

**SUBSTATION AND ASSOCIATED 400KV TRANSMISSION AND
132KV DISTRIBUTION LINES FOR A PROPOSED SOLAR PARK AND
CSP SITE IN THE NORTHERN CAPE**

REVISED VISUAL IMPACT ASSESSMENT

Produced for:
ESKOM HOLDINGS (LTD)

Produced by:
MetroGIS (Pty) Ltd.
PO Box 384, La Montagne, 0184
Tel: (012) 349 2884/5 Fax: (012) 349 2880
E-mail: lourens@metrogis.co.za Web: www.metrogis.co.za



On behalf of:
Zitholele Consulting (Pty) Ltd.



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1. STUDY APPROACH

1.1. Qualification and Experience of the Practitioner

MetroGIS (Pty) Ltd, specialising in visual assessment and Geographic Information Systems, undertook this visual assessment in collaboration with Nu Leaf Planning and Environmental (Pty) Ltd.

Lourens du Plessis, the lead practitioner undertaking the assessment, has been involved in the application of Geographical Information Systems (GIS) in Environmental Planning and Management since 1990.

The team undertaking the visual assessment has extensive practical knowledge in spatial analysis, environmental modeling and digital mapping, and applies this knowledge in various scientific fields and disciplines. The expertise of these practitioners is often utilised in Environmental Impact Assessments, State of the Environment Reports and Environmental Management Plans.

The visual assessment team is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape Province of South Africa, the core elements are more widely applicable.

Zitholele Consulting (Pty) Ltd appointed MetroGIS (Pty) Ltd as an independent specialist consultant to undertake the visual impact assessment for a Substation and associated 400kV Transmission and 132kV Distribution lines for a proposed Solar Park and CSP site in the Northern Cape.

Neither the author, MetroGIS or Nu Leaf Planning and Environmental will benefit from the outcome of the project decision-making.

This report represents a revision of the the original Visual Impact Assessment undertaken in October 2012. Additional alignment alternatives have since been included for the Ferrum and Nieuwehoop Corridors and the alignment of the Aries_Alternative 1 Corridor has changed slightly. In addition, responses from Interested and affected parties have been received and addressed as appropriate.

1.2. Assumptions and Limitations

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

1.3. Level of Confidence

Level of confidence¹ is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
 - 3: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.

¹ Adapted from Oberholzer (2005).

- 2: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
 - 1: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.
- The information available, understanding of the project and experience of this type of project by the practitioner:
 - 3: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
 - 2: A moderate level of information and knowledge is available of the project and the visual impact assessor is moderately experienced in this type of project and level of assessment.
 - 1: Limited information and knowledge is available of the project and the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

Table 1: Level of confidence.

	Information on the project & experience of the practitioner			
Information on the study area		3	2	1
	3	9	6	3
	2	6	4	2
	1	3	2	1

*The level of confidence for this assessment is determined to be **3** and indicates that the author's confidence in the accuracy of the findings is moderate:*

- The information available, and understanding of the study area by the practitioner is rated as **1** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

1.4. Methodology

The study was undertaken using Geographic Information Systems (GIS) technology as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from 20m interval contours supplied by the Chief Directorate National Geo-Spatial Information.

The approach utilised to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data. This included cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed facility could have a potential impact;

- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

This report (visual impact assessment) sets out to identify and quantify the possible visual impacts related to the proposed facility, including related infrastructure, as well as offer potential mitigation measures, where required.

The following methodology has been followed for the assessment of visual impact:

- **Determine Potential visual exposure**

The visibility or visual exposure of any structure or infrastructure is the point of departure for the visual impact assessment. It stands to reason that if the proposed infrastructure were not visible, no impact would occur.

Viewshed analyses of the proposed infrastructure indicate the potential visibility.

- **Determine Visual Distance/Observer Proximity to the facility**

In order to refine the visual exposure of the infrastructure on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence.

Proximity radii for the proposed alignment corridors are created in order to indicate the scale and viewing distance of the infrastructure and to determine the prominence thereof in relation to their environment.

The visual distance theory and the observer's proximity to the infrastructure are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed infrastructure.

- **Determine Viewer Incidence/Viewer Perception**

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of a structure is favourable to all observers, then the visual impact would be positive.

It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure.

It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the Visual Absorption Capacity of the natural vegetation**

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed infrastructure. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate the potential visual absorption capacity (VAC) of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover and other landscape characteristics.

- **Determine the Visual impact index**

The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

- **Determine Impact significance**

The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of extent, duration, magnitude and probability.

2. BACKGROUND

Eskom Holdings Limited is proposing the establishment of electrical infrastructure to support the development of a Solar Park and CSP site located approximately 15km south west of Upington.

The primary infrastructure includes three 400kV Transmission Lines (with an assumed corridor width of 2km) and associated feeder bays. Each of the three Transmission Lines has a number of alternative corridor alignments, as follows:

- The Aries Corridor links the Solar Park to the 400kV Aries Substation located approximately 110km to the south west of Upington, near Kenhardt. Four alternative corridors are being considered (refer also to **Map 1a**):
 - **Aries_Alternative 1** is the western most alignment, and runs in a slightly northwesterly direction from the Aries Substation. Once the corridor has crossed the Orange River and the N14, it swings to the northeast to link with the new substation at the Solar Park. This corridor is approximately **131km** in length.
 - **Aries_Alternative 1B** follows the same alignment as Aries_Alternative 1, except for a portion to the immediate north of the Orange River crossing. This section of line deviates to the north west to make a wider loop, before joining with the Aries_Alternative 1 alignment just north west of Keimoes. This corridor is approximately **139km** in length.
 - **Aries_Alternative 2**, which is the central alignment, runs due north from the Aries Substation, until it reaches the Orange River and the N14, where after it banks to the north east to link with the new substation at the Solar Park. This corridor is approximately **121km** in length.

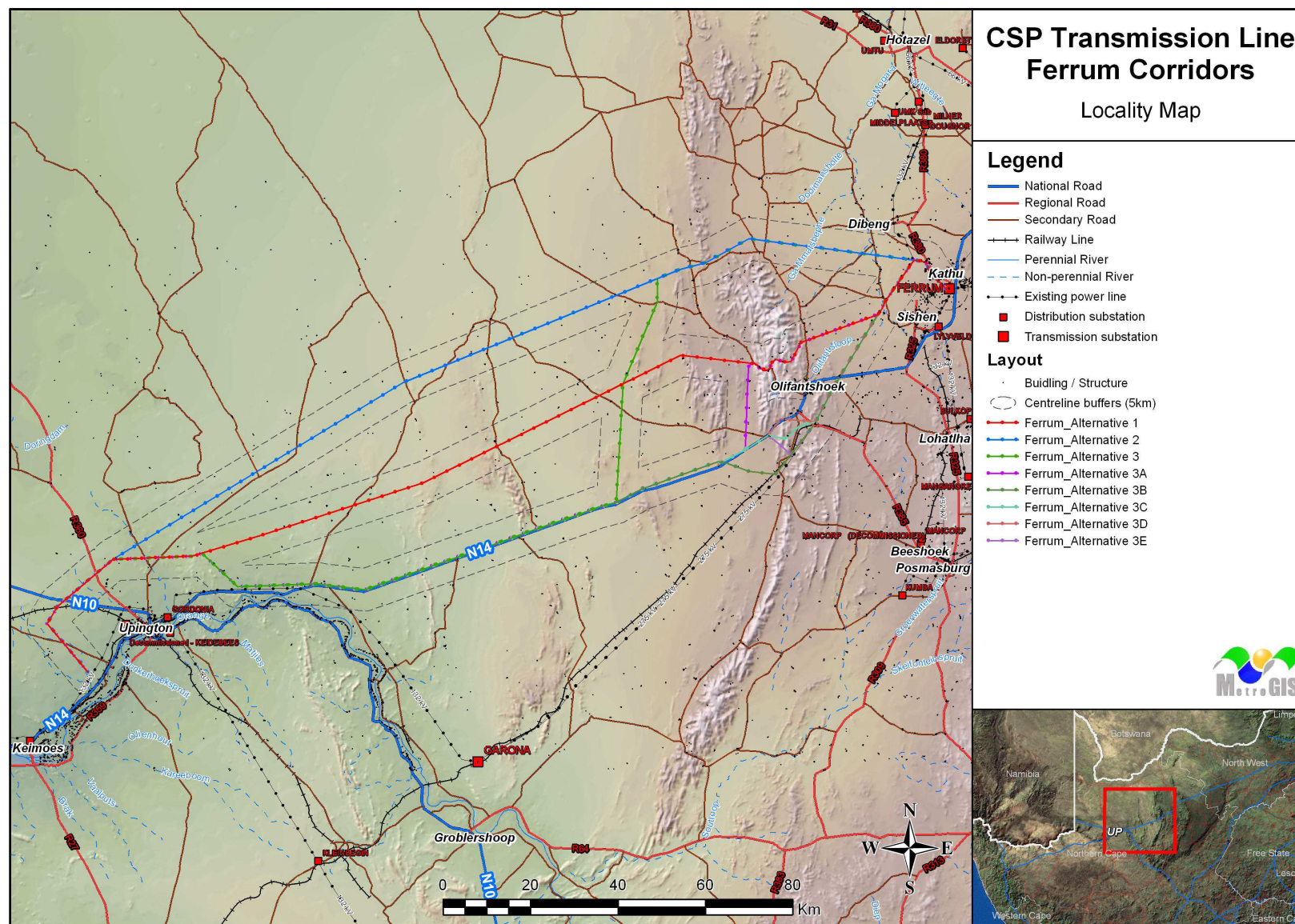
- **Aries_Alternative 3** is the eastern most alignment, and runs in a slightly northeasterly direction from the Aries Substation. Once the corridor has crossed the Orange River and the N14, it swings to the northeast to link with the new substation at the Solar Park. This corridor is approximately **114km** in length.
- The Ferrum Corridor links the Solar Park to the 400kV Ferrum Substation located approximately 210 km to the north east of Upington, near Kathu. Eight alternative corridors are being considered (refer also to **Map 1b**):
 - **Ferrum_Alternative 1** is the central alignment, and runs in a southwesterly direction from the Ferrum Substation. Close to Upington, the alignment banks to the west, southwest and southeast, curving around the north west of the city before linking with the new substation at the Solar Park. This corridor is approximately **252km** in length.
 - **Ferrum_Alternative 2** is the northern most alignment, and runs in a westerly direction from the Ferrum Substation before turning to the southwest. Just beyond Upington, the alignment banks to the southeast to link with the new substation at the Solar Park. This corridor is approximately **248km** in length.
 - **Ferrum_Alternative 3** also runs in a westerly direction from the Ferrum Substation before turning sharply to the south, and then to the west at the N14. The alignment follows the road for a distance, before it banks to the north west, west, south west and south east, curving around the north west of Upington before linking with the new substation at the Solar Park. This corridor is approximately **282km** in length.
 - **Ferrum_Alternative 3A** follows the central alignment in a southwesterly direction from the Ferrum Substation, but then turns sharply to the south. At the N14, the alignment turns to the southwest, and follows the same alignment at Ferrum_Alternative 3 to the new substation at the Solar Park. This corridor is approximately **270km** in length.
 - **Ferrum_Alternative 3B** runs in a relatively straight line to the south west along the existing 275kV power line. The alignment runs over the railway line, before swinging to the west and then to the south west, to link with the N14 and the Ferrum_Alternative 3A corridor beyond. This corridor is approximately **266km** in length.
 - **Ferrum_Alternative 3C** also runs along the power line to the south west before swinging to the south west at the railway line to link with the N14 and the Ferrum_Alternative 3A corridor. This corridor is approximately **262km** in length.
 - **Ferrum_Alternative 3D** runs along the power to the south west before swinging to the west at the railway line to link with the N14 and the Ferrum_Alternative 3A corridor. This corridor is approximately **263km** in length.
 - **Ferrum_Alternative 3E** runs along the power to the south west along the existing 275kV power line. The alignment runs over the railway line, before swinging to the north west to link with the N14 and the Ferrum_Alternative 3A corridor. This corridor is approximately **267km** in length.
- The Nieuwehoop Corridor links the Solar Park to the 400kV Nieuwehoop Substation located approximately 70 km to the south east of Upington. Four alternative corridors are being considered (refer also to **Map 1c**):
 - **Nieuwehoop_Alternative 1** is the eastern alignment, and runs in a northwesterly direction from the Nieuwehoop Substation. Before reaching the R359, the line banks to the north west, and then to the west and

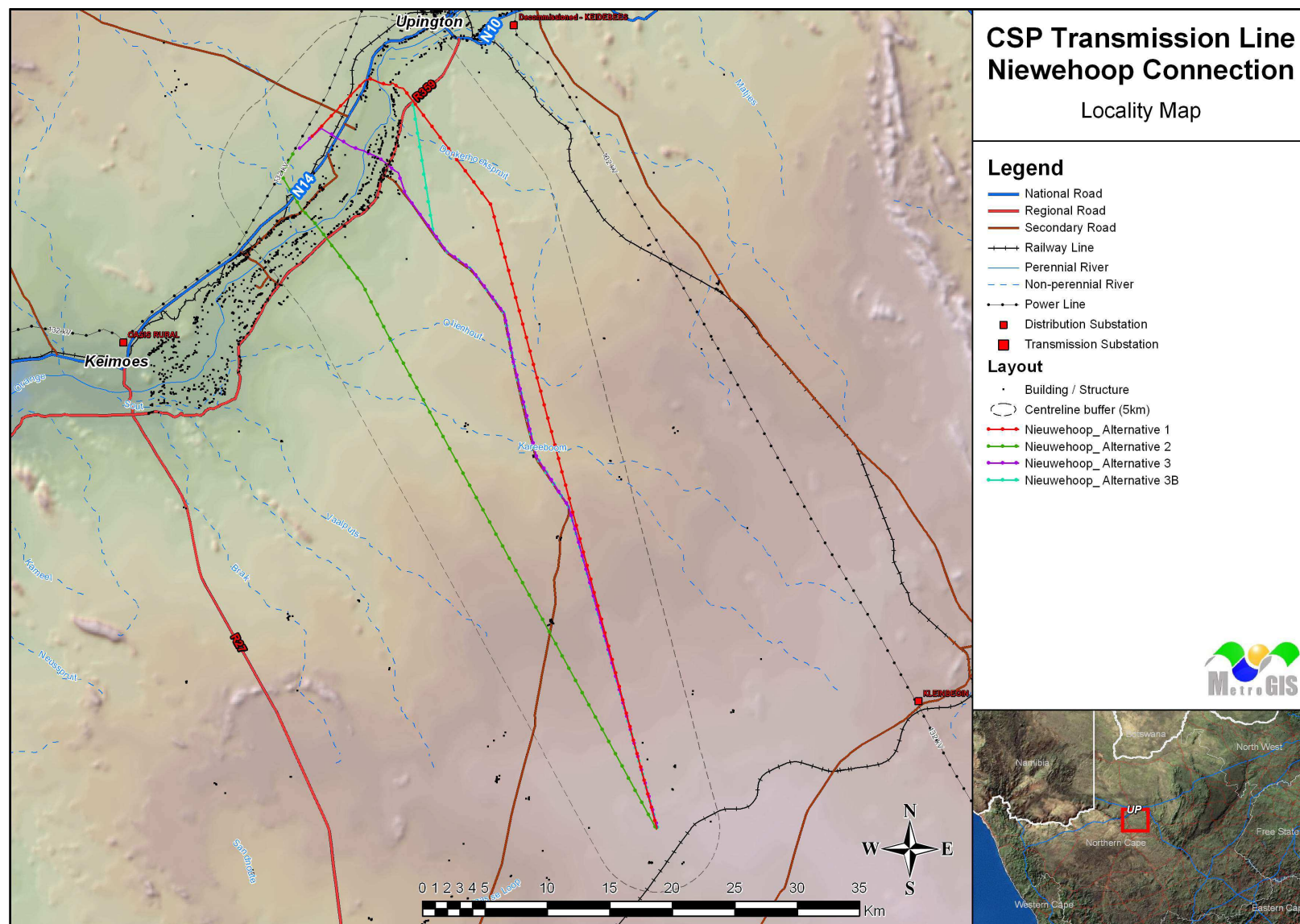
south west, crossing over both the Orange River and the N14 before linking with the new substation at the Solar Park. This corridor is approximately **73km** in length.

- **Nieuwehoop_Alternative 2** is the western alignment, and runs in a northwesterly direction from the Nieuwehoop Substation. After crossing over the Orange River and the N14, the line makes a sharp turn to the northeast to link with the new substation at the Solar Park. This corridor is approximately **63km** in length.
- **Nieuwehoop_Alternative 3** is the central alignment and also runs in a northwesterly direction from the Ferrum Substation. After about 20km the line intersects with a secondary road, which ultimately joins with the R359. This corridor alternative follows this road for some distance before banking to the north west and crossing over the Orange River and the N14. The alignment then banks to the southwest before linking with the new substation at the Solar Park. This corridor is approximately **67km** in length.
- **Nieuwehoop_Alternative 3B** follows the Nieuwehoop_Alternative 3 alignment for its southern part. About 10km south of the R359, this corridor swings directly to the north, joining with the Nieuwehoop_Alternative 1 Corridor at the R359. The corridor crosses over both the Orange River and the N14 before linking with the new substation at the Solar Park. This corridor is approximately **73km** in length.

Additional infrastructure includes the following:

- The construction of a 400kV and 132kV Tx substation at the CSP site;
- The construction of five 500MVA 400/132kV transformers and associated switchgear at the Solar Park site;
- Access roads;
- The upgrade of substations along the Transmission Line corridors and
- The phased construction of a number of 132kV distribution lines, including:
 - Three 132kV lines for the IPP's around Solar Park;
 - Three 132kV lines and two 20MVA Transformers at the CSP site
 - Five 132kV lines for the DoE Solar Park;
 - Five 132kV lines to the Gordonia Substation (measuring approx. 25km).





3. SCOPE OF WORK

The study area for the visual assessment encompasses a total geographical area of approximately 285km x 240km. Each Transmission line corridor, however, has been addressed in terms of its own receiving environment. The size of each sub-study area depends on the length of the relevant corridor, and includes a minimum 5km buffer (i.e. extending 5km on either side of each of Transmission line). Refer to **Maps 1a, 1b and 1c** in this regard.

The scope of work for this assessment includes the determination of the potential visual impacts in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the three proposed Transmission Line Corridors (i.e. Aries, Ferrum and Nieuwehoop), and the alternatives identified for each. Mitigation measures are recommended where appropriate.

In addition, the scope includes a comparative assessment of all alternatives, and a recommendation of a preferred alternative for each corridor from a visual perspective.

Issues related to the three proposed Transmission Lines include the following:

- The visibility of the Transmission Lines to, and potential visual impact on, users of national roads (N14, N10), arterial roads (R359, R27, R380, R325) and secondary roads.
- The visibility of the Transmission Lines to, and potential visual impact on residents of built-up centres and populated places (i.e. the towns of Upington, Keimoes, Kakamas, Dibeng, Kathu, Sishen, Olifantshoek).
- The visibility of the Transmission Lines to, and potential visual impact on farmsteads and settlements.
- The visibility of the Transmission Lines to, and potential visual impact on protected and conservation areas (i.e. the Augrabies National Park and the Spitskop Nature Reserve)².
- The visibility of the Transmission Lines to, and potential visual impact on scenic and visually sensitive topographical features (i.e. rivers and mountains).
- The potential impact of the Transmission Lines on the visual character and sense of place of the region and of the scenic Northern Cape³.
- The potential impact of the Transmission Lines on tourism, with specific reference to tourist access routes (i.e. the N14, N10, R27, R360, R325 and R359) and tourist destinations (i.e. attractions and accommodation).
- The potential visual impact of associated infrastructure (i.e. distribution lines, substations, transformers, switchgear, access roads and cleared servitudes) on sensitive visual receptors.
- Potential cumulative visual impacts.
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

² These Provincial and National conservation areas have been sourced from the SANBI database. Additional conservation initiatives, such as Private Nature Reserves, Conservancies and Game Farms are likely to exist within the study area, but as the locations of these are not known at this stage, the visual impact on them cannot be determined. The public participation process confirmed that game farms and conservation destinations exist within the study area, but it is unknown where these are situated.

³ As this is a desktop study, no site visit has been undertaken. In this respect, the visual character and sense of place of the region cannot be assessed.

4. RELEVANT LEGISLATION AND GUIDELINES

The following legislation and guidelines have been considered in the preparation of this report:

- The Environmental Impact Assessment Amendment Regulations, 2010;
- Guideline on Generic Terms of Reference for EAPs and Project Schedules (DEADP, Provincial Government of the Western Cape, 2011).

5. THE AFFECTED ENVIRONMENT

Regionally, the study area is located in the centre of the Northern Cape Province. The elevation of the region ranges from about 650m a.s.l. along the Orange River to 1200m a.s.l. in the Koranaberg Mountains west of Kathu.

The terrain north of Upington is generally described as *Dune hills (parallel crests) and lowlands*. To the south are mostly *Lowlands with hills with Extremely irregular plans and Slightly irregular plains* to the south west and southeast respectively. *Hills* are to be found east of Upington and west of Kathu.

The Orange River is the most prominent hydrological feature in the area, meandering generally from the east of the study area to the west. A large number of non-perennial drainage lines are present within the study area, all of which drain towards the Orange River. Refer to **Maps 1a to c**.

The river has, to a large degree, dictated the settlement pattern in this arid region by providing a source of perennial water for the cultivation of grapes. This and the associated production of wine is the primary agricultural activity of this district.

Cattle and game farming practises also occur, but are less intensive. Other prominent land-use activities include mining, especially in the east, beyond the Koranaberg. Conservation and nature oriented tourism is also known to occur along the Orange River and within the region.

Upington is the largest urban centre in the study area. Smaller towns include Augrabies, Marchland, Kakamas, Keimoes, Groblershoop, Hotazel, Dibeng, Kathu, Sishen, Olifantshoek, Lohatlha, Beeshoek and Posmasburg. In addition, a large number of farms and homesteads also occur within the study area, especially along the Orange River, and east of the Koranaberg.

The above-mentioned towns account for the highest population concentration within the region, which is sparsely populated (less than 10 people per km²).

Industrial infrastructure includes existing power lines, which follow the river and main roads to some extent, as well as a number of substations. The N10, N14 and a number of regional arterial roads traverse the area, as does a railway line (mostly freight). In addition, a number of secondary roads interconnect within the region.

Land cover is mostly *Shrubland* and *Thicket* to the south of the Orange River, and *Thicket*, interspersed with *Shrubland* and *Woodland* characterises the region to the north. *Cultivated land* (irrigated agriculture) is common along the Orange River, and *Mining and quarries* occurs in the east, beyond the Koranaberg. Refer to **Maps 2a to c**.

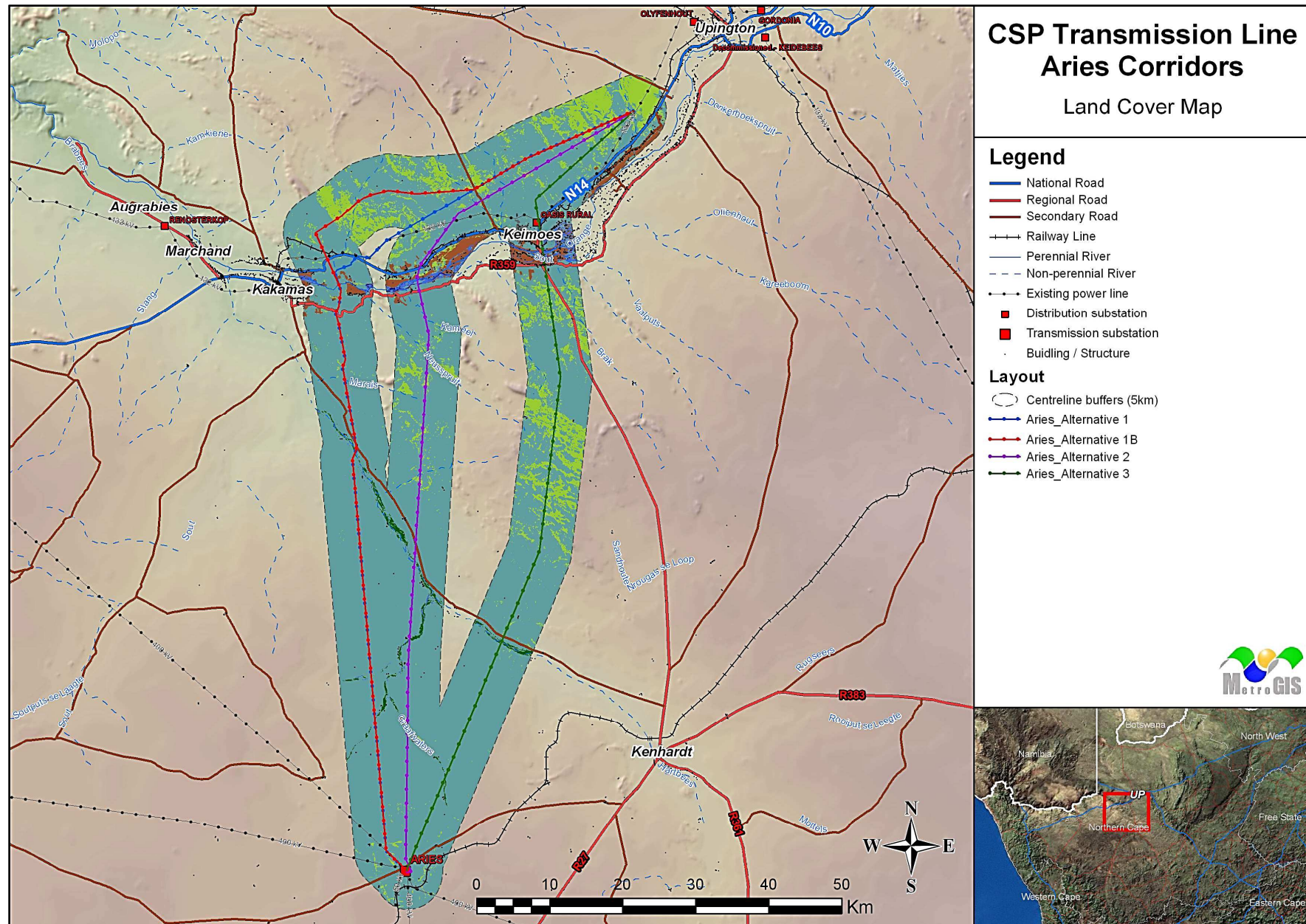
The natural vegetation of the study area is primarily *Orange river broken veld* with some *Namaqualand broken veld* occurring west of Augrabies, and *Kalahari thornveld and shrub bushveld* occurring north of Upington.

