

**MERCURY - PERSEUS 400 kV TRANSMISSION LINE**  
**VISUAL IMPACT ASSESSMENT REPORT**  
**ADDENDUM 1**

Prepared by:

*The Landscape Architecture and Graphic Design Unit*  
**STRATEGIC ENVIRONMENTAL FOCUS**  
*P.O. Box 74785*  
*Lynnwood Ridge*  
*0040*

Prepared for:

**STRATEGIC ENVIRONMENTAL FOCUS**  
P.O. Box 74785  
Lynnwood Ridge  
0040

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## EXECUTIVE SUMMARY

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, to assess their significance, and to recommend a preferred alignment.

An assessment of the potential visual impacts for the fourth proposed alignment was added to the rating matrix, see **Table 6.1&2 Impact Assessment Matrix** discussed in the main VIA report. A comparison of the initial three proposed alignments or corridors with the latest proposal identifies the new proposed alignment as the preferred option. The reasons can be summarised as follows:

- This route is far shorter than corridor 2 or 3 and only slightly longer than corridor 1;
- A significant portion of the alignment passes through grazing farmland, away from main roads thereby greatly limiting potential critical views;
- A second significant portion follows the R59 through cultivated lands with low visual quality and landscape character, along an existing disturbance corridor which offset the critical views that could be experienced along the R59; and
- The proposed fourth alignment is re-directed along an existing railway line north of Bothaville for a stretch of 25 kilometres through numerous rows and stands of mature Blue gum and pine trees, thereby reducing the length of the R59 that would experience critical views.

The results of the assessment indicate an order of **preference for the proposed corridors** as:

1. **Proposed Corridor 4 (slightly longer than Corridor 1 passing east of Hoopstad);**
2. Proposed Corridor 1 (shortest alignment passing immediately west of Bultfontein and further to the west of, Wesselsbron and Bothaville);
3. Proposed Corridor 2 (alignment passing to the east of Bultfontein then alongside the R719 to a point just north of Wesselsbron before sweeping around to the east of Bothaville); and
4. Proposed Corridor 3 (the longest alignment extending some distance to the west of Bultfontein , then passing just to the west and north of Wesselsbron, before sweeping wide to the east via Viljoenskroon to the Mercury substation).

A comprehensive list of recommended management objectives and mitigation measures are outlined in **Section 7** of the main VIA report for each project component. Monitoring programs have been proposed for the construction and operational phases of the proposed transmission line.

The construction and operation of the proposed Mercury - Perseus 400 kV Transmission Line will result in visual impacts within the study area. The significance of these impacts without mitigation will be high due to the relative scale of the structures and the high visibility within the study area. These impacts will last for the entire operational life of the transmission line.

However should the mitigation measures and monitoring programs recommended in this study be implemented the significance of these impacts can be reduced to an acceptable level.

<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>ii</b>
<b>FIGURES.....</b>	<b>v</b>
<b>TABLES .....</b>	<b>v</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
<b>2. BACKGROUND AND BRIEF .....</b>	<b>1</b>
<b>3. STUDY APPROACH .....</b>	<b>1</b>
<b>4. STUDY AREA.....</b>	<b>2</b>
4.1.1 Visual environment of Corridor 4 .....	6
<b>5. IDENTIFICATION OF RISK SOURCES.....</b>	<b>7</b>
<b>5.1 Proposed Corridors and alternative alignments .....</b>	<b>7</b>
<b>5.2 Project Components.....</b>	<b>8</b>
<b>5.3 Project Phases.....</b>	<b>9</b>
5.3.1 Construction Phase.....	9
5.3.2 Operational Phase .....	9
<b>6. IMPACT DESCRIPTION AND ASSESSMENT.....</b>	<b>10</b>
<b>7. RECOMMENDED MITIGATION / MANAGEMENT MEASURES .....</b>	<b>18</b>
<b>8. ALTERNATIVES.....</b>	<b>19</b>
<b>9. DISCUSSION.....</b>	<b>20</b>
<b>9.1 Goal .....</b>	<b>20</b>
<b>9.2 Assessment .....</b>	<b>20</b>
9.1.1 Visual Environment.....	20
9.1.2 Project components .....	20
9.1.4 Potential risk sources.....	21
9.1.5 Assessment of potential visual impacts .....	21
9.1.5 Preferred alignment .....	22
9.1.6 Recommended mitigation .....	22
9.1.7 Alternative alignments.....	22
<b>9.2 Monitoring of implementation of mitigation measures.....</b>	<b>23</b>
<b>10. CONCLUSION .....</b>	<b>24</b>
<b>11. REFERENCES.....</b>	<b>25</b>

## FIGURES

Figure 4. 1: Landscape Types ..... 3

## TABLES

Table 4. 1: Sensitivity To Visual Impacts ..... 5

Table 6. 1: Impact Assessment Matrix revision 01 ..... 11

Table 6. 2: Impacts of proposed CORRIDOR 4 on the study area ..... 13

## **1. INTRODUCTION**

This Visual Impact Assessment is a specialist study to determine the visual effects of the proposed Mercury - Perseus 400 kV Transmission Line on the surrounding environment, focussing on the proposed alternative alignments between the existing Perseus and Mercury Sub-Stations, adjacent to Dealesville and Vierfontein respectively, in the Free State Province. This study forms part of the overall environmental impact assessment for the Mercury - Perseus 400 kV Transmission Line project.

