environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.

15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES	NO ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

1) Project Title:

FREE STATE: Welkom: Thabong Interchange and the Associated Works on the National Route R730 Section 1 (Km 14.00)

2) Proponent and Environmental Assessment Practitioner:

SANRAL is proposing the rehabilitation of some sections of the R730 and Jan Hofmeyer Road, as well as the extension of the Jan Hofmeyer Road into the Thabong Township. These roads earmarked for rehabilitation are situated in Welkom, in the Free State Province. SANRAL appointed AECOM SA to design the Thabong Interchange and associated works. AECOM appointed Jeffares & Green (Pty) Ltd to undertake the Environmental Authorisation Process, for the above mentioned activities.

3) Project Details:

The proposed project consists of the following components:

4) Thabong Interchange and R730 upgrade:

This consists of the upgrading of the existing Thabong Interchange, as well as the upgrading and rehabilitation of approximately 5km of the existing R730. The proposed upgrade and rehabilitation will consist of the following (Refer to Figures 1 and 2):

- Rehabilitation of the existing dual carriageway between km 10 and km 11.1 (Section A-B);
- Proposed new intersection between km 11.1 and 12.2 (Sections B-F);
- Resealing of the existing single carriageway and construct new single carriageway on the Eastern side to become a dual carriageway between km 12.2 and km 15.1 (Sections F-G);
- Construction of six (6) new bridges which will form the interchange;
- Upgrading of four (4) existing bridges along the R730;
- Upgrading of three (3) exiting culverts along the R730; and
- Construction of four (4) new culverts along the R730 as part of the interchange and road upgrade;
- Construction of new stormwater management infrastructure, which also includes the culverts (new and existing) mentioned above.

The above mentioned route sections, and the location of the proposed new infrastructure and infrastructure to be upgraded are displayed on a Layout Plan attached to Appendix A. In addition, a detailed description of the above activities, and the location of these activities is provided in Section 2 of this Basic Assessment Report.

5) Proposed upgrade and extension of the Jan Hofmeyer Road:

- Rehabilitation of the existing dual carriage way between km 0 and km 1 (Sections D-C); and
- New Interchange and construction the Jan Hofmeyer Road extension which will be approximately 5.5 km in length between km 1 and km 5.5 (Sections C-E). An 800m section of this proposed new road will be a single carriageway, and the remainder of this road will be a dual carriage way to allow for access into the interchange. The area earmarked for the extension of the Jan Hofmeyer Road is already impacted by an existing dirt road, and many cross roads and foot paths (Refer to Figures 1 and 2);

- Construction of new stormwater management infrastructure.

The above mentioned route sections are displayed on a Layout Plan attached to Appendix A. In addition, a detailed description of the above activities, and the location of these activities is provided in Section 2 of this Basic Assessment Report.

6) Proposed Community Project:

SANRAL is also proposing a community project within the study area which will involve the construction of two pedestrian bridges, as well as various pedestrian walkways. Refer to Figure 3.

A Layout Plan showing the location of the pedestrian bridges and walkways are attached to Appendix A. In addition, a detailed description of the above activities, and the location of these activities is provided in Section 2 of this Basic Assessment Report.

7) Project Need and Desirability:

The area around the Thabong Interchange is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation, which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities and injuries are probably much higher than the statistics used in their assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads. Without this project, unsafe conditions in the area will remain.

8) Environmental Authorisation Phase History:

- Jeffares & Green (Pty) Ltd was appointed by AECOM on the 24th of October 2013 to undertake the Environmental Authorisation Process for this proposed project;
- An inception meeting was held with AECOM on the 11th of November 2013
- An initial site visit was undertaken on the 18th of November 2013
- The initial Public Participation Phase commenced on the 18th of November 2013 and involved:
  - BID Distribution to Adjacent Landowners and Affected Parties by hand and via e-mail;
  - Placement of site notices at various Public Places;
  - Placement of a notice in the Vista Newspaper which was published on the 16th of January 2014; and
  - Hosting of a Public Open Day on the 21st of January 2014 at the Thabong Community Hall;
- Undertaking of all Specialist Assessments between January and March 2014;
- Completion and submission of the Basic Assessment Application Form submitted to DEA on the 26th of May 2014;
- DEA acknowledge receipt of the application and issued a reference number on the 9th of June 2014 (14/12/16/3/3/1/1203);
- Extensive Liaison with the Department of Water Affairs (DWA) was undertaken between March to May 2014 and Water Use License Application Forms and a Water Use License Technical Report for obtaining a General Authorisation (GA) for the undertaking of Geotechnical Drilling activities within the wetland areas were compiled;
- A site visit with DWA was undertaken on the 28th May 2014, and the Application for GA application documentation was submitted to DWA on this day;
- A GA was issued by DWA on 12 June 2014;
- Phase 1 of the Geotech Drilling commenced during the week of 6-10 October 2014
- Jeffares & Green (Pty) Ltd submitted a formal written request to the Department of Environmental Affairs (DEA) on the 30th of October 2014, including details on all the project delays, and requesting extension on the Environmental Authorisation (EA) validity period;
- On the 24th of February 2015, DEA informed Jeffares that the application for extension of the EA validity period was not granted and that a new application in terms of the Environmental Impact Assessment Regulations of 2014 has to be submitted;

- All relevant engineering information, stormwater management, and the Geotechnical Assessment Report was received from AECOM during the period March – May 2015.