The study area includes two large formally protected conservation areas, namely Augrabies National Park which lies on the Orange River just north west of Augrabies, and the Spitskop Provincial Nature Reserve just north east of Upington. Although the Augrabies NP is a well-known and well-frequented tourist destination, the Spitskop Nature Reserve is not, and has little infrastructure at present.

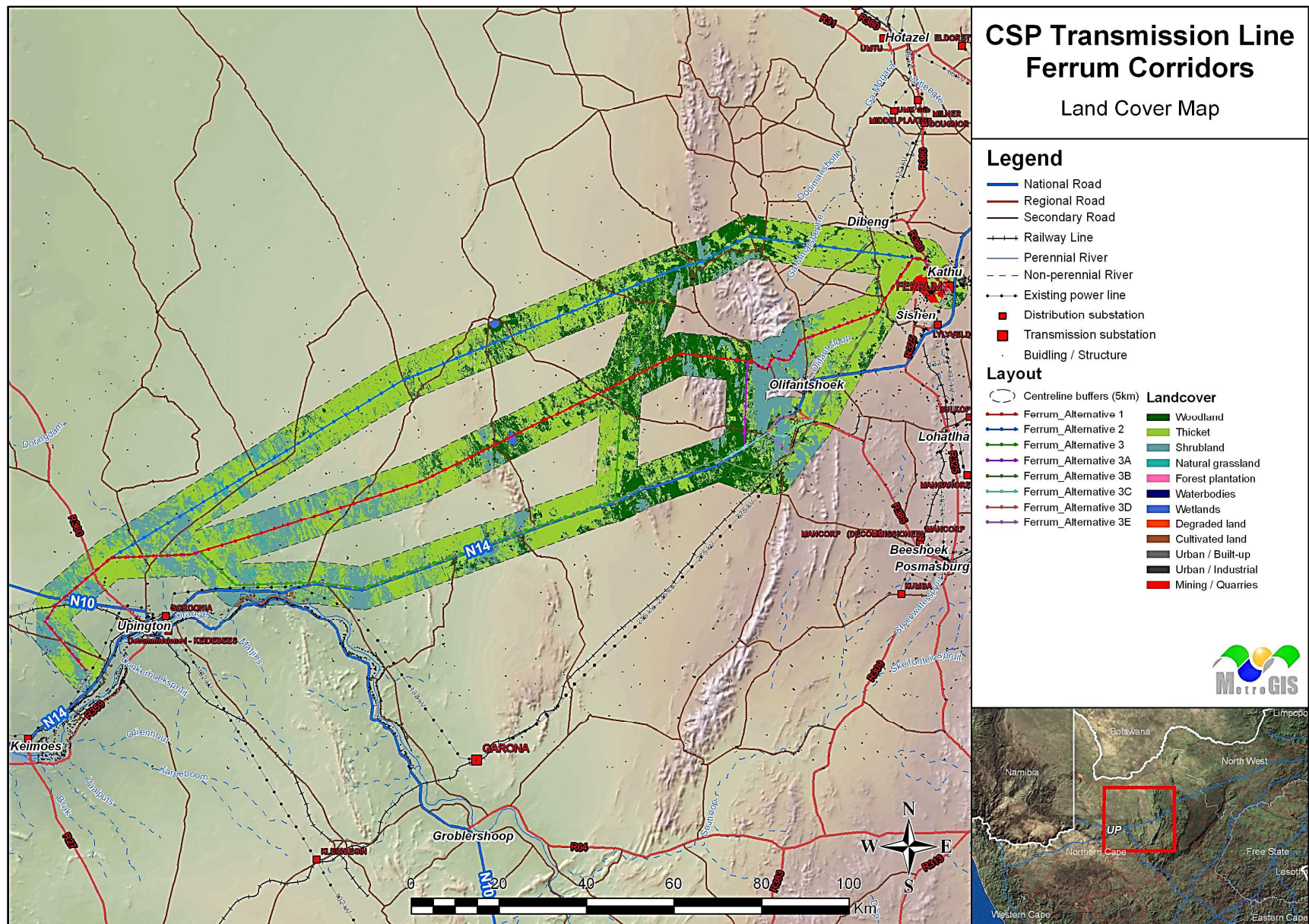
The greater region is generally seen as having a high scenic value and tourism value potential. Outside of towns, and beyond the river, the landscape is characterised by wide-open spaces. Development, where this occurs at all, is domestic in scale, and sparsely spread.

The N14, N10, R27, R360 and R325 are the primary roads in the region and are the main link between Gauteng, the West Coast and Namibia. These in addition to the R359 are considered to be routes most likely to carry tourists.

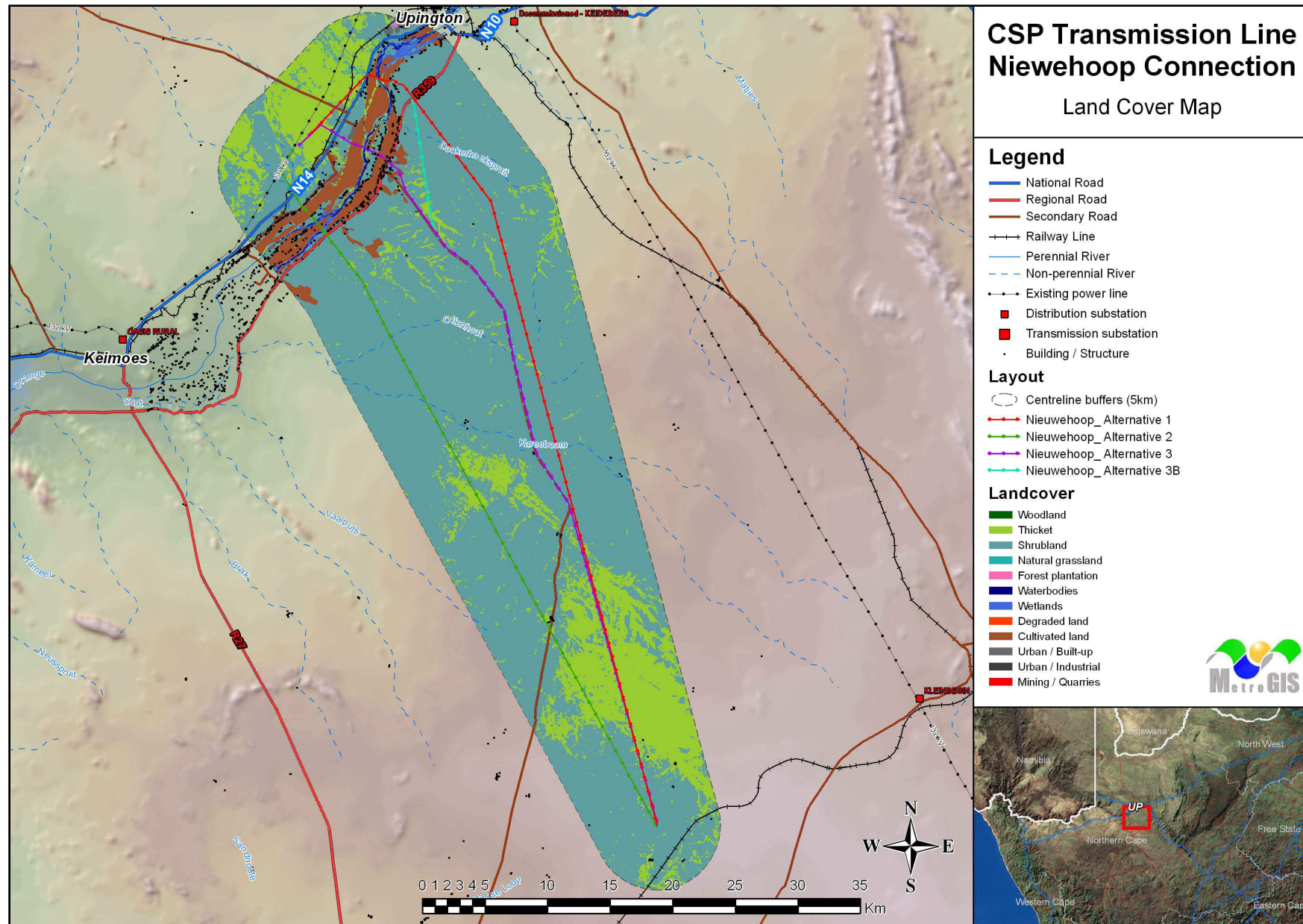
In terms of tourist destinations and accommodation, the area along the Orange River is expected to host a relatively high concentration of overnight facilities. In addition, it may be expected that private nature reserves and game farms within the greater region will also cater for tourists to some extent. At this stage, however, as the locations of such tourist destinations are not known. The public participation process confirmed that game farms and conservation destinations exist within the study area, but it is unknown where these are situated



Map 2a: Land cover and land use along the Aries Corridor and alternatives.



Map 2b: Land cover and land use along the Ferrum Corridor and alternatives.



6. RESULTS

6.1. Potential visual exposure

The visibility analyses for each of the Transmission Line corridors and their alternatives was calculated from the centreline of each corridor, for a distance of 5km on either side at an offset height of 42m above ground level (i.e. the maximum height of a 400kV structures) in order to simulate a worst case scenario.

All three corridors and their alternatives will be visually exposed to large areas within their respective 5km offsets. This is due mainly to the relatively tall Transmission Line infrastructure.

In addition, all three corridors and their alternatives tend to display an even potential exposure pattern where they traverse flat terrain and more scattered patterns where they encounter elevated and hilly topography.

It is envisaged that all three corridors and their alternatives would be easily and comfortably visible to observers (i.e. people travelling along roads, residing in towns and at homesteads or visiting the region), especially within a 5km offset of the corridor in question, and could potentially constitute a high visual prominence, potentially resulting in a visual impact.

The following is of specific relevance regarding the proposed corridors and their alternatives:

6.1.1. The Aries Corridors

The Aries Corridors links the Solar Park to the 400kV Aries Substation located approximately 110 km to the south west of Upington, near Kenhardt. Three alternative corridors are being considered.

6.1.1.1 *Aries_Alternative 1*

Refer to **Map 3a_1**. This Alternative runs alongside an existing power line for a short stretch in the south. The alignment does not follow a road alignment, but short stretches of the R359 and N14 will be visually affected as the line crosses over. Five secondary roads also lie within the zone of potential visual exposure.

Additional stretches of the N14 will be affected in the vicinity of the Solar Park. Of note is that the N14 and the R359 are considered to be tourist access routes.

The alignment crosses the Orange River and nine non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed, but some low hills are affected to the east of Kakamas.

No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas. The eastern outskirts of Kakamas fall just beyond the zone of potential visual exposure.

A low to moderate number of settlements and homesteads, especially along the Orange River and the N14, will be visually affected by the proposed infrastructure.

6.1.1.2 *Aries_Alternative 1B*

Refer to **Map 3a_2**. This Alternative runs alongside an existing power line for a short stretch in the south. The alignment does not follow a road alignment, but short stretches of the R359 and N14 will be visually affected as the line crosses over. Five secondary roads also lie within the zone of potential visual exposure.

Additional stretches of the N14 will be affected in the vicinity of the Solar Park. Of note is that the N14 and the R359 are considered to be tourist access routes.

The alignment crosses the Orange River and nine non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed, but some low hills are affected to the east of Kakamas.

No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas. The eastern outskirts of Kakamas fall just beyond the zone of potential visual exposure.

A low to moderate number of settlements and homesteads, especially along the Orange River and the N14, will be visually affected by the proposed infrastructure.

6.1.1.3 *Aries_Alternative 2*

Refer to **Map 3a_3**. This Alternative does not follow the alignment of any existing power line, nor any existing road. Short stretches of the R359 and N14 will be visually affected as the line crosses over. Five secondary roads also lie within the zone of potential visual exposure.

Additional stretches of the N14 will be affected in the vicinity of the Solar Park. Of note is that the N14 and the R359 are considered to be tourist access routes.

The alignment crosses the Orange River and ten non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed, but a couple of low hills are affected to the east of Kakamas.

No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas. The northwestern outskirts of Keimoes fall just beyond the zone of potential visual exposure.

A moderate number of settlements and homesteads, especially along the Orange River and the N14, will be visually affected by the proposed infrastructure.

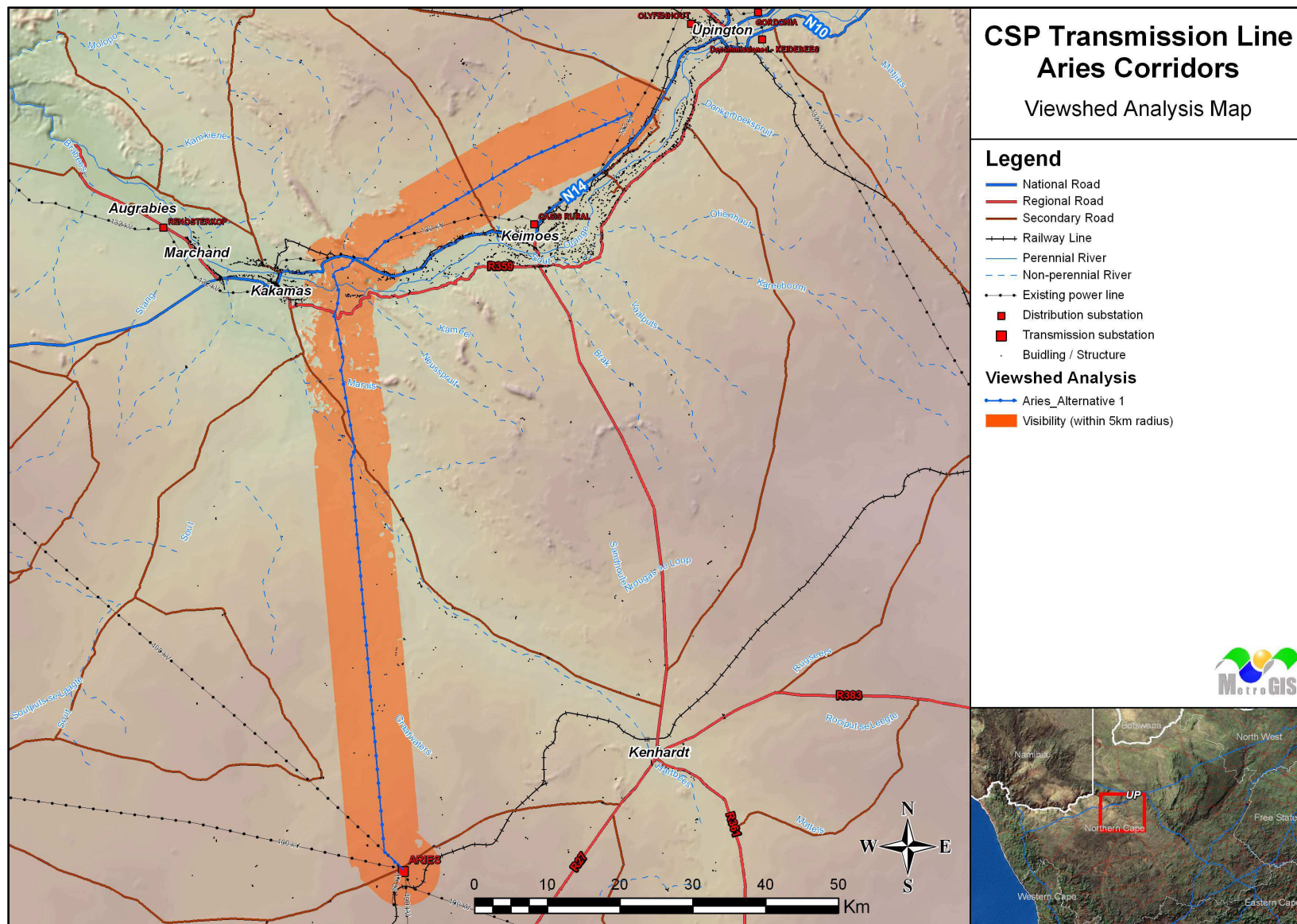
6.1.1.4 *Aries_Alternative 3*

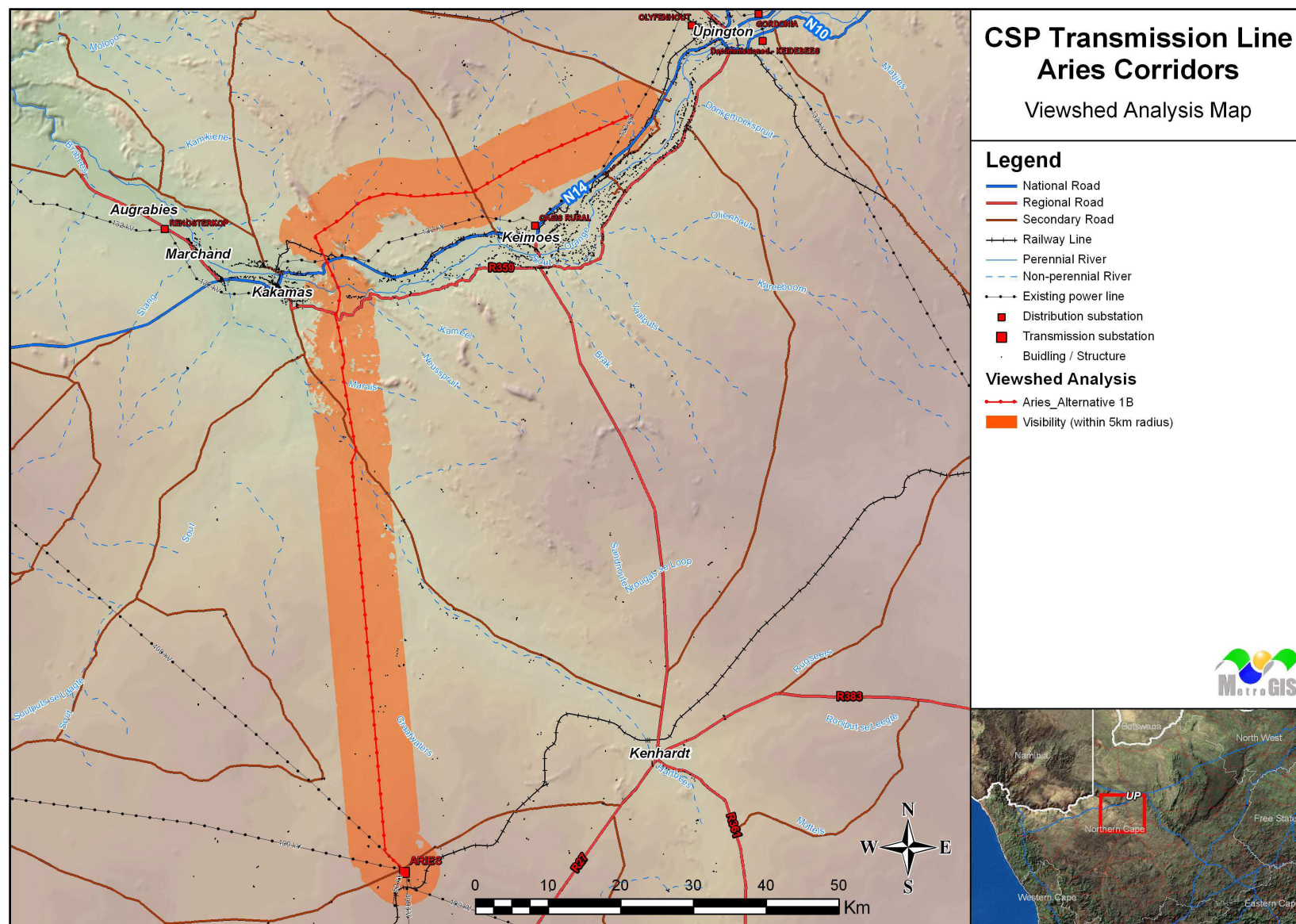
Refer to **Map 3a_4**. This Alternative does not follow the alignment of any existing power line, nor any existing road. Short stretches of the R359, R27 and N14 will be visually affected as the line crosses over. Three secondary roads also lie within the zone of potential visual exposure.

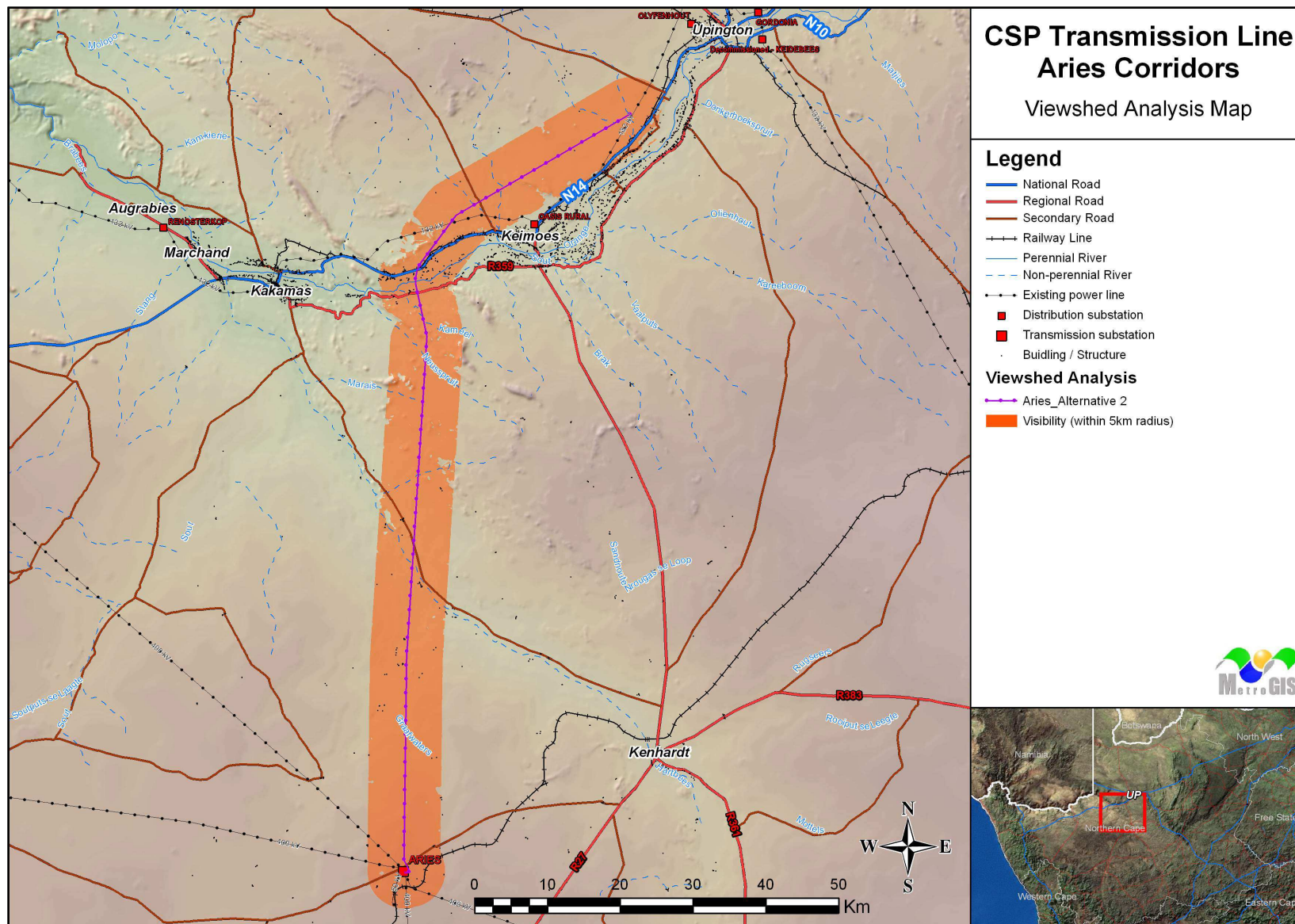
Additional, slightly longer stretches of the N14 will be affected in the vicinity of the Solar Park. Of note is that the R359, R27 and N14 are considered to be tourist access routes.