## **2. BACKGROUND AND BRIEF**

The goal of this Addendum to the Visual Impact Assessment report is to assess the impacts of a proposed fourth corridor that emerged from the initial environmental impact assessment for the above project.

In order to ensure consistency with the assessment of the first three corridors, this addendum uses the same methodology and reporting format as the initial Visual Impact Assessment. The objectives for this addendum to the VIA report were to:

- Determine the extent of the study area, this includes the site and the surrounding landscape which is visually connected to the site;
- Determine the visual character of the study area;
- Identify elements of particular visual quality (visual assets) that could be affected by the proposed project;
- Identify and define the project components that may potentially impact on the visual environment;
- Identify the potential visual impacts on the visual environment for the proposed corridor;
- Assess the significance of the identified impacts for the proposed corridor;
- Recommend a preferred alternative alignment; and
- Recommend generic mitigation measures to reduce the potential visual impacts in the study area that may result from the proposed project.

## **3. STUDY APPROACH**

### **3.1 Information base (source)**

The information sourced for the initial VIA was used to in the current assessment.

### **3.2 Assumptions**

The assumptions made for the initial VIA remain valid for this study.

### **3.3 Limitations**

The limitations to the initial VIA remain for this study, however the site visit took place during a drier period, which allowed easier access to portions of the proposed alignment.

### **3.4 Glossary of terms**

Refer to the main VIA report.

### **3.5 List of abbreviations**

Refer to the main VIA report.

### **3.6 Methodology**

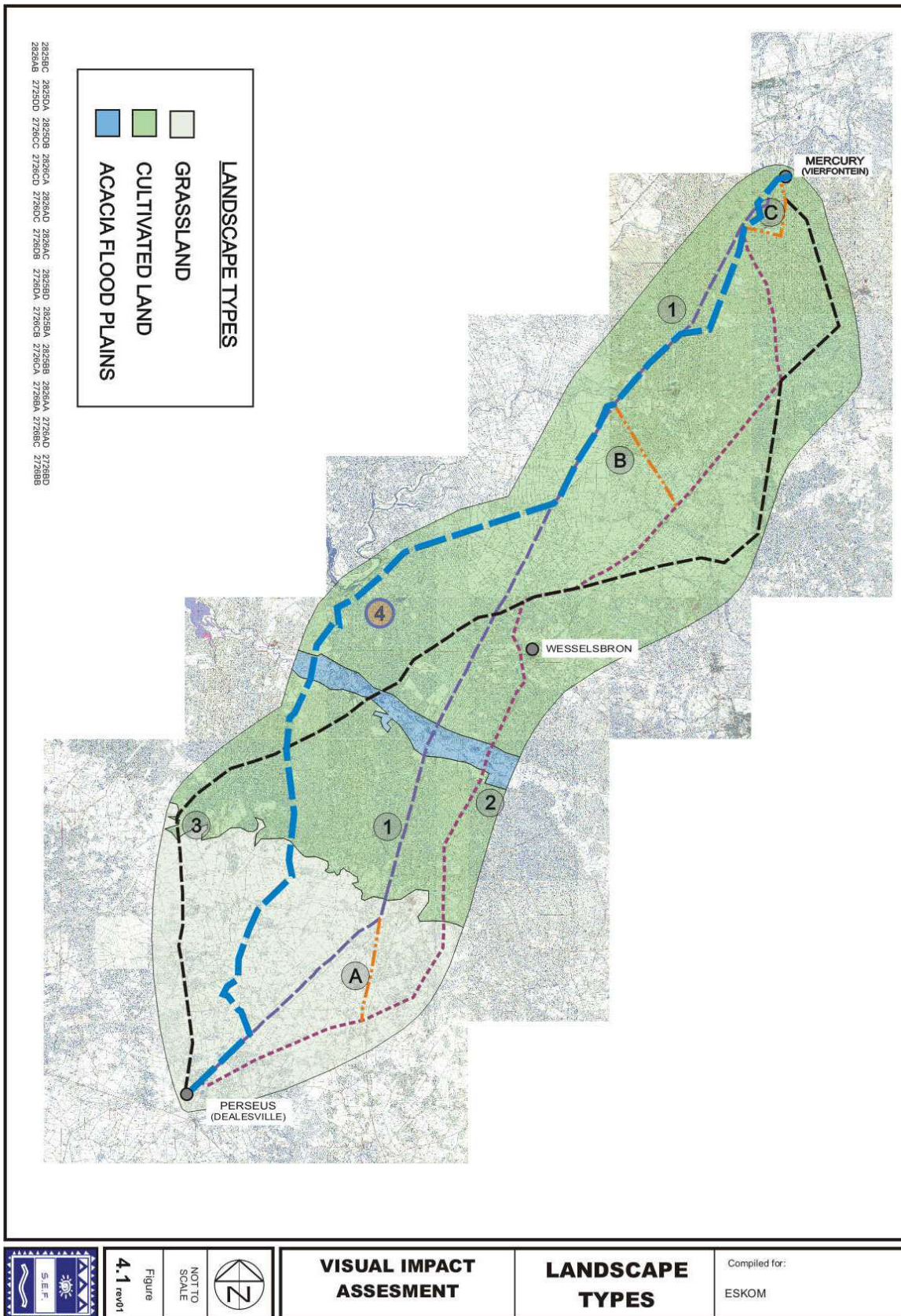
The methodology used is described in the main VIA report.

