PROPOSED EXXARO DORSTFONTEIN WEST EXPANSION PROJECT WITHIN THE JURISDICTION OF EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

VISUAL IMPACT ASSESSMENT

PREPARED FOR:

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ON BEHALF OF:

EXXARO COAL CENTRAL
DORSTFONTEIN WEST
DORSTFONTEIN FARM 71 IS
R547
KRIEL

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EXECUTIVE SUMMARY

Nsovo Environmental Consulting was appointed by Exxaro, as the independent environmental consultant to undertake the Environmental Authorization (EA) for the proposed expansion of the Dorstfontein West Coal Mine within the jurisdiction of Emalahleni Local Municipality (Ward 25) in Mpumalanga Province.

Outline Landscape Architects was requested to compile a Visual Impact Assessment (VIA) for the project. This VIA is a specialist study that addresses the visual effects of the proposed development of discard dumps and conveyor belt development.

The area containing the physical structures is estimated to be 7.5km in length and 2.5km in width.

DESCRIPTION OF THE AFFECTED ENVIRONMENT

The study area consists of large areas of agricultural land used for commercial purposes. There are few human settlements, like small towns and agricultural communities and the landscape is degraded around these settlements. Mining is one of the key land uses and contributes significantly to the visual degradation of parts of the study area.

ACTIVITY	**DESCRIPTION (**Refer to Figure 1)
Extension of Existing Discard Dump	There will be an extension to the existing discard dump.
Conveyor Belt Route A	This route follows south-east of the R547, crosses diagonally over the R544 and ends at the Dorstfontein East Mine. A service road will run parallel to the conveyor belt route.
Conveyor Belt Route B	This route also runs in a south-east of the R547 but is more than 1km away from the R547, also crosses over the R544 and then joins the same alignment as Route A towards the Dorstfontein East Mine. A service road will run parallel to the conveyor belt route.

FINDINGS AND RECOMMENDATIONS

VIEWER SENSITIVITY

Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors included in this study are:

- Residents;
- Tourists; and
- Motorists.

SIGNIFICANCE OF VISUAL IMPACTS

VISUAL IMPACT ON RESIDENTS

The study area is moderately populated, with lower population in the rural settlements and farming communities, to higher populations in the towns. The residents close to the mine are in Kriel and Thubehihle and may experience a *low* degree of visual intrusion.

VISUAL IMPACT ON TOURISTS

The entire study area is considered to have a low tourism potential, mostly because of the environmental degradation caused by the mining developments and human settlements. There is also no major thoroughfare to prominent tourist destinations.

The temporary exposure to possible unsightly views of the construction camps and the associated activity will be minimal and localised.

The proposed new developments will only have an impact on tourists in near proximity to the mine, which will be mostly along main transportation routes. The severity of the visual impact of the mining activities on tourists will be low, causing a *low* visual impact.

VISUAL IMPACT ON MOTORISTS

The major routes in the study area are R547 and R544, connecting the towns, mines and farms. The secondary road network in the study area carries a much lower volume of motorists. Many of the roads are gravel roads which are mostly utilised by the local residents.

Motorists' visual exposure to the new conveyor line and extension of discard dump, will be brief and the severity of visual impact will be *low*.

RECOMMENDED MITIGATION MEASURES

In most cases, the landscape and visual impacts occurring during the construction phase can be mitigated effectively. Rehabilitation of the disturbed areas may cause a reduction in the negative visual impact of the study area.

Upon closure of the mine, and once rehabilitation has taken place, the visual aesthetics will dramatically improve. Therefore, there is an anticipated *low* significance of visual impact for the proposed development.

CONCLUSION

The alternatives are rated according to preference by using a three-point rating system in the table below, one (1) being the most preferred. The preference rating is informed by the impact assessment discussions in Section 5 and the overall performance of each alternative with regards to the impact on the landscape character and the identified viewers.

Evaluation of alternative alignments

Visual Impact of Alternatives	Corrective Measures	Impact Rating Criteria					
		Nature	Extent	Duration	Magnitude	Probability	Significance
Conveyor Belt Route A	No	Negative	2 (local)	4 (long term)	6 (moderate)	3 (medium)	36 medium
	Yes	Negative	2 (local)	4 (long term)	4 (low)	2 (low)	20 low
Conveyor Belt Route B	No	Negative	2 (local)	4 (long term)	4 (low)	3 (medium)	30 medium - low
	Yes	Negative	2 (local)	4 (long term)	2 (minor)	2 (low)	16 low
Extension of existing dump	No	Negative	2 (local)	4 (long term)	4 (low)	3 (medium)	30 medium
	Yes	Negative	2 (local)	4 (long term)	2 (minor)	1 (improbable)	8 low
	Yes	Negative	2 (local)	4 (long term)	4 (low)	2 (low)	20 low

During the construction phase, unsightly views may be created by the presence of the construction equipment but will be temporary. During the operational phase it is anticipated that **Conveyor Belt Route B will have the least visual impact**. The proposed **Extension of the Existing Discard Dump has been identified as having the least visual impact**. The advantage of extending the existing discard dump, is that no additional haul/access road will be required, as the existing infrastructure can be used and that viewers are already exposed to similar mining activities.

It is also concluded that the Visual Absorption Capacity of Route B is significantly higher that Route A, which would be more visible from the road.

The following Visual Impact Assessment Criteria (as utilised in table above) applies:

Status of Impact:
The visual impact is assessed as either having a:
Negative effect (i.e. at a cost to the environment),
Positive effect (i.e. a benefit to the environment), or
Neutral effect on the environment.

Extent of the Impact:
(1) Site (site only),
(2) Local (site boundary and immediate surrounds),
(3) Regional,
(4) National, or
(5) International.

Duration of the Impact:
The length that the impact will last for is described as either:
(1) Immediate (<1 year)
(2) Short term (1-5 years),
(3) Medium term (5-15 years),
(4) Long term (ceases after the operational life span of the project),
(5) Permanent.

Magnitude of the Impact:
The intensity or severity of the impacts is indicated as either:
(0) none,
(2) Minor,
(4) Low,
(6) Moderate (environmental functions altered but continue),
(8) High (environmental functions temporarily cease), or

(10) Very high / unsure (environmental functions permanently cease).

Probability of Occurrence:
The likelihood of the impact actually occurring is indicated as either:
(0) None (the impact will not occur),
(1) Improbable (probability very low due to design or experience)
(2) Low probability (unlikely to occur),
(3) Medium probability (distinct probability that the impact will occur),
(4) High probability (most likely to occur), or
(5) Definite.

Significance of the Impact:
Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.
S= (E+D+M) P

The significance ratings are given below
(<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(30-60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated), (>60) high (i.e. where the impact must have an influence on the decision process to develop in the area).

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LIST OF ABBREVIATIONS

EIA	Environmental Impact Assessment.
FHWA	Federal Highway Administration of the United States Department of Transportation. The publishers of the guide "*Visual Impact Assessment for High Projects*" 1981.
LCA	Landscape Character Assessment.
LT	Landscape Type
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment.
ULI	Urban Land Institute
ZVI	Zone of Visual Influence.

1. INTRODUCTION

Nsovo Environmental Consulting was appointed by Exxaro, as the independent environmental consultant to undertake the Environmental Authorization (EA) for the proposed expansion of the Dorstfontein West Coal Mine within the jurisdiction of Emalahleni Local Municipality (Ward 25) in Mpumalanga Province.

Outline Landscape Architects was requested to compile a Visual Impact Assessment (VIA) for the project. This VIA is a specialist study that addresses the visual effects of the proposed development.

Outline Landscape Architects is an independent sub-consultant and neither the author, nor Outline Landscape Architects will benefit from the outcome of the project decision-making.

Kathrin Hammel, the principal Landscape Architect and Visual Specialist from Outline Landscape Architects undertook this Visual Impact Assessment. She is a registered Professional Landscape Architect at the South African Council of Landscape Architects, SACLAP no 20162. Kathrin has been involved as Visual Impact Specialist since 2009

The study will assess the Visual Impact of the following activities that Exxaro Dorstfontein West proposes to undertake:

- The extension of the discard dump facility which has become necessary due to the life of the current discard dump coming to an end in 2022. The discard dump extension will cater for both slurry and discard coal and is expected to cater for the life of the mine.
- The construction of a conveyor belt from DCM West which will be linked to the conveyor systems at DCM East to ensure coal is conveyed from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Terminal. A service road will run parallel to the conveyor belt and will be 3m wide and approximately 7km in length.

