of identified stone kraals
- No impact to any significant identified archaeological resource is permitted including sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737)
- Should any new heritage resources be uncovered during the course of development activities, work in the vicinity of the find must cease and HWC (in the Western Cape) and SAHRA (in the Northern Cape) must be contacted regarding an appropriate way forward.



CTS HERITAGE

For the proposed amended layout (May 2021):

- The turbine proposed to be located in the vicinity of sites MDF 028 and MDF 029 is moved to an alternative location more than 100m away from the identified archaeological heritage
- Besides the relocation of the turbine at MDF 028 & 029, no mitigation is necessary as the turbine positions are outside of the 100m buffers surrounding any IIIC or above sites
- No impact to any significant identified heritage resource is permitted including sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737)
- Should any new heritage resources be uncovered during the course of development activities, work in the vicinity of the find must cease and HWC (in the Western Cape) and SAHRA (in the Northern Cape) must be contacted regarding an appropriate way forward.



CTS HERITAGE

CONTENTS

1. INTRODUCTION	5
1.1 Background Information on Project	5
1.2 Previous Heritage Processes	5
1.3 Description of Property and Affected Environment	6
2. METHODOLOGY	9
2.1 Purpose of Archaeological Study	9
2.2 Summary of steps followed	9
2.3 Constraints & Limitations	10
3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT	11
4. IDENTIFICATION OF HERITAGE RESOURCES	13
4.1 Field Assessment	13
4.2 Archaeological Resources identified	21
4.3 Selected photographic record	25
5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT	31
5.1 Assessment of impact to Archaeological Resources	31
6. CONCLUSION AND RECOMMENDATIONS	38
7. REFERENCES	40
Appendix 1: Heritage Screening Assessment (August 2020)	



CTS HERITAGE

1. INTRODUCTION

1.1 Background Information on Project

This application is for a proposed amendment to the layout of the authorised Modderfontein Wind Energy Facility located in both the Northern and Western Cape. The original Environmental Authorisation has authorised up to 67 wind turbines for the Modderfontein WEF with a total generating capacity of 201 MW using turbines with a generating capacity of up to 3 MW. The Applicant has proposed the following amendment to the existing Authorisation:

Up to 34 wind turbines with a total generating capacity of 200.4 MW using turbines with a generating capacity of up to 5.6 MW.

Please note the proposed development will be an approximately 67% reduction in turbine density which should at least maintain and possibly even reduce the impact levels as previously authorised.

1.2 Previous Heritage Processes

At the time of the original EIA process for the Karoo Renewable Wind Energy Facility which included the proposed Modderfontein WEF as well as other properties including the Noblesfontein Wind Energy Facility, Binneman et al. (2011) completed an archaeological assessment. This assessment was submitted to both Heritage Western Cape and SAHRA (SAHRIS Case ID 2005).

In response to the Karoo Renewable Wind Energy Facility, application, SAHRA made the following comments (It is important to note that some of these recommendations pertain to sites located within the authorised Noblesfontein Wind Energy Facility, and are therefore not pertinent to this application):

- The Later Stone Age sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737) must be mitigated with a Phase 2 Archaeological Impact Assessment. Mitigation in the form of recording, sampling and a photographic record must be undertaken before trenching and any other earth-moving activity resulting from this proposed project commences. The archaeologist will require a mitigation permit from SAHRA in terms of s. 35 of the National Heritage Resources Act (Act 25 of 1999). On receipt of a satisfactory mitigation (Phase 2) permit report from the archaeologist, SAHRA will make further recommendations in terms of the site such as its final destruction or additional sampling.
- The proposed final position of wind turbines and solar panels must be investigated for the presence of possible rock engravings and rock paintings.
- No construction activity is allowed within 100m of rock paintings, rock engravings, rock shelters where rock art material is preserved and sites with stone walls and kraals. If this distance cannot be avoided and the development has to occur within 100m from any of these sites, a temporary fence must be erected around the site (in consultation with the archaeologist) and foremen and workmen educated about its significance.
- In no circumstances will development be allowed within 50m from stone walls and kraals and from rock art sites.
- All newly identified rock paintings and rock engravings in the area should be recorded, if this has not been done



CTS HERITAGE

yet, through photographic record and GPS position. These recordings (which may require involvement of a rock art specialist) should be included in the report to be submitted to SAHRA after the micro-siting survey is undertaken.

- A Heritage Management Plan for rock engravings, rock painting and gong rocks must be compiled and submitted to SAHRA for revision.
- The Khoekhoen pottery at site S40 should be collected and recorded. The archaeologist will apply for a collection permit from SAHRA (*S40 is located within the Noblesfontein property*)
- Destruction of the sites S46, GPS 48 must be permitted by SAHRA through a destruction permit. The developer, or their archaeologist, must apply to SAHRA for the permit. A single application (destruction permit) might be used for all sites (*S46 is located within the Noblesfontein property*).
- A Phase II HIA is required for the area of the remains (*S45 which describes the location of the human remains is located within the Noblesfontein property*.) This should define the area of the burial ground and include archival research to investigate if there is a possible link between the burials and the construction of the railway line. When a Phase II report is received by the SAHRA Burial Grounds and Graves Unit, further recommendations will be made in relation to a possible relocation or preservation of the graves. Provisions stipulated in section 36 of the National Heritage Resources Act (Act No. 25 of 1999) are applicable (see Appendix 1 and SAHRA Regulations).
- A Phase 1 Palaeontological Impact Assessment in the form of a field survey of the area is requested, the assessment must be then submitted to SAHRA for comments. If deemed necessary after the survey, a Phase 2 rescue operation might also be requested.
- A palaeontologist must inspect fresh excavations undertaken in the fossil-bearing Teekloof Formation.
- As stated also in the Archaeological Impact Assessment, Substation 1 option 1 and substation 2 option 1 are the preferred options for two substations.

As a portion of the Modderfontein WEF project falls within the Western Cape, Heritage Western Cape (HWC) who is the heritage authority that manages the heritage resources in the Western Cape was also consulted in the original application. HWC replied that they are “satisfied with the reports being referenced and that Section 38 comments and decisions whether under a NID or HIA phase still stands therefore the requirements of 2011 stated in the NID (if one was done) still stands. However an integrated HIA (including integrated recommendation) which fulfils the requirement of Section 38(3) of the NHRA still needs to be submitted with the AIA, EA and other associated reports.”

According to the Environmental Authorisation granted for the original layout of the Modderfontein WEF, “If there are any changes to the layout of the turbines from the approved plan, the additional survey work will be required in order to ensure that no sites are directly impacted and/or to identify the need for an excavation permit”.

1.3 Description of Property and Affected Environment

The area proposed for the Modderfontein Wind Farm lies south and southeast of the Biesiespoort dirt road that links the N1 to the Biesiespoort railway junction and station. The topography of the farm consists of low hills and ridges that



CTS HERITAGE

are overlooked by the much larger Horseshoe mountain formation north of the area. The owners farmhouse and guest house (Desert Dew Guesthouse) is located along the northern boundary of the study area, more or less equidistant from the western and eastern boundaries. The vegetation is dominated by typical karoo shrublands that are the source of grazing for sheep and cattle on the farm and a number of antelope species were encountered in varying numbers during the survey such as springbok, rhebuck and steenbuck.

A large valley occupies the central zone surveyed, surrounded by a low plateau to the north, hills and ridges to the south, west and east. The Noblesfontein Wind Farm, already constructed, lies immediately to the west on the neighbouring property and a 765kV powerline traverses the eastern portion of the study area. A few windmills and small dams, many not in working order, dot the farm besides a few jeep tracks used for mountain biking and managing the stock farming activities.

