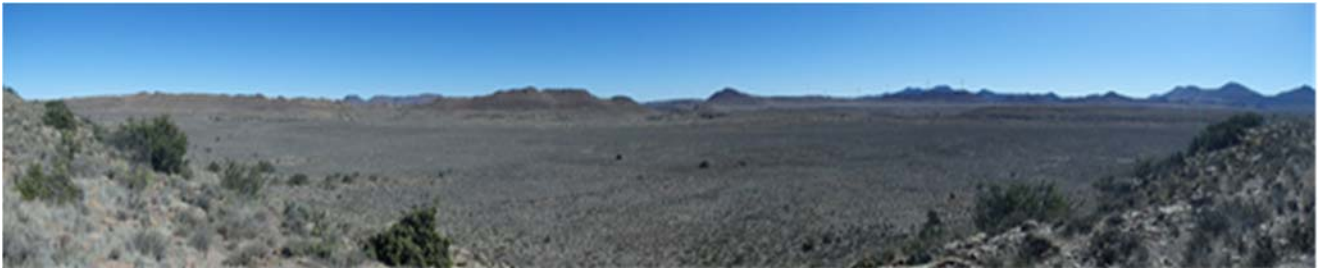


HERITAGE IMPACT ASSESSMENT

Cultural Landscape Assessment

In terms of Section 38(8) of the NHRA

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 Sarah Winter

For the Terramanzi Group

July 2021

TABLE OF CONTENTS

A. INTRODUCTION	3
A.1 Brief and Scope	
A.2 Project Description	
B. CULTURAL LANDSCAPE SIGNIFICANCE	16
B.1 Regional cultural landscape patterns	
B.2 Role of the site as a cultural landscape	
B.2.1 Landscape qualities	
B.2.2 Site elements	
C. SUMMARY OF THE VISUAL IMPACT ASSESSMENTS	15
D. IMPACTS ON CULTURAL LANDSCAPE RESOURCES	17
E. CONCLUSIONS AND RECOMMENDATIONS	20
REFERENCES	21

FIGURES:

Figure 1: Site location

Figure 2: Approved turbine layout for the Modderfontein WEF

Figure 3: Proposed amended turbine layout for the Modderfontein WEF

Figure 4: Typical section through the Great Karoo

Figure 5: Historical evolution of settlement patterns at the Cape

Figure 6: Map of the Cape Colony

Figure 7: Photo key plan

Figure 8: Location of stone engravings and historical built structures

Figure 9: Comparison of view sheds for authorised and amended layout

Figure 10: Visual simulation from Viewpoint 1

PHOTOGRAPHS:

Photos 1 to 7: Landscape context

Photo 8: Rock engraving

Photo 9: Small stone structure

Photo 10: Stone kraal and dipping pen

Photo 11: Stone kraal walling

Photo 12: Modderfontein homestead

TABLES:

Table 1: Impacts of the authorised layout and associated infrastructure to cultural landscape resources

Table 2: Impacts of the amended layout and associated infrastructure to cultural landscape resources

LIST OF APPENDICES:

Appendix A: Declaration of Independence and Expertise

A. INTRODUCTION

The Modderfontein Wind Energy Facility (WEF) is located on the boundary of the Western and Northern Cape Provinces, approximately 20km northeast of Three Sisters and is located within the Beaufort West REDZ area. The application is for a proposed amendment to the authorised layout.

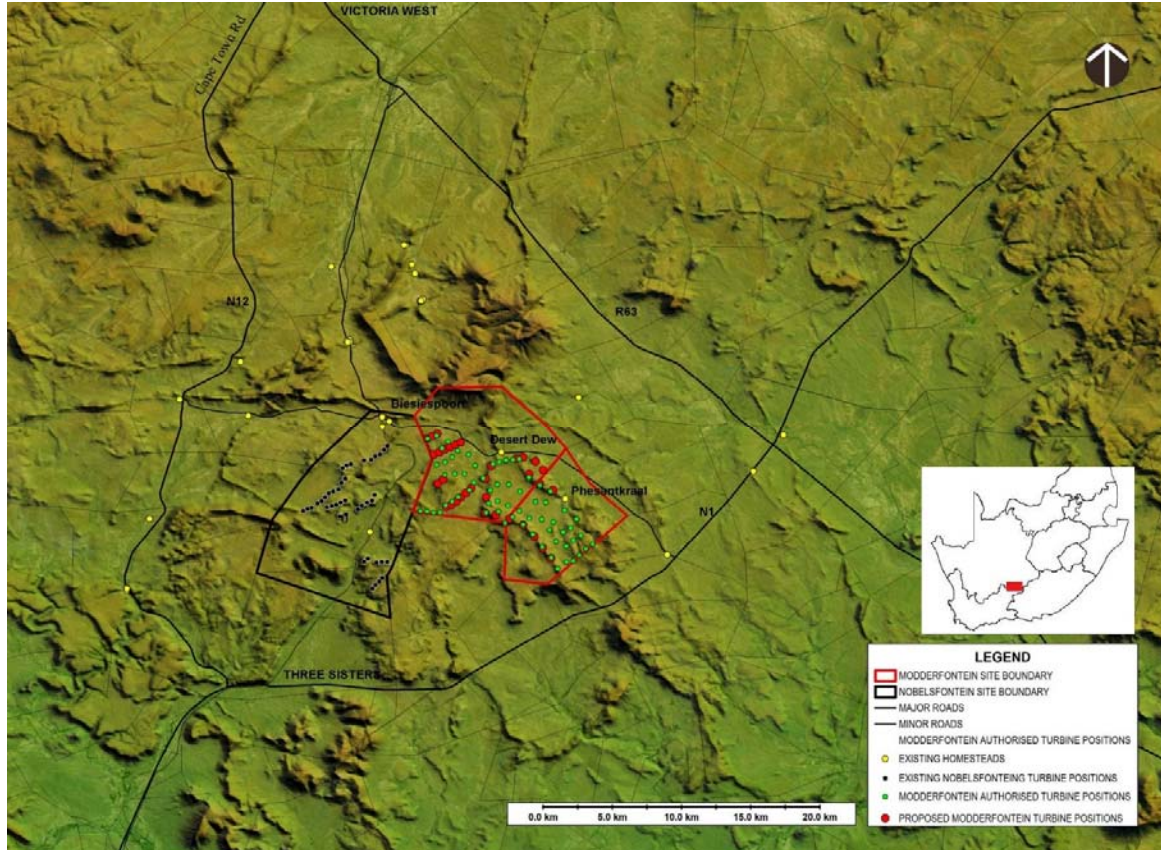


Figure 1: Site Location

A.1. Brief and Scope

The purpose of this cultural landscape assessment is two-fold:

