BULSKOP PHOTOVOLTAIC CLUSTER AND GRID CONNECTION,

NEAR BEAUFORT WEST, WESTERN CAPE

CULTURAL LANDSCAPE ASSESSMENT

Submitted in terms of Section 38 (4) of the National Heritage Resources Act (Act 25 of 1999)

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Prepared for CTS Heritage

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A. INTRODUCTION

Six solar photovoltaic (PV) facilities (Hardeveld PV, Rosenia PV, Hoodia PV, Salsola PV, Gamka PV, Bulskop PV) (collectively referred to as the Bulskop PV Cluster) are proposed to be developed on the Remaining Extent (Portion 0) of Farm 423 near Beaufort West in the Western Cape Province. The boundary of the study area is approximately 2 600 ha in size. The proposed cluster comprises six PV facilities (each ~250 ha in extent). It is proposed to connect to the National Grid via a new 17,5 km single or double circuit 132 kV overhead powerline from the cluster to the Droërivier Main Transmission Substation (MTS) (approximately 17 km west of the facility). The study area falls within the jurisdiction of the Beaufort West Municipality and the greater Central Karoo District Municipality, as well as the Beaufort West Renewable Energy Development Zone (REDZ).

Figure 1. Site location: PV array and grid connection south of Beaufort West (Source: Google Earth)

A.1 Study Brief and Scope of Work

The purpose of this report is to assess the project 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). The assessment has included the following scope of work:

- An historical overview of the site and its broader context.
- Fieldwork with particular attention on potential heritage receptors from a cultural landscape perspective.
- A review of the archaeological and visual impact assessment reports.
- An assessment of heritage significance and formulation of heritage indicators.
- An assessment of the impact of the proposals and formulation of recommendations.

A.2 Project Description

Photovoltaic cluster:

Each facility will consist of solar PV technology with fixed, single or double axis tracking mounting structures with a maximum height of ± 5.5m above the ground.

Associated infrastructure will include the following:

- Laydown area.
- Access and internal road network.
- Auxiliary buildings (33kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.).
- On-site substation/collector switching station
- Inverter-station, transformers and internal electrical reticulation (underground cabling).
- Battery Energy Storage System (BESS).
- Rainwater Tanks; and
- Perimeter fencing and security infrastructure.

Grid connection:

The proposed grid connection corridor is approximately 17,5 km long and located within the Central Strategic Transmission Corridor, areas earmarked for the development of large-scale renewable energy facilities and existing grid connection infrastructure and will traverse five (5) properties, namely:

- Remaining Extent of Farm 423
- Portion 4 of Farm 169
- Portion 5 of Farm 169
- Portion 1 of Farm Steenrotsfountain No 168
- Portion 10 of Farm Weltevreden No 170

The development of the Bulskop Grid Connection Infrastructure will include various infrastructure components including a new collector substation/switching station up to 1.25 ha in extent and a power line of up to 132 kV between the Bulskop Collector Substation/Switching Station and the existing Droërivier Main Transmission Substation.

A.3 Site Description

The site is characterised by the following:

- Regional location within the Great Karoo which is a vast arid area with a dispersed pattern of settlement, extensive stock farms, more recent game farms and irrigation based agriculture along the rivers; the vegetation cover is low consistent with the Nama Karoo Biome.
- Location to the south of the regional centre of Beaufort West which dates to the late 18th century; town is framed by the Nuweveld escarpment to the north, lies between the Gamka and Kuils Rivers (normally dry) and on the outskirts lies the 75 000 hectare Karoo National Park; urban fringe activities to the south-east of the town, namely new cemetery and waste water treatment works (figure 2).
- Site for PV cluster located east of the R61; site of grid connection traversed by R61, Blythe Street extension and the N12 (figure 3).
- No significance landscape or built environment features are located on the site.
- Steenbokkie Private Nature Reserve abuts the site to the north and west.
- Eskom power lines traverse the site and the Steekbokkie Private Nature Reserve (figure 4, 5).
- Long views towards the Nuweveld escarpment add scenic value (figure 6).
- Located within the Beaufort West REDZ and adjacent to other solar power facilities, approved not yet constructed.

Photographs:

Figure 2. View from Blyth Street extension towards the urban periphery of Beaufort West and the Nuweveld escarpment.

Figure 3. Views from Blyth Street extension of existing Eskom transmission lines traversing the landscape.

Figure 4. Views of the Eskom transmission lines traversing the site.

Figure 5. Existing Eskom transmission pylons.