## **4. STUDY AREA**

The scale of the visual impact assessment was determined by means of 1:50 000 topocadastral plans and extended to a buffer area that extends five kilometres outside of the fourth proposed corridor. The study area is considered to be largely homogenous in terms of visual character and can be divided into three main landscape types: “grasslands”; “cultivated lands”; and “Acacia flood plains”. These three landscape types were captured using 1:50 000 topocadastral plans and are illustrated in Figure 4.1\_rev01.

An analysis of the sensitivity to visual impacts for the overall study area and each segment of each of the proposed corridor is provided in Table 4.1. A motivation for the values arrived at is based on those described in the main VIA report.

**Figure 4. 1: Landscape Types**





#### **4.1. Description of affected environment**

The visual character and sensitivity of the visual environment within the study area varies at a local level depending on the presence of pans, ridges, agricultural uses, roads, transmission lines and urban development. The proposed corridor traverses the three landscape types (see Figure 4.1), crosses two rivers and bypasses a number of towns between the Perseus and Mercury sub-stations.

The affected environment specific to each segment of the proposed corridor is discussed below under section 4.1.1 in as far as it differs in sensitivity from that of the values of the overall study area. An analysis of the sensitivity to visual impacts for each segment of the proposed corridor is provided in Table 4.1. The maximum sensitivity rating that any area can achieve is 17, a value that is achieved by being highly sensitive to impacts on all aspects and having a minimum visual absorption capacity in terms of slope, vegetation height and pattern/diversity.

The sensitivity values for the visual aspects for the affected environment are discussed in the main VIA report.

**Table 4. 1: Sensitivity To Visual Impacts**

Sensitivity rating		Susceptibility to visual impacts	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	Capacity to mitigate visual impacts	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC mean value	Sensitivity rating	Length of segment in km	Higher values equate to greater sensitivity (Product of sensitivity and length)
High	3															
Moderate	2															
Low	1															
Mitigation rating																
High	3															
Moderate	2															
Low	1															
STUDY AREA																
Overview of Entire Study Area																
Perseus to R708 (Bultfontein)			2	2	3	3	3	1		1	1	1	1.0	14.0	48.0	672.0
Bultfontein			1	1	1	3	3	3		1	1	1	1.0	11.0	-	-
Bultfontein Vet River			2	2	1	2	3	2		1	1	1	1.0	11.0	42.0	462.0
Vet River			3	3	3	3	2	2		1	2	2	1.7	14.3	3.5	50.2
Vet River to Wesselsbron			2	2	1	3	3	2		1	1	1	1.0	12.0	22.0	264.0
Wesselsbron to Mercury			2	2	1	2	3	3		1	1	2	1.3	11.7	134.0	1,563.3
													<b>74.0</b>	<b>249.5</b>	<b>3,011.5</b>	
Corridor 4																
Perseus to R708 (Bultfontein)			2	2	3	3	2	3		1	1	1	1	14.0	48.0	672.0
Bultfontein			2	3	2	2	3	1		1	1	1	1.0	12.0	0.0	0.0
R708 (Bultfontein) to Vet River			2	2	1	3	3	1		1	1	1	1.0	11.0	42.0	462.0
Vet River			3	3	3	3	2	3		1	2	2	1.7	15.3	6.0	92.0
Vet River to Wesselsbron			1	2	1	3	3	3		1	1	1	1.0	12.0	24.0	288.0
Wesselsbron to Mercury			2	1	1	2	3	3		1	1	3	1.7	10.3	94.0	971.3
													<b>74.7</b>	<b>214.0</b>	<b>2485.3</b>	

#### 4.1.1 *Visual environment of Corridor 4*

##### *Perseus to R708 / Bultfontein*

The proposed alignment within corridor 4 between the Perseus sub-station and the R708 to Bultfontein is aligned with an existing all-weather gravel road that traverses the “grasslands” landscape type. This segment has a moderate sensitivity rating.

##### *R708 / Bultfontein*

As the proposed corridor 4 does not pass close to the town of Bultfontein this segment length is effectively zero with impacts limited to the immediate vicinity of the crossing of the R708.

##### *R708 / Bultfontein to Vet River*

This segment traverses a stretch of grazing land before reaching cultivated lands, primarily maize and sunflower crops. The sensitivity rating for this segment is moderate.

##### *Vet River*

This segment occurs on the Vet River and is limited to the width of the flood plain at the point where the proposed alignment of this corridor crosses the river. The sensitivity rating for this segment is high due to the visual sensitivity of the flood plain and high visibility and critical views from the surrounding provincial and local road network.

##### *Vet River to Wesselsbron*

This segment traverses cultivated lands, primarily maize and sunflower crops. The sensitivity rating for this segment is high due very low visual absorption capacity, high visibility and critical views along the R59, with which the proposed corridor is aligned.

##### *Wesselsbron to Mercury*

The section of the proposed corridor falling within this segment is aligned with and falls mostly within 1000m of the R59 and R30 main roads as well as a portion of the rail link to Bothaville. The sensitivity rating for this segment is moderate.