1. To assess the 2011 authorised layout from a cultural landscape perspective as a component of an integrated heritage impact assessment (HIA) that satisfies Section 38 (3) of the National Heritage Resources Act (Act 25 of 1999; NHRA). This is a specific request from Heritage Western Cape (HWC) given that no integrated HIA including a cultural landscape assessment was submitted to Heritage Western Cape (HWC) for the development.
2. To assess the amended layout from a cultural landscape perspective with emphasis on a comparison between the authorised and amended layout.

This assessment is a desktop review of the information contained in the draft HIA prepared by CTS Heritage and initial and amended visual impact assessments (VIA) for the project with particular attention to sensitive heritage receptors from a cultural landscape perspective. Additional information was sourced from high-level cultural landscape assessment work undertaken in the region by the author and other others and is referenced accordingly.

A.2 Project description

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 approximately 20km from Three Sisters.

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 following amendments to the existing authorisation are proposed:

- Up to 34 wind turbines with a total generating capacity of 140MW (cluster 1) and 50.4MW (cluster 2).
- A total output of 190.4MW.
- WTGs with a generating capacity of up to 5.6 MW.
- An approximate 50% reduction in turbine density.

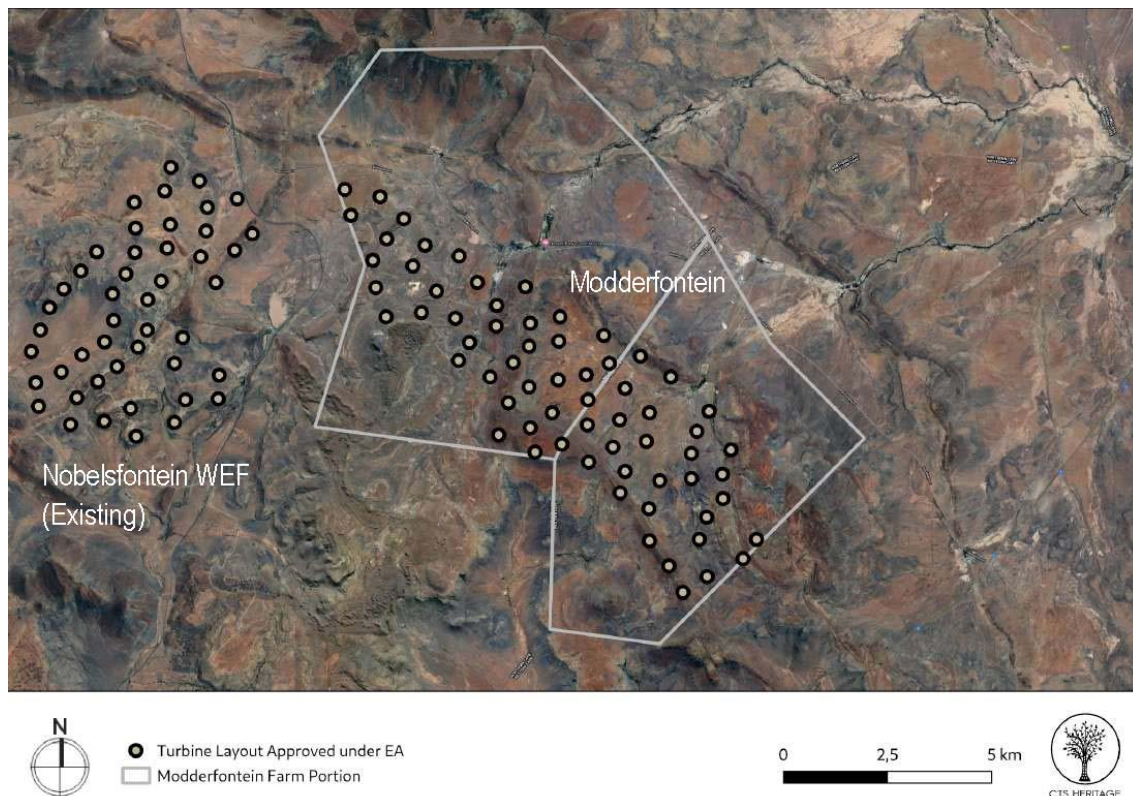


Figure 2: Approved turbine layout for the Modderfontein WEF

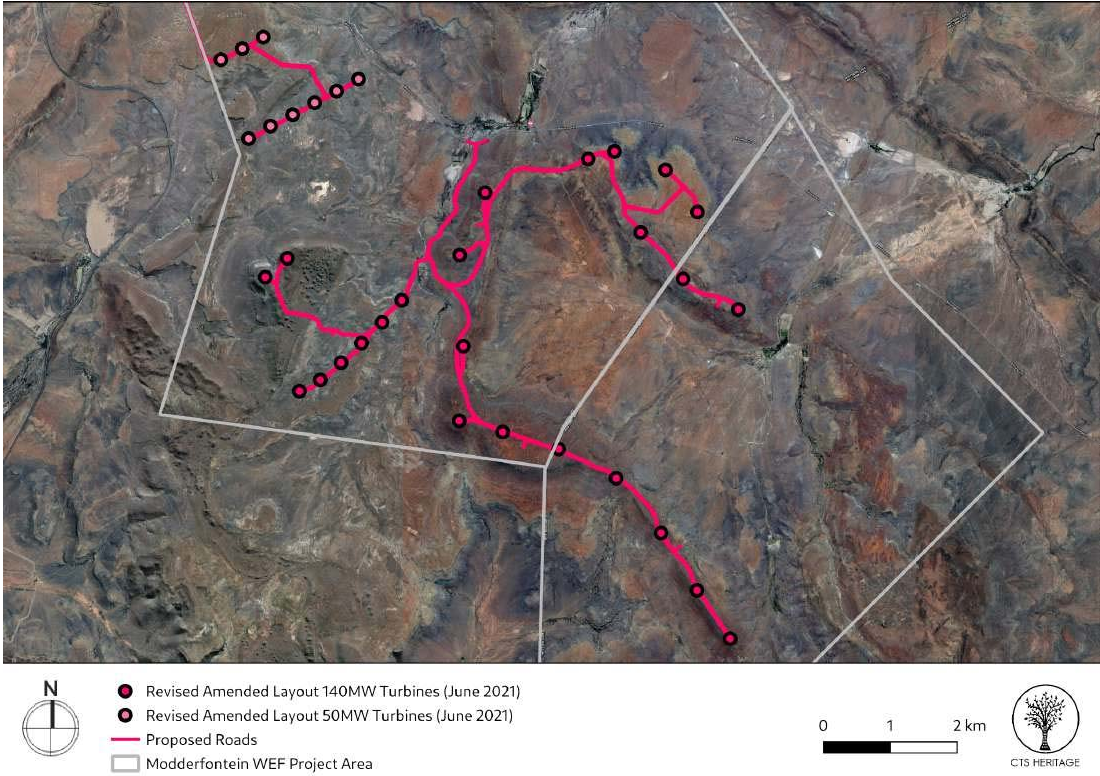


Figure 3: Proposed amended turbine layout for the Modderfontein WEF

B. CULTURAL LANDSCAPE SIGNIFICANCE

B.1 Regional cultural landscape patterns

The study area forms part of the Central Karoo region characterised by a semi-arid, dramatically expansive landscape with a perceived sense of limited human intervention associated with a sparse settlement pattern. On one level scattered homesteads and remote towns constitute the major components of a relatively pristine uncultivated cultural landscape with the closest urban settlements to Modderfontein being the small settlement of Three Sisters 12km south of the site and the town of Victoria West 34km north of the site. This is in some contrast to the N1 corridor and the regional role of Beaufort West 77km from site. The site also has a degree of linkage with the N1 to the southeast of the site, the N12 and railway line to the west of the site and the R63 to the northeast of the site. Also of consideration is the existing WEF at Nobelsfontein immediately adjacent to the site.