1.1. BACKGROUND AND BRIEF

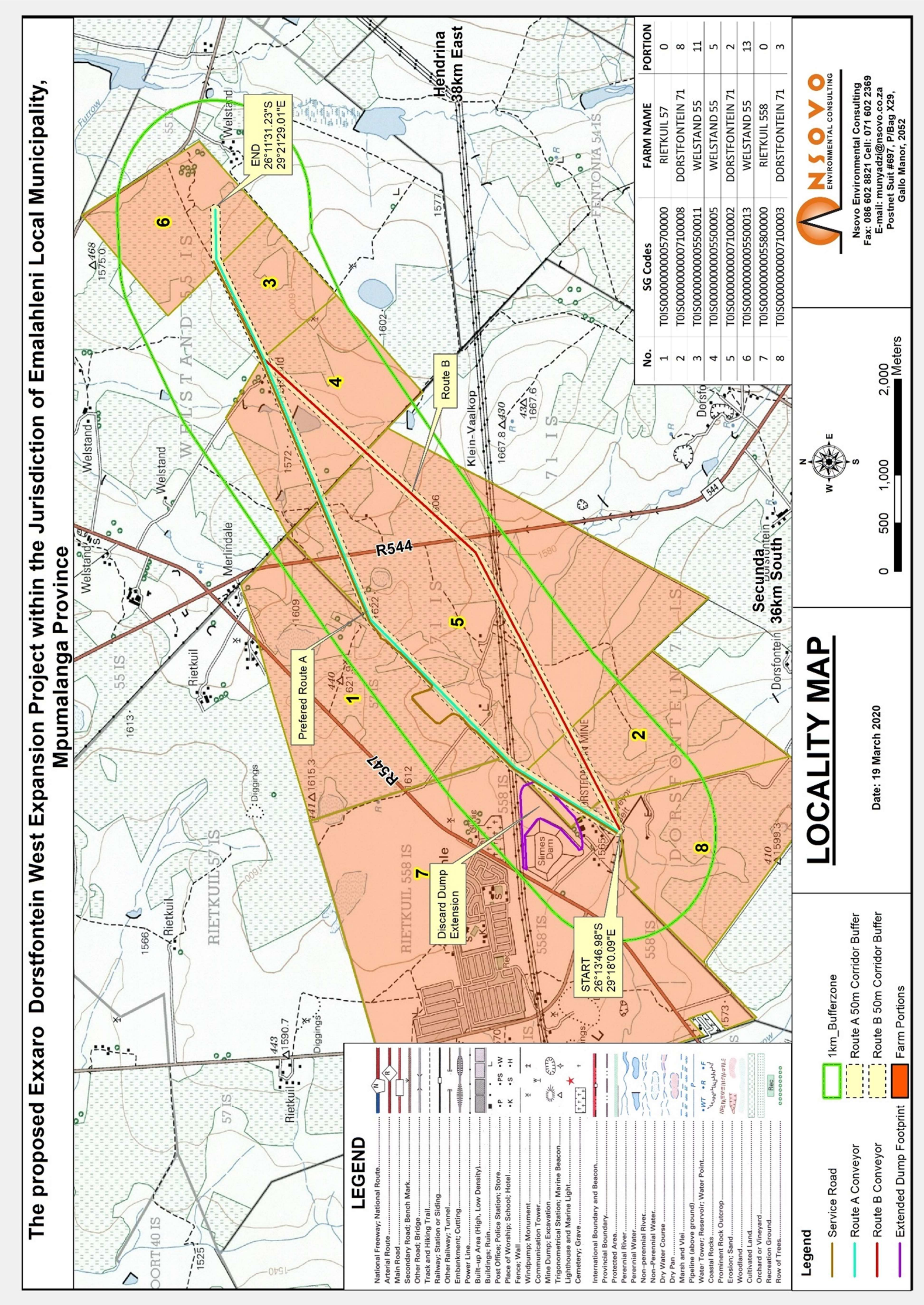
This VIA will conform to the requirements of a Level Three assessment which requires the realisation of the following objectives (Adapted from Oberholzer (2005)):

- Determination of the extent of the study area;
- Description of the proposed project and the receiving environment;
- Identification and description of the landscape character of the study area;
- Identification of the elements of particular visual value and -quality that could be affected by the proposed project;
- Identification of landscape- and visual receptors in the study area that will be affected by the proposed project and assess their sensitivity;
- Indication of potential landscape- and visual impacts;
- Assessment of the significance of the landscape- and visual impacts;
- Recommendations of mitigation measures to reduce and/or alleviate the potential adverse landscape- and visual impacts.

1.2. STUDY AREA

The study area includes the area covered by the 2 alternative routes of the conveyor belt and the expansion of a discard dump facility. The area earmarked for the development of the conveyor belt is estimated to be 7.5km in length and 2.5km in width. The report will discuss the visual impact beyond this area. The site is north-east of Kriel and is adjacent to the R547 regional road, in the Emalahleni Local Municipality (Ward 25), Mpumalanga Province (Figure 1).

Figure 1: Locality Map



2. STUDY APPROACH

2.1. INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps and GIS generated data were sourced from the Surveyor General, and EcoGIS (2019) respectively;
- Observations made and photographs taken during site visits;
- Professional judgement based on experience gained from similar projects; and
- Literature research on similar projects.

2.2. ASSUMPTIONS AND LIMITATIONS

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

- This level of assessment excludes surveys to establish viewer preference and thereby their sensitivity. Viewer sensitivity is determined by means of a commonly used rating system (Table 3).
- The site visit was conducted during January 2019 and the photographs used in this report illustrate the character of the landscape in the summer season.

2.3. LEVEL OF CONFIDENCE

The level of confidence assigned to the findings of this assessment is based on:

- The level of information available and/or understanding of the study area (rated 2); and
- The information available and/or knowledge and experience of the project (rated 3).

This visual impact assessment is rated with a general confidence level of 6. This rating indicates that the author's general confidence in the accuracy of the findings is *high* (Table 2). Where the confidence level of specific findings is not regarded as high, it is noted in the last column of each impact assessment table.

2.4. METHOD

A broad overview of the approach and methodology used in this assessment is provided below:

- The extent of the study area is determined and indicated in Figure 1;
- The site is visited to establish a photographic record of the site, views and areas of particular visual quality and or -value;
- The project components and activities are described and assessed as potential elements of visual and landscape impacts;
- The receiving environment is described in terms of its prevailing landscape- and visual character;
- Landscape- and visual receptors that may be affected by the proposed project are identified and described;
- Mitigation measures are proposed to reduce adverse impacts; and
- The findings of the study are documented in this Visual Impact Assessment.

3. PROJECT DESCRIPTION

3.1. OVERVIEW OF DEVELOPMENT

The table below indicates the description of the proposed activities.

Table 1: Description of Activities

ACTIVITY	DESCRIPTION (Refer to Figure 1)
Extension of Existing Discard Dump	There will be an extension to the existing discard dump.
Conveyor Belt Route A	This route follows south-east of the R547, crosses diagonally over the R544 and ends at the Dorstfontein East Mine. A service road will run parallel to the conveyor belt route.
Conveyor Belt Route B	This route also runs in a south-east of the R547 but is more than 1km away from the R547, also crosses over the R544 and then joins the same alignment as Route A towards the Dorstfontein East Mine. A service road will run parallel to the conveyor belt route.

3.2. PROJECT COMPONENTS AND ACTIVITIES

Each project component and activity will affect the receiving environment differently and is therefore discussed separately. The following project components will occur during the construction and operational phases of the project and are identified as elements that may cause a potential landscape and/or visual impact:

3.2.1. CONSTRUCTION CAMPS AND LAY-DOWN YARDS

Temporary construction camps will be present for the duration of the construction period. The appointed contractor will set up construction camp along the alignment of the conveyor route, where practical. The material lay-down yards are expected to be located adjacent to the construction camp and will serve as storage areas for the construction material and equipment. The extension of the mine discard dump will have a static position and will increase in height over time.

3.2.2. ACCESS ROADS

An access road will be made during construction but will remain for the lifetime of the mining activities as a maintenance route will be required for the conveyor belt system. The length of the conveyor belt service road will be 7km long and the road will be 3m in width. The service road will be seen as a unit with the conveyor belt system, and as long as the road runs parallel to the conveyor belt and does not widen significantly, the visual impact is minimal.

The discard dump will be extended from the existing dump site, and the existing access/haul road can be used.

3.2.3. CONVEYOR BELT ROUTE AND DISCARD DUMP

The completed conveyor route will connect the Dorstfontein West Mine to the Dorstfontein East Mine. The direct linear distance is approximately 7.5 km (Figure 1).

The impact of the maximum height of 46m for the dump site that could have a visual impact has been taken into consideration in the report. The conveyor belt height has been calculated at 8m in height. As mentioned above, a service road runs parallel to the conveyor belt.

3.3. VISUAL CHARACTERISTICS OF PROJECT COMPONENTS

The conveyor belt route will have an industrial character, steel pole and chute structure. The entire conveyor line will be perceived as a rhythmic arrangement of vertical poles and open or closed chute, forming a linear element through the landscape.

The overhead conveyor crosses over the R544 to Dorstfontein East. Road regulations indicate that the clearance under the bridge should be 4.5m. The total height of the bridge is designed to be 7.3m

The expansion of the existing mine discard dump will start with low mounds, growing in height as material increases. The position will stay the same, but the visual impact will increase over time. The access/haul roads may have a visual impact.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

Landscape and visual impacts may result from changes to the landscape. A distinction should be made between impacts on the visual resource (landscape) and on the viewers. The former are impacts on the physical landscape that may result in changes to landscape character while the latter are impacts on the viewers themselves and the views they experience.