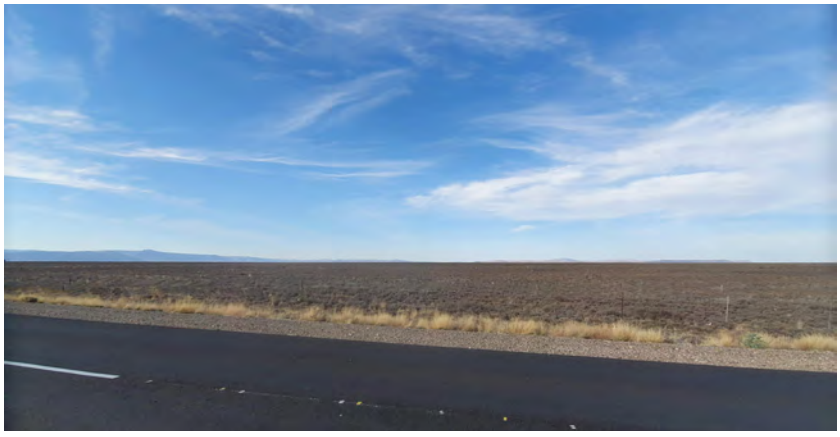

Figure 6. Views from the R61 looking across the site for the PV cluster with long views to the Nuweveld escarpment in the background.

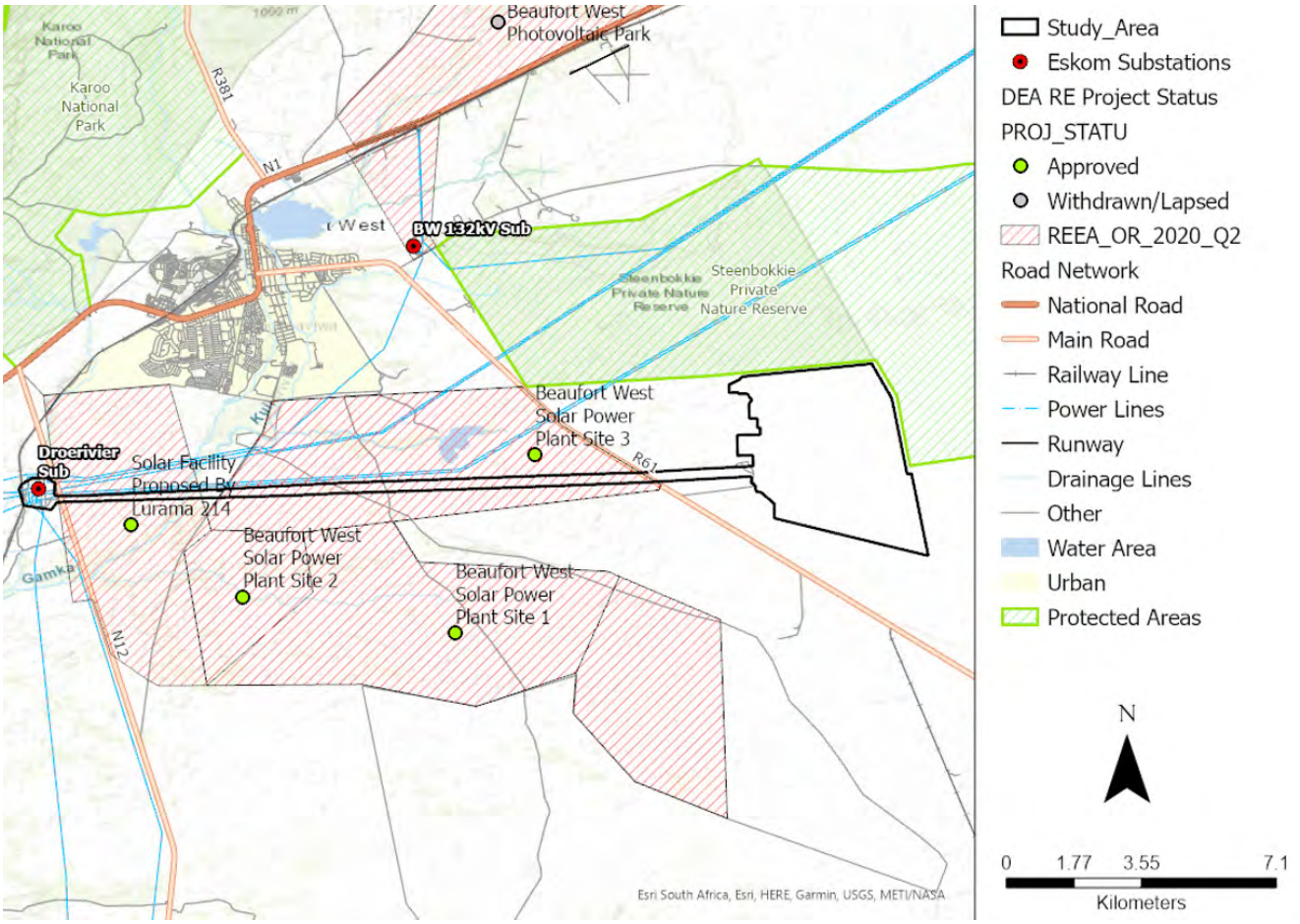

Figure 7. Location of the site in relation to other PV facilities that are approved not yet constructed. (Source: VRM Africa 2021)