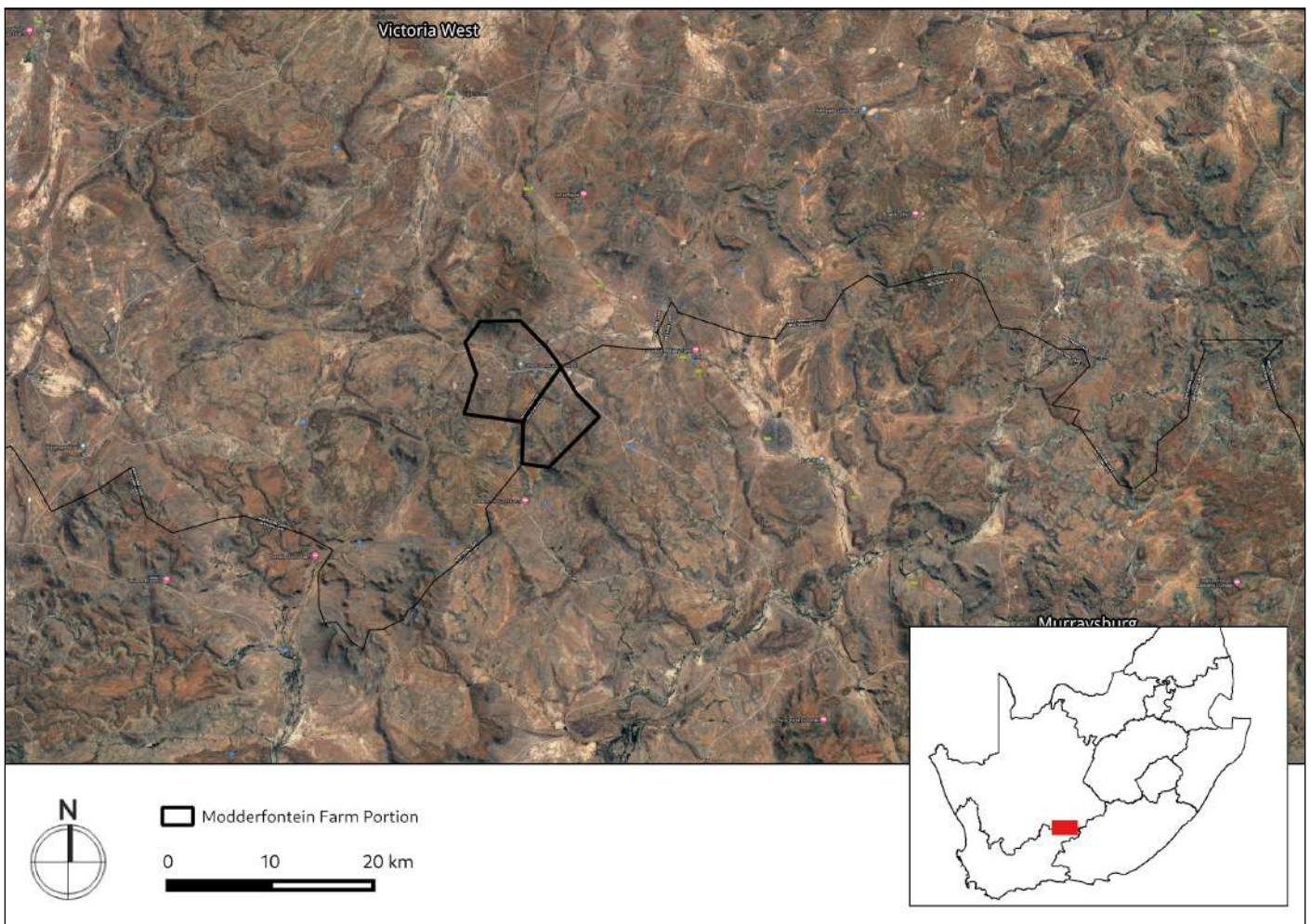


Figure 1.1: Close up satellite image indicating proposed location of development



CTS HERITAGE

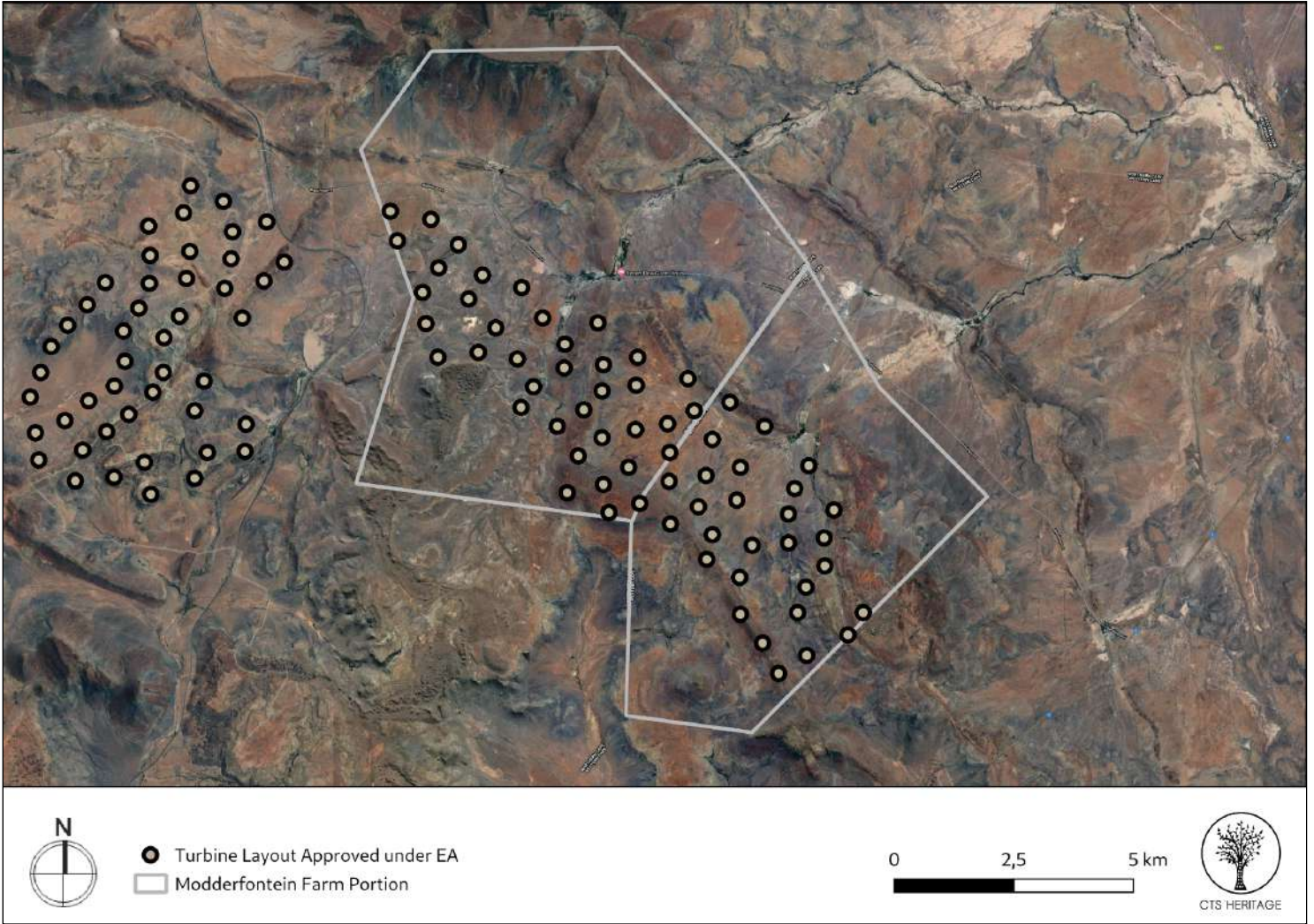


Figure 1.2: Approved turbine layout for the Modderfontein WEF (Noblesfontein WEF lies to the west)



CTS HERITAGE

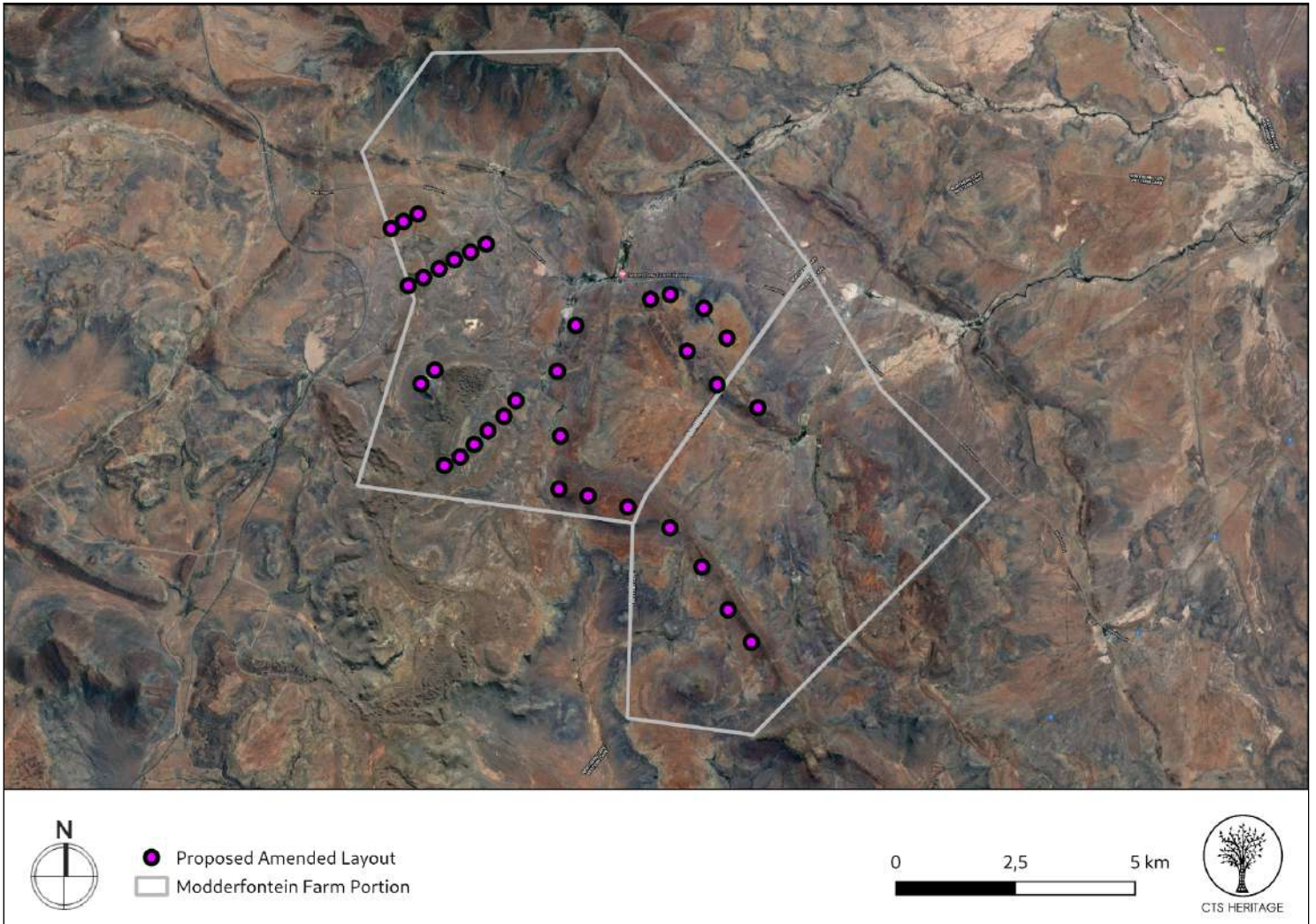


Figure 1.2: Proposed amended turbine layout for the Modderfontein WEF

2. METHODOLOGY

2.1 Purpose of Archaeological Study

This archaeology specialist assessment is drafted to achieve the following:

- Ensuring that the proposed amended layout conforms with SAHRA's requirements indicated above
- To satisfy HWC's requirements for an integrated HIA in terms of section 38(3) for the original layout as the original authorised layout was never subject to a process in terms of section 38(8) with HWC
- To assess the impact to archaeological resources posed by the proposed amended layout to inform the HIA for the proposed amended layout
-

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs from 28 April 2021 to 1 May 2021 to determine what archaeological resources are likely to be impacted by the proposed development. Both the original layout and the amended layout were surveyed.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.



CTS HERITAGE

- 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).

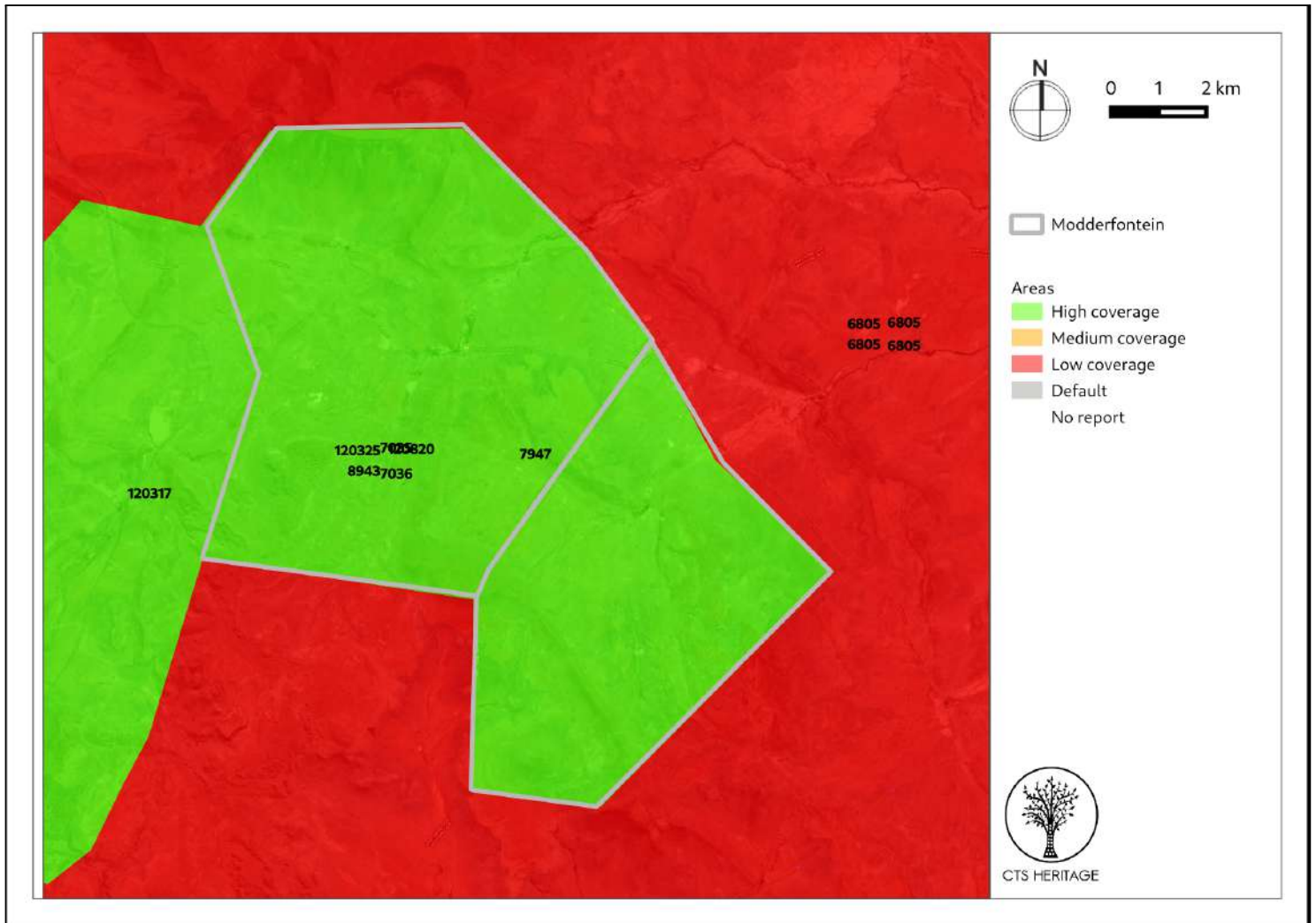


Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

2.3 Constraints & Limitations

The sparse vegetation cover did not inhibit the survey in any way and full coverage of all the turbine positions was obtained by assessing Binneman's report (2011) and the sites identified during his survey, with nearly every single turbine location in the original layout being resurveyed due to the absence of jeep tracks in the original report and gaps in the distribution of sites that made it impossible to determine if areas containing no archaeological finds were surveyed. While interconnecting jeep tracks were used to move the 4x4 vehicle around the property, the entire survey was conducted on foot as the turbines are proposed on the ridges, elevated plateaus and small hills. We weren't able to assess all boulders outside of the proposed development footprint for engravings as the farm is too vast to cover but it is more than likely that a few more engravings sites will be found during further research or development based surveys that happen to require survey in areas not walked. However, a large number of boulders were assessed during this survey and it was noted that only a few engraving sites, mostly historic, were found thus far.



