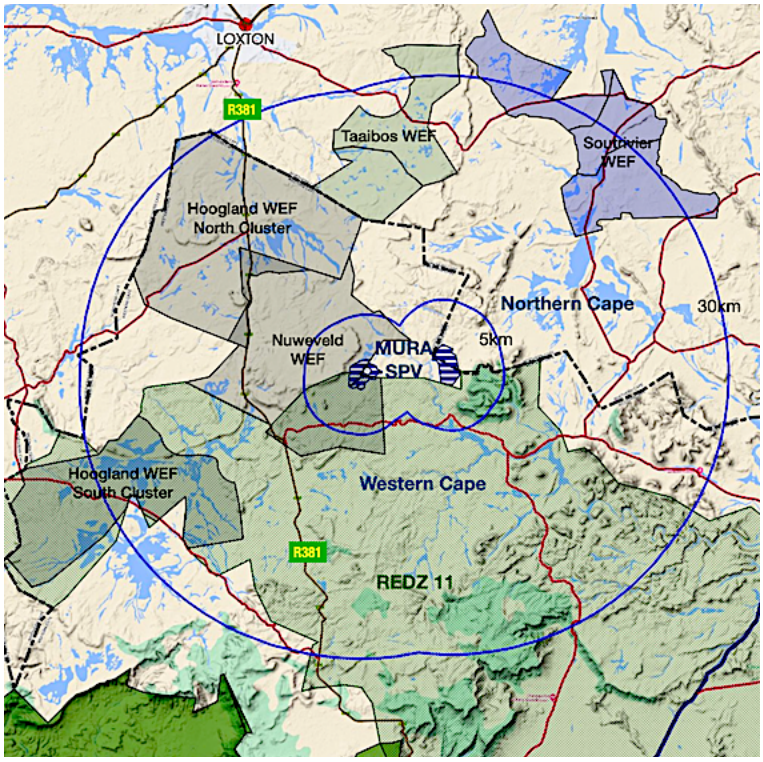
Proposed Mura Solar PV Projects
Western Cape and Northern Cape Provinces

for Red Cap Energy (Pty) Ltd

Draft Visual Impact Assessment

05 December 2022



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This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). Where a specialist assessment is required and no specific environmental theme protocol has been prescribed (as per Government Gazette 43110, 20 March 2020), the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations.

NEMA requirements for Specialist Reports		
	Specialist Report content as required by the NEMA 2014 EIA Regulations, as amended	**Section**
1 (1)(a)	(i) the specialist who prepared the report; and	Appendix A
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix C
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Sections 1 and 2
(cA)	an indication of the quality and age of the base data used for the specialist report;	Section 3
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 9 and 12
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used;	Section 3
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	Sections 9, 10, 11 and maps
(g)	an identification of any areas to be avoided, including buffers;	Section 9
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Maps 6-8
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Section 14
(k)	any mitigation measures for inclusion in the EMPr;	Section 13
(l)	any conditions for inclusion in the environmental authorisation;	Sections 14
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 13
(n)	a reasoned opinion-	Section 14
	(i) whether the proposed activity or portions thereof should be authorised; and	
	(iA) regarding the acceptability of the proposed activity or activities; and	
	(ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Refer to EAP
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to EAP
(q)	any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Section 8

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Abbreviations and Glossary

List of Abbreviations

BA	Basic Assessment
BESS	Battery Energy Storage System
DFFE	Department of Forestry, Fisheries and Environment
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GN	Government Notice
MTS	Main Transmission Station
NEMA	National Environmental Management Act
O&M	Operations and maintenance
OHPL	Overhead Powerline
REDZ	Renewable Energy Development Zone
REEA	Renewable Energy EIA Application Database
VIA	Visual Impact Assessment
WEF	Wind Energy Facility

Glossary

Definitions	
Receptor	Individuals, groups or communities who are subject to the visual influence of a particular project.
Viewpoint	A selected point in the landscape from which views of the project are ascertained.
Viewshed	The outer boundary defining a view catchment area, used to determine the zone of visual influence.
View shadow	An area within the view catchment visually obscured from the project, usually by topography.
Visual absorption capacity	The ability of an area to visually absorb development by means of screening topography, vegetation, or buildings.

1 Introduction

Red Cap Energy (Pty) Ltd is proposing to develop four solar facilities and associated grid connections, on behalf of four separate Project Applicants, namely Mura 1 (Pty) Ltd, Mura 2 (Pty) Ltd, Mura 3 (Pty) Ltd, and Mura 4 (Pty) Ltd, collectively known as the Mura PV projects between Loxton and Beaufort West (see **Map 1**). The proposed Mura PV projects are located in close proximity to the approved Nuweveld Wind Farm Development.

The four solar facilities are being assessed within a combined specialist report. For the grid connection, an Electrical Grid Infrastructure (EGI) Corridor is proposed and will be assessed as part of a separate Basic Assessment Process.

Five initial areas were identified, while only four sites are being assessed as part of this assessment. Mura Solar Project 1 falls within the REDZ and thus subject to a shortened Basic Assessment (BA) process (see **Map 2**) while Mura Solar 2 – 4 are located outside of the REDZ and will therefore be assessed as part of separate Scoping and EIA processes.

The purpose of this Draft Visual Impact Assessment (VIA) is to inform the layout (i.e the extent of each solar PV facility) of the proposed solar facilities. This involved the identification of visual/scenic features, potential sensitive receptors, and visual sensitivity mapping. An earlier desktop visual screening study and fieldwork were undertaken as part of the visual assessment.

2 Terms of Reference

The terms of reference for the visual specialist study included the following:

- Visual sensitivity mapping
- Sensitivity Verification Reporting
- Defining the legal, planning and policy context
- Description of the Baseline Environment
- Determination of potential impacts (direct, indirect, cumulative)
- Formulation of mitigation measures to minimise visual impacts
- Input into the Management Plan / Monitoring Programme
- Incorporation of public comment following public participation.

3 Methodology

A visual assessment methodology included the following steps:

- A 3D digital terrain model of the study area is used to determine the viewshed of the project.
- Potential sensitive receptors, such as farmsteads, identified.
- Landscape features and sensitive receptors are mapped together with recommended buffers for the solar facilities and related infrastructure.
- Field work is used to verify the existence and significance of landscape features and receptors in order to refine the visual mapping layers.
- A photographic record is made with the emphasis on views from potential sensitive receptors at varying distances.
- The panoramic photographs, which included their GPS positions, are used to create the photomontages.
- Potential visual impacts for the construction, operational and decommissioning phases of the projects are assessed along with their relative significance.
- Mitigation measures to avoid or minimise potential negative visual impacts are formulated.
- Cumulative visual impacts in relation to other existing and proposed renewable energy facilities and associated grid connections in the area are assessed.
- Impact significance ratings are determined based on the methodology provided by the EAP.

Field Work:

A site visit was carried out from 18 to 20 July 2022. The track used during the fieldwork is indicated on **Map 4**. The season was not a consideration for the visual assessment, but clear visibility was required for the photographic survey.

4 Assumptions and Limitations

Internal access roads will mostly make use of widened existing roads. A panel height of 6m has been used to determine the viewshed of the solar PV facilities.

Detailed design of these would only become available at a later stage.

5 Legal Requirements and Guidelines

Legal and policy documents relating to visual and scenic resources are described below. These tend to fall under the National Heritage legislation, the natural heritage being part of the 'national estate', and therefore the VIA Report needs to be read in conjunction with the HIA.

National Heritage Resources Act (Act 25 of 1999 NHRA)	The Act includes protection of national and provincial heritage sites, as well as areas of environmental or cultural value, and proclaimed scenic routes. Natural heritage, including scenic resources, form part of the 'national estate'.
Provincial Government of the Western Cape 2005: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes	A guideline document for specialist visual input with respect to determining potential visual impacts, along with criteria for rating the significance of impacts.

6 Project Description

Table 1 below indicates the areal extent of each of the solar projects, and Table 2 lists the footprint and height of the infrastructure located within the footprint of each of the solar PV projects:

Table 1: Areal extent and generation capacity of solar projects

Project Name	Project Extent (full area to be transformed)	Road Access Area (existing roads to be upgraded)*	Generation capacity
Mura Solar Project 1	160 ha	18 ha	Up to 150 MW
Mura Solar Project 2	430 ha	20 ha	Up to 400 MW
Mura Solar Project 3	370 ha	37 ha	Up to 320 MW
Mura Solar Project 4	420 ha	40 ha	Up to 360 MW

**may include up to two construction camps of 2.2 ha each*

Table 2: Solar project components located within the Solar PV project footprints

Component	Footprint	Height	Description
Solar arrays		Max. 6m	Either single axis tracking or fixed tilt mounting.
3 Substations	3x 150x75m	Max. 12m	Includes substation building and high voltage gantry.
Buildings		Max. 8m	Includes offices, O&M buildings, workshop, ablutions, converter/inverter stations.
Battery energy storage system (BESS)	3,5ha	Max. 12m	Connected to substations via underground high voltage cable.
Internal access roads*	2 to 4m wide	n/a	Gravel surface, plus side drains. Up to 12m wide during construction.
Maintenance area		n/a	Panel cleaning and maintenance area.