B. CULTURAL LANDSCAPE SIGNIFICANCE

B.1 Regional cultural landscape patterns

The relatively undisturbed areas of the Karoo region have an archaeological record spanning hundreds of thousands of years. Archaeological sites typically occur near dolerite outcrops due to the presence of underground water, showing stone tool scatters, rock art and herder kraals (Winter & Oberholzer 2013). The name 'Karoo' has its roots in the Khoe word meaning 'place of great dryness'. The archaeology shows the area as well-used on a seasonal and nomadic basis with water sources providing sites suited to the needs of hunter-gather San people and pastoralist-herder Khoe people. Sectors of the southern Karoo's grassy plains provided grazing to vast herds of antelope, quagga, white rhinoceros, hartebeest, ostrich and livestock (Anderson 1985: 8).

Following the arrival of settlers (1652), attitudes to land changed it irreversibly. The VOC undertook a system of granting freehold land to burghers for permanent occupation, with the purpose of provisioning the settlement. This introduced the notion of private land ownership with all allocated land centred on a reliable water source, in a system alien to the indigenous people who treated land and water as common property. The greater mobility of the San lifestyle allowed fairly rapid retreat, while Khoe who resisted subjugation and acculturation moved away from the western Cape. This led to a shifting frontier of contact as the growing settlement, hungry for resources, followed in their wake.

The frontier push was sanctioned by the VOC and largely undertaken by trekboers, whose lifestyle was that of a semi-nomadic pastoralist, like the Khoe, following transhumance routes. Where the landscape allowed, small livestock farms were established in a system of renewable permits for loan farms. Stock farms were necessarily expansive – water and grazing being limited – and many farmers simply occupied land without formal title, moving on when it ceased being productive. From the 1750s the push north came to a prolonged pause below the Nuweveld escarpment, a natural barrier to the arid central Karoo plateau. The Gamka River, perennial at this stage, defined the movement route, with springs, and the confluence of seasonal rivers such as the Leeuw, the Hans and the Kuils, encouraging settlement. Leeu Gamka, at the confluence of the two rivers became an outspan place on the trading route.

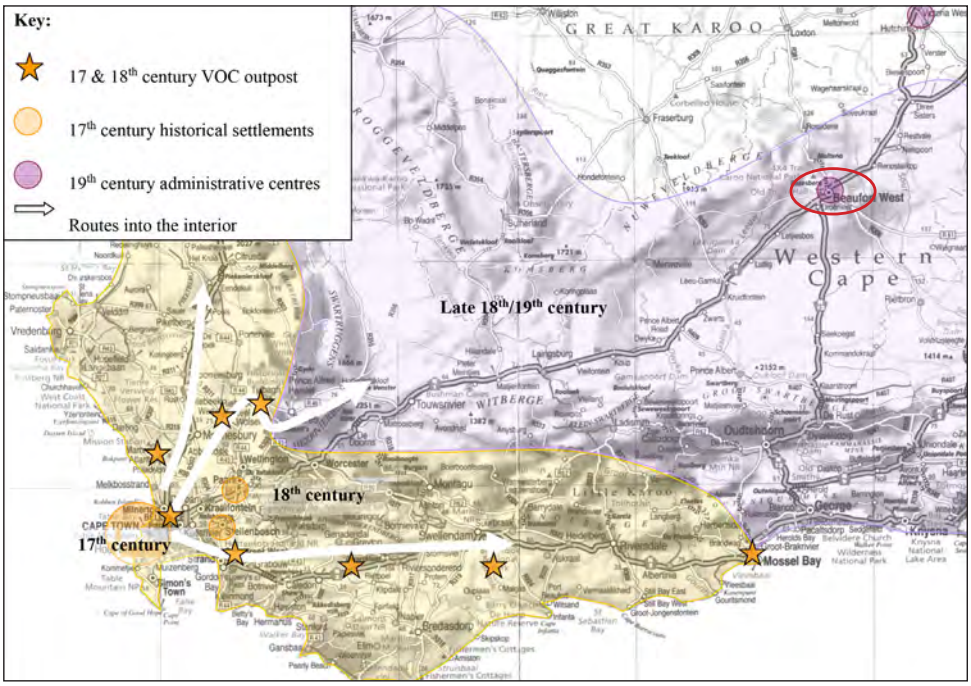

Figure 8. Figure 5: Historical evolution of settlement patterns at the Cape spanning the early and later colonial period, with the site location circled (Source: Winter et al 2009)

Hooivlakte (Hooijvlakte, Hooyvlakte), later becoming Beaufort West was granted as a loan farm in 1760, it incorporated both the Gamka and Kuils Rivers. With the occupation of the area by stock farmers, sheep replaced game, the grass receded, and farmers became suppliers of fresh meat to the refreshment station in place of Khoe (Guelke 1982 In Winter et al 2009). Expansion was fiercely opposed by the San, who resisted alienation from water sources until forcibly suppressed by the 1790s. Other new arrivals to the Central Karoo include Xhosa, alienated from their grazing lands in the eastern Cape (Anderson 1985).

