HERITAGE SCOPING REPORT: PROPOSED SOYUZ 6 SOLAR ENERGY FACILITY, OUTSIDE BRITSTOWN, NORTHERN CAPE PROVINCE

Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an Environmental Impact Assessment

Prepared for:

Terramanzi Group (Pty) Ltd

On behalf of:

Soyuz 6 Solar PV Park (Pty) Ltd

Draft for Comment: 6 February 2023

ACO Associates cc
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EXECUTIVE SUMMARY

ACO Associates cc was appointed by the Terramanzi Group (Pty) Ltd, on behalf of Soyuz 6 Solar PV Park (Pty) Ltd, to undertake a heritage scoping assessment for the proposed Soyuz 6 solar photovoltaic park south of Britstown in the Northern Cape.

This report provides heritage input for inclusion in the scoping report for the project and its associated infrastructure and its findings will feed into the heritage impact assessment that is likely to be required as part of the EIA that is to be undertaken for the project.

This report has relied on a range of primary and secondary information to provide a high-level assessment of the potential palaeontological, archaeological and historical built environment sensitivity of the development site. This was supplemented by a site inspection of the Britstown PV Cluster project areas conducted by ACO Associates between 7 and 11 January 2023. Together, these information sources have allowed a description of the heritage potential of the project site, the identification of potential heritage impacts and in some cases, the identification of sensitive areas that should be avoided, if possible, in the planning of the project.

Findings:
Input received from palaeontologist Dr Marion Bamford of the University of the Witwatersrand, indicates that the Soyuz 6 SPV park and access road straddle three geological units. The area is dominated by Jurassic dolerite which runs in a line across the area from the south-west to the north-east. North of this non-fossiliferous igneous intrusion is a thin band of Tierberg Formation shales of the lower Karoo Supergroup (which date from the mid-Permian, between circa 252 and 299 million years, and are known to contain invertebrate fossils. The south-eastern and north-western corner of the Soyuz 6 SPV area are underlain by Quaternary sand, alluvium and calcrete which are much younger, dating to within the last million years. These sediments may contain transported fossils that originated in the source area of the sediments or have been trapped in palaeo-channels along the modern river valleys. This fossil material will be fragmentary and out of its original context but may, nevertheless preserve important palaeontological information.

The January 2023 survey of the Soyuz 6 project footprint and access road found very little archaeological material or other heritage resources, which accords with what is known from the wider area. Archaeological sites tend to be found on and around the rocky outcrops and other features in the landscape like rivers, streams, springs, pans and sources of the stone raw material used for making tools.

There are no historical built structures within the Soyuz 6 project footprint and the nearest historical farm complex still in use is at Twyfelhoek, more than 4,5 km north-west of the project area.

No graves or burial grounds were recorded within the Soyuz 6 project footprint although a handful of stone mounds associated with ruined and abandoned historical structures adjacent to the access road from Soyuz 1 to 2 could be unmarked graves.

The cultural landscape within which the Soyuz 6 SPV park will be situated is not well developed but reflects the recent historical use of the land for stock farming. Its main features are fences, water troughs, wind pumps and occasional farm complexes.

Conclusions:
The main concerns related to the Soyuz 6 SPV park are impacts to palaeontological resources and impacts to the cultural landscape.

The location of the Soyuz 6 SPV project in an area of mixed high and moderate

palaeontological sensitivity is not a fatal flaw and should not constrain the proposed development, provided suitable measures to mitigate any impacts are implemented as part of the development of the SPV. Mitigation measures will be detailed in the HIA and may include site visits by a palaeontologist, the monitoring of earthworks by the ECO and the implementation of a protocol or mechanism for reporting and dealing with chance finds of fossil material during project activities.

Although no significant archaeological sites or materials have been identified in the Soyuz 6 project area, were such material to be encountered during the development of the project it is unlikely to represent a major constraint. Most archaeological sites are limited in extent and have much smaller constraints footprints on development that those applicable to biodiversity or ecology, for example. It is generally possible to mitigate or avoid impacts on these resources arising from SPV developments should they be found to be present within the development footprint. Experience from many previous WEF and SPV developments has shown that the presence of archaeological resources within a development area is seldom a fatal flaw, and it is thus very unlikely to be the case for the Soyuz 6 SPV project provided suitable mitigation measures are implemented.

Historical buildings at Twyfelhoek north-west of the Soyuz 6 project area will not be directly affected by the proposed SPV facility but there may be indirect, visual impacts arising from its construction. The presence of historical building in the vicinity of the Soyuz 6 project area is unlikely to be a fatal flaw.

The occurrence of formal historical burial grounds in or near farm complexes means that they are likely to be avoided in the planning and siting of the project. Although historical graves and burials are extremely sensitive heritage receptors, their presence within the project area is not a fatal flaw, provided they are excluded from impacts during the development process.

With respect to unmarked usually pre-colonial graves, they too are an extremely sensitive and often contested heritage resource, and it is generally impossible to predict their presence in advance of development. However, the inclusion in the project EMPr of a procedure for reporting and dealing with chance finds of human remains will ensure that the sensitivity of development area with respect to this potential heritage resource is low and that they will not be a fatal flaw.

The cultural landscape within which the Soyuz 6 SPV park will be located is likely to be the heritage resource most affected by the construction of the SPV facility but given that it is of low cultural significance the impacts will not be a fatal flaw to the project.

It is to be expected that SAHRA will request a Heritage Impact Assessment for the Soyuz 6 SPV park as part of the EIA. Given the mixed high and moderate palaeontological sensitivity of the development site, the HIA will need to include a desk-based palaeontological impact assessment, and possibly a field inspection due to the presence of high sensitivity sediments on the site. A comment on the HIA will be required from SAHRA on the archaeology and palaeontologic and from the Northern Cape heritage authority (Ngwao-Boswa Ya Kapa Bokoni) on the cultural landscape. Any comments received from either of these bodies must be considered by the competent authority before issuing an Environmental Authorisation.

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GLOSSARY

Archaeology: Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: Period of the Stone Age extending between approximately 2 million and 200 000 years ago**.**

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate, as defined by the National Heritage Resources Act 25 of 1999.

Later Stone Age: The archaeology of the last 20,000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between approximately 200,000 and 20,000 years ago, associated with early modern humans.

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Quaternary: The geologic time period that encompasses the most recent 2.6 million years. It comprises the Pleistocene (2.6 Ma – 10,000 years ago) and the Holocene (10,000 years ago to the present) and is characterised by a series of global glacial cycles.

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage.

Structure (historic): Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

ABBREVIATIONS

BESS	Battery Energy Storage System
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
kV	Kilovolt
LSA	Later Stone Age
Ma	Million years
MSA	Middle Stone Age
MW	Megawatts
MWh	Megawatt hours
MVA	Megavolt Ampere
NHRA	National Heritage Resources Act (No 25 of 1999)
OHPL	Overhead powerline
REEA	Renewable Energy EIA Application
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SPV	Solar Photovoltaic
ZVAP	Zeekoe Valley Archaeological Project

1 INTRODUCTION

ACO Associates cc (ACO) was appointed by the Terramanzi Group (Pty) Ltd, on behalf of Soyuz 6 Solar PV Park (Pty) Ltd, to undertake heritage scoping assessment as part of the Environmental Impact Assessment (EIA) process for the proposed Soyuz 6 Solar Photovoltaic (SPV) Park, to be located south-east of Britstown in the Northern Cape (Figure 1).