The overarching scenic qualities of the area are a function of its geology with the Beaufort Group shales forming low-lying 'vlaktes' to the east, framed by an escarpment rising to the Nuweveld Plateau to the west, and punctuated with dolerite koppies, e.g. Three Sisters. Three Sisters topographical landmark along the N1 is close to the turn-off from the N1 to the N12, being a major entry point to the Northern Cape and Kimberley from Cape Town. Modderfontein is located on near the escarpment where the landscape is more undulating and diverse features with low mountains and peaks

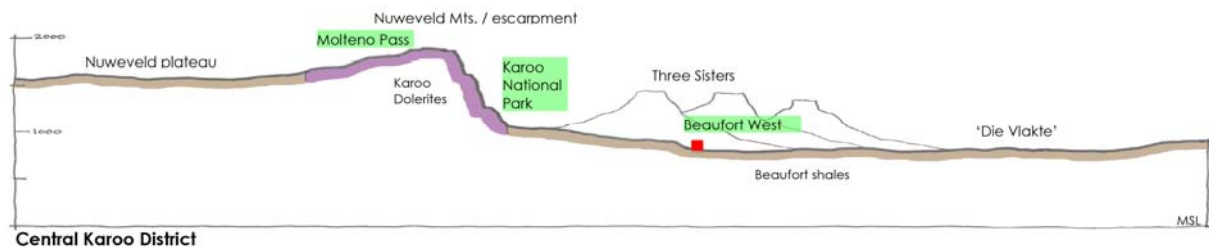


Figure 4: Typical Section through the Central Karoo (Winter & Oberholzer 2013)

The vegetation is generally low with a mixture of shrubs, grass and succulents and a few Acacia Karoo trees in the dry riverbeds. Farming is mostly small stock farming and more recently game farming.

The relatively undisturbed areas of the Karoo region are rich in archaeology with an archaeological record spanning hundreds of thousands of years. Archaeological sites typically occur near dolerite outcrops due to the presence of underground water, e.g. stone tool scatters, rock art and herder kraals (Winter & Oberholzer 2013).

The name 'Karoo' has its roots in the Khoisan word meaning 'place of great dryness'. It once supported large grassy flatlands and the San and Khoekhoen migrated across the region for hunting and grazing purposes. Less than two hundred years ago large herds of antelope still roamed the grass plains. With the occupation of the area by stock farmers the sheep gradually replaced the game and the grass receded along with changing grazing and weather patterns (Winter et al 2009; Winter & Oberholzer 2013).

By the late 17th century, the Khoekhoen had moved from the region into the more water rich southern Karoo and the coastal plains. Numerous rock paintings and engravings have been recorded in the region some dating to the 19th century, e.g. the engravings at Nelspoort as well as on Modderfontein (Winter et al 2009).