CTS HERITAGE

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

The area proposed for development is located approximately 35km south southeast of Victoria West in the Central Karoo region of the Northern Cape. Victoria West was established by the Dutch Reformed Church in 1843 along the banks of the Brakrivier watercourse. In 1859, the town became a municipality. According to the Desktop Assessment completed by Booth et al. (2010, SAHRIS ID 7036), the records of early colonial travellers through the area and from Victoria West note interactions with San people who inhabited the area up until the late 19th century. In the mid-1920s, archaeologists identified a stone tool technological industry from the area and along the Vaal River known as the Victoria West Industry. Further evidence of San persistence in this landscape comes from the Later Stone Age archaeology and the rock engravings found throughout the Karoo, and on this farm.

In March 2011, Binneman et al. (SAHRIS ID 7035) completed an archaeological impact assessment that includes the area assessed in this report. Binneman et al. (2011) describe the farm as consisting of a varied landscape, including “flat, open floodplains, ridges, rocky outcrops and hillocks or koppies... The farm also consists of natural springs and dams. Disturbances owing to the construction of farm roads, fences, powerlines, telephone lines, windmills and dams, as well as domestic stock grazing and other farming activities occur throughout the area.” Binneman et al (2011) identified surface scatters of Middle Stone Age (MSA) artefacts throughout the farm, primarily located in flat floodplains at the base of rocky outcrops. Binneman et al (2011) also identified a possible purple mudstone quarry next to a river and small rocky outcrop. According to Binneman et al (2011) this quarry may have been the source for some of the MSA artefacts identified on the property. Later Stone Age (LSA) scatters were also identified on the property, however these are not as prevalent as the MSA artefacts. SAHRIS Site ID 34718 (MOD31) represents one of the more dense LSA sites on the property, including *in situ* bone. A stone kraal (Site ID 34719, MOD32) is located in close proximity to the LSA site and may even overlap it. Binneman et al (2011) also identified two areas of rock engravings (SAHRIS Site ID 34631, MOD10), some in close proximity to MSA artefacts, as well as a rock gong (SAHRIS Site ID 34632, MOD11). Binneman et al (2011) also identified several stone wall structures on the property including a large stone wall complex consisting of three large kraals and a small pen and occupation area at SAHRIS Site ID 34720 (MOD33). It must be noted that it is unclear from the report by Binneman et al (2011) whether the whole of the farm was surveyed for archaeology, or if only the area proposed for turbines was assessed as no track paths are included in the assessment. Booth (2012) completed a walkdown assessment of the neighbouring farms in order to ground-truth the proposed WEF turbine locations, however no such walkdown had taken place on the farms included in this assessment before this report was commissioned.

A list of the sites located within the Modderfontein Development Area that were identified by Binneman (2011) are recorded on SAHRIS and are included in the table in Appendix 1. These sites are considered in the assessment of impact in this report and are included in the recommendations proposed.



CTS HERITAGE

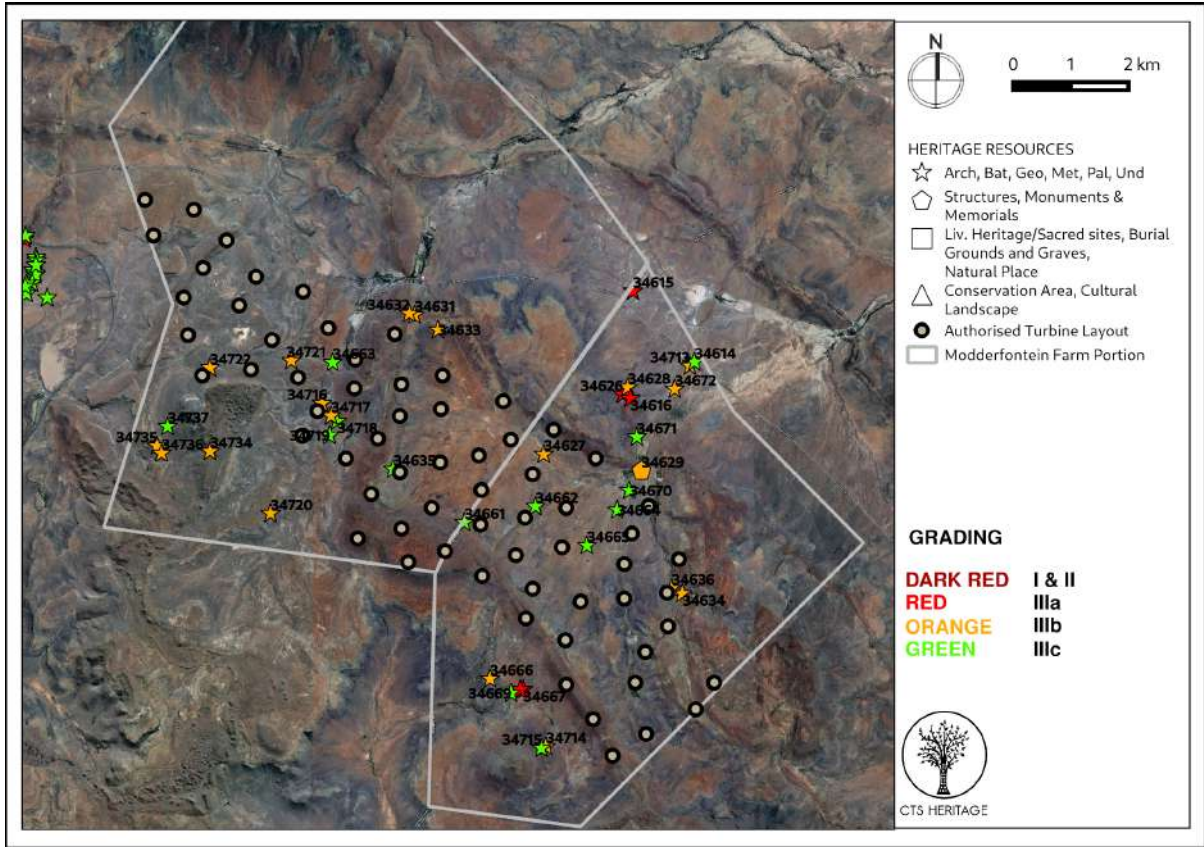


Figure 3.1. Heritage Resources Map. Heritage Resources previously identified in and near the study area by Binneman (2011), with SAHRIS Site IDs indicated overlying the authorised turbine layout

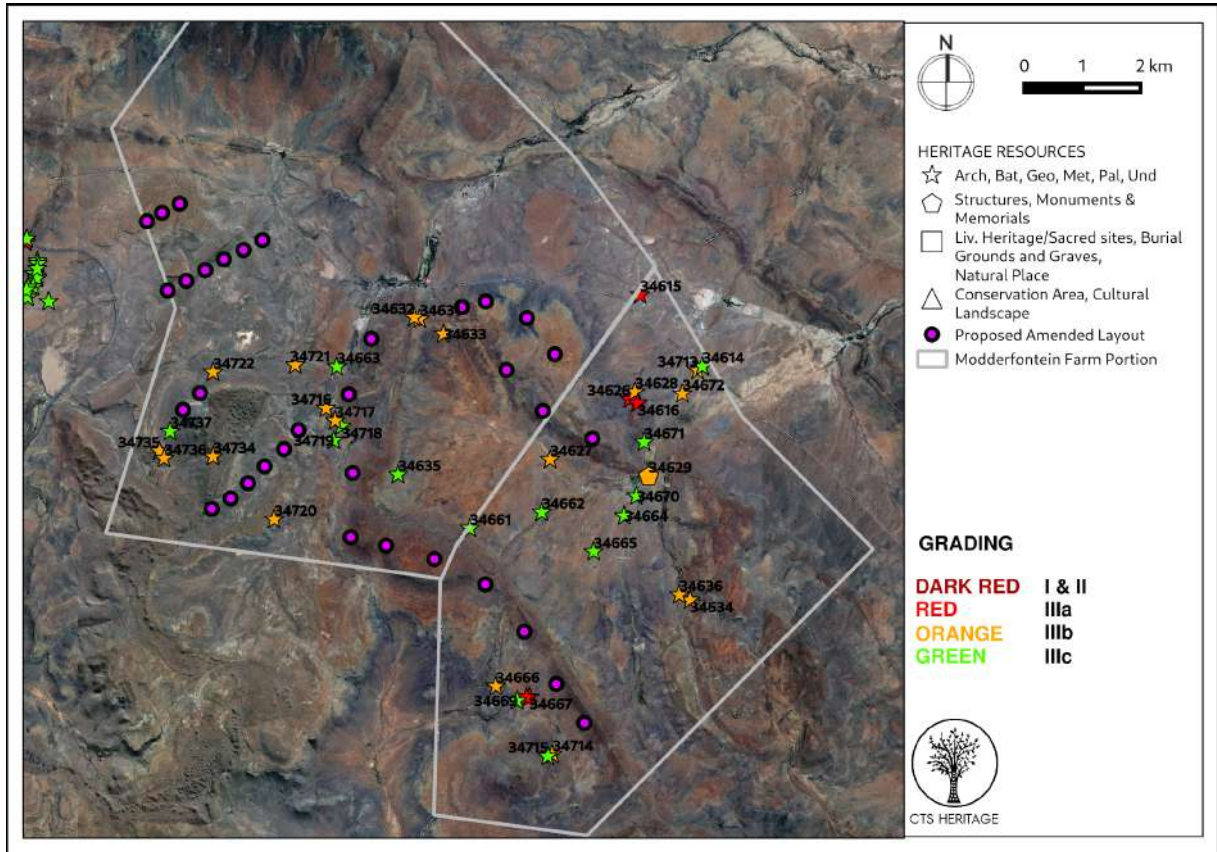


Figure 3.2. Heritage Resources Map. Heritage Resources previously identified in and near the study area by Binneman (2011), with SAHRIS Site IDs indicated overlying the proposed amended turbine layout



CTS HERITAGE

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The field assessment was carried out by the archaeologist to cover both the original layout as well as the amended layout. This was done in order to satisfy SAHRA and HWC's requirements for a thorough heritage assessment of the area envisaged under the original EA and to provide alternatives within the footprint of the original approved layout that could be used should heritage sites of high significance be found in the footprint of the amended layout. A total of 85 additional observations were made during the field assessment and these were dominated by MSA open air artefact scatters. The MSA artefacts were predominantly derived from local hornfels and quarries at the base of the ridges and small hills were observed where exposures of rock were readily available. The large valley (figure 4.9) was particularly interesting in that the flat level plain held isolated scatters in low numbers of artefacts while the boundary zones formed by the base and immediate tops of the ridges and hills contained sites with many more artefacts per square metre in associated with knapping and quarrying activities. It would appear that the natural topography of the valley and the surrounding elevated positions provided cover and observation areas for hunter-gatherers living in this area during the MSA and that episodic hunting and butchering work was carried out in the level plain before moving back to the ridges. At site MDF 047 a number of MSA hornfels blades were found in a production site that lies on the western boundary of the large valley.

LSA material was virtually absent on the farm but where it was found the bulk of the source material was sourced from elsewhere and introduced into the area rather than being sourced locally. The engravings found by Binneman (2011) and during this survey were historic and likely date to the 19th century when the diamond rush created a large increase in migrant work seeking opportunities in Kimberley. The scratched images at site MDF 079 may be older than the historic 19th century but they are poorly preserved and not good examples of LSA engravings encountered elsewhere in the Northern Cape. Site MDF 028-29 was an excellent example of an historic engraving of horses and wagons, possible cattle drawing a plough and a possible train carriage. This site will require elimination of the proposed turbine position or placement of the turbine outside the 100m buffer area delineated for this site. A stone circle, likely to have been a collapsed kraal or camp, was found site MDF 072. It wasn't possible to definitively assign this to the LSA or the MSA and only MSA artefacts were found while assessing this site.