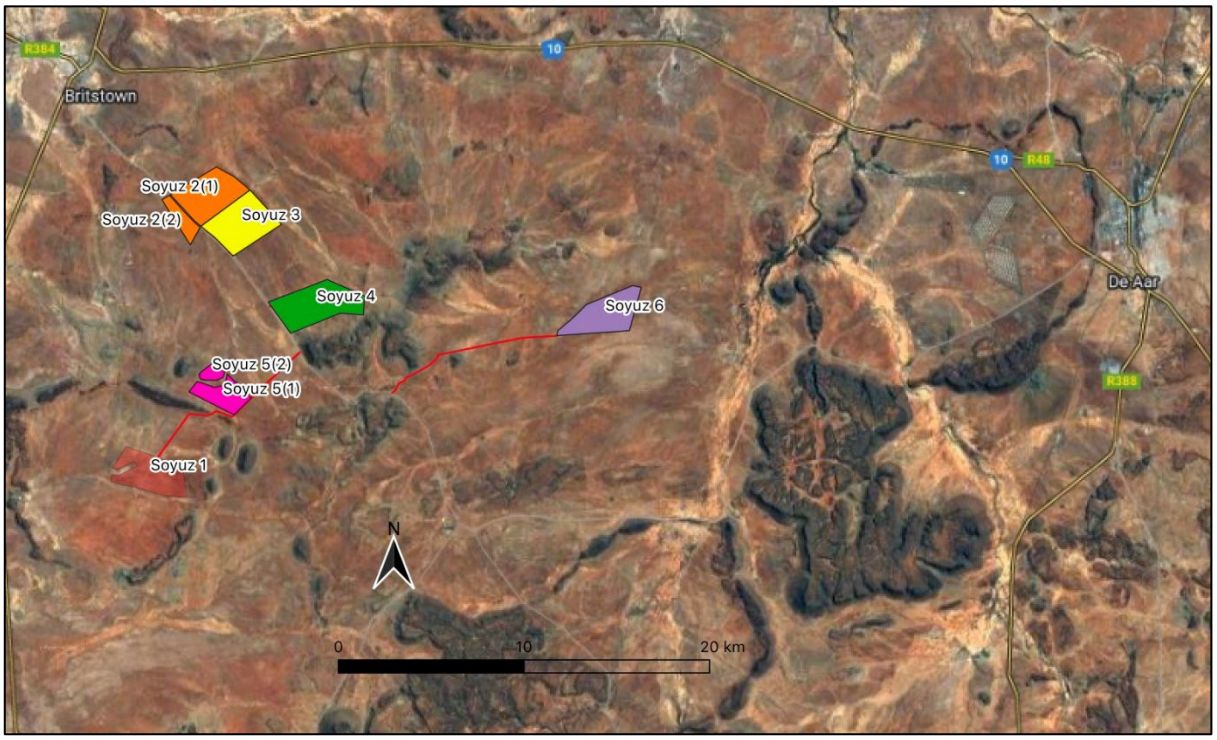

Figure 1: Proposed Britstown solar facilities (coloured polygons) with Britstown to the north-west and De Aar to the east.(Source: 1:250 000 chart 3022, National Geo-spatial Information, http://www.ngi.gov.za).

1.1 Terms of Reference

The Soyuz 6 SPV project forms part of the proposed development of 6 solar PV facilities (Soyuz 1-6) with their associated infrastructure and the electricity grid infrastructure (EGI) to support these facilities.

This report provides heritage input for inclusion in the scoping report for the proposed Soyuz 6 SPV project and its associated infrastructure. The findings of this report will contribute to the defining of a developable area for the Soyuz 6 SPV project and will also feed into the heritage impact assessment (HIA) that is likely to be required as part of the EIA that is to be undertaken for the project.

ACO Associates are required to provide:

- Details of the heritage receiving environment of the project;
- Potential impacts to heritage resources identified as part of the scoping assessment;
- Opportunities and constraints mapping and the rationale therefor;
- Potential cumulative impacts for consideration; and
- A plan of study for the impact assessment phase.

1.2 The Author

John Gribble has an MA (UCT, 1989), in archaeology and has been working in cultural resource management since the early 1990s. He has worked in both the regulatory and

commercial heritage management fields: the former during 13 years at the National Monuments Council / South African Heritage Resources Agency (SAHRA), and the latter as both a terrestrial and maritime archaeological consultant in South Africa and the UK.

He holds archaeological accreditation with the Association of Southern African Professional Archaeologists CRM section (Member #43) as follows:

- Principal Investigator: Maritime Archaeology and Colonial Archaeology; and
- Field Director: Stone Age Archaeology.

A signed and certified specialist statement of independence is attached to this scoping report as Appendix A and the author's CV is attached as Appendix B.

2 METHODOLOGY

This scoping report aims to provide a general description of the known and potential heritage sensitivities of the project site and to flag any heritage-related fatal flaws to the proposed development of the Soyuz 6 SPV park together with draft opportunities and constraints mapping for the proposed project.

The National Heritage Resources Act (No 25 of 1999) (NHRA) defines the range and extent of what are considered to be South Africa's heritage resources. At its broadest, according to Section 2(xvi) of the Act, a heritage resource is "any place or object of cultural significance". This means that the object or place has aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

In terms of the definitions provided in Section 2 of the NHRA, heritage resources potentially present on the Soyuz 6 SPV site which may be impacted by the proposed development include:

- Palaeontological resources;
- Pre-colonial archaeological sites and materials;
- Colonial era archaeological sites and materials;
- Rock paintings and / or rock engravings;
- Historical built structures; and
- Graves and burials.

2.1 Sources of Information

This scoping report relies on a range of primary and secondary information to provide a high-level assessment of the potential palaeontological, archaeological and historical built environment sensitivity of the development site.

The sources of information used are shown in Table 1 below and include published archaeological papers and reports for the general project area and unpublished archaeological and heritage impact assessments that have been undertaken in the vicinity of the project site.

Table 1: Information sources used in this assessment

Data/Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-SpatialInformation	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Geological chart	Council for Geoscience	Various	Spatial	Current 1:250 000 geological survey chart for the area

Aerial photographs	Chief Directorate: National Geo-SpatialInformation	Various	Spatial	Historical aerial photographyof the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Northern Cape Farm Portions	Current	Spatial	Cadastral boundaries, extents and aerial photography
Cadastral data	Chief Directorate:National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

In addition, a site inspection of the Soyuz PV Cluster project areas as a whole was conducted by ACO Associates for five days between 7 and 11 January 2023. The survey was conducted by two experienced field archaeologist and heritage resources identified were recorded on Garmin GPS units (GPSMap 62s) carried by the field team, by site descriptions recorded while in the field and photographically when pertinent.

Together, these information sources have allowed a description of the heritage potential of the project site, the identification of potential heritage impacts and in some cases, the identification of sensitive areas that should be avoided, if possible, in the planning of the project.

2.2 Grading and Site Sensitivity

Section 7(2) of the NHRA requires that provincial authorities formulate a system for the grading of heritage resources. While this is yet to happen in most provinces, the national heritage body, the South African Heritage Resources Agency (SAHRA) has formulated a grading system for archaeology and palaeontologic which is applied in those in provinces where it is currently the statutory commenting authority on behalf of the province.

Sites of local heritage significance form the Grade 3 tier of the system, with those of high local significance designated as Grade 3A. Those of medium or low local significance are designated Grades 3B and 3C respectively. It is generally assumed that Grade 3A heritage resources should be preserved in their entirety, while Grade 3B and 3C sites can be mitigated or part preserved, as appropriate.

Resources which do not meet the Grade 3 criteria are referred to as Not Conservation-Worthy, although this author prefers the term “Ungradable” and this is used in this report. Generally, these resources require no further action or mitigation in respect of development proposed on a site.

2.3 Restrictions and Assumptions

The January 2023 field survey was were carried out at the surface only and any completely buried archaeological sites or material will not have been recorded.

Recent good rain in the area meant that the project site was densely vegetated. This limited artefact visibility but based on what archaeological material was noted during the survey, it is

unlikely that significant archaeological occurrences were present. Landscape features such as rocky hills and outcrops, which are known to be the focus of most heritage resources in this area, could be easily identified and visited.

No palaeontological fieldwork has yet been conducted on the project site.

The assessment of cumulative impacts is based on the list of approved Wind and Solar PV projects in the Renewable Energy EIA Application (REEA) Database (2022_Q2) within 30 km of the Soyuz SPV cluster.

3 PROJECT DESCRIPTION

The applicant proposes the development of six new solar photovoltaic (SPV) facilities to be known as Soyuz SPV Parks 1-6 with a combined capacity of 1470 megawatts (MW). The purpose of these facilities is to generate clean electricity from a renewable energy source (i.e., solar radiation) to contribute to the national energy grid and/or to serve any private off takers.

The Soyuz 1 SPV Park and associated infrastructure will be located on Portion 1 of Farm 91 approximately 24,5 km south-east of Britstown in the Emthanjeni Local Municipality, Northern Cape. The land is currently zoned agricultural and is mainly used for stock farming (see Figure 1 and Figure 2).