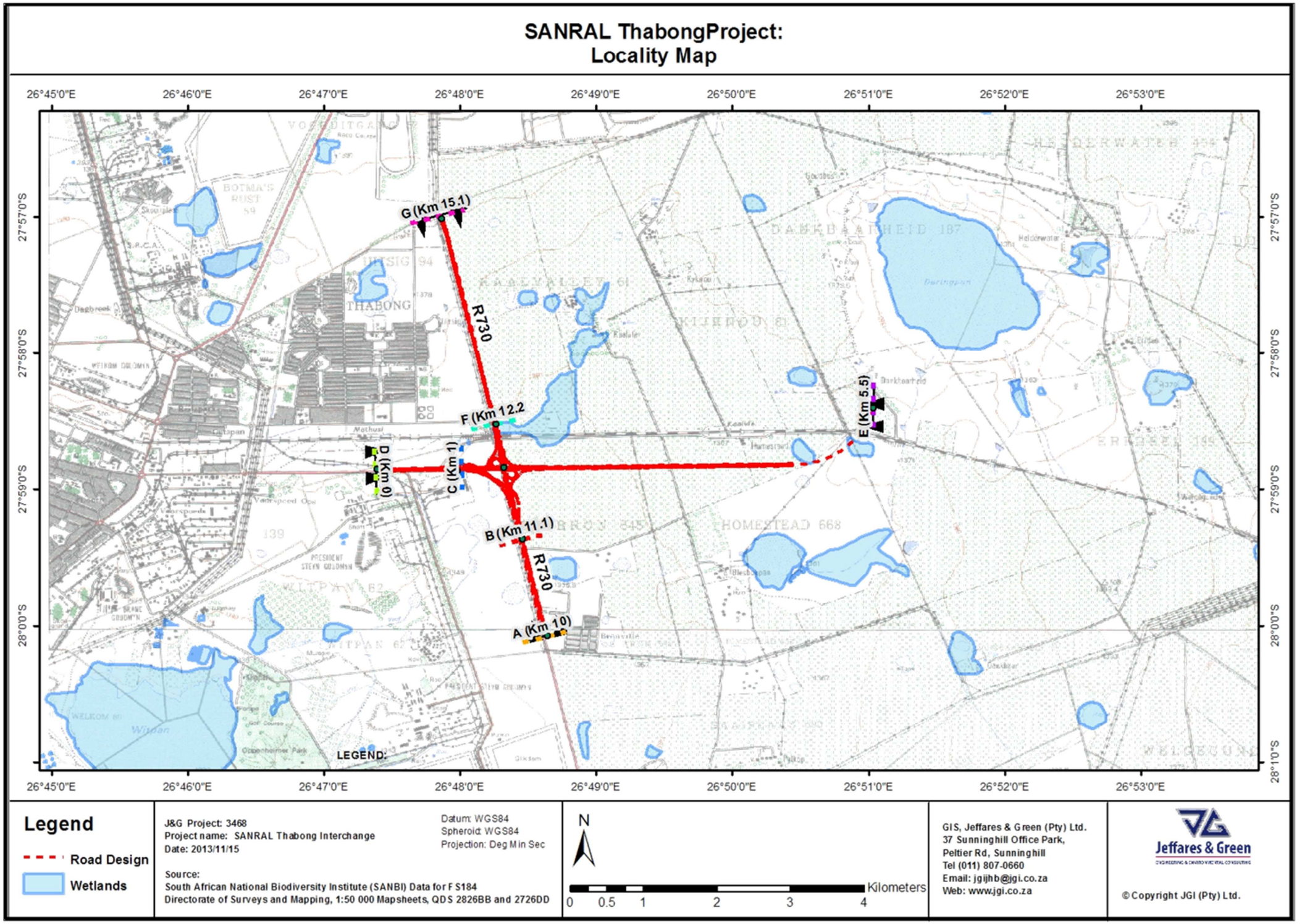


Figure 1: Locality Map

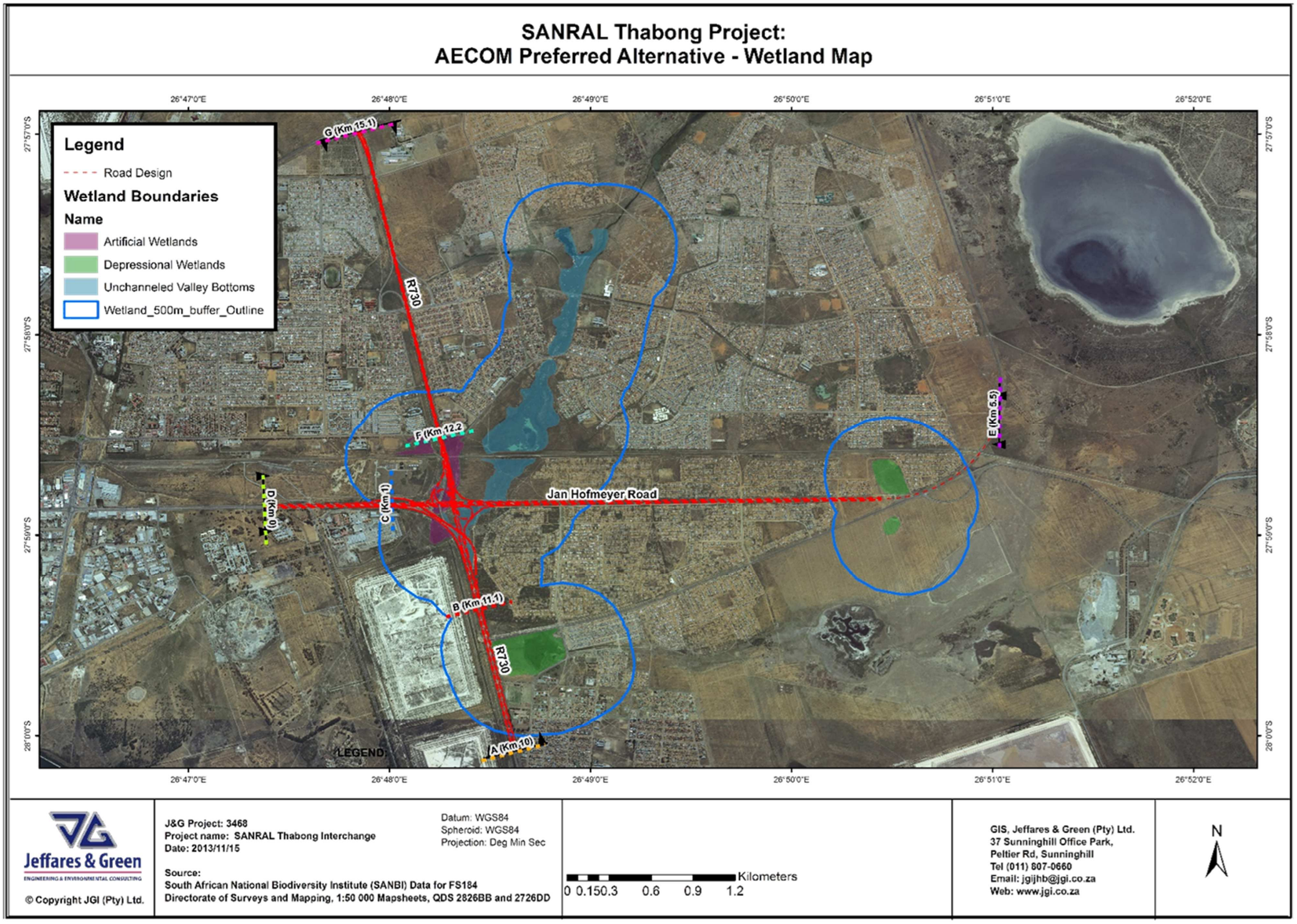


Figure 2: Locality and Wetland Map

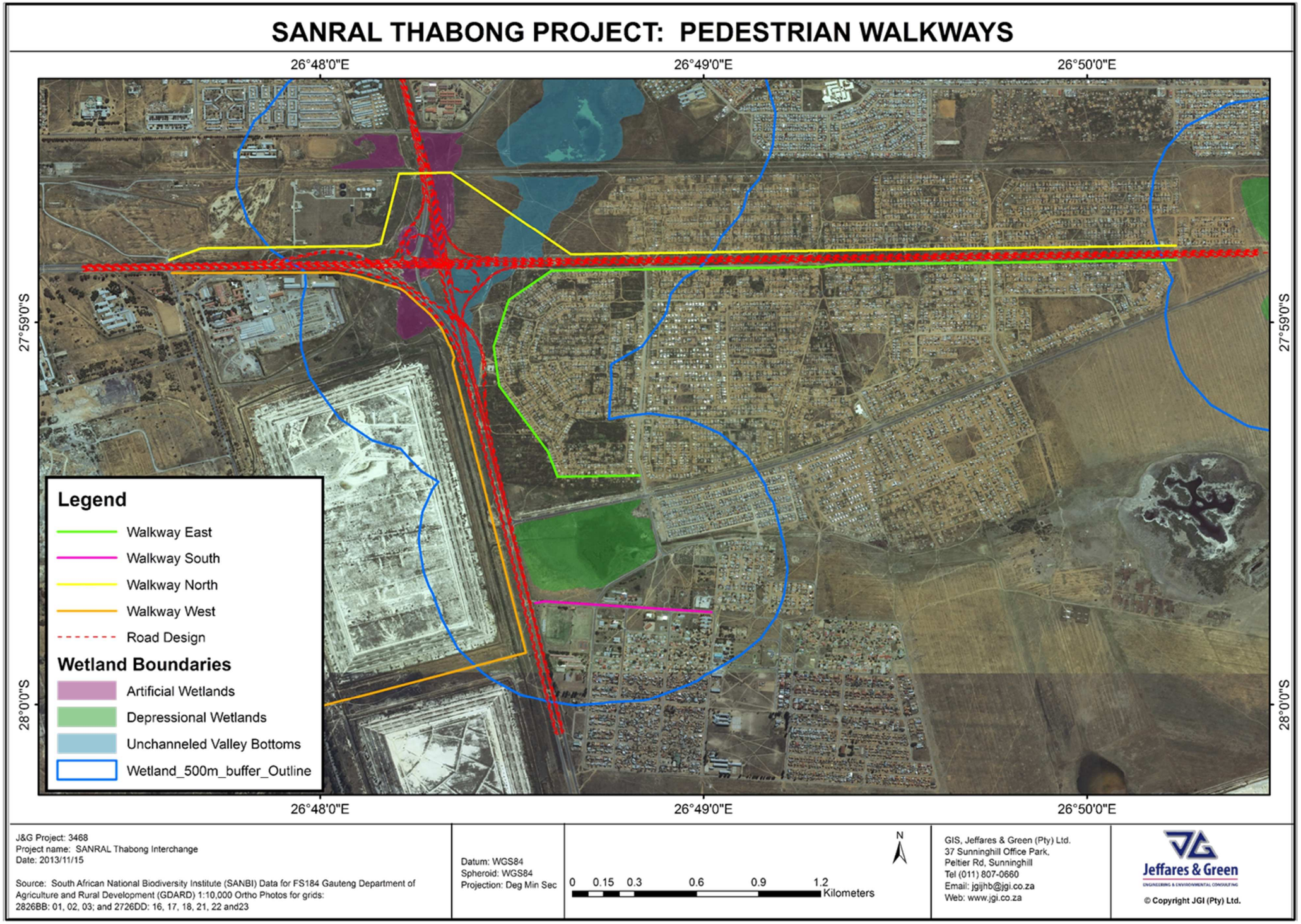


Figure 3: Pedestrian Walkway Layout Plan

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 983, 984 and 985	Description of project activity
GN 983 Activity 14: The development of- i. canals exceeding 100 square metres in size; ii. channels exceeding 100 square metres in size; iii. bridges exceeding 100 square metres in size; iv. dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; v. weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; vi. bulk storm water outlet structures exceeding 100 square metres in size; vii. marinas exceeding 100 square metres in size; viii. jetties exceeding 100 square metres in size; ix. slipways exceeding 100 square metres in size; x. buildings exceeding 100 square metres in size; xi. boardwalks exceeding 100 square metres in size; or xii. **infrastructure or structures with a physical footprint of 100 square metres or more**; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; - excluding- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing roads or road reserves.	This project will include the construction of a new interchange which will consist of various bridges and culverts which will be constructed within the delineated edges and within the buffer zones of wetland areas. Refer to the detailed descriptions in Section 2 of this Basic Assessment Report.

Listed activity as described in GN 983, 984 and 985	Description of project activity
GN 983 Activity 19: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- i. **a watercourse**; ii. the seashore; or iii. the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater- but excluding where such infilling, depositing , dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.	This project will include the construction of a new interchange which will consist of various bridges and culverts which will be constructed within the delineated edges and within the buffer zones of wetland areas. Refer to the detailed descriptions in Section 2 of this Basic Assessment Report.
GN 983 Activity 24: The development of- i. a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or ii. a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding- (a) roads which are identified and included in activity 27 in Listing Notice 2 of 2014; or (b) roads where the entire road falls within an urban area.	This project will include the upgrading and rehabilitation of the R730 and Jan Hofmeyer Road, as well as the extension of the Jan Hofmeyer Road. R730 Reserve width of 62m Jan Hofmeyer Reserve width of 64m
GN 983 Activity 48: The expansion of- i. canals where the canal is expanded by 100 square metres or more in size; ii. channels where the channel is expanded by 100 square metres or more in size iii. bridges where the bridge is expanded by 100 square metres or more in size; iv. dams, where the dam, including infrastructure and water surface area, is expanded by100 square metres or more in size; v. weirs, where the weir, including infrastructure and water surface area, is expanded by100 square metres or more in size; vi. bulk storm water outlet structures where the bulk storm water outlet structure is expanded by 100 square metres or more in size; or	Existing bridges and culverts will be widened as part of the road upgrade and rehabilitation. Refer to the detailed descriptions in Section 2 of this Basic Assessment Report.

Listed activity as described in GN 983, 984 and 985	Description of project activity
vii. marinas where the marina is expanded by 100 square metres or more in size; where such expansion or expansion and related operation occurs- (a) within a watercourse; (c) in front of a development setback; or (d) f no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding- (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads or road reserves.	
GN 983 Activity 49: The expansion of- (i) jetties by more than 100 square metres; (ii) slipways by more than 100 square metres; (iii) buildings by more than 100 square metres; (iv) boardwalks by more than 100 square metres; or (v) **infrastructure or structures where the physical footprint is expanded by 100 square metres or more**; where such expansion or expansion and related operation occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding- (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;	Existing bridges and culverts will be widened as part of the road upgrade and rehabilitation. Refer to the detailed descriptions in Section 2 of this Basic Assessment Report.

Listed activity as described in GN 983, 984 and 985	Description of project activity
(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads or road reserves.	
GN 983 Activity 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	This project will include the upgrading and rehabilitation of the R730 and Jan Hofmeyer Road, as well as the extension of the Jan Hofmeyer Road. R730 Reserve width of 62m Jan Hofmeyer Reserve width of 64m

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Please note that no site alternatives have been considered, as this project involves the rehabilitation and upgrade of an existing road.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

Refer to Section I - X below which provides a detailed description and location of all project components.

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred) • Starting point of the activity • Middle/Additional point of the activity • End point of the activity		
Alternative S2 (if any) • Starting point of the activity • Middle/Additional point of the activity • End point of the activity		
Alternative S3 (if any) • Starting point of the activity • Middle/Additional point of the activity • End point of the activity		

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

I. Proposed Interchange Upgrade

Proposed Interchange Upgrade (Centre Point of the Interchange)		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
	27° 58' 50.281" S	26° 48' 19.176" E

II. R730 Upgrade and Rehabilitation

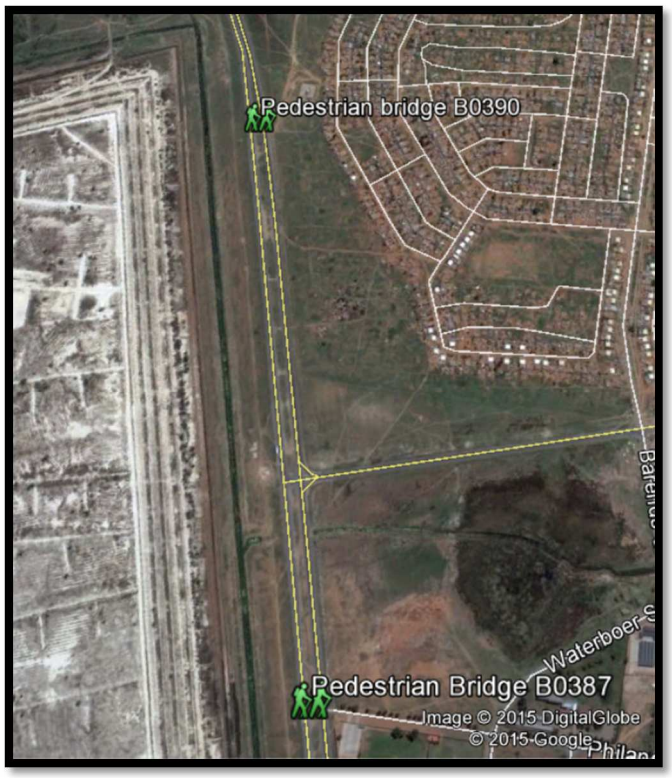
R730 Upgrade and Rehabilitation:		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
• Rehabilitation of the existing dual carriageway between km 10 and km 11.1 (Section A-B); • Proposed new intersection between km 11.1 and 12.2 (Sections B-F); • Resealing of the existing single carriageway and construct new single carriageway on the Eastern side to become a dual carriageway between km 12.2 and km 15.1 (Sections F-G). Refer to the Locality Map attached to Appendix A, as well as Figure 1 below.	A (km 10) 28° 0' 4.454" S B (km 11.1) 27° 59' 22.110" S F (km 12.2) 27° 58' 31.028" S G (km 15.1) 27° 56' 59.386" S	A (km 10) 26° 48' 37.474" E B (km 11.1) 26° 48' 26.758" E F (km 12.2) 26° 48' 15.094" E G (km 15.1) 26° 47' 50.690" E