## **5. IDENTIFICATION OF RISK SOURCES**

The Visual Impact Assessment is focused on two phases of the proposed development: **the construction and operation phases**. For each phase, potential risks of impact to the affected environment are identified. The risk sources are briefly described in this section, while a discussion on the impact assessment is provided in the next section.

### **5.1 Proposed Corridors and alternative alignments**

The proposed corridor is assessed for potential risks sources. In order to assess the potential risk sources for the proposed corridor as a whole it is necessary to first identify the project components and their associated risks sources.

The assessment of the risk sources of the proposed corridor considers the projects components comprising the corridor, the phase during which certain impacts are likely to occur, as well as the linear extent of each component and of the entire corridor. The basic assumption followed is that the risk associated with a project component increases in direct proportion to the linear extent in kilometres of that component. This assumption implies that for the four proposed corridors, where all else is equal, the risk of visual impacts is greatest for the corridor with the greatest length.

The project components with potential risks sources are discussed in greater detail in 5.2. The potential risk sources of visual impacts for the construction and operation phases are discussed under 5.3 Project Phases.

## **5.2 Project Components**

To identify the potential risk sources that may result in impacts to the visual environment, the proposed Mercury - Perseus 400 kV Transmission Line has been divided into project components, which are analysed separately for risk sources. The identified project components introduce potential risks arising from either the construction or operation phases and in some instances both. Project components that have been identified are:

- The transmission line;
- Access roads;
- Cleared servitude;
- Sub-stations;
- Construction camps (equipment and lay down areas); and
- Campsites for construction crew housing.

The potential risk of visual impacts associated with each of the project components, is assessed in the main VIA report for each visual aspect on each of the three landscape types.

## **5.3 Project Phases**

The assessment of potential risk sources is grouped according to the phases of the project, these being the **construction phase** and the **operation phase**.

### **5.3.1 Construction Phase**

During the construction phase the following project components are considered as potential risk sources:

- The transmission line;
- Access roads;
- Cleared servitude;
- Construction camps (equipment and lay down areas); and
- Campsites for construction crew housing.

The potential risk of visual impacts with respect to each visual aspect and the source associated with the project components during the construction phase is described under section 5.3.1 in the main VIA report.

### **5.3.2 Operational Phase**

During the operation phase the following project components are considered as potential risk sources:

- The transmission line;
- Access roads;
- Cleared servitude;

The potential risk of visual impacts with respect to each visual aspect and the source associated with the project components during the operational phase is described under section 5.3.2 in the main VIA report.

## 6. IMPACT DESCRIPTION AND ASSESSMENT

The assessment and comparison of the existing and potential visual impacts for the fourth proposed corridor against that of the initial three proposed corridors, serves to identify a preferred alignment for the proposed transmission line and its associated infrastructure and activities.

An assessment of the potential visual impacts for the corridor was added to the **Impact Assessment Matrix**, discussed in the main VIA report see Table 6.1 and 6.2. The matrix analyses the proposed corridor by multiplying the visual sensitivity ratings for each visual aspect of each project component by the potential risk rating for the corresponding visual aspect and project component for each segment of the corridor. The proposed corridor is divided into segments that correspond to the landscape types over which the alignment passes. The values for each of the visual aspects are combined to arrive at an impact rating for each segment of the proposed corridor for each project component.

The fourth proposed corridor traverses the same landscape types in the same sequence as the initial three proposed corridors resulting in essentially the same potential visual impacts. A comparison of the proposed corridors must therefore concentrate on the differences between the proposed alternatives. The primary difference is the length of the four proposals, as potential impacts that affect a greater extent of the visual environment on a longer alignment will have a higher significance.

The impact assessment matrix factors in the length of the segment over which each project component has influence to arrive at an impact value for each segment and for each project component. The higher figures indicate a potentially greater visual impact resulting from the project component assessed. The segment impact values are added to arrive at the impact value for the entire project component.

To assess which of the proposed corridors is the preferred one, the impact values for each project component is added up to arrive at an overall impact value for the entire corridor. The results of the assessment indicate an order of preference for the proposed corridors as:

1. **Proposed Corridor 4 (only slightly longer than corridor 1 passing east of Hoopstad);**
2. Proposed Corridor 1 (shortest alignment passing west of Bultfontein across farmland);
3. Proposed Corridor 2 (alignment passing to the east of Bultfontein and alongside the R719); and
4. Proposed Corridor 3 (the longest alignment extending some distance to the west of Bultfontein ).

The impact values arrived at in the impact assessment matrix indicate the potential for visual impacts. A further assessment is required to determine the significance of the identified impacts. The method of assessing significance used for the overall environmental impact assessment report serves as a template for determining the significance of the potential visual impacts identified for the construction and operational phases of the proposed corridor. These assessments are summarised in Table 6.3.