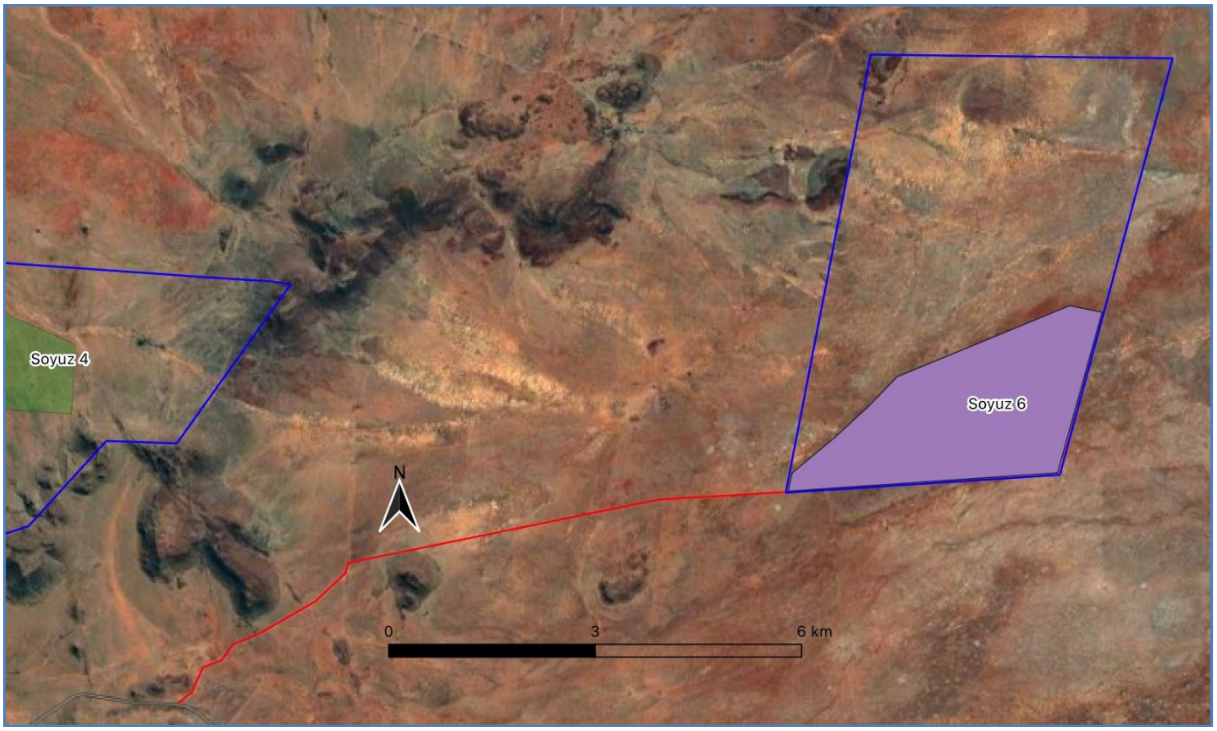

Figure 2: The Soyuz 6 SPV park site (purple shaded polygon) within the boundary of Portion 1 of Farm 91 (blue polygon). The red line represents the proposed access road.

The project will have a generating capacity of up to 240 MW and a Battery Energy Storage System (BESS) capacity of 1000 megawatt hours (MWh).

Bi-facial, single axis trackers will be utilised for the SPV panels and an on-site substation with a capacity of 240 Megavolt Ampere (MVA), will enable the connection of a 132 kV overhead powerline (OHPL).

The project specifications are shown in Table 2 below:

Table 2: Soyuz 6 SPV Park project specifications

SOYUZ 6 SOLAR PV PARK	
Contracted Capacity of Facility	240 MW
Infrastructure Proposed	• Bifacial SPV modules, single axis tracker mounting structures at a height of up to 6m above ground level • Inverters and transformers • Underground and overhead cabling up to 33kV between project components • 1,500 m² O&M building • 2,500 m² paved areas • 50,000 m² Battery Energy Storage System (1000 MWh) • 15,000 m² back to back substation (including facility substation, and Eskom collector/switching station with feeder bays) (240MW) • Access and internal roads • Fencing around development area • 8,000 m² temporary construction camp • 32,000 m² temporary laydown areas
Lifespan of the project	30 years

3.1 Study Area

The study area for all the proposed Soyuz SPV facilities comprises the seven farm portions shown in Table 3 below. Although, according to the current proposed project footprint two of the properties (Farm 1/126 and Farm 1/97) will not be directly affected by the projects, they have nevertheless been included in this scoping assessment.

Table 3: Farm portions in the study area

Farm Number	Portion	Landowner	SPV Project
Farm 97	Portion 1	Witfontein Trust	None
Farm 97	Portion 2	Witfontein Trust	Soyuz 2 & 3
Farm 126	Portion 1	Witfontein Trust	None
Farm 91	Portion 1	JC Paul Familie Trust	Soyuz 6
Farm 127	Portion 5	JC Paul Familie Trust	Soyuz 4
Farm 127	Portion 1	Andrie Grove	Soyuz 5
Farm 145	Portion 3	Andrie Grove	Soyuz 1

The assessment of the full extents of the affected farms, rather than just the proposed project footprints, allows the identification and assessment of less immediate heritage sensitivities such as potential visual impacts on the cultural landscape.

The total study area for all the Soyuz SPV facilities is approximately 13,050 hectares (ha).

4 RECEIVING ENVIRONMENT

The property on which the Soyuz 6 SPV facility is being proposed is rural farmland and is zoned agricultural. Historically the land has been and continues to be used for stock farming.

The Soyuz 6 SPV project site is situated on a largely flat plain, within a ring of intrusive, igneous dolerite hills and outcrops (Plate 1 and Plate 2).

The proposed Soyuz 6 SPV development site is almost entirely covered in the red alluvial sands typical of this part of the Northern Cape. Although the depth of the sand varies, animal burrows noted during the survey indicate that it can be more than a metre thick in places..

The vegetation is the grassy, dwarf shrubland typical of the Nama-Karoo biome Plate 1 and Plate 2).

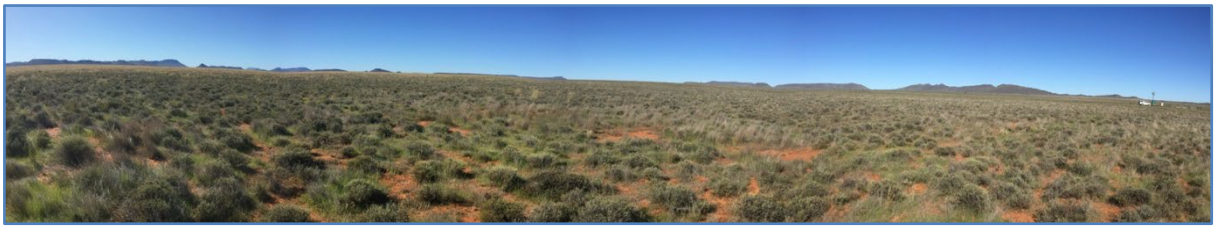

Plate 1: View south-east across the SPV area from the northern boundary (Photo: J Gribble).

Plate 2: View north-west across the SPV area from the south-eastern corner of the site. (Photo: J Gribble).

4.1 Heritage Sensitivities of Receiving Environment

This section describes the heritage sensitivities of the proposed Soyuz 6 development site as they are currently understood.

4.1.1 Palaeontology

According to a comment for this scoping study received from palaeontologist Dr Marion Bamford of the University of the Witwatersrand, the Soyuz 6 SPV park and access road straddle three geological units. The area is dominated by Jurassic dolerite (Jd) which runs in a line across the area from the south-west to the north-east. North of this non-fossiliferous igneous intrusion is a thin band of Tierberg Formation shales of the lower Karoo Supergroup (Pt) which date from the mid-Permian, between circa 252 and 299 million years, and are known to contain invertebrate fossils such as fish scales, sponge spiracles and other trace fossils.

The south-eastern and north-western corner of the Soyuz 6 SPV area are underlain by Quaternary sand, alluvium and calcrete which are much younger, dating to within the last million years. These sediments may contain transported fossils that originated in the source area of the sediments or have been trapped in palaeo-channels along the modern river valleys. This fossil material will be fragmentary and out of its original context but may, nevertheless preserve important palaeontological information (Figure 3 and Table 4).

SAHRA's palaeo-sensitivity map (see https://sahris.sahra.org.za/map/palaeo) (Figure 4), indicates that the portion of the Soyuz 6 development footprint underlain by Quaternary sediments is of moderate palaeontological sensitivity, but that the Tierberg formation sediments are of high sensitivity.