A few built environment structures were found such as the ruined shepherd's building at site MDF 002 and the beautiful stonework found at the kraal and dipping pen at site MDF 020. Previously recorded structures by Binneman have already been reported on with the main cluster at SAHRIS Site ID 34629. While none of our recent findings contradicted the work done by Binneman (2011), it seems the original layout had not been provided for in the previous assessment and his study therefore provided a very good characterisation of the overall archaeological resources of the farm rather than an exhaustive survey of the impacted footprint of the original layout. This study has therefore filled the gaps in the survey of the original layout as well as firming up the sites that may be impacted by the revised and reduced layout.



CTS HERITAGE



Figure 4.1: Contextual Image of development area



Figure 4.2: Contextual Image of development area



Figure 4.3: Contextual Image of development area



CTS HERITAGE



Figure 4.4: Contextual Images of Development Area



Figure 4.5: Contextual Images of Development Area



Figure 4.6: Contextual Images of Development Area



CTS HERITAGE



Figure 4.8: Contextual Images of Landscape



Figure 4.9: Contextual Images of Development Area



CTS HERITAGE



Figure 4.10: Contextual Images of Landscape



Figure 4.11: Contextual Images of the proposed development indicating existing turbines on neighbouring Noblesfontein



Figure 4.12: Contextual Images of the proposed powerline route



CTS HERITAGE



Figure 4.13: Contextual Images of Landscape



Figure 4.14: Contextual Images of Landscape



CTS HERITAGE



Figure 4.15: Contextual Images of Landscape



Figure 4.16: Contextual Images of Landscape



CTS HERITAGE

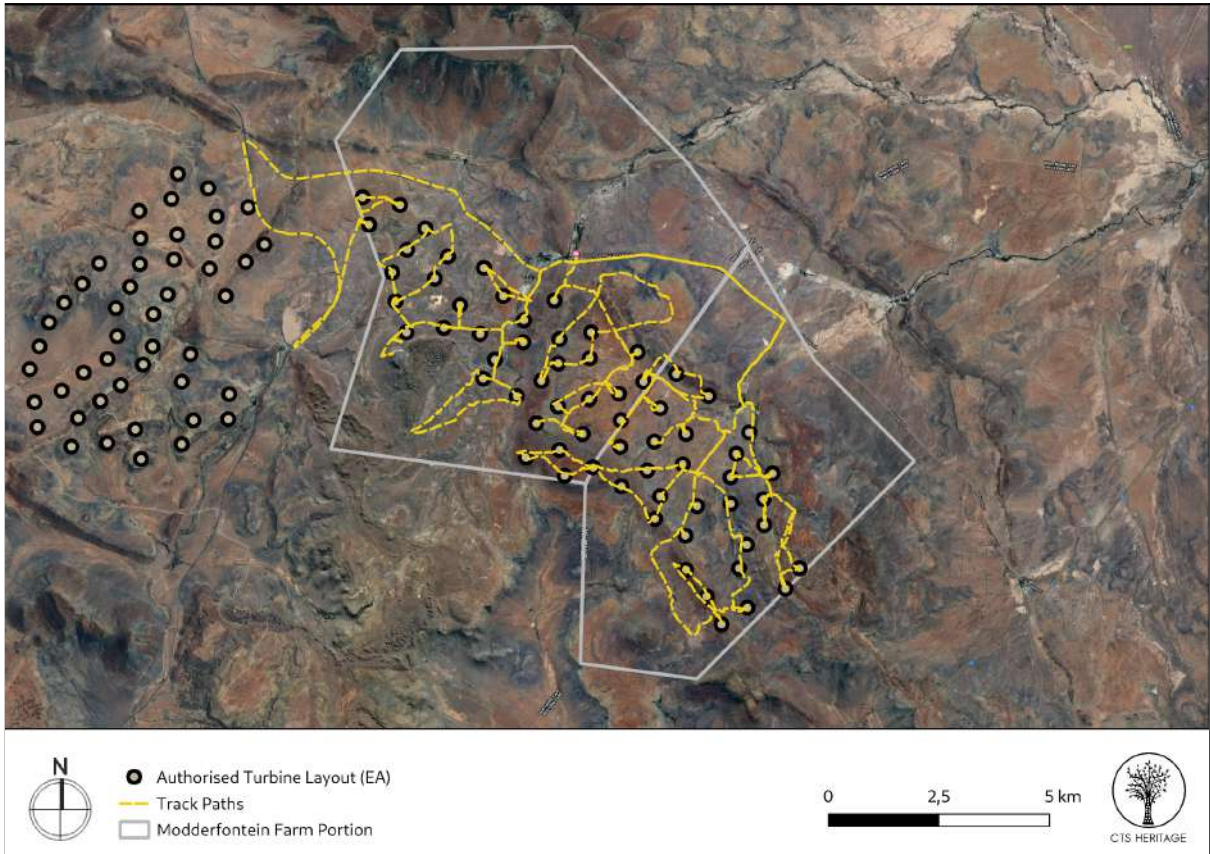


Figure 5.1: Overall track paths of foot survey relative to the previously approved turbine layout

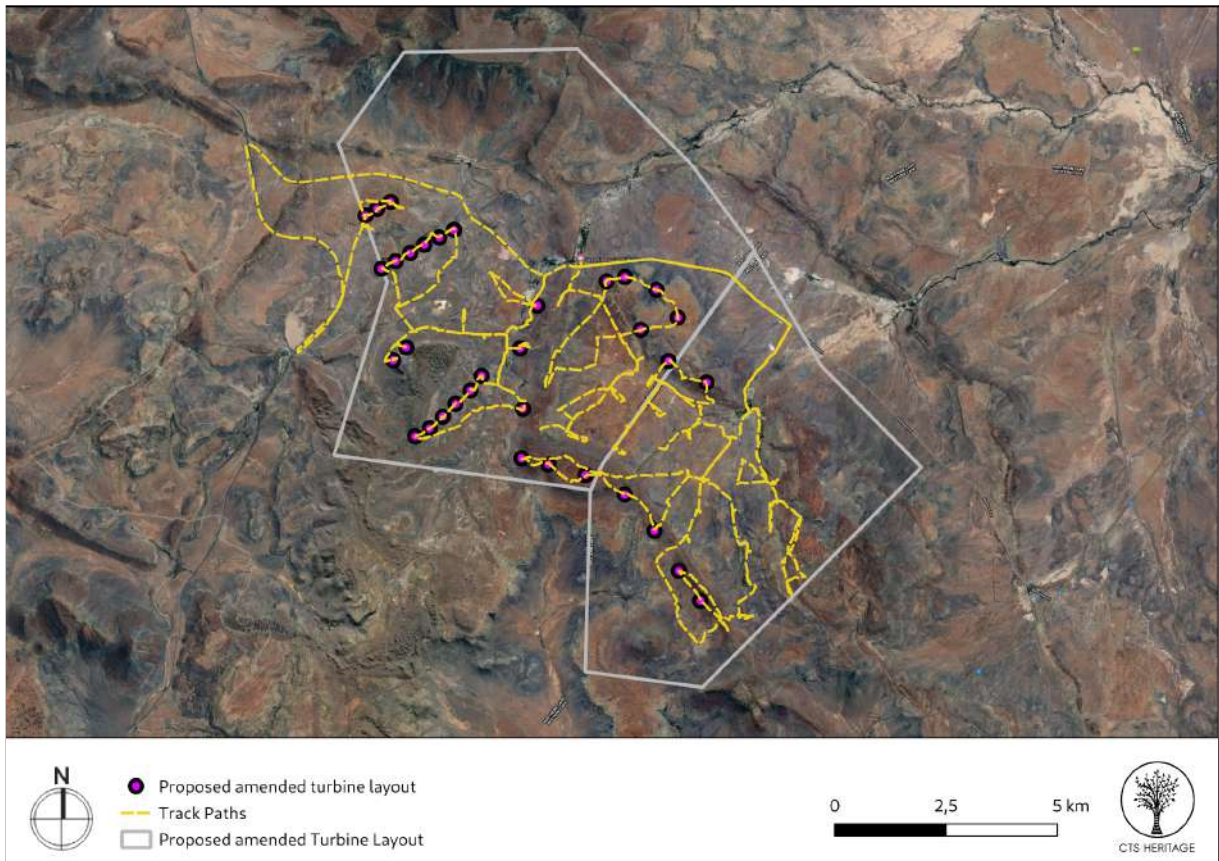


Figure 5.2: Overall track paths of foot survey relative to the proposed amended turbine layout



4.2 Archaeological Resources identified

The sites listed in the table below are the sites identified in this 2021 field assessment and are recorded in addition to the sites recorded by Binneman (2011). The sites from Binneman (2011) are recorded on SAHRIS, are listed in Appendix A this report and are included in the mapping assessments conducted in Figures 8 and 9 below.

Table 1: Observations noted during the 2021 field assessment

Site No.	Site Name	Description	Period	Co-ordinates		Grading	Mitigation
WESTERN CAPE							
MDF WEF 1	Modderfontein WEF 1	Hornfels flakes, mostly no retouch	MSA	-31.77684	23.30726	NCW	None required
MDF WEF 2	Modderfontein WEF 2	Slate walled ruin square no roof, some glass and tin	Historic	-31.78466	23.31264	IIIC	None required unless layout changes
MDF WEF 3	Modderfontein WEF 3	Hornfels core & flake quartzite	MSA	-31.79808	23.31044	NCW	None required
MDF WEF 4	Modderfontein WEF 4	hornfels core, flake	MSA	-31.77667	23.30378	NCW	None required
MDF WEF 5	Modderfontein WEF 5	hornfels flake	MSA	-31.77622	23.29847	NCW	None required
MDF WEF 6	Modderfontein WEF 6	hornfels flakes	MSA	-31.77472	23.29894	NCW	None required
MDF WEF 7	Modderfontein WEF 7	Hornfels core patinated	MSA	-31.77262	23.29943	NCW	None required
MDF WEF 8	Modderfontein WEF 8	Patinated radial core, hornfels flake	MSA	-31.77243	23.29944	NCW	None required
MDF WEF 9	Modderfontein WEF 9	hornfels core, step hinges	MSA	-31.77333	23.30164	NCW	None required
MDF WEF 10	Modderfontein WEF 10	Chert and hornfels flakes	MSA	-31.77535	23.28655	NCW	None required
MDF WEF 11	Modderfontein WEF 11	Hornfels flakes	MSA	-31.77481	23.28461	NCW	None required
MDF WEF 12	Modderfontein WEF 12	hornfels flakes, retouched core flake	MSA	-31.77507	23.28364	NCW	None required
MDF WEF 13	Modderfontein WEF 13	hornfels flakes, thin flake	MSA	-31.77528	23.28143	NCW	None required
MDF WEF 14	Modderfontein WEF 14	Stone boundary walling	Historic	-31.77479	23.2655	NCW	None required
MDF WEF 16	Modderfontein WEF 16	Hornfels flake	MSA	-31.77963	23.28248	NCW	None required
MDF WEF 17	Modderfontein WEF 17	Stone walled dam wall	Historic	-31.78748	23.29852	NCW	None required
MDF WEF 18	Modderfontein WEF 18	Hornfels chunk, imported raw material	LSA	-31.80641	23.29587	NCW	None required
MDF WEF 19	Modderfontein WEF 19	Hornfels flake	MSA	-31.77639	23.29142	NCW	None required
MDF WEF 20	Modderfontein WEF 20	Some walled kraal, dipping pen	Historic	-31.77638	23.29163	IIIC	None required unless layout changes
MDF WEF 21	Modderfontein WEF 21	hornfels core and flake	MSA	-31.7679	23.2869	NCW	None required