Fencing	n/a	2 to 3m	
Construction camps**	4.4 ha	n/a	Temporary construction and storage area incl. batching plant.

**the internal access roads are not located within the solar PV project footprint*
***these camps may either be located within the solar PV project footprint or within the internal access road corridor*

7 Description of the Study Area

A brief description of the landscape and scenic features of the study area are given below.

Landscape setting

The landscape and scenic features of the study area are similar to those for the Nuweveld wind farms. The 4 solar project areas lie within an expansive semi-arid landscape, with widely scattered farmsteads usually nestled among tree copses. The large farms mainly support merino sheep, and occasionally dorper sheep, goats and horses, as well as game, such as small antelope.

Geology and landforms

The landscape in this part of the Great Karoo has been eroded over time, the once deeply buried Beaufort Group mudstones and sandstones and the dolerite intrusions having been exposed to form the present-day Karoo landscape (**Map 3**).

The regional plateau is characterised by horizontal sills and dykes of erosion-resistant dolerite forming steep slopes in places, boulder-strewn *mesas* and flat-topped *koppies* that are the main scenic features of the study area. The gentler, lower hillslopes and plains consist of more easily weathered mudstone, with occasional narrow ledges of harder sandstone. The flattish plains, where the solar projects are located, are at around 1400-1500m elevation, and the surrounding dolerite ridges and mesas around 1600-1700m elevation (**Map 2**).

Vegetation cover

The vegetation of the Upper Karoo Bioregion is a response to the geology and relatively low rainfall, which occurs mainly in summer. The *Eastern Upper Karoo (NKu4)* vegetation type on the Beaufort Group mudstones and sandstones covers most of the study area, and consists largely of dwarf shrubland, along with grasses and succulent shrubs in places.

The *Upper Karoo Hardeveld (NKu2)* vegetation type covers smaller areas, occurring on the dolerite crests and steep slopes, often among large boulders. It consists of a grassy dwarf Karoo shrubland (Mucina and Rutherford, 2006).

Land use

There are a few scattered farmsteads in the surroundings, within the viewshed, which form green oases in the semi-arid landscape. The farmsteads are on average 5 to 10km+ apart, linked by narrow gravel roads. The farms are generally extensive in area and support mainly sheep farming and game.

Sense of place

The flat-topped hills and dolerite ridges are a characteristic feature of the Great Karoo in an otherwise fairly featureless, parched landscape, an area noted mainly for its empty, uncluttered landscapes, stillness, red sunsets, dark nights and starry skies.

The most scenic areas tend to be the dolerite koppies and the river courses, particularly in the vicinity of Leeukloof and Booiskraal (see Figures 1 to 4 below).

Fig. 1: Typical mesas and plains with succulent shrub vegetation of the study area

Fig. 2: Booiskraal farmstead about 3,3km south of Mura Solar Project 4

Fig. 3: Bultfontein farmstead about 2km north-east of Mura Solar Project 2

Fig. 4: Existing access road between Leeukloof and Booiskraal

8 Site Sensitivity Verification

Where a specialist assessment is required and no specific environmental theme protocol has been prescribed (as per Government Gazette 43110, 20 March 2020), the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations.

In accordance with GN 320 and GN 1150 of the NEMA EIA Regulations of 2014, prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

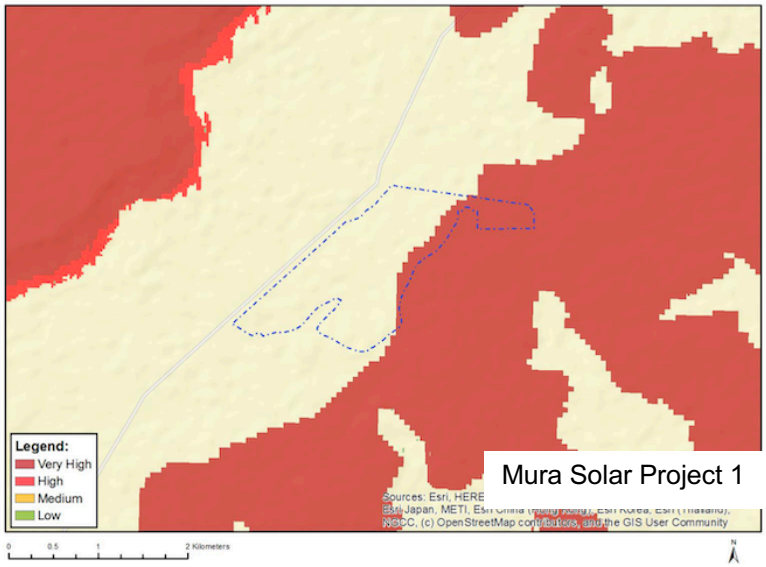
The downloaded screening tool maps of the study area, (DFFE, September 2022), include a landscape/visual theme for the proposed sites, with a landscape / visual specialist impact assessment being required for the solar projects as part of the EIA/BA process.

The DFFE's Maps of Relative Landscape Sensitivity for the 4 solar projects are indicated below in Figure 5. These maps were prepared at the regional scale and are disputed based on more detailed studies for the Mura solar projects by the visual specialist at the project scale (see **Map 7**). The SA Large Telescope is about 175km to the south-west and would not be affected.

A landscape/visual assessment is required for the access road corridors, but no screening tool map applies. It should also be noted that existing roads will be used and widened during construction to accommodate the delivery of infrastructure. No new access roads are proposed.

Landscape features and sensitive receptors were mapped using 1:50 000 topographical survey maps and Google Earth satellite imagery. Recommended buffers were added to landscape

MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY

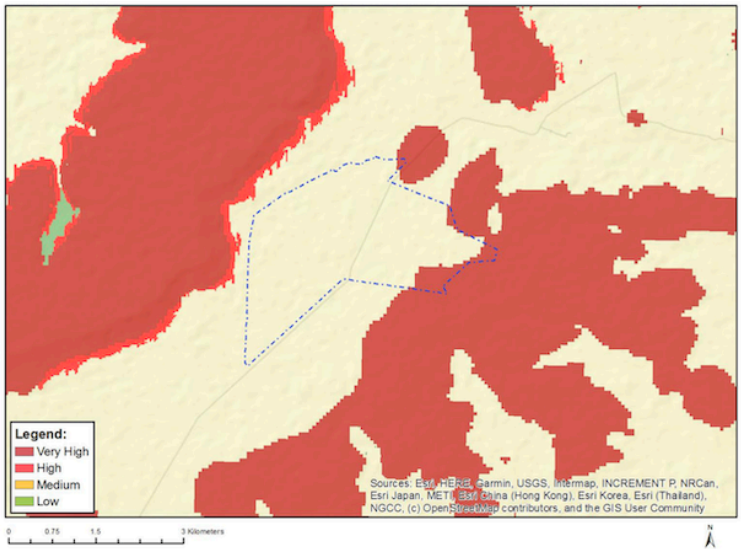


Mura Solar Project 1

features and receptors.

Sensitivity	Feature(s)
Very High	Mountain tops and high ridges

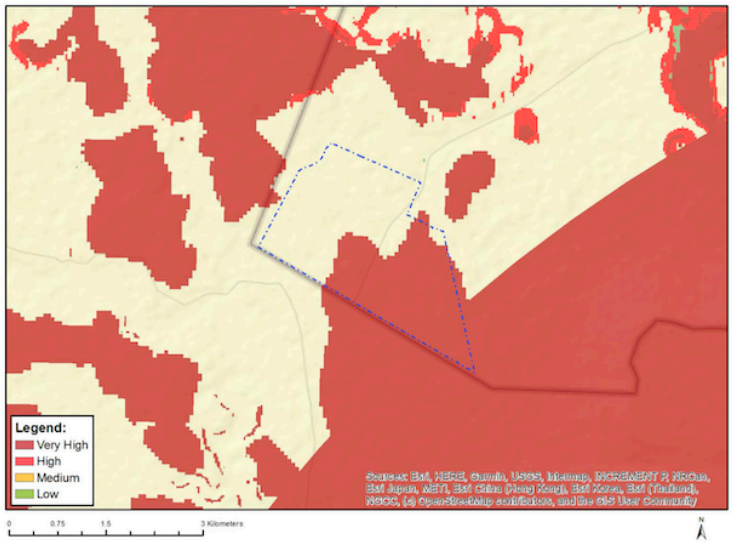
MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY