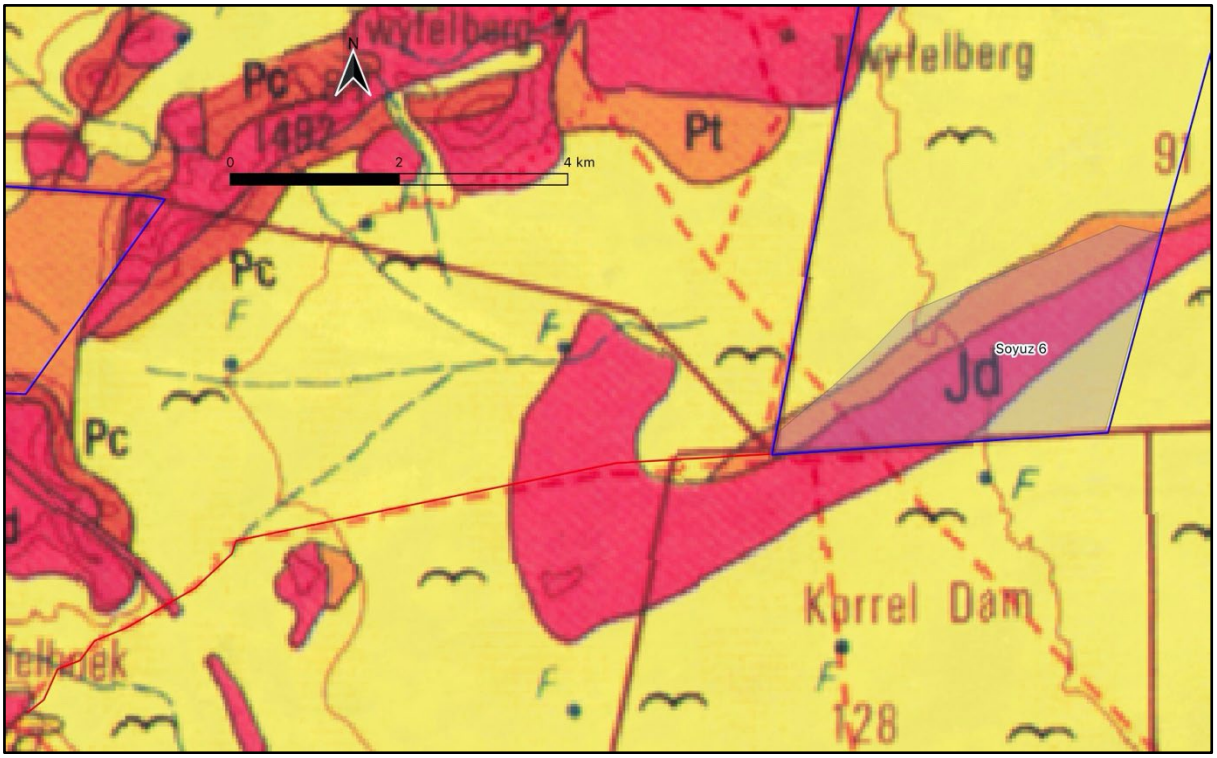

Figure 3: Extract from the 1:250,000 geological chart of the Britstown area showing the presence of Jurassic dolerite (Jd), Tierberg Formation shales (Pt) and Quaternary sands (yellow) in the area covered by the Soyuz 6 SPV park (Pale purple shaded area) and access road (red line) (Source: Geological Survey 1:250 000 map 3022 Britstown).

Table 4: Explanation of symbols for the geological map and approximate ages (SG = Supergroup; Fm = Formation; Ma = million years)

Symbol	Colour	Group/Formation	Lithology	Approximate Age
	Pale yellow	Quaternary	Alluvium	Quaternary, ca 1.0 Ma to Present
Jd	Red	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pc	Orange	Carnarvon Formation, Ecca Group	Mudstone, siltstone, sandstone	Late Permian
Pt	Pale orange	Tierberg Fm, Ecca Group, Karoo SG	Weathering shale with subordinate siltstone and sandstone	Mid-Permian, ca. 299 – 252 Ma

Figure 4: Soyuz 6 project footprint and access road (red line) superimposed on the SAHRIS palaeo-sensitivity map showing the moderate sensitivity of the site (green and orange shading respectively). The grey areas are the non-fossiliferous dolerite outcroppings (Source: https://sahris.sahra.org.za/map/palaeo).

4.1.2 Archaeology

A substantial number of archaeological impact assessments have been conducted in the this part of the Karoo in recent years to support wind and SPV projects around De Aar to the east of the Britstown Cluster (Figure 5) (see, for example, Kaplan, 2010a, 2010b; Bekker, 2012a, 2012b; Fourie, 2012; Kruger, 2012; Huffman, 2013; Orton & Webley, 2013a, 2013b; Fourie, 2014, Gribble and Euston-Brown, 2020, 2021; Webley and Orton, 2011).

East and south of the Soyuz SPV cluster these recent studies are supplemented by the results of what is still South Africa's largest, most intensive archaeological survey: the Zeekoe Valley Archaeological Project (ZVAP) (Figure 6). Between 1979 and 1981, 4,954 km^2 of the Seekoei River drainage, between the Sneeuberg in the south and Hanover in the north, was intensively surveyed by a team of archaeologists and the locations of more than 14,000 archaeological stone tool occurrences were recorded (Sampson, 1985). The ZVAP survey, provides a very detailed picture of the spatial distribution of not only pre-colonial archaeological sites spanning the period from the late Early Stone c. 250,000 years ago to within the last 200 years, but also maps landscape features that formed foci for our ancestors' use of the landscape.

The ZVAP results and those from the more recent surveys have allowed the development of a good general understanding of the pre-colonial, Stone Age archaeology in the Karoo and of the likely locations and distribution of sites of different periods within the Karoo landscape. They can be used as an indicator of the likely archaeological sensitivities of Karoo landscapes, including the Soyuz 6 SPV project area.

Due to the geology of the Karoo, caves and rock shelters are very rare and this means that most Karoo archaeological sites are open sites containing principally stone artefacts. Ostrich eggshell is sometime preserved and, occasionally, pottery on recent sites, but bone is rarely preserved except in rare, stratified contexts. Sites span the full range from the Early and Middle Stone Ages to the contact period between the Later Stone Age inhabitants of the region and the incoming European colonists within the last two centuries.

Potentially archaeologically sensitive areas in the Karoo landscape include:

- Springs, pans and watercourses which were a focus for human activity in the past, and prehistoric and colonial-era archaeological sites may be found around them.
- Outcrops of hornfels which were quarried for stone tool raw material during the Early, Middle and Later Stone Ages.
- Any accessible rock shelter or overhang on the skirts or slopes of hills and mountains. These have the potential to contain rock paintings and/or archaeological deposit.
- Dolerite outcrops and boulders which may contain pre-colonial (and in some instances historical) rock engravings.

The survey of the Soyuz 6 project footprint found very little archaeological material or other heritage resources in the development site (Figure 7 and Table 5).

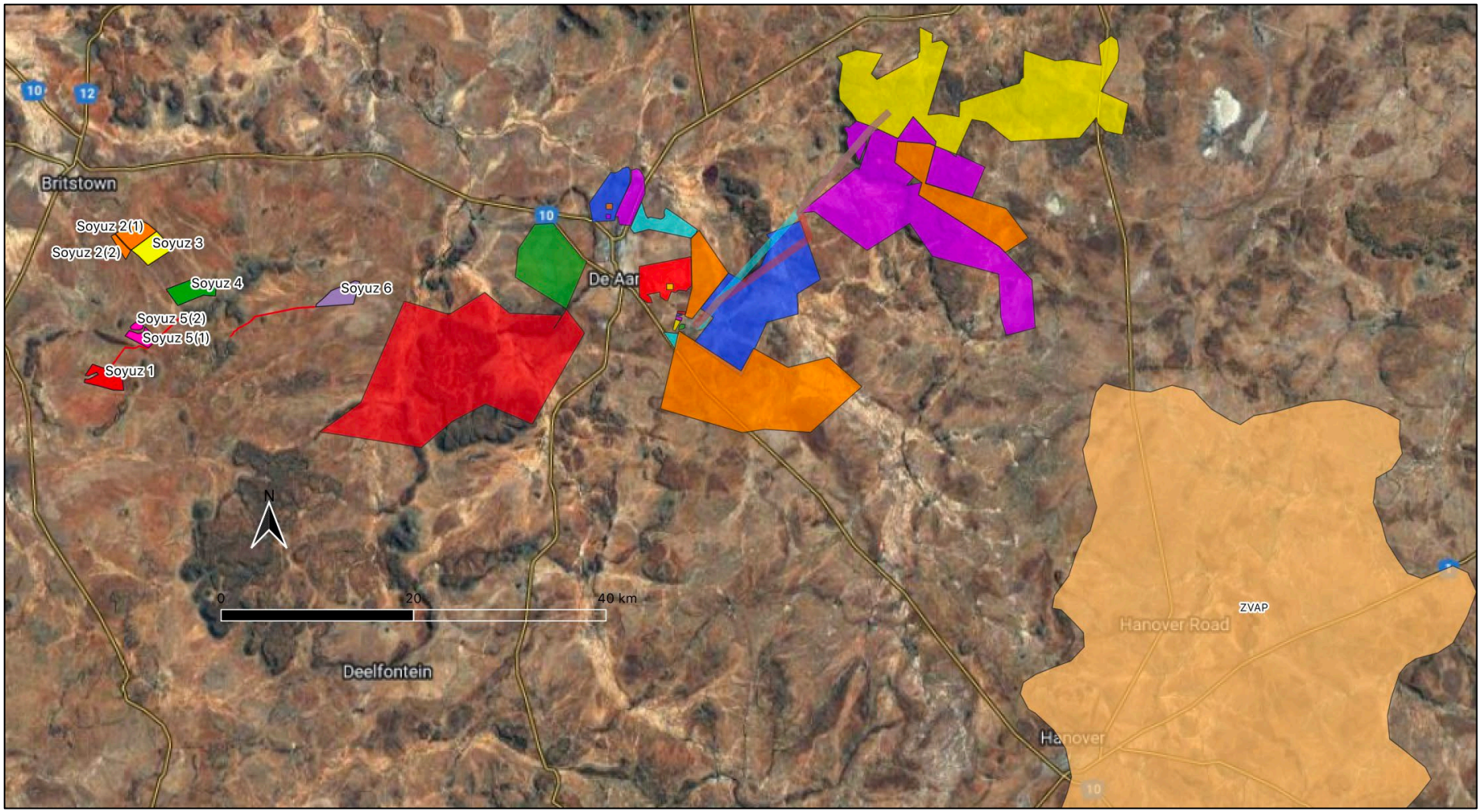

Figure 5: Previous heritage assessments in the vicinity of the Soyuz SPV cluster. The Soyuz project areas are shown on the left of the image. Part of the ZVAP survey area is shown on the right of the image.