4.1. VISUAL RESOURCE

Visual resource is an encompassing term relating to the visible landscape and its recognisable elements, which through their co-existence; result in a particular landscape character.

4.1.1. LANDSCAPE CHARACTER

The study area consists primarily of human settlements and agricultural land. The natural landscape is degraded, with minimal pristine landscape remaining. There is some vacant undeveloped land that was previously cultivated, as well as land used for subsistence farming. Mining, especially coal, is one of the key land-uses and contributes significantly to the visual degradation of the study area.

The landscape character does not change considerably through the study area and is relatively homogenous in character (Swanwick, 2002). Landscape types are distinguished by differences in topographical features, vegetation communities and patterns, land use and human settlement patterns.

The broad scale vegetation type that has been identified in the study area is the Eastern Highveld Grassland. Another vegetation type that has been identified near the site is the Eastern Freshwater Temperate Wetland. (Figure 2).

4.1.2. VISUAL CHARACTER

Visual character is based on human perception and the observer's response to the relationships between and composition of the landscape, the land uses and identifiable elements in the landscape. The description of the visual character includes an assessment of the scenic attractiveness regarding those landscape attributes that have aesthetic value and contribute significantly to the visual quality of the views, vistas and/or viewpoints of the study area.

The overall landscape varies between agricultural landscape, which is undulating to flat, to degraded, polluted landscapes around homesteads and towns. Large mines present a negative effect on the visual character of the landscape.

4.1.2.1 *Visual Value*

Visual value relates to those attributes of the landscape or elements in the landscape to which people attach values that though not visually perceivable, still contribute to the value of the visual resource. These visual values are derived from ecological, historical, social and/or cultural importance and are described in terms of their uniqueness, scarcity, and naturalness and/or conservation status. The importance of visual value of a landscape or element in the landscape is measured against its value on an international, national and local level.

Very few parts of the study area have been left undisturbed and there is very little to no unspoilt pristine landscape remaining. These areas however remain under pressure and are vulnerable due to human settlement expansion and mining activities.

4.1.2.2 *Visual Quality*

Visual quality is a qualitative evaluation of the composition of landscape components and their excellence in scenic attractiveness. Many factors contribute to the visual quality of the landscape and are grouped under the following main categories (Table 2) that are internationally accepted indicators of visual quality (FHWA, 1981):

Table 2: Criteria of Visual Quality (FHWA, 1981)

INDICATOR	CRITERIA
Vividness	The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.
Intactness	The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.
Unity	The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony of inter-compatibility between landscape elements.

The landscape is allocated a rating from an evaluation scale of 1 to 7 and divided by 3 to get an average. The evaluation scale is as follows: Very Low =1; Low =2; Moderately Low =3; Moderate =4; Moderately High =5; High =6; Very High =7;

The regional landscape is assessed against each indicator separately. All three indicators should be *high* to obtain a *high* visual quality. The evaluation is summarised in Table 3.

Table 3: Visual Quality of the regional landscape

VIVIDNESS	INTACTNESS	UNITY	VISUAL QUALITY
3	2	3	Moderately Low

The visual quality of the landscape is moderately low and can be attributed to the many mining developments and degraded towns and settlements.

4.1.2.3 *Visual absorption capacity*

Visual Absorption Capacity (VAC) signifies the ability of the landscape to accept additional human intervention without serious loss of character and visual quality or value. VAC is founded on the characteristics of the physical environment such as:

- Degree of visual screening:
  A degree of visual screening is provided by landforms, vegetation cover and/or structures such as buildings. For example, a high degree of visual screening is present in an area that is mountainous and is covered with a forest compared to an undulating and mundane landscape covered in grass;

- Terrain variability:
  Terrain variability reflects the magnitude of topographic elevation and diversity in slope variation. A highly variable terrain will be recognised as one with great elevation differences and a diversity of slope variation creating talus slopes, cliffs and valleys. An undulating landscape with a monotonous and repetitive landform will be an example of a low terrain variability;
- Land cover:
  Land cover refers to the perceivable surface of the landscape and the diversity of patterns, colours and textures that are presented by the particular land cover (i.e. urbanised, cultivated, forested, etc.);

A basic rating system is used to evaluate the three VAC parameters. The values are relative and relate to the type of project that is proposed and how it may be absorbed in the landscape (Table 4). A three-value range is used; three (3) being the highest potential to absorb an element in the landscape and one (1) being the lowest potential. The values are counted together and categorised in a *high*, *medium* or *low* VAC rating.

Table 4: Regional Visual Absorption Capacity evaluation

ACTIVITY	VISUAL SCREENING	TERRAIN VARIABILITY	LAND COVER	VAC
Extension of Existing Discard Dump	2	2	2	moderate
Conveyor Route A	2	3	2	moderate
Conveyor Route B	2	3	2	moderate

The VAC of the study area is considered moderate, for the development of the discard dump as well as Route A and Route B for the conveyors and provides moderate overall screening capacity for this project.

The moderate VAC relates to the undulating topography and agricultural landscape with mostly monotonous vegetation. The regular forms and associated vertical structure of the conveyor belt will be moderately absorbed into the landscape and topography.

The less prominent project components such as conveyor route service roads, and access/haul roads, are expected to be visually absorbed to a large degree in the landscape.