The alignment crosses the Orange River and seven non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed, nor are any conservation areas.

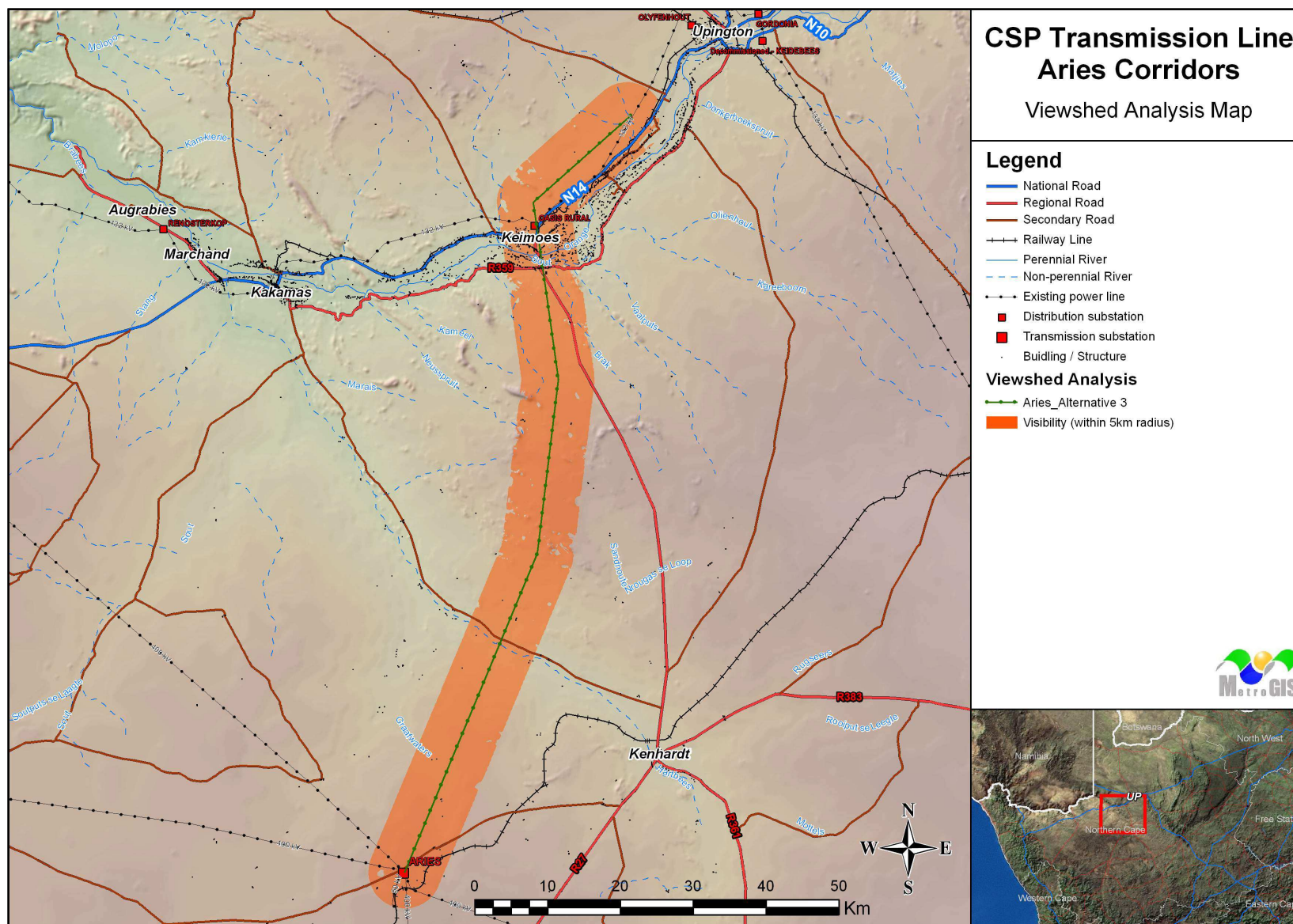
The town of Keimoes falls within the viewshed of this alternative, as do a moderately high number of settlements and homesteads, especially along the Orange River and the N14. These receptors are likely to be visually affected by the proposed infrastructure.







Map 3a_3: Potential Visual Exposure of the Aries_Alternative 2.



6.1.2. The Ferrum Corridor

The Ferrum Corridor links the Solar Park to the 400kV Ferrum Substation located approximately 210 km to the north east of Upington, near Kathu. Four alternative corridors are being considered.

6.1.2.1 *Ferrum_Alternative 1*

Refer to **Map 3b_1**. This Alternative runs alongside an existing power line for a short stretch in the west outside Kathu. The alignment does not follow a road alignment, but short stretches of the N14, N10, R360 and R380 will be visually affected as the line crosses over.

Of note is that the N14, N10 and R360 are considered to be tourist access routes. Thirteen secondary roads also lie within the zone of potential visual exposure.

The alignment does not cross or visually affect the Orange River, but four non-perennial streams fall within the viewshed. In addition, the alignment traverses a high section of the Koranaberg south west of Kathu, as well as some hills located a further 80km to the west.

It is likely that the Spitskop Nature reserve north of Upington lies within the zone of potential visual exposure.

The town of Kathu will be visually exposed, as will a moderately high number of settlements and homesteads, especially in the vicinity of Kathu.

6.1.2.2 *Ferrum_Alternative 2*

Refer to **Map 3b_2**. This Alternative does not follow an existing power line or a road alignment, but short stretches of the N14, N10, R360 and R380 will be visually affected as the line crosses over.

Of note is that the N14, N10 and R360 are considered to be tourist access routes. Seventeen secondary roads also lie within the zone of potential visual exposure.

The alignment does not cross or visually affect the Orange River, but six non-perennial streams fall within the viewshed. The alignment also passes through the Koranaberg, but does not traverse any mountains. Adjacent slopes are visually affected, however.

It is likely that the Spitskop Nature reserve north of Upington lies within the zone of potential visual exposure.

The town of Kathu will be visually exposed, as will a moderately high number of settlements and homesteads, especially in the vicinity of Kathu.

6.1.2.3 *Ferrum_Alternative 3*

Refer to **Map 3b_3**. This Alternative runs alongside an existing power line for a short stretch in the east of Upington, and follows the N14 for a stretch of about 100km. In addition to the visual exposure along this route, short stretches of the N10, R360 and R380 will be visually affected as the line crosses over.

Of note is that the N14, N10 and R360 are considered to be tourist access routes. Nineteen secondary roads also lie within the zone of potential visual exposure.

The alignment does not cross over the Orange River, but a short stretch is visually impacted upon to the east of Upington. In addition, six non-perennial streams fall within the viewshed. The alignment also passes through the Koranaberg, but does not traverse any mountains. Adjacent slopes are visually affected, however.

It is likely that the Spitskop Nature reserve north of Upington lies within the zone of potential visual exposure.

The town of Kathu will be visually exposed, as will a moderately high number of settlements and homesteads, especially in the vicinity of Kathu.

6.1.2.4 *Ferrunm_Alternative 3A*

Refer to **Map 3b_4**. This Alternative runs alongside an existing power line for a short stretch in the west outside Kathu and to the east of Upington. It also follows the N14 for a stretch of about 140km. In addition to the visual exposure along this route, short stretches of the N10, R360 and R380 will be visually affected as the line crosses over.

Of note is that the N14, N10 and R360 are considered to be tourist access routes. Fifteen secondary roads also lie within the zone of potential visual exposure.

The alignment does not cross over the Orange River, but a short stretch is visually impacted upon to the east of Upington. In addition, six non-perennial streams fall within the viewshed and the alignment traverses a high section of the Koranaberg south west of Kathu.

It is likely that the Spitskop Nature reserve north of Upington lies within the zone of potential visual exposure.

The town of Kathu will be visually exposed, as will a moderately high number of settlements and homesteads, especially in the vicinity of Kathu.

6.1.2.5 *Ferrum_Alternative 3B, 3C, 3D and 3E*

The description of the visual impact index (below) has been combined for these three corridor alternatives as they represent only small variations in a single part of the corridor.

Refer to **Maps 3b_5, 3b_6, 3b_7 and 3b_8** respectively. These alternatives are effectively variations of Corridor F3_alt, except for a section in the north east, near Kathu.

These alternatives run along the existing 275kV power line south west of Kathu for varying distances before swinging west to the N14, and then south west, to follow the F3_alt alignment. Corridor F3_a follows this power line for the longest stretch (i.e. for about 60km), and Corridors F3_b and c follow it for the shortest (i.e. for about 40km)

All alignments follow the N14 for a stretch of about 120 to 140km. In addition to the visual exposure along this route, short stretches of the N10, R360, R385 and R380 will be visually affected for all alignments, as the line crosses over.

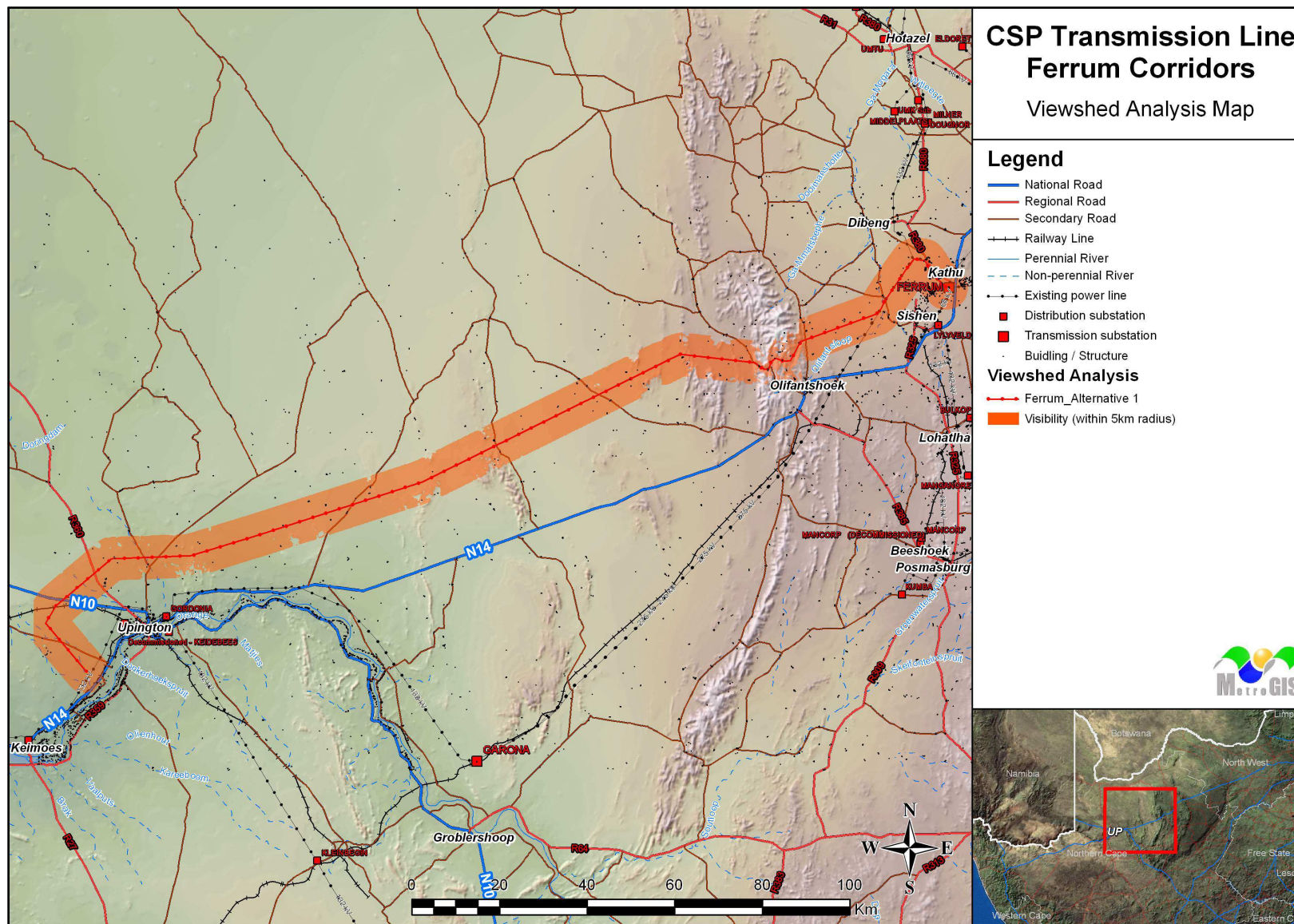
Of note is that the N14, N10 and R360 are considered to be tourist access routes. Thirteen secondary roads also lie within the zone of potential visual exposure of all alignments, except for F3_d, which affects fourteen secondary roads.

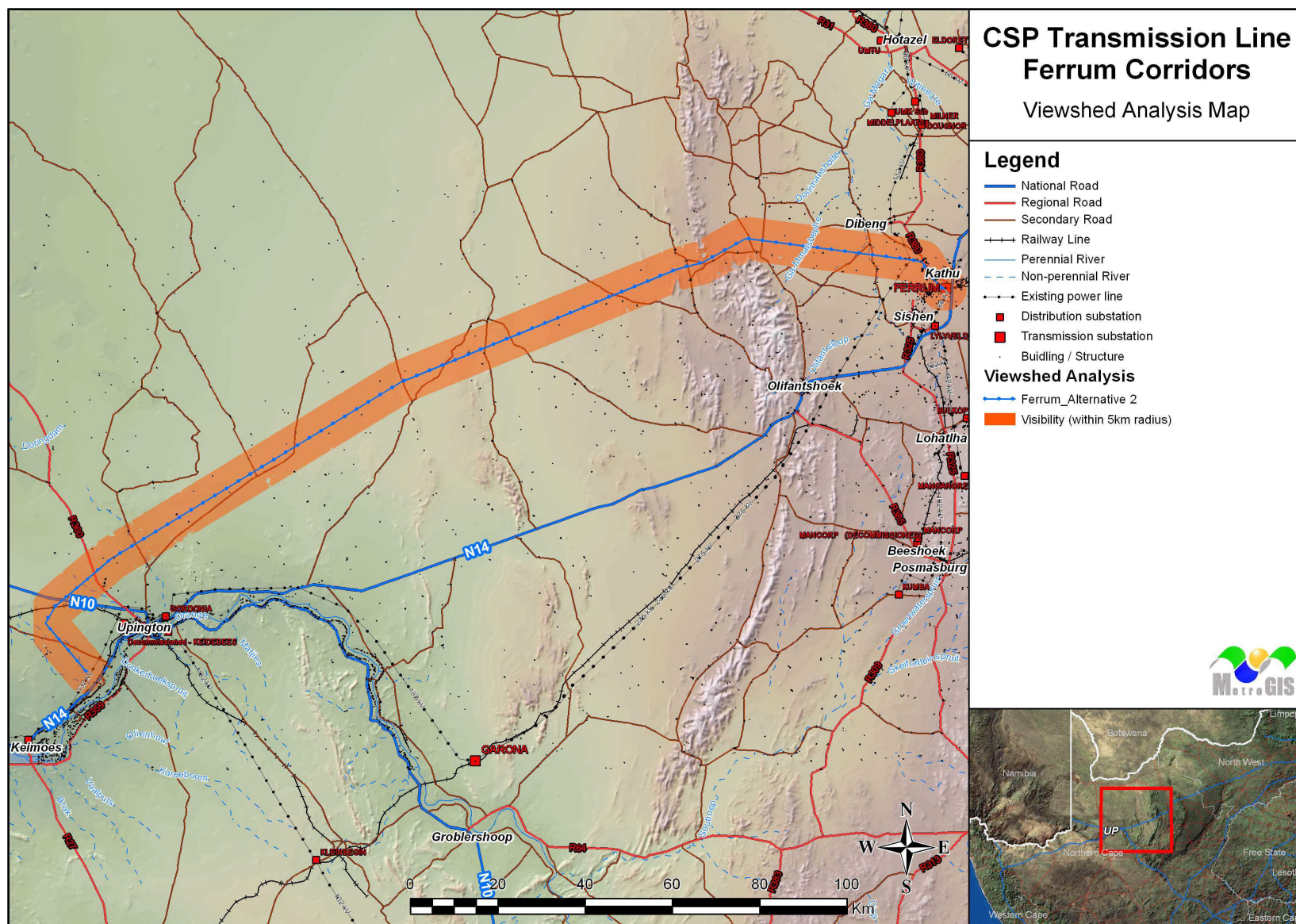
None of these alignments cross over the Orange River, but a short stretch is visually impacted upon to the east of Upington.

In addition, six non-perennial streams fall within the viewshed and the alignments all traverse a lower section of the Koranaberg south west of Kathu.

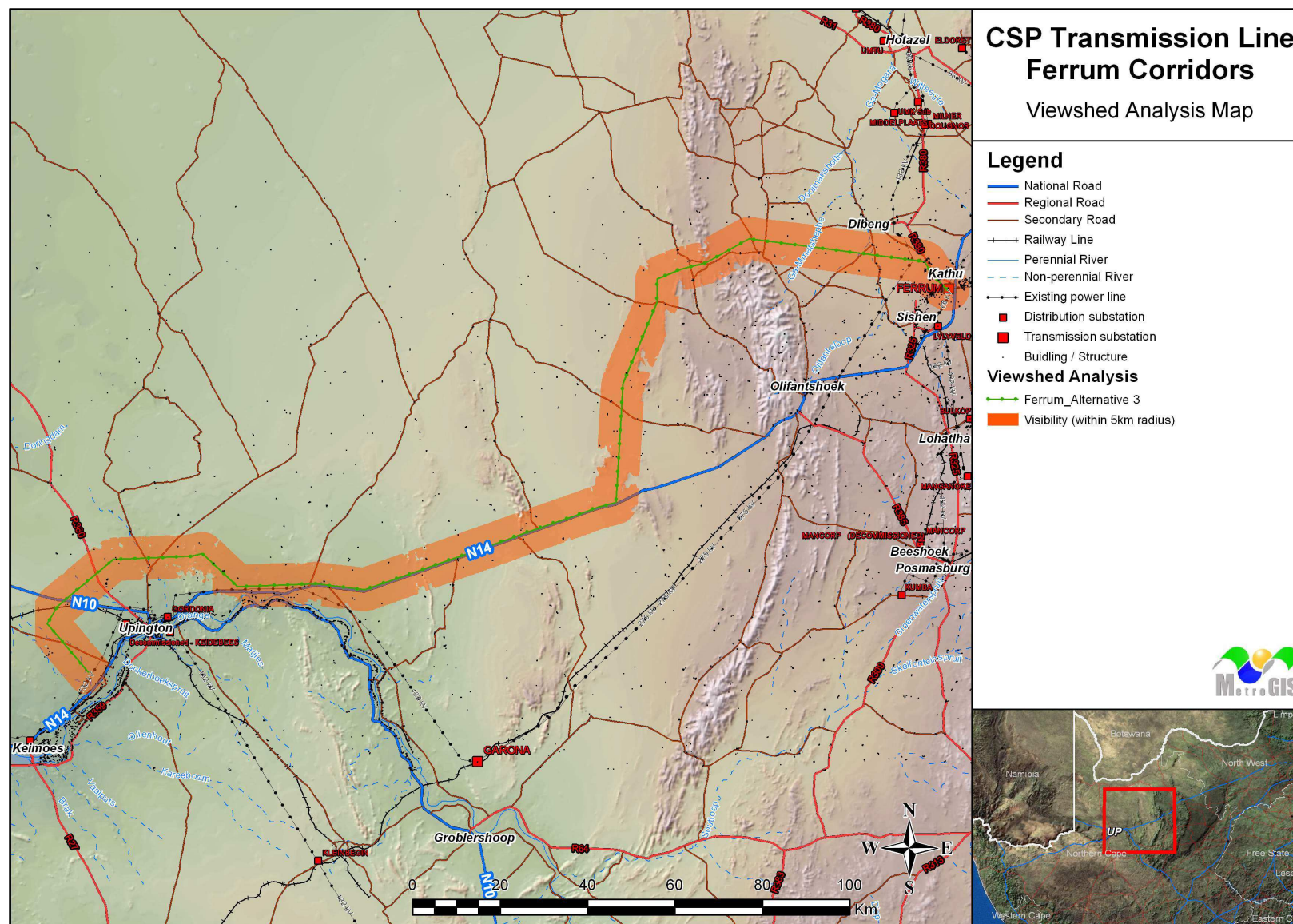
It is likely that the Spitskop Nature reserve north of Upington lies within the zone of potential visual exposure.

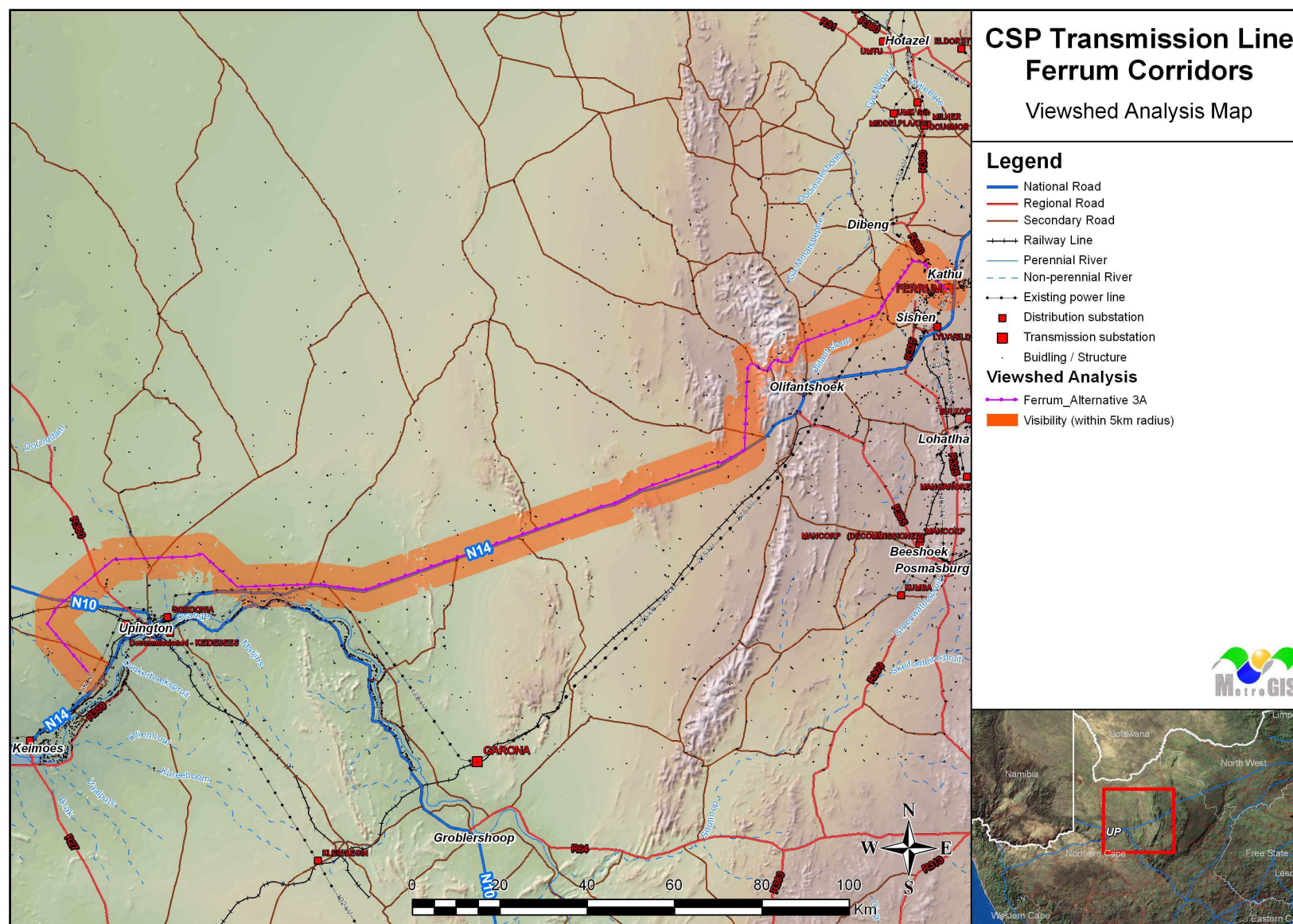
The town of Kathu will be visually exposed, as will a moderately high number of settlements and homesteads, especially in the vicinity of Kathu.