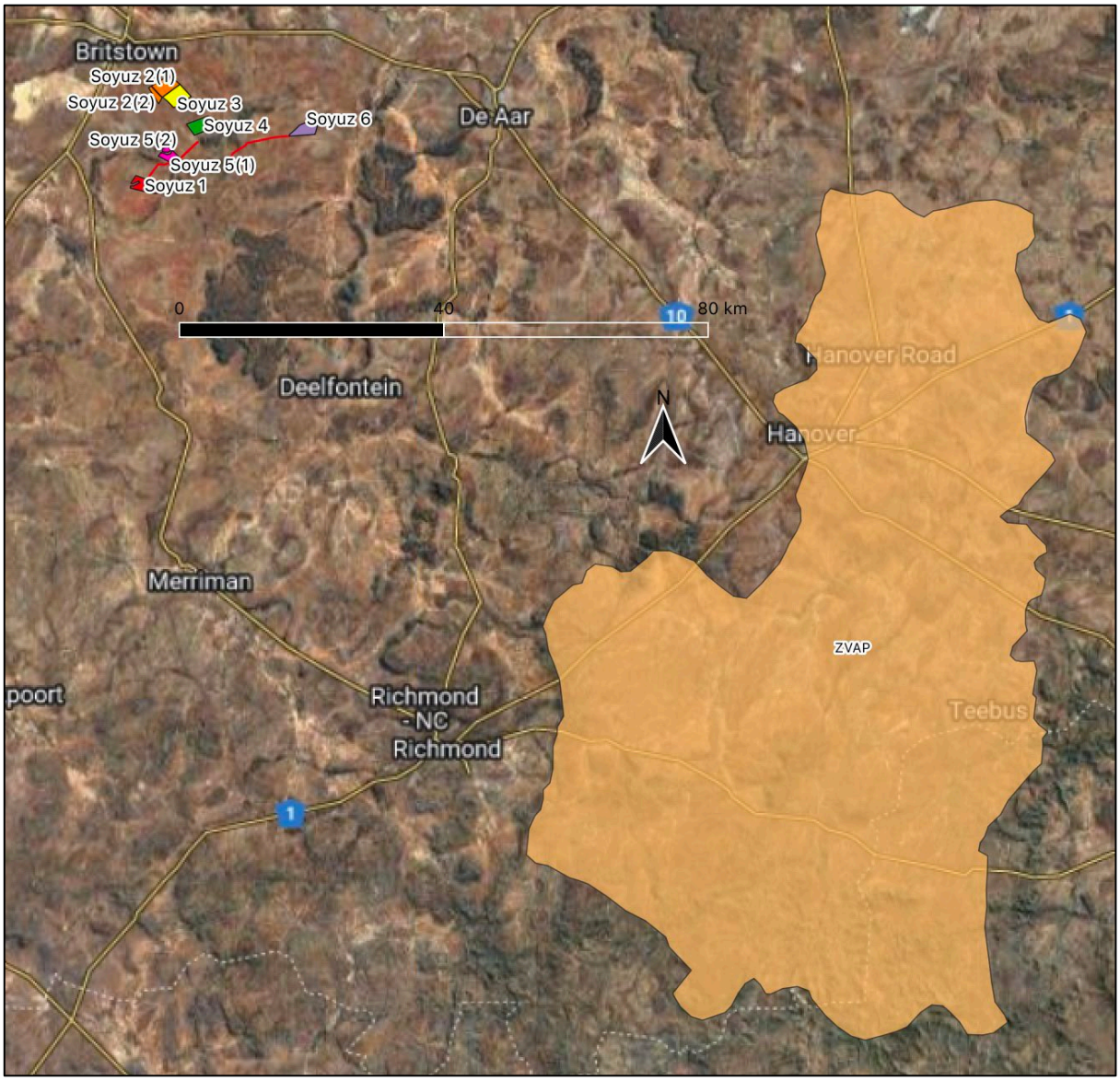

Figure 6: Extent of the ZVAP survey area (shaded area) in relation to the proposed Soyuz SPV cluster (coloured polygons) (After Sampson, 1985).

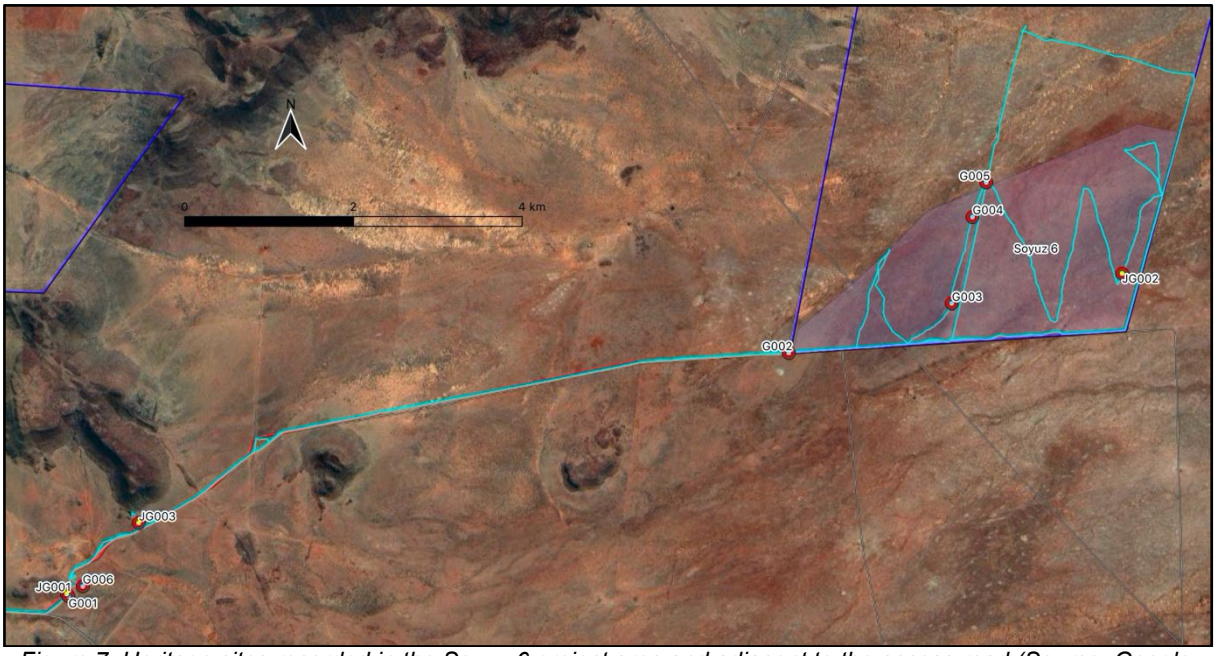

Figure 7: Heritage sites recorded in the Soyuz 6 project area and adjacent to the access road (Source: Google Earth).

Table 5: List of heritage resources recorded during the ACO survey of Soyuz 6 SPV project areas

Site	Location	Description	Grading
JG001	-30.721591981 23.656608006	MSA hornfels lithics on open sandy wash below koppie. Patinated (red) and worn, for the most part. Occasional smaller and "fresh" LSA (?) lithics noted. Approx 1 piece / m2. Extent approx. 20m^2. Farm track cuts through scatter	Ungradable
JG002	-30.692285998 23.769003041	Occasional patinated and worn MSA hornfels lithics on less vegetated area of red coversands. More gravel present that elsewhere and a handful of lithics present. Approx. 10m2 and 2-3 pieces per metre at most dense.	Ungradable
JG003	-30.715121990 23.664306030	Ephemeral scatter of hornfels LSA lithics on northern side of low dolerite outcrop. Approx 6m^2 in extent. Up to 4 pieces / m2. Lithics mostly "fresh" with some carrying light grey patina and not formal tools noted. Single large patinated MSA flake recorded.	Ungradable
G001	-30.721828 23.656803	Gravel lag on an open wash. Approx. 20 x 15 m in extent. Occasional MSA hornfels lithics, some heavily patinated and worn. 2-3 pieces / m^2. Chunks and some blades noted	Ungradable
G002	-30.699556 23.733508	MSA hornfels lithics on open area at farm gate. Mostly patinated but some less so. 4-5 pieces per m2.	Ungradable
G003	-30.695038 23.750877	Roughly rectangular stone feature. Dolerite cobbles. Approx. 2 x 1.5 m2. Probably too big for a grave.	3C
G004	-30.687102 23.753084	Thin scatter of very red patinated hornfels MSA lithics. Amongst dense surface scatter of worn and patinated hornfels pebbles.	Ungradable
G005	-30.683981 23.754555	Thin scatter of lightly patinated hornfels lithics. MSA. 1-2 pieces per m^2.	Ungradable
G006	-30.720896 23.658318	Large, packed stone kraal complex in eastern lee of small dolerite outcrop. Constructed of large dolerite boulders roughly packed. Walls stand to maximum of 1m. At least 3-roomed. Couple of pieces of dark green bottle glass and some 19th century ceramics noted, including Annular Ware. Site approx. 30 x 13 m.	3C

Within the Soyuz 6 SPV development site, ephemeral scatters of heavily patinated Middle Stone Age (MSA) hornfels lithics were noted (Plate 3). This type of archaeological material is very common and occurs widely across much of the Karoo and is generally in secondary context, having been moved by water and deflated by sediment erosion down into a mixed lag deposit. This material is regarded as background scatter, and is of very low cultural significance. A roughly rectangular stone feature (G003) constructed of dolerite cobbles and

measuring approximately 2 x 1.5 m was noted in the SPV park area. The feature may be a modern hunting skerm (Plate 4).