British colonial rule from 1806 brought a new landownership policy that transferred loan farms to perpetual quitrent. This imposed “settled agriculture”, unsustainable without large land parcels and sure access to water, which further dispossessed Khoe, Xhosa and many of the poorer trekboers unable to fit the legal system. They were pushed beyond the escarpment or subjugated to a life of labour, and were replaced by wealthy farming burghers, merchants and officials (Anderson 1985, Guelke Shell 1992).

The late 18th century frontier of the colony was edged by two vast administrative regions, District of Stellenbosch (1679) and District of Graaff-Reinet (1786). In 1818 the Colonial Government established a sub-magistracy on exiting farms Hooyvlakte and Boesjesmansberg, selected for their access to permanent water. Both the town and its new district were named Beaufort (renamed Beaufort West in 1869). The town was laid out in a linear form between the Gamka and Kuils rivers. It utilised and

upgraded existing buildings to serve as official residences and administrative offices and introduced a leiwater system to irrigate the town's fruit trees and market gardens. In the same year, a mission station was established at Kookfontein, a remote area outside Beaufort West, but disbanded within three years (Winter et al 2009).

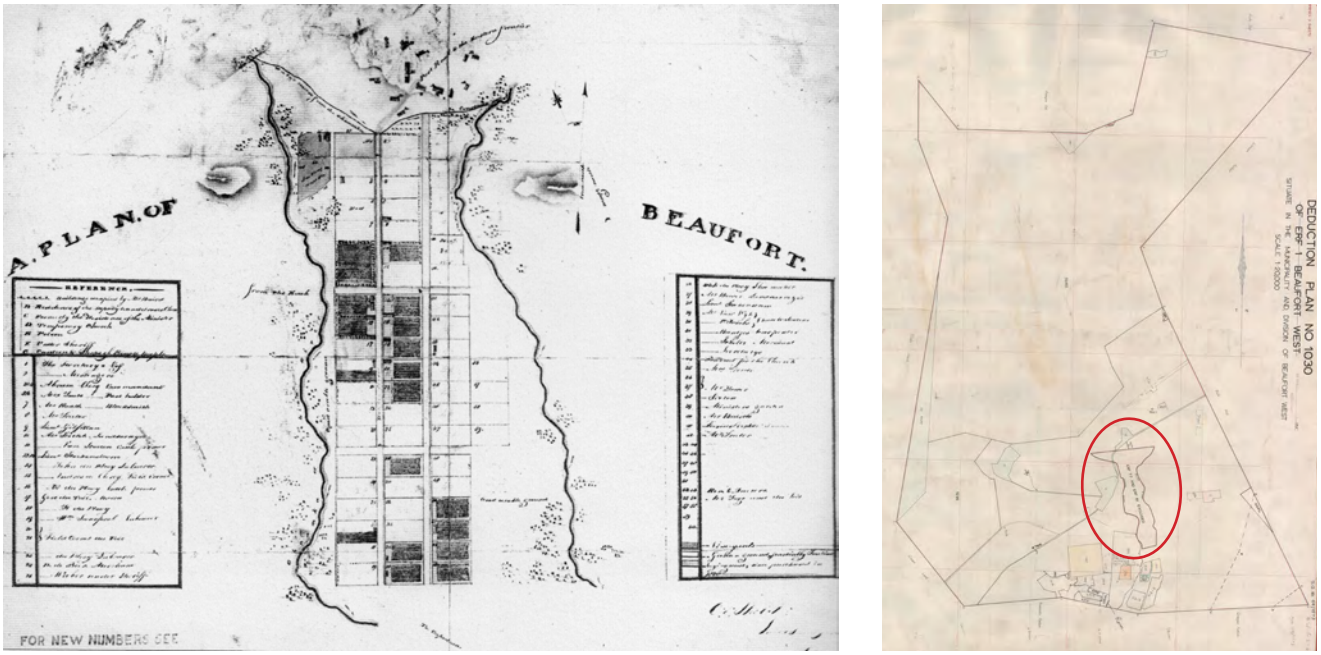

Figure 9. 1825 plan of Beaufort (left) and (right) survey diagram showing the extent of the parent farm, with the Beaufort town centre circled. (Source: Fransen 2006, SG 64/1873)

Survey diagrams for parent farms immediately south of Beaufort West paint a clear picture of the priorities in land acquisition. Springs are described: "weak but permanent", "periodical", and "permanent but decreases"; rivers: "permanent", "periodical pools after rain"; and land: "good sheep grazing but scantily supplied with water", "good grazing for horned cattle". Farm names, which frequently include "fontein", attest to the importance of spring water. Diagrams also suggest rapid formalisation of ownership from the 1830s, although it is highly likely that all land with access to water and grazing was previously in use, and possibly occupied, prior to its first record of survey(Anderson 1985).