CTS HERITAGE

MDF WEF 22	Modderfontein WEF 22	Heavily patinated hornfels flake	MSA	-31.7663	23.28662	NCW	None required
MDF WEF 27	Modderfontein WEF 27	hornfels flakes	MSA	-31.75634	23.28994	NCW	None required
MDF WEF 28	Modderfontein WEF 28	Historical scratches names and lines	Historic	-31.75658	23.29067	IIIA	Avoid, 100m Buffer
MDF WEF 29	Modderfontein WEF 29	Wagon and horses scene, scratched, incised	Historic	-31.75667	23.29072	IIIA	Avoid. 100m Buffer
MDF WEF 30	Modderfontein WEF 30	Heavily patinated hornfels flake	MSA	-31.76087	23.29167	NCW	None required
NORTHERN CAPE							
MDF WEF 15	Modderfontein WEF 15	hornfels core	LSA	-31.77217	23.2533	NCW	None required
MDF WEF 23	Modderfontein WEF 23	Hornfels core flake	MSA	-31.76534	23.27204	NCW	None required
MDF WEF 24	Modderfontein WEF 24	Hornfels flake retouched, formal	MSA	-31.75711	23.27701	NCW	None required
MDF WEF 25	Modderfontein WEF 25	Hornfels cores and flakes	MSA	-31.75555	23.27858	NCW	None required
MDF WEF 26	Modderfontein WEF 26	Quartzite flakes	MSA	-31.75272	23.28282	NCW	None required
MDF WEF 31	Modderfontein WEF 31	hornfels core	MSA	-31.75629	23.2794	NCW	None required
MDF WEF 32	Modderfontein WEF 32	Dark quartzite flake	MSA	-31.74648	23.2732	NCW	None required
MDF WEF 33	Modderfontein WEF 33	Light blue hornfels core flake	MSA	-31.74636	23.27381	NCW	None required
MDF WEF 34	Modderfontein WEF 34	Quartzite flake	MSA	-31.74543	23.28194	NCW	None required
MDF WEF 35	Modderfontein WEF 35	Iron pole	Historic	-31.73848	23.28047	NCW	None required
MDF WEF 36	Modderfontein WEF 36	Heavily patinated hornfels flake	MSA	-31.73611	23.27514	NCW	None required
MDF WEF 37	Modderfontein WEF 37	Heavily patinated hornfels flake	MSA	-31.73566	23.27339	NCW	None required
MDF WEF 38	Modderfontein WEF 38	Quartzite core	MSA	-31.73583	23.26792	NCW	None required
MDF WEF 39	Modderfontein WEF 39	Dark quartzite flake	MSA	-31.73748	23.26705	NCW	None required
MDF WEF 40	Modderfontein WEF 40	Historical scratched graffiti	Historic	-31.73825	23.26693	IIIB	None required unless layout changed
MDF WEF 41	Modderfontein WEF 41	Quartzite flake large	MSA	-31.74112	23.26532	NCW	None required
MDF WEF 42	Modderfontein WEF 42	hornfels flakes	MSA	-31.74223	23.2644	NCW	None required
MDF WEF 43	Modderfontein WEF 43	Formal hornfels point	MSA	-31.7428	23.2639	NCW	None required
MDF WEF 44	Modderfontein WEF 44	hornfels core flake	MSA	-31.7465	23.25938	NCW	None required
MDF WEF 45	Modderfontein WEF 45	Hornfels flake	MSA	-31.74718	23.25865	NCW	None required
MDF WEF 46	Modderfontein WEF 46	hornfels core	MSA	-31.75232	23.25423	NCW	None required
MDF WEF 47	Modderfontein WEF 47	Lots of MSA blades hornfels	MSA	-31.75398	23.25765	IIIB	100m Buffer, none required with



CTS HERITAGE

							revised layout
MDF WEF 48	Modderfontein WEF 48	Hornfels flake	MSA	-31.75414	23.26089	NCW	None required
MDF WEF 49	Modderfontein WEF 49	Quartzite flake	MSA	-31.75326	23.26362	NCW	None required
MDF WEF 50	Modderfontein WEF 50	Heavily patinated hornfels flake	MSA	-31.759	23.27011	NCW	None required
MDF WEF 51	Modderfontein WEF 51	Hornfels flake	MSA	-31.76112	23.26412	NCW	None required
MDF WEF 52	Modderfontein WEF 52	Hornfels chunk	MSA	-31.76764	23.25944	NCW	None required
MDF WEF 53	Modderfontein WEF 53	Hornfels quarrying	MSA	-31.76814	23.26059	NCW	None required
MDF WEF 54	Modderfontein WEF 54	Dark quartzite cores and flakes	MSA	-31.76601	23.25705	NCW	None required
MDF WEF 55	Modderfontein WEF 55	Hornfels blade	MSA	-31.76552	23.25326	NCW	None required
MDF WEF 56	Modderfontein WEF 56	Hornfels blade	MSA	-31.7658	23.25212	NCW	None required
MDF WEF 57	Modderfontein WEF 57	Hornfels core flake	MSA	-31.74027	23.25612	NCW	None required
MDF WEF 58	Modderfontein WEF 58	Hornfels flakes and cores, various grades	MSA	-31.73846	23.25733	NCW	None required
MDF WEF 59	Modderfontein WEF 59	Metal fencing wire	Modern	-31.74098	23.25548	NCW	None required
MDF WEF 60	Modderfontein WEF 60	Early MSA hornfels flakes	MSA	-31.741	23.25002	NCW	None required
MDF WEF 61	Modderfontein WEF 61	Heavily patinated hornfels flake	MSA	-31.73774	23.24169	NCW	None required
MDF WEF 62	Modderfontein WEF 62	Diagnostic MSA, radial core and blade, higher grade hornfels	MSA	-31.73555	23.24157	NCW	None required
MDF WEF 63	Modderfontein WEF 63	Hornfels core	MSA	-31.73616	23.24245	NCW	None required
MDF WEF 64	Modderfontein WEF 64	Hornfels flake	MSA	-31.74967	23.24374	NCW	None required
MDF WEF 65	Modderfontein WEF 65	Hornfels flakes and cores, higher grade hornfels	MSA	-31.75847	23.23462	NCW	None required
MDF WEF 66	Modderfontein WEF 66	Hornfels flake patinated, light blue	MSA	-31.76114	23.23104	NCW	None required
MDF WEF 67	Modderfontein WEF 67	hornfels flake long, unworked	MSA	-31.76718	23.22296	NCW	None required
MDF WEF 68	Modderfontein WEF 68	hornfels flakes, hornfels thin burin bladelet	MSA, LSA	-31.76789	23.22403	IIIA	Avoid, 100m buffer
MDF WEF 69	Modderfontein WEF 69	Small patinated hornfels flake	MSA	-31.76739	23.22573	NCW	None required
MDF WEF 70	Modderfontein WEF 70	Hornfels flakes white patina, core	MSA	-31.76193	23.24633	NCW	None required
MDF WEF 71	Modderfontein WEF 71	hornfels flake	MSA	-31.76038	23.24767	NCW	None required
MDF WEF 72	Modderfontein WEF 72	Stone kraal walling	Historic	-31.76035	23.24769	IIIB	100m buffer
MDF WEF 73	Modderfontein WEF 73	Hornfels core	MSA	-31.75844	23.24437	NCW	None required
MDF WEF 74	Modderfontein WEF 74	Quartzite core flake	MSA	-31.74712	23.23789	NCW	None required
MDF WEF 75	Modderfontein WEF 75	Very heavily patinated hornfels flakes	MSA	-31.74583	23.23316	NCW	None required



CTS HERITAGE

MDF WEF 76	Modderfontein WEF 76	Very heavily patinated hornfels flakes	MSA	-31.74419	23.23332	NCW	None required
MDF WEF 77	Modderfontein WEF 77	Hornfels adzes, ccs point	LSA	-31.743	23.23312	NCW	None required
MDF WEF 78	Modderfontein WEF 78	Various hornfels flakes, LSA and MSA, quartzite flake and core	MSA	-31.74503	23.23312	IIIC	None required unless layout changes
MDF WEF 79	Modderfontein WEF 79	Binneman site, scratched and incised engravings, hard to make out the older figures. Msa and historic artefacts	Historic	-31.74646	23.22203	IIIA	Avoid, 100m buffer
MDF WEF 80	Modderfontein WEF 80	Hornfels blade	MSA	-31.74951	23.21942	NCW	None required
MDF WEF 81	Modderfontein WEF 81	Hornfels flake	MSA	-31.75221	23.21535	NCW	None required
MDF WEF 82	Modderfontein WEF 82	Early MSA flaked core quartzite	MSA	-31.73672	23.21722	NCW	None required
MDF WEF 83	Modderfontein WEF 83	Early MSA flakes quartzite	MSA	-31.73369	23.21429	NCW	None required
MDF WEF 84	Modderfontein WEF 84	Early MSA quartzite flaked core	MSA	-31.7289	23.22327	NCW	None required
MDF WEF 85	Modderfontein WEF 85	High grade hornfels retouched blade	MSA	-31.72651	23.22583	NCW	None required

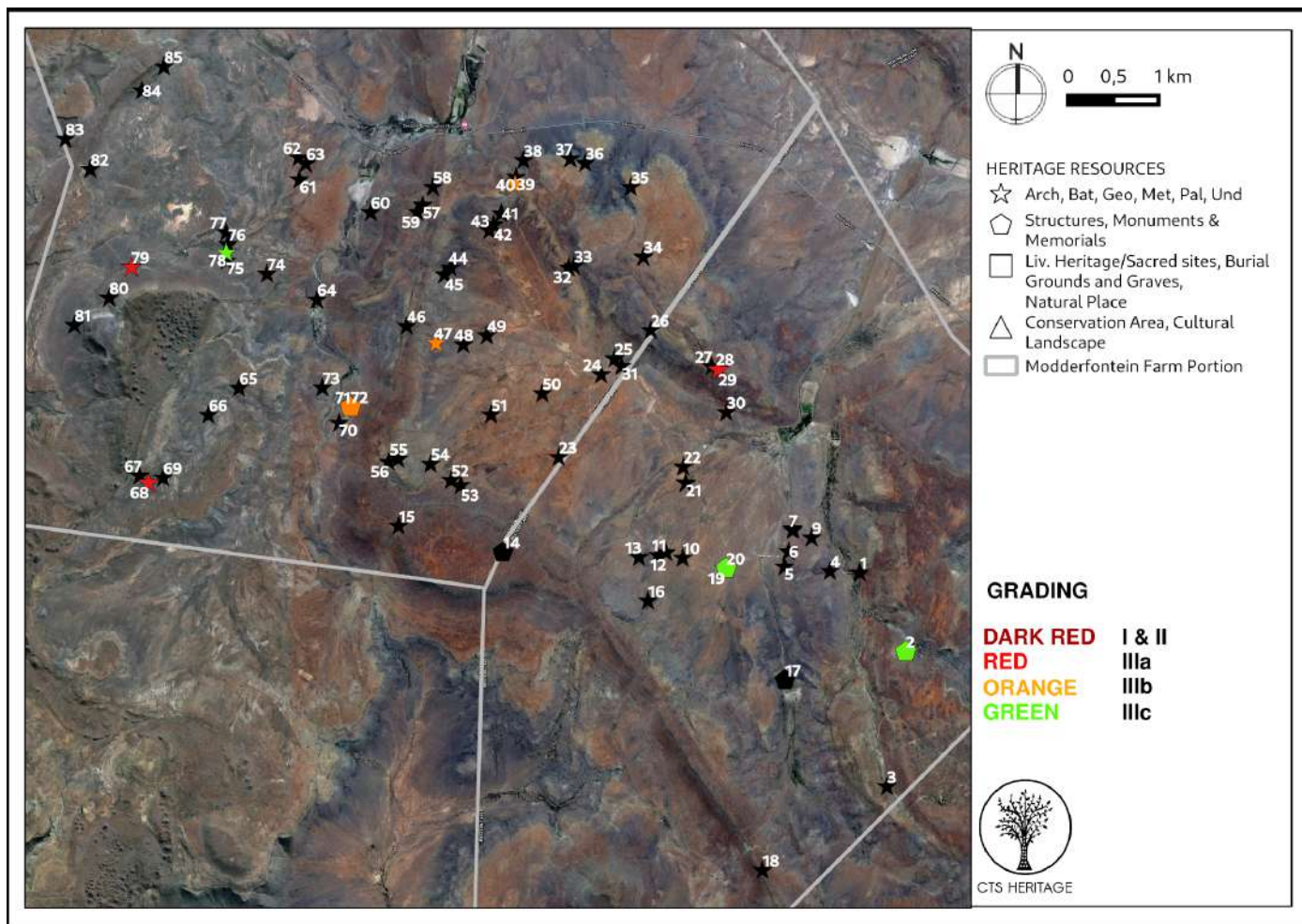


Figure 6: Map of observations from the April 2021 field assessment



4.3 Selected photographic record

(a full photographic record is available upon request)