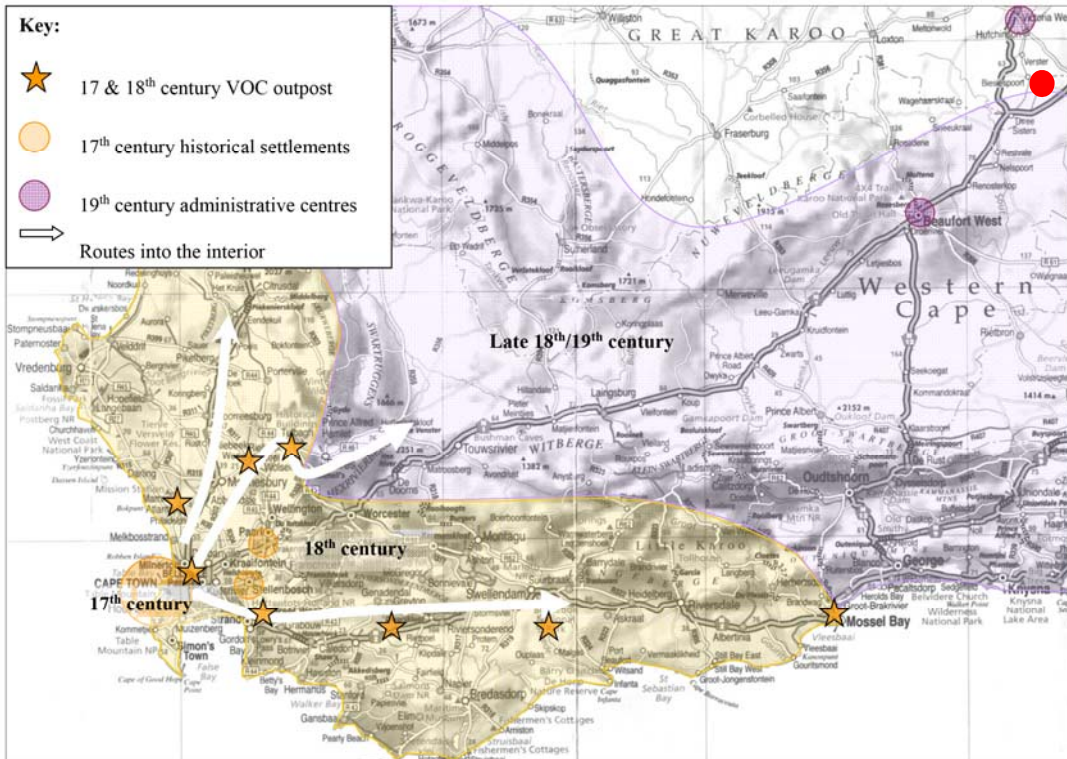


Figure 5: Historical evolution of settlement patterns at the Cape spanning the early and later colonial period with the approximate location of Modderfontein shown (red dot) between Victoria West and Three Sisters (Winter *et al* 2009)



Figure 6: Map of the Cape Colony showing the extent of the expansion of the colonial settlement with the approximate location of Modderfontein shown (red dot) below Victoria West (Davenport & Saunders n.d. 150 In Winter *et al*)

During the early colonial period, the harshness of the Karoo region formed an almost impenetrable barrier from the Cape to the interior for colonial explorers, hunters and travellers. The 18th century was characterized by a marked increase in the rate of expansion of the boundaries of the settlement at the Cape. This was associated with the emergence of the migrant stock farmer (trekboer) (Guelke 1982 In Winter et al 2009).

By 1745 freeburgher farmers had expanded into the Bokkeveld and Hantam regions beyond the Witzenberg Mountains. By 1770, two thirds of the freeburgher farmers were migrant stock farmers who subsisted through stock farming alone. These farmers were in direct competition with the Khoekhoen for grazing and water. By the end of the 18th century, the Khoekhoen were no longer the major suppliers of fresh meat to the refreshment station: this role having been taken over by certain freeburgher stock farmers (Guelke 1982 In Winter et al 2009).

The expansion of the stock farmers into the Karoo was fiercely resisted by the San. In the Koup (area surrounding Merweville) the San successfully managed to resist the presence of stock farmers until the early 1800s. The crux of this resistance was the alienation of indigenous groups from water sources (Penrith 1974; Viviers 1968 In Winter et al 2009).

Early routes into the interior largely followed the tracks initially used by migrating herds of game or the cattle herds and sheep flocks of the Khoekhoen on their seasonal route between coastal and inland grazing grounds. These routes were later reinforced by generations of trek farmers moving between the markets at the Cape and their farms (Winter et al 2009).

In 1795 the Cape was occupied by the British. Under the British rule, the Cape was actively colonized. Administration centres were established and urbanisation encouraged. Under the British administration, a number of mission stations were established. These mission stations initially provided refuge for dispossessed Khoekhoen and, after emancipation, ex-slaves as well (Winter et al 2009). According to Penn (Karoo National Park Display In Winter et al 2009), the British accomplished with the mission stations what the Dutch could not do with the commando system: pacify the Khoisan.

Permanent settlement of the region only really occurred in the 19th century with towns being established near permanent water sources. It during this period that Beaufort West was established as a drostdy in 1818 on the farm Hooyvlakte. In the same year, a mission station was established at Kookfontein, just outside Beaufort West (Winter et al 2009).

The discovery of diamonds and gold in the mid-19th century further escalated the rate of expansion of the colony and led to the increased use of stage coaches traveling to the diamond and gold fields, first at Kimberley and then later at the Witwatersrand (Winter et al 2009).

Victoria West, established as a church town in 1843 along the banks of the Brakrivier, was declared a municipality in 1859. Victoria West gained further significance as a stopover for stage coaches travelling to the diamond and gold fields (Winter et al 2009).

The railway line from Cape Town to the interior dates to the second half of the 19th century. The rail line reached Ceres in 1875 and Beaufort West in 1880. The railway link bypassed Victoria West until 1904 when a new line was opened linking Victoria West to Calvinia (Winter et al 2009).

The records of early colonial travellers note interactions with San people who inhabited the area near Victoria West up until the late 19th century. Rosenthal (1959 In Winter et al 2009) also refers to a 'Hottentot' location close to the town in the mid-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 the ongoing presence of the San in the landscape comes from the Later Stone Age archaeology and rock engravings found throughout the Karoo, and on Modderfontein farm (Lavin and Wiltshire 2021).