New landownership systems and a changing farming economy at the Cape (wool was replacing wine export) brought prospectors to the Beaufort area. Already established for sheep farming, it was identified as well-suited to the wool producing Saxon Merino sheep. Beaufort became a prosperous centre for wool, and in 1837 was the first municipality in the Cape Colony, with numerous infrastructure projects such as the 1860s large dam development, "then the most important work in the colony" (Theal 1908: 105). The ostrich feather boom (1860s to 1910) benefited the area with extensive managed farming until the collapse of the fashion (Marais 1977). The railway network, connecting ports to the interior centres of production, reached Beaufort West in 1880 and helped the town to become a vital centre on the route from Cape Town to the Kimberley diamond fields and the Witwatersrand gold mines (from 1886).

The invention of the ground water pump (late 1880s) further altered the landscape, allowing year-round access to water for irrigation and stock. The South African War (1899-1902) introduced another layer, with the line of British blockhouses built to protect the communication infrastructure of the railway; garrisons of soldiers would have been housed in proximity. Beaufort West's remaining blockhouse is north of the railway on the east side of town. In the early 1900s, Crown land surrounding the town was reserved as commonage, later disbursed for expansion. The 20th century consolidated the area as a wool producer and brought increased infrastructure: the N1 National Route, uranium mining and recently, renewable energies. In 1979 the Karoo National Park was established to protect the Nama-Karoo biome.

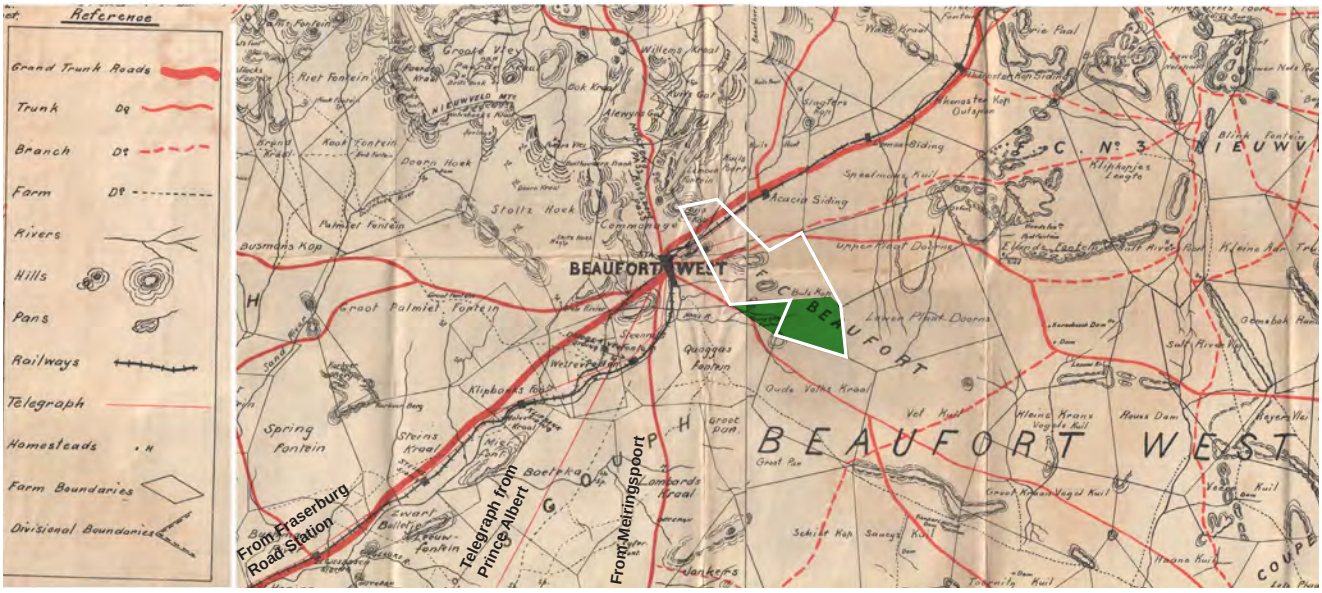

Figure 10. 1901 shows infrastructure development and farm boundaries. Original Bulshok farm outlined white; today's Bulshok 423 shown green (Source: Imperial map of the Cape Colony of South Africa 1901. UCT Special Collections, islandora:24847)

B.1.1 Properties involved in Bulskop development

Note: Access to archived title deeds is not possible under the restrictions imposed by Covid-19; historic survey diagrams have been studied in their place.