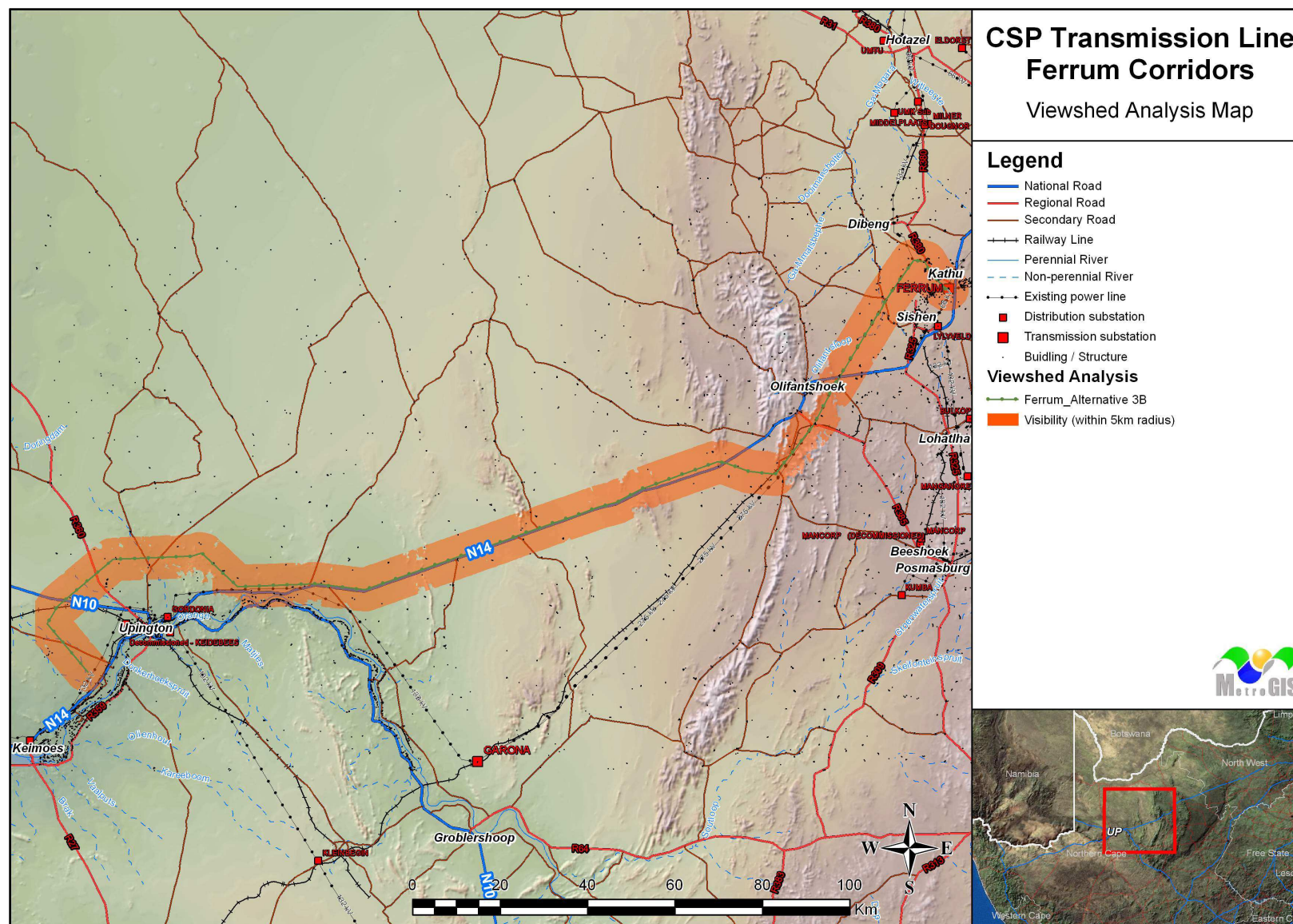


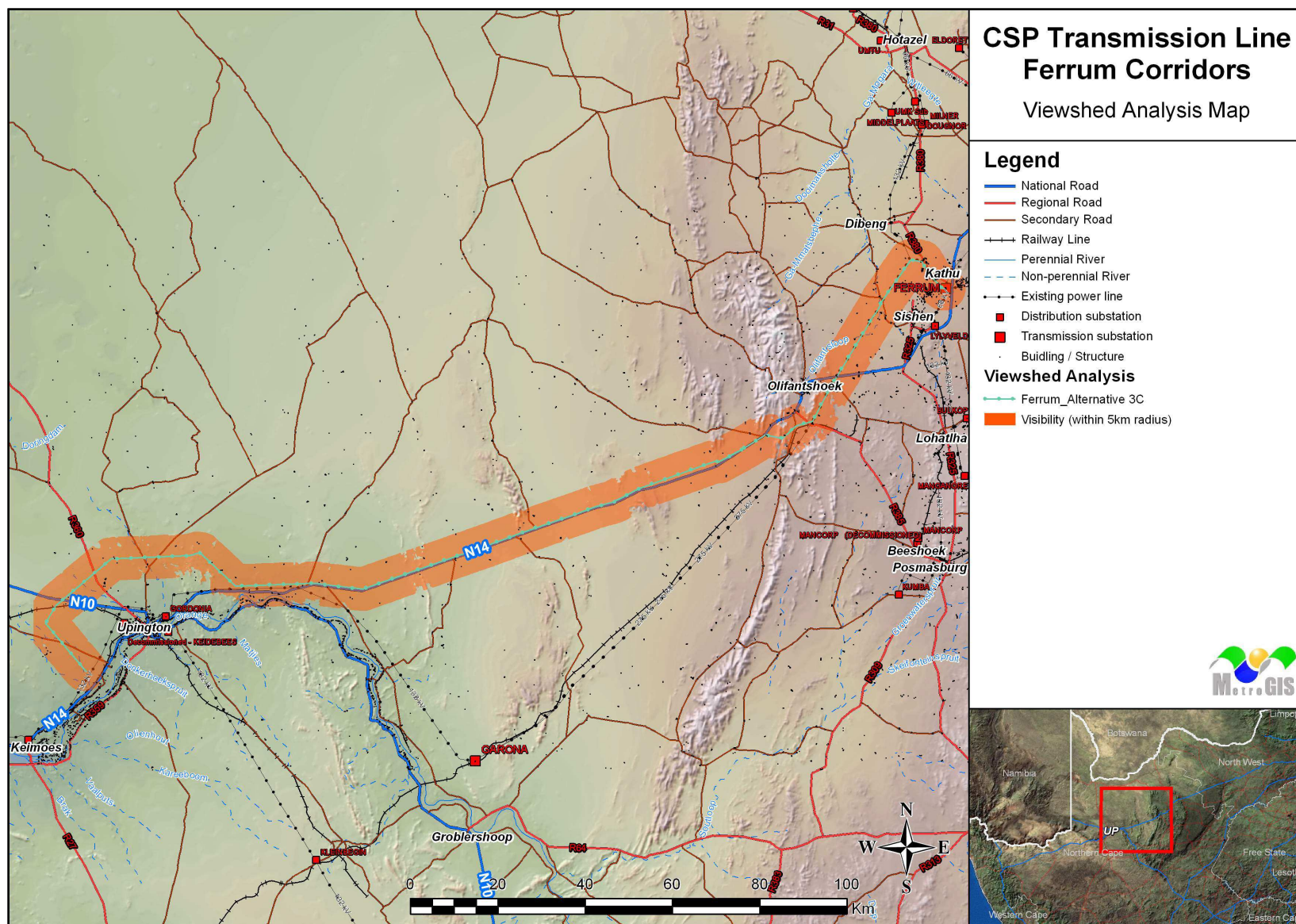


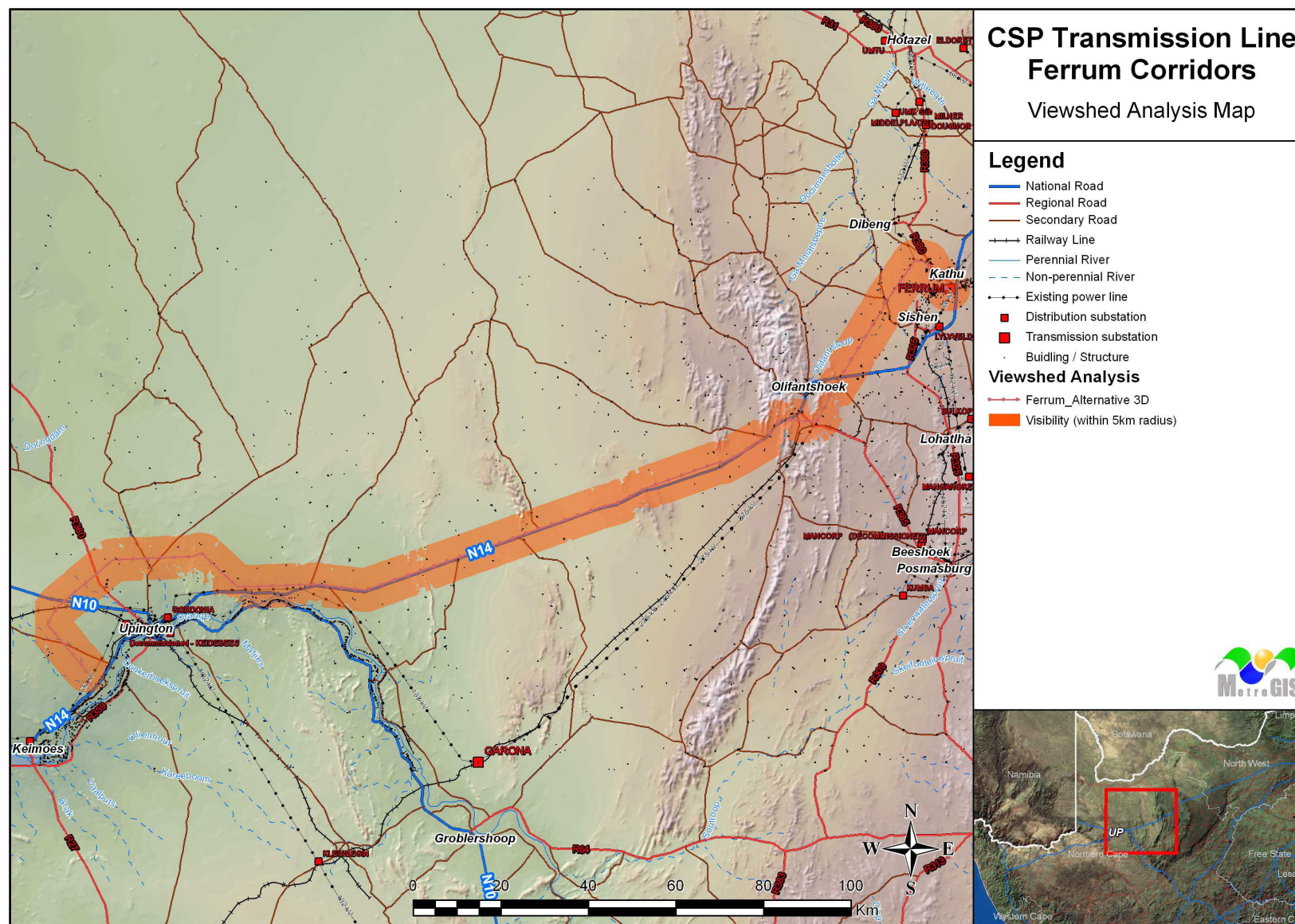
Map 3b_2: Potential Visual Exposure of the Ferrum_Alternative 2.

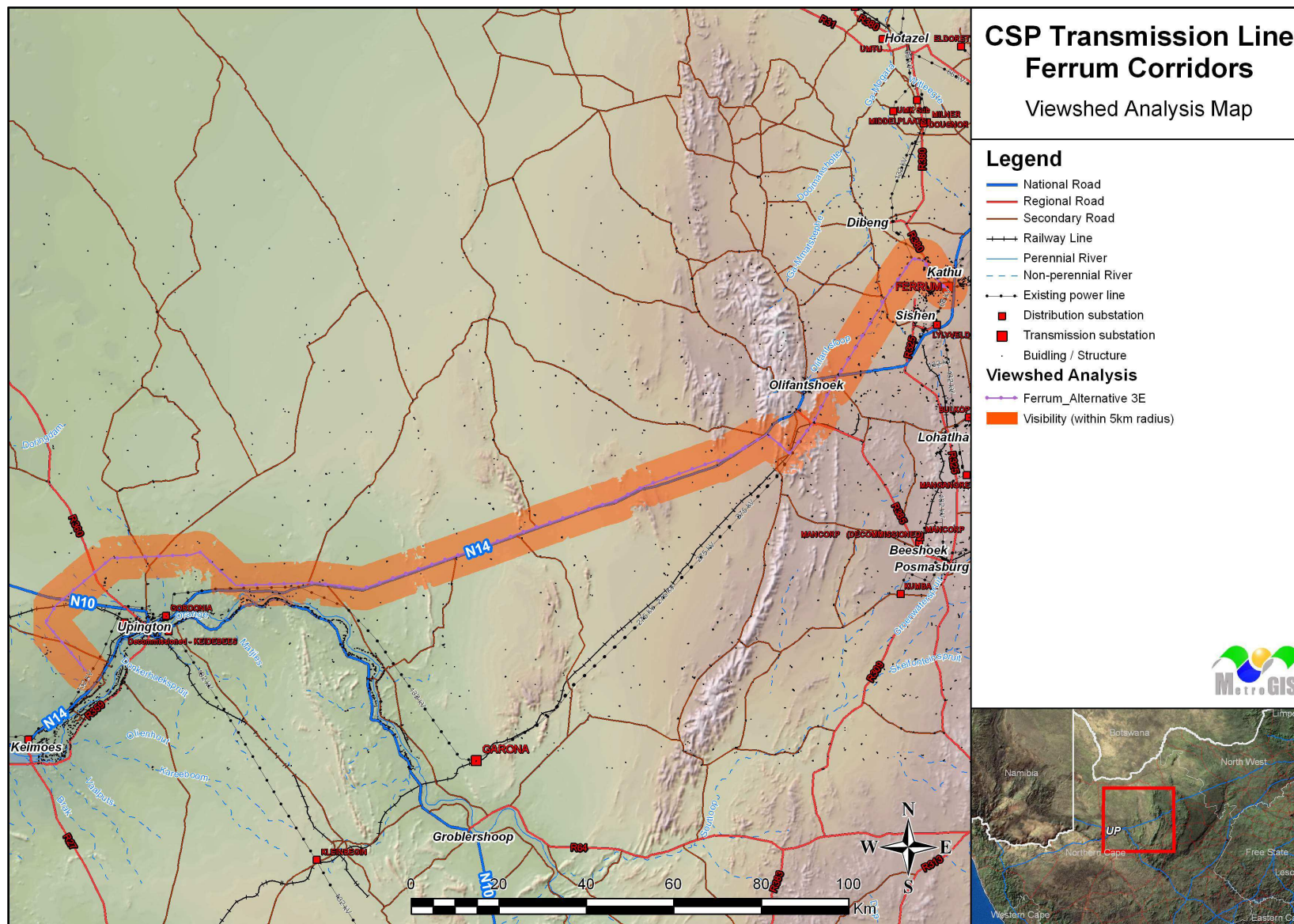












Map 3b_8: Potential Visual Exposure of the Ferrum_Alternative 3E.

6.1.3. The Nieuwehoop Corridor

The Nieuwehoop Corridor links the Solar Park to the 400kV Nieuwehoop Substation located approximately 70 km to the south east of Upington. Three alternative corridors are being considered.

6.1.3.1 *Nieuwehoop_Alternative 1*

Refer to **Map 3c_1**. This Alternative does not run along an existing power line nor follow a road alignment, but short stretches of the R359 and N14 will be visually affected as the line crosses over. Three secondary roads also lie within the zone of potential visual exposure.

Additional stretches of the N14 will be affected in the vicinity of the Solar Park. Of note is that the N14 and the R359 are considered to be tourist access routes.

The alignment crosses the Orange River and seven non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed.

No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas. The southern outskirts of Upington fall just beyond the zone of potential visual exposure.

A low to moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359 will be visually affected by the proposed infrastructure.

6.1.3.2 *Nieuwehoop_Alternative 2*

Refer to **Map 3c_2**. This Alternative does not run along an existing power line nor follow a road alignment, but short stretches of the R359 and N14 will be visually affected as the line crosses over. Three secondary roads also lie within the zone of potential visual exposure. Of note is that the N14 and the R359 are considered to be tourist access routes.

The alignment crosses the Orange River and five non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed.

No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas.

A low to moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359 will be visually affected by the proposed infrastructure.

6.1.3.3 *Nieuwehoop_Alternative 3*

Refer to **Map 3c_3**. This Alternative does not run along an existing power line, but does follow a secondary road for about 30km. Short stretches of the R359 and N14 will be visually affected as the line crosses over. Three secondary roads also lie within the zone of potential visual exposure. Of note is that the N14 and the R359 are considered to be tourist access routes.

The alignment crosses the Orange River and six non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed.

No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas.

A low to moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359 will be visually affected by the proposed infrastructure.

6.1.3.4 *Nieuwehoop_Alternative 3B*

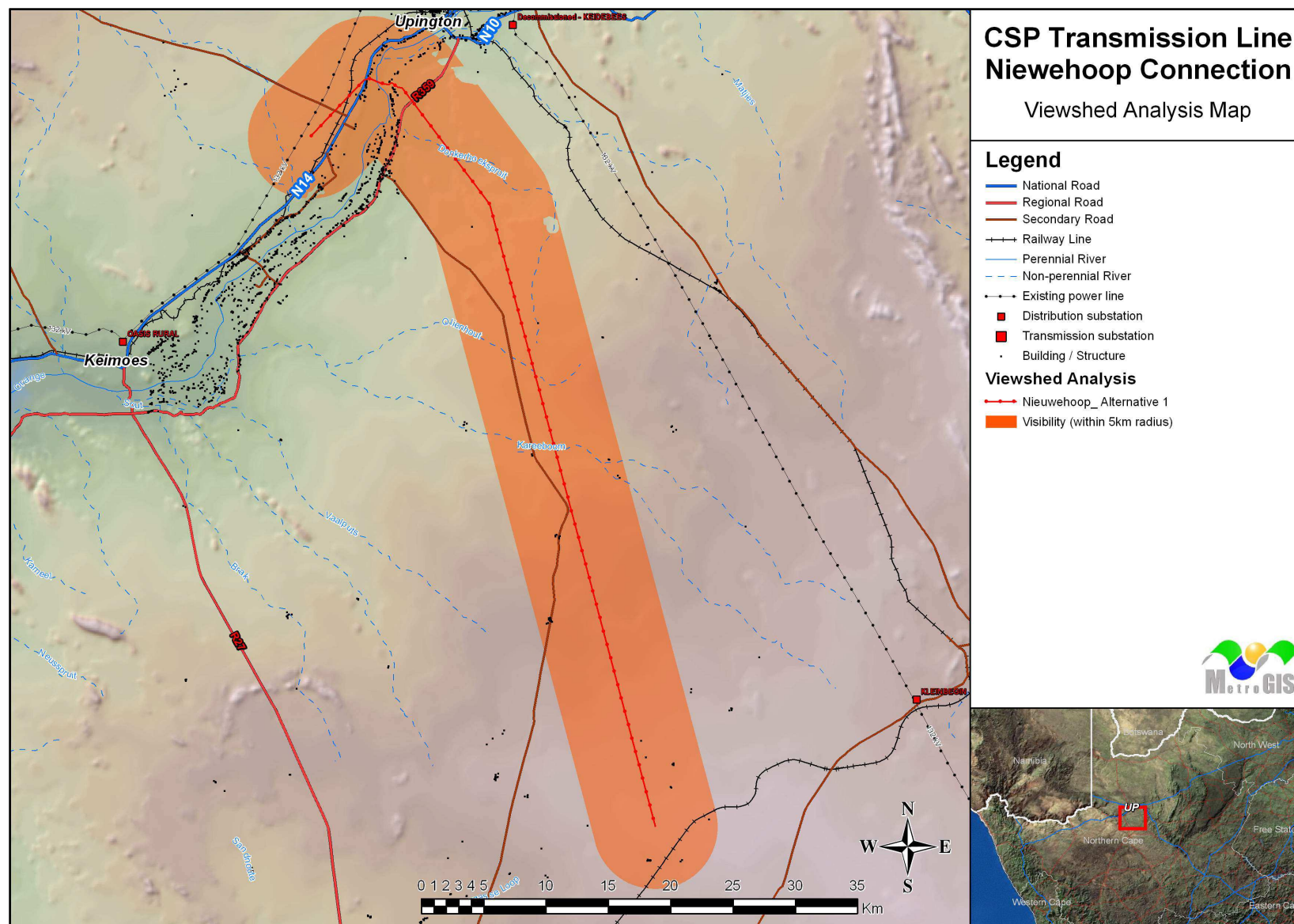
Refer to **Map 3c_4**. This Alternative is effectively a variation of Nieuwehoop_Alternative 3, and therefore does not run along an existing power line, but does follow a secondary road for about 25km before swinging due north to cross the R359 and the Orange River at the same points as Nieuwehoop_Alternative 1.

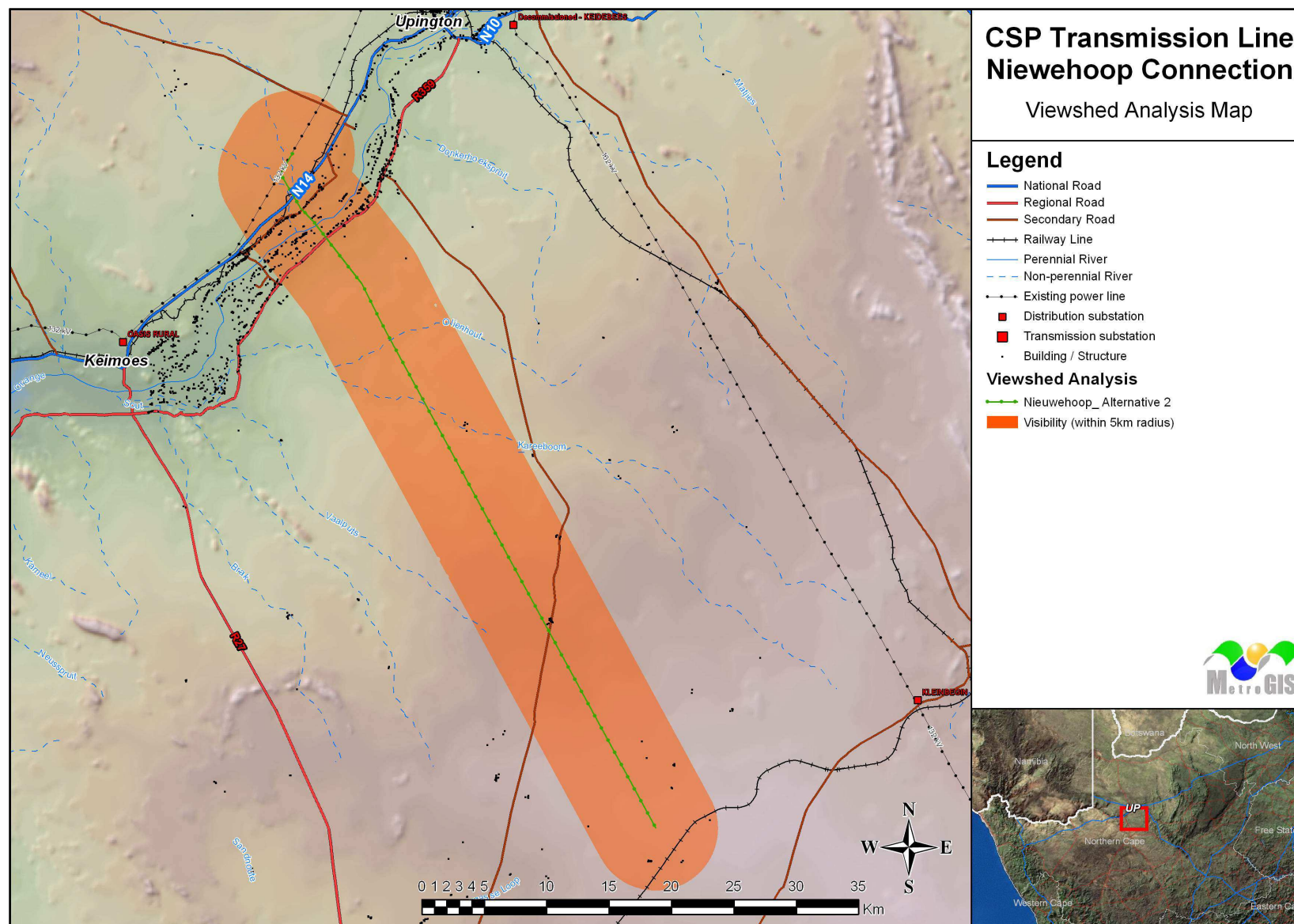
Short stretches of the R359 and N14 will be visually affected as the line crosses over. Three secondary roads also lie within the zone of potential visual exposure. Of note is that the N14 and the R359 are considered to be tourist access routes.