Figure 2: Vegetation Map

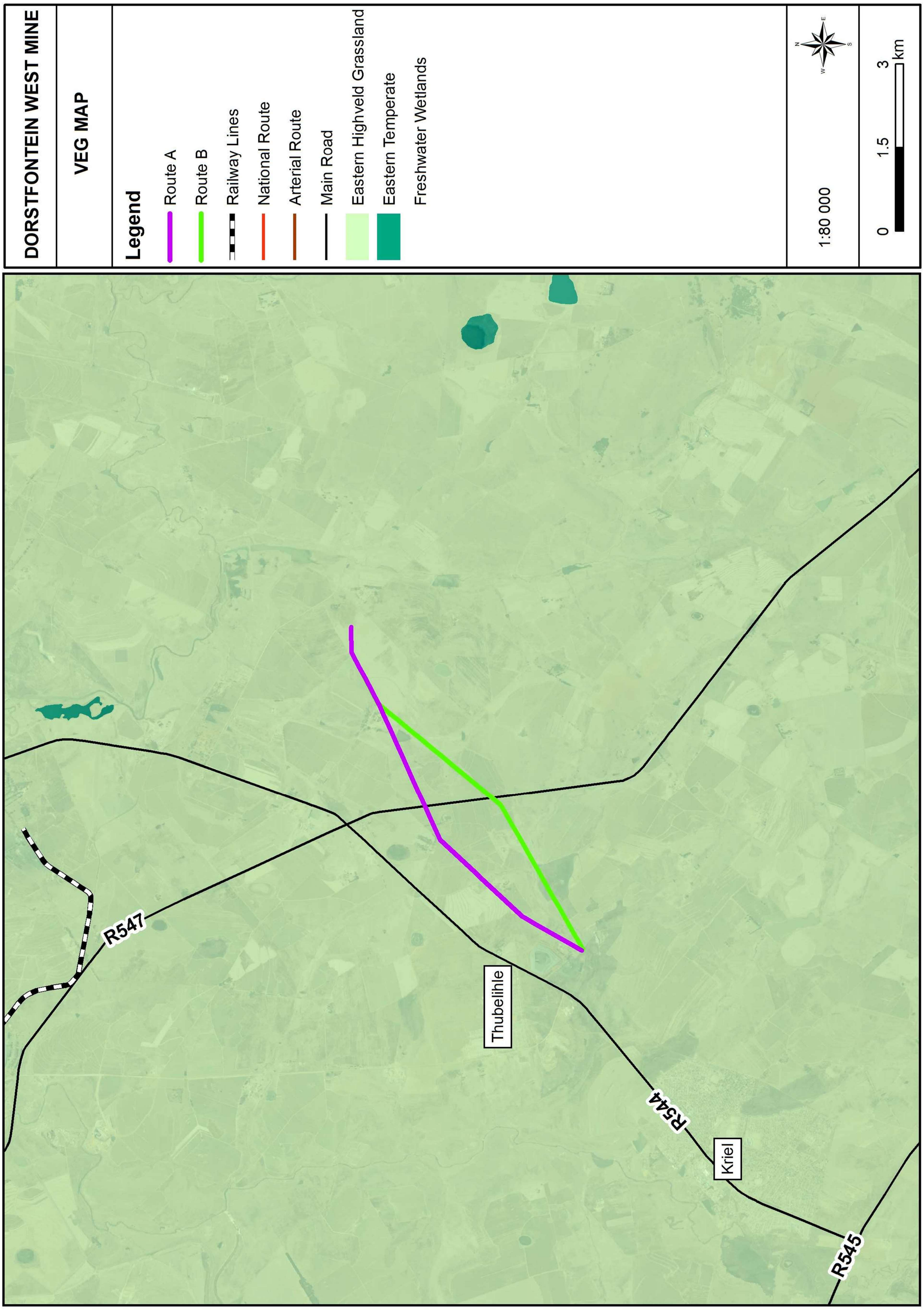


Figure 3: Land Cover Map

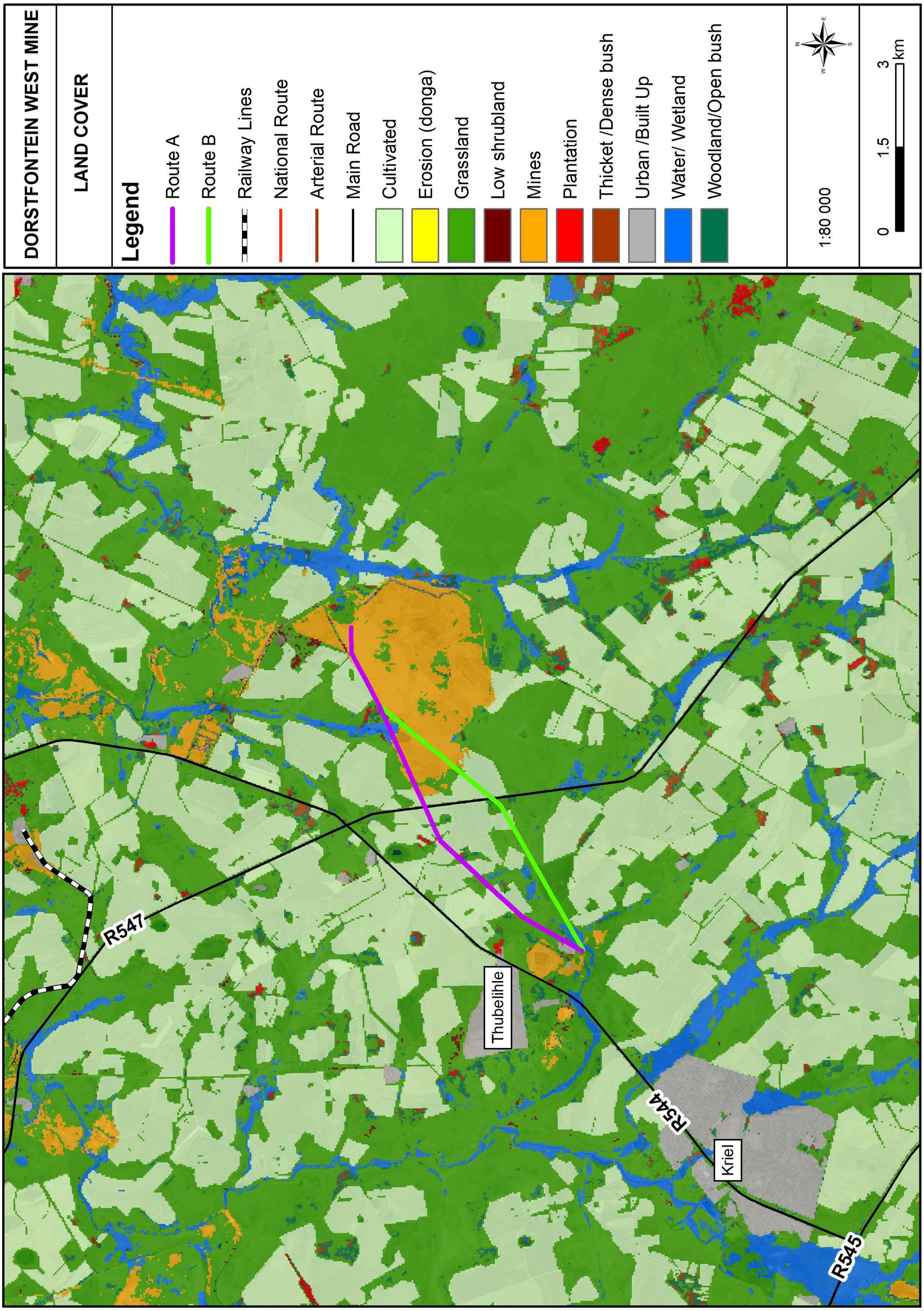


Figure 4: Landscape Character of Study Area

The main road, R547, agricultural land, slightly undulating landscape

Mining developments

Mining developments, powerline and agricultural landscape

Figure 5: Existing discard dump and one proposed area for extension of discard dump

Figure 6: Character of existing discard dump

Figure 7: View from the top of the discard dump

Figure 8: View to Dorstfontein East mine roughly where conveyor belt will cross the R544

Figure 9: View towards Dorstfontein East mine roughly where conveyor belt will cross the R544

Figure 10: View towards Dorstfontein West mine roughly where conveyor belt will cross the R544

Figure 11: View towards landscape from R547 mine roughly where conveyor belt system will run between DCMW and DCME

5. IMPACT ASSESSMENT

The significance of impacts is a comparative function relating to the severity of the identified impacts on the respective receptors. The significance of an impact is considered *high* should a *highly* sensitive receptor be exposed to a *highly* severe impact as indicated on Table 5 below.

Table 5: Significance of impacts

RECEPTOR SENSITIVITY	IMPACT SEVERITY		
	LOW	MEDIUM	HIGH
LOW	No significance	Low	Low
MEDIUM	Low	Medium	Medium
HIGH	Low	Medium	High

5.1. SIGNIFICANCE OF LANDSCAPE IMPACT

5.1.1. LANDSCAPE CHARACTER SENSITIVITY

The sensitivity of the landscape character is an indication of "…the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character" (GLVIA, 2002). A landscape with a *high* sensitivity would be one that is greatly valued for its aesthetic attractiveness and/or have ecological, cultural or social importance through which it contributes to the inherent character of the visual resource.

The majority of the study area is considered to have moderate to low landscape character sensitivity due to the mostly developed landscape, environmental degradation and the minimal pristine condition of the landscape, the moderate visual quality and minimal tourism value. The undulating monotonous agricultural landscape provides moderate visual screening towards mid and late summer when the maize is at maximum height. During the winter months, low visual screening is afforded by the landscape. The site falls within the summer rainfall zone, and during the winter months plants are dormant and low-growing.

Previous human induced activities and interventions have impacted significantly on the original landscape character. In this case, mining and existing infrastructure, including power lines, roads, mine dumps, etc., can be classified as landscape disturbances and elements that cause a reduction in the condition of the affected landscape type and negatively affect the quality of the visual resource.

The assessment of the landscape is substantiated through professional judgement and informed reasoning which is based on the landscape character assessment in Section 4 above. A landscape sensitivity rating was adapted from GOSW (2006) (Table 6) and applied in the classification of the study area into different sensitivity zones.

Table 6: Landscape character sensitivity rating (Adapted from GOSW, 2006)

	DESCRIPTION
Low sensitivity	These landscapes are likely to: ◦ Have distinct and well-defined landforms; ◦ Have a strong sense of enclosure; ◦ Provide a high degree of screening; ◦ Have been affected by extensive development or man-made features; ◦ Have reduced tranquillity; ◦ Are likely to have little inter-visibility with adjacent landscapes; and ◦ Exhibit no or a low density of sensitive landscape features that bare visual value.
Moderate sensitivity	These landscapes are likely to: ◦ Have a moderately elevated topography with reasonably distinct landforms that provides some sense of enclosure; ◦ Have been affected by several man-made features; ◦ Have limited inter-visibility with adjacent landscapes; and ◦ Exhibit a moderate density of sensitive landscape features that bare visual value.
High sensitivity	These landscapes are likely to: ◦ Consist mainly of undulating plains and poorly defined landforms; ◦ Be open or exposed with a remote character and an absence of man-made features; ◦ Are often highly visible from adjacent landscapes; and ◦ Exhibit a high density of sensitive landscape features that bare visual value.

5.1.2. SEVERITY OF POTENTIAL LANDSCAPE IMPACTS

Landscape impacts are alterations to the fabric, character, visual quality and/or visual value which will either positively or negatively affect the landscape character. During the construction and operational phases, the project components are expected to impact on the landscape character of the landscape types it traverses. The magnitude/severity of this intrusion is measured against the scale of the project, the permanence of the intrusion and the loss in visual quality, -value and/or VAC.

Table 7: Landscape impact – Altering the landscape character

LANDSCAPE IMPACT								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
Extension of Discard Dump facility	Negative Impacting on the visual quality of the landscape due to the presence of foreign elements and a loss of vegetation cover	Localised impacts over an extensive area	Permanent if not mitigated	Low	Definite	Low	Low	High
Conveyor Belt Route A				Moderate	Definite	Moderate	Low	High
Conveyor Belt Route B				Moderate	Definite	Moderate	Low	High
Operational phase								
Extension of Discard Dump facility	Negative Impacting on the visual quality of the landscape.	Localised impact	Permanent if not mitigated	Moderate	Definite	Moderate	Low	High
Conveyor Belt Route A				Moderate	Definite	Moderate	Low	High
Conveyor Belt Route B				Moderate	Definite	Moderate	Low	High

Construction phase

The activities that are expected to cause landscape impacts and that are associated with the construction phase, are the establishment of construction camps and the construction of the service road. These activities will create surface disturbances which will result in the removal of vegetation, mostly through agricultural land and the exposure of the underlying soil. The exposed soil and change in texture will contrast severely with the intact vegetation around the disturbance footprint.