III. Jan Hofmeyer Road Upgrade and Extension

Jan Hofmeyer Road Upgrade and Extension		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
9) Rehabilitation of the existing dual carriage way between km 0 and 1 (Sections D-C); and 10) New Interchange and construction the Jan Hofmeyer Road extension which will be approximately 5.5 km in length between km 1 and km 5.5 (Sections C-E). An 800m section of this proposed new road will be a single carriageway, and the remainder of this road will be a dual carriage way to allow for access into the interchange. The area earmarked for the extension of the Jan Hofmeyer Road is already impacted by an existing dirt road, and many cross roads and foot paths. Refer to the Locality Map attached to Appendix A, as well as Figure 1 below.	D (km 0) 27° 58' 51.502" S C (km 1) 27° 58' 50.981" S E (km 5.5) 27° 58' 23.691" S	D (km 0) 26° 47' 22.652" E C (km 1) 26° 48' 0.777" E E (km 5.5) 26° 51' 2.022" E

IV. Proposed New Pedestrian Bridges

Proposed New Pedestrian Bridges



Two Pedestrian Bridges are Proposed:

- **Pedestrian Bridge - B0387 Philander Street Overpass**

- **Pedestrian Bridge - B0390 Hani Park Overpass**

Description	Lat (DDMMSS)	Long (DDMMSS)
• **Pedestrian Bridge - B0387 Philander Street Overpass** ○ Continuous two-span main deck over R730 with spans of 25.5 m each ○ Continuous multiple span solid slab deck at ramps ○ Multiple circular and semi-circular column piers founded on piles.	27°59'11.44"S	26°48'24.50"E
• **Pedestrian Bridge - B0390 Hani Park Overpass** ○ Continuous three-span main deck over R730; with spans of 25.5 m each ○ Continuous multiple span solid slab deck at ramps ○ Multiple circular and semi-circular column piers founded on piles	27°59'44.11"S	26°48'32.36"E

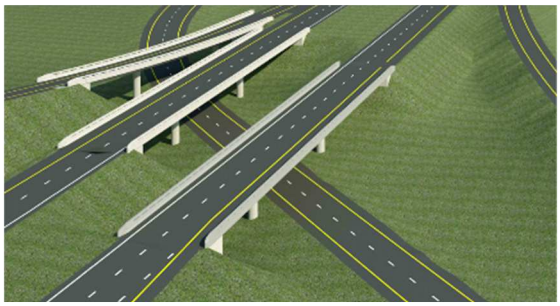
V. Proposed New Interchange Bridges

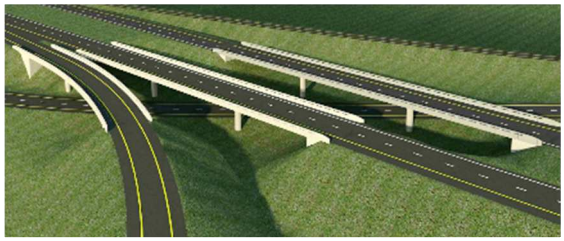
Proposed New Interchange Bridges

Six (6) new bridges are proposed, and details of each bridge is provided below.

- B0325A Thabong I/C - Jan Hofmeyer Road Underpass (R73NB)
- B0325B Thabong I/C – Jan Hofmeyer Road Underpass (R73SB)
- B0325D Thabong I/C – R73 Ramp and R73 SB to Jan Hofmeyer Road WB
- B0393A Thabong I/C – Jan Hofmeyer Road EB to R73 SB Ramp under R73 NB
- B0393B Thabong I/C – Jan Hofmeyer Road EB to R73 SB Ramp under R73 SB
- B0393D Thabong I/C – Ramp Jan Hofmeyer Road EB to R73 SB Ramp under Ramp Jan Hofmeyer Road WB to R73 SB

Please take note of the following:
There will be a total of six (6) Bridges at the interchange, and a total of seven (7) stormwater structures in the wetland area. Five (5) out of the 7 drainage structures are classified as bridges in terms of SANRAL's structure classifications.



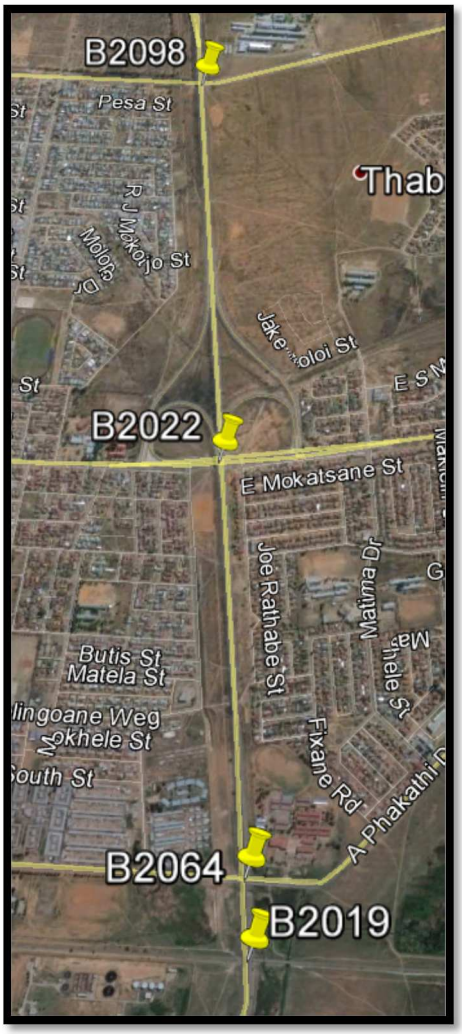


Proposed New Interchange Bridges		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
• **B0325A Thabong I/C - Jan Hofmeyer Road Underpass (R73NB)** ○ This proposed bridge will be a four (4) span continuous box girder bridge with spans of 21.8 m, 28.4 m, 28.4 m and 21.8 m, and with a total length of 100.4 m. ○ The bridge will be supported by multiple circular column piers founded on piles, with perched abutments founded on piles. ○ This bridge will accommodate the North Bound dual carriageway with widths between 14.4 m and 20.4 m.	26° 48' 16.052" E	27° 58' 53.192" S
• **B0325B Thabong I/C – Jan Hofmeyer Road Underpass (R73SB)** ○ This proposed bridge will be a four (4)-span continuous box girder bridge with spans of 21.8 m, 28.4 m, 28.4 m and 21.8 m, and with a total length of 100.4 m. ○ This bridge will be supported by single circular column piers founded on piles, and perched abutments founded on piles. ○ This bridge will accommodate the South Bound dual carriageway with a width of 10.9 m.	26° 48' 19.454" E	27° 58' 50.765" S
• **B0325D Thabong I/C – R73 Ramp and R73 SB to Jan Hofmeyer Road WB** ○ This bridge will form the South Bound off-ramp carriageway and will have a width of 8m. ○ The bridge will be a four (4)-span continuous box girder bridge with spans of 21.8 m, 28.4 m, 28.4 m and 21.8 m, and with a total length of 100.4 m. ○ This bridge will be supported by single round column piers founded on piles, and perched abutments founded on piles.	26° 48' 19.953" E	27° 58' 50.758" S
• **B0393A Thabong I/C – Jan Hofmeyer Road EB to R73 SB Ramp under R73 NB** ○ This bridge will be a three (3)-span continuous box girder deck bridge with spans of 26 m, 33 m and 26 m, and a total length of 85m; ○ This bridge will be supported by single circular column piers founded on piles, and perched abutments founded on piles; ○ This bridge will accommodate the North Bound dual carriageway with a width of 10.9m.	26° 48' 20.362" E	27° 58' 58.703" S
• **B0393B Thabong I/C – Jan Hofmeyer Road EB to R73 SB Ramp under R73 SB** ○ This will be a three (3)-span continuous box girder deck bridge with spans of 26 m, 33 m and 26 m, and a total length of 85m; ○ This bridge will be supported by single circular column piers founded on piles, and perched abutments founded on piles. ○ This bridge will accommodate the South Bound dual carriageway with a width of 10.9m.	26° 48' 21.566" E	27° 58' 59.492" S

Proposed New Interchange Bridges		
• **B0393D Thabong I/C – Ramp Jan Hofmeyer Road EB to R73 SB Ramp under Ramp Jan Hofmeyer Road WB to R73 SB** ○ This bridge will be the Jan Hofmeyer Road on-ramp to the R730 carriageway with a width of 8m. ○ This bridge will be a three (3)-span continuous box girder deck bridge with spans of 17.5 m, 30 m and 17.5 m, and with a length of 65m. ○ This bridge will be supported by single circular column piers founded on piles, and perched abutments founded on piles.	26° 48' 22.343" E	27° 59' 0.081" S

VI. Upgrade of Existing Bridges along the R730

Upgrade of Existing Bridges along the R730



- **B2098 Ndaki Street Underpass**

- **B2022 Nkoane Interchange**

- **B2064 Constantia Street Underpass**

- **B2019 Ross Kent South Bridge**

Upgrade of Existing Bridges along the R730		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
• **B2098 Ndaki Street Underpass:** Ndaki Street Underpass bridge is a simply supported deck with span length of 15.71 m.The existing bridge is 12.025 m wide and will be widened on the eastern side by 11.475 m to give a new total width of 23.5m	27°57'14.46"S	26°47'54.69"E
• **B2022 Nkoane Interchange** Nkoane Interchange Bridge is a two-span continuous deck with span lengths of 14.6 m, 17 m and a total bridge length of 31.6 m. The existing bridge various in width from 22.0 m to 24.3 m and will be widened on the eastern side by 15.4 m to 16.9 m, to give a new varying total width between 37.4 m to 41.2 m	27°57'52.93"S	26°48'5.74"E
• **B2064 A & B Constantia Street Underpass** Constantia Street Underpass bridge is a two-span continuous deck with spans of 30.75 m each and a total length of 61.5 m. The existing North Bound carriageway, Bridge A, is 12.0 m between parapets (no work is required on bridge A), the new proposed dualled South Bound carriageway, Bridge B, is 10.9 m between parapets. Bridge A and B is be divided by a varying median between 1.245 m to 2.3855 m.	27°58'30.19"S	26°48'15.07"E
• **B2019 A&B Ross Kent South Rail Underpass Bridge** The Ross Kent South Rail underpass bridge is a simply supported precast beam and slab deck with a span length of 17.5 m. The existing North Bound carriageway, Bridge A, will be widened by 4.05 m to give a new carriageway width of 16.90 m between parapets, the new proposed daulled South Bound carriageway, Bridge B, varies from 20.2 m to 21.3 m between parapets. Bridge A and B is be divided by a 7 m median.	27°58'36.80"S	26°48'15.98"E

VII. Proposed Pedestrian Walkways

Pedestrian Walkways

Two distinct types of foot paths are proposed for construction, namely a 2m wide foot path and a 1.5m wide foot path. Both of these footpaths will be paved. The 2m wide foot path will be used on the routes with the higher anticipated pedestrian traffic. The routes will be typically linked to sports and recreation facilities and public spaces. The 1.5m wide foot path can be seen as a feeder route to the 2m wide foot path route. Refer to the Layout Plan attached to Appendix A, as well as the various figures in this table below.

Description & Coordinates

Walkway North:

This walkway will be approximately 4.8km long.

Waypoint No	Lat (DDMMSS)	Long (DDMMSS
NW 1	27° 58' 47.994" S	26° 50' 13.913" E
NW 2	27° 58' 49.340" S	26° 48' 39.230" E
NW 3	27° 58' 36.531" S	26° 48' 20.458" E
NW 4	27° 58' 36.724" S	26° 48' 12.325" E
NW 5	27° 58' 47.706" S	26° 48' 9.535" E
NW 6	27° 58' 48.040" S	26° 48' 7.815" E
NW 7	27° 58' 48.410" S	26° 47' 41.439" E
NW 8	27° 58' 50.223" S	26° 47' 36.371" E

Pedestrian Walkways

Description & Coordinates

Walkway East:

This walkway will be approximately 4.2km long.