Mura Solar Project 2

Sensitivity	Feature(s)
Very High	Mountain tops and high ridges

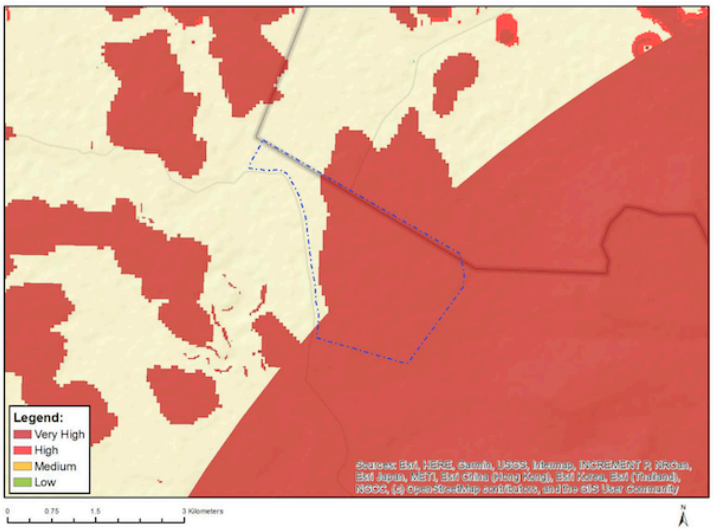
MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY



Mura Solar Project 3

Sensitivity	Feature(s)
Very High	Mountain tops and high ridges
Very High	South African Large Telescope

MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY



Mura Solar Project 4

Sensitivity	Feature(s)
Very High	Mountain tops and high ridges
Very High	South African Large Telescope

Figure 5: DFFE Maps of Relative Landscape Sensitivity (solar theme) for the four Mura solar projects

9 Visual Sensitivity Mapping

Visibility

Estimated degrees of visibility based on the scale of the facilities and related infrastructure, and on distance from various receptors are indicated in Tables 3 and 4 below:

Table 3: Degrees of Visibility of Proposed Solar Project Facilities

Very high visibility	0-500m	Prominent feature within the observer's view frame
High visibility	500m-1km	Relatively prominent within observer's view frame
Moderate visibility	1-2km	Only prominent as part of the wider landscape
Low visibility	2-4km	Visible as a minor element in the landscape
Very low visibility	>4km	Hardly visible with the naked eye in the distance

Table 4: Viewing Distances and Potential Visibility from Receptors

Farmsteads in the Study Area	Distance to PV1	Distance to PV2	Distance to PV3	Distance to PV4	Potential Visibility
Leeukloof	4.36km	4.42km	13.14km	12.4km	Low visibility. View shadow.
Gansfontein	8.54km	7.15km	5.7km	6.25km	Low visibility. Beyond 5km
Abramskraal	14.76km	13.87km	5.61km	6.74km	Low visibility. Beyond 5km
Bultfontein	2.97km	1.96km	4.96km	4.79km	Moderate visibility (see pano)
Booiskraal	9.05km	8.83km	5.07km	3.38km	Low visibility. View shadow.

Visual Exposure

The viewshed, or zone of visual influence, potentially extends for some 5km, but is partly restricted by topography in some directions, where parts of the surrounding area would be in a view shadow (see **Map 5**). The viewsheds of the proposed solar PV facilities tend to be fairly localised.

Visual Absorption Capacity (VAC)

This relates to the potential of the landscape to screen the proposed solar projects from view. The largely treeless landscape provides little screening effect. In most cases, clumps of trees around farmsteads tend to reduce visibility by receptors.

Landscape Integrity

Landscape integrity tends to be enhanced by scenic or rural quality and intactness of the landscape, as well as absence of other visual intrusions. Cultural landscapes, such as rural or farming scenes also have visual or scenic value. On the other hand, industrial activity and visual 'clutter', including substations and powerlines, detract from these scenes. The sites for the solar projects generally have uncluttered, expansive landscapes with pastoral scenes.

Visually Sensitive Resources

Natural and cultural landscapes, or scenic resources, form part of the 'National Estate' and may have local, regional or even national significance, usually, but not only, of tourism importance. **Map 6** indicates landscape features of interest *Visual Impact Intensity*

The overall potential visual impact intensity (or magnitude) is determined in Table 5 below by combining all the factors above, namely visual exposure, visibility, visual absorption capacity, landscape integrity and visually sensitive resources.

Table 5: Visual Impact Intensity

Visual Criteria	Comments	Solar facilities	Internal Access roads (incl. construction camps)
Visual exposure	Limited viewshed of solar facilities	Medium-low	Low
Visibility	Visible from a number of farmsteads.	Medium	Low
Visual absorption capacity (VAC)	Visually exposed plains, and therefore low VAC.	Medium	Low
Landscape integrity / intactness	Effect on rural / pastoral farming character.	Medium-high	Low-medium
Landscape / scenic sensitivity	Effect on scenic resources.	Low	Low
Impact intensity	Summary	**Medium**	**Low**

6. Visual Sensitivity Mapping

Landscape features of visual or scenic value, along with potential sensitive receptors in the surroundings, are described in Table 6 below. Visual features are indicated on **Map 6**.

Table 6: Typical Scenic Features and Sensitive Receptors

Landscape features within study area	
Topographic features	Characteristic landforms include the *mesas* and *koppies* formed from horizontal dolerite sills and vertical dolerite dykes. These features contribute to the scenic value, providing visual interest or contrast in the open Karoo landscape.
Water Features	In the dry landscape, drainage features and the larger dams provide scenic and amenity value.
Cultural landscapes	Green patches of cultivated land and tree copses in alluvial valleys form part of the cultural landscape. Archaeological sites also form part of the cultural landscape, covered elsewhere in the Heritage Assessment.

Receptors within the study area	
Protected Areas	Visual significance is increased by the protection status of reserves. There are no known proclaimed nature reserves, private reserves or game farms in the vicinity of the proposed solar projects.
Guest farms	Private guest farms and guest accommodation in the area are important for the local tourism economy and tend to be sensitive to loss or degradation of scenic quality. There are no guest farms within 3km of the solar projects.
Human settlements, farmsteads	Except for the nearby farmsteads, there are no other settlements within the study area.
Scenic and arterial routes	Much of the route between Leeukloof and Booiskraal has scenic features.

Scenic resources and sensitive receptors within the study area have been categorised into no-go, high sensitivity, medium and low visual sensitivity zones, for the proposed solar PV facilities, as indicated in Table 7 below.

The visual sensitivity categories in relation to the mapping are outlined in Tables 8 and 9 below, and indicated on **Map 7.**

Table 7: Sensitivity Categories

No Go	Areas or features considered of such sensitivity or importance that any adverse effects upon them may be regarded as a fatal flaw.
High	Development to be limited and remain within acceptable limits of change determined by the specialist, and comply with restrictions or mitigation measures identified by the specialist.
Medium	Areas considered to be developable, but to remain within acceptable limits of change as determined by the specialist, and comply with restrictions or mitigation measures identified by the specialist.
Low	Low sensitivity areas that are considered to be developable. However specialists may still wish to define acceptable limits of change where necessary.

Table 8: Visual Sensitivity Buffers for the Proposed Solar Project Areas

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features	within 100m	within 250m	-	-
Steep slopes	Slopes > 1:4	Slopes > 1:10	-	-
River features	Feature	Within 500m	-	-
Cultural landscapes/ cropland	within 250m	within 500m	-	-
Protected Landscapes / Sensitive Receptors				
Private reserves /guest farms	within 500m	within 1 km	within 2 km	-
Farmsteads outside site	within 500m	within 1 km	within 2 km	-
Farmsteads inside site	within 250m	within 500m	-	-
Scenic routes, poorts, passes	within 750m	within 1 km	within 2 km	-
District roads	within 100m	within 150m	within 250m	-
Minor roads	within 50m	within 100m	within 150m	-

*Table 9: Visual Sensitivity Buffers for Proposed New Access Roads (including construction camps)**

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features	Feature	within 50m	-	-
Steep slopes	Slopes > 1:4	Slopes > 1:10	-	-
River features	-	Within 50m	Within 100m	-
Cultural landscapes/ cropland	-	within 150m	Within 250m	-
Protected Landscapes / Sensitive Receptors				
Private reserves /guest farms	within 50m	within 250m	within 350m	-
Farmsteads	n/a	n/a	n/a	-
District roads	n/a	n/a	n/a	-
Minor roads	n/a	n/a	n/a	-

*the sensitivity buffers do not apply to the widening of existing roads

10 Visual Impact Assessment

The quantification of overall visual impact significance for the proposed solar projects is based on the methodology provided by WSP (2022), as used in Tables 10 to 12. The assessment criteria are included in Appendix B of this report.