Figure 7.1: MDF 002



Figure 7.2: MDF 020



Figure 7.3: MDF 020



CTS HERITAGE

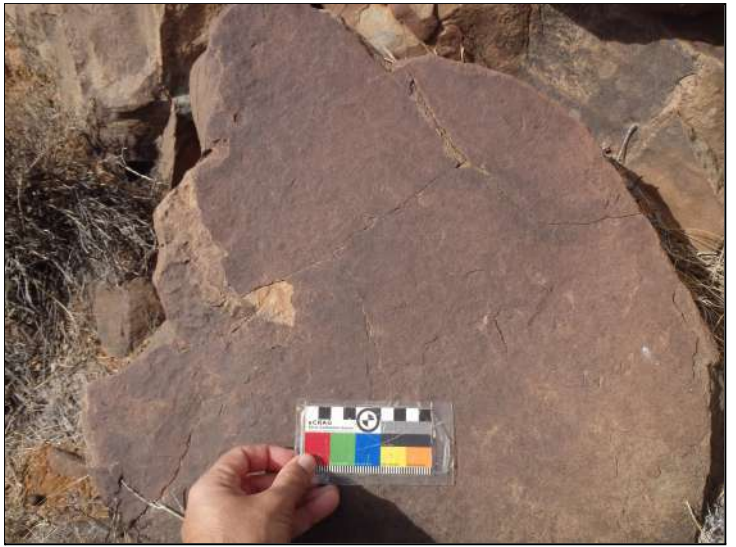


Figure 7.4: MDF 028



Figure 7.5: MDF 028



Figure 7.6: MDF 029



CTS HERITAGE



Figure 7.7 MDF 040



Figure 7.8 MDF 047



Figure 7.9 MDF 068



CTS HERITAGE



Figure 7.10 MDF 068



Figure 7.11 MDF 068



Figure 7.12 MDF 072



CTS HERITAGE



Figure 7.13 MDF 072



Figure 7.14 MDF 078



Figure 7.15 MDF 079



CTS HERITAGE



Figure 7.16 MDF 079



Figure 7.17 MDF 079



Figure 7.15 MDF 079



CTS HERITAGE

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

Impacts of the Authorised Layout

According to Binneman et al (2011), “It is highly likely that the surface scatters of Middle Stone Age stone artefacts encountered occur in a disturbed context owing to water runoff, wash and erosion along the floodplains as well as being washed down the slopes of rocky outcrops and ridges”. Similarly the occurrence of Later Stone Age stone artefacts may have been disturbed by erosion as well as natural and animal disturbances. Documented areas containing rock engravings on boulders should be avoided and further investigation into the areas containing boulders surrounding the points of the proposed turbines should be investigated for further possible occurrences of rock engravings. The stone wall structures must be avoided during the construction phase of the proposed development.” Based on the location of known archaeological heritage located within the proposed development area, the amended layout will not impact on any known heritage resources and all proposed turbines are located more than 100m from any known resources. There is no objection to the proposed amended layout on condition that the recommendations included in the assessment completed by Binneman (2011) are adhered to. These are -

1. The exposed human remains must be reported to the South African Heritage Resources Agency (SAHRA) so that they may appoint the relevant archaeologist/s to remove the exposed human remains.
2. No construction activities may take place within 100m of the documented rock shelters containing rock paintings and boulders containing rock engravings.
3. The ridges and rocky outcrops surrounding the locations of the turbines and solar panels must be investigated prior to construction to establish whether undocumented rock shelters contain rock paintings and rocky outcrops contain boulders with rock engravings. If any are encountered the recommendations in point 2 will be implemented.
4. No construction activities may take place within 100m of the documented stone-wall structures.
5. If it is inevitable that construction activities must take place within 100m of any documented and undocumented rock shelters containing paintings, rocky outcrops with boulders containing rock engravings and stone-wall structures a perimeter fence must be erected to protect the sensitive area from any possible negative impact.
6. It is possible that in situ archaeological sites/remains, and human remains may be uncovered during construction. Therefore, a professional archaeologist should be appointed during the vegetation removal and construction phases of the development.

The 100m buffer zones recommended by Binneman (2011) are mapped in the figures below. As per Figures 8.1, 8.2 and 8.3, the authorised layout complies with these recommendations as well as the recommendations from SAHRA for the Northern Cape component of the proposed development.

In their response to the Karoo Renewable Wind Energy project, SAHRA specifically requested that the Later Stone Age sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737) must be mitigated with a Phase 2 Archaeological Impact Assessment. However, as indicated in Figure 8.1 below, none of these sites is likely to be negatively impacted by the authorised layout.



CTS HERITAGE

A number of additional heritage resources were identified in the 2021 field assessment. Of the resources identified that have heritage significance, sites MDF 047 (hornfels scatter) and MDF 072 (stone kraal) are located in close proximity to authorised turbine positions (Figure 8.1 and 8.3). The proposed turbines at these locations are more than 50m away from the identified resources but closer than 100m. It is unlikely that these resources will be negatively impacted by the proposed turbine construction, especially since the revised layout places turbines much further away than 100m from these sites.

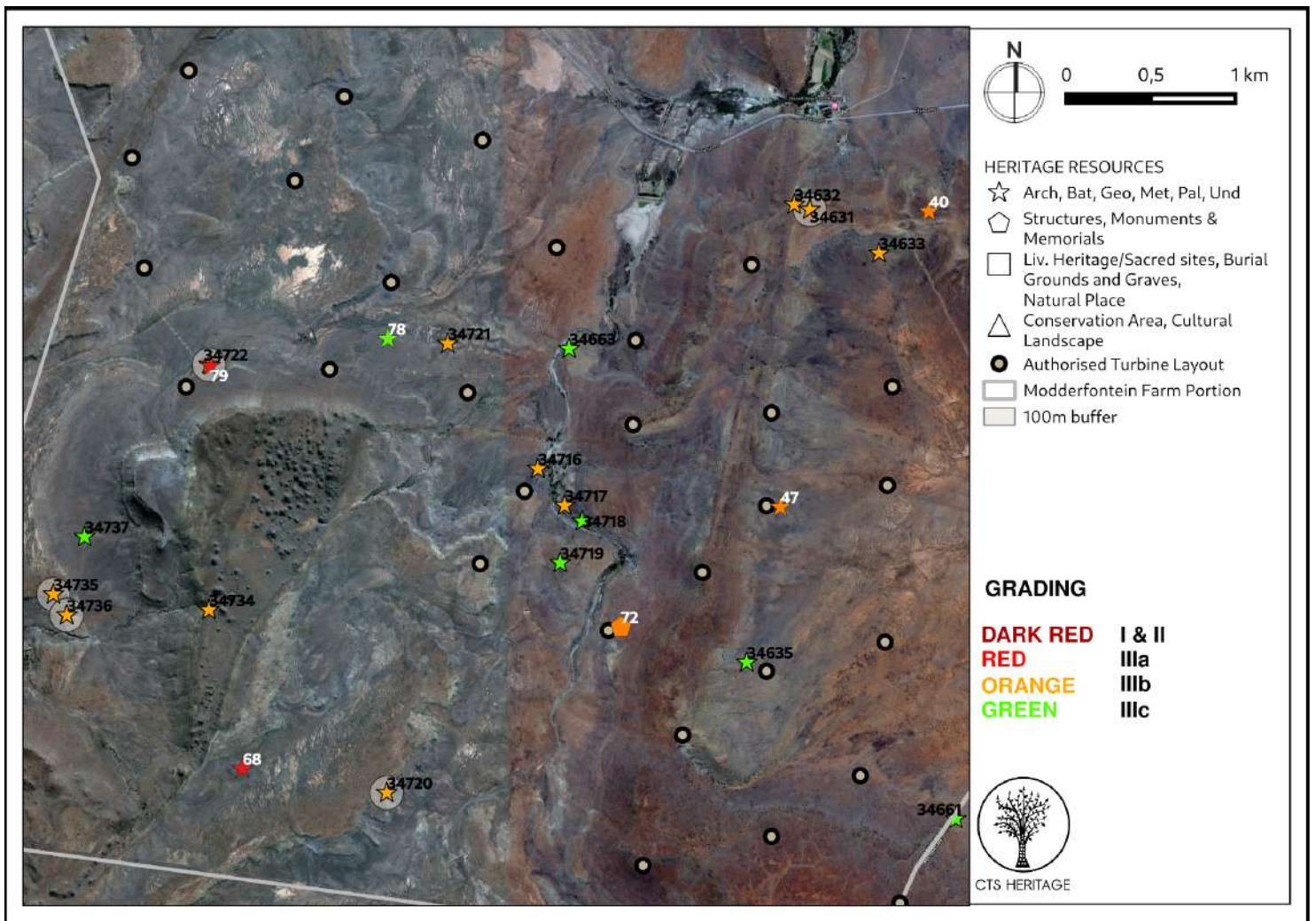


Figure 8.1: Map of heritage resources identified during the field assessment and on SAHRIS relative to the Authorised Layout located in the Northern Cape



CTS HERITAGE

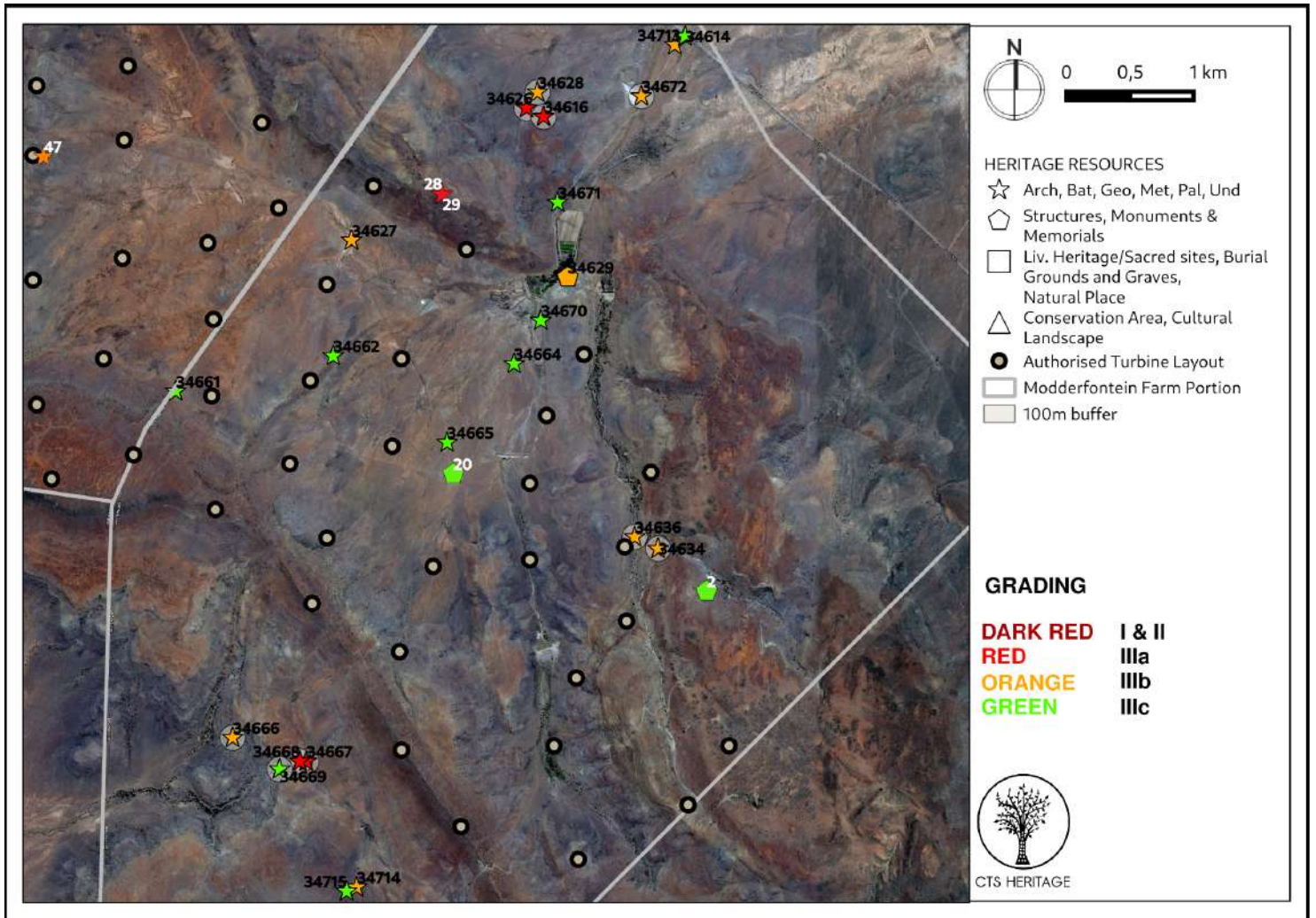


Figure 8.2: Map of heritage resources identified during the field assessment and on SAHRIS relative to the Authorised Layout located in the Western Cape