Waypoint No	Lat (DDMMSS)	Long (DDMMSS
EW 1	27° 59' 24.062" S	26° 48' 50.003" E
EW 2	27° 59' 24.243" S	26° 48' 37.150" E
EW 3	27° 59' 20.283" S	26° 48' 35.647" E
EW 4	27° 59' 10.002" S	26° 48' 28.007" E
EW 7	27° 59' 3.765" S	26° 48' 27.163" E
EW 8	27° 58' 56.430" S	26° 48' 29.519" E
EW 9	27° 58' 51.886" S	26° 48' 36.191" E
EW 10	27° 58' 51.286" S	26° 49' 18.590" E
EW 11	27° 58' 51.005" S	26° 49' 20.578" E
EW 12	27° 58' 50.244" S	26° 50' 13.953" E

Description & Coordinates

Walkway South:

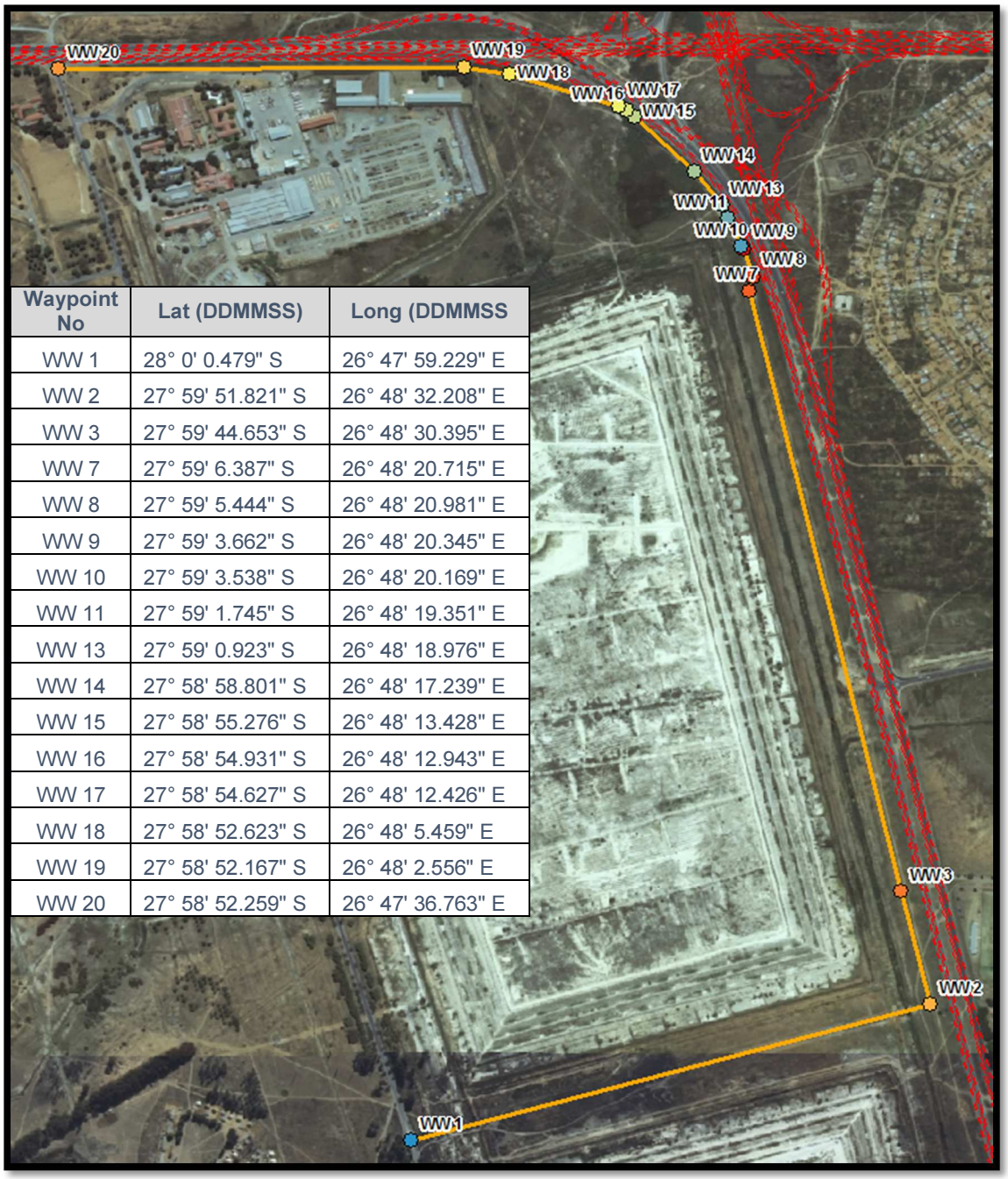
This walkway will be approximately 0.8km long.

Waypoint No	Lat (DDMMSS)	Long (DDMMSS
SW 1	27° 59' 45.406" S	26° 49' 1.216" E
SW 2	27° 59' 43.717" S	26° 48' 35.090" E
SW 3	27° 59' 44.007" S	26° 48' 33.637" E

Pedestrian Walkways

Description & Coordinates

Walkway West:
This walkway will be approximately 3.8km long.



Waypoint No	Lat (DDMMSS)	Long (DDMMSS
WW 1	28° 0' 0.479" S	26° 47' 59.229" E
WW 2	27° 59' 51.821" S	26° 48' 32.208" E
WW 3	27° 59' 44.653" S	26° 48' 30.395" E
WW 7	27° 59' 6.387" S	26° 48' 20.715" E
WW 8	27° 59' 5.444" S	26° 48' 20.981" E
WW 9	27° 59' 3.662" S	26° 48' 20.345" E
WW 10	27° 59' 3.538" S	26° 48' 20.169" E
WW 11	27° 59' 1.745" S	26° 48' 19.351" E
WW 13	27° 59' 0.923" S	26° 48' 18.976" E
WW 14	27° 58' 58.801" S	26° 48' 17.239" E
WW 15	27° 58' 55.276" S	26° 48' 13.428" E
WW 16	27° 58' 54.931" S	26° 48' 12.943" E
WW 17	27° 58' 54.627" S	26° 48' 12.426" E
WW 18	27° 58' 52.623" S	26° 48' 5.459" E
WW 19	27° 58' 52.167" S	26° 48' 2.556" E
WW 20	27° 58' 52.259" S	26° 47' 36.763" E

VIII. Proposed Upgrade of Existing Culverts

Existing Stormwater Infrastructure

There are currently seven (7) major culverts situated along the R730. Five (5) of these seven (7) culverts will be upgraded as part of the upgrading and rehabilitation of the R730. The image below shows the location all seven (7) existing culverts. A Drainage Assessment was undertaken by AECOM to determine current and future stormwater levels under flood conditions within the study area, in order to upgrade the existing bulk stormwater system and design the new stormwater system accurately in order to ensure sufficient drainage in the area during flood events to prevent flooding and ponding of water. The Draft Drainage Assessment Report Compiled by AECOM is attached to Appendix D of this Basic Assessment Report.

These 7 major culverts includes the following:

- Three (3) existing pedestrian culverts; and
- Four (4) existing stormwater culverts.

The Drainage Assessment included an assessment of the existing bulk stormwater system in the study area. This included a 1:100 year flood analysis of the existing scenario to determine a baseline of the existing 1:100 year flood extent. This analysis was required to ensure that the proposed upgrade of the interchange does not result in an increase in the flood levels during a 100 year storm event, specifically in the residential area.

The analysis have shown that approximately 20% of the 1:100 year stormwater peak runoff is conveyed downstream via the culvert system through the Thabong Interchange. The stormwater volumes are in excess of the capacity of the existing culverts. This leads to the overtopping of the railway line, and stormwater is then diverted along the east of the R730 in a southerly direction. This leads to flooding of parts of the Thabong residential area.

Existing Stormwater Infrastructure		
In addition, the prevailing topography and a sewer pump station located between the R730 as well as the residential area constricts flood flows, which results in the overtopping of the R730 in a westerly direction towards the canal situated adjacent to the mine dump. Major attenuation of flow occurs in the vicinity of the unlined canals located adjacent to the mine dump as a result of limited capacity of the main discharge canal that flows in a southerly direction. The attenuation of flow also results in a lack of capacity of the upstream drainage system through the interchange as a result of the backwater effect and the extremely flat prevailing slopes of the upstream drainage system. The current stormwater drainage system does not comply with Section 8.3 of the SANRAL Drainage Manual of 2013, and upgrades to five (5) of the seven (7) existing culverts are required to make the current drainage system compliant with Section 8.3. The additional stormwater infrastructure required for the proposed new interchange and the extension of Jan Hofmeyer Road will also be designed to comply with Section 8.3.		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
• **C0481 - Storm water culvert** ○ This culvert is known as the Tributary of Sand River, and is situated along the R730 Section 1, at km 12.288. ○ This culvert is 4 x 1.0 x 1.5 m in size. ○ The lengthening of this culvert is proposed as part of the road upgrade project.	27°58'34.29"S	26°48'15.49"E
• **C0116 - Pedestrian culvert** ○ This culvert is known as the Leseding Pedestrian Subway and is situated along the R730 Section 1, at km 12.889. ○ This culvert is 1 x 2.5 x 3 m in size. ○ The lengthening of this culvert is proposed as part of the road upgrade project.	27°58'15.07"S	26°48'11.05"E
• **C0477 - Pedestrian culvert** ○ This culvert is known as the Thabong Pedestrian Subway and is situated along the R730 Section 1, at km 13.289. ○ This culvert is 1 x 2.5 x 3 m in size. ○ The lengthening of this culvert is proposed as part of the road upgrade project.	27°58'2.49"S	26°48'7.82"E
• **C0478 - Storm water culvert** ○ This culvert is known as the Nkoane I/C: Culvert 1 and is situated along the R730 Section 1, at km 13.789. ○ This culvert is 1 x 2.5 x 3 m in size. ○ No work is required for this culvert as part of the road upgrade project.	27°57'44.70"S	26°48'10.71"E
• **C0479 - Storm water culvert** ○ This culvert is known as the Nkoane I/C: Culvert 2 and is situated along the R730 Section 1, at km 13.918. ○ This culvert is 1 x 2.5 x 3 m in size. ○ The lengthening of this culvert is proposed as part of the road upgrade project	27°57'42.33"S	26°48'2.87"E
• **C0480 - Storm water culvert** ○ This culvert is known as the Nkoane I/C: Culvert 3 and is situated along the R730 Section 1, at km 13.95. ○ This culvert is 1 x 2.5 x 3 m in size. ○ No work is required for this culvert as part of the road upgrade project.	27°57'41.70"S	26°48'0.32"E
• **C0112 - Pedestrian culvert** ○ This culvert is known as the Thabong Pedestrian Subway 2 and is situated along the R730 Section 1, at km 14.439.	27°57'25.95"S	26°47'58.75"E

Existing Stormwater Infrastructure		
○ This culvert is 1 x 2.5 x 3 m in size. ○ The lengthening of this culvert is proposed as part of the road upgrade project.		

IX. Proposed New Stormwater Infrastructure

New Stormwater Infrastructure

A Drainage Assessment was undertaken by AECOM to determine current and future stormwater levels under flood conditions within the study area, in order to upgrade the existing bulk stormwater system and design the new stormwater system accurately in order to ensure sufficient drainage in the area during flood events to prevent flooding and ponding of water. The Draft Drainage Assessment Report Compiled by AECOM is attached to Appendix D of this Basic Assessment Report.