During the Anglo Boer War (1899-1901) a line of blockhouses were constructed along the railway line from the Cape Town to the Witwatersrand including Beaufort West and Victoria West.

The 1960s onwards saw the modernisation of infrastructure and the implementation of the National Road system (e.g. N1, N12 and R63). Many of the old routes are still in existence as secondary routes.

B.2 Role of the site as a cultural landscape

The site forms part of a broader cultural landscape representative of the Great Karoo region possessing heritage value for historical, aesthetic, architectural, social, scientific reasons. The site possesses a number of landscape qualities, which are representative of this cultural landscape or regional morphological zone as illustrated in photo sequence 1 to 8. However, the site does not possess particular heritage significance in its own right to warrant formal protection or grading from a cultural landscape perspective. Notwithstanding this, there are three aspects with heritage management implications from a cultural landscape perspective:

1. The site's location in relation to the national and regional route network has significance in terms of the experiential qualities of the broader landscape traversed by the N1, N12 and R63.
2. As noted in the VIA (2011), there is a significant presence of a number of tall hills and mountains with steep elevated slopes with an inherent scenic quality making them visually sensitive, as illustrated below.
3. As recorded in the Archaeological Impact Assessment (2021; AIA), embedded within the site are a number of conservation worthy archaeological and built features including rock engravings and stone structures, as illustrated below.

B.2.1 Landscape qualities



Photo 1: View from position 2 of a landscape with an undulating topography (Wiltshire 2021)



Photo 2: View from elevated position 7 across an open plain framed by distant mountains (Wiltshire 2021)



Photo 3: View from position 31 of an open expansive landscape, minimal visual presence of human intervention and low vegetation dominated by scrubland, with some thicket, bushland and bush clumps along drainage lines (Wiltshire 2021)



Photo 4: View from position 61 of a varied landscape with flat, open plains, ridges, rocky outcrops and hillocks or koppies (Wiltshire 2021)



Photo 5: View from position 74 with Nobelsfontein WEF in the distance (Wiltshire 2021)



Photo 6: View from position 8 towards the Nobelsfontein WEF (Wiltshire 2021)



Photo 7: View from position 17 towards transmission lines across the site (Wiltshire 2021)

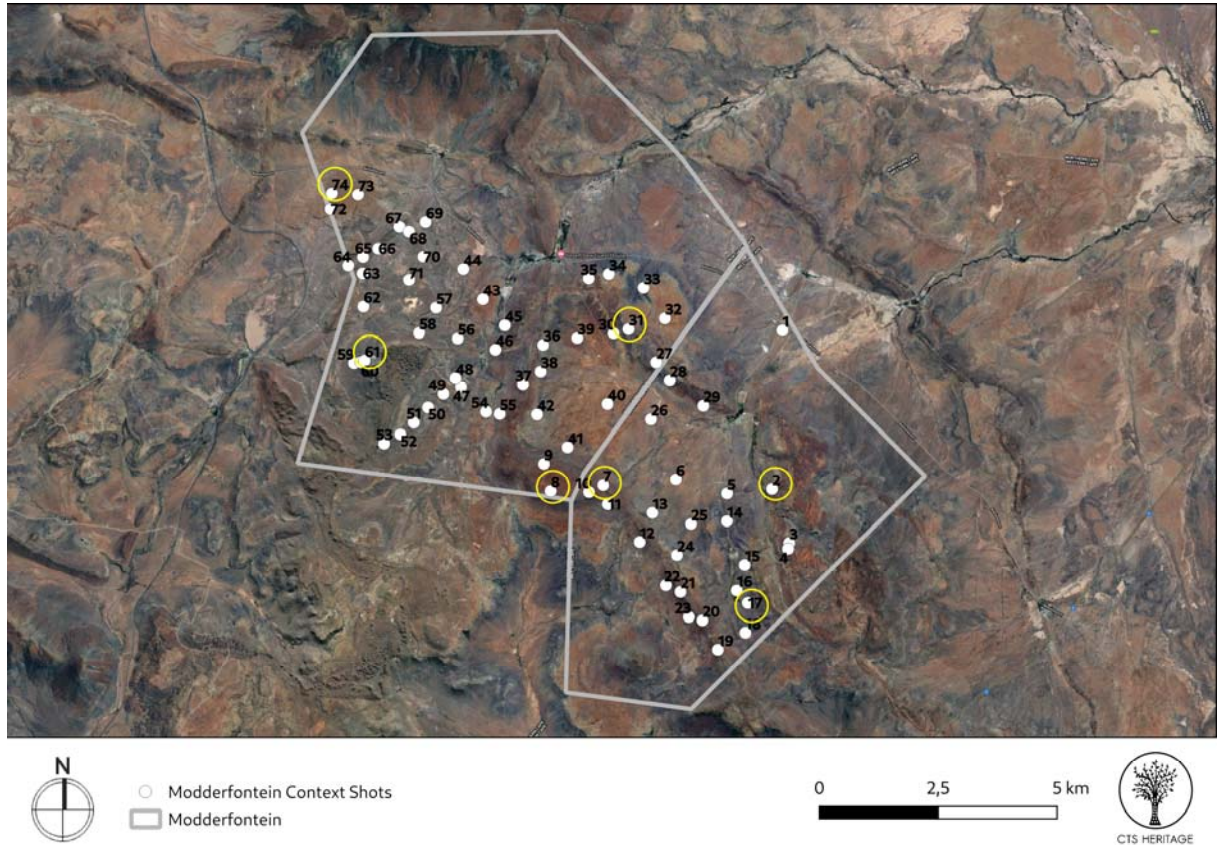


Figure 7: Photo key plan

B.2.2 Site elements

The AIA (2021) identifies four rock engraving sites on Modderfontein (MDF 28, 29, 40 & 79). They have suggested grading of Grade IIIA (MDF 28, 29 & 79) and Grade IIIB (MDF 40) and a recommended buffer of 100m. According to Binneman (2011 In Wiltshire 2021) these likely date to the 19th century when the diamond rush created a large increase in migrant work seeking opportunities in Kimberley.