Today's Farm 423 Bulskop, is composed of a portion of what was neighbouring Hans Rivier Farm (portion 6 of portion 4 of 169, 2549/1998) and a subdivision of the larger Bulskop farm 163 and (6/1872). First evidence of a survey for the full extent of the original Bulskop farm was 1872, possibly registered as Crown Land with tenant farmers. In 1894 a portion was granted to Commissioner of the Municipality of Beaufort West for urban development, and in 1896 the remainder transferred ownership. In 1914 and 1915 portions described as Hans Rivier and including the watercourse, a dwelling and a dam, was surveyed in a transfer to DW Truter in 1915 (1315/1914). A surveyor's note points out that the wider farm had, for years, been treated as one single farm and beacons were now concealed. It appears that potions of farms shift between neighbouring properties where family connections, particularly through marriage and inheritance, are evident in the ownership (SG 1316/1914, 1902/1914, 200/1914). Other portions of Bulskop have since been consolidated with neighbouring Plaat Doorns.

The proposed infrastructure extends west over remaining portions of farms Hans Rivier, and Steenrotsfontein. The latter was a large property, first surveyed in 1839 for AP Meiring, and granted as quitrent in 1859 to PJ Van der Merwe. Early government grants to MJ Webber (1838) of Quaggasfontein surveyed in 1833 included a perennial spring and an area identified as good sheep pasturage (SG 305/1833).

B.2 STATEMENT OF HERITAGE SIGNIFICANCE

Cultural landscape assessments typically require assessments at various scales including regional, site and individual elements scales. The context of this particular study area is different in that there are very few features or structuring elements that create variations across the landscape.

As a general statement the landscape of the study area is an open, barren, featureless and homogenous landscape with little variation in topography, land use and vegetation. It compromises very few productive

elements in terms of agriculture and built form. The only distinctive features are long distance views towards the Nuweveld escarpment to the north.

The primary structuring element at the broader landscape scale is the escarpment immediately to the north above the N1. Embedded within this landscape is the Karoo National Park and historic/scenic routes and passes. The secondary structuring element is the route network and settlement pattern centred on Beaufort West which is at the confluence of the N1, N12 and R61.

The R61 traverses the site; the grid connection is located mostly to the west of the R61 and the PV cluster entirely to the east. The R61 could be considered to have some significance as an important linkage route and in traversing a representative karoo landscape of what is colloquially known as 'Die Vlakte' – a vast, open, flat landscape with a dispersed pattern of settlement. The landscape of the site and its immediate environment is sufficiently representative to constitute a heritage resource from a cultural landscape perspective. This sector of the R61 does not warrant scenic drive status.

There are no landscape and built features worthy of formal protection from a cultural landscape perspective. There are a series of koppies located immediately to the east of the R61 which provide a degree of visual interest. The PV cluster is located beyond these koppies at a lower level on a flat, featureless, sandy plain which provides a degree of visual screening.

The landscape associated with the proposed grid connection is dominated by an existing infrastructural corridor with a range of Eskom power lines and pylons.

The Steenbokkie Private Nature Reserve is located immediately to the north of the site but does not constitute a heritage resource from a cultural landscape perspective with power lines running through the landscape.

The site is located some 10km away from the historic core of Beaufort West but bares no visual-spatial relationship. The site is separated from the town by an existing infrastructural corridor and urban fringe activities located immediately to the south-east of Beaufort West.

In summary, the site cannot be regarded as a cultural landscape worthy of formal protection in terms of the National Heritage Resources Act (Act 25 of 1999).

B.3 HERITAGE INDICATORS

Considering the above the low levels of significance of the site and its landscape context, there are three broad heritage related indicators in terms of the siting and layout of the PV cluster and grid connection:

- The siting of the PV cluster to be set back from the R61 by a minimum of 800m and to make use in the slight change in topography to the east as the preferred location for the facility. This area is referred to as the 'sand pan area' on the cultural landscape elements diagram.
- The use of the existing infrastructural transmission corridor for the grid connection.
- To avoid slightly elevated topographical features within the scenic corridor of the R61.