The proposed upgrading and extension of the Jan Hofmeyer Rd to the east of the interchange will create a barrier which will restrict the flood flows originating mainly from the Sand River Tributary, and this will results in ponding upstream of the interchange and Jan Hofmeyer Road during large storm events. The bridge and culverts structures at the Thabong interchange and Jan Hofmeyer Road were modelled and designed as a combined drainage system to conform to the Drainage Manual requirements and to limit the 1 in 100 year flood extent encroaching on the Thabong residential area. The following stormwater infrastructure are proposed:

- A berm is proposed for construction between point J, up to the road embankment at point K *(refer to Map 5.6 on page 14 of the Draft Drainage Assessment Report attached to Appendix D of this Basic Assessment Report)*. This berms is required to guide the surface water runoff through the proposed bridge and culvert at point K, and to limit it from encroaching on the residential area downstream of Jan Hofmeyer Road and to the east of the R730;
- A weir in line with the berm is proposed at point L which is located approximately 1.4m above the invert level of the box culverts at point K *(refer to Map 5.6 on page 14 of the Draft Drainage Assessment Report attached to Appendix D of this Basic Assessment Report).* The weir will control the flow at point L and will minimise uncontrolled lateral overflow on the berm during larger storm events. All flow conveyed across the weir will be conveyed to an inlet structure located at point M (refer to Map 5.6 on page 14 of the Drainage Assessment Report attached to Appendix D of this Basic Assessment Report). This inlet structure will be located in a trapped low point, and stormwater runoff from the residential area to the east of the R730 will also be conveyed towards this inlet structure;
- Most of the surface water flow from the interchange and the upstream catchment is conveyed further downstream by the existing mine canal, which flows from point F in a southerly direction along the mine dump *(refer to Map 5.6 on page 14 of the Draft Drainage Assessment Report attached to Appendix D of this Basic Assessment Report).* This existing canal will be widened for a distance of 925m, and will be provided with a concrete lining, designed to accommodate lower order floods. The lining will also greatly assist with the maintenance of the canal. The widening of the canal will create adequate conveyance capacity, thereby reducing the attenuation of flow in this area. The widening of the canal will further improve the capacity of the upstream stormwater system, where backwater effects are experienced as a result of the extremely flat slopes of the upstream drainage systems.

All new proposed bridges which will form part of the Thabong Interchange will consist of multiple culvert cells, as per the bridge structure classification criteria stipulated in Section 8 of the SANRAL Drainage Manual, 2013. The proposed drainage system at the interchange will consist of two major stormwater conveyance systems, namely the Western and Eastern conveyance systems. Each of these two systems will be designed to handle a portion of the peak discharge. The Westerns system will follow the route of the existing drainage system through the interchange, while the Eastern system crosses Jan Hofmeyer Road to the east of the interchange on-off ramps. These conveyance systems consists of bridge and major culvert structures (and associated open channels between the structures), as indicated in Figure 5-5 on page 13 of the Draft Drainage Assessment Report attached to Appendix D of this Basic Assessment Report: (Please note however that only a Draft Drainage Assessment Report is currently available, and the detailed design phase of the stormwater

New Stormwater Infrastructure

infrastructure is currently underway by AECOM. The number of culverts proposed may change during the detailed design phase, however, AECOM confirmed that the overall development footprint will not change.
 	
• Western Conveyance System:
  ○ Bridge B0405: 9 / 1.8 x 1.2 m box culverts;
  ○ Bridge B0406: 10 / 1.8 x 1.2 m box culverts;
  ○ Bridge B9001: 10 / 1.2 x 1.2 m & 6 / 1.8 x 0.9 m box culverts; and
  ○ Major Culvert C0492: 4 / 1.5 x 0.9 m box culverts
• Eastern Conveyance System:
  ○ Bridge B0407: 23 / 1.8 x 0.9 m box culverts;
  ○ Bridge B0408: 16 / 1.8 x 1.2 m box culverts; and
  ○ Major Culvert C0491: 3 / 1.8 x 1.2 m box culverts.
 	
In addition, Culvert C0496, an existing lesser structure consisting of 2 / 0.9 x 0.45 m box culverts, did not satisfy the hydraulic capacity requirements. It is therefore proposed that the existing structure be replaced with a new major culvert structure consisting of 4 / 3.0 x 1.2 m box culverts.
 	
Please take note of the following:
There will be a total of six (6) Bridges at the interchange, and a total of seven (7) stormwater structures in the wetland area. Five (5) out of the 7 drainage structures are classified as bridges in terms of SANRAL's structure classifications.

Description	Lat (DDMMSS)	Long (DDMMSS)
Bridge B0405: 9 / 1.8 x 1.2 m box culverts	27°58'46.37"S	26°48'18.48"E
Bridge B0406: 10 / 1.8 x 1.2 m box culverts	27°58'50.73"S	26°48'15.31"E
Bridge B9001: 10 / 1.2 x 1.2 m & 6 / 1.8 x 0.9 m box culverts	27°58'54.34"S	26°48'13.24"E
Major Culvert C0492: 4 / 1.5 x 0.9 m box culverts	27°58'46.33"S	26°48'14.06"E
Bridge B0407: 23 / 1.8 x 0.9 m box culverts	27°58'50.79"S	26°48'30.62"E
Bridge B0408: 16 / 1.8 x 1.2 m box culverts	27°59'02.96"S	26°48'22.37"E
Major Culvert C0491: 3 / 1.8 x 1.2 m box culverts	27°59'04.09"S	26°48'22.92"E
Major Culvert C0496: 4 / 3.0 x 1.2 m box culverts	27°59'34.49"S	26°48'29.87"E

X. Construction Phase Temporary Infrastructure

Description	Lat (DDMMSS)	Long (DDMMSS
SANRAL and the contractor will decide prior to commencement of construction activities where the construction camp will be situated. The construction camp may not be situated within the floodline, riparian or wetland area. The construction camp will include the following amongst others: • Site office; • Temporary refuelling area; • Temporary ablution facilities; • Hazardous materials storage area; • Concrete batching area; • Area for mixing of stone chips with pre-coating liquid, and storage of these coated stone chips; • Overnight parking area for all machinery and construction vehicles; • Demarcated general waste and hazardous waste storage areas; • Demarcated area for the storage of construction road signs, surveyor pegs, and all other construction materials.	To be confirmed prior to commencement of construction activities	To be confirmed prior to commencement of construction activities

Description	Lat (DDMMSS)	Long (DDMMSS
No contractor's camp will be erected. All construction personnel will be housed in the Welkom area.	Not Applicable	

b) Lay-out alternatives

This project is for the upgrade of an existing road and interchange, hence layout alternatives were limited. Two layout alternatives were considered for the upgrading of the interchange. The centre point of the two alternatives are exactly the same. Images of the two alternatives considered are provided below. Drawings of these two alternatives are attached to Appendix A. As Jan Hofmeyer Road will be constructed within an already proclaimed road reserve, layout alternatives could not be considered for Jan Hofmeyer Road.

Layout Alternative 1:	Layout Alternative 2 (Preferred Alternative)
	

Alternative 1 vs Alternative 2

Alternative 1:

- *Alternative 1 is a compact option and will be cheaper to construct than Alternative 2, however, it includes two at-grade interchange terminals.*
- *The interchange terminals will not be able to operate as one-way stop controlled intersections in the long run. There is not adequate space to provide roundabouts at these junctions, and they will have to be signalized as soon as Masimong and Bruntville areas develop, if not earlier.*
- *The eastern interchange terminal can operate satisfactorily as an all-way stop controlled until the Masimong and Bruntville areas develop in future, provided that two east-west lanes are provided per direction and also two right turn lanes from the off-ramp. The double right-turn lane is unorthodox for an all-way stop-controlled intersection and should be avoided if possible.*
- *At the western interchange terminal, the high flow of through traffic towards Welkom in the morning will make the right turn from the off-ramp towards Thabong (albeit a low volume) unsafe from the onset (i.e. even before the Masimong and Bruntville areas are developed), unless an all-way stop controlled intersection is provided.*
- *Considering the above, both interchange terminals should be signalized from the onset if interchange layout Alternative 1 is implemented.*

Alternative 2:

- If Alternative 2 is implemented, there will be only one at-grade interchange terminal.
- The interchange terminal can operate comfortably as a one-way stop controlled intersection until Masimong and Bruntville areas develop in future. At that stage the intersection should be signalized.
- By 2031 the conflicting traffic flows at the interchange terminal would be substantially lower than for the Alternative 1 interchange terminals. The east-west road between Welkom and Thabong will have to be a 4-lane road (i.e. two through lanes per direction) with a single short right turn lane from the east.

- One concern about Alternative 2 is the high volume of traffic on the loop in the south-eastern quadrant by 2031 (AM peak hour). If traffic on the loop exceeds capacity far into the future it would be difficult to improve the capacity of the turning movement.

A key difference between the two Alternatives is that the high right turn traffic volume (in the morning) from the north towards Welkom (1444 veh/h by 2031) is accommodated through an at-grade interchange terminal in Alternative 1 compared to a free-flow loop in Alternative 2.

First order estimates of the project cost of the two alternatives indicate that the cost of Alternative 2 will be R32m higher.

Conclusion - Alternative 1 vs Alternative 2:

Taking into consideration all of the abovementioned SANRAL decided that the Detail Design of the Thabong Interchange should be based on Alternative 2.

Alternative 2 Layout Optimization

After adopting Alternative 2 as the preferred alternative for which the detailed design should be done SANRAL requested further investigation into the possible modification and optimization of the preferred layout. In response to the request a further five options based on Alternative 2 were investigated. A document providing details on these five (5) alternatives is attached to Appendix A of this Basic Assessment Report. A summary of the outcome is provided below:

Alternative 2 – Option 1:
- Free-flow movements in all directions but one;
- Five directional ramps, two loops and one at-grade intersection provided;
- One at-grade intersection on Jan Hofmeyer affecting two traffic movements only. That is Jan Hofmeyer EB and Jan Hofmeyer WB to R730 NB;
- All the most important turning movements are free-flow;
- Substandard YLBP Distances between Thabong Interchange and Nkoane Rd Interchange optimized;

Alternative 2 – Option 2:
- Free-flow movements in all directions;
- Five directional ramps and three loops provided;
- Parclo type loop configurations with less than 200 m weaving distance directly on R730 NB and Jan Hofmeyer WB impacting capacity and traffic flow;
- Substandard YLBP Distances between Thabong Interchange and Nkoane Rd Interchange optimized;

Alternative 2 – Option 3:
- Free-flow movements in all directions;
- C-D Road along R730 SB, four directional ramps and four loops provided;
- Parclo type loop configurations with less than 200 m weaving distance directly on R730 NB and Jan Hofmeyer WB and EB impacting capacity and traffic flow;
- Substandard YLBP Distance on R730 SB between Nkoane Rd and Thabong interchanges **NOT** optimized;
- Distance between end of SB to EB ramp and first at grade intersection on Jan Hofmeyer east of interchange less than 200 m (too short).

Alternative 2 – Option 4:
- Free-flow movements in all directions;
- C-D Roads along R730 SB and NB, four directional ramps and four loops provided;
- Parclo type loop configurations with less than 200 m weaving distance directly on Jan Hofmeyer WB and EB impacting capacity and traffic flow;

- Substandard YLBP Distance on R730 SB and NB between Nkoane Rd and Thabong interchanges **NOT** optimized;
- Distance between end of SB to EB ramp and first at-grade intersection on Jan Hofmeyer east of interchange less than 200 m (too short).

Alternative 2 – Option 5:

- Free-flow movements in all directions but two;
- C-D Roads along R730 SB and NB, four directional ramps, four loops and two at-grade intersections on Jan Hofmeyer provided;
- Parclo type loop configurations with less than 200 m weaving distance directly on Jan Hofmeyer WB and EB impacting capacity and traffic flow;
- Substandard YLBP Distance on R730 SB and NB between Nkoane Rd and Thabong interchanges **NOT** optimized;
- At-grade intersections on Jan Hofmeyer with less than 200 m spacing impacting capacity and traffic flow.