Photo 8: One of the rock engravings (MDF 29) showing a wagon and horses (Wiltshire 2021)

The AIA (2021) identifies three historic structures on Modderfontein including the ruin of a small stone structure (MDF 2; Grade IIIC), stone kraal and dipping pen (MDF 20; Grade IIIC) and stone kraal walling (MDF 72; Grade IIIB). The date of these structures are unknown, possibly 19th century. A 100m buffer is recommended for these structures.



Photos 9: Small stone structure (MDF 2) (Wiltshire 2021)



Photo 10: Stone kraal and dipping pen (MDF 20) (Wiltshire 2021)



Photo 11: Stone kraal walling (MDF 72) (Wiltshire 2021)

The Modderfontein homestead dates to the 1970s and has no heritage value.



Photo 12: Modderfontein homestead (Desert Dew Guest house) (Google Maps 2020)

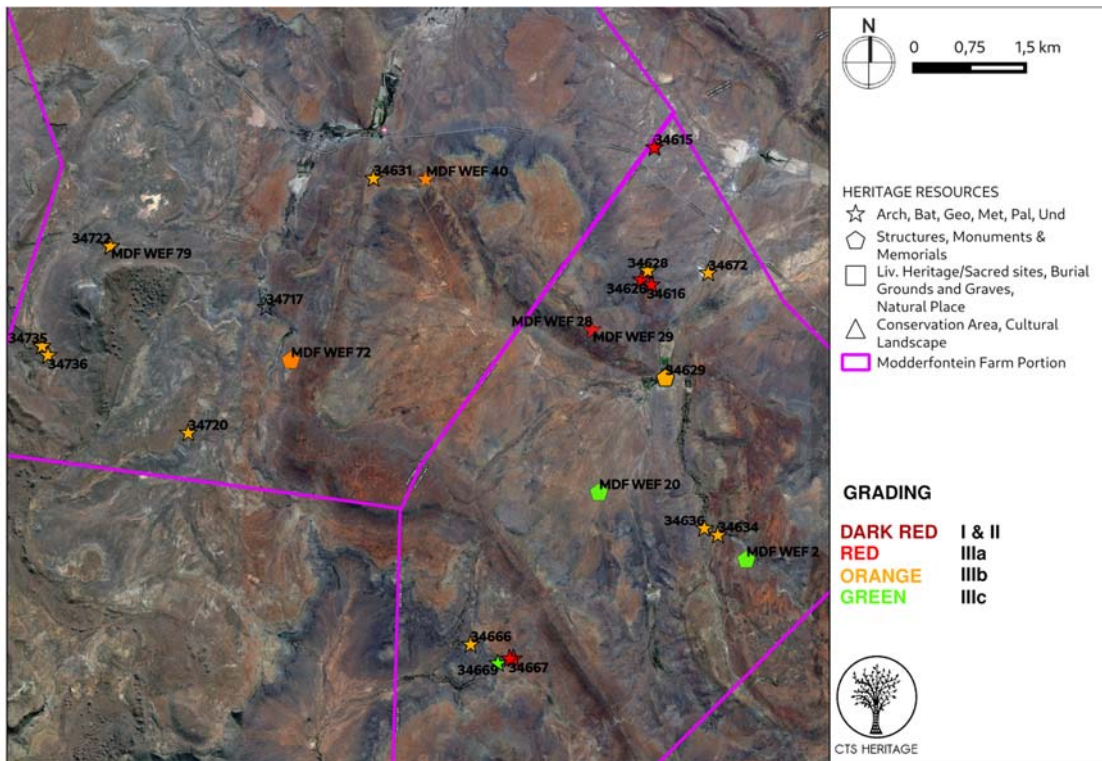


Figure 8: Location stone engravings and historic built structures

C. SUMMARY OF THE VISUAL IMPACT ASSESSMENTS

A VIA was conducted in 2011 assessing the Visual Impacts of the authorised layout. In summary, the VIA (2011) found that:

- The visual impact on major routes and settlements and homesteads within close proximity of the site (i.e. within 5km) is expected to be **high** both before and after mitigation.
- The visual impact on major routes and settlements and homesteads within the region (i.e. beyond 5km of the site) is expected to be **moderate** both before and after mitigation.
- The visual impact on the regional visual character and sense of place is expected to be **moderate** both before and after mitigation.
- The visual impact on the tourism routes (N1 and N12) of the region and the tourism potential of the area is anticipated to be **low**. Specific reference is made to Three Sisters, which is a landmark south of the N1 and has become to be a tourist attraction. It does not lie within the anticipated viewshed of the WEF.

The VIA (2021) for the amended layout found that:

- While the turbines are slightly taller than the authorised layout, they may be slightly more obvious over a greater distance. However, the extent of the visual field associated with the amended project is similar to the authorised project. (Refer to Figure 8)
- The amended layout will result in a fewer number of turbines being visible than the authorised layout. (Refer to Figure 9)
- The proposed amendment to the layout and turbine specification will not increase levels of visual impacts assessed by the original VIA.
- From a visual impact perspective, there is no reason why the proposed amendment to the Modderfontein WEF should not be authorised.