Adjacent to the current farm track which will form part of the proposed access road for the SPV park, a scatter of MSA hornfels lithics were recorded on open sandy wash (JG001 and G001). This site has already been disturbed by the farm road and is of low cultural significance.

JG003 is a small, ephemeral scatter of hornfels LSA lithics on northern side of a low dolerite outcrop. The scatter is roughly 6m^2 in extent and consists of mostly "fresh" hornfels lthics,, although some carry a light grey patina. No formal tools noted. A single large patinated MSA flake recorded.

Large, packed stone kraal complex (G006) was recorded on the eastern side of a small dolerite outcrop, approximately 100 m east of the access road (Plate 5).

Plate 3: Patinated MSA lithics recorded at waypoint G005 (Photo: G Euston-Brown).

Plate 4: Rectangular stone feature G003. Possibly a hunting skerm (Photo: G Euston-Brown).

Plate 5: G006, a large kraal complex east of the access road (Photo: G Eustion-Brown).

4.1.3 Historical Built Environment

A comparison of the earliest 1:250,000 topographic map sheet for the area, which dates from

1966, with modern satellite imagery in a GIS indicates that there are no historical built structures within the Soyuz 6 project footprint. The nearest historical farm complex is at Twyfelhoek, more than 4,5 km north-west of the project area (Figure 8).

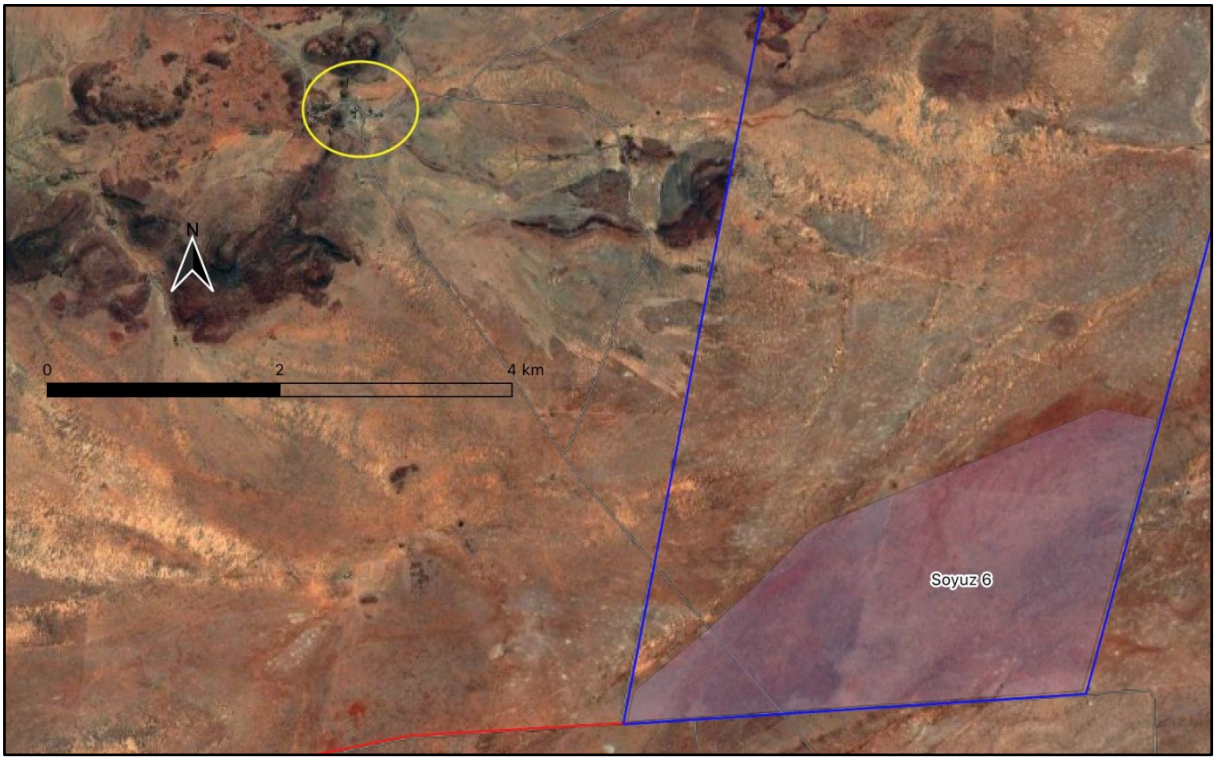

Figure 8: Location of the Twyfelhoek farmstead more than 4,5 km north-west of the Soyuz 6 project footprint (Source: Google Earth).

4.1.4 Graves and Burials

No graves or burial grounds were recorded within the Soyuz 6 project footprint. A handful of stone mounds associated with the historical structures adjacent to the access road from Soyuz 1 to 2 could be unmarked graves.

4.1.5 Cultural Landscape

The cultural landscape within which the Soyuz 6 SPV park will be located is not well developed but reflects the recent historical use of the land for stock farming. Its main features are fences, water troughs, wind pumps and occasional farm complexes.

5 POTENTIAL RISKS AND IMPACTS

The main concerns related to the Soyuz 6 SPV park are impacts to palaeontological resources and impacts to the cultural landscape.

Although the development footprint appears to contain no significant archaeology, there is the very small chance that significant buried archaeological sites and/or material could occur on the site.

Although no graves have been identified within the project footprint, it is possible that unmarked burials could be present.

Direct impacts to the historical built environment are unlikely so it has been scoped out of this assessment.

The following risks and direct impacts have been identified for the Soyuz 1 SPV project:

- **Construction Phase**
  - Potential impacts on palaeontology
  - Potential impacts on archaeology
  - Potential impacts on graves and burials
  - Potential impacts on the cultural landscape.
- **Operational Phase**
  - Potential impacts on the cultural landscape.
- **Decommissioning Phase**
  - Potential impacts on the cultural landscape.
- **Cumulative Impacts**
  - Potential impacts on palaeontology
  - Potential impacts on archaeology
  - Potential impacts on graves and burials
  - Potential impacts on the cultural landscape.

5.1 Potential Impacts during the Construction Phase

The impact assessment below uses the methodology supplied by Terramanzi, which is attached in Appendix C below.

5.1.1 Palaeontology

Activities associated with the construction and decommissioning of the Soyuz 6 project may disturb or destroy fossil material within the Tierberg Formation and Quaternary sediments that cover part of the site.

However, the potential for fossils in these sediments is very variable and significance of impacts palaeontological resources would thus be **low negative**, but **very low negative** with the implementation of mitigation measures

Table 6: Impacts on Palaeontology

IMPACT NATURE	**Palaeontological Impact – Disturbance and/or destruction of palaeontological material during construction and decommissioning**		**STATUS**	**NEGATIVE**
Impact Description	Disturbance and/or destruction of palaeontological material			
Impact Source(s)	Activities associated with the construction and decommissioning of the SPV facility			
Receptor(s)	Potential palaeontological material			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Preferred Alternative:	1	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Preferred Alternative:	4	Preferred Alternative:	4
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Preferred Alternative:	2	Preferred Alternative:	2
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Preferred Alternative:	-2	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Preferred Alternative:	-16	Preferred Alternative:	8
	No-Go Alternative:	-0	No-Go Alternative:	+0
CUMULATIVE IMPACTS	Cumulative impacts to palaeontological resources are difficult to assess due to the variable distribution and preservation of fossil material. However, location of this project and others approved or built within a 30km radius on areas either			

	largely underlain by either dolerite or Quaternary sediments suggests that the cumulative impact on palaeontological resources is likely to be low.
CONFIDENCE	High
MITIGATION MEASURES	Implementation of a Fossil Chance Find Protocol and monitoring of earthworks by the Environmental Compliance Officer. Report any chance finds of palaeontological material to SAHRA and/or an palaeontologist.

5.1.2 Archaeology

Archaeological sites and/or materials may be affected during activities associated with the construction and decommissioning of the Soyuz 6 project. Most of the archaeological material identified within the project footprint is of very low cultural significance. The significance of impacts on the known archaeological would thus be **low negative**, but **very low negative** with the implementation of mitigation measures.