The potential visual impacts for each of the 4 proposed Mura Solar Projects would be similar, and therefore only one set of tables is provided.

Table 10: Visual Impact Assessment – Construction Phase of Solar Facilities

Nature of the impact: Visual effect of construction activities on scenic resources and sensitive receptors					
Description of Impact: Visual intrusion of heavy vehicles and construction activities required for the erection of solar arrays and related infrastructure, temporary construction areas e.g. camps and batching plants. Litter generated from construction site. Noise and dust from construction activity.					
	M+	**E+**	**R+**	**Dx**	**P=**
Without Mitigation Score	Medium 3	Local 2	Recoverable 3	Short term 2	Highly probable 4
With Mitigation Score	Medium 3	Local 2	Recoverable 3	Short term 2	Probable 3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
(M+E+R+D) x P	N3 Moderate Impact (40)		N2 Low Impact (30)		
Mitigation measures: Disturbed areas to be rehabilitated / revegetated as soon as possible during the construction phase. The layout of the solar project (including all associated infrastructure) must avoid the very high (No-go) areas identified. Stockpiles to be located within approved construction footprints. Recycling and refuse bins to be provided to eliminate litter from the site.					
Residual impact	Visual disturbance caused by construction vehicles.				

Table 11: Visual Impact Assessment – Operational Phase of Solar Facilities

Nature of the impact: Visual intrusion on scenic resources and sensitive receptors					
Description of Impact: Potential visual effect of solar facilities on the rural landscape, scenic resources, and sensitive receptors. Change in the pastoral character and sense of place of the local area.					
	M+	**E+**	**R+**	**Dx**	**P=**
Without Mitigation Score	Medium 3	Local 2	Recoverable 3	Long term 4	Highly probable 4
With Mitigation Score	Medium 3	Local 2	Recoverable 3	Long term 4	Probable 3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
(M+E+R+D) x P	N3 Moderate Impact (48)		N3 Moderate Impact (36)		
Mitigation measures: Mitigation only achievable by means of avoidance of very high visual sensitivity areas and receptors or reduction in the extent of facilities.					
Residual impact	Visual intrusion of solar facilities on the exposed landscape.				

Table 12: Visual Impact Assessment – Decommissioning Phase of Solar Facilities

Nature of the impact: Visual intrusion of activities to remove infrastructure.					
Description of Impact: Visual effect of construction activities to remove infrastructure at the end of the life of the project, including substations, buildings and internal overhead powerlines.					
	M+	**E+**	**R+**	**Dx**	**P=**
Without Mitigation Score	Medium 3	Site 1	Recoverable 3	Short term 2	Highly probable 4
With Mitigation Score	Low 2	Site 1	Recoverable 3	Short term 2	Probable 3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
(M+E+R+D) x P	N3 Moderate Impact (36)		N2 Low Impact (24)		
Mitigation measures: Disturbed areas to be rehabilitated / revegetated as soon as possible after the decommissioning phase. Structures to be removed at the end of the life of the project.					
Residual impact	Visual intrusion of remaining roads and slabs on the local landscape.				

The quantification of overall visual impact significance for the proposed access road corridors is given in Tables 13 to 15 below. The access road corridors may include up to two construction camps.

Table 13: Visual Impact Assessment – Construction Phase of new Access Roads and Construction Camps

Nature of the impact: Visual effect of construction activities on scenic resources and sensitive receptors					
Description of Impact: Visual intrusion of heavy vehicles and construction activities required for the widening/construction of roads, side drains and culverts. Developing of construction camps. Noise and dust from construction activity.					
	M+	**E+**	**R+**	**Dx**	**P=**
Without Mitigation Score	Low 2	Local 2	Recoverable 3	Short term 2	Probable 3
With Mitigation Score	Low 2	Local 2	Recoverable 3	Short term 2	Low probability 2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
(M+E+R+D) x P	N2 Low Impact (27)		N2 Low Impact (18)		
Mitigation measures: Disturbed areas to be rehabilitated / revegetated as soon as possible during the construction phase. New construction camps to be located away from main district roads and if possible the camps authorised as part of the Nuweveld WEF should be utilised, if these are constructed.					
Residual impact	Visual disturbance caused by construction vehicles.				

Table 14: Visual Impact Assessment – Operational Phase of Access Roads

Nature of the impact: Visual effect of traffic on sensitive receptors					
Description of Impact: Potential intrusion of dust and noise from maintenance vehicles.					
	M+	**E+**	**R+**	**Dx**	**P=**
Without Mitigation Score	Low 2	Local 2	Recoverable 3	Long term 4	Low probability 2
With Mitigation Score	Low 2	Local 2	Recoverable 3	Long term 4	Low probability 2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
(M+E+R+D) x P	N2 Low Impact (22)		N2 Low Impact (22)		
Mitigation measures: Limited mitigation possible but could include speed control measures.					
Residual impact	Visual intrusion of maintenance vehicles.				

Table 15: Visual Impact Assessment – Decommissioning Phase of Access Roads

Nature of the impact: None.	
Description of Impact: The access roads would not be decommissioned as they form part of the existing road network. Therefore, no further visual impacts are involved, and the impact would be neutral.	
Mitigation measures: Rehabilitation of widened roads to be maintained.	
Residual impact	None.

11 Alternatives

Five initial areas were selected to be screened from an environmental and technical perspective. Areas 1,3 and 4 were screened out due to several constraints which made development within these areas unfeasible. For the assessment phase of the project, four sites, within two originally assessed areas of Areas 2 and 5, are being taken forward into the formal Assessment Phase of the development.

The preferred solar project areas are assessed against the 'No-go' alternative of not constructing the projects, in which case the status quo of the current farming activities on the site would prevail, and the significance of the no-go alternative would therefore be neutral.

12 Assessment of Cumulative Visual Impacts

Map 1 indicates other similar renewable energy projects, either existing or proposed, in order to assess cumulative visual impacts within a 30km radius of the proposed Mura solar project. The proposed Hoogland WEF, and Nuweveld WEF by Redcap fall within this radius. Only parts of the Nuweveld WEF would potentially be seen in combination with the proposed Mura solar projects, although the nature of the topography would largely screen these projects from each other. Cumulative Impacts have been assessed in the Cumulative Visual Impact summary, Table 16, below.

Table 16: Cumulative Visual Impact

Nature of the impact: Visual effect of renewable energy projects within 30km					
Description of Impact: Combined visual effect of existing and proposed renewable energy projects on scenic resources and sensitive receptors.					
	M+	**E+**	**R+**	**Dx**	**P=**
Without Mitigation Score	Medium 3	Regional 3	Irreversible 5	Long term 4	Probable 3
With Mitigation Score	Medium 3	Regional 3	Irreversible 5	Long term 4	Probable 3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
(M+E+R+D) x P	N3 Moderate Impact (45)		N3 Moderate Impact (45)		
Mitigation measures: Mitigation only achievable by means of avoidance or reduction in the extent of energy facilities.					
Residual impact	Visual intrusion of renewable energy facilities on the exposed landscape.				

13 Mitigation and EMPR Requirements

Mitigation measures have been recommended for the solar facilities and related infrastructure in the tables above, in order to minimise visual impacts on scenic resources and sensitive receptors.

Environmental Management Programme

Visual input into the Environmental Management Programme (EMPr) is discussed below. This should be included in the Environmental Authorisation for the project.

Construction Phase Monitoring:

Ensure that visual management measures are included as part of the EMPr, monitored by an Environmental Control Officer (ECO), including siting of any construction camps, stockpiles, temporary laydown areas and batching plants outside of identified no-go areas unless otherwise approved by the visual specialists, as well as the implementation of dust suppression and litter control measures. Rehabilitation efforts to commence immediately after construction activities are completed.

Responsibility: ECO / Contractor.
Timeframe: Preparation of EMPr during the planning phase. Monitoring during the construction phase.

Operation Phase Monitoring:

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the maintenance of rehabilitated areas, as well as control of any signage, lighting and wastes at the proposed solar projects, with interim inspections by the responsible environmental officer.

Responsibility: Solar Farm Operator.
Timeframe: During the operational life of the project.

Decommissioning Phase Monitoring:

Ensure that procedures for the removal of structures during decommissioning are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard, and signed off by the delegated authority.

It is assumed that some access roads and concrete pads would remain. Those that are not required should be ripped and vegetation or cropland reinstated to match the surroundings.

The revegetation measures are not described here as they would fall under the auspices of the vegetation/ biodiversity specialist.

Responsibility: ECO / Contractor / qualified rehabilitation ecologist or horticulturist.
Timeframe: During the decommissioning contract phase, as well as a prescribed maintenance period thereafter (usually one year).