Conclusion – Alternative 2 Options 1-5

After evaluating the results of the abovementioned investigation SANRAL decided to adopt Alternative 2, Option 1 as the interchange layout for which the Detail Design should be completed. The decision was amongst others based on the following considerations.

- The best YLBP Distances between the Thabong and Noakane interchanges is obtained with this option;
- Weave, merge and diverge movements over short distances on both carriageways of R730 are eliminated;
- The one at-grade intersection on Jan Hofmeyer will have less of an impact on the capacity of the road than is the case with the short weaving distances associated with the other options;
- High level cost comparisons indicate that construction cost of this option will be lower than, or similar to that of the other options.

The various layout drawings for Alternative 2 Options 1-5 are attached to Appendix A of this Basic Assessment Report.

Please note that these layout alternatives were not assessed as part of the Impact Assessment, as the feasibility of all alternatives were determined based on engineering designs and cost implications. No site alternatives or major layout alternatives were possible as this project involves the upgrading the rehabilitation of an existing roads. All alternatives layouts considered will occur within the same footprint, and all construction and operational phase impacts will therefore be similar.

Alternative 2 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Layout Alternative 2 (Refer to above description)	27° 58' 50.281" S	26° 48' 19.176" E
Alternative 1		
Description	Lat (DDMMSS)	Long (DDMMSS)
Layout Alternative 1 (Refer to above description)	27° 58' 50.281" S	26° 48' 19.176" E
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 2 (preferred alternative)
N/A
Alternative 1
Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 2 (preferred alternative)		
N/A		
Alternative 1		
Alternative 3		

e) No-go alternative

The area around the Thabong Interchange is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation, which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities and injuries are probably much higher than the statistics used in the assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads. Without this project, unsafe conditions in the area will remain.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative: (Total footprint of the proposed interchange)	**Size of the activity:**
Alternative A2[1] (preferred activity alternative)	316 000 m²
Alternative A1 (if any)	m²
Alternative A3 (if any)	m²

or, for linear activities:

[1] "Alternative A.." refer to activity, process, technology or other alternatives.

Alternative: (Total footprint of the R730 & upgrades & the Jan Hofmeyer Road upgrades & extension)	**Length of the activity:**
Alternative A2 (preferred activity alternative)	11 300 m
Alternative A1 (if any)	m
Alternative A3 (if any)	m

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative: (Total footprint of all the servitudes for the road upgrades, new road section and the interchange)	**Size of the site/servitude:**
Alternative A2 (preferred activity alternative)	1 119 232 m^2
Alternative A1 (if any)	m^2
Alternative A3 (if any)	m^2

4. SITE ACCESS

Does ready access to the site exist?	YES ✓	NO
If NO, what is the distance over which a new access road will be built		m

Describe the type of access road planned:

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s;)
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal

minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES ✓	NO	Please explain
The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES ✓	NO	Please explain
The Provincial Spatial Development Framework (PSDF) gives effect to the Free State 2030 vision and the Free State Growth and Development Strategy (FSGDS). As outlined in the Free State SDF (revised 25 February 2013) the FSGDS is based on six growth and development pillars, each of which has its own set of drivers, as listed below: Pillar 1: Inclusive economic growth and sustainable growth job creation *Driver 1: Diversify and expand agricultural development and food security* *Driver 2: Minimise the impact of the declining mining sector and ensure that existing mining potential is harnessed* *Driver 3: Expand and diversify manufacturing opportunities* ***Driver 4: Capitalise on transport and distribution opportunities*** *Driver 5: Harness and increase tourism potential and opportunities* Pillar 2: Education, Innovation and skills development *Driver 6: Ensure an appropriate skills base for growth and development* Pillar 3: Improved Quality of life *Driver 7 Curb crime and streamline criminal justice performance* ***Driver:8 Expand and maintain basic road infrastructure*** *Driver 9: Facilitate sustainable human settlements* *Driver 10:Provide and improve adequate health care for citizens* *Driver 11: Ensure Social Development and social security services for all citizens* *Driver 12: Integrate Environmental limitations and change into growth and development planning* Pillar 4: Sustainable rural development *Driver 13: Mainstream rural development into growth and development planning* Pillar 5: Build social cohesion *Driver 14: Maximise arts, culture and sports, and recreation opportunities and prospects for all communities* Pillar 6:.Good governance *Driver 15: Foster good governance to create a conducive climate for growth and development* **The Drivers indicated in bold are directly related to the proposed SANRAL Thabong New Interchange and Road Upgrade project, and therefore the project is in line with the PSDF.**			
(b) Urban edge / Edge of Built environment for the area	YES ✓	NO	Please explain
It is assumed that this proposed project is situated within the urban edge of the Matjhabeng Local Municipality, however, confirmation from Matjhabeng are pending.			

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES ✓	NO	Please explain

The Spatial Development Framework (SDF) for the Matjhabeng Local Municipality could not be found. The Integrated Development Plan (IDP) of 2012-2016 was used to complete this section.

In terms of the 2012-2016 IDP, the City has identified various long terms goals which are listed below. Transportation is one of these goals identified, and objectives to be undertaken to achieve these goals are also provided in the IDP, and is listed below. The entire Thabong project is in line with the IDP's transportation goals.

Long term goals and Strategic objectives:

- Financial Sustainability;
- Economic Development;
- Infrastructure Services;
- Human Settlements;
- Environment;
- Safety and Security;
- Healthcare;
- Transportation;
  - A community of road and public users who are aware of an committee to a core set of values;
  - Improved access for residents to employment, education, recreation and market opportunities through strategic transport infrastructure and operations which are well aligned with the future Metro's Spatial Development Framework;
  - Development and maintenance of a world-class road traffic signalling and stormwater infrastructure network across the future Metro; and
  - Improved safety, affordability, convenience and comfort on all transport infrastructure and services.
- Governance;
- Land, Spatial Form and Urban Management; and
- Institutional Transformation.

Municipalities in RSA are require, in terms of Section 36(1) of the National Land Transport Act, 2009 (Act No. 5 of 2009), to prepare a Comprehensive Integrated Transport Plan (CITP) every five years, which must be reviewed annually. The Matjhabeng Local Municipality has not produced a CITP since its inception. A CITP was compiled for the Lejweleputswa District Municipality (DM), and it is envisaged to update the DM's plan into the IDP timeframe. The following key challenges was identified in the CITP for the DM:

- Roads and stormwater maintenance, backlog of approximately R4 billion exist and the construction of new roads backlog exist to the value of approximately R1.9 billion, which increases annually as new residential areas are established and developed. The following areas of improvement as identified in the CITP directly relates to this proposed Thabong project:
  - Cleaning of unlined stormwater canals in Mathjabeng twice a year;
  - Concrete lining of existing canals at 5km per annum;
  - Extension of Jan Hofmeyer Road north of Hani Park area (SANRAL)'
  - Road lighting provincial roads Hani Park area (SANRAL); and
  - Main channel to drain Thabong T16 south of the retention area.
- Insufficient financial support from the Provincial Departments to eradicate these backlogs;
- Risk of flooding and damage to properties and community health and safety hazards due to poor stormwater infrastructure maintenance and upgrade and construction of new systems (estimated stormwater infrastructure backlog is R850 million); and
- Poor stormwater infrastructure maintenance, upgrade and construction of new systems (estimated stormwater infrastructure backlog is R850 million) increase the risk of flooding, damage to property and community and safety hazards.

(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
No structure plans could be found for the Matjhabeng Local Municipality.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO	Please explain
An Environmental Management Framework for the Matjhabeng Local Municipality could not be found. An EMP for the Lejweleputswa District Municipality could also not be sourced.			
(f) Any other Plans (e.g. Guide Plan)	YES ✓	NO	Please explain
The proposed development is in line with the Municipal IDP. .It is therefore assumed that the proposed project will be in line with all other plans.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES ✓	NO	Please explain
Refer to 2 (c) above			

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES ✓	NO	Please explain

The area around the Thabong Interchange is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities and injuries are probably much higher than the statistics used in the assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads.

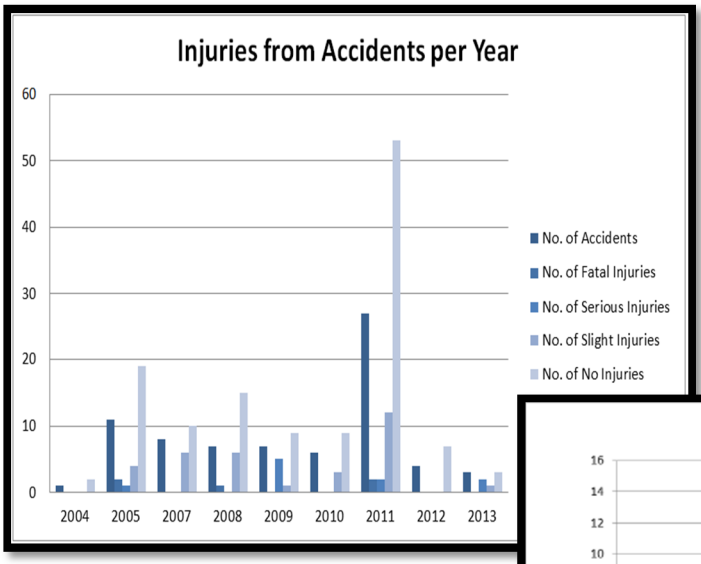


Figure from AECOM's Road Safety Report

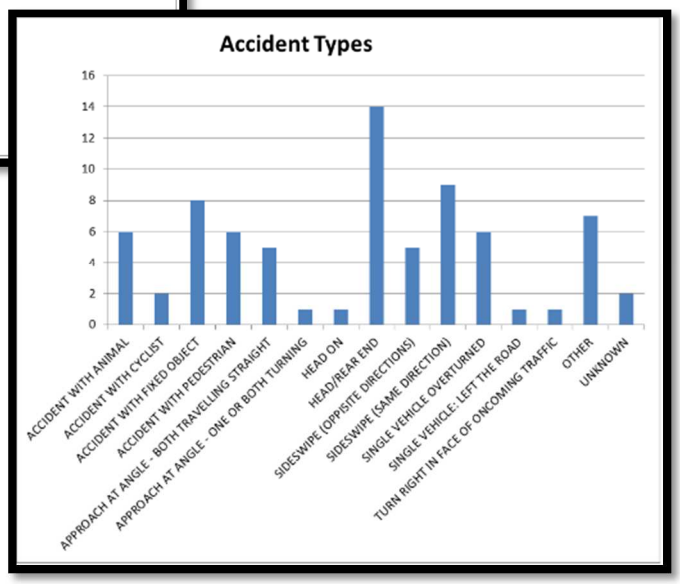


Figure from AECOM's Road Safety Report

In addition, median barriers will be constructed to prevent vehicular and pedestrian movements across the median, street lighting will be provided, and the current pedestrian underpass will be upgraded and lighting will be provided. Fences will be constructed along some sections of the median barrier, in order to prevent pedestrians from jaywalking and encouraging them to make use of the pedestrian bridges. The proposed fences will be ClearVu or similar type fencing which will not cause any obstructions.

5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES ✓	NO	Please explain
During the construction phase municipal water and electricity supply will be utilised. During the operational phase, only electricity will be required for street lighting. The existing substation in the area has sufficient capacity to feed the street lighting network. AECOM indicate that it was confirmed verbally by the Electrical Engineer from the Municipality that the capacity will be adequate. AECOM mentioned that the City's Electrical Engineer will confirm this in writing once the design has been approved.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES ✓	NO	Please explain
The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude. It is therefore assumed that the proposed project will be in line with all other plans. In addition, although SANRAL will be constructing the extension of the Jan Hofmeyer Road, the Jan Hofmeyer Road extension will also be a municipal road. The Municipality is in favour of the road upgrade and all associated infrastructure.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO ✓	Please explain
This project does not form part of a National Programme.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES ✓	NO	Please explain
The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. The extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude.			
9. Is the development the best practicable environmental option for this land/site?	YES ✓	NO	Please explain
The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude.			