Table 7: Impacts on Archaeology

IMPACT NATURE	**Archaeological Impact – Disturbance and/or destruction of archaeological sites and/or materials during construction and decommissioning**		**STATUS**	**NEGATIVE**
Impact Description	Disturbance and/or destruction of archaeological sites and/or materials			
Impact Source(s)	Activities associated with the construction and decommissioning of the SPV facility			
Receptor(s)	Known and potential archaeological sites and/or materials			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Preferred Alternative:	1	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Preferred Alternative:	4	Preferred Alternative:	4
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Preferred Alternative:	3	Preferred Alternative:	2
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Preferred Alternative:	-2	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Preferred Alternative:	-24	Preferred Alternative:	8
	No-Go Alternative:	-0	No-Go Alternative:	+0
CUMULATIVE IMPACTS	Cumulative impacts to archaeological resources are difficult to assess due to the variable distribution and quality of archaeological surveys ion the area. However, our cumulative knowledge of the archaeology of the Karoo suggests that the cumulative impact of the Soyuz SPV Cluster and other projects within a 30km on archaeological resources is likely to be low.			
CONFIDENCE	High			
MITIGATION MEASURES	Report any chance finds of significant archaeological material to SAHRA and/or an archaeologist.			

5.1.3 Graves or Burials

Human graves or burials could be impacted almost anywhere on the site, but the probability of this happening during activities earthworks associated with the construction and decommissioning of the Soyuz 6 project is extremely low and the significance rating is thus **very low negative** both without and with the implementation of mitigation measures.

Table 8: Impacts on Graves or Burials

IMPACT NATURE	**Graves and Burials Impact – Disturbance**	**STATUS**	**NEGATIVE**

	and/or destruction of graves or burials during construction and decommissioning			
Impact Description	Disturbance and/or destruction of graves or burials			
Impact Source(s)	Activities associated with the construction and decommissioning of the SPV facility			
Receptor(s)	Potential human graves or burials			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Preferred Alternative:	1	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Preferred Alternative:	4	Preferred Alternative:	4
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Preferred Alternative:	1	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Preferred Alternative:	-2	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Preferred Alternative:	-8	Preferred Alternative:	4
	No-Go Alternative:	-0	No-Go Alternative:	+0
CUMULATIVE IMPACTS	Most historical graveyards are associated with farm complexes, whether still occupied or not, and are thus generally avoided in the planning and construction of project such as the Soyuz 6 SPV park. Although unmarked burials can occur anywhere within the landscape, the pre-colonial inhabitants of the area often buried their dead along river courses which are invariably excluded from developments due to their other environmental sensitivity. Overall, therefore, it is likely that the cumulative impacts of this project and others in the vicinity on graves and burials will be very low.			
CONFIDENCE	High			
MITIGATION MEASURES	Cease work immediately in the immediate area if human remains are encountered. Leave remains in situ and make site safe Report the finds to SAHRA and/or an archaeologist.			

5.1.4 Cultural Landscape

The cultural landscape is likely to be the heritage resource most affected by the construction of the SPV facility, but given that it is of low cultural significance, the potential impact is assessed to be **low negative**.

Table 9: Impacts on the Cultural Landscape

IMPACT NATURE	**Cultural Landscape Impact - Alteration of the cultural landscape due to the presence of the SPV project**	**STATUS**	**NEGATIVE**	
Impact Description	Alteration of the cultural landscape			
Impact Source(s)	Construction of the SPV facility			
Receptor(s)	Landscape in and around the SPV facility			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Preferred Alternative:	1	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Preferred Alternative:	3	Preferred Alternative:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Preferred Alternative:	3	Preferred Alternative:	3
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Preferred Alternative:	-2	Preferred Alternative:	1
	No-Go Alternative:	0	No-Go Alternative:	0

SIGNIFICANCE RATING (F) = (A*B*D)*C	Preferred Alternative:	-18	Preferred Alternative:	9
	No-Go Alternative:	-0	No-Go Alternative:	0
CUMULATIVE IMPACTS	Impacts on the cultural landscape could occur extensively if numerous project are constructed in close proximity to one another and especially if these projects contain tall structural elements like turbines or powerlines. These impacts cannot be fully mitigated but the application of the recommendations of visual consultants would likely reduce the impacts from medium to low negative.			
CONFIDENCE	High			
MITIGATION MEASURES	Minimise disturbance footprint during construction and rehabilitate all disturbed areas that will not be needed during operation. At decommissioning, rehabilitate all areas following approved rehabilitation plan.			

Summary table of overall significance:

DESCRIPTION OF IMPACT	**Overall Significance with Mitigation**	
	No-Go Alternative	**Preferred Alternative**
Disturbance and/or destruction of palaeontological material during construction and decommissioning	None – no change	Low -ve
Disturbance and/or destruction of archaeological sites and/or materials during construction and decommissioning		Low -ve
Disturbance and/or destruction of graves or burials during construction and decommissioning		Low -ve
Alteration of cultural landscape due to the presence of the SPV project		Low -ve

6 OPPORTUNITIES AND CONSTRAINTS MAPPING

The location of the Soyuz 6 SPV project in an area of mixed high and moderate palaeontological sensitivity is not a fatal flaw and should not constrain the proposed development, provided suitable measures to mitigate any impacts are implemented as part of the development of the SPV. Mitigation measures will be detailed in the HIA and may include site visits by a palaeontologist, the monitoring of earthworks by the ECO and the implementation of a protocol or mechanism for reporting and dealing with chance finds of fossil material during project activities.

Although no significant archaeological sites or materials have been identified in the Soyuz 6 project area, were such material to be encountered during the development of the project it is unlikely to represent a major constraint. Most archaeological sites are limited in extent and have much smaller constraints footprints on development that those applicable to biodiversity or ecology, for example. It is generally possible to mitigate or avoid impacts on these resources arising from SPV developments should they be found to be present within the development footprint. Experience from many previous WEF and SPV developments has shown that the presence of archaeological resources within a development area is seldom a fatal flaw, and it is thus very unlikely to be the case for the Soyuz 6 SPV project provided suitable mitigation measures are implemented.

Historical buildings at Twyfelhoek north-west of the Soyuz 6 project area will not be directly affected by the proposed SPV facility but there may be indirect, visual impacts arising from its construction. The presence of historical building in the vicinity of the Soyuz 6 project area is unlikely to be a fatal flaw.

The occurrence of formal historical burial grounds in or near farm complexes means that they are likely to be avoided in the planning and siting of the project. Although historical graves and burials are extremely sensitive heritage receptors, their presence within the project area is not a fatal flaw, provided they are excluded from impacts during the development process.

With respect to unmarked usually pre-colonial graves, they too are an extremely sensitive and often contested heritage resource, and it is generally impossible to predict their presence in advance of development. However, the inclusion in the project EMPr of a procedure for reporting and dealing with chance finds of human remains will ensure that the sensitivity of development area with respect to this potential heritage resource is low and that they will not be a fatal flaw.

The cultural landscape within which the Soyuz 6 SPV park will be located is likely to be the heritage resource most affected by the construction of the SPV facility but given that it is of low cultural significance the impacts will not be a fatal flaw to the project.

7 PLAN OF STUDY FOR THE IMPACT ASSESSMENT PHASE

It is to be expected that SAHRA will request a Heritage Impact Assessment for the Soyuz 6 SPV park as part of the EIA. Given the mixed high and moderate palaeontological sensitivity of the development site, the HIA will need to include a desk-based palaeontological impact assessment, and possibly a field inspection due to the presence of high sensitivity sediments on the site.

A comment on the HIA will be required from SAHRA on the archaeology and palaeontologic and from the Northern Cape heritage authority (Ngwao-Boswa Ya Kapa Bokoni) on the cultural landscape.

Any comments received from either of these bodies must be considered by the competent authority before issuing an Environmental Authorisation.

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(Pty) Ltd. Archaeology Contracts Office.

9 APPENDIX A: SPECIALIST DECLARATION

(See separate PDF file)

APPENDIX B: CURRICULUM VITAE – JOHN GRIBBLE

(Last updated – 12 January 2023)

Name:	John Gribble
Profession:	Archaeologist (Maritime)
Date of Birth:	15 November 1965
Parent Firm:	ACO Associates cc
Position in Firm:	Senior Archaeologist
Years with Firm:	5+
Years of experience:	33
Nationality:	South African
HDI Status:	n/a

Education:

1979-1983	Wynberg Boys' High School
1986	BA (Archaeology), University of Cape Town
1987	BA (Hons) (Archaeology), University of Cape Town
1990	Master of Arts, (Archaeology) University of Cape Town

Employment:

- September 2017 – present: ACO Associates, Senior Archaeologist and Consultant
- 2014-2017: South African Heritage Resources Agency, Manager: Maritime and Underwater Cultural Heritage Unit
- 2012-2018: Sea Change Heritage Consultants Limited, Director
- 2011-2012: TUV SUD PMSS (Romsey, United Kingdom), Principal Consultant: Maritime Archaeology
- 2009-2011: EMU Limited (Southampton, United Kingdom), Principal Consultant: Maritime Archaeology
- 2005-2009: Wessex Archaeology (Salisbury, United Kingdom), Project Manager: Coastal and Marine
- 1996-2005: National Monuments Council / South African Heritage Resources Agency, Maritime Archaeologist
- 1994-1996: National Monuments Council, Professional Officer: Boland and West Coast, Western Cape Office

Professional Qualifications and Accreditation:

- Member: Association of Southern African Professional Archaeologists (ASAPA) (No. 043)
- Principal Investigator: Maritime and Colonial Archaeology, ASAPA CRM Section
- Field Director: Stone Age Archaeology, ASAPA CRM Section
- Class III Diver (Surface Supply), Department of Labour (South Africa) / UK (HSE III)

Experience:

I have more than 30 years of professional archaeological and heritage management experience. After completing my postgraduate studies and a period of freelance archaeological work in South Africa and aboard, I joined the National Monuments Council (NMC) (now the South African Heritage Resources Agency (SAHRA)) in 1994. In 1996 I

become the NMC's first full-time maritime archaeologist and in this regulatory role was responsible for the management and protection of underwater cultural heritage in South Africa under the National Monuments Act, and subsequently under the National Heritage Resources Act.