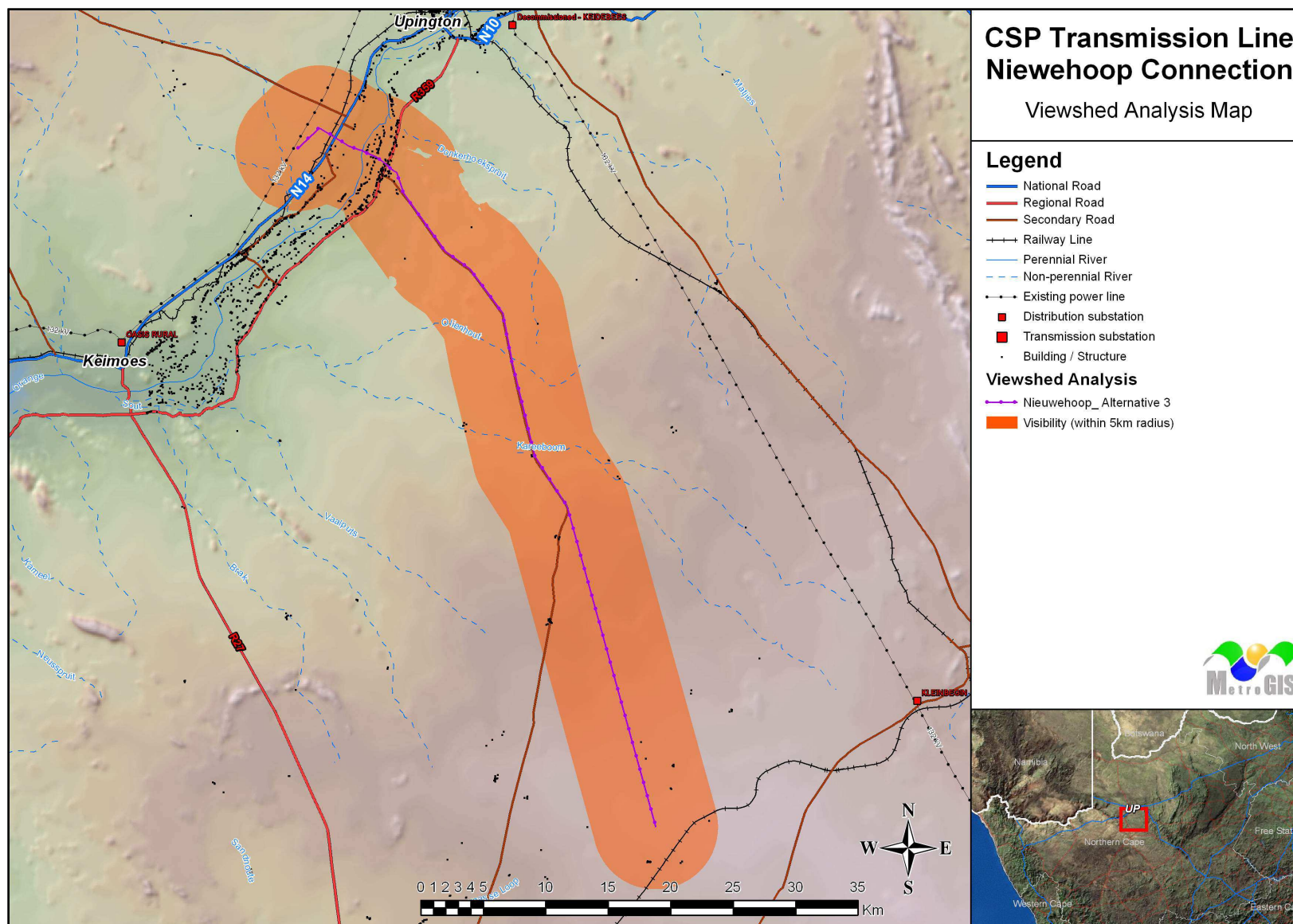
The alignment crosses the Orange River and seven non-perennial streams fall within the viewshed. No significant hills or mountains are likely to be visually exposed.

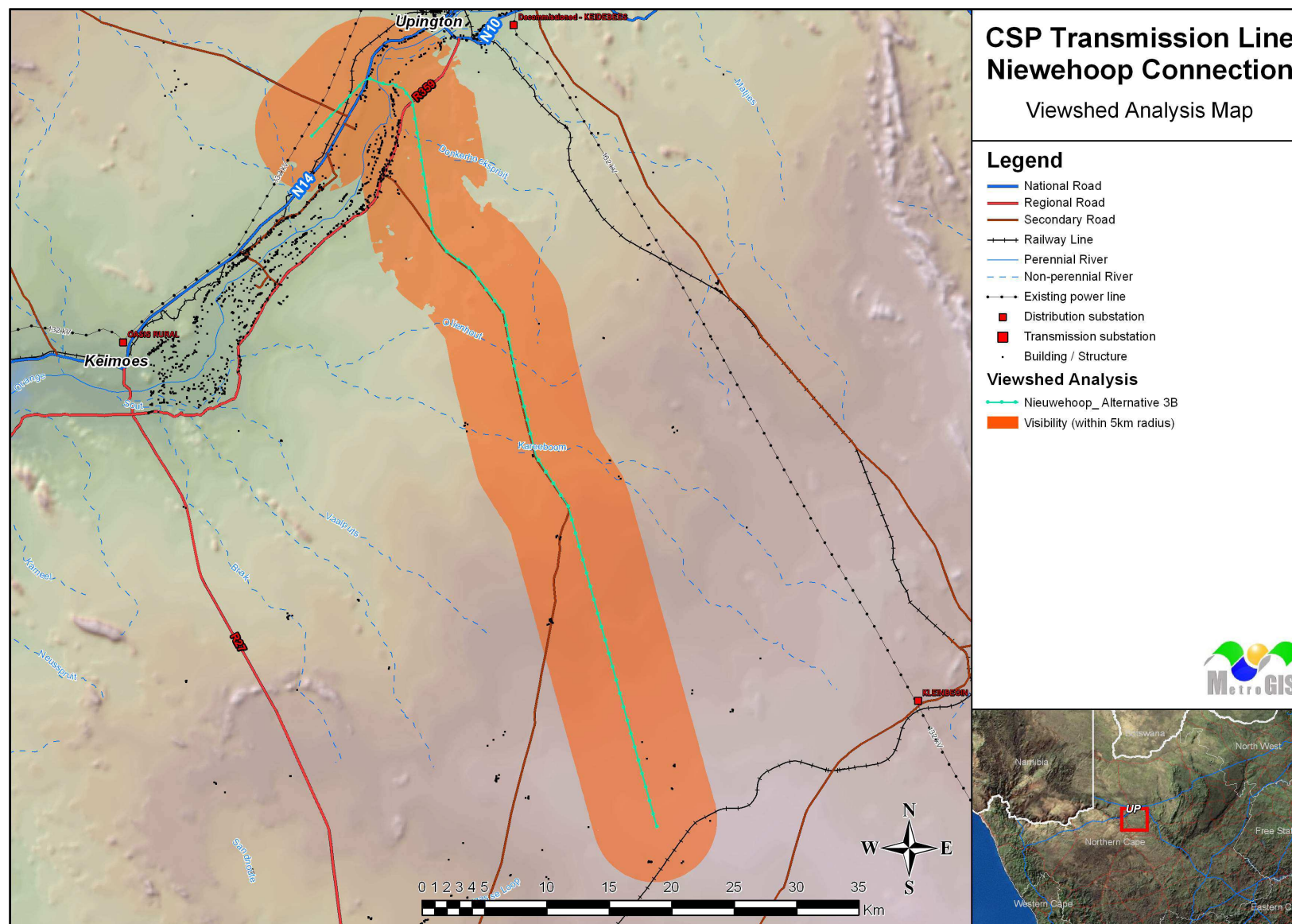
No conservation areas lie within the zone of potential visual exposure, nor do any towns or urban areas.

A low to moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359 will be visually affected by the proposed infrastructure.









Map 3c_3: Potential Visual Exposure of the Nieuwehoop_Alternative 3B.

6.2. Visual distance / observer proximity

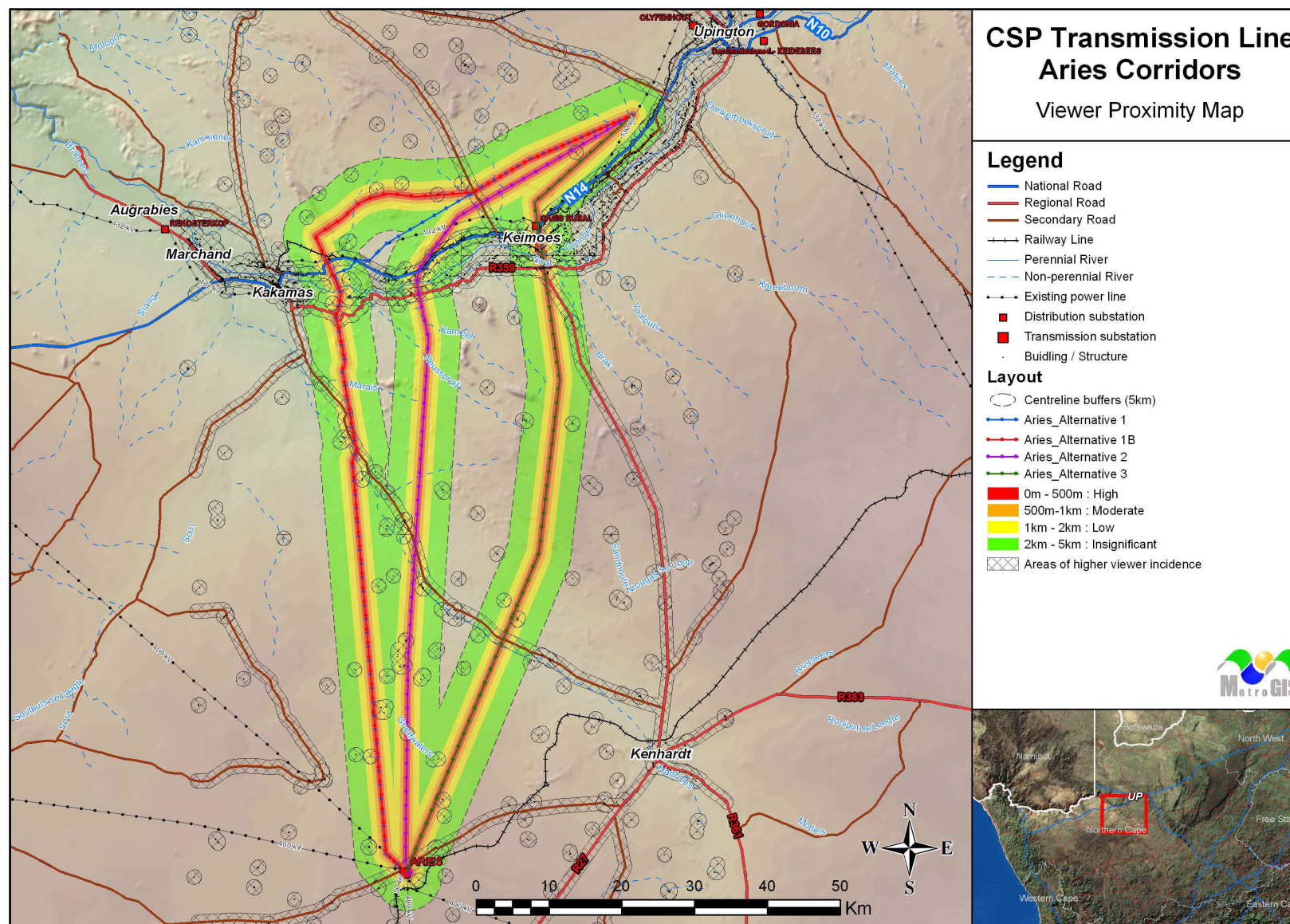
MetroGIS determined proximity offsets based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed infrastructure).

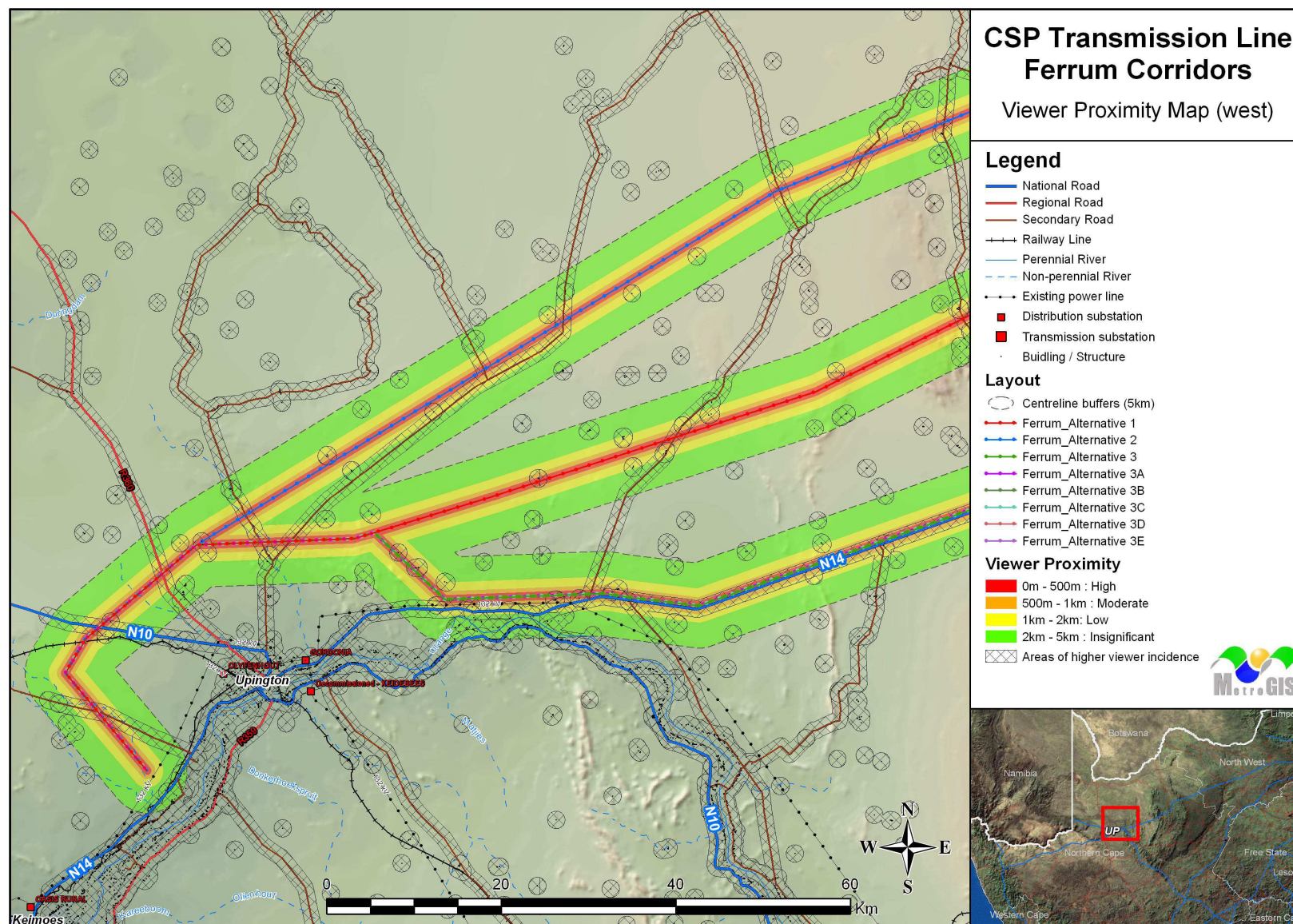
The proximity offsets (calculated from the centre line of each Alignment) are as follows:

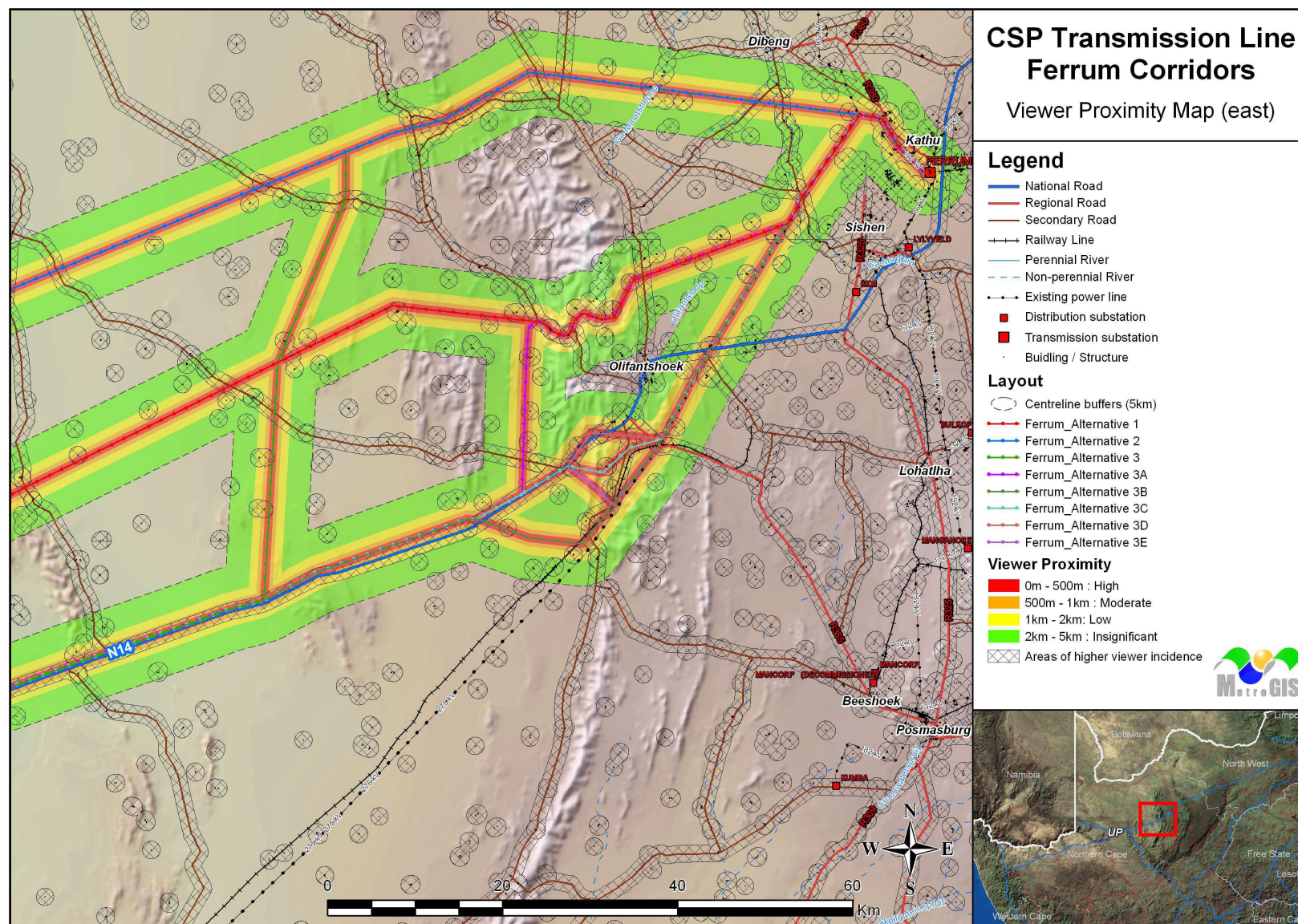
- 0 – 500m - Short distance view where the infrastructure would dominate the frame of vision and constitute a very high visual prominence.
- 500 – 1000m - Medium distance views where the infrastructure would be easily and comfortably visible and constitute a high visual prominence.
- 1000 – 2000m - Medium to longer distance view where the infrastructure would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 2000m - Long distance view where the infrastructure would still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the infrastructure.

These offsets have been illustrated on the maps that follow:

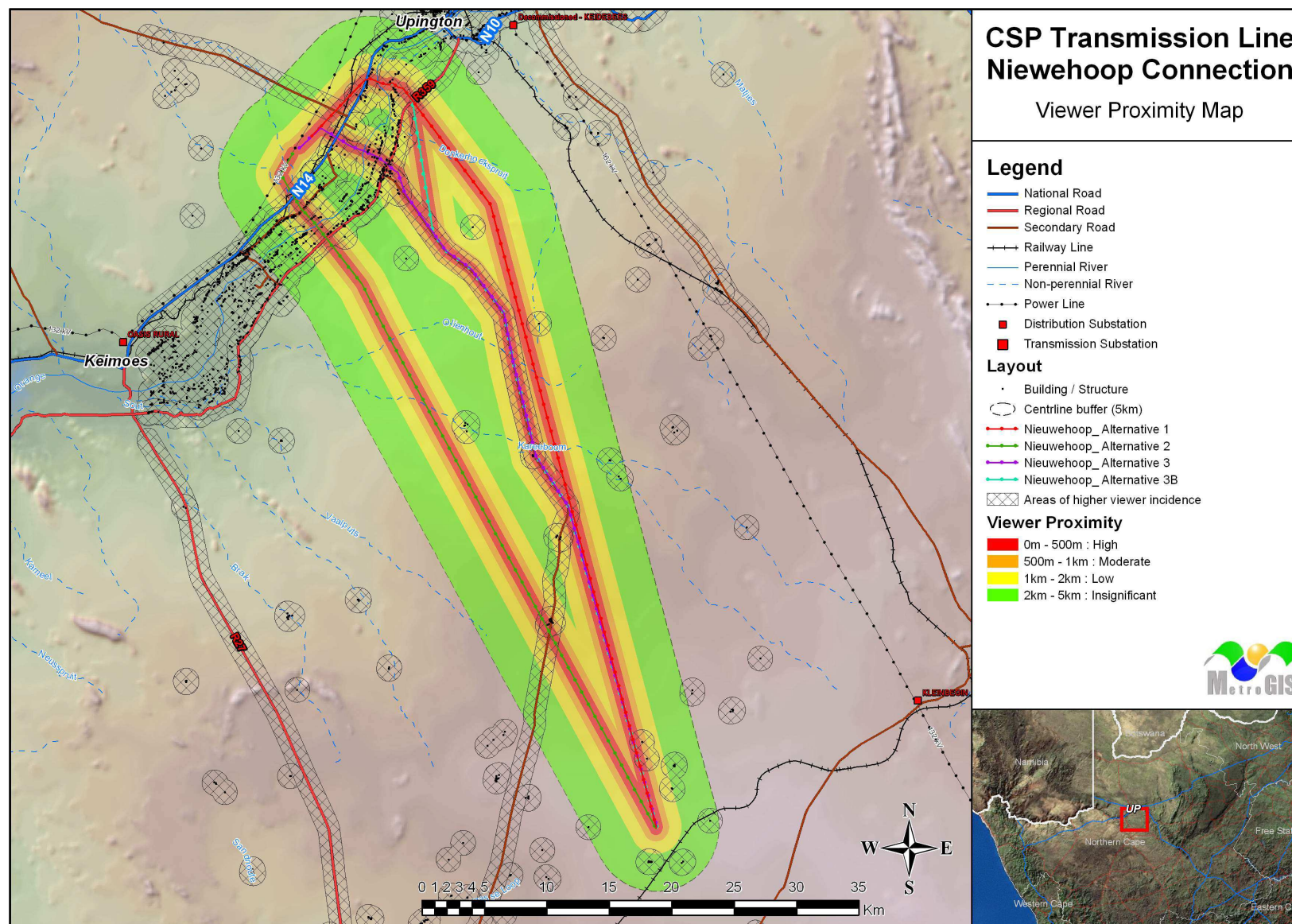
- **Map 4a:** Visual Distance and Observer Proximity to the Aries Corridor Alternatives
- **Map 4b:** Visual Distance and Observer Proximity to the Ferrum Corridor Alternatives
- **Map 4c:** Visual Distance and Observer Proximity to the Nieuwehoop Corridor Alternatives







Map 4b_2: Visual Distance and Observer Proximity to the Ferrum Corridor Alternatives (eastern section).



Map 4c: Visual Distance and Observer Proximity to the Nieuwehoop Corridor Alternatives.

6.3. Viewer incidence / viewer perception

Viewer incidence is calculated to be the highest along the national and main arterial roads (i.e. the N14, N10, R27, R360, R325) as well other arterial and secondary roads within the study area. Commuters and tourists using these roads may be negatively impacted upon by visual exposure to the proposed power line.

Other than along the above roads, viewer incidence is concentrated in the populated places within the study area. These include the major town of Upington and the smaller towns (i.e. Augrabies, Marchland, Kakamas, Keimoes, Groblershoop, Hotazel, Dibeng, Kathu, Sishen, Olifantshoek, Lohatlha, Beeshoek and Posmasburg). Despite the populations in these areas, these receptors are not considered to be particularly sensitive to visual impact, due to the presence of the urban area (and its associated visual clutter).

Homesteads and settlements, by virtue of their visually exposed nature, are considered to be sensitive visual receptors. A high concentration of homesteads and settlements occur along the N14, R358, and the Orange River and east of the Koranaberg. The remainder of the study area is much more sparsely populated.

It is uncertain whether all of the potentially affected settlements are inhabited or not, so it is assumed that they are all inhabited.