10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES ✓	NO	Please explain
The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude. The project will increase road and pedestrian safety in the area.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO ✓	Please explain
The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO ✓	Please explain
Not Applicable. The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO ✓	Please explain
Not Applicable. The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. Then extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude.			

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES ✓	NO	Please explain

The proposed Interchange and community based project will contribute to SIP 6:

The 17 Strategic Integrated Projects include the following:

1. SIP 1: Unlocking the Northern Mineral Belt with Waterberg as the Catalyst;
2. SIP 2: Durban- Free State– Gauteng Logistics and Industrial Corridor
3. SIP 3: South Eastern node & corridor development
4. SIP 4: Unlocking the economic opportunities in North West Province
5. SIP 5: Saldanha-Northern Cape Development Corridor
6. **SIP 6: Integrated Municipal Infrastructure Project**
7. SIP 7: Integrated Urban Space and Public
8. SIP 8: Green Energy in support of the South African economy
9. SIP 9: Electricity Generation to support socio-economic development
10. SIP 10: Electricity Transmission and Distribution for all Transport Programmes
11. SIP 11: Agri-logistics and rural infrastructure
12. SIP 12: Revitalisation of public hospitals and other health facilities
13. SIP 13: National school build programme
14. SIP 14: Higher Education Infrastructure
15. SIP 15: Expanding access to communication technology
16. SIP 16: SKA & Meerkat
17. SIP 17: Regional Integration for African cooperation and development

15. What will the benefits be to society in general and to the local communities?	Please explain
Refer to 4 above.	

16. Any other need and desirability considerations related to the proposed activity?	Please explain
Refer to 4 above	

17. How does the project fit into the National Development Plan for 2030?	Please explain

The National Development Plan for 2013 identified the following nine main challenges to be addressed by 2030. These nine challenges includes the following:

1. Too few people work;
2. The standard of education for most black learners is of poor quality;
3. Infrastructure is poorly located, under-maintained and insufficient to foster higher growth;
4. Spatial patterns exclude the poor from the fruits of development;
5. The economy is overly and unsustainably resource intensive;
6. A widespread disease burden is compounded by a failing public health system;
7. Public services are uneven and often of poor quality;
8. Corruption is widespread; and
9. South Africa remains a divided society.

Based on the above a list of categories or areas which requires development and upgrading in order to enable sustainable development were developed. These areas include the following:

- Creating jobs and livelihoods;
- Expanding infrastructure;
- Transitioning to a low-carbon economy;
- Transforming urban and rural spaces;
- Improving education and training;
- Providing quality health care;
- Building a capable state;
- Fighting corruption and enhancing accountability; and
- Transforming society and uniting the nation.

The current Thabong Interchange area is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities and injuries are probably much higher than the statistics used in the assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads.

In addition, median barriers will be constructed to prevent vehicular and pedestrian movements across the median, street lighting will be provided, and the current pedestrian underpass will be upgraded and lighting will be provided. Fences along some sections of the median barrier will be constructed in order to prevent pedestrians from jaywalking and encouraging them to make use of the pedestrian bridges. The proposed fences will be ClearVu or similar type fencing which will not cause any obstructions.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

The general objectives of IEM as set out in Section 23 of NEMA have been taken into account as follows:

- Modes of Environmental Management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management as set out in Section 2 of NEMA have been identified and employed. Refer to Section 19 below;
- The actual and potential impact on the environment, were identified, predicted and evaluated. Refer to the Impact Assessment Methodology and Impact Assessment in Section D of this Report, as well as the Impact Assessment ratings attached to Appendix F of this Report;
- Adequate consideration was given to the effect of activities on the environment through the undertaking of the impact assessment, as well as through the compilation of the Environmental Management Plan (EMP);
- A Public Participation Process as per the requirements as set out in Section 54 of Regulation 543 on the Environmental Impact Assessment Regulations has been undertaken. The Draft Basic Assessment Report will be made available for Public and Commentary Authority review to ensure that appropriate and adequate opportunity will be provided to these parties to provide comment or raise issues and concerns with regards to the effect that the proposed project may have on the environment.

Environmental attributes which may have a significant effect on the environment were considered in the management and decision making process, through the undertaking of the impact assessment, and through the compilation of the EMP.

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The principles of environmental management as set out in Section 2 of NEMA, have been considered during the undertaking of the Impact Assessment, formulation of mitigation measures, as well as during the compilation of the Environmental Management Plan. Some important principles addressed as part of this project are outlined below:

- Section 2(4)(a) of NEMA discusses sustainable development requirements to be considered. The following sustainable development requirements form a key part of this project:

(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; and

(vii) That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented are minimised and remedied.

- Section 2(4)(d) refer to the equitable access to services to meet basic human needs:

Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act No. 107 of 1998 as amended.	NEMA gives effect to Section 24 of the Constitution and in this respect, of particular importance is NEMA's injunction that the interpretation of any law	National & Provincial	27 November 1998

	concerned with the protection and management of the environment must be guided by its principles. At the heart of these is the principle of 'sustainable development'.		
Environmental Impact Assessment Regulations, 8 December 2014	The proposed interchange and road upgrade triggers activities 14, 19, 24, 48 and 49 of Regulation 983.	National & Provincial	8 December 2014
National Water Act (Act 36 of 1998)	Activities 21 (c) and (i) of the National Water Act will most likely be triggered by the proposed project, as geotechnical drilling will be undertaken within wetland	National	20 August 1998
The Constitution of South Africa (No 108 of 1996)	Section 24 of the Constitutions Bill of Rights states that everyone has the right – (a) To an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - (i) Prevent pollution and ecological degradation; (ii) Promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	National	18 December 1996
National Heritage Resources Act (Act 25 of 1999)	The proposed substation footprint requires the need for a Heritage Impact Assessment in terms of Section 38 of the Heritage Resources Act.	National & Provincial	28 April 1999
National Forest Act (Act 84 of 1998)	There may be protected trees on site which will have to be removed to make way for the proposed infrastructure.	Department of Agriculture, Forestry and Fisheries	30 October 1998
Notice of the List of Protected Tree Species Under The National Forests Act, 1998 (Act No 84 Of 1998)	There may be protected trees on site which will have to be removed to make way for the proposed infrastructure.	Department of Agriculture, Forestry and Fisheries	16 September 2011

The National Veld and Forest Act (Act 101 of 1998)	Section 12 of this Act renders firebreaks compulsory to landowners from whose land a veld fire may start, burn or spread. If it is determined that the land acquired for the proposed substation, may start, burn or spread a veld fire then it would be compulsory for Eskom to implement firebreaks.	Department of Agriculture, Forestry and Fisheries	27 November 1998

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES ✓	NO
If YES, what estimated quantity will be produced per month?	10 m^3	

How will the construction solid waste be disposed of (describe)?

Construction solid waste will be stored in waste skips at the construction camp, and will be emptied on a weekly basis, or more frequently if required, and will be disposed of at the municipal landfill site. All dangerous or hazardous wastes will be stored in containers provided by a hazardous waste service provider such as Enviroserv, and these containers will be collected by the service provider once full. Thorough record must be kept of all wastes disposed and the matter in which is disposed.

Wet concrete waste will be stored in a designated area with an impervious surface. Waste bitumen will also be stored in a designated area with an impervious surface. Once hardened, the bitumen will be broken up and will be disposed of at a waste site that permits such wastes.

Experience with road construction projects have shown that local farmers approach contractors to obtain the hardened concrete and bitumen waste for surfacing of their farm roads. As the concrete and bitumen waste is inert once hardened, it is not an environmental threat, and therefore farmers can utilised this. But, thorough record should be kept of the volumes of hardened waste concrete and bitumen and the manner in which these wastes are disposed of.

Where will the construction solid waste be disposed of (describe)?

General construction wastes will be disposed of at the Municipal landfill site, and hazardous wastes will be disposed of at a hazardous landfill site. A hazardous waste contractor such as Enviroserv should be appointed to provide containers for the storage, removal and disposal of hazardous wastes.

Will the activity produce solid waste during its operational phase?	YES	NO ✓
If YES, what estimated quantity will be produced per month?		m^3

How will the solid waste be disposed of (describe)?

Not Applicable

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Welkom Landfill site. In terms of the Matjhabeng IDP of 2013-2014 there are four (4) landfill sites and one (1) refuse relay station within the municipality. In terms of the 2014-2014 IDP, only one of these Landfill Sites is licensed.

The Landfill Sites listed in the IDP includes:

- Welkom,
- Henneman;
- Odendaalsrus;
- Allandridge; and
- Virginia

In terms of the South African Information Centre Permit Database, the Welkom Landfill Site is a G: Landfill Site and a license was obtained on 26/06/1992.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

All dangerous or hazardous wastes will be stored in containers provided by a hazardous waste service provider such as Enviroserv, and these containers will be collected by the service provider once full. Thorough record must be kept of all wastes disposed and the matter in which is disposed.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

YES	NO
✓	

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Pre-coating fluid and bitumen will be used on site. The empty Pre-coating fluid containers and bitumen drums are classified as hazardous waste. These containers should be stored on an impervious surface and should be covered to prevent rainwater from entering the empty containers. These containers will be removed from site regularly and will be disposed off at a licensed hazardous landfill site, or will be removed from site by a licensed hazardous waste service provider.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO
	✓

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO
✓	

During the construction phase chemical toilets will be placed on site by a registered service provided such as Sanitech for use by construction workers. These toilets will be emptied regularly and wastes from these toilets will be disposed of in the municipal sewer system. No temporary French drains will be installed.

If YES, what estimated quantity will be produced per month? m^3

Will the activity produce any effluent that will be treated and/or disposed of on site?

YES	NO

	✓

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO ✓

If YES, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		**Cell:**	
E-mail:		**Fax:**	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Chemical toilets will be provided, thus no waste water will be available to recycle

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	YES	NO ✓
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Servicing of vehicles so they are used optimally and reduce emissions. Dust suppression

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?	YES	NO ✓

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?	YES ✓	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

Describe the noise in terms of type and level:

During the construction phase, the operation of machinery and equipment, as well as the construction vehicle traffic will create a noise impact. The provisions of SABS 1200A will apply to all areas within audible distance of residents and construction activities generating output levels of 85 dB or more will be confined to the hours 08h00 to 17h00 Mondays to Fridays.

Existing noise levels generated by traffic on the R730 and Jan Hofmeyer Road is expected to remain unchanged after completion of the construction phase.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
✓ **Only during the construction phase**					✓ **During the Operation Phase**

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:		litres
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	YES ✓	NO

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

In terms of street lighting, the following energy efficiency measures will be implemented:
The design luminaire consist of high-pressure die-cast aluminium housing in which all electrical and optical components will be mounted and be easily accessible. The luminaire will be designed to operate high-pressure sodium 400W and 200W. Such lamps provide the greatest amount of photopic illumination for the least consumption of electricity. The most efficient light source when compared to mercury vapour. Actual life expectancy is about 10,000 to 12,000 hours on average and lower cost.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

An alternative energy source considered by AECOM consist of LED lighting with a life expectancy of 60,000 hours at 90% lumen maintenance. LED street lights use 40-80% less electricity and have at least 5 times the life expectancy than regular High Pressure Sodium (HPS) fixtures. LED lamps are 7 times more energy efficient than incandescent and twice as efficient as fluorescent lamps. This result in less expense in replacing the lights themselves but also the labor to replace the lamp is needed less often. This provides a great cost savings by itself and the fitting is more costly than HSP.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A): **0**

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES ✓ / NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Free State
District Municipality	Lejweleputswa District Municipality
Local Municipality	Matjhabeng Local Municipality
Ward Number(s)	Wards 23, 31, 26, 28, 25, 12, 13, 11
Farm name and number	Not Applicable The project is situated within the existing R730 road reserve, and within the existing Jan Hofmeyer Road Reserve. The extension of Jan Hofmeyer Road will be situated within the already proclaimed servitude. The above road reserves are owned by SANRAL. All of these road reserves fall under the SANRAL Declaration No 550 dated 22 April 2003 and are known as National Road N1S, 15Y & 16Y ; Bloemfontein-Kroonstad. This Declaration is attached to Appendix 5.
Portion number	As Above
SG Code	Not Applicable

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:	Municipal and Provincial Road Reserve R730 road reserve registered in the name of SANRAL; and Jan Hofmeyer servitude registered in the name of the Free state Province.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?	YES	NO ✓

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	✓
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	✓
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

A Surface Geotechnical Investigation was undertaken by AECOM for this proposed project in March 2015. A copy of the Surface Geotechnical Investigation Report is attached to Appendix D of this Basic Assessment Report.