In 2005 I moved to the UK to join Wessex Archaeology, one of the UK's biggest archaeological consultancies, as a project manager in its Coastal and Marine Section. In 2009 I joined Fugro EMU Limited, a marine geosurvey company to set up their maritime archaeological section. I then spent a year at TUV SUD PMSS, an international renewable energy consultancy, where I again provided maritime archaeological consultancy services to principally the offshore renewable and marine aggregate industries.

In August 2012 I established Sea Change Heritage Consultants Limited, a maritime archaeological consultancy. Sea Change traded until 2018, providing archaeological services to a range of UK maritime sectors, including marine aggregates and offshore renewable energy.

In the UK I was also involved in strategic projects which developed guidance and best practice for the UK offshore industry with respect to the marine historic environment. This included the principal authorship of two historic environment guidance documents for COWRIE and the UK renewable energy sector (*Historical Environment Guidance for the Offshore Renewable Energy Sector* (2007) and *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (2010)). I was also manager and lead author in the development of the archaeological elements of the first Regional Environmental Assessments for the UK marine aggregates industry, and in the 2009 *UK Continental Shelf Offshore Oil and Gas and Wind Energy Strategic Environmental Assessment* for Department of Energy and Climate Change. In 2013-14 I was lead author and project co-ordinator on *The UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001: An Impact Review for the United Kingdom* and in 2016 I was co-author of a Historic England / Crown Estate / British Marine Aggregate Producers Association funded review of marine historic environment best practice guidance for the UK offshore aggregate industry.

I returned to South African in mid-2014 where I was re-appointed to my earlier post at SAHRA: Manager of the Maritime and Underwater Cultural Heritage Unit. In July 2016 I was appointed as Acting Manager of SAHRA's Archaeology, Palaeontology and Meteorites Unit.

I left SAHRA in September 2017 to join ACO Associates as Senior Archaeologist and Consultant. Since being at ACO I have carried out a wide range of terrestrial and maritime archaeological assessments, many of which are listed in the following section.

In 2018 of the potential impacts of marine mining on South Africa's palaeontological and archaeological heritage for the Council for Geoscience, on behalf of the Department of Mineral Resources.

I have been a member of the Association of Southern African Professional Archaeologists (No. 043) for more than thirty years and am accredited by ASAPA's Cultural Resource Management section.

I have been a member of the ICOMOS International Committee for Underwater Cultural Heritage since 2000 and served as a member of its Bureau between 2009 and 2018.

Since 2010 I have been a member of the UK's Joint Nautical Archaeology Policy Committee.

I am a member of the Advisory Board of the George Washington University / Iziko Museums of South Africa / South African Heritage Resources Agency / Smithsonian Institution 'Southern African Slave Wrecks Project'.

I have served on the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee since 2014.

Selected Project Reports:

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APPENDIX C: IMPACT ASSESSMENT METHODOLOGY

9.1 Definitions of Terminology

ITEM	DEFINITION
EXTENT	
Local	Extending only as far as the boundaries of the activity, limited to the site and its immediate surroundings
Regional	Impact on the broader region
National	Will have an impact on a national scale or across international borders
DURATION	
Short-term	0-5 years
Medium-Term	5-15 years
Long-Term	>15 years, where the impact will cease after the operational life of the activity
Permanent	Where mitigation, either by natural process or human intervention, will not occur in such a way or in such a time span that the impact can be considered transient.
MAGNITUDE OR INTENSITY	
Low	Where the receiving natural, cultural or social function/environment is negligibly affected or where the impact is so low that remedial action is not required.
Medium	Where the affected environment is altered, but not severely and the impact can be mitigated successfully and natural, cultural or social functions and processes can continue, albeit in a modified way.
High	Where natural, cultural or social functions or processes are substantially altered to a very large degree. If a negative impact then this could lead to unacceptable consequences for the cultural and/or social functions and/or irreplaceable loss of biodiversity to the extent that natural, cultural or social functions could temporarily or permanently cease.
PROBABILITY	
Improbable	Where the possibility of the impact materialising is very low, either because of design or historic experience
Probable	Where there is a distinct possibility that the impact will occur
Highly Probable	Where it is most likely that the impact will occur
Definite	Where the impact will undoubtedly occur, regardless of any prevention measures
SIGNIFICANCE	
Low	Where a potential impact will have a negligible effect on natural, cultural or social environments and the effect on the decision is negligible. This will not require special design considerations for the project
Medium	Where it would have, or there would be a moderate risk to natural, cultural or social environments and should influence the decision. The project will require modification or mitigation measures to be included in the design
High	Where it would have, or there would be a high risk of, a large effect on natural, cultural or social environments. These impacts should have a major influence on decision making.
Very High	Where it would have, or there would be a high risk of, an irreversible negative impact on biodiversity and irreplaceable loss of natural capital that could result in the project being environmentally unacceptable, even with mitigation. Alternatively, it could lead to a major positive effect. Impacts of this nature must be a central factor in decision making.
STATUS OF IMPACT	

Whether the impact is positive (a benefit), negative (a cost) or neutral (status quo maintained)
DEGREE OF CONFIDENCE IN PREDICTIONS
The degree of confidence in the predictions is based on the availability of information and specialist knowledge (e.g. low, medium or high)
MITIGATION
Mechanisms used to control, minimise and or eliminate negative impacts on the environment and to enhance project benefits Mitigation measures should be considered in terms of the following hierarchy: (1) avoidance, (2) minimisation, (3) restoration and (4) off-sets.

9.2 Scoring System for Impact Assessment Ratings

To comparatively rank the impacts, each impact has been assigned a score using the scoring system outlined in the Table below. This scoring system allows for a comparative, accountable assessment of the indicative cumulative positive or negative impacts of each aspect assessed.

IMPACT PARAMETER	SCORE	
Extent (A)	**Rating**	
Local	1	
Regional	2	
National	3	
Duration (B)	**Rating**	
Short term	1	
Medium Term	2	
Long Term	3	
Permanent	4	
Probability (C)	**Rating**	
Improbable	1	
Probable	2	
Highly Probable	3	
Definite	4	
IMPACT PARAMETER	**NEGATIVE IMPACT SCORE**	**POSITIVE IMPACT SCORE**
Magnitude/Intensity (D)	**Rating**	**Rating**
Low	-1	1
Medium	-2	2
High	-3	3
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Rating**	**Rating**
Low	0 to - 40	0 to 40
Medium	- 41 to - 80	41 to 80
High	- 81 to - 120	81 to 120
Very High	> - 120	> 120

Please complete the following Tables for <u>EACH IDENTIFIED IMPACT</u>.

IMPACT NATURE	Impact – Nature of Impact Eg. Botanical Impact – Loss of natural	STATUS	POSITIVE/NEGATIVE

	vegetation			
Impact Description				
Impact Source(s)				
Receptor(s)				
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Preferred Alternative:		Preferred Alternative:	
	No-Go Alternative:		No-Go Alternative:	
DURATION (B)	Preferred Alternative:		Preferred Alternative:	
	No-Go Alternative:		No-Go Alternative:	
PROBABILITY (C)	Preferred Alternative:		Preferred Alternative:	
	No-Go Alternative:		No-Go Alternative:	
INTENSITY OR MAGNITUDE (D)	Preferred Alternative:		Preferred Alternative:	
	No-Go Alternative:		No-Go Alternative:	
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Preferred Alternative:**		**Preferred Alternative:**	
	No-Go Alternative:		**No-Go Alternative:**	
CUMULATIVE IMPACTS				
CONFIDENCE				
MITIGATION MEASURES				

Summary table of overall significance:

DESCRIPTION OF IMPACT	**Overall Significance**	
	No-Go Alternative	**Preferred Alternative**

Examples for Table 2:
Description of impact: Loss of endangered vegetation types and plant species
Overall Significance with mitigation: Low/Moderate/High/Very High +/- (eg. High +)