CTS HERITAGE

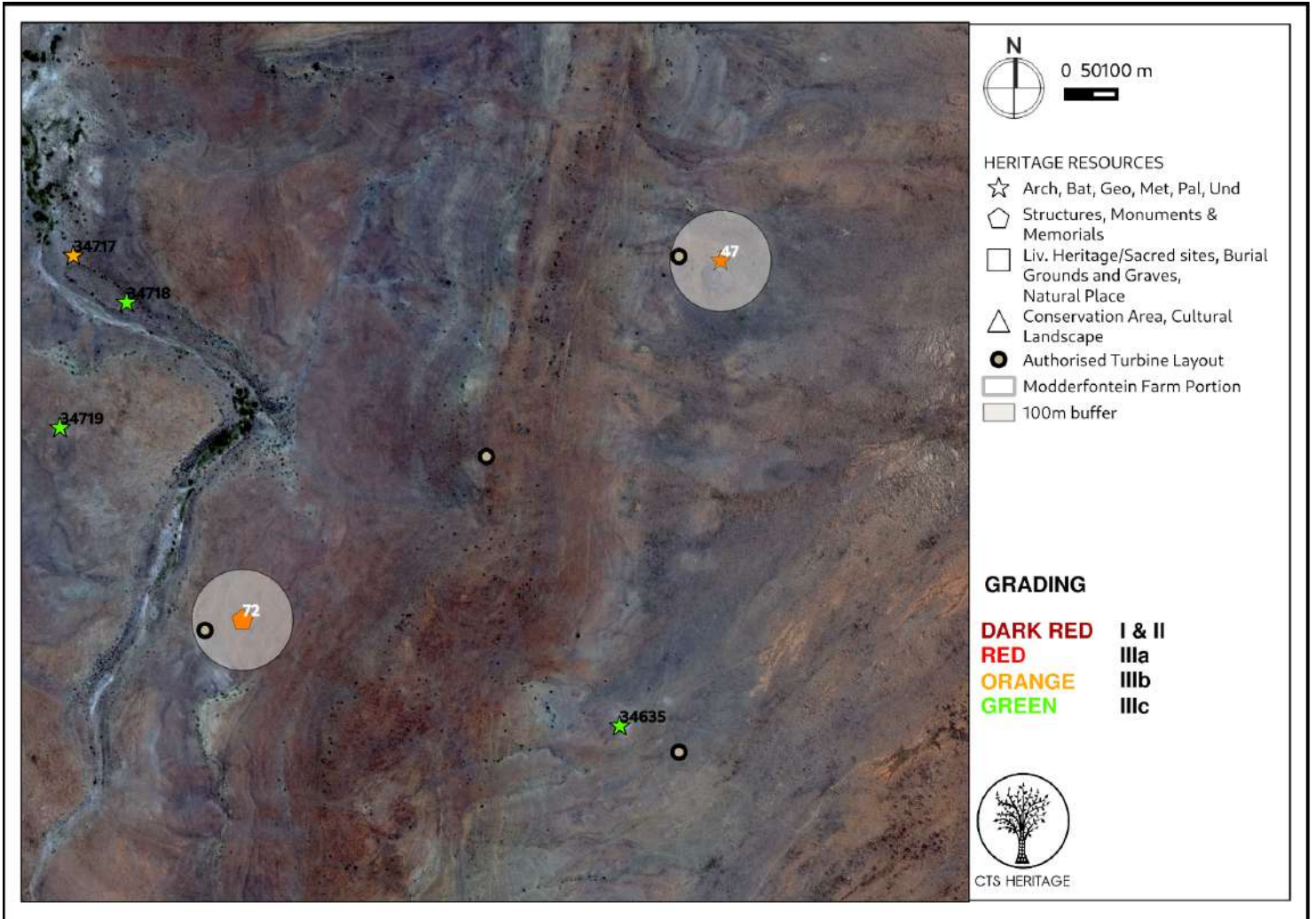


Figure 8.3 Map indicating the location of Sites MDF 047 and MDF 072 in proximity to a previously authorised turbine location with 100m buffer indicated in the Northern Cape



CTS HERITAGE

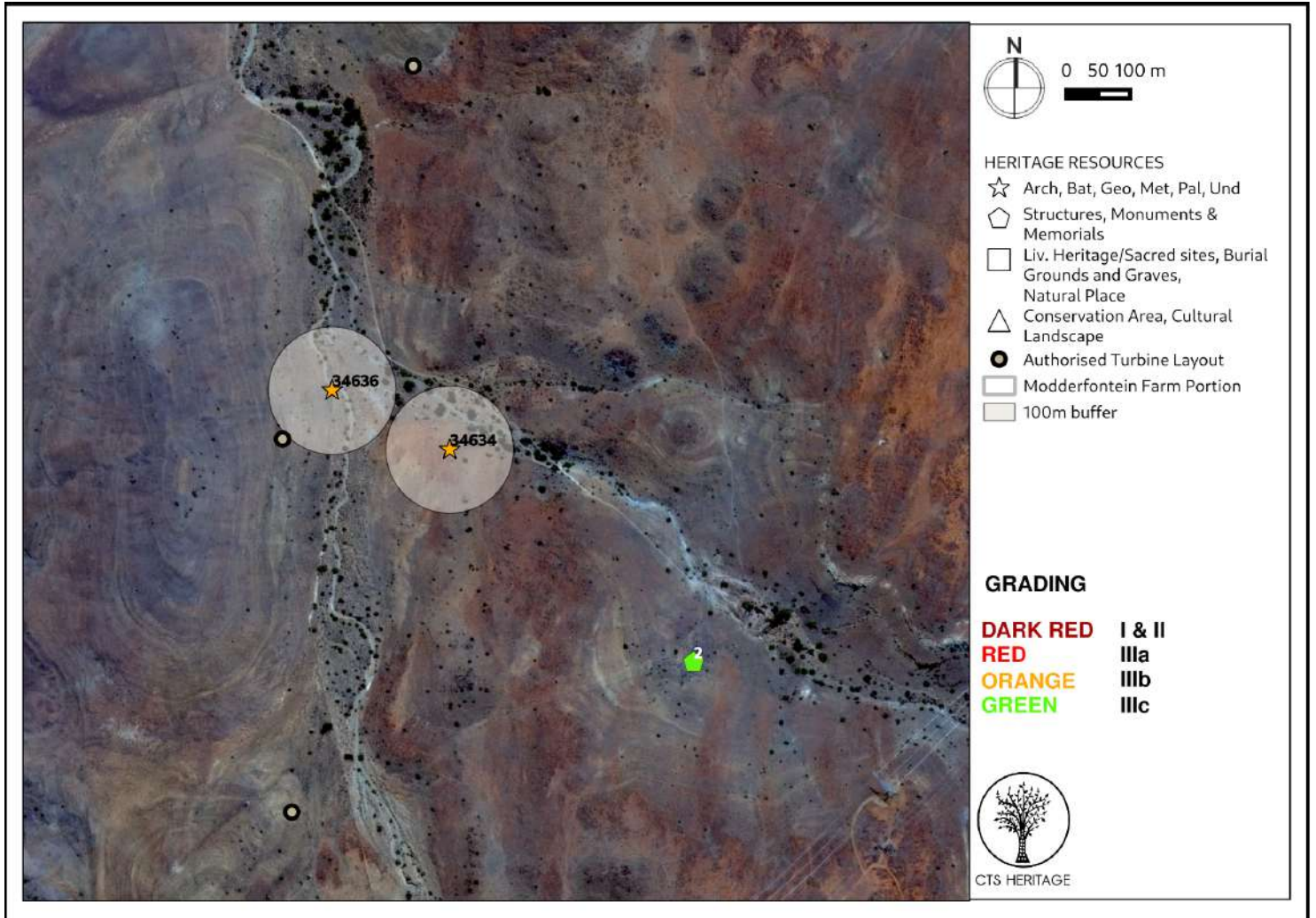


Figure 8.4: Map indicating the location of Sites with SAHRIS ID 34636 and 34634 in proximity to a previously authorised turbine location with 100m buffer indicated in the Western Cape

Impacts of the Proposed Amended Layout

The proposed amended turbine layout is greatly reduced compared to the authorised layout, with only 25 turbines proposed as opposed to the 67 turbines in the authorised layout. The anticipated impact to archaeological heritage resources is therefore greatly reduced.

No impacts to archaeological heritage resources are anticipated resulting from the proposed amended turbine layout in the Northern Cape. All proposed turbines are located well away from any significant identified archaeological sites.

In the proposed amended layout, only 5 turbines are proposed within the Western Cape. No archaeological resources were identified within the vicinity of four of the turbines located in the Western Cape however one turbine is located almost on top of two significant archaeological resources - MDF 028 and MDF 029. Both of these sites are historic rock art sites and have been determined to have high local significance. In the proposed amended layout, these resources are likely to be negatively impacted and as such, **it is recommended that the turbine is moved to a location more than 100m from the identified rock art sites** (Figure 9.2 and 9.3).



CTS HERITAGE

In their response to the Karoo Renewable Wind Energy project, SAHRA specifically requested that the Later Stone Age sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737) must be mitigated with a Phase 2 Archaeological Impact Assessment. However, as indicated in Figure 9.1 below, none of these sites is likely to be negatively impacted by the proposed amended layout. As such, it is rather recommended that these sites be avoided and that no impact should take place.

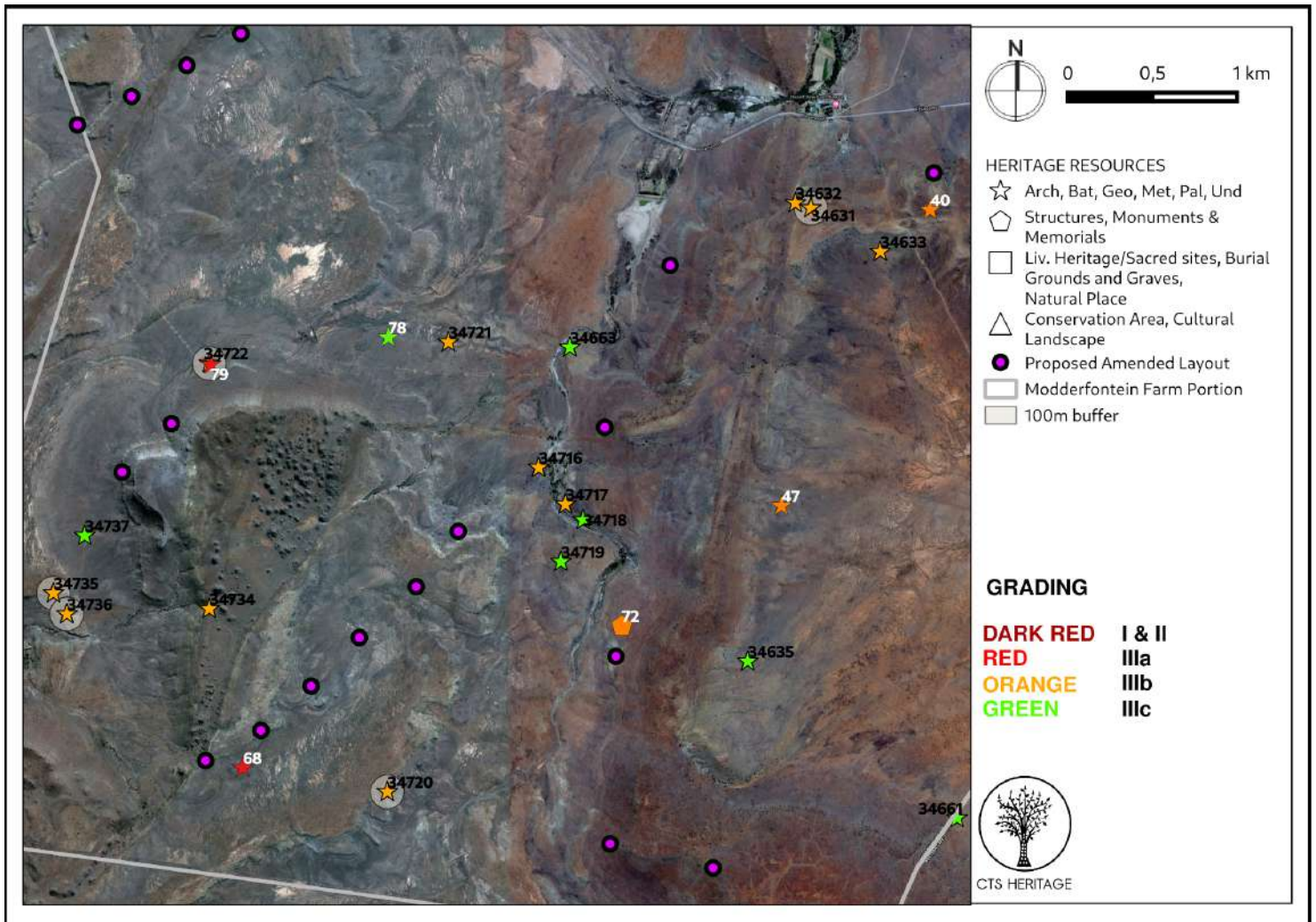


Figure 9.1: Map of heritage resources identified during the field assessment and on SAHRIS relative to the proposed Amended Layout located in the Northern Cape. Sites MDF 072 and 047 are now completely unaffected in the proposed 100m buffer zones.