14 Summary and Conclusion

Summary of Findings

The draft visual assessment is based on the currently provided layouts for the proposed four Mura solar projects. Mitigation measures have been recommended in Tables 10 to 15 above. These have been included where possible in the project layouts. Visual photomontages have been attached to depict the current layout.

The preliminary visual assessment findings are the following:

- The viewshed is fairly localised in all directions given the modest height of the solar facilities.
- There are a number of visual receptors in the surroundings these being mainly small farmsteads and guest farms in some cases.
- The overall visual impact significance for the four solar projects has been rated as medium, both before and after mitigation, as there would be some change in character to the area.
- The potential visual impact significance for the two access road corridors has been rated as low, because they are upgrades of existing roads, and are not generally of visual significance.
- The cumulative visual impact significance of the solar energy facilities, seen in combination with other renewable energy projects in the area has been rated as medium, as there would be limited inter-visibility between projects. The cumulative visual impact for access roads would be neutral as these form part of the existing road network.
- Effective mitigation for the solar facilities is limited to 'avoidance', such as limiting the extent of the facilities.

Conclusion and Impact Statement

The layout of the Mura solar facilities has been subject to an iterative planning process, based on the various specialist findings, including the mapping of scenic resources and sensitive receptors. The currently proposed layout succeeds in avoiding visually sensitive areas as indicated on the visual sensitivity map (**Map 7**).

The cumulative visual impact of the solar facilities and related infrastructure, such as the substations, battery facilities and grid connection powerlines, could affect the rural quality of the area, but this would be fairly localised.

Specialist Recommendations for Inclusion in the EA

It is the opinion of the Visual Specialists that provided the recommended mitigation measures and EMPr are implemented, the project would not present a potential fatal flaw in visual terms and could be authorised.

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DFFE, September 2022. Screening Report for an Environmental Authorisation - Proposed Site Environmental Sensitivity, Mura PV Projects (Mura 1 to 4).

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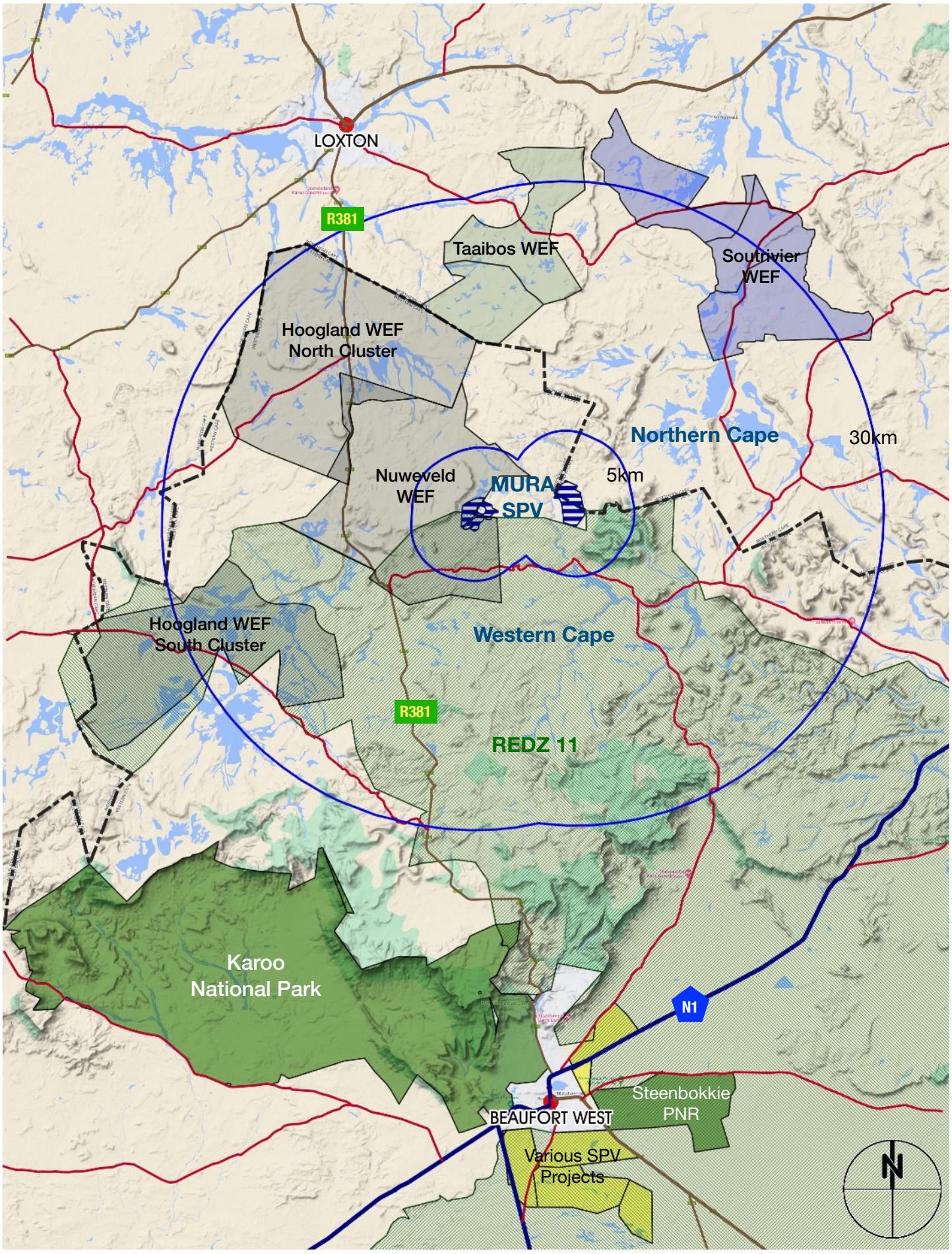
Red Cap (Pty) Ltd. October 2022. Mura Terms of Reference. 8 pp.

WSP, September 2022. Mura Solar Impact Assessment Methodology. 3 pp.



base map : Google Maps Terrain 2022

Map 1 : Mura SPV : Regional Locality

ELEVATION :

- 1300 - 1400m
- 1400 - 1500 m
- 1500 - 1600 m
- 1600 - 1700 m
- 1700 - 1800 m

Access Road Corridors

base map : NGI 50K Topographic Series : 3122CD Dunedin, DC Hillcrest

0 1 2 3 4 5 km

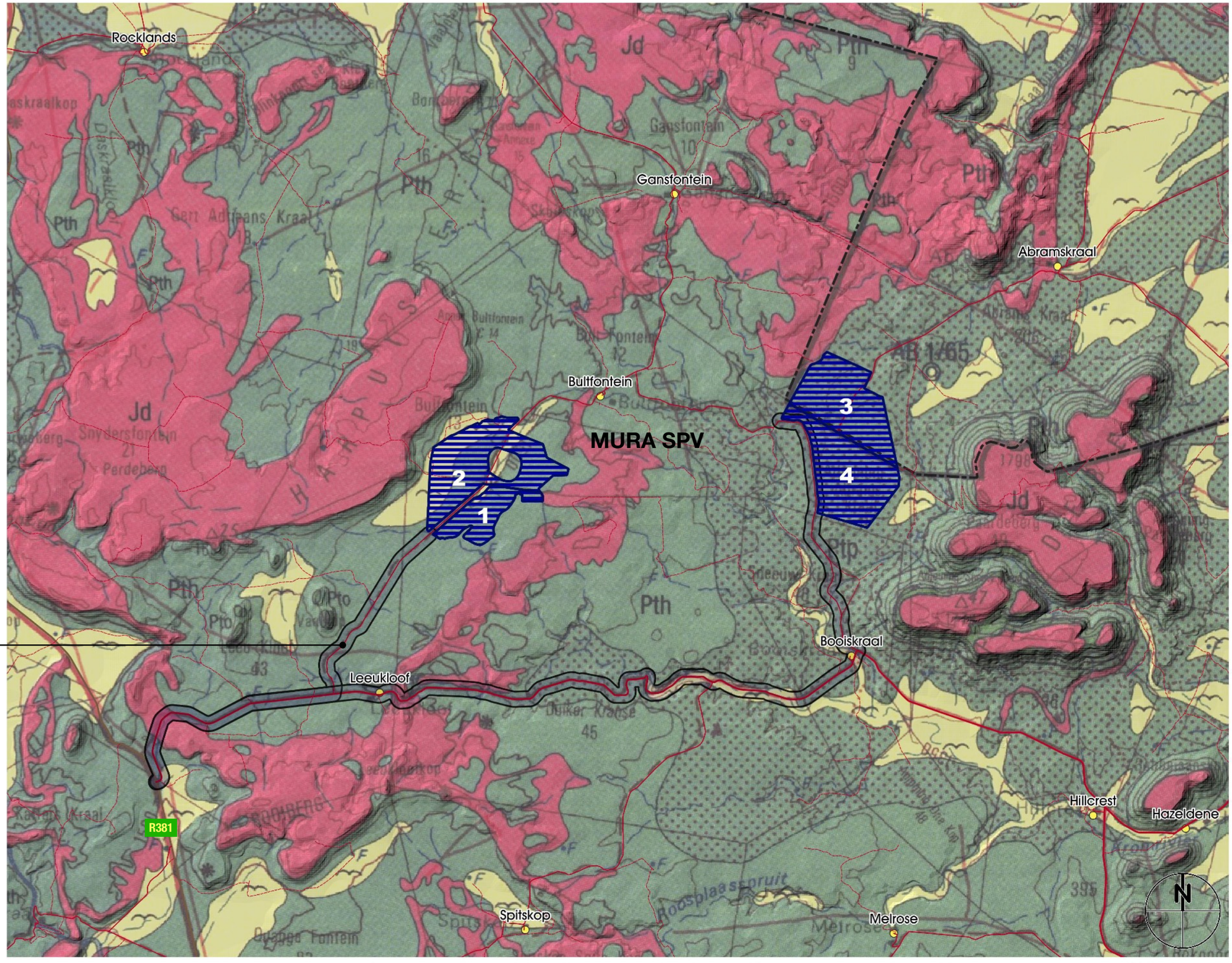
1:100,000

Map 2 : Mura SPV : Layout and Physiography

Geology Legend :