The extent of the disturbances will generally affect a relatively small footprint area.

The construction camps and lay-down yards are anticipated to disturb a much larger area. The size and location of the construction camps will play a major role in the severity of the landscape impact. Accurate technical information is not available for the construction camps but due to the disturbed, industrial character of the area the construction camp will be easily associated with the mine and therefore mitigates the impact considerably.

Considering the moderate to low VAC throughout most of the study area, the developed condition of great parts of the landscape and the relatively high recovery rate of the endemic vegetation, the *severity of landscape impact* during the construction stage is expected to be *low* for Route A and Route B. The impact will extend over the entire length of the different alignments and may vary in degrees of severity along the linear length as it transects landscape types of varying VAC. Surface disturbances are also minimised through, for example, utilising existing roads.

The *severity of the landscape impact* can however be mitigated to a low severity for all the Alternatives. Sensitive placement of the construction camps, limited surface disturbance and prompt rehabilitation are prerequisite conditions if the severity of impact is to be reduced.

The *severity of the landscape impact* for the extension of the discard dump is expected to be low. All discard dump surface activities will be visible from a certain distance from the mine, however due to the existing mining activities the expansion of the discard dump will not change the current impact significantly.

<u>Operational phase</u>

All operational activities (dust, transportation trucks, coal waste stockpiles) will be visible from a certain distance from the mine. It will pose a visual impact to rural residents that look onto the site and road users that regularly use the main road.

Surface disturbances that occur during construction may remain for an extended period during the operational phase. These are seen as residual effects carried forward from the construction phase and can be completely or substantially mitigated if treated appropriately during the construction phase.

The main impact will be caused as a result of the presence of the completed conveyor belt and the extension of the discard dump. Dust pollution and movement of machinery will also cause a visual intrusion. The existing mining activities and visual association of the workings of a mine will help to reduce the impact.

<u>Closure phase</u>

Upon closure of the mining activities, rehabilitation of affected areas will take place and visual aesthetics will be improved. Minimal negative residual impact is expected on visual aspects.

5.2. SIGNIFICANCE OF VISUAL IMPACTS

5.2.1. VIEWER SENSITIVITY

Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors are grouped according to their similarities. The visual receptors included in this study are:

- Residents;
- Motorists; and
- Tourists;

To determine visual receptor sensitivity a commonly used rating system is utilised. This is a generic classification of visual receptors and enables the visual impact specialist to establish a logical and consistent visual receptor sensitivity rating for viewers who are involved in different activities without engaging in extensive public surveys.

5.2.1.1 Residents

Residents of the affected environment are classified as visual receptors of *high* sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment.

5.2.1.2 *Tourists*

These are regarded as visual receptors of exceptional *high* sensitivity. Their attention is focused towards the landscape which they essentially utilise for enjoyment purposes and appreciation of the quality of the landscape.

5.2.1.3 *Motorists*

Motorists are generally classified as visual receptors of *low* sensitivity due to their momentary view and experience of the proposed development. As a motorist's speed increases, the sharpness of lateral vision declines and the motorist tends to focus on the line of travel (USDOT, 1981). This adds weight to the assumption that under normal conditions, motorists will show *low* levels of sensitivity as their attention is focused on the road and their exposure to roadside objects is brief.

5.2.2. SEVERITY OF POTENTIAL VISUAL IMPACTS

Severity of visual impact refers to the magnitude of change to specific visual receptor's views and/or experience of the landscape. Severity of visual impact is influenced by the following factors:

- The **viewer's exposure** to the project:
  - Distance of observers from the proposed project;
  - The visibility of the proposed project (ZVI);
  - Number of affected viewers; and
  - Duration of views to development experienced by affected viewers.
- Degree of **visual intrusion** created by the project.

Empirical research indicates that the visibility of the conveyor belt system and hence the severity of visual impact, decreases as the distance between the observer and the conveyor belt system increases. The landscape type, through which the conveyor crosses, can mitigate the severity of visual impact through topographical or vegetative screening. Bishop *et al* (1988) noted that in some cases the conveyor belt may dominate the view for example, silhouetted against the skyline, or in some cases be absorbed in the landscape. A complex landscape setting with a diverse land cover and topographical variation has the ability to decrease the severity of visual impact more than a mundane landscape (Bishop *et al*, 1985).

The Zone of Visual Influence (ZVI) is determined through a Geographical Information System (GIS). The result reflects a shaded pattern which identifies the areas that are expected to experience views of the proposed alignments. The ZVI is limited to 5 km from the proposed alignments.

A visibility analysis and viewer sensitivity has been completed for the two proposed routes for the conveyor belt system and proposed extension of the dump site (Appendix 1). According to Bishop *et al* (1988), visual receptors within 1 km from the alignments are most likely to experience the highest degree of visual intrusion, hence contributing to the severity of the visual impact. This is considered as the zone of highest visibility after which the degree of visual intrusion decreases rapidly at distances further away.

In order to assess the extent and degree of visibility in the visual envelope, a Geographical Information System (GIS) was utilized. A visibility analysis was performed which provides the following information on Figure 13 – 15 below:

- The areas within the visual envelope that may experience views of the proposed project; and

- The degree of visibility in terms of the percentage of the proposed project that will be visible from a specific location.

The GIS performs an analysis for a series of elevated observer points which represents the height of the conveyor belt route and the proposed discard dump in a digital elevation model (DEM). This results in a visibility map with the degree of visibility illustrated by a colour.

The visibility analyses consider worst-case scenarios, using line-of-sight, based on topography alone. The screening capability of vegetation is not captured in the base model of the DEM and is therefore not considered in these results.

5.2.2.1 Potential visual impacts on Residents

Table 8: Potential visual impacts on residents

VISUAL IMPACT ON RESIDENTS								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
Conveyor Belt Route A	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Lifetime of Mine	Moderate	Probable	Moderate	Low	High
Conveyor Belt Route B				Moderate	Probable	Moderate	Low	High
Extension of the existing discard dump				Low	Probable	Low	Low	High
Operational phase								
Conveyor Belt Route A	Negative – The presence of a conveyor belt and discard dump site intrudes on existing views and spoils the views of the landscape.	Local	Lifetime of Mine	Moderate	Definite	Moderate	Low	High
Conveyor Belt Route B				Moderate	Definite	Moderate	Low	High
Extension of the existing discard dump				Low	Definite	Low	Low	High
Closure phase								
All Alternatives	Upon closure of mine and after rehabilitation	Local	Lifetime of Mine	Low	Definite	Low	Low	High

The study area is moderately populated, with a higher population in a township settlement across the R547 road, Thubelihle (north-west) of the site and the town, Kriel, to the south-west. Farming communities surround the site. The towns and surrounding areas are generally degraded and not very scenic.

Numerous other farm residents will experience intrusion on their views due to the presence of the proposed conveyor belt. It is unpractical to discuss all, but they are recognised as the general population of the study area and are identified as affected visual receptors.

It can be concluded that the study area has a moderate density of residents that will be affected viewers.

Construction phase

During the construction phase, unsightly views may be created by the presence of the construction camp and the lay-down yards. The duration of the potential visual impact will be temporary which will result in an anticipated *low* significance of visual impact for all the alternatives. The visual exposure to the construction activity will be limited.

The cleared site, construction camp and material lay-down yards will appear unsightly and out of character. Large scale construction elements, such as cranes, will be highly visible and increase awareness of the construction activity over a considerable area. The visual intrusion caused during the construction stage will be moderate but will be temporary in nature.

Operational phase

The residents of the settlements and farming communities surrounding the mine may experience a low degree of visual intrusion.

The current presence of the mines in the visual field of the residents will reduce the impact experienced, however the introduction of the conveyor belt will be a new element of visual intrusion.

The proposed Route B will have a lower visual impact on residents than Route A. The Visibility Analysis (Appendix 1) indicates that residents from Thubelihle and Kriel will be less affected by Route B. Agricultural communities will be affected by both new routes.

The proposed expansion of the existing discard dump will have the least visual impact on residents.

The Visual Absorption Capacity (VAC) of the landscape plays a role in the visibility of the proposed conveyor belt and development of discard dumps. The landscape is gently undulating and in summer when vegetation is higher, especially the maize, the VAC is higher than dry winter months when vegetation will be scarce.

The region is associated with large-scale existing mining activities which reduces the significance of the overall visual impact and can be regarded as moderately low.

Closure phase

The duration of the impact will only be as long as the mine is operational. Upon closure of mining activities, rehabilitation of all areas is anticipated, and the visual aesthetics will be improved. No negative residual impacts are expected on visual aspects.