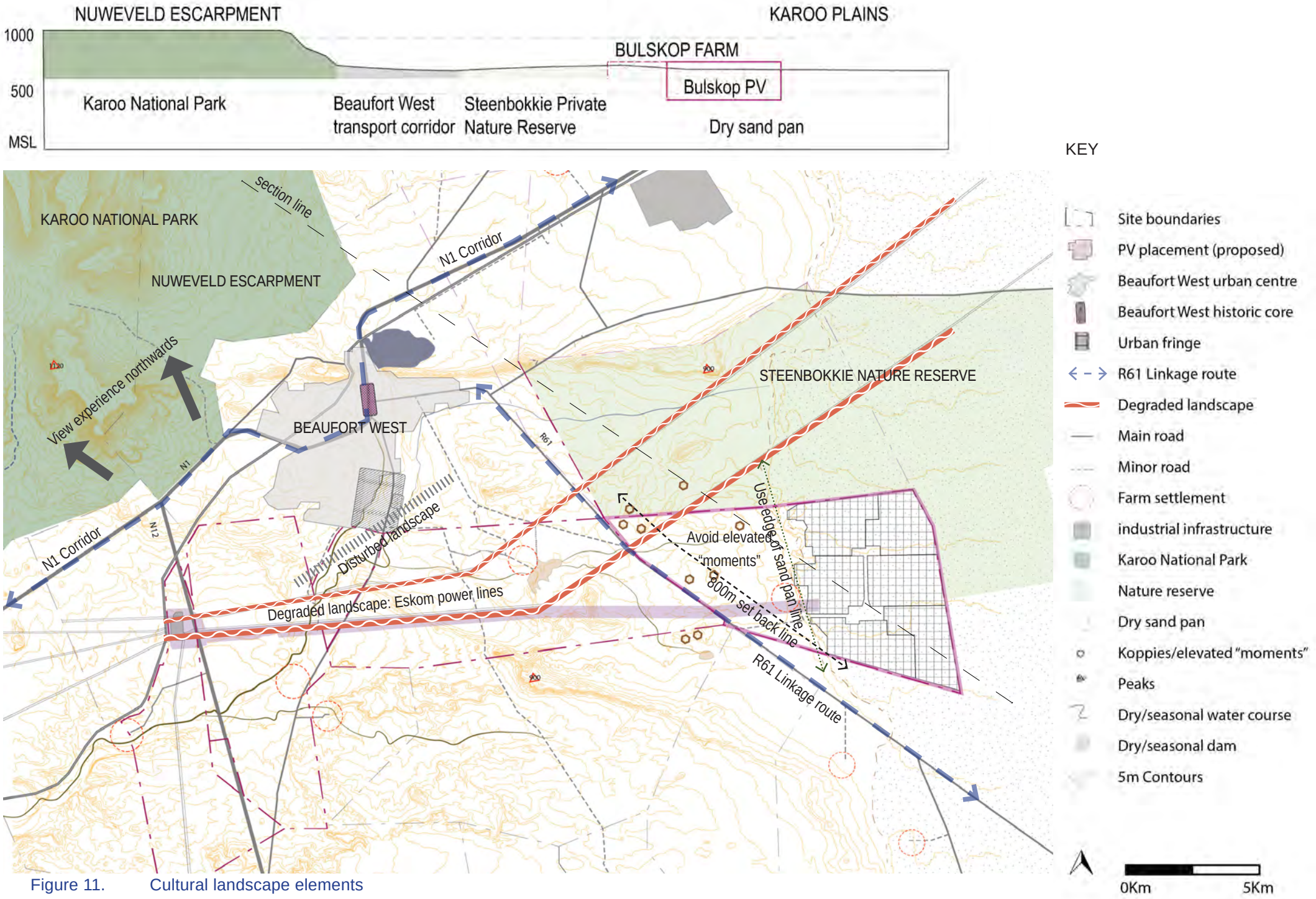

Figure 11. Cultural landscape elements

C. SUMMARY OF THE VISUAL IMPACT ASSESSMENTS

The Visual Impact Assessment (VIA) examined the existing scenic resources and sensitive receptors in and around the proposed area for development. In terms of cultural landscape related impacts, it finds no significant landscape features on the proposed development sites, which have an overall low scenic quality. The site has limited visual resources, the terrain is flat with no water features, limited vegetation and associated colours, and portions are transformed and degraded by agricultural practice.

The viewshed is unfragmented but localised, with two receptors falling into the 1Km zone of high exposure. They are the R61 linkage route (west) and the Steenbokkie Private Nature Reserve (SPNR) to the north. The concentration of activity areas in the SPNP are topographically screened from the proposed PV landscape, although there is some impact to views from the central portions of the raised ridgeline. However, the double power line corridor of the Eskom Droerivier infrastructure dominates this vista and degrades the scenic quality and sense of place.

The solar panels are approximately 5.5m high above the ground. The vegetation in the region is low in profile, which in relation to the flat terrain creates a uniform vegetated landscape that has a low visual absorption capacity. This means that the view from the R61 is at the same elevation as the proposed PV site. However, a slight rise between the road and the panels limits the base views, and the likely result is weak levels of form and line contrast, with colour and texture also muted by the 800m distance to the nearest panel structure.

The wider visual landscape is dominated by the background views of the escarpment and the Karoo National Park (KNP). It has regional scenic quality and tourism value, however visual exposure of the KNP to the proposed development is considered to be very low. Overall, the VIA considers the benefits of the PV related landscape change likely to outweigh any impact the landscape, where scenic resources are limited. Recommended mitigations relate to nighttime light spillage resulting from the operational infrastructure.