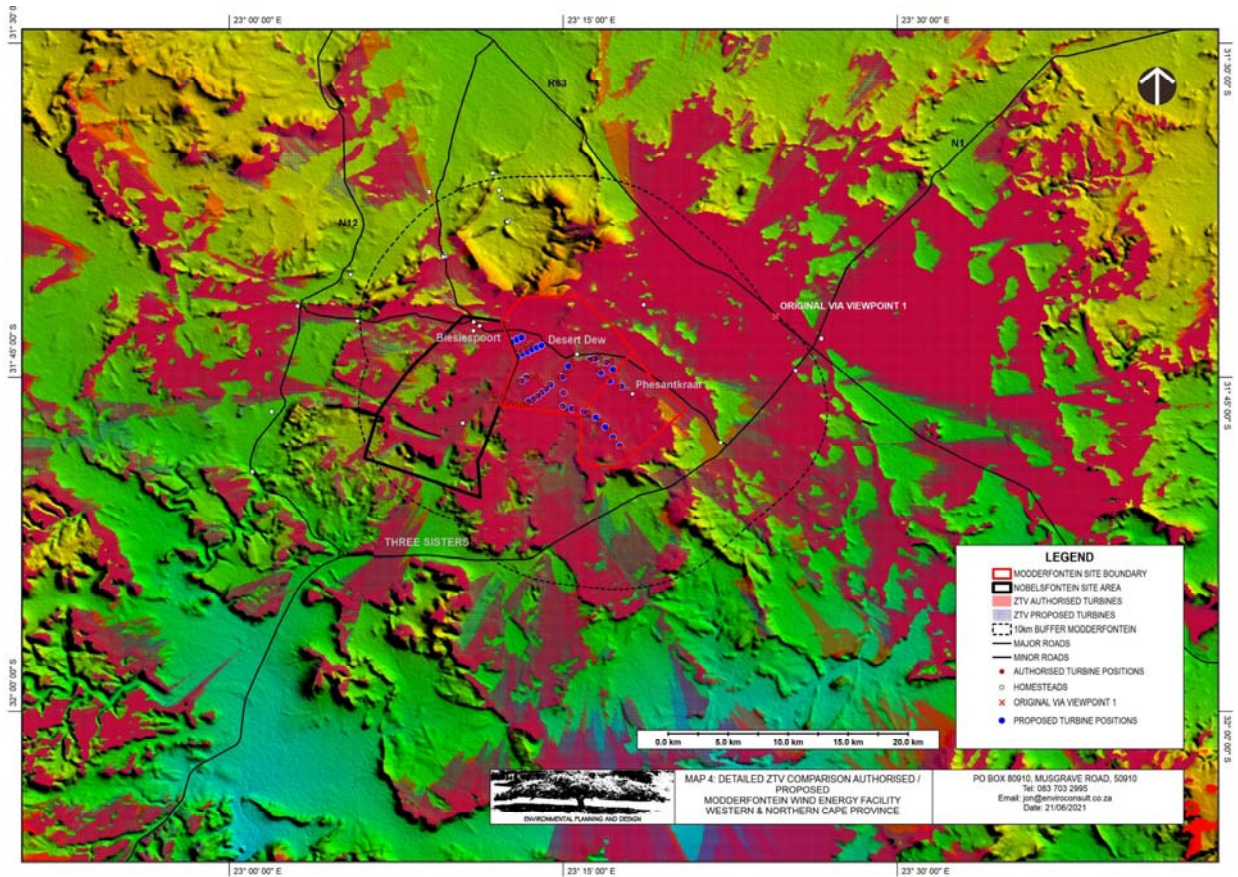
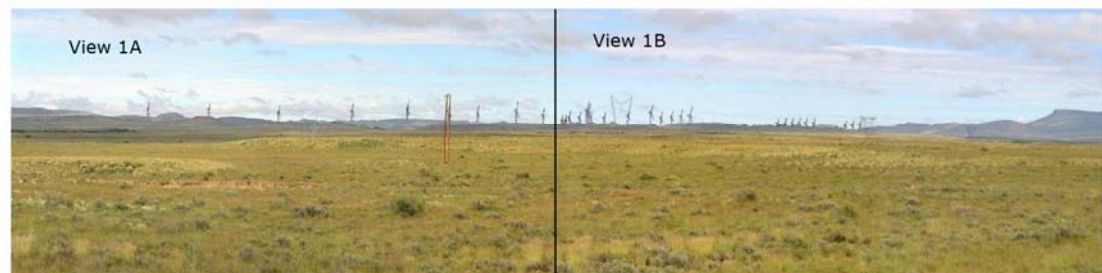


Figure 9: Comparison of view sheds for authorised and amended layout (VIA 2021)



Authorised Modderfontein section of the project as seen from Viewpoint 1



Proposed amended Modderfontein section of the project as seen from Viewpoint 1

Figure 10: Visual simulation from Viewpoint 1 showing authorised layout (above) and amended layout (below) (VIA 2021)

D. IMPACTS ON CULTURAL LANDSCAPE RESOURCES

Based on an understanding of cultural landscape significance and visual impacts, the impacts on cultural landscape heritage resources are identified as follows:

- There is no substantial difference between the authorised and amended layout. While there is a significant reduction in the number of turbines from 67 to 34 in the amended layout this is offset by the extent of the viewsheds being similar and by the height of the turbines being slightly taller in the amended layout.
- In both layouts, the overall impact on the regional cultural landscape is anticipated as **moderate** before and after mitigation. However, at a local scale the impact is anticipated as **high**. In this regard, the primary cultural landscape receptors are the N1, N12 and R63.
- The impact on the regional cultural landscape is considered acceptable given the broad expansive nature of the landscape and thus its ability to absorb the nature and scale of development. The site and its immediate context does not possess particular heritage significance in its own right to warrant formal protection or grading from a cultural landscape perspective.
- At the individual site element scale, the 100m buffers for stone engravings and historic built structures recommended in the AIA (2021) are considered adequate.

Table 1: Impacts of the authorised layout and associated infrastructure to cultural landscape resources ie. No-Go Alternative

IMPACT NATURE	Destruction of cultural landscape heritage	STATUS	NEGATIVE
Impact Description	Visual impact on the cultural landscape heritage resource		
Impact Source	Operational phase of WEF		
Receptors	The experiential qualities of the landscape traversed by the N1, N12 and R63		
PARAMETER	WITHOUT MITIGATION	WITH MITIGATION	
Extent (A)	2	2	
Duration (B)	3	3	
Probability (C)	4	4	
Intensity or Magnitude (D)	-2	-2	
SIGNIFICANCE RATING (F) = (A*B*D)*C	-36	-36	
Cumulative Impacts	The proposed WEF is located within a REDZ area and as such, cumulative impacts to the Cultural Landscape are anticipated.		
Confidence	High		
Mitigation Measures	<ul style="list-style-type: none"> - Implementation of the recommendations in the VIA will assist, however the visual impact on the broader Cultural Landscape remains unchanged. 		