5.2.2.2 Potential visual impacts on tourists

Table 9: Potential visual impacts on tourists

VISUAL IMPACT ON TOURISTS								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
Conveyor Belt Route A	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Lifetime of Mine	Low	Low Probability	Low	Low	High
Conveyor Belt Route B				Low	Low Probability	Low	Low	High
Extension of the existing discard dump				Low	Low Probability	Low	Low	High
Operational phase								
Conveyor Belt Route A	Negative – The presence of a conveyor belt and extension of dump site intrudes on existing views and spoils the views of the landscape.	Local	Lifetime of Mine	Low	Low Probability	Low	Low	High
Conveyor Belt Route B				Low	Low Probability	Low	Low	High
Extension of the existing discard dump				Low	Low Probability	Low	Low	High
Closure phase								
All Alternatives	Upon closure of mine and after rehabilitation	Local	Lifetime of Mine	Low	Low Probability	Low	Low	High

The study area has very little tourist activity with interspersed pockets with natural wetlands and grassveld landscapes. The entire regional area is considered to have low tourism potential, mostly because of the monotonous agricultural areas, large scale mining developments and overall environmental degradation. The R547 is also not a main thoroughfare road used to reach prominent tourist destinations.

Construction phase

The temporary duration of the construction phase is not expected to cause major visual impacts. The location, number and size of the construction camps and lay-down yards will be crucial in regulating the impact. Detail information is not available, and it is anticipated that the visual impact will occur localised and that a very small number of tourists will be adversely affected by these project components during construction.

Their exposure to possible unsightly views of the construction camps and the associated activity will however be minimal and localised.

The potential visual impact on tourists during the construction phase of the proposed project can be mitigated with relative ease. The greatest factor to consider is the location of the construction camp.

Operational phase

Considering the relative short length of the conveyor belt routes, very few tourists might be affected during their visit to or passing through the study area. Although it is difficult to pinpoint particular locations in the study area that are of specific value, the areas next to the roads will be most important.

It can be concluded that Route B, for the conveyor belt system will cause the least visual intrusion for tourists travelling through the study area. The proposed extension of the existing dump will have the least visual impact.

The severity of the visual impact of the conveyor belt and expansion of the discard dump on tourists will be low, causing a low visual impact.

Closure phase

The duration of the impact will only be as long as the mine is operational. Upon closure of mining activities, rehabilitation of all areas is anticipated, and the visual aesthetics will be improved. No negative residual impacts are expected on visual aspects.

5.2.2.3 Potential visual impacts on motorists

Table 10: Potential visual impacts on motorists

VISUAL IMPACT ON MOTORISTS								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
Conveyor Belt Route A	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Lifetime of Mine	Moderate	Low Probability	Moderate	Low	High
Conveyor Belt Route B				Low	Low Probability	Low	Low	High
Extension of the existing discard dump				Low	Low Probability	Low	Low	High
Operational phase								
Conveyor Belt Route A	Negative – The presence of a conveyor belt and extension of dump site intrudes on existing views and spoils the views of the landscape.	Local	Lifetime of Mine	Moderate	Low Probability	Moderate	Low	High
Conveyor Belt Route B				Low	Low Probability	Low	Low	High
Extension of the existing discard dump				Low	Low Probability	Low	Low	High
Closure phase								
All Alternatives	Upon closure of mine and after rehabilitation	Local	Lifetime of Mine	Low	Low Probability	Low	Low	High

The major routes within the study area are the R547 and R544, connecting the towns, mines and farms. The secondary road network in the study area carries a much lower volume of motorists. Many of the roads are gravel roads which are utilized by the local residents. Their duration of views will be temporary, and it is expected that the visual intrusion that they will experience will be low.

Construction phase

The potential visual impact that may be experienced by motorists during the construction phase is considered to be minimal. Limited information is available, and the number, location and size of the construction camps and lay-down yard are essential for accurately assessing the visual impact.

The presence of the construction camp and lay-down yard may create unsightly views. Motorists' visual exposure to the impact will be brief and the severity of visual impact will be *low*. The significance of potential visual impact is expected to be *low*.

Operational phase

Conveyor Route A will be the most visible from the R547. Route B is visible to motorists and when the proposed conveyor belt crosses the R544. The speed at which motorists travel and the association of the regional area with coal mines, also has a moderating effect on the severity of the visual impact and further reduces visual exposure.

Closure phase

The duration of the impact will only be as long as the mine is operational. Upon closure of mining activities, rehabilitation of all areas is anticipated, and the visual aesthetics will be improved. No negative residual impacts are expected on visual aspects.

6. RECOMMENDED MITIGATION MEASURES

The aim of mitigation is to reduce or alleviate the intrusive contrast between the proposed project components and activities, and the receiving landscape to a point where it is acceptable to visual and landscape receptors.

6.1. GENERAL

- Where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, the vegetation occurring in the area to be disturbed must be replanted with endemic, indigenous species, especially veld-grass and trees. A hydroseeding application is recommended in the disturbed areas as a measure of rehabilitation.

6.2. CONVEYOR BELT AND DISCARD DUMPS

- It is recommended that a permeable steel structure be used for the pylons of the conveyor to create the lowest degree of visual obstruction;
- Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil.
- Plant fast-growing endemic trees along the service road and conveyor system. The trees will with time create a screen and increase the biodiversity of the area.
- It is also recommended that trees be planted in areas where the proposed discard dump is most visible, to reduce the visual impact of viewers.

6.3. ACCESS ROUTES

- Make use of existing access roads where possible;

- Where new access roads are required, the disturbance area should be kept to a minimum. A two-track dirt road will be the most preferred option;
- Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation;
- Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover;
- Road verges that need to be cleared should be kept to a minimum;
- Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas; and
- If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road in order to reduce the visible extent of the cleared corridor.

6.4. CLEARED SERVITUDES

- Locate the alignment and the associated cleared servitude so as to avoid the removal of established vegetation; and
- Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape.

6.5. CONSTRUCTION CAMPS AND LAY DOWN YARDS

- If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas;
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors;
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and
- Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height.

7. CONCLUSION

The two alternative alignments for the conveyor belt and the extension of the existing dump site, have been evaluated against internationally accepted criteria to determine the impact they will have on the landscape character and the viewers that have been identified in the study area.

Table 11: Evaluation of proposed alternatives

Visual Impact of Alternatives	Corrective Measures	Impact Rating Criteria					
		Nature	Extent	Duration	Magnitude	Probability	Significance
Conveyor Belt Route A	No	Negative	2 (local)	4 (long term)	6 (moderate)	3 (medium)	36 medium
	Yes	Negative	2 (local)	4 (long term)	4 (low)	2 (low)	20 low
Conveyor Belt Route B	No	Negative	2 (local)	4 (long term)	4 (low)	3 (medium)	30 medium - low
	Yes	Negative	2 (local)	4 (long term)	2 (minor)	2 (low)	16 low
Extension of existing dump	No	Negative	2 (local)	4 (long term)	4 (low)	3 (medium)	30 medium
	Yes	Negative	2 (local)	4 (long term)	2 (minor)	1 (improbable)	8 low
	Yes	Negative	2 (local)	4 (long term)	4 (low)	2 (low)	20 low

Route B is regarded as the most preferred conveyor belt alternative. Its alignment follows along a line that is further away from the main transportation route, the R547. The Visual Absorption Capacity of Route B is significantly higher than Route A, which would be more visible from the road. The Visible Analysis for Route B (Appendix 1 Figure 13 & 14) also clearly indicates that this route will be less visible to residents of nearby Thubehihle and Kriel.

The Extension of the Existing Dump will have the least visual impact on viewers within the surrounding areas. This option is chosen, and no new access/haul road will need to be cleared, as the roads within the existing infrastructure can be utilised. For all alternatives for the proposed discard dumps, the great advantage of extending the existing discard dump, is that viewers are already exposed to a similar mining activity. (Appendix 1 Figure 15)

The alternatives for the Visual Impact Assessment Criteria for all impacts as indicated in Table 11 applies are rated as per below:

Status of Impact:
The visual impact is assessed as either having a:
Negative effect (i.e. at a cost to the environment),
Positive effect (i.e. a benefit to the environment), or
Neutral effect on the environment.

Extent of the Impact:
(1) Site (site only),
(2) Local (site boundary and immediate surrounds),
(3) Regional,
(4) National, or

(5) International.

Duration of the Impact:
The length that the impact will last for is described as either:
(1) Immediate (<1 year)
(2) Short term (1-5 years),
(3) Medium term (5-15 years),
(4) Long term (ceases after the operational life span of the project),
(5) Permanent.

Magnitude of the Impact:
The intensity or severity of the impacts is indicated as either:
(0) none,
(2) Minor,
(4) Low,
(6) Moderate (environmental functions altered but continue),
(8) High (environmental functions temporarily cease), or
(10) Very high / unsure (environmental functions permanently cease).

Probability of Occurrence:
The likelihood of the impact actually occurring is indicated as either:
(0) None (the impact will not occur),
(1) Improbable (probability very low due to design or experience)
(2) Low probability (unlikely to occur),
(3) Medium probability (distinct probability that the impact will occur),
(4) High probability (most likely to occur), or
(5) Definite.

Significance of the Impact:
Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.
S= (E+D+M) P

The significance ratings are given below
(<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(30-60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated), (>60) high (i.e. where the impact must have an influence on the decision process to develop in the area).

APPENDIX 1

Figure 12 to Figure 14 reflects the results of a viewer sensitivity visibility assessment, carried out using GIS software. The results provide a clear interpretation of the extent of the visual influence and also provide an indication of the land use that can be expected in the affected areas.