CTS HERITAGE

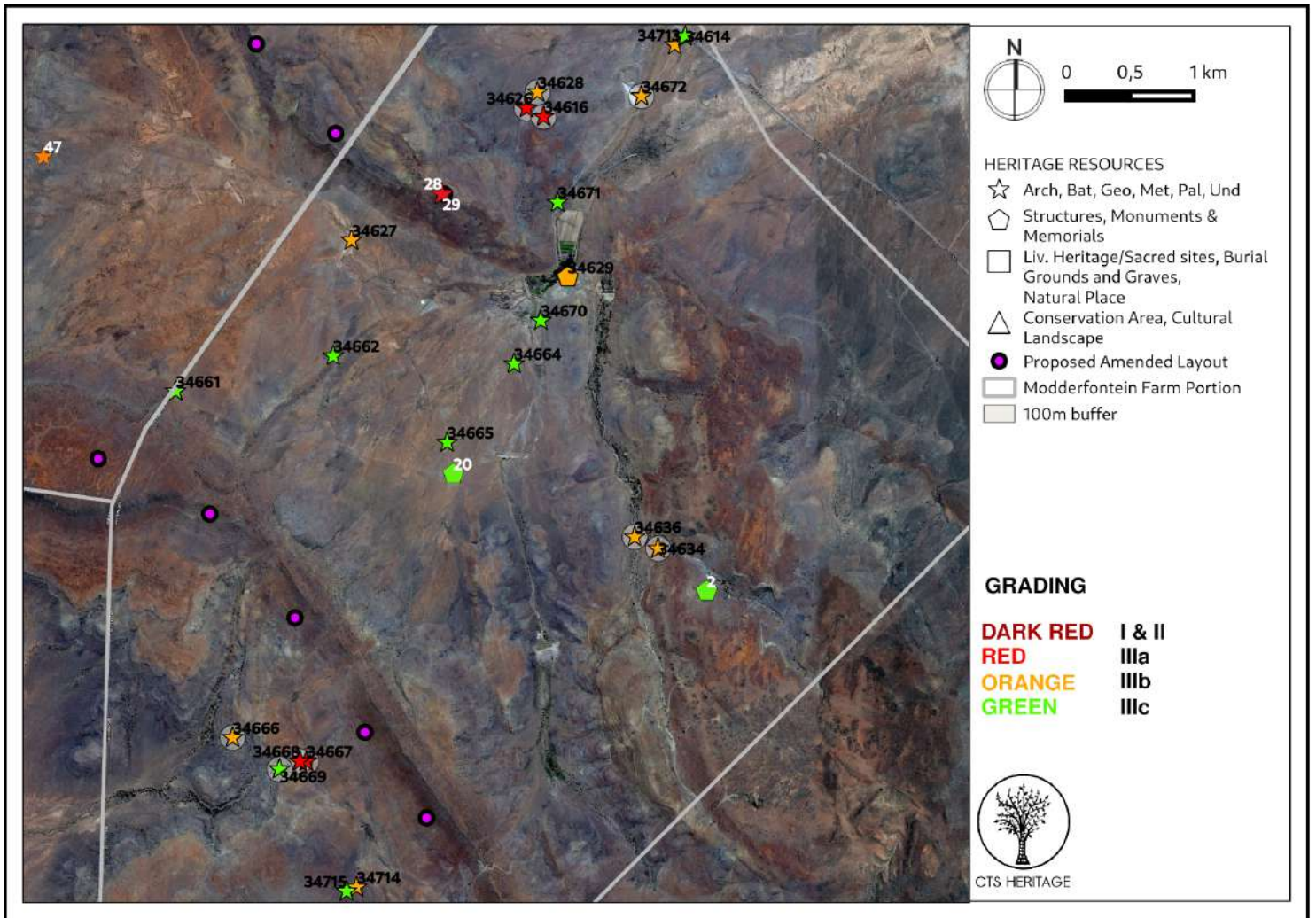


Figure 9.2: Map of heritage resources identified during the field assessment and on SAHRIS relative to the proposed Amended Layout located in the Western Cape



CTS HERITAGE



Figure 9.3: Map indicating the location of Sites MDF 028 and MDF 029 in proximity to a proposed turbine location with 100m buffer indicated in the Western Cape

6. CONCLUSION AND RECOMMENDATIONS

Based on the outcomes of this report, it is not anticipated that the proposed development will negatively impact on significant archaeological heritage on condition that the following recommendations are implemented:

For the Authorised Layout:

- No development takes place within 100m of identified rock art sites or of identified stone kraals
- No impact to any significant identified archaeological resource is permitted including sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737)
- Should any new heritage resources be uncovered during the course of development activities, work in the vicinity of the find must cease and HWC (in the Western Cape) and SAHRA (in the Northern Cape) must be contacted regarding an appropriate way forward.



CTS HERITAGE

For the proposed amended layout (May 2021):

- The turbine proposed to be located in the vicinity of sites MDF 028 and MDF 029 is moved to an alternative location more than 100m away from the identified archaeological heritage
- Besides the relocation of the turbine at MDF 028 & 029, no mitigation is necessary as the turbine positions are outside of the 100m buffers surrounding any IIIC or above sites
- No impact to any significant identified heritage resource is permitted including sites S31, S32 and S39 (SAHRIS IDs 34718, 34719 and 34737)
- Should any new heritage resources be uncovered during the course of development activities, work in the vicinity of the find must cease and HWC (in the Western Cape) and SAHRA (in the Northern Cape) must be contacted regarding an appropriate way forward.



CTS HERITAGE

7. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
7035	AIA Phase 1	Johan Binneman, Celeste Booth, Natasha Higgitt	05/03/2011	A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Karoo Renewable Energy Facility on a site south of Victoria West, Northern and Western Cape Province on the farms Phaisantkraal 1, Modderfontein 228, Nobelsfontein 227, Annex Nobelsfontein
7036	AIA Desktop	Celeste Booth, Natasha Higgitt	19/11/2010	An Archaeological Desktop Study for the proposed Karoo Renewable Energy Facility on a site south of Victoria West, Northern and Western Cape
7947	AIA Desktop	Frans Prins	05/02/2011	DRAFT Technical Report in support of the EMP for the South Western Karoo Basin Gas Exploration Application Project: CULTURAL HERITAGE: CENTRAL PRECINCT
8943	PIA Phase 1	Lloyd Rossouw	24/03/2011	Palaeontological desktop assessment of a commercial renewable energy facility site located approximately 34km south of Victoria West in the Western Cape Province (and Northern Cape)
120317	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120820	HIA Phase 1	Celeste Booth	01/12/2012	An Archaeological Ground-Truthing Walk-Through For The Nobelsfontein Wind Energy Facility Situated On A Site South Of Victoria West On The Farms Nobelsfontein 227, Annex Nobelsfontein 234, Ezelsfontein 235, And Rietkloofplaaten 239, Northern Cape Province



CTS HERITAGE

APPENDIX 1: Sites within the study area recorded on SAHRIS

See SAHRIS for full site descriptions

Site ID	Site no	Full Site Name	Site Type	Grading
WESTERN CAPE				
34627	MOD9	Modderfontein 9	Artefacts	Grade IIIb
34626	PHAIS4	Phaisantkraal 4	Artefacts, Rock Art	Grade IIIa
34628	PHAIS5	Phaisantkraal 5	Rock Art	Grade IIIb
34629	PHAIS6	Phaisantkraal 6	Building	Grade IIIb
34634	PHAIS7	Phaisantkraal 7	Rock Art, Stone walling	Grade IIIb
34636	PHAIS8	Phaisantkraal 8	Stone walling	Grade IIIb
34661	MOD14	Modderfontein 14	Artefacts	Grade IIIc
34662	MOD15	Modderfontein 15	Artefacts	Grade IIIc
34664	MOD17	Modderfontein 17	Artefacts	Grade IIIc
34665	MOD18	Modderfontein 18	Artefacts	Grade IIIc
34666	PHAI19	Phaisantkraal19	Stone walling	Grade IIIb
34667	PHAI20	Phaisantkraal 20	Rock Art	Grade IIIa
34668	PHAI21	Phaisantkraal 21	Deposit, Rock Art	Grade IIIa
34669	PHAI22	Phaisantkraal 22	Rock Art	Grade IIIc
34670	PHAI23	Phaisantkraal 23	Artefacts	Grade IIIc
34671	PHAI24	Phaisantkraal 24	Artefacts	Grade IIIc
34672	PHAI25	Phaisantkraal 25	Stone walling	Grade IIIb
34713	PHAI26	Phaisantkraal 26	Artefacts	Grade IIIb
34714	PHAI27	Phaisantkraal 27	Artefacts	Grade IIIb
34715	PHAI28	Phaisantkraal 28	Artefacts	Grade IIIc
34614	PHAIS1	Phaisantkraal 1	Artefacts	Grade IIIc
34615	PHAIS2	Phaisantkraal 2	Stone walling	Grade IIIa
34616	PHAIS3	Phaisantkraal 3	Stone walling	Grade IIIa



CTS HERITAGE

Site ID	Site no	Full Site Name	Site Type	Grading
NORTHERN CAPE				
34716	MOD29	Modderfontein 29	Artefacts	Grade IIIb
34717	MOD30	Modderfontein 30	Stone walling, Artefacts	Grade IIIb
34631	MOD10	Modderfontein 10	Rock Art, Artefacts	Grade IIIb
34632	MOD11	Modderfontein 11	Artefacts	Grade IIIb
34633	MOD12	Modderfontein 12	Artefacts	Grade IIIb
34635	MOD13	Modderfontein 13	Artefacts	Grade IIIc
34663	MOD16	Modderfontein 16	Artefacts	Grade IIIc
34718	MOD31	Modderfontein 31	Artefacts	Grade IIIc
34719	MOD32	Modderfontein 32	Artefacts	Grade IIIc
34720	MOD33	Modderfontein 33	Stone walling	Grade IIIb
34721	MOD34	Modderfontein 34	Artefacts	Grade IIIb
34722	MOD35	Modderfontein 35	Rock Art	Grade IIIb
34734	MOD36	Modderfontein 36	Artefacts	Grade IIIb
34735	MOD37	Modderfontein 37	Stone walling	Grade IIIb
34736	MOD38	Modderfontein 38	Stone walling	Grade IIIb
34737	MOD39	Modderfontein 39	Artefacts	Grade IIIc



CTS HERITAGE

APPENDIX 2: Heritage Screening Assessment (March 2019)