The region as a whole has a high scenic value, and an associated tourism value. Tourists and visitors to this area are therefore seen as sensitive visual receptors upon which the construction of the new power line could have a negative visual impact.

The severity of the visual impact on these receptors decreases with increased distance from the proposed infrastructure.

6.4 Visual absorption capacity

The broader study area receives between 123 mm and 185 mm of rainfall per year and the proposed site is situated mostly within the *Orange River broken veld* vegetation type. Land use along the Orange River consists of *irrigated agriculture*, but this is limited to a strip along the river. The remainder of the study area consists mostly of *Shrubland*, *Thicket* and *Woodland* with limited grazing potential.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment is deemed to be low by virtue of the nature of the vegetation and the low occurrence of urban development.

Where homesteads and settlements occur, some more significant vegetation and trees may have been planted, which would contribute to visual absorption. As this is not a consistent occurrence, however, VAC will not be taken into account for any of the homesteads or settlements, thus assuming a worst-case scenario in the impact assessment.

Within the towns and built-up areas, as well as within the mining areas, VAC will be of relevance, due to the presence of buildings, structures and equipment, also known as visual clutter. In this respect, the presence of the built-up environment will 'absorb' the visual impact to some extent.

The scale and form of the Transmission Line infrastructure means that there is some potential that the receiving environment will visually absorb it in terms of texture, colour, form and light / shade characteristics. This is more likely in areas where power lines or other infrastructure are already present, and less likely where there is no infrastructure at all.

In summary, therefore, VAC will not be taken into account for the impact assessment, except in towns, industrial areas (such as mines) and along existing power line routes.

6.5. Visual impact index

The combined results of the visual exposure, viewer incidence/perception and visual distance of the respective power line corridor Alternatives are displayed on the Visual Impact Index Maps that follow.

Here the weighted impact and the likely areas of impact are indicated as a visual impact index. Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index.

An area with short distance, high frequency of visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

The following is of specific relevance regarding the three proposed Transmission Line corridors and their alternative:

6.5.1. The Aries Corridor

6.5.1.1 Aries_Alternative 1

Refer to **Map 5a**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, N14 and secondary roads, as the line crosses over (where the alignment crosses the road);
 - A low to moderate number of settlements and homesteads, especially along the Orange River and the N14.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A low to moderate number of settlements and homesteads, especially along the Orange River and the N14.

- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations and hills (east of Kakamas) screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.1.2 *Aries_Alternative 1B*

Refer to **Map 5a**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, N14 and secondary roads, as the line crosses over (where the alignment crosses the road);
 - A low to moderate number of settlements and homesteads, especially along the Orange River and the N14.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A low to moderate number of settlements and homesteads, especially along the Orange River and the N14.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations and hills (east of Kakamas) screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.1.3 *Aries_Alternative 2*

Refer to **Map 5a**.

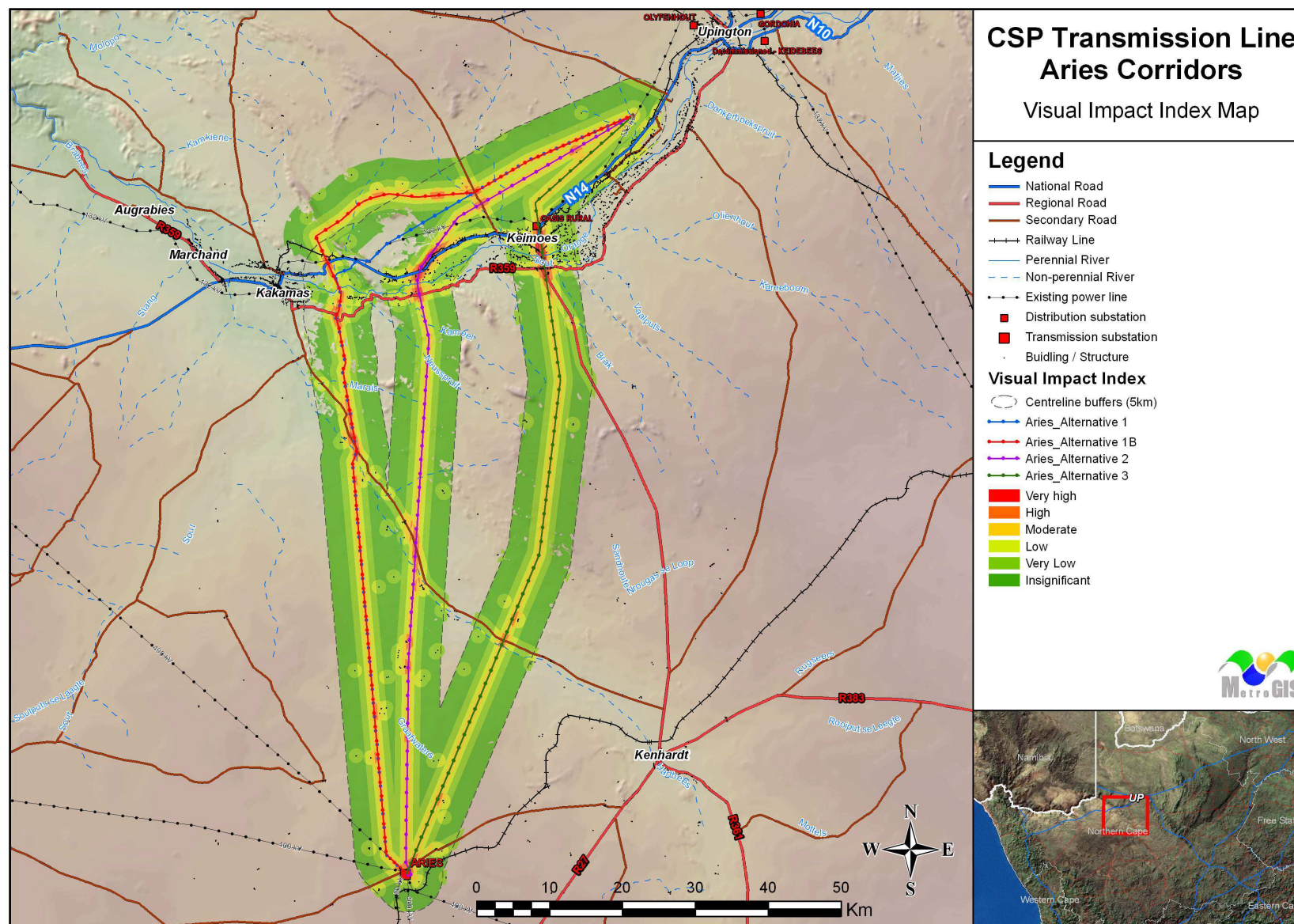
- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A moderate number of settlements and homesteads, especially along the Orange River and the N14.

- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A moderate number of settlements and homesteads, especially along the Orange River and the N14.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations and hills (east of Kakamas) screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.1.4 *Aries_Alternative 3*

Refer to **Map 5a**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, R27, N14 and secondary roads (where the alignment crosses the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Keimoes.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, R27, N14 and secondary roads (where the alignment crosses the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Keimoes.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.



Map 5a: Visual Impact Index of the Aries Corridor Alternatives.

6.5.2. The Ferrum Corridor

The Ferrum Corridor links the Solar Park to the 400kV Ferrum Substation located approximately 210 km to the north east of Upington, near Kathu. Four alternative corridors are being considered.

6.5.2.1 *Ferrum_Alternative 1*

Refer to **Map 5b**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations, hills and the Koranaberg mountains screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

The Spitskop Nature reserve lies within this zone, just north of Upington. Potential visual impacts are mostly **low**

6.5.2.2 *Ferrum_Alternative 2*

Refer to **Map 5b**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);

- A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
- The town of Kathu.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads, as the line crosses over (where the alignment crosses the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

The Spitskop Nature reserve lies within this zone, just north of Upington. Potential visual impacts are mostly **low**

6.5.2.3 *Ferrum_Alternative 3*

Refer to **Map 5b**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);
 - A 100km stretch of the N14 (where the alignment runs adjacent to the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);
 - A 100km stretch of the N14 (where the alignment runs adjacent to the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.

- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

The Spitskop Nature reserve lies within this zone, just north of Upington. Potential visual impacts are mostly **low**

6.5.2.4 *Ferrum_Alternative 3A*

Refer to **Map 5b**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);
 - A 140km stretch of the N14 (where the alignment runs adjacent to the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the N14, N10, R360, R380 and secondary roads (where the alignment crosses the road);
 - A 140km stretch of the N14 (where the alignment runs adjacent to the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations, hills and the Koranaberg mountains screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

The Spitskop Nature reserve lies within this zone, just north of Upington. Potential visual impacts are mostly **low**

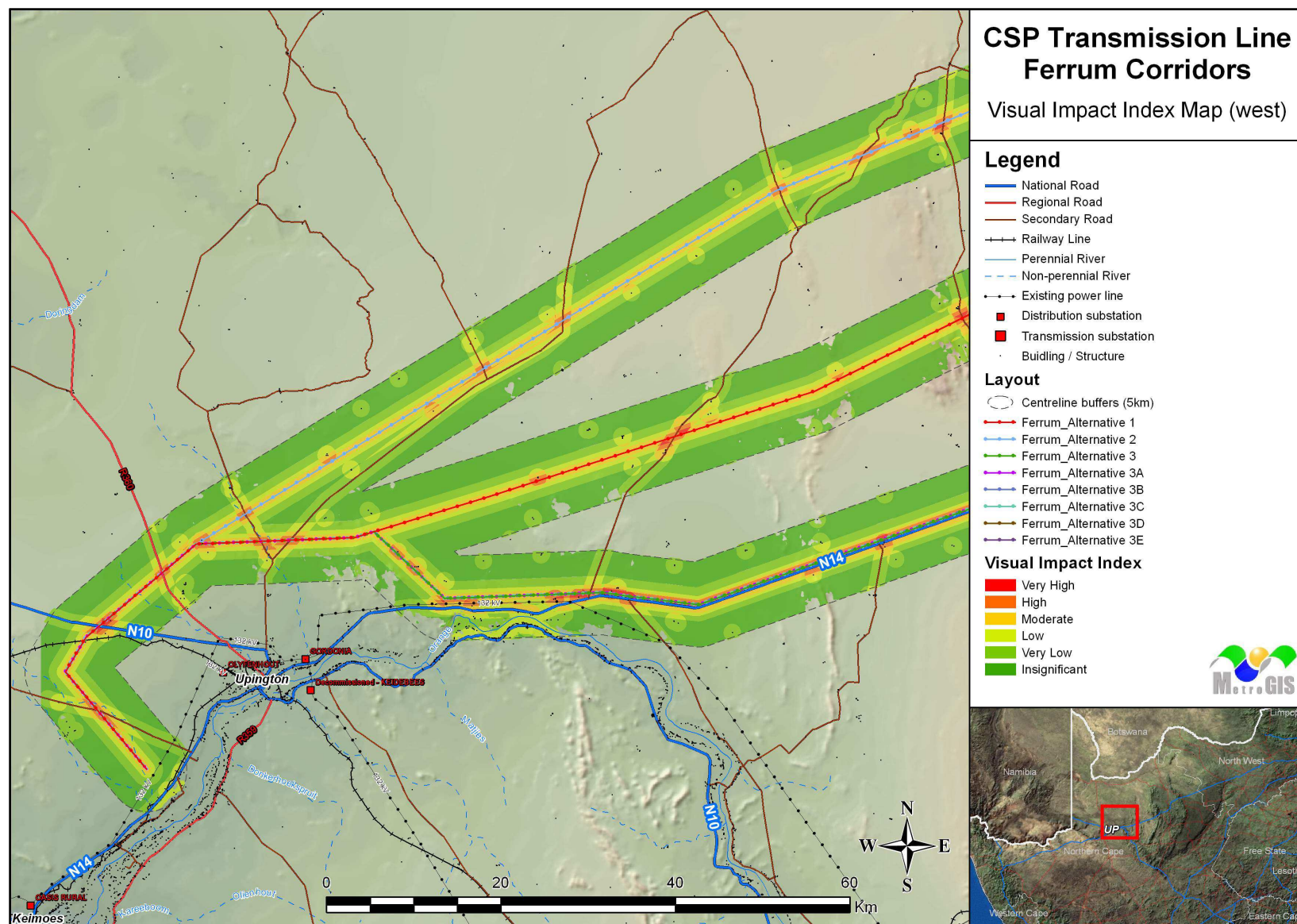
6.5.2.5 *Ferrum_Alternative 3B, C, D and E*

Refer to **Map 5b**.

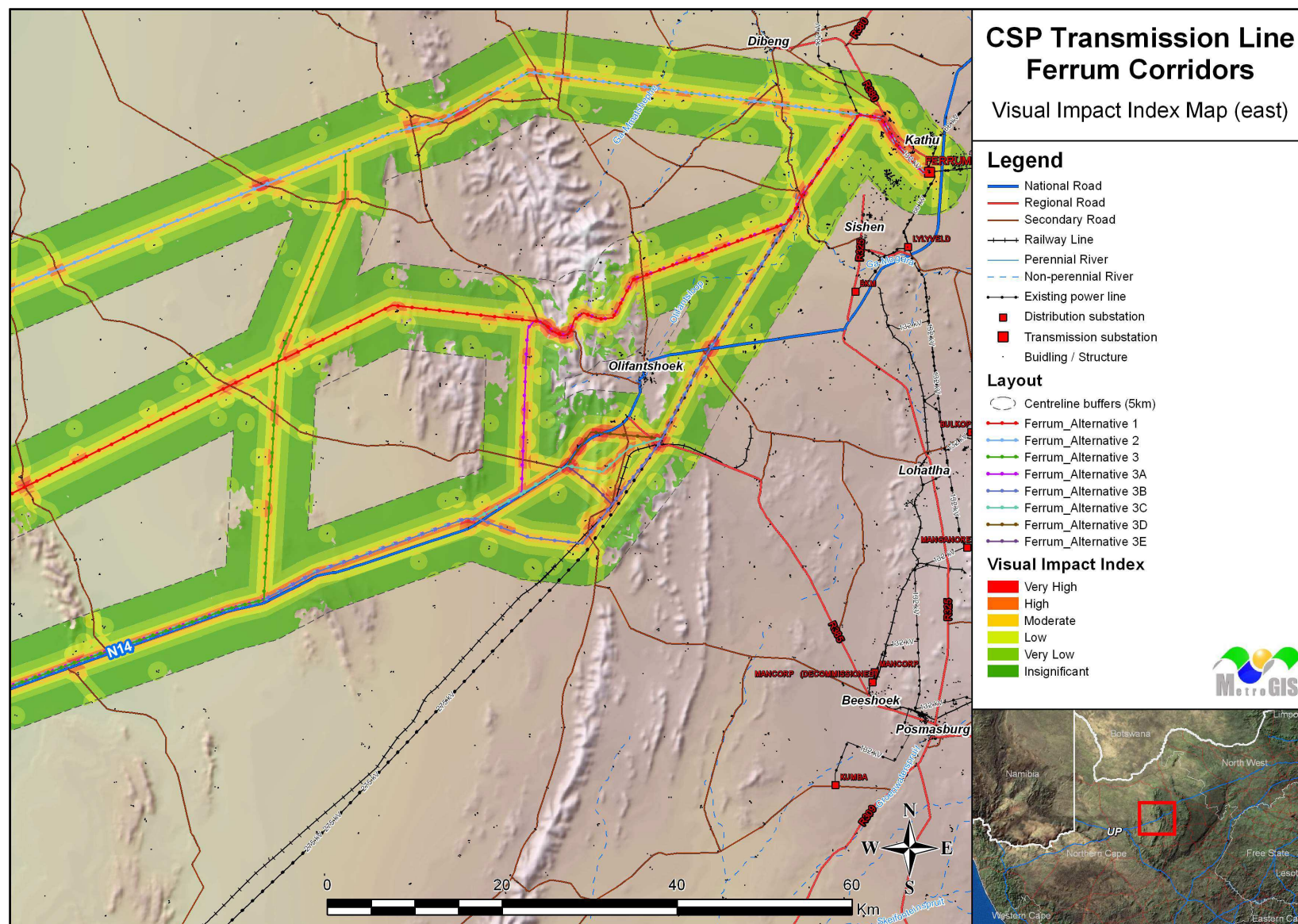
The description of the visual impact index (below) has been combined for these three corridor alternatives as they represent only small variations in a single part of the corridor.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the N14, N10, R360, R385, R380 and secondary roads (where the alignment crosses the road);
 - A 120- 140km stretch of the N14 (where the alignment runs adjacent to the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the N14, N10, R360, R385, R380 and secondary roads (where the alignment crosses the road);
 - A 120 - 140km stretch of the N14 (where the alignment runs adjacent to the road);
 - A moderately high number of settlements and homesteads, especially along the Orange River and the N14.
 - The town of Kathu.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact is reduced slightly, as topographical undulations, hills and the Koranaberg mountains screen visual impacts beyond to a limited extent. Potential visual impacts are mostly **very low** within this zone.

The Spitskop Nature reserve lies within this zone, just north of Upington. Potential visual impacts are mostly **low**



Map 5b_1: Visual Impact Index of the Ferrum Corridor Alternatives (western section).



Map 5b_2: Visual Impact Index of the Ferrum Corridor Alternatives (eastern section).

6.5.3. The Nieuwehoop Corridor

The Nieuwehoop Corridor links the Solar Park to the 400kV Nieuwehoop Substation located approximately 70 km to the south east of Upington. Three alternative corridors are being considered.

6.5.3.1 *Nieuwehoop_Alternative 1*

Refer to **Map 5c**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact remains high, as topographical undulations are largely absent. Potential visual impacts are mostly **very low** within this zone.

6.5.3.2 *Nieuwehoop_Alternative 2*

Refer to **Map 5c**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:

- Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact remains high, as topographical undulations are largely absent. Potential visual impacts are mostly **very low** within this zone.

6.5.3.3 *Nieuwehoop_Alternative 3*

Refer to **Map 5c**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A 30km stretch of the a secondary road (where the alignment runs adjacent to the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A 30km stretch of the a secondary road (where the alignment runs adjacent to the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
- Beyond the 2000m offset (i.e. long distance), the extent of visual impact remains high, as topographical undulations are largely absent. Potential visual impacts are mostly **very low** within this zone.

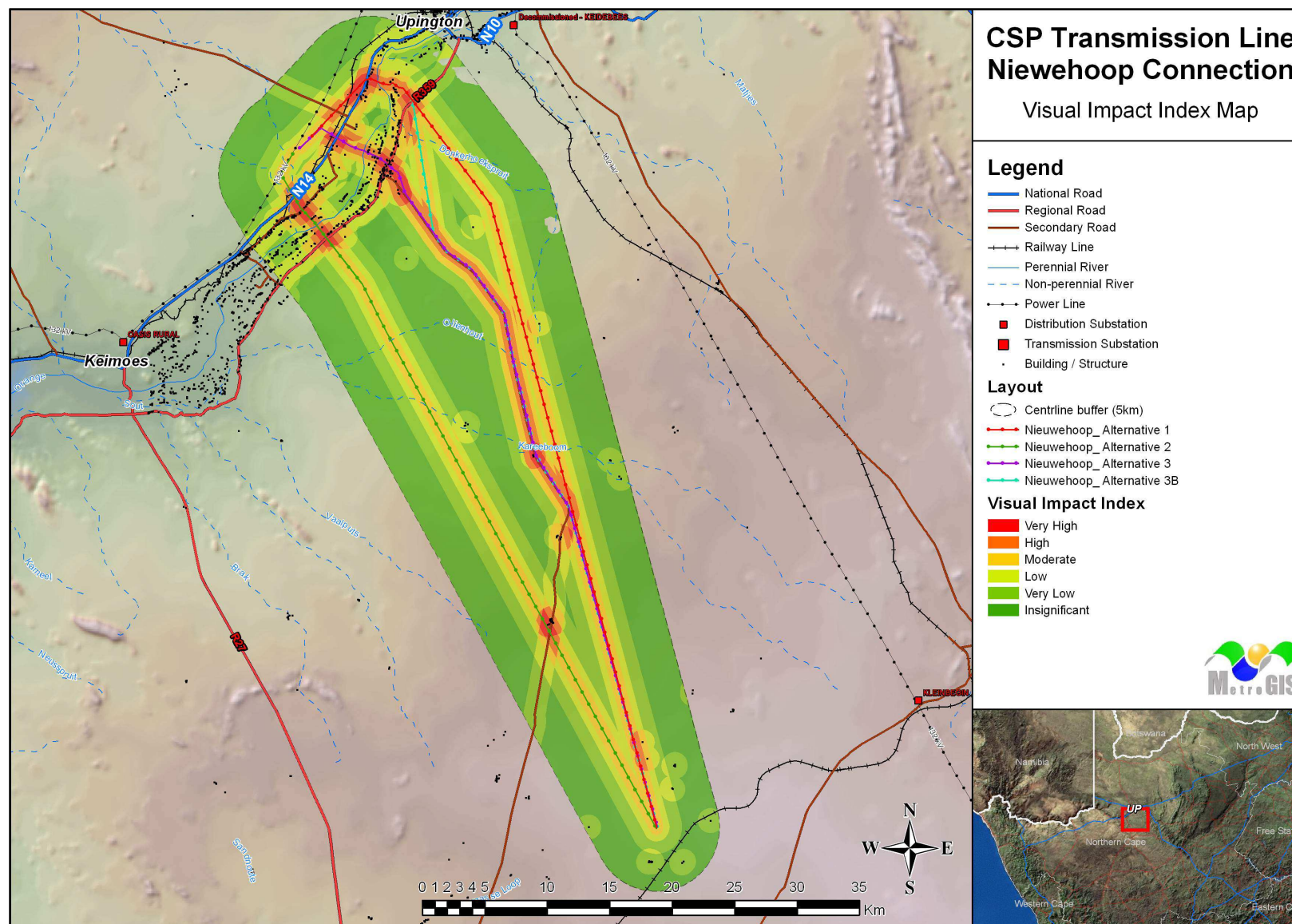
6.5.3.4 *Nieuwehoop_Alternative 3B*

Refer to **Map 5c**.

- The visual impact index map clearly indicates a core area of potentially **high** visual impact within a 500m offset on either side of the proposed

Transmission Line (i.e. short distance). Potential areas of **very high** visual impact within the short distance include the following:

- Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A 25km stretch of the a secondary road (where the alignment runs adjacent to the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
- The extent of visual impact remains high in the medium distance (i.e. between the 500m and 1000m offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include the following:
 - Short stretches of the R359, N14 and secondary roads (where the alignment crosses the road);
 - A 25km stretch of the a secondary road (where the alignment runs adjacent to the road);
 - A moderate number of settlements and homesteads, especially along the Orange River, the N14 and the R359.
 - The extent of visual impact is still high in the medium to longer distance (i.e. between the 1000m and 2000m offset). Potential visual impact is mostly **low** within this zone.
 - Beyond the 2000m offset (i.e. long distance), the extent of visual impact remains high, as topographical undulations are largely absent. Potential visual impacts are mostly **very low** within this zone.



Map 5c: Visual Impact Index of the Nieuwehoop Corridor Alternatives.

6.6 Visual impact assessment: methodology

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues (see Chapter 3: SCOPE OF WORK) related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed infrastructure) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - site only (very high = 5), local (high = 4), regional (medium = 3), national (low = 2) or international (very low = 1)
- **Duration** - very short (0-1 yrs = 1), short (2-5 yrs = 2), medium (5-15 yrs = 3), long (>15 yrs = 4), and permanent (= 5)
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10)
- **Probability** - very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5)
- **Status** (positive, negative or neutral)
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5)
- **Significance** - low, medium or high

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

*Please note that due to the declining visual impact over distance, the **extent** (or spatial scale) rating is reversed (i.e. a localised visual impact has a higher value rating than a national or regional value rating). This implies that the visual impact is highly unlikely to have a national or international extent, but that the local or site-specific impact could be of high significance.*

6.7 Visual impact assessment: primary impacts

6.7.1 Potential visual impact on users of main roads in close proximity to the proposed infrastructure.

6.7.1.1 The Aries Corridor

Potential visual impact on users of national roads (N14), arterial roads (R359) and secondary roads in close proximity of the proposed Transmission lines (i.e. within 500m) are expected to be of **moderate** significance for all alternatives⁴. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to roads (based on the frequency of road crossings and / or the presence of these roads within the 500m offset) influences the probability rating for each of the alternatives).

Table 2a: Impact table summarising the significance of visual impacts on users of national, arterial and secondary roads in close proximity to the infrastructure: Aries Corridor

Nature of Impact: Potential visual impact on users of national, arterial and secondary roads in close proximity to the proposed infrastructure						
	ARIES ALTERNATIVE 1, 1B		ARIES ALTERNATIVE 2		ARIES ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a
Mitigation: None.						
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

⁴ On this scale, the same visual impact assessment would be applicable for Alternatives 1 and 1B as they represent only small variations in a single part of the corridor.