**Table 6. 1: Impact Assessment Matrix revision 01**

	Transmission line impact value	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Impact rating	Affected portion in kilometres	Access roads	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Impact rating	Affected portion in kilometres	Cleared Servitude	Sense of place
<b>STUDY AREA</b>																												
<b>Overview of Entire Study Area</b>	<b>8,147</b>																											
Perseus to R708 / Bultfontein	1,440	4	4	6	9	6	4	3	3	3	3	30	48	336	2	2	3	3	3	2	1	1	1	1	14.0	24.0	-	2
R708 / Bultfontein	72	2	2	2	9	6	6	3	3	3	3	24	3	17	1	1	1	3	3	3	1	1	1	1	11.0	1.5	-	1
R708 / Bultfontein to Vet River	966	4	4	2	6	6	4	3	3	3	3	23	42	231	2	2	1	2	3	2	1	1	1	1	11.0	21.0	-	2
Vet River	105	6	6	6	9	4	4	3	6	6	5	30	3.5	26	3	3	3	3	2	2	1	2	2	1	14.7	1.8	49	3
Vet River to Wesselsbron	572	4	4	2	9	6	4	3	3	3	3	26	22	132	2	2	1	3	3	2	1	1	1	1	12.0	11.0	-	2
Weselsbron to Mercury	3,216	4	4	2	6	6	6	3	3	6	4	24	134	804	2	2	1	2	3	3	1	1	2	1	12.0	67.0	-	2
	6,371													1,545														49
<b>Corridor 1</b>	<b>6,843</b>																											
Perseus to R708 / Bultfontein	1,421	4	4	6	9	4	6	3	3	6	4	29	49	686	2	2	3	3	2	3	1	1	2	1	14.0	49	-	2
R708 / Bultfontein	51	2	2	2	3	6	6	3	3	6	4	17	3	27	1	1	1	1	3	3	1	1	2	1	9.0	3	-	1
R708 / Bultfontein to Vet River	756	4	4	4	9	6	4	3	3	6	4	27	28	36	2	2	2	3	3	2	1	1	2	1	13.0	3	-	2
Vet River	180	6	6	6	9	4	4	3	6	6	5	30	6	88	3	3	3	3	2	2	1	2	2	1	14.7	6	84	3
Vet River to Wesselsbron	480	4	4	2	9	6	2	3	3	3	3	24	20	220	2	2	1	3	3	1	1	1	1	1	11.0	20	-	2
Weselsbron to Mercury	2,300	4	2	2	9	6	6	3	3	6	4	25	92	331	2	1	1	3	3	3	1	1	2	1	12.0	28	-	2
	5,188													1,389														84
<b>Corridor 2</b>	<b>7,417</b>																											
Perseus to R708 / Bultfontein	1,800	4	4	6	9	6	4	3	3	3	3	30	60	277	2	2	3	3	3	2	1	1	1	1	14.0	20	-	2
R708 / Bultfontein	93	6	6	4	6	6	6	3	3	3	3	31	3	45	3	3	2	2	3	3	1	1	1	1	15.0	3	-	3
R708 / Bultfontein to Vet River	901	6	4	6	9	6	6	3	3	3	3	34	26.5	-	3	2	3	3	3	3	1	1	1	1	16.0	-	-	3
Vet River	204	6	6	6	9	6	6	3	6	6	5	34	6	-	3	3	3	3	3	3	1	2	2	1	16.7	-	96	3
Vet River to Wesselsbron	696	4	4	4	9	6	6	3	3	6	4	29	24	-	2	2	3	3	3	3	1	1	2	1	14.0	-	-	2
Weselsbron to Mercury	2,829	4	2	4	6	6	6	3	6	6	5	23	123	295	2	1	2	2	3	3	1	2	2	1	12.0	25	-	2
	6,523													617														96
<b>Corridor 3</b>	<b>7,428</b>																											
Perseus to R708 / Bultfontein	1,344	4	4	6	9	6	2	3	3	3	3	28	48	312	2	2	3	3	3	1	1	1	1	1	13.0	24	-	2
R708 / Bultfontein	-	4	6	4	6	6	2	3	3	3	3	25	0	-	2	3	2	2	3	1	1	1	1	1	12.0	-	-	2
R708 / Bultfontein to Vet River	1,008	4	4	2	9	6	2	3	3	3	3	24	42	-	2	2	1	3	3	1	1	1	1	1	11.0	-	-	2
Vet River	91	6	6	4	9	4	2	3	6	6	5	26	3.5	-	3	3	2	3	2	1	1	2	2	1	12.7	-	42	3
Vet River to Wesselsbron	528	4	4	2	9	6	2	3	3	3	3	24	22	-	2	2	1	3	3	1	1	1	1	1	11.0	-	-	2
Weselsbron to Mercury	3,752	4	4	4	9	6	4	3	3	3	3	28	134	174	2	2	2	3	3	2	1	1	1	1	13.0	13	-	2
	6,723													486														42
<b>Corridor 4</b>	<b>6,710</b>																											
Perseus to R708 / Bultfontein	1,440	4	4	6	9	4	6	3	3	3	3	30	48	444	2	2	3	3	2	3	1	1	1	1	14.0	32	-	2
R708 / Bultfontein	-	4	6	4	6	6	2	3	3	3	3	25	0	-	2	3	2	2	3	1	1	1	1	1	12.0	-	-	2
R708 / Bultfontein to Vet River	1,008	4	4	2	9	6	2	3	3	3	3	24	42	462	2	2	1	3	3	1	1	1	1	1	11.0	42	-	2
Vet River	192	6	6	6	9	4	6	3	6	6	5	32	6	94	3	3	3	3	2	3	1	2	2	1	15.7	6	90	3
Vet River to Wesselsbron	624	2	4	2	9	6	6	3	3	3	3	26	24	-	1	2	1	3	3	3	1	1	1	1	12.0	-	-	1
Weselsbron to Mercury	1,974	4	2	2	6	6	6	3	3	9	5	21	94	207	2	1	1	2	3	3	1	1	3	1	11.0	19	-	2
	5,238													1,206														90