Table 2: Impacts of the amended layout and associated infrastructure to cultural landscape resources i.e. Preferred Alternative

IMPACT NATURE	Destruction of cultural landscape heritage	STATUS	NEGATIVE
Impact Description	Visual impact on the broader cultural landscape heritage resource		
Impact Source	Operational phase of WEF		
Receptors	The experiential qualities of the landscape traversed by the N1, N12 and R63		
PARAMETER	WITHOUT MITIGATION	WITH MITIGATION	
Extent (A)	2	2	
Duration (B)	3	3	
Probability (C)	4	4	
Intensity or Magnitude (D)	-2	-2	
SIGNIFICANCE RATING (F) = (A*B*D)*C	-36	-36	
Cumulative Impacts	The proposed WEF is located within a REDZ area and as such, cumulative impacts to the cultural landscape are anticipated.		
Confidence	High		
Mitigation Measures	Implementation of the recommendations in the VIA will assist, however the negative visual impact on the broader cultural landscape remains unchanged.		

E. CONCLUSIONS AND RECOMMENDATIONS

As noted above, despite the location of the development area within the Beaufort West REDZ, the site forms part of a broader cultural landscape representative of the Great Karoo region possessing heritage value for historical, aesthetic, architectural, social, scientific reasons. The site possesses a number of landscape qualities, which are representative of this cultural landscape or regional morphological zone. However, the site does not possess particular heritage significance in its own right to warrant formal protection or grading from a cultural landscape perspective. Notwithstanding this, there are three aspects with heritage management implications from a cultural landscape perspective:

1. Impacts to the scenic routes of the N1, N12 and R63.
2. Impacts to the number of tall hills and mountains with steep elevated slopes with an inherent scenic quality.
3. Impacts to the conservation worthy archaeological and built features including rock engravings and stone structures,

Based on the assessment conducted, there is no substantial difference between the authorised and amended layout in terms of impacts to the cultural landscape. While there is a significant reduction in the number of turbines from 67 to 34 in the amended layout this is off set by the extent of the viewsheds being similar and by the height of the turbines being slightly taller in the amended layout.

In both layouts, the overall impact on the regional cultural landscape is anticipated as **moderate** before and after mitigation. However, at a local scale the impact is anticipated as **high**. In this regard, the primary cultural landscape receptors are the N1, N12 and R63.

The impact on the regional cultural landscape is considered acceptable given the broad expansive nature of the landscape and thus its ability to absorb the nature and scale of development.

Recommendations

The following cultural landscape recommendations apply to both the authorised layout and the proposed amended layout:

- There is no preferred alternative in terms of impacts to the cultural landscape
- The mitigation recommendations included in the VIA should be implemented
- The buffer areas recommended in the AIA (2021) must be implemented

REFERENCES

CTS Heritage (2021). Archaeological Specialist Study for Part 2 Amendment Application for the Modderfontein Wine Energy Facility

CTS Heritage (2021) Draft Heritage Impact Assessment for Part 2 Amendment Application for the Modderfontein Wind Energy Facility

Environmental Planning and Design (2021). Modderfontein Wind Energy Facility. Addendum to the Visual Impact Assessment for Part 2 Amendment Application

MetroGIS (2011). Karoo Renewable Energy Facility Visual Impact Assessment

Winter, Sarah, Baumann, Nicolas, and Clift, Harriet (2009). Heritage Scoping Study (2009): Cultural Landscape and Built Environment Specialist Study of proposed Eskom Gamma-Omega Transmission Line (520km).

Winter, Sarah and Oberholzer, Bernard (2013). Heritage and Scenic Study: Provincial Spatial Development Framework (2013).

Appendix A:

Declaration of Independence:

Sarah Winter declares that she is an independent heritage practitioner with expertise and experience in heritage impact assessments and that this cultural landscape assessment has been carried out in an objective manner. She has no interest, be it business, financial, personal or other, in the proposed Modderfontein Wind Energy Facility other than fair remuneration for professional work performed in connection with a cultural landscape assessment for this project.

Expertise:

Name	Qualification	Professional Accreditation	Years of Experience
Sarah Winter	BA Archaeology and Anthropology (UCT) 1989 Master of City and Regional Planning (UCT) 1995	Association of Heritage Practitioners (Accredited member)	Heritage practitioner 20 years

Sarah Winter has 20 years of experience as a heritage practitioner with extensive experience in undertaking heritage impact assessments. She co-authored the Department of Environmental Affairs and Development Planning Guidelines for Involving Heritage Specialists in Environmental Impact Assessments (2005). Her specific area of expertise is in cultural landscape assessments undertaken as part of heritage impact assessments, municipal heritage inventories, conservation management plans and planning policy frameworks. She also co-authored the specialist Heritage and Scenic Study for the Western Cape Provincial Spatial Development Framework (2013).

Sarah is a founder member of Association of Professional Heritage Practitioners. She has taught on the Robben Island Museum-University of the Western Cape Heritage and Museum Studies Programme, the University of Cape Town Landscape Architecture Masters Programme and the UCT MPhil in Conservation of the Built Environment Programme.

Sarah served on the Councils of Heritage Western Cape (HWC) (2010 – 2016) and the South African Heritage Resources Agency (SAHRA) (2015 – 2016). She chaired the HWC Built Environment and Landscape Committee (BELCOM) (2010 – 2016) and was a member of the HWC Impact Assessment Committee (IACOM) (2010 – 2013).