6.7.1.2 The Ferrum Corridor

Potential visual impact on users of national roads (N14, N10), arterial roads (R360, R380, R385) and secondary roads in close proximity of the proposed Transmission lines (i.e. within 500m) are expected to be of **moderate** significance for Ferrum_Alternative 1 and 2, and of **high** significance for Ferrum_Alternative 3, Ferrum_Alternative 3A and for Ferrum_Alternative 3B, 3C, 3D and 3E⁵. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to roads (based on the frequency of road crossings and / or the presence of these roads within the 500m offset) influences the probability rating for each of the alternatives.

Table 2b: Impact table summarising the significance of visual impacts on users of national, arterial and secondary roads in close proximity to the infrastructure: Ferrum Corridor

Nature of Impact:										
Potential visual impact on users of national, arterial and secondary roads in close proximity to the proposed infrastructure										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	No mitigation	Mitigation considered	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Definite (5)	N/a	Definite (5)	N/a	Definite (5)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	High (90)	N/a	High (90)	N/a	High (90)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:										
None.										
Cumulative impacts:										
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.										

⁵ On this scale, the same visual impact assessment would be applicable for all three corridor alternatives as they represent only small variations in a single part of the corridor.

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.7.1.3 The Nieuwehoop Corridor

Potential visual impact on users of national roads (N14), arterial roads (R359) and secondary roads in close proximity of the proposed Transmission lines (i.e. within 500m) are expected to be of **moderate** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to roads (based on the frequency of road crossings and / or the presence of these roads within the 500m offset) influences the probability rating for each of the alternatives.

Table 2c: Impact table summarising the significance of visual impacts on users of national, arterial and secondary roads in close proximity to the infrastructure: Nieuwehoop Corridor

Nature of Impact: Potential visual impact on users of national, arterial and secondary roads in close proximity to the proposed infrastructure								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.								
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.7.2 Potential visual impact on residents of built up areas and towns in close proximity to the proposed infrastructure.**6.7.2.1 The Aries Corridor**

The potential visual impact on residents of residents of built-up centres and populated places (i.e. Keimoes) within 500m of the proposed Transmission lines is expected to be of **moderate** significance for Aries_Alternative 3, and of **low** significance for the other Alternatives. The presence of visual clutter within the urban environment reduces the probability of this impact occurring.

No mitigation is possible. The table below illustrates this impact assessment.

Table 3a: Impact table summarising the significance of visual impacts on residents of built up areas and towns in close proximity to the proposed infrastructure: Aries Corridor

Nature of Impact:						
Potential visual impact on residents of built up areas and towns in close proximity to the proposed infrastructure.						
	ARIES_ALTERNATIVE 1, 1B		ARIES_ALTERNATIVE 2		ARIES_ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	None (0)	N/a	None (0)	N/a	V high (10)	N/a
Probability	V. Improbable (1)	N/a	V. Improbable (1)	N/a	Probable (3)	N/a
Significance	Low (8)	N/a	Low (8)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	N/a	N/a	N/a	N/a
Irreplaceable loss of resources?	No	N/a	N/a	N/a	N/a	N/a
Can impacts be mitigated?	No	N/a	N/a	N/a	N/a	N/a
Mitigation:						
None.						
Cumulative impacts:						
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						
Residual impacts:						
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

6.7.2.2 The Ferrum Corridor

The potential visual impact on residents of residents of built-up centres and populated places (i.e. Kathu) within 500m of the proposed Transmission lines is expected to be of **moderate** significance for all Alternatives. The presence of visual clutter within the urban environment reduces the probability of this impact occurring.

No mitigation is possible. The table below illustrates this impact assessment.

Table 3b: Impact table summarising the significance of visual impacts on residents of built up areas and towns in close proximity to the proposed infrastructure: Ferrum Corridor

Nature of Impact: Potential visual impact on residents of built up areas and towns in close proximity to the proposed infrastructure.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.										
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.										
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.										

6.7.2.3 The Nieuwehoop Corridor

The potential visual impact on residents of residents of built-up centres and populated places within 500m of the proposed Transmission Lines is expected to be of **low** significance for all Alternatives.

The table below illustrates this impact assessment.

Table 3c: Impact table summarising the significance of visual impacts on residents of built up areas and towns in close proximity to the proposed infrastructure: Nieuwehoop Corridor

Nature of Impact: Potential visual impact on residents of built up areas and towns in close proximity to the proposed infrastructure.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	None (0)	N/a	None (0)	N/a	None (0)	N/a	None (0)	N/a
Probability	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a
Significance	Low (8)	N/a	Low (8)	N/a	Low (8)	N/a	Low (8)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.								
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.								

6.7.3 Potential visual impact on residents of farmsteads and settlements in close proximity to the proposed infrastructure

6.7.3.1 The Aries Corridor

The potential visual impact on residents of farmsteads and settlements within 500m of the proposed Transmission Lines is expected to be of **high** significance for Aries_Alternatives 3 and of **moderate** significance for all other Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence within a 500m offset) influences the probability rating for each of the alternatives.

Table 4a: Impact table summarising the significance of visual impacts on residents of farmsteads and settlements in close proximity to the proposed infrastructure: Aries Corridor

Nature of Impact:						
Potential visual impact on residents of farmsteads and settlements in close proximity to the proposed infrastructure.						
	ARIES_ALTERNATIVE 1, 1B		ARIES_ALTERNATIVE 2		ARIES_ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Improbable (2)	N/a	Probable (3)	N/a	High (4)	N/a
Significance	Moderate (36)	N/a	Moderate (54)	High (72)	High (72)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a
Mitigation:						
None.						
Cumulative impacts:						
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						
Residual impacts:						
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

6.7.3.2 The Ferrum Corridor

The potential visual impact on residents of farmsteads and settlements within 500m of the proposed Transmission Lines is expected to be of **high** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence within a 500m offset) influences the probability rating for each of the alternatives.

Table 4b: Impact table summarising the significance of visual impacts on residents of farmsteads and settlements in close proximity to the proposed infrastructure: Ferrum Corridor

Nature of Impact:										
Potential visual impact on residents of farmsteads and settlements in close proximity to the proposed infrastructure.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B,C,D,E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	High (4)	N/a	High (4)	N/a	High (4)	N/a	High (4)	N/a	High (4)	N/a
Significance	High (72)	N/a	High (72)	N/a	High (72)	N/a	High (72)	N/a	High (72)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:										
None.										
Cumulative impacts:										
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.										
Residual impacts:										
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.										

6.7.3.3 The Nieuwehoop Corridor

The potential visual impact on residents of farmsteads and settlements within 500m of the proposed Transmission Lines is expected to be of **high** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence within a 500m offset) influences the probability rating for each of the alternatives.

Table 4c: Impact table summarising the significance of visual impacts on residents of farmsteads and settlements in close proximity to the proposed infrastructure: Nieuwehoop Corridor

Nature of Impact:								
Potential visual impact on residents of farmsteads and settlements in close proximity to the proposed infrastructure.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a	Local (4)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:								
None.								
Cumulative impacts:								
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								
Residual impacts:								
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.								

6.7.4 Potential visual impact on sensitive visual receptors within the region.

6.7.4.1 The Aries Corridor

The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 500m offset) is expected to be of **moderate** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence beyond a 500m offset) influences the probability rating for each of the alternatives.

Table 5a: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region: Aries Corridor

Nature of Impact: Potential visual impact on sensitive visual receptors within the region.						
	ARIES ALTERNATIVE 1, 1B		ARIES ALTERNATIVE 2		ARIES ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	High (8)	N/a	High (8)	N/a	High (8)	N/a
Probability	Improbable (2)	N/a	Probable (3)	N/a	High (4)	N/a
Significance	Moderate (30)	N/a	Moderate (45)	N/a	Moderate (60)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a
Mitigation: None.						
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

6.7.4.2 The Ferrum Corridor

The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 500m offset) is expected to be of **moderate** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence beyond a 500m offset) influences the probability rating for each of the alternatives.

Table 5b: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region: Ferrum Corridor

Nature of Impact:										
Potential visual impact on sensitive visual receptors within the region.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	High (8)	N/a	High (8)	N/a	High (8)	N/a	High (8)	N/a	High (8)	N/a
Probability	High (4)	N/a	High (4)	N/a	High (4)	N/a	High (4)	N/a	High (4)	N/a
Significance	Moderate (60)	N/a	Moderate (60)	N/a	Moderate (60)	N/a	Moderate (60)	N/a	Moderate (60)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:										
None.										
Cumulative impacts:										
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.										
Residual impacts:										
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.										

6.7.4.3 The Nieuwehoop Corridor

The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 500m offset) is expected to be of **moderate** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence beyond a 500m offset) influences the probability rating for each of the alternatives.

Table 5c: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region: Nieuwehoop Corridor

Nature of Impact: Potential visual impact on sensitive visual receptors within the region.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	High (8)	N/a	High (8)	N/a	High (8)	N/a	High (8)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (45)	N/a	Moderate (45)	N/a	Moderate (45)	N/a	Moderate (45)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.								
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.								

6.7.5 Potential visual impact on conservation areas within the region.

The location of the Augrabies National Park and the Spitskop Nature reserve has been sourced from the SANBI database. Additional conservation initiatives, such as Private Nature Reserves, Conservancies and Game Farms are likely to exist within the study area, but as the locations of these are not known at this stage, the visual impact on them cannot be determined. The public participation process confirmed that game farms and conservation destinations exist within the study area, but it is unknown where these are situated.

6.7.5.1 The Aries Corridor

The potential visual impact on protected and conservation areas (the Augrabies National Park) is expected to be of **low** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Table 6a: Impact table summarising the significance of visual impacts on conservation areas within the region: Aries Corridor

Nature of Impact:						
Potential visual impact on conservation areas within the region.						
	ARIES ALTERNATIVE 1, 1B		ARIES ALTERNATIVE 2		ARIES ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	None (0)	N/a	None (0)	N/a	None (0)	N/a
Probability	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a
Significance	Low (7)	N/a	Low (7)	N/a	Low (7)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a
Mitigation:						
None.						
Cumulative impacts:						
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						
Residual impacts:						
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

6.7.5.2 The Ferrum Corridor

The potential visual impact on protected and conservation areas (the Spitskop Nature Reserve) is expected to be of **moderate** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Table 6b: Impact table summarising the significance of visual impacts on conservation areas within the region: Ferrum Corridor

Nature of Impact: Potential visual impact on conservation areas within the region.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	Low (4)	N/a	Low (4)	N/a	Low (4)	N/a	Low (4)	N/a	Low (4)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (33)	N/a	Moderate (33)	N/a	Moderate (33)	N/a	Moderate (33)	N/a	Moderate (33)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.										
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.										
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.										

6.7.5.3 The Nieuwehoop Corridor

The potential visual impact on protected and conservation areas (the Augrabies National Park and the Spitskop Nature Reserve) is expected to be of **low** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Table 6c: Impact table summarising the significance of visual impacts on conservation areas within the region: Nieuwehoop Corridor

Nature of Impact: Potential visual impact on conservation areas within the region.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	None (0)	N/a	None (0)	N/a	None (0)	N/a	None (0)	N/a
Probability	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a
Significance	Low (7)	N/a	Low (7)	N/a	Low (7)	N/a	Low (7)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.								
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.								

6.7.6 Potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto

Substation upgrades along the three Transmission Line corridors will take place within the existing substation HV yards. Therefore associated visual impacts are likely to be limited in extent to that of the existing substations. It is expected that the visual impact of the infrastructure will be absorbed by the existing visual impact to a large extent.

The construction of the 400kV and 132kV Tx substation at the CSP site and the construction of five 500MVA 400/132kV transformers and associated switchgear at the Solar Park site will fall within the viewshed of the CSP and Solar Park sites respectively. It is expected that the visual impact of the infrastructure will be absorbed by the existing visual impact to a large extent.

The phased construction of a number of 132kV distribution lines also forms part of this project:

- Three 132kV lines for the IPP's around Solar Park;
- Three 132kV lines and two 20MVA Transformers at the CSP site
- Five 132kV lines for the DoE Solar Park;
- Five 132kV lines to the Gordonia Substation (measuring approx. 25km).

With the exception of the five lines to the Gordonia Substation, the distribution lines will fall within the viewshed of the CSP site and the Solar Park site. It is expected that the visual impact of the infrastructure will be absorbed by the existing visual impact to a large extent.

Lastly, access roads will be required, firstly to construct the Transmission Lines, and secondly to maintain it (operational phase). These access roads have the potential of manifesting as landscape scarring, and thus a potential visual impact within the viewshed areas. This is especially relevant for steep slopes where cut and fill may be required to render access possible in high lying areas and on steep slopes. Graded slopes could be vulnerable to erosion over time. Such erosion and landscape scarring could represent a visual impact.

No dedicated viewshed has been generated for the access roads, nor is a proposed layout available for each corridor. However, it is assumed, but that the area of potential visual exposure will lie within that of the power line.

6.7.6.1 The Aries Corridor

The potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **moderate** significance for all Alternatives. Mitigation can reduce the significance of impacts to **low**.

The presence of existing infrastructure (i.e. the Solar Park and CSP sites, and existing power line infrastructure) reduces the probability of this impact occurring somewhat. The table overleaf illustrates the assessment of this anticipated impact.

Table 7a: Impact table summarising the significance of visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto: Aries Corridor

Nature of Impact: Potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto.						
	ARIES_ALTERNATIVE 1, 1B		ARIES_ALTERNATIVE 2		ARIES_ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Moderate (42)	Low (28)	Moderate (42)	Low (28)	Moderate (42)	Low (28)
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No	No	No	No	No
Can impacts be mitigated?	No	No	No	No	No	No
Mitigation: Planning: Plan with due cognisance of topography; use existing roads / disturbed areas where possible; consolidate infrastructure where possible. Construction: rehabilitation of all construction areas, including servitudes. Where driftsand is present, rehabilitation will not be possible. Operation: Maintenance of access roads and servitudes, and rehabilitation where required to avoid dust and erosion. Where driftsand is present, rehabilitation will not be possible.						
Cumulative impacts: The construction of distribution lines, substations, transformers, switchgear, access roads and cleared servitudes will increase the cumulative visual impact of built, electrical and road type infrastructure within the region.						
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

6.7.6.2 The Ferrum Corridor

The potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **moderate** significance for all Alternatives. Mitigation can reduce the significance of impacts to **low**.

The presence of existing infrastructure (i.e. the Solar Park and CSP sites, and existing power line infrastructure) reduces the probability of this impact occurring somewhat. The table overleaf illustrates the assessment of this anticipated impact.

Table 7b: Impact table summarising the significance of visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto: Ferrum Corridor

Nature of Impact: Potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 4		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Moderate (42)	Low (28)	Moderate (42)	Low (28)	Moderate (42)	Low (28)	Moderate (42)	Low (28)	Moderate (42)	Low (28)
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No	No	No	No	No	No	No	No	No
Can impacts be mitigated?	No	No	No	No	No	No	No	No	No	No
Mitigation: Planning: Plan with due cognisance of topography; use existing roads / disturbed areas where possible; consolidate infrastructure where possible. Construction: rehabilitation of all construction areas, including servitudes. Where driftsand is present, rehabilitation will not be possible. Operation: Maintenance of access roads and servitudes, and rehabilitation where required to avoid dust and erosion. Where driftsand is present, rehabilitation will not be possible.										
Cumulative impacts: The construction of distribution lines, substations, transformers, switchgear, access roads and cleared servitudes will increase the cumulative visual impact of built, electrical and road type infrastructure within the region.										
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.										

6.7.6.3 The Nieuwehoop Corridor

The potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **moderate** significance for all Alternatives. Mitigation can reduce the significance of impacts to **low**.

The presence of existing infrastructure (i.e. the Solar Park and CSP sites, and existing power line infrastructure) reduces the probability of this impact occurring somewhat. The table overleaf illustrates the assessment of this anticipated impact.

Table 7c: Impact table summarising the significance of visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto: Nieuwehoop Corridor

Nature of Impact: Potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Moderate (42)	Low (28)	Moderate (42)	Low (28)	Moderate (42)	Low (28)	Moderate (42)	Low (28)
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No	No	No	No	No	No	No
Can impacts be mitigated?	No	No	No	No	No	No	No	No
Mitigation: Planning: Plan with due cognisance of topography; use existing roads / disturbed areas where possible; consolidate infrastructure where possible. Construction: rehabilitation of all construction areas, including servitudes. Where driftsand is present, rehabilitation will not be possible. Operation: Maintenance of access roads and servitudes, and rehabilitation where required to avoid dust and erosion. Where driftsand is present, rehabilitation will not be possible.								
Cumulative impacts: The construction of distribution lines, substations, transformers, switchgear, access roads and cleared servitudes will increase the cumulative visual impact of built, electrical and road type infrastructure within the region.								
Residual impacts: None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.								

6.7.7 Potential visual impact of construction on sensitive visual receptors in close proximity to the infrastructure

During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Mitigation entails proper planning, management and rehabilitation of all construction sites to forego visual impacts.

6.7.7.1 The Aries Corridor

The table below illustrates the assessment of the anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure. Visual impacts are likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low**.

Table 8a: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed infrastructure: Aries Corridor

Nature of Impact: Potential visual impact of construction on visual receptors in close proximity to the infrastructure.						
	ARIES ALTERNATIVE 1, 1B		ARIES ALTERNATIVE 2		ARIES ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)
Duration	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	High (4)	Improbable (2)	High (4)	Improbable (2)	High (4)	Improbable (2)
Significance	Moderate (44)	Low (18)	Moderate (44)	Low (18)	Moderate (44)	Low (18)
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No	No	No	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Mitigation: Construction: Proper planning, management and rehabilitation of the construction sites. Where driftsand is present, rehabilitation will not be possible.						
Cumulative impacts: None.						
Residual impacts: None.						

6.7.7.2 The Ferrum Corridor

The table below illustrates the assessment of the anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure. Visual impacts are likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low**.

Table 8b: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed infrastructure: Ferrum Corridor

Nature of Impact: Potential visual impact of construction on visual receptors in close proximity to the infrastructure.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 4		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)
Duration	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)	Moderate (6)	Low (4)	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	High (4)	Improbable (2)	High (4)	Improbable (2)	High (4)	Improbable (2)	High (4)	Improbable (2)	High (4)	Improbable (2)
Significance	Moderate (44)	Low (18)	Moderate (44)	Low (18)	Moderate (44)	Low (18)	Moderate (44)	Low (18)	Moderate (44)	Low (18)
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No	No	No	No	No	No	No	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mitigation: Construction: Proper planning, management and rehabilitation of the construction sites. Where driftsand is present, rehabilitation will not be possible.										
Cumulative impacts: None.										
Residual impacts: None.										

6.7.7.3 The Nieuwehoop Corridor

The table below illustrates the assessment of the anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure. Visual impacts are likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low**.

Table 8c: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed infrastructure: Nieuwehoop Corridor

Nature of Impact: Potential visual impact of construction on visual receptors in close proximity to the infrastructure.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)	Local (4)
Duration	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)	Very short term (1)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	High (4)	Improbable (2)	High (4)	Improbable (2)	High (4)	Improbable (2)	High (4)	Improbable (2)
Significance	Moderate (44)	Low (18)	Moderate (44)	Low (18)	Moderate (44)	Low (18)	Moderate (44)	Low (18)
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No	No	No	No	No	No	No
Can impacts be mitigated?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mitigation: Construction: Proper planning, management and rehabilitation of the construction sites. Where driftsand is present, rehabilitation will not be possible.								
Cumulative impacts: None.								
Residual impacts: None.								

6.7.8 Potential visual impact on scenic and visually sensitive topographical features within the region.

The nature of the mountainous terrain is such that it offers some degree of visual absorption, but it is also sensitive to visual intrusion. The mountainous part of the study area is also scenic, and the construction of a power line within such areas will constitute a visual impact, rendered more significant due to the sensitive nature of the natural features. Similarly, visual impact on the rivers and drainage lines of the region will be significant.

6.7.8.1 The Aries Corridor

The anticipated visual impact of the Transmission Lines on the scenic and visually sensitive mountains and drainage lines of the study area is expected to be of **moderate** significance Aries_Alternatives 1, 1B⁶ and Aries_Alternatives 2, and of **low** significance for Aries_Alternatives 3. There is no mitigation for this impact. The table below illustrates the assessment of this anticipated impact. *Note: The extent of the section traversing mountainous areas and in close proximity to the Orange River and other drainage lines influences the probability rating for each of the alternatives.*

Table 9a: Impact table summarising the significance of visual impacts on scenic and visually sensitive topographic features within the region: Aries Corridor

Nature of Impact: Potential visual impact on scenic and visually sensitive topographic features within the region.						
	ARIES ALTERNATIVE 1, 1B		ARIES ALTERNATIVE 2		ARIES ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	High (8)	N/a	High (8)	N/a	High (8)	N/a
Probability	Improbable (2)	N/a	Improbable (2)	N/a	V Improbable (1)	N/a
Significance	Moderate (30)	N/a	Moderate (30)	N/a	Low (15)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a
Mitigation: None.						
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						

⁶ On this scale, the same visual impact assessment would be applicable for Aries_Alternatives 1 and 1B as they represent only small variations in a single part of the corridor.

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.7.8.2 The Ferrum Corridor

The anticipated visual impact of the Transmission Lines on the scenic and visually sensitive mountains and drainage lines of the study area is expected to be of **high** significance for Ferrum_Alternative 1 and 3A, of **moderate** significance for Ferrum_Alternatives 3B, 3C, 3D and 3E⁷ and of **low** significance for Ferrum_Alternative 2 and 3.

There is no mitigation for this impact. The table below illustrates the assessment of this anticipated impact. *Note: The extent of the section traversing mountainous areas and in close proximity to the Orange River and other drainage lines influences the probability rating for each of the alternatives.*

Table 9b: Impact table summarising the significance of visual impacts on scenic and visually sensitive topographic features within the region: Ferrum Corridor

Nature of Impact:										
Potential visual impact on scenic and visually sensitive topographic features within the region.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	High (8)	N/a	High (8)	N/a	High (8)	N/a	High (8)	N/a	High (8)	N/a
Probability	High (4)	N/a	Improbable (2)	N/a	Improbable (2)	N/a	High (4)	N/a	Probable (3)	N/a
Significance	High (60)	N/a	Low (30)	N/a	Low (30)	N/a	High (60)	N/a	Moderate (45)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:										
None.										

⁷ On this scale, the same visual impact assessment would be applicable for all three corridor alternatives as they represent only small variations in a single part of the corridor.

Cumulative impacts:

The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.7.8.3 The Nieuwehoop Corridor

The anticipated visual impact of the Transmission Lines on the scenic and visually sensitive mountains and drainage lines of the study area is expected to be of **low** significance all Alternatives. There is no mitigation for this impact. The table below illustrates the assessment of this anticipated impact. *Note: The extent of the section traversing mountainous areas and in close proximity to the Orange River and other drainage lines influences the probability rating for each of the alternatives.*

Table 9c: Impact table summarising the significance of visual impacts on scenic and visually sensitive topographic features within the region: Nieuwehoop Corridor

Nature of Impact: Potential visual impact on scenic and visually sensitive topographic features within the region.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	High (8)	N/a	High (8)	N/a	High (8)	N/a	High (8)	N/a
Probability	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a	V Improbable (1)	N/a
Significance	Low (15)	N/a	Low (15)	N/a	Low (15)	N/a	Low (15)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.								
Cumulative impacts: The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.8 Visual impact assessment: secondary impacts**6.8.1 Potential visual impact on the visual character and sense of place of the region.**

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

Specific aspects contributing to the sense of place of this region include the rugged, undeveloped nature of the area, the wide-open vistas and the scenic beauty of the landscape and the mountains.

As this is a desktop study, no site visit has been undertaken. In this respect, the visual character and sense of place of the region cannot be assessed.

6.8.2 Potential visual impact on tourist access routes and tourist destinations within the region.

The greater region is generally seen as having a high scenic value and tourism value potential. Outside of towns, and beyond the river, the landscape is characterised by wide-open spaces. Development, where this occurs at all, is domestic in scale, and sparsely spread. The N14, N10, R27, R360 and R325 are the primary roads in the region and are the main link between Gauteng, the West Coast and Namibia. These in addition to the R359 are considered to be routes most likely to carry tourists.

In terms of tourist destinations and accommodation, the area along the Orange River is expected to host a relatively high concentration of overnight facilities. In addition, it may be expected that private nature reserves and game farms within the greater region will also cater for tourists to some extent. At this stage, however, as the locations of such tourist destinations are not known. The public participation process confirmed that game farms and conservation destinations exist within the study area, but it is unknown where these are situated.

Visual intrusion through the development of industrial type infrastructure within this environment could affect the area's tourism value and potential.

6.8.2.1 The Aries Corridor

The anticipated visual impact of the Transmission lines and associated infrastructure on tourist access routes (i.e. the N14, N10, R27, R360, R325 and R359) and tourist destinations (i.e. attractions and accommodation) within the region is expected to be of **moderate** significance for all Alternatives. There is no mitigation for this impact. The table overleaf illustrates the assessment of this anticipated impact.