**Table 6.1 continued: Impact Assessment Matrix revision 01.**

	Sub-stations	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Impact rating	Affected portion in kilometres	Construction camps equip. & materials	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Impact rating	Affected portion in kilometres	Construction crew housing	
<b>STUDY AREA</b>																												
<b>Overview of Entire Study Area</b>																												
Perseus to R708 / Bultfontein	34	6	4	6	6	9	6	3	3	3	3	34.0	1.0	25	4	4	3	6	6	4	2	2	1	1.7	25.3	1	35	
R708 / Bultfontein	-	3	2	2	6	9	9	3	3	3	3	28.0	-	-	2	2	1	6	6	6	2	2	1	1.7	21.3	0	-	
R708 / Bultfontein to Vet River	-	6	4	2	4	9	6	3	3	3	3	28.0	-	-	4	4	1	4	6	4	2	2	1	1.7	21.3	0	-	
Vet River	-	9	6	6	6	6	6	3	6	6	6	2	36.7	-	-	6	6	3	6	4	4	2	4	2	1.7	27.3	0	-
Vet River to Wesselsbron	-	6	4	2	6	9	6	3	3	3	3	30.0	-	-	4	4	1	6	6	4	2	2	1	1.7	23.3	0	-	
Wesselsbron to Mercury	31	6	4	2	4	9	9	3	3	6	3	31.0	1.0	23	4	4	1	4	6	6	2	2	2	1.7	23.3	1	32	
	65													49													66	
<b>Corridor 1</b>																												
Perseus to R708 / Bultfontein	34	6	4	6	6	9	6	3	3	6	3	34.0	1.0	25	4	4	3	6	6	4	2	2	2	1.7	25.3	1	35	
R708 / Bultfontein	-	3	2	2	2	9	9	3	3	6	3	24.0	-	-	2	2	1	2	6	6	2	2	2	1.7	17.3	0	-	
R708 / Bultfontein to Vet River	-	6	4	4	6	9	6	3	3	6	3	32.0	-	-	4	4	2	6	6	4	2	2	2	1.7	24.3	0	-	
Vet River	-	9	6	6	6	6	6	3	6	6	6	2	36.7	-	-	6	6	3	6	4	4	2	4	2	1.7	27.3	0	-
Vet River to Wesselsbron	-	6	4	2	6	9	6	3	3	3	3	27.0	-	-	4	4	1	6	6	2	2	2	1	1.7	21.3	0	-	
Wesselsbron to Mercury	31	6	2	2	6	9	9	3	3	6	3	31.0	1.0	23	4	2	1	6	6	6	2	2	2	1.7	23.3	1	32	
	65													49													66	
<b>Corridor 2</b>																												
Perseus to R708 / Bultfontein	34	6	4	6	6	9	6	3	3	3	3	34.0	1.0	25	4	4	3	6	6	4	2	2	1	1.7	25.3	1	35	
R708 / Bultfontein	-	9	6	4	4	9	9	3	3	3	3	38.0	-	-	6	6	2	4	6	6	2	2	1	1.7	28.3	0	-	
R708 / Bultfontein to Vet River	-	9	4	6	6	9	9	3	3	3	3	40.0	-	-	6	4	3	6	6	6	2	2	1	1.7	29.3	0	-	
Vet River	-	9	6	6	6	9	9	3	6	6	6	2	42.7	-	-	6	6	3	6	6	2	4	2	1.7	31.3	0	-	
Vet River to Wesselsbron	-	6	4	4	6	9	9	3	3	6	3	35.0	-	-	4	4	2	6	6	6	2	2	2	1.7	26.3	0	-	
Wesselsbron to Mercury	31	6	2	4	4	9	9	3	6	6	3	31.0	1.0	22	4	2	2	4	6	6	2	4	2	1.7	22.3	1	32	
	65													48													66	
<b>Corridor 3</b>																												
Perseus to R708 / Bultfontein	31	6	4	6	6	9	3	3	3	3	3	31.0	1.0	23	4	4	3	6	6	2	2	2	1	1.7	23.3	1	32	
R708 / Bultfontein	-	6	6	4	4	9	3	3	3	3	3	29.0	-	-	4	6	2	4	6	2	2	2	1	1.7	22.3	0	-	
R708 / Bultfontein to Vet River	-	6	4	2	6	9	3	3	3	3	3	27.0	-	-	4	4	1	6	6	2	2	2	1	1.7	21.3	0	-	
Vet River	-	9	6	6	6	6	3	3	6	6	2	31.7	-	-	6	6	2	6	4	2	2	4	2	1.7	24.3	0	-	
Vet River to Wesselsbron	-	6	4	2	6	9	3	3	3	3	3	27.0	-	-	4	4	1	6	6	2	2	2	1	1.7	21.3	0	-	
Wesselsbron to Mercury	32	6	4	4	6	9	6	3	3	3	3	32.0	1.0	24	4	4	2	6	6	4	2	2	1	1.7	24.3	1	33	
	63													48													64	
<b>Corridor 4</b>																												
Perseus to R708 / Bultfontein	34	6	4	6	6	9	3	3	3	3	3	34.0	1.0	25	4	4	3	6	6	4	2	2	1	1.7	25.3	1	35	
R708 / Bultfontein	-	6	6	4	4	9	3	3	3	3	3	29.0	-	-	4	6	2	4	6	2	2	2	1	1.7	22.3	0	-	
R708 / Bultfontein to Vet River	-	6	4	2	6	9	3	3	3	3	3	27.0	-	-	4	4	1	6	6	2	2	2	1	1.7	21.3	0	-	
Vet River	-	9	6	6	6	9	3	6	6	2	39.7	-	-	-	6	6	3	6	4	6	2	4	2	1.7	29.3	0	-	
Vet River to Wesselsbron	-	3	4	2	6	9	3	3	3	3	3	30.0	-	-	2	4	1	6	6	6	2	2	1	1.7	23.3	0	-	
Wesselsbron to Mercury	29	6	2	2	4	9	9	3	3	9	3	29.0	1.0	21	4	2	1	4	6	6	2	2	3	1.7	21.3	1	30	
	63													47													64	