- Alluvium
- Jd — Dolerite
- Pth — Beaufort Group Mudstones and Sandstones (Hoedemaker)
- Ptp — Beaufort Group Mudstones and Sandstones (Poortjie)

Access Road Corridors



base map : CGS : Victoria West 3122 Geology 250K

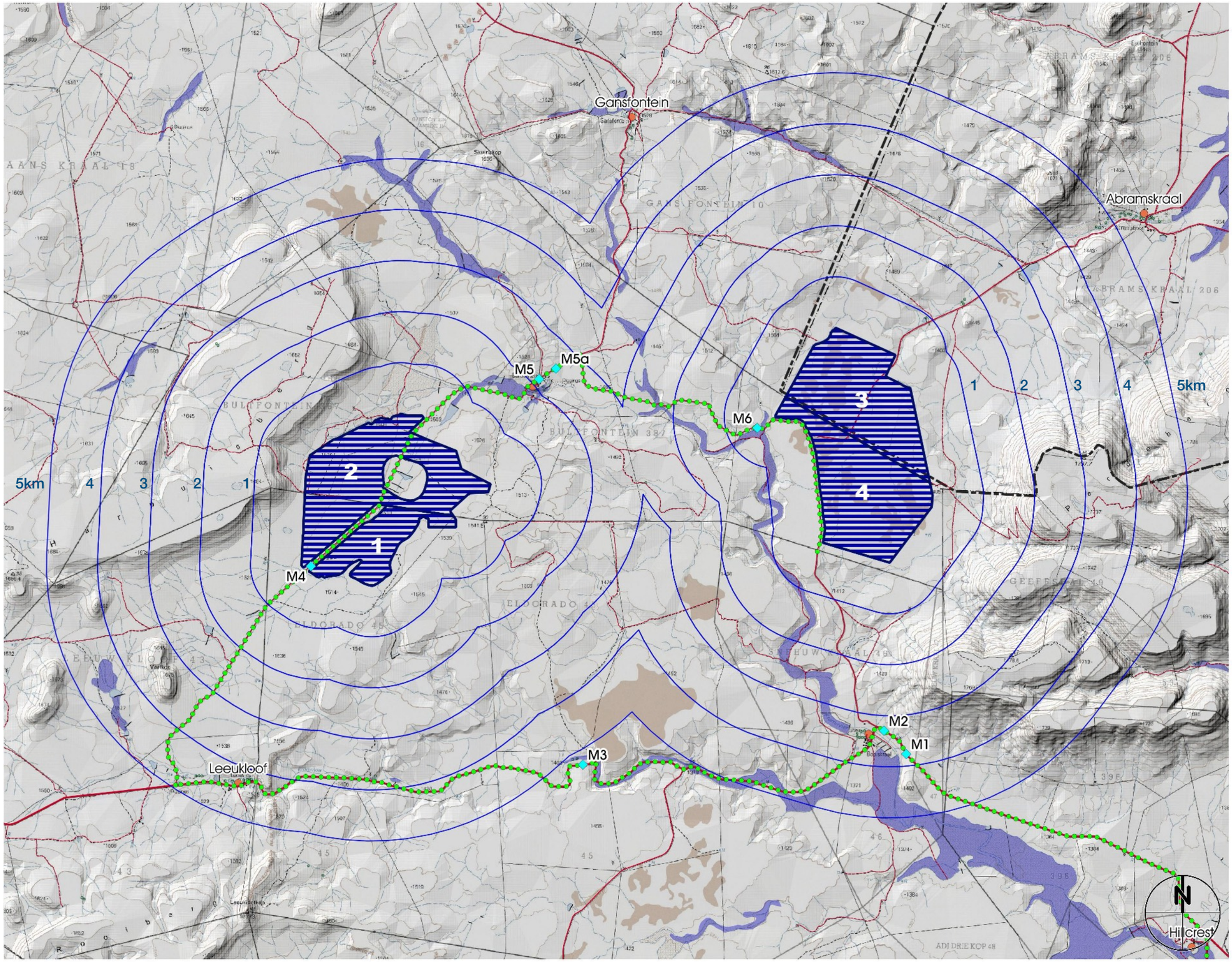
Map 3 : Mura SPV : Geology

Legend :

Fieldwork Track

M3 Viewpoints

SPV Areas

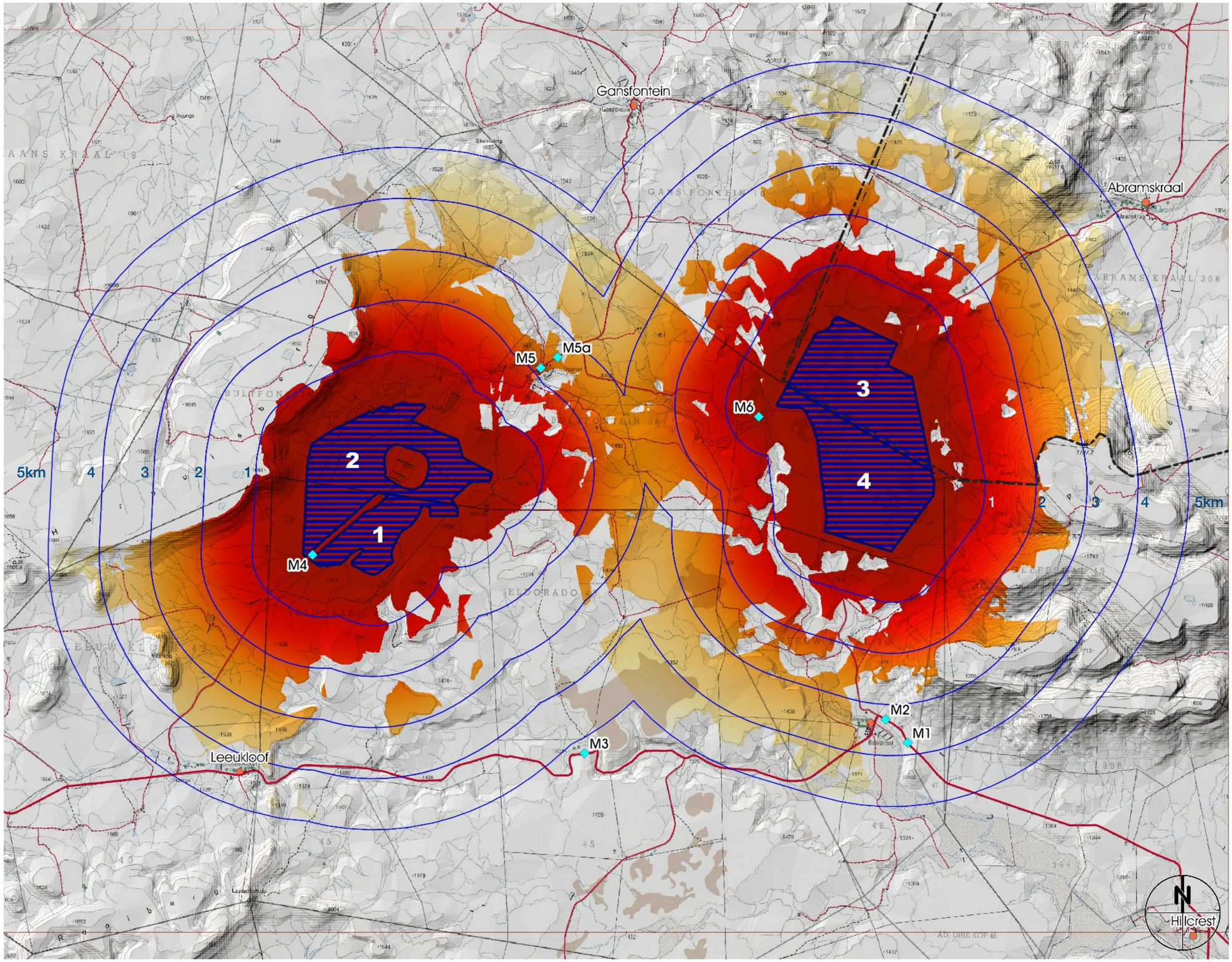


base map : NGI 50K Topographic Series : 3122CD Dunedin, DC Hillcrest

Map 4 : Mura SPV : Fieldwork

Viewshed Legend :