Note: The frequency of exposure to tourist routes (based on the frequency of road crossings and / or the presence of these roads within the 500m offset) influences the probability rating for each of the alternatives.

Table 10a: Impact table summarising the significance of visual impacts on tourist access routes and tourist destinations within the region: Aries Corridor

Nature of Impact:						
Potential visual impact on tourist access routes and tourist destinations within the region.						
	ARIES ALTERNATIVE 1, 1B		ARIES ALTERNATIVE 2		ARIES ALTERNATIVE 3	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a
Mitigation:						
None.						
Cumulative impacts:						
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (5) and transmission substations (1) present in the study area.						
Residual impacts:						
None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.						

6.8.2.2 The Ferrum Corridor

The anticipated visual impact of the Transmission lines and associated infrastructure on tourist access routes (i.e. the N14, N10, R27, R360, R325 and R359) and tourist destinations (i.e. attractions and accommodation) within the region is expected to be of **moderate** significance for Ferrum_Alternative 1 and Ferrum_Alternative 2, and of **high** significance for Ferrum_Alternative 3, 3A and 3B, 3C, 3D and 3E⁸. There is no mitigation for this impact. The table overleaf illustrates the assessment of this anticipated impact.

Note: The frequency of exposure to tourist routes (based on the frequency of road crossings and / or the presence of these roads within the 500m offset) influences the probability rating for each of the alternatives.

Table 10b: Impact table summarising the significance of visual impacts on tourist access routes and tourist destinations within the region: Ferrum Corridor

Nature of Impact:										
Potential visual impact on tourist access routes and tourist destinations within the region.										
	FERRUM_ALTERNATIVE 1		FERRUM_ALTERNATIVE 2		FERRUM_ALTERNATIVE 3		FERRUM_ALTERNATIVE 3A		FERRUM_ALTERNATIVE 3B, 3C, 3D, 3E	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	High (4)	N/a	Definite (5)	N/a	Definite (5)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	High (68)	N/a	High (90)	N/a	High (90)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:										
None.										
Cumulative impacts:										
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines, distribution substations (14) and transmission substations (2) present in the study area.										

⁸ On this scale, the same visual impact assessment would be applicable for all three corridor alternatives as they represent only small variations in a single part of the corridor.

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.8.2.3 The Nieuwehoop Corridor

The anticipated visual impact of the Transmission lines and associated infrastructure on tourist access routes (i.e. the N14, N10, R27, R360, R325 and R359) and tourist destinations (i.e. attractions and accommodation) within the region is expected to be of **moderate** significance for all Alternatives. There is no mitigation for this impact. The table overleaf illustrates the assessment of this anticipated impact.

Note: The frequency of exposure to tourist routes (based on the frequency of road crossings and / or the presence of these roads within the 500m offset) influences the probability rating for each of the alternatives.

Table 10c: Impact table summarising the significance of visual impacts on tourist access routes and tourist destinations within the region: Nieuwehoop Corridor

Nature of Impact:								
Potential visual impact on tourist access routes and tourist destinations within the region.								
	NIEUWEHOOP_ ALTERNATIVE 1		NIEUWEHOOP_ ALTERNATIVE 2		NIEUWEHOOP_ ALTERNATIVE 3		NIEUWEHOOP_ ALTERNATIVE 3B	
	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered	No mitigation	Mitigation considered
Extent	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a	Regional (3)	N/a
Duration	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a	Long term (4)	N/a
Magnitude	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a	V high (10)	N/a
Probability	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a	Probable (3)	N/a
Significance	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a	Moderate (54)	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation:								
None.								
Cumulative impacts:								
The construction of the power line will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing transmission power lines, distribution power lines and distribution substations (3) present in the study area.								

Residual impacts:

None. The visual impact of the power line will be removed after decommissioning. If the lines are not decommissioned and removed, then the impact will persist.

6.9. The potential to mitigate visual impacts

- The primary visual impact, namely the presence of the Transmission Lines, is not possible to mitigate.
- Mitigation of visual impacts associated with the construction of access roads is possible through the use of existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.

Access roads, which are not required post-construction, should be ripped and rehabilitated.

- Consolidate infrastructure and make use of already disturbed sites rather than pristine areas wherever possible.
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of all construction sites. Construction should be managed according to the following principles:
 - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
 - Reduce the construction period through careful logistical planning and productive implementation of resources.
 - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor in order to minimise vegetation clearing.
 - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
 - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
 - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
 - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
 - Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.
 - Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications. Where driftsand is present, rehabilitation will not be possible.
 - Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications. Where driftsand is present, rehabilitation will not be possible.

- Secondary impacts anticipated as a result of the proposed Transmission Lines (i.e. impacts on tourist access routes and tourist destinations) are not possible to mitigate.
- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated.

The possible mitigation of both primary and secondary visual impacts as listed above should be implemented and maintained on an on-going basis.

7. COMPARATIVE ASSESSMENT OF THE ALTERNATIVES

7.1. Approach

The scope of work undertaken in Chapter 5 has revealed much in terms of the anticipated nature and significance of the visual impacts likely to result from the three proposed Transmission Lines and their alternatives.

This exercise was not sufficient, however to distinguish between and compare the alternatives for each Corridor from a visual perspective.

In this respect, it is necessary to undertake a comparative assessment of the alternatives for each Corridor according to relevant visual criteria. The aim of the assessment is to identify which alternative is most and least preferable for each Corridor.

The following visual criteria are applied⁹:

- The **length** of the proposed transmission line corridor. The longer the alignment, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to **major roads** (national and arterial), based on the frequency of road crossings and / or the proximity of these roads within a 500m offset (i.e. along the length of the corridor). The greater the exposure, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to **secondary roads**, based on the frequency of road crossings and / or the proximity of these roads within a 500m offset (i.e. along the length of the corridor). The greater the exposure, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to **urban centres** and built up areas (i.e. Upington, Kakamas and Kathu) within a 2km offset.
- The exposure to farmsteads and **settlements** based on the frequency of occurrence within a 2km offset. The higher the number of farmsteads and settlements, the greater the number of visual receptors, and therefore the less desirable the alternative.
- The exposure to conservation and **protected areas** within a 2km offset (i.e. those that appear on the SANBI database).

⁹ It is important to note that none of these criteria should be viewed in isolation, as all are relevant in the comparison between alternatives. It is the actual comparison of the alternatives making use of these criteria (included as the tables as follows) that is of importance.

- The exposure to scenic and sensitive topographical features, specifically **hills, mountains and drainage lines**. The greater the exposure to hills, mountains and drainage lines, the greater the visual impact, and therefore the less desirable the alternative.
- The proximity of **existing power lines and roads** along the alignment. It is argued that the presence of an existing visual impact will 'absorb' the potential visual impact of the power line to some extent. The concentration of linear infrastructure within this environment is considered preferable, as it localises the cumulative extent of potential visual impact. The shorter the section of alignment adjacent to existing power line infrastructure, the greater the visual impact, and therefore the less desirable the alternative.
- The **remoteness** of the alignment, and its potential to affect the character and sense of place of the landscape. This aspect is of relevance within the more remote parts of the study area which have minimal infrastructure and where visual intrusion is not yet existing. These areas may be considered to be visually pristine. The more remote the power line, the greater the visual impact, and therefore the less desirable the alternative.
- The significance of potential visual impacts on **tourism** (i.e. tourist access routes and tourist destinations) within the region. The greater the exposure to identified tourist routes and destinations, the greater the visual impact, and therefore the less desirable the alternative.

The sections that follow address the application of the above criteria to each of the three Corridors and their alternatives. Weighted values have been used as appropriate, with higher values indicating a high visual impact and low values indicating a low visual impact.

The sum of accumulated values gives an indication of which Alternative is likely to have the greatest visual impact. The Alternative with the highest total is the least desirable, while that with the lowest is the preferred option from a visual perspective.

7.2. Comparative Visual Assessment: Aries Corridor Alternatives

Table 11a: Comparative visual assessment of the Aries Corridor Alternatives

CRITERIA	ARIES_ALTERNATIVE 1	ARIES_ALTERNATIVE 1B	ARIES_ALTERNATIVE 2	ARIES_ALTERNATIVE 3
Total length	3 (138km)	3 (138km)	2 (121km)	1 (114km)
Major roads	1 (N14, R359)	1 (N14, R359)	1 (N14, R359)	2 (N14, R359, R27)
Secondary roads	1 (5)	1 (5)	1 (5)	1 (3)
Urban centres	0	0	0	1 (Keimoes)
Settlements	1 (low to mod)	1 (low to mod)	2 (mod)	3 (mod to high)
Protected areas	0	0	0	0
Mountains and drainage lines	2 (low hills, 9 streams, Orange)	2 (low hills, 9 streams, Orange)	2 (low hills, 10 streams, Orange)	1 (no hills, 7 streams, Orange)
Existing infrastructure	1 (short stretches)	1 (short stretches)	4 (none)	4 (none)
Remoteness	2	2	2	1
Tourism	1 (N14, R359)	1 (N14, R359)	1 (N14, R359)	2 (N14, R359, R27)
TOTAL	12	12	15	16

Overall, considering all relevant criteria, Aries_Alternative 1 and 1B are considered preferable from a visual perspective.

7.3. Comparative Visual Assessment: Ferrum Corridor Alternatives

Table 11b: Comparative visual assessment of the Ferrum Corridor Alternatives

CRITERIA	FERRUM_ALT ERNATIVE 1	FERRUM_ALT ERNATIVE 2	FERRUM_ALT ERNATIVE 3	FERRUM_ALT ERNATIVE 3A	FERRUM_ALT ERNATIVE 3B	FERRUM_ALT ERNATIVE 3C	FERRUM_ALT ERNATIVE 3D	FERRUM_ALT ERNATIVE 3E
Total length	1 (252km)	1 (248km)	4 (282km)	3 (270km)	3 (266km)	2 (262km)	2 (263km)	3 (267km)
Major roads	1 (N10, N14, R360, R380)	1 (N10, N14, R360, R380)	2 (N10, N14, R360, R380)	3 (N10, N14, R360, R380)	3 (N10, N14, R360, R380, R385)	3 (N10, N14, R360, R380, R385)	3 (N10, N14, R360, R380, R385)	3 (N10, N14, R360, R380, R385)
Secondary roads	1 (13)	2 (17)	2 (19)	1 (15)	1 (13)	1 (13)	1 (13)	1 (14)
Urban centres	1 (Kathu)	1 (Kathu)	1 (Kathu)	1 (Kathu)	1 (Kathu)	1 (Kathu)	1 (Kathu)	1 (Kathu)
Settlements	1 (mod-high)	1 (mod-high)	1 (mod-high)	1 (mod-high)	1 (mod-high)	1 (mod-high)	1 (mod-high)	1 (mod-high)
Protected areas	1 (Spitskop NR)	1 (Spitskop NR)	1 (Spitskop NR)	1 (Spitskop NR)	1 (Spitskop NR)	1 (Spitskop NR)	1 (Spitskop NR)	1 (Spitskop NR)
Mountains and drainage lines	3 (Koranaberg, 4 streams)	1 (low hills, 6 streams)	1 (low hills, 6 streams, Orange)	4 (Koranaberg, 6 streams, Orange)	2 (lower Koranaberg, 6 streams, Orange)	2 (lower Koranaberg, 6 streams, Orange)	2 (lower Koranaberg, 6 streams, Orange)	2 (lower Koranaberg, 6 streams, Orange)
Existing infrastructure	4 (short stretch power line)	5 (none)	3 (road & power line)	2 (road & power line)	1 (road & power line)	1 (road & power line)	1 (road & power line)	1 (road & power line)
Remoteness	4	4	3	2	1	1	1	1
Tourism	1 (N10, N14, R360, R380)	1 (N10, N14, R360, R380)	2 (N10, N14, R360, R380)	3 (N10, N14, R360, R380)	3 (N10, N14, R360, R380)	3 (N10, N14, R360, R380)	3 (N10, N14, R360, R380)	3 (N10, N14, R360, R380)
TOTAL	18	18	20	21	17	16	16	17

Overall, considering all relevant criteria, Ferrum_Alternative 3C and D are considered most preferable from a visual perspective. Ferrum_Alternative 3B and 3E and also considered acceptable.

7.4. Comparative Visual Assessment: Nieuwehoop Corridor Alternatives

Table 11c: Comparative visual assessment of the Nieuwehoop Corridor Alternatives

CRITERIA	NIEUWEHOOP_ ALTERNATIVE 1	NIEUWEHOOP_ ALTERNATIVE 2	NIEUWEHOOP_ ALTERNATIVE 3	NIEUWEHOOP_ ALTERNATIVE 3B
Total length	3 (73km)	1 (63km)	2 (67km)	3 (73km)
Major roads	2 (N14, R359)	1 (N14, R359)	1 (N14, R359)	1 (N14, R359)
Secondary roads	1 (3)	1 (3)	2 (3)	2 (3)
Urban centres	0	0	0	0
Settlements	1 (mod)	1 (mod)	1 (mod)	1 (mod)
Protected areas	0	0	0	0
Mountains and drainage lines	2 (7 streams, Orange)	1 (5 streams, Orange)	1 (6 streams, Orange)	2 (7 streams, Orange)
Existing infrastructure	4 (none)	4 (none)	1 (secondary road)	1 (secondary road)
Remoteness	3	3	1	2
Tourism	2 (N14, R359)	1 (N14, R359)	1 (N14, R359)	1 (N14, R359)
TOTAL	18	13	10	13

Overall, considering all relevant criteria, Nieuwehoop_Alternative 3 is considered most preferable from a visual perspective. Nieuwehoop_Alternative 2 and 3B are also considered acceptable.

8. CONCLUSION AND RECOMMENDATIONS

The construction and operation of the three proposed Transmission Line corridors and associated infrastructure will have a visual impact on the scenic resources of this region.

The Transmission Line infrastructure will be visible within an area that is generally seen as having a high quality natural and scenic landscape and a resultant tourism value and potential. The infrastructure would thus be visible within an area that incorporates various sensitive visual receptors that would consider visual exposure to this type of infrastructure to be intrusive.

There are not many options as to the mitigation of the visual impact of the Transmission Lines. The infrastructure spans hundreds of kilometres and no amount of vegetation screening or landscaping would be able to hide structures of these dimensions.

The following mitigation (as detailed in section 6.9) is, however, recommended:

- Mitigation of visual impacts associated with the construction of access roads is possible through the use of existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken

properly, with adequate drainage structures in place to forego potential erosion problems.

Access roads, which are not required post-construction, should be ripped and rehabilitated.

- Consolidate infrastructure and make use of already disturbed sites rather than pristine areas wherever possible.
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of all construction sites. Construction should be managed according to the following principles:
 - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
 - Reduce the construction period through careful logistical planning and productive implementation of resources.
 - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor in order to minimise vegetation clearing.
 - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
 - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
 - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
 - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
 - Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.
 - Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications. Where driftsand is present, rehabilitation will not be possible.
 - Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications. Where driftsand is present, rehabilitation will not be possible.
- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated.

In term of the Alternatives, all alternative alignments for each Corridor will be visually exposed to large areas within their respective 2000m offsets. This is due to the tall (42m) Transmission Line infrastructure associated with 400kV power lines.

In addition, all Corridor Alternatives tend to display an even potential exposure pattern where they traverse flat terrain and more scattered patterns where they encounter elevated topography.

Overall, considering all relevant criteria, the following are considered the preferred Alternatives (from a visual perspective) for the three Transmission Line Corridors:

- For the Aries Corridor, Aries_Alternatives 1 and 1B;
- For the Ferrum Corridor, Ferrum_Alternative 3C and 3D, followed by Ferrum_Alternative 3B and 3E.
- For the Nieuwehoop Corridor, Nieuwehoop_Alternative 3, followed by Nieuwehoop_Alternative 2 and Nieuwehoop_Alternative 3B.

9. IMPACT STATEMENT

In light of the results and findings of the Visual Impact Assessment undertaken for the three proposed Transmission Line corridors and associated infrastructure, it is acknowledged that the receiving environment adjacent to the Corridors will be transformed for the entire operational lifespan of the infrastructure.

The following is a summary of impacts remaining, assuming mitigation as recommended is exercised:

- For the Aries Corridor:
 - Potential visual impact on users of national roads (N14), arterial roads (R359) and secondary roads in close proximity of the proposed Transmission lines (i.e. within 500m) are expected to be of **moderate** significance for all alternatives.
 - The potential visual impact on residents of built-up centres and populated places (i.e. Keimoes) within 500m of the proposed Transmission lines is expected to be of **moderate** significance for Aries_Alternative 3, and of **low** significance for the other Alternatives.
 - The potential visual impact on residents of farmsteads and settlements within 500m of the proposed Transmission Lines is expected to be of **high** significance for Aries_Alternative 3 and of **moderate** significance for all other Alternatives.
 - The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 500m offset) is expected to be of **moderate** significance for all Alternatives.
 - The potential visual impact on protected and conservation areas (the Augrabies National Park) is expected to be of **low** significance for all Alternatives.
 - The potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **low** significance for all Alternatives.
 - The potential visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure is likely to be of **low** significance for all Alternatives.
 - The anticipated visual impact of the Transmission Lines on the scenic and visually sensitive mountains and drainage lines of the study area is expected to be of **moderate** significance Aries_Alternatives 1, 1B and 2, and of **low** significance for Aries_Alternative 3.
 - The anticipated visual impact of the Transmission lines and associated infrastructure on tourist access routes and tourist destinations within the region is expected to be of **moderate** significance for all Alternatives.

- For the Ferrum Corridor:
 - Potential visual impact on users of national roads (N14, N10), arterial roads (R360, R380, R385) and secondary roads in close proximity of the proposed Transmission lines (i.e. within 500m) are expected to be of **moderate** significance for Ferrum_Alternatives 1 and 2, and of **high** significance for Ferrum_Alternatives 3, 3A and for Ferrum_Alternatives 3B, 3C, 3D and 3E.
 - The potential visual impact on residents of residents of built-up centres and populated places (i.e. Kathu) within 500m of the proposed Transmission lines is expected to be of **moderate** significance for all Alternatives.
 - The potential visual impact on residents of farmsteads and settlements within 500m of the proposed Transmission Lines is expected to be of **high** significance for all Alternatives.
 - The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 500m offset) is expected to be of **moderate** significance for all Alternatives.
 - The potential visual impact on protected and conservation areas (the Spitskop Nature Reserve) is expected to be of **moderate** significance for all Alternatives.
 - The potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **low** significance for all Alternatives.
 - The potential visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure is likely to be of **low** significance for all Alternatives.
 - The anticipated visual impact of the Transmission Lines on the scenic and visually sensitive mountains and drainage lines of the study area is expected to be of **high** significance for Ferrum_Alternatives 1 and 3A, of **moderate** significance for Ferrum_Alternatives 3B, 3C, 3D and 3E and of **low** significance for Ferrum_Alternatives 2 and 3.
 - The anticipated visual impact of the Transmission lines and associated infrastructure on tourist access routes and tourist destinations within the region is expected to be of **moderate** significance for Ferrum_Alternatives 1 and 2, and of **high** significance for 3, 3A and Ferrum_Alternatives 3B, 3C, 3D and 3E.
- For the Nieuwehoop Corridor:
 - Potential visual impact on users of national roads (N14), arterial roads (R359) and secondary roads in close proximity of the proposed Transmission lines (i.e. within 500m) are expected to be of **moderate** significance for all Alternatives.
 - The potential visual impact on residents of residents of built-up centres and populated places within 500m of the proposed Transmission Lines is expected to be of **low** significance for all Alternatives.
 - The potential visual impact on residents of farmsteads and settlements within 500m of the proposed Transmission Lines is expected to be of **high** significance for all Alternatives.
 - The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 500m offset) is expected to be of **moderate** significance for all Alternatives.

- The potential visual impact on protected and conservation areas (the Augrabies National Park and the Spitskop Nature Reserve) is expected to be of **low** significance for all Alternatives.
- The potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **low** significance for all Alternatives.
- The potential visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure is likely to be of **low** significance for all Alternatives.
- The anticipated visual impact of the Transmission Lines on the scenic and visually sensitive mountains and drainage lines of the study area is expected to be of **low** significance all Alternatives.
- The anticipated visual impact of the Transmission lines and associated infrastructure on tourist access routes and tourist destinations within the region is expected to be of **moderate** significance for all Alternatives.

With the exception of the anticipated impacts on rural farmsteads and settlements, all impacts above are determined to have a post mitigation significance of moderate or low. In addition, none are considered to be fatal flaws from a visual perspective. This is based on the relatively low density of visual receptors beyond the Orange River, and the existing presence of power line, road and mining infrastructure within the region.

Furthermore, it is the opinion of the author that the anticipated visual impact is not likely to detract from the regional tourism appeal or numbers of tourists frequenting the area.

It is therefore recommended that the development of the Transmission Line Corridors as proposed (i.e. the recommended Alternatives for each) be supported, subject to the implementation of the recommended mitigation measures (section 6.9) and management actions (Chapter 10).

10. MANAGEMENT PROGRAMME

The management programme tables aim to summarise the key findings of the visual impact report and to suggest possible management actions in order to mitigate the potential visual impacts. The tables are applicable to all three Transmission Line Corridors.

Table 12: Management Programme: Planning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the planning of the three proposed Transmission Line Corridors.

Project component/s	The Transmission Lines and associated infrastructure.		
Potential Impact	Primary visual impact of the infrastructure due to the presence of the Transmission Lines and the associated infrastructure in the landscape.		
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure as well as within the region.		
Mitigation: Target/Objective	Optimal planning of infrastructure so as to minimise visual impact.		
Mitigation: Action/control	Responsibility	Timeframe	
Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.	Eskom Holdings Ltd / design consultant	Planning phase.	
Consolidate infrastructure and make use of already disturbed sites rather than pristine areas.	Eskom Holdings Ltd / design consultant	Planning phase.	
Performance Indicator	No access roads and other associated infrastructure are visible from surrounding areas.		
Monitoring	Not applicable.		

Table 13: Management Programme: Construction.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the construction of the three proposed Transmission Line Corridors.

Project component/s	Construction activities along the Transmission Line corridors		
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing.		
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure.		
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.		
Mitigation: Action/control	Responsibility	Timeframe	
Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	Eskom Holdings Ltd / contractor	Early in the construction phase.	
Reduce the construction period through careful logistical planning and productive implementation of resources.	Eskom Holdings Ltd / contractor	Early in the construction phase.	
Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Eskom Holdings Ltd / contractor	Early in and throughout the construction phase.	
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Eskom Holdings Ltd / contractor	Throughout the construction phase.	
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste	Eskom Holdings Ltd / contractor	Throughout the construction phase.	

facilities.		
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Eskom Holdings Ltd / contractor	Throughout the construction phase.
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Eskom Holdings Ltd / contractor	Throughout the construction phase.
Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications. Where driftsand is present, rehabilitation will not be possible..	Eskom Holdings Ltd / contractor	Throughout and at the end of the construction phase.
Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications. Where driftsand is present, rehabilitation will not be possible.	Eskom Holdings Ltd / contractor	Throughout and at the end of the construction phase.
Performance Indicator	Vegetation cover within the servitudes and in the vicinity of the infrastructure is intact with no evidence of degradation or erosion.	
Monitoring	Monitoring of vegetation clearing during construction. Monitoring of rehabilitated areas post construction.	

Table 14: Management Programme: Operation.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the operation of the three proposed Transmission Line Corridors.		
Project component/s	Transmission Lines and associated infrastructure.	
Potential Impact	Visual impact of vegetation rehabilitation failure.	
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure.	
Mitigation: Target/Objective	Well-rehabilitated and maintained servitudes.	
Mitigation: Action/control	Responsibility	Timeframe
Maintain roads to forego erosion and to suppress dust.	Eskom Holdings Ltd / operator	Throughout the operational phase.
Monitor rehabilitated areas, and implement remedial action as and when required.	Eskom Holdings Ltd / operator	Throughout the operational phase.
Performance Indicator	Intact vegetation within servitudes and in the vicinity of the infrastructure.	
Monitoring	Monitoring of rehabilitated areas.	

Table 15: Management Programme: Decommissioning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the decommissioning of the three proposed Transmission Line Corridors.

Project component/s	Transmission Lines corridors.		
Potential Impact	Visual impact of residual visual scarring and vegetation rehabilitation failure.		
Activity/risk source	The viewing of the above mentioned by observers along or near the corridors.		
Mitigation: Target/Objective	Rehabilitated vegetation in all disturbed areas.		
Mitigation: Action/control	Responsibility	Timeframe	
Remove infrastructure not required for the post-decommissioning use of the sites.	Eskom Holdings Ltd / operator	During the decommissioning phase.	
Rehabilitate access roads and servitudes not required for the post-decommissioning use of the sites. Consult an ecologist to give input into rehabilitation specifications.	Eskom Holdings Ltd / operator	During the decommissioning phase.	
Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.	Eskom Holdings Ltd / operator	Post decommissioning.	
Performance Indicator	Intact vegetation along and in the vicinity of the corridors.		
Monitoring	Monitoring of rehabilitated areas.		

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