**Table 6. 2:** Impacts of proposed CORRIDOR 4 on the study area

Stage in project lifecycle <b>Corridor 4</b>	Extent	Duration	Intensity	Probability of occurrence /risk	Significance		Status	Confidence
					WOMM	WMM		
<b>Perseus to R708 / Bultfontein</b>								
<b>Construction</b>								
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low		
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Highly probable	Low to medium	Low		
Intrusion of transmission line on sense of place and visual quality of pans and elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
<b>Operation</b>								
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low		
Intrusion of transmission line on sense of place and visual quality of pans and elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
<b>R708 / Bultfontein</b>								
<b>Construction</b>								
None								
<b>Operation</b>								
None								

Stage in project lifecycle <b>Corridor 4</b>	Extent	Duration	Intensity	Probability of occurrence /risk	Significance		Status	Confidence
					WOMM	WMM		
<b>R708 / Bultfontein to Vet River</b>								
<b>Construction</b>								
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Probable	Low to medium	Low		
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
<b>Operation</b>								
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low		
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
<b>Vet River</b>								
<b>Construction</b>								
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for access roads and/or servitudes.	Site	Long term	Medium	Highly probable	Medium	Low		
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for construction camps or housing.	Site	Short term	Medium	Probable	Medium to high	Low to medium		

Stage in project lifecycle <b>Corridor 4</b>	Extent	Duration	Intensity	Probability of occurrence /risk	Significance		Status	Confidence
					WOMM	WMM		
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium		
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
Impact due to high visibility of transmission line and critical views from the R34 and R700 main roads.	Regional	Long term	Medium	Highly probable	Medium	Low to medium		
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views R34 and R700.	Regional	Medium term	Low	Probable	Low to medium	Low		
<b>Operation</b>								
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low		
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets within servitudes.	Site	Medium term	Medium	Probable	Medium	Low		
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
Impact due to high visibility of transmission line and critical views from the R34 and R700 main roads	Regional	Long term	Medium	Highly probable	Medium	Low to medium		
<b>Vet River to Wesselsbron</b>								
<b>Construction</b>								
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium		

Stage in project lifecycle <b>Corridor 4</b>	Extent	Duration	Intensity	Probability of occurrence /risk	Significance		Status	Confidence
					WOMM	WMM		
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
Impact due to high visibility of transmission line and critical views from the R59 main road.	Regional	Long term	High	Highly probable		Low to medium		
Impact due to high visibility of construction camps and lay down areas and / or construction housing and critical views from the R59 main road.	Regional	Medium term	Low	Probable	Low to medium	Low		
<b>Operation</b>								
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium		
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		
Impact due to high visibility of transmission line and critical views from the R59 main road.	Regional	Long term	High	Highly probable	High	Low to medium		
<b>Wesselsbron to Mercury</b>								
<b>Construction</b>								
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low		
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium		
Impact due to high visibility of transmission line and critical views from the R59, R30, and R504 main roads.	Regional	Long term	High	Highly probable	High	Low to medium		
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from the R59, R30, and R504 main roads.	Regional	Medium term	Low	Probable	Low to medium	Low		

Stage in project lifecycle <b>Corridor 4</b>	Extent	Duration	Intensity	Probability of occurrence /risk	Significance		Status	Confidence
					WOMM	WMM		
<b>Operation</b>								
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium		
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low		
Impact due to high visibility of transmission line and critical views from the R59, R30, and R504 main roads.	Regional	Long term	Medium	Highly probable	Medium	Low to medium		
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high		

WOMM: Without mitigation measures

WMM: With mitigation measures

## **7. RECOMMENDED MITIGATION / MANAGEMENT MEASURES**

The potential visual impacts associated with the project components comprising of the proposed fourth alignment and the initial three proposed alternatives identified in section 6 above all have the potential to impact negatively on the visual environment. It is not anticipated that any of the project components will have beneficial impacts in terms of the visual environment. The degree of visual impact can be managed through the establishment of a management plan that if followed can in order of preference avoid, remove, or minimise potential visual impacts.

The potential visual impacts that may result from the six project components would each require a different set of management objectives and mitigation measures due to their differing scale and nature of risk. The recommended management objectives and mitigation measures are discussed in the main visual impact assessment report and are applicable to the proposed fourth alignment.