Figure 12: Conveyor Belt Route A

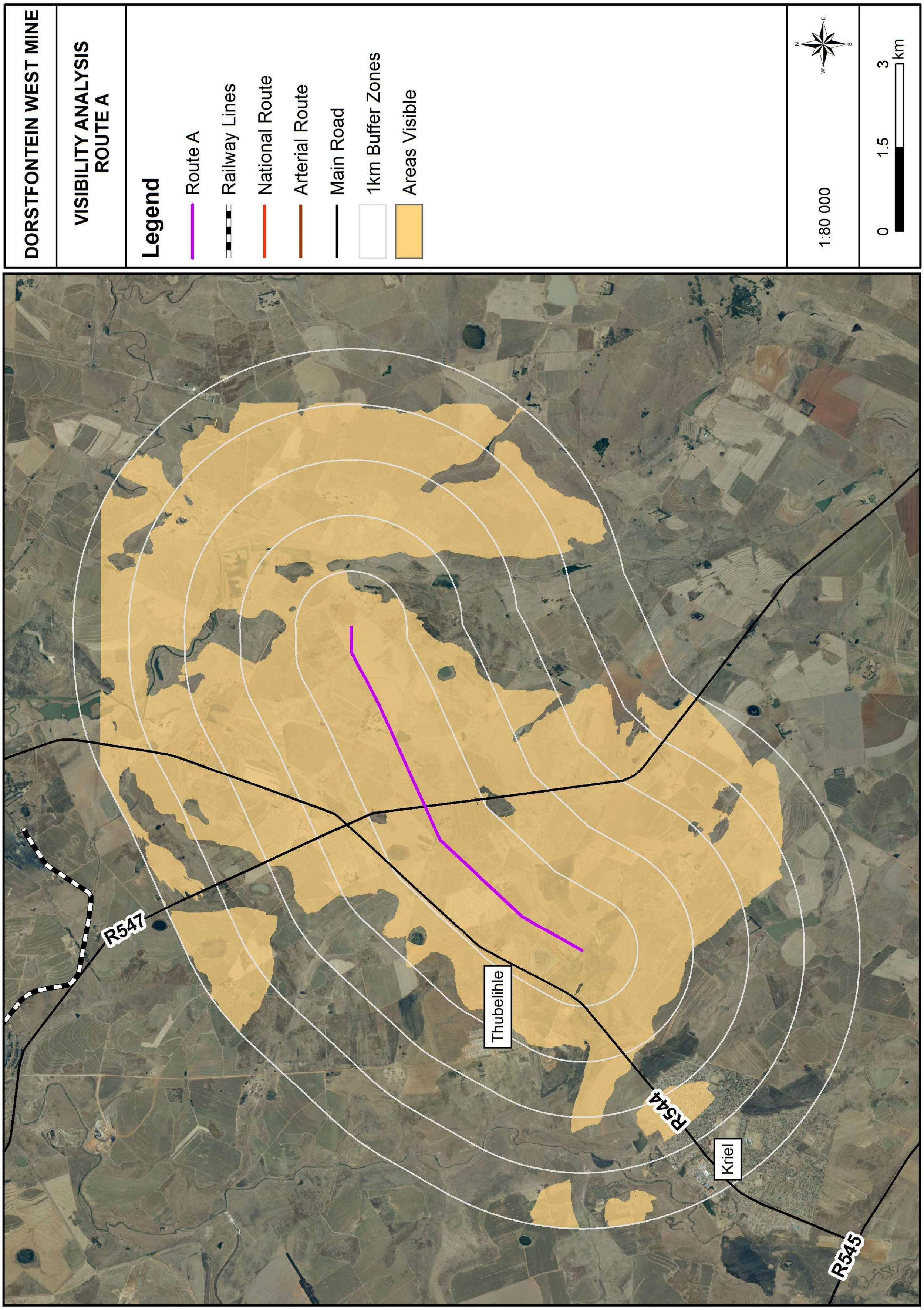


Figure 13: Conveyor Belt Route B

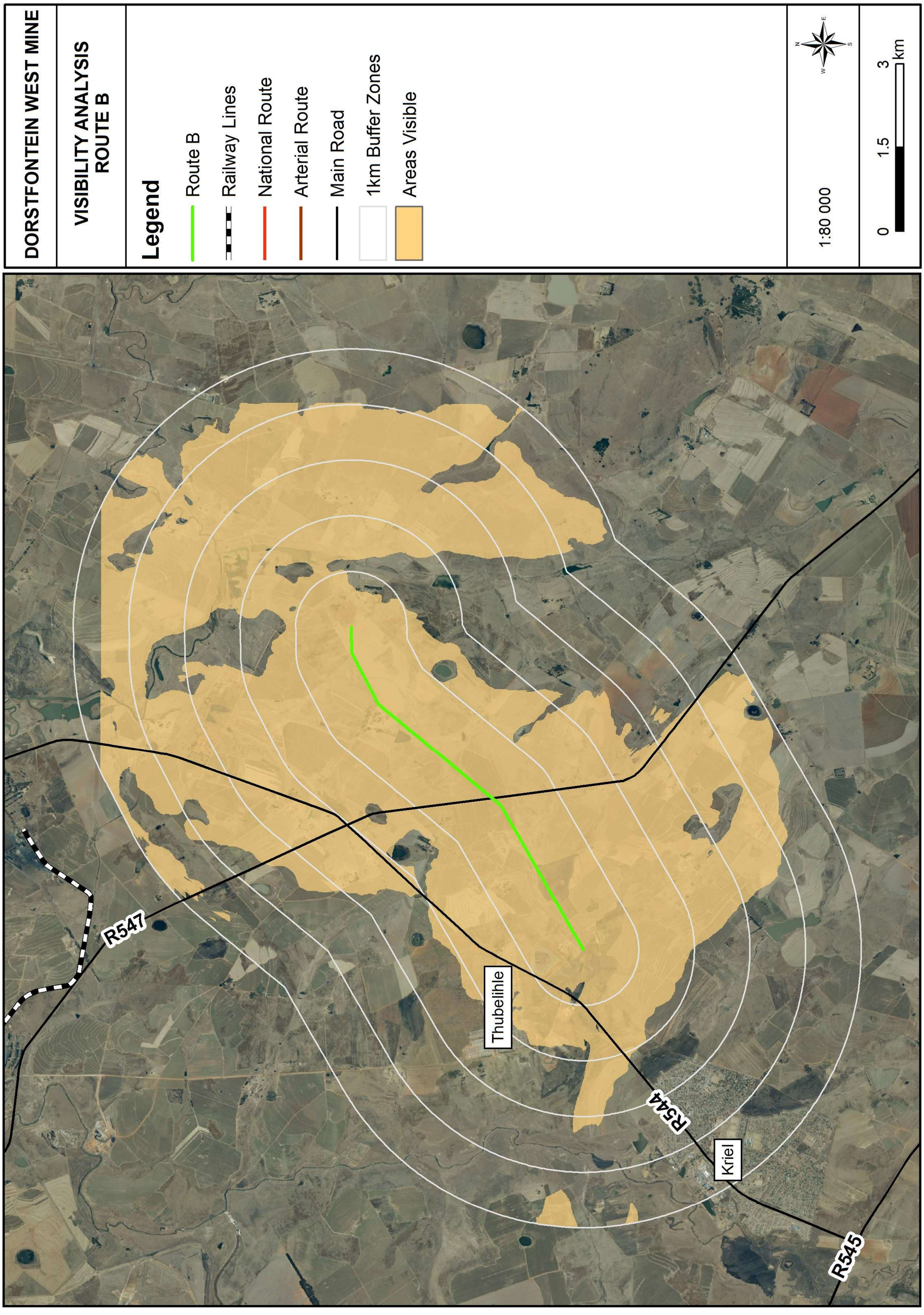
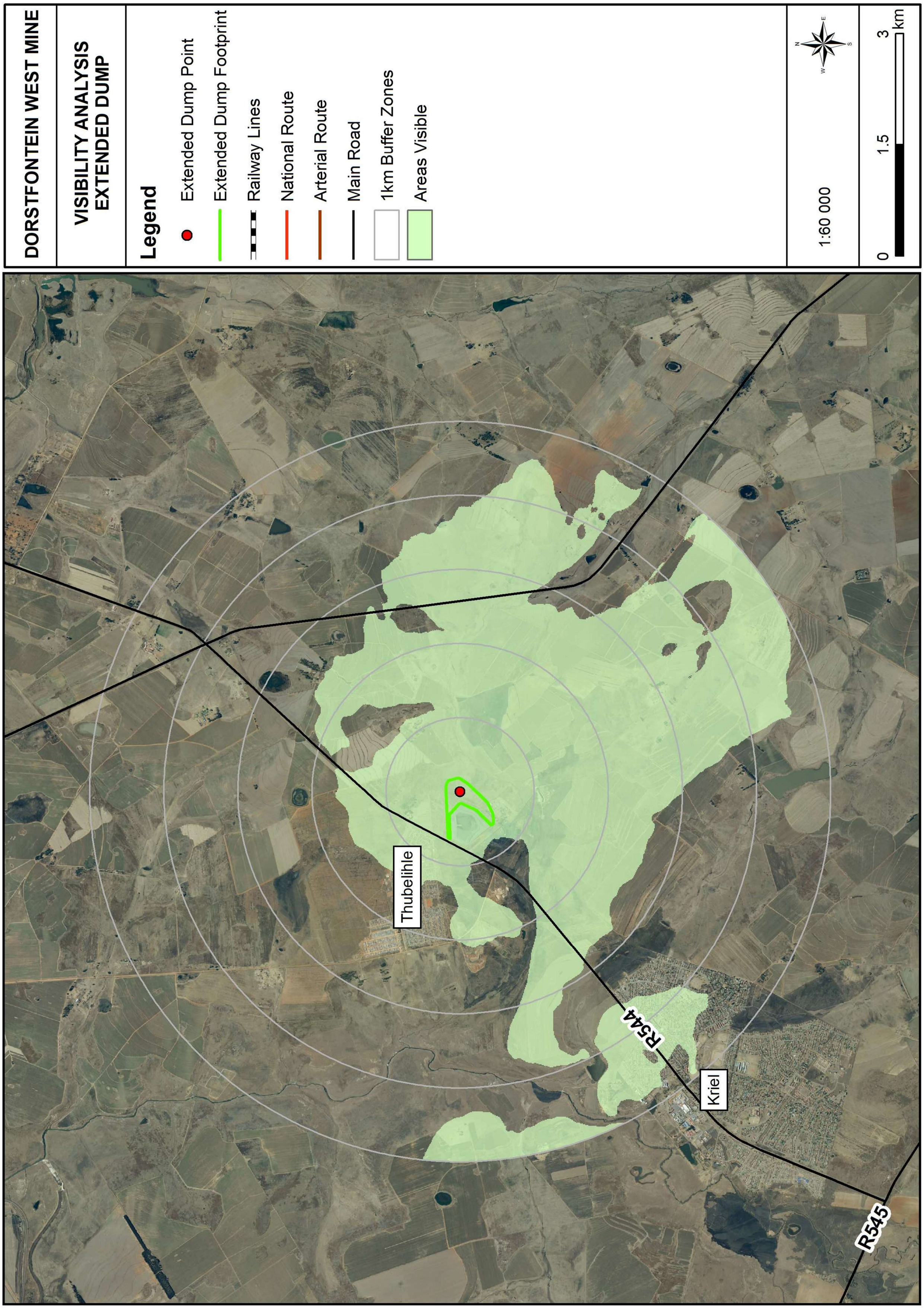