- High Visibility
- Medium Visibility
- Low Visibility
- No Visibility (View Shadow)

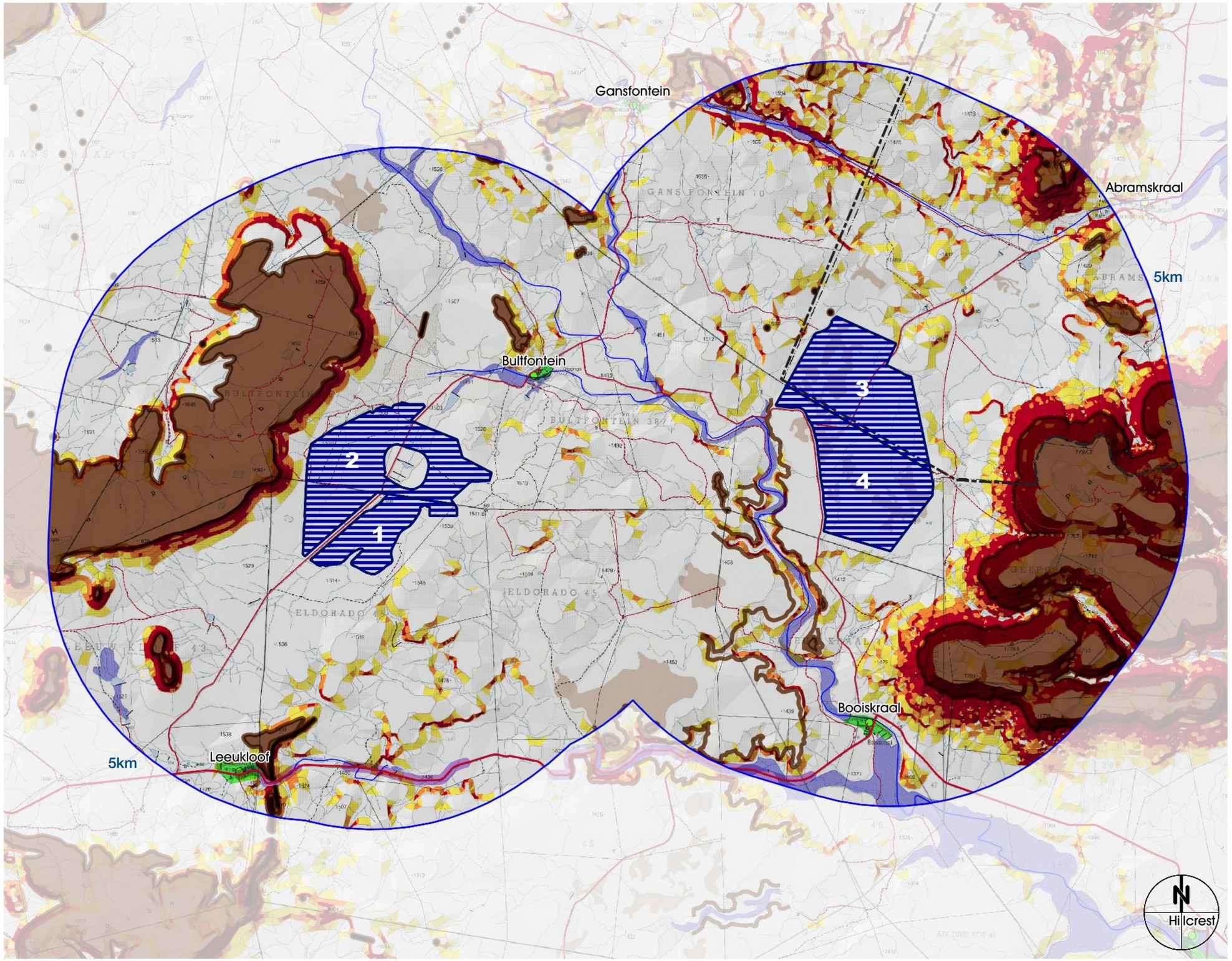


base map : NGI 50K Topographic Series : 3122CD Dunedin, DC Hillcrest

Map 5 : Mura SPV : Nominal Viewshed : *(based on SPV arrays 6m high)*

LEGEND :

- Topographic Features
- YELLOW <1:10 slopes
  ORANGE 1:10 - 1:4 slopes,
  RED >1:4 + slopes
- Watercourses
- Cultural Landscapes
- Farmsteads
- Scenic Roads
- District Roads



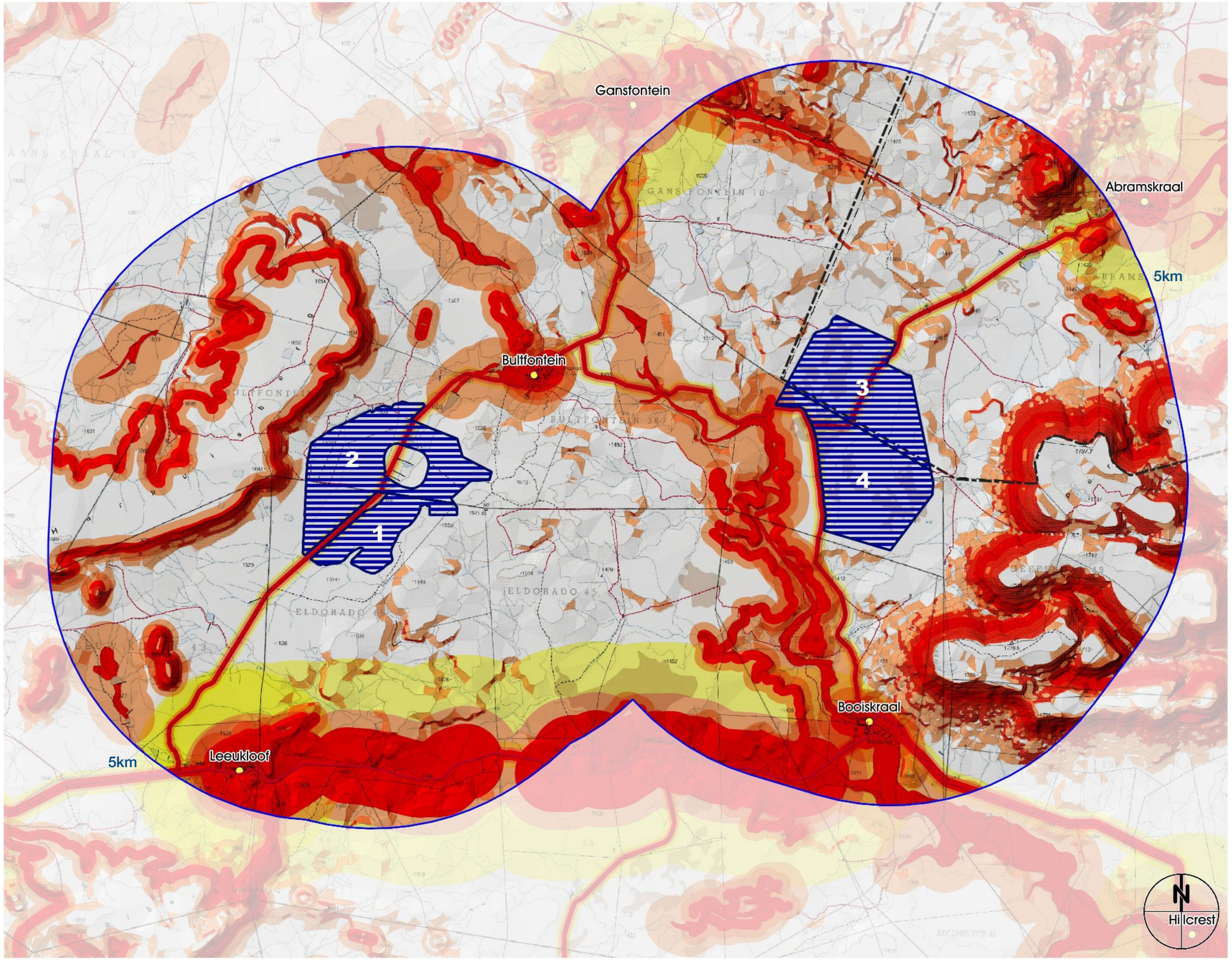
base map : NGI 50K Topographic Series : 3122CD Dunedin, DC Hillcrest