## **8. ALTERNATIVES**

No new alternative links have been proposed.



## **9. DISCUSSION**

### **9.1 Goal**

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, to assess their significance, and to recommend a preferred alignment.

### **9.2 Assessment**

The visual environment, the project components, the potential risk sources associated with the project components and their assessed impact on the visual environment were investigated by examining the following visual aspects:

- Genius Loci (Sense of place)
- Visual Quality (Aesthetics)
- Landscape Character
- Surrounding Landscape Compatibility
- Scale
- Visual Absorption Capacity (VAC)
- Visibility (viewshed and viewing distance)
- Critical Views

#### **9.1.1 Visual Environment**

The study area is considered to be largely homogenous in terms of visual character and can be divided into three main landscape types: “grasslands”; “cultivated lands”; and “Acacia flood plains”. These three landscape types were digitised using 1:50 000 topocadastral plans and are illustrated in Figure 4.1.

The sensitivity to visual impacts for each segment of each of the proposed corridors was assessed in terms of the visual aspects listed above. The Acacia flood plain landscape type that occurs within the flood plains of the Vet and Vals rivers was highlighted as a particularly sensitive visual environment.

#### **9.1.2 Project components**

The proposed Mercury - Perseus 400 kV Transmission Line has been divided into project components which are each analysed separately for risk sources. Project components that have been identified are:

- The transmission line;
- Access roads;
- Cleared servitude;
- Sub-stations;
- Construction camps (equipment and lay down areas); and
- Campsites for construction crew housing.

#### **9.1.4**     *Potential risk sources*

The assessment of the risk sources of each proposed corridor considers the projects components comprising the corridor, the phase during which certain impacts are likely to occur, as well as the linear extent of each component and of the entire corridor.

The transmission line is considered to pose the greatest potential risk of visual impact during both the construction and the operational phases due to its height and metallic, industrial aesthetic.

The clearing of vegetation either for access roads or within servitudes to manage the risk of damage due to fire is considered to pose a potentially great risk of visual impact during both the construction and the operational phases, mainly within the river flood plains

The establishment of construction camps, lay down areas and housing poses a potential risk of visual impact during the construction phase in terms of critical views from main roads and places of gathering such as urban centres, schools and other public recreational and institutional areas.

#### **9.1.5**     *Assessment of potential visual impacts*

Assessments of the potential visual impacts for the fourth proposed alignment and each of the three initial corridors was carried out by means of a rating matrix, see **Table 6.1 Impact Assessment Matrix**. The basic assumption followed is that the risk associated with a project component increases in direct proportion to the linear extent in kilometres of that component. This assumption implies that for the four proposed corridors, where all else is equal, the risk of visual impacts is greatest for the corridor with the greatest length.

### 9.1.5 Preferred alignment

The results of the assessment indicate an order of preference for the proposed corridors as:

1. **Proposed Corridor 4 (slightly longer than Corridor 1 passing east of Hoopstad);**
2. Proposed Corridor 1 (shortest alignment passing immediately west of Bultfontein and further to the west of, Wesselsbron and Bothaville);
3. Proposed Corridor 2 (alignment passing to the east of Bultfontein then alongside the R719 to a point just north of Wesselsbron before sweeping around to the east of Bothaville); and
4. Proposed Corridor 3 (the longest alignment extending some distance to the west of Bultfontein , then passing just to the west and north of Wesselsbron, before sweeping wide to the east via Viljoenskroon to the Mercury substation).

Due to the high visibility of the study area it is therefore considered preferable to align the proposed transmission line along existing disturbance corridors or through areas where higher concentrations of infrastructure exist, even though these may include roads that would experience critical views of the line, rather than introducing a highly intrusive transmission line into areas with little or no visible infrastructure.

The proposed alignment of Corridor 4 improves on that of Corridor 1 and is the preferred alignment as it:

1. Follows existing disturbance corridors for most of its length,
2. Follows the railway line north of Bothaville rather than the main road; and
3. Is aligned well away from main roads where it crosses through grassland from the R59 to join the Corridor 1 alignment in the south.

### 9.1.6 Recommended mitigation

The potential visual impacts that may result from the six project components would each require a different set of management objectives and mitigation measures due to their differing scale and nature of risk. A comprehensive list of recommended management objectives and mitigation measures are outlined in section 7 for each project component.

### 9.1.7 Alternative alignments

Three alternative alignment links were proposed for the project (A, B & C). These links do not provide alternative routes that would result in lesser cumulative impacts than the already identified and preferred corridor 4.

## **9.2      *Monitoring of implementation of mitigation measures***

The recommended strategy for the monitoring of the effective implementation of recommended mitigation measures are discussed in the main visual impact assessment report and remain applicable to the proposed fourth alignment.

## **10. CONCLUSION**

The construction and operation of the proposed Mercury - Perseus 400 kV Transmission Line will result in visual impacts within the study area. The significance of these impacts without mitigation will be high due to the relative scale of the structures and the high visibility within the study area. These impacts will last for the entire operational life of the transmission line.

However should the mitigation measures and monitoring programs recommended in this study be implemented the significance of these impacts can be reduced to an acceptable level.

## **11. REFERENCES**

LYNCH, K. (1996). Good City Form. 10th Printing. Massachusetts Institute of Technology (MIT) Press, Cambridge, Massachusetts, USA.