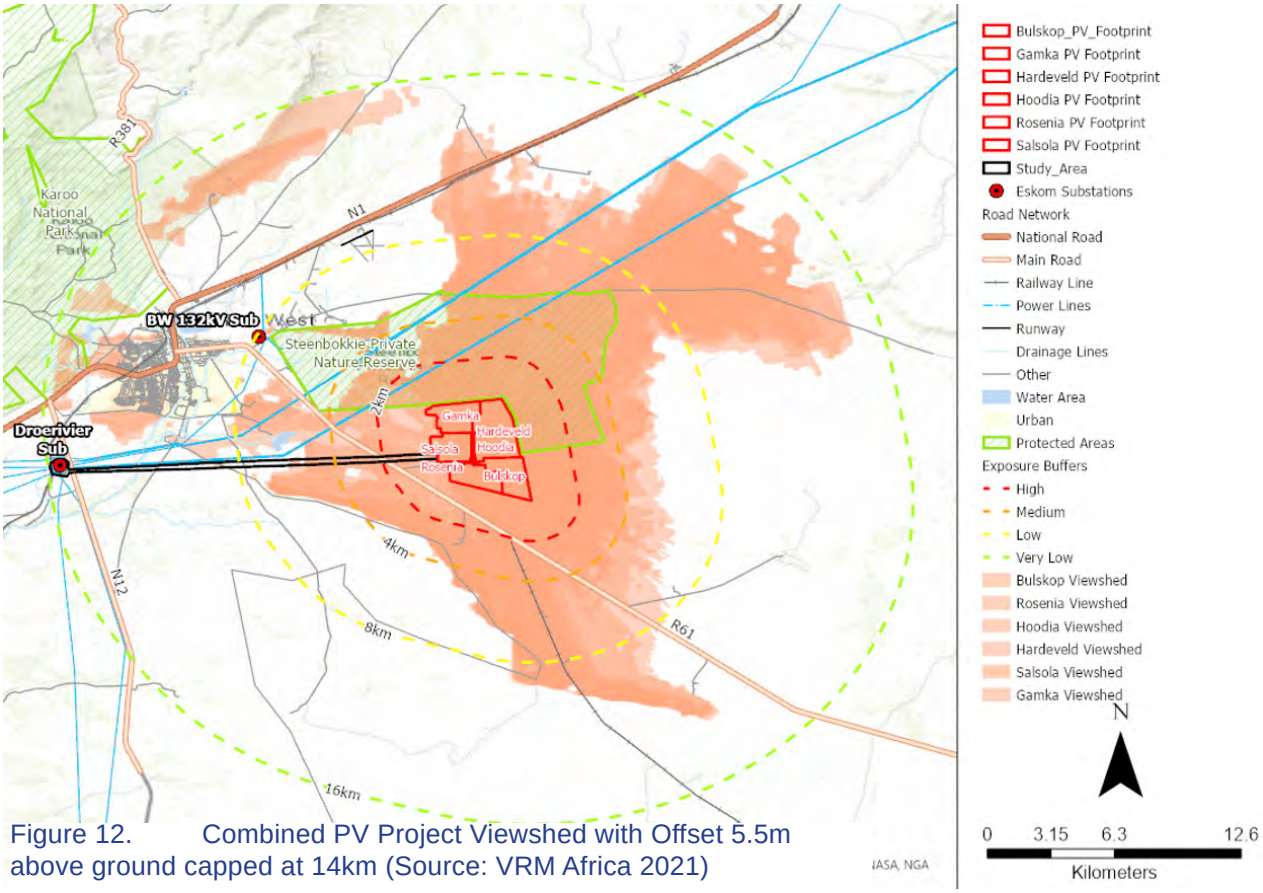

Figure 12. Combined PV Project Viewshed with Offset 5.5m above ground capped at 14km (Source: VRM Africa 2021)

D. ASSESSMENT OF HERITAGE IMPACTS ON CULTURAL LANDSCAPE

The nature of the intervention in the form of a PV cluster and grid connection will have a low impact on cultural landscape heritage resources. The siting of the development complies with the three broad heritage indicators in terms of the following:

- The PV cluster is located to the east of the R61 and is set back by 800m at the nearest point. It is located in the easternmost sector of the site within a 'sand pan area' where a slight change in topography will provide visual screening.
- The grid connection makes use of the existing infrastructural corridor.
- The project will have minimal impact on the Karoo National Park and associated escarpment due to distance, the location of Beaufort West in between the project and Park and the existing infrastructural corridor as a dominant visual component in this immediate landscape.

E. CONCLUSIONS AND RECOMMENDATIONS

No mitigation measures are recommended from a cultural landscape perspective given the low heritage significance of the landscape directly affected by the project and the low impact on the broader landscape context.

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