Figure 14: Extension of Existing Discard Dump



GLOSSARY OF TERMS

Aesthetics	The science or philosophy concerned with the quality of sensory experience. (ULI, 1980)
Horizon contour	A line that encircles a development site and that follows ridgelines where the sky forms the backdrop and no landform is visible as a background. This is essentially the skyline that when followed through the full 360-degree arc as viewed from a representative point on the site defines the visual envelope of the development. This defines the boundary outside which the development would not be visible.
Landscape characterisation/ character	This covers the gathering of information during the desktop study and field survey work relating to the existing elements, features, and extent of the landscape (character). It includes the analysis and evaluation of the above and the supporting illustration and documentary evidence.
Landscape condition	Refers to the state of the landscape of the area making up the site and that of the study area in general. Factors affecting the condition of the landscape can include the level maintenance and management of individual landscape elements such as buildings, woodlands etc and the degree of disturbance of landscape elements by non-characteristics elements such as invasive tree species in grassland or car wrecks in a field.
Landscape impact	Changes to the physical landscape resulting from the development that include; the removal of existing landscape elements and features, the addition of new elements associated with the development and altering of existing landscape elements or features in such as way as to have a detrimental effect on the value of the landscape.
Landscape unit	A landscape unit can be interpreted as an “outdoor room” which are enclosed by clearly defined landforms or vegetation. Views within a landscape unit are contained and face inward.
Sense of place	That distinctive quality that makes a particular place memorable to the visitor, which can be interpreted in terms of the visual character of the landscape. A more emotive sense of place is that of local identity and attachment for a place “*which begins as undifferentiated space* [and] *becomes place as we get to know it better and endow it with value*” (Tuan 1977)[1].
Viewer exposure	The extent to which viewers are exposed to views of the landscape in which the proposed development will be located. Viewer exposure considers the visibility of the site, the viewing conditions, the viewing distance, the number of viewers affected the activity of the viewers (tourists or workers) and the duration of the views.
Viewer sensitivity	The assessment of the receptivity of viewer groups to the visible landscape elements and visual character and their perception of visual quality and value. The sensitivity of viewer groups depends on their activity and awareness within the affected landscape, their preferences, preconceptions and their opinions.
Visual absorption capacity (VAC)	The inherent ability of a landscape to accept change or modification to the landscape character and/or visual character without diminishment of the visual quality or value, or the loss of visual amenity. A high VAC rating implies a high ability to absorb visual impacts while a low VAC implies a low ability to absorb or conceal visual impacts.

[1] Cited in Climate Change and Our 'Sense of Place', http://www.ucsusa.org/greatlakes/glimpactplace.html

Visual amenity	The notable features such as hills or mountains or distinctive vegetation cover such as forests and fields of colour that can be identified in the landscape and described. Also included are recognised views and viewpoints, vistas, areas of scenic beauty and areas that are protected in part for their visual value.
Visual character	This addresses the viewer response to the landscape elements and the relationship between these elements that can be interpreted in terms of aesthetic characteristics such as pattern, scale, diversity, continuity and dominance.
Visual contour	The outer perimeter of the visual envelope determined from the site of the development. The two-dimensional representation on plan of the horizon contour.
Visual contrast	The degree to which the physical characteristics of the proposed development differ from that of the landscape elements and the visual character. The characteristics affected typically include: • Volumetric aspects such as size, form, outline and perceived density; • Characteristics associated with balance and proportion such scale, diversity, dominance, continuity; • Surface characteristics such as colour, texture, reflectivity; and • Luminescence or lighting.
Visual envelope	The approximate extent within which the development can be seen. The extent is often limited to a distance from the development within which views of the development are expected to be of concern.
Visual impact	Changes to the visual character of available views resulting from the development that include: obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the view shed experienced by visual receptors and intrusion of foreign elements into the view shed of landscape features thereby detracting from the visual amenity of the area.
Visual impact assessment	A specialist study to determine the visual effects of a proposed development on the surrounding environment. The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, and to assess their significance. These impacts include landscape impacts and visual impacts.
Visual quality	An assessment of the aesthetic excellence of the visual resources of an area. This should not be confused with the value of these resources where an area of low visual quality may still be accorded a high value. Typical indicators used to assess visual quality are vividness, intactness and unity. For more descriptive assessments of visual quality attributes such as variety, coherence, uniqueness, harmony, and pattern can be referred to.
Visual receptors	Includes viewer groups such as the local community, residents, workers, the broader public and visitors to the area, as well as public or community areas from which the development is visible. The existing visual amenity enjoyed by the viewers can be considered a visual receptor such that changes to the visual amenity would affect the viewers.
Zone of visual influence	The extent of the area from which the most elevated structures of the proposed development could be seen and may be considered to be of interest (see visual envelope).

LEVEL OF CONFIDENCE

Table 12: Confidence level chart and description

CONFIDENCE LEVEL CHART				
		Information, knowledge and experience of the **project**		
		3b	2b	1b
Information, and knowledge of the **study area**	3a	9	6	3
	2a	6	4	2
	1a	3	2	1

3a – A *high* level of information is available of the **study area** in the form of recent aerial photographs, GIS data, documented background information and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.

2a – A *moderate* level of information is available of the **study area** in the form of aerial photographs GIS data and documented background information 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.

1a – *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.

3b – A *high* level of information and knowledge is available of the **project** in the form of up-to-date and detailed engineering/architectural drawings, site layout plans etc. and the visual impact assessor is well experienced in this type of project and level of assessment.

2b – A *moderate* level of information and knowledge is available of the **project** in the form of conceptual engineering/architectural drawings, site layout plans etc. and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.

1b – *Limited* information and knowledge is available of the **project** in the form of conceptual engineering/architectural drawings, site layout plans etc. and/or the visual impact assessor has a low experience level in this type of project and level of assessment. (Adapted from Oberholzer. B, 2005)

VISUAL RECEPTOR SENSITIVITY

Table 13: Visual receptor sensitivity

VISUAL RECEPTOR SENSITIVITY	DEFINITION (BASED ON THE GLVIA 2ND ED PP90-91)
Exceptional	Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features.
High	Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape; Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; Residents with views affected by the development.
Moderate	People engaged in outdoor sport or recreation (other than appreciation of the landscape);
Low	People at their place of work or focussed on other work or activity; Views from urbanised areas, commercial buildings or industrial zones; People travelling through or passing the affected landscape on transport routes.
Negligible (Uncommon)	Views from heavily industrialised or blighted areas

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