0 1 2 3 4 5 km
1:75,000

Map 6 : Mura SPV : Visual Features

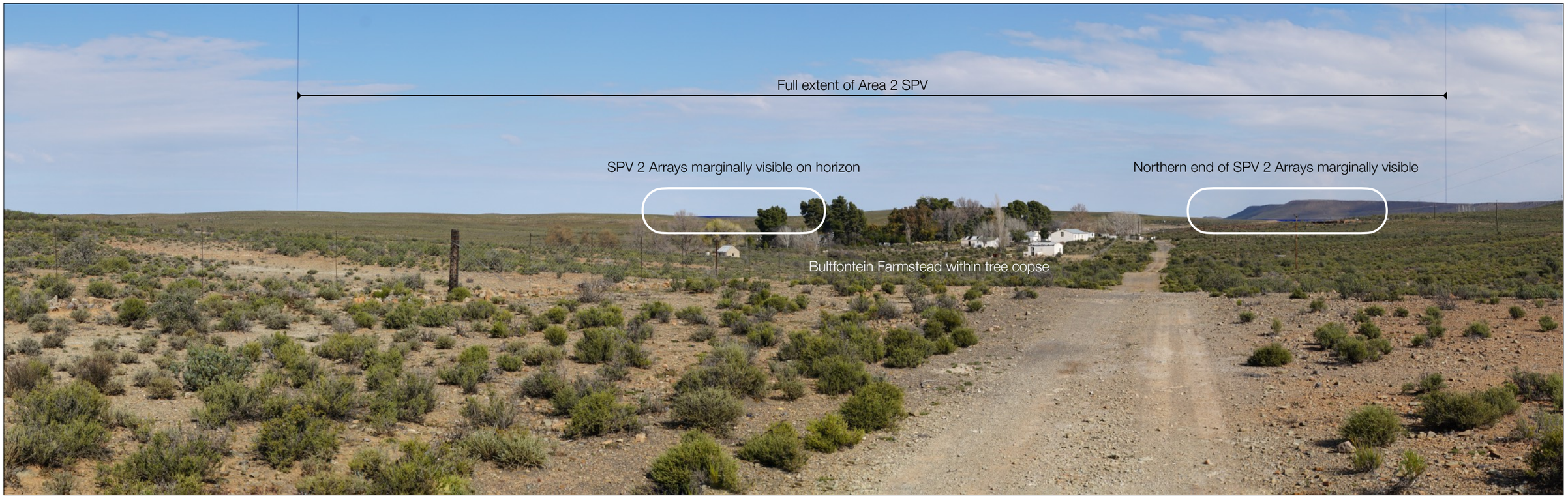
Visual Sensitivity : SPV Arrays

- Very High - NoGo
- High Visual Sensitivity
- Medium Visual Sensitivity
- Low Visual Sensitivity



base map : NGI 50K Topographic Series : 3122CD Dunedin, DC Hillcrest

Map 7 : Mura SPV : Visual Sensitivity • Solar PV Areas



Viewpoint M5a • looking South-West near Bultfontein Farmstead

Location : 31.802193S, 22.531826E distance : 1.98km

Viewpoint M6 • looking South-East from scenic area of farm road

Location : 31.812172S, 22.573683E distance : 2.37km (to visible Southern end)

Viewpoint Photomontages

Appendix A: Visual Specialists

Bernard Oberholzer, Landscape Architect
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Quinton Lawson, Architect
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Expertise

Bernard Oberholzer has a Bachelor of Architecture (UCT) and Master of Landscape Architecture (U. of Pennsylvania), and has more than 25 years' experience in undertaking visual impact assessments. He has presented papers on *Visual and Aesthetic Assessment Techniques*, and is the author of *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes,* prepared in association with the CSIR for the Dept. of Environmental Affairs and Development Planning, Provincial Government of the Western Cape, 2005.

Quinton Lawson has a Bachelor of Architecture Degree (Natal) and has more than 15 years' experience in visual assessments, specialising in 3D modelling and visual simulations. He has previously lectured on visual simulation techniques in the Master of Landscape Architecture Programme at UCT.

The authors have been involved in visual assessments for a wide range of residential, industrial and renewable energy projects. They prepared the 'Landscape/Visual Assessment' chapter in the report for the *National Wind and Solar PV Strategic Environmental Assessment (SEA)*, as well as the *National Electricity Grid Infrastructure SEA* in association with the CSIR, for the then Department of Environmental Affairs in 2014-2015.

Appendix B: Impact Assessment Methodology

3 Environmental impact assessment

Reporting Requirements

- Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of methodology (as required)
- Update and/or confirmation of Baseline Environment – including update and / or confirmation of sensitivity mapping
- Identification and description of Impacts
- Full impact assessment (including Cumulative)
- Mitigation measures
- Impact Statement

Ensure that all reports fulfil the requirements of the relevant Protocols.

Assessment of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in Error! Not a valid bookmark self-reference..

[1] Impacts that arise directly from activities that form an integral part of the Project.
[2] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[3] Secondary or induced impacts caused by a change in the Project environment.
[4] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[5] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

Table 0-1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 1** below.

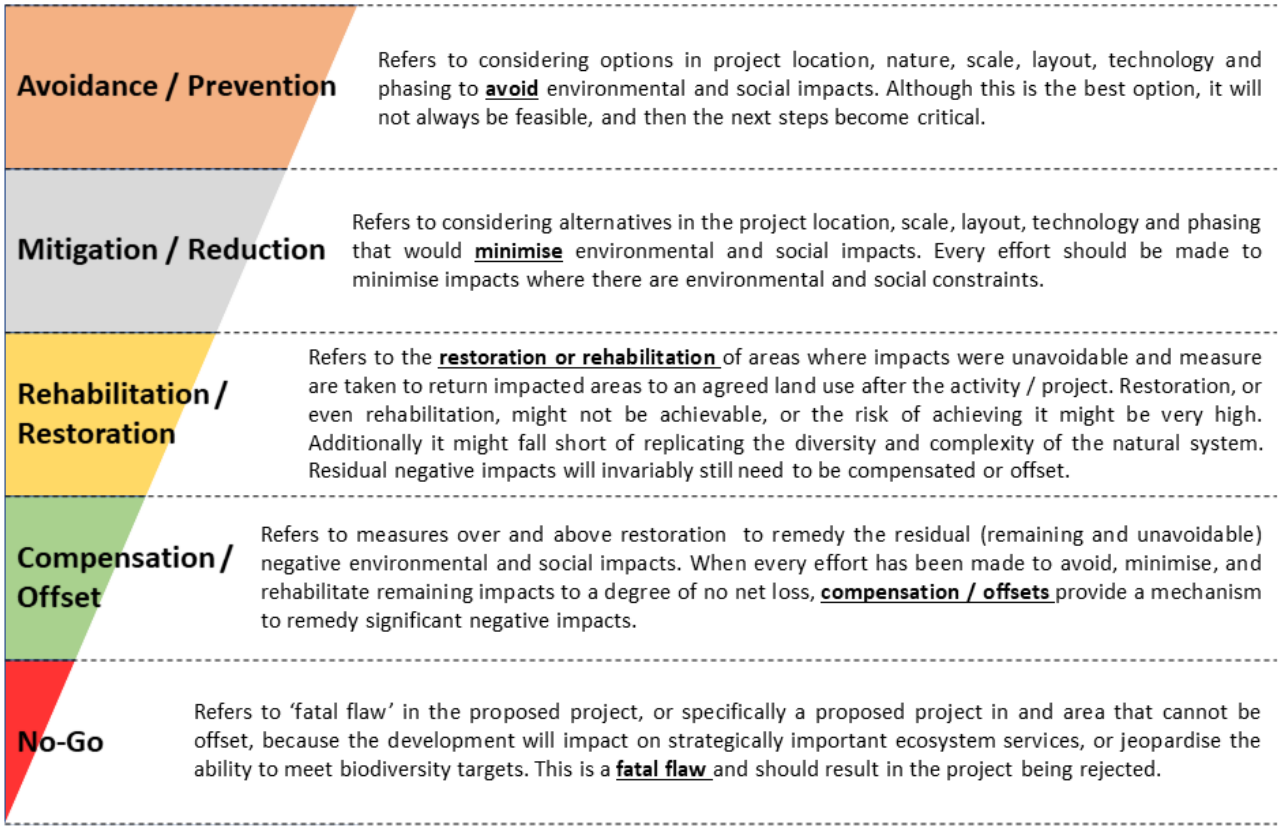

Figure 1: Mitigation Sequence/Hierarchy