Is the site(s) located on any of the following?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES ✓	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO ✓	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES ✓	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO ✓	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES ✓	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES ✓	NO	YES	NO	YES	NO
Any other unstable soil or geological feature • *Transported soils were described in the trial pit logs to have a "pinhole voided" structure, which is indicative of a potentially collapsible soil fabric.*	YES ✓	NO	YES	NO	YES	NO
An area sensitive to erosion • *It is anticipated that there could be areas sensitive to erosion due to the location of the wetlands.*	YES ✓	NO	YES	NO	YES	NO

As mentioned above, a Surface Geotechnical Investigation was undertaken by AECOM for this proposed project in March 2015. A copy of the Surface Geotechnical Investigation Report is attached to Appendix D of this Basic Assessment Report. A Wetland Rehabilitation Plan was compiled by Ecotone Freshwater Consultants in June 2014 for the undertaking of Geotechnical Drilling activities within the wetland area for the proposed construction of the Interchange. It should be noted that a Wetland Rehabilitation Plan was attached to the General Authorisation Application to the Department of Water Affairs for the undertaking of drilling activities in the wetland area. The Department of Water Affairs issued a General Authorisation for the undertaking of the drilling activities on the 12th of June 2015. A copy of the General Authorisation is attached to Appendix J of this Basic Assessment Report. The Wetland Rehabilitation Plan compiled by Ecotone is attached to Appendix D of this Basic Assessment Report.

AECOM provided the following summary of their findings and recommendations in their Geotechnical Report:

- The founding conditions for the upgrade of National Route R730 Section 1 (14.00km) generally consist of stiff to very stiff sedimentary residual soils composed of varyingly calcified sandy clay, clayey silt and silty clay underlain by generally very poor to poor laminated mudstone, siltstone and bedded sandstone rock at an average depth of 6m below ground. The rock is very soft and highly to completely weathered at shallow depth improving with depth. A shallow perched groundwater table should be expected at existing bridge locations, proposed pedestrian bridge locations and at existing culvert 20R that lies in the wetland between existing bridges B2064 and B2019. Test pit side walls were observed as being stable during excavation however precautionary measures should be put in place to ensure personnel safety during construction.
- Pile capacity analyses carried out for 750mm, 900mm, 1050mm and 1200mm diameter auger piles indicate that assuming an allowable end bearing pressure of 3MPa and a shaft stress of 6 MPa the piles need to be embedded six pile diameters into soft rock. However, where very soft rock is encountered, sockets should be embedded ten pile diameters, assuming an allowable end bearing pressure of 2MPa and a shaft stress

of 6MPa. Should medium to hard rock of at least 10MPa be encountered prior to achieving the six or ten pile diameter socket, the pile will be founded as an end bearing pile on the medium to hard rock assuming an allowable end bearing pressure of 6MPa.

- Medium to super heavy Franki piles may also be used to form the foundations at bridge sites where rock was not encountered at shallow depth. Rock was encountered at shallow depth at the new interchange bridges B0325A, B0325B and B0325D.
- The consistency of granular or cohesive soil across the project area is dense or stiff respectively therefore Franki pile positions may have to first be pre-drilled using an auger rig in order to achieve the required penetration during installation.
- The ingress of groundwater into auger pile excavations should be expected at pile toes especially since the piles will be socketed in fractured very soft to soft rock. The size of very hard boulders in the fill material at bridge locations is expected to be in the order of 150 to 300mm accounting for a concentration of plus / minus two or three boulders per metre over a depth of 0.3 to 4.5m. The consistency of the fill matrix varies from firm to very stiff, or loose to very dense.
- With the exception of existing storm water culvert 20R and pedestrian bridge culvert 25R which will require the construction of a rock mattress, culverts may be founded on well compacted soilcrete (G6 with 5% cement by volume) bearing on in-situ material having an allowable bearing pressure ranging from 150kPa to 500kPa.
- Culvert locations will require the removal of 1.0m in-situ material composed of soft to firm or loose topsoil and transported material with natural gravel or graded crushed stone beyond founding level. Removal of the 1.0m thick layer will generally expose a stiff to very stiff calcified sandy clay, a medium dense to dense clayey gravel or a medium dense to dense sandy gravel. 1m of in-situ material should be removed beyond founding level at culvert locations in the wetland surrounding the proposed new interchange. Ripping of the in-situ material 1m beyond founding level will generally expose a fine grained, medium dense to dense clayey sand. The exposed in situ material should be compacted to a significant depth using a vibratory plate or pad roller compactor before placing soilcrete (G6 with 5% cement by volume) prior to layer works. The soilcrete should be placed in 150mm increments and compacted to 95% MOD AASHTO density at -1% to +2% of optimum moisture content to founding level.
- Earthworks in areas proposed for freeway widening will involve the following:
  - Removal of the in-situ soil to a depth of 800mm after stripping of a 150mm topsoil layer and replace with an 800mm thick rock mattress made of compacted dump rock placed on top of a geofabric in wetland areas.
  - Removal of 1.0 meter of in-situ soil after the stripping of a 150mm topsoil layer and replacing with fill of G10 material classification (TRH14, 2007) or better in areas with in-situ undesirable subgrade material;
  - Compaction of the in-situ soil once a 150mm topsoil layer has been stripped in areas with desirable insitu subgrade material.
- Surface water drainage must be installed to make effective provision for the disposal of stormwater which falls on, or is intercepted by the embankment. A functioning subsurface drainage system must be provided for embankments in areas with a shallow groundwater water table and in wetlands to intercept and remove seepage water from the subgrade.
- The envisaged upgrades along the approximately 5km section of the R730 in Thabong are feasible provided cognisance is taken of the findings contained herein. It is however imperative that the recommendations within this report be re-visited once structural layouts, foundation types, foundation dimensions, loading and stresses have been agreed upon so that, if required, more site specific investigation can be conducted.
- In addition, during construction an engineering geologist or geotechnical engineer should inspect all foundation excavations or auger shafts to ensure quality and that conditions at variance to those found during the subsurface investigations are assessed and addressed and to validate the findings of this report. As a precaution, sloping, benching, or other approved cave-in protection systems must be utilized during foundation or trench excavations. Dewatering measures should also be put in place. Although no side-wall collapse was observed in the test pits, measures must be put in place to temporarily case collapse zones within pile holes.

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E] ✓	Natural veld with heavy alien infestation[E] ✓	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface ✓	Building or other structure ✓	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

A Faunal & Floral Ecological and Impact Survey for the Thabong Project was undertaken by Mr Mathew Ross from Enviross. The Report compiled by Mr Ross is attached to Appendix D of this Basic Assessment Report.

A desktop and field survey was conducted by Mr Ross in April 2014. A short summary of the findings, conclusions and recommendations of Mr Ross's Report is provided below:

Summary of Findings:

The proposed development area falls within a single vegetation unit, namely Vaal-Vet Sandy Grassland. This vegetation type falls within the Grassland biome and Dry Highveld Grassland bioregion. The vegetation unit is regarded as *Endangered* conservationally due to transformation of a large proportion of the unit by urbanisation, agriculture and mining developments, as well as a general overall lack of incorporation of this unit into formally conserved areas (Mucina & Rutherford, 2006).

Exotic vegetation was commonplace throughout the survey area, with the highest occurrences being that of exotic annual weeds (forbs) that are typical indicators of local disturbance features. The dominant exotic species included *Flaveria bidentis*, *Tagetes minuta, Schkuhria pinnata* and various *Conyza* species.

Mr Ross mentioned in his Report that the proposed interchange upgrade development will have a relatively limited footprint area, but that the footprint area includes a variety of habitat units. These include grassland and wetland habitat and an association with urban areas. Wetland habitat units have been indicated by SANBI through the National Freshwater Ecosystem. Open areas do occur, but these areas are suffering degradation through perpetual disturbance features, including dumping, historical construction of underground sewerage pipe lines and ongoing construction activities that are not adequately reinstated.

- Floral Species of Conservational Concern & Protected Species:
  - There are no floral species listed for the area of conservational concern.
  - There are no tree species that are nationally protected under the National Forests Act (Act No 84 of 1998) that has been recorded from the QDS that incorporates the proposed development.

- Areas identified as ecologically sensitive for floral species of conservational concern
  - There are no species of conservational concern recorded for the area, nor are there likely to be any occurrences of sensitive or threatened species within the impacting footprint area of the proposed development. The proposed development area does, however, include wetland habitat units that are considered to be statutorily protected and inherently sensitive habitat features. These habitat units should be treated as ecologically sensitive and the impacts to these habitat units should be limited as far as possible.

- Faunal Features:
  - The survey area is relatively limited and therefore the habitat diversity is also limited. Large-scale impacting features associated with the proposed development site has reduced the overall ecological integrity of the area, which, in turn, has limited the chances of the area supporting a wide faunal diversity. It is also presumed that no sensitive or species of conservational concern would occur within the impact area in viable, breeding populations.
    - **Mammals:** Of a total of 63 species that have a historical distribution range that coincides with the survey area, none are classified as *Critically Endangered*, and one (2%) as *Endangered.* There are seven (11%) categorised as *Near Threatened,* six (9%) as *Data Deficient.* The greater proportion, with 49 (78%), are regarded as *Least Concern*. This analysis means that there is only one Red Data Listed (RDL) mammalian species pertaining to the survey area, but this species has a low probability of occurrence. Of the seven *Near Threatened* species applicable to the project, none of these are expected to occur within the impacting footprint area. Those species with a low-medium Probability of Occurrence (POC) are limited to species that are able to migrate in and out of the area freely and may use the wetland habitat units for foraging purposes. The remaining species are regarded as *Data Deficient* and are thought to be widespread.
    - **Avifauna:** Of the 25 species recorded, one (1%) is considered *Critically Endangered*, none (0%) are regarded as *Endangered*, 6 (2%) are regarded as *Vulnerable*, 18 (6%) as *Near Threatened*, 0 (0%) as *Data Deficient* and 272 (92%) are regarded as *Least Concern*. This shows that approximately 2.4% (7) of the species occurring within the region are regarded Red Data Listed. Those species that are known to have a preference to the habitat units presented within the survey area are thought to suffer potential negative impacts from the proposed development activities. There are species that are regarded as having a medium Probability of Occurrence (POC) within the area, namely the two flamingo species (*Phoenicopterus ruber* and *Phoenicopterus minor*). These species are known to frequent open, shallow pans within the area and would frequent the nearby wetlands. These areas will not be impacted by the proposed development activities. The overall impact to avifaunal conservation emanating from the proposed development activities is regarded as being low.
    - **Reptiles:** There are 40 reptilian species recorded from the region pertaining to the survey area (Branch, 1998 & ADU, 2013). There are no species, however, that have been recorded from within the region that are presently considered to be of conservational significance. The largely transformed and degraded nature of the habitat units throughout the survey area limits the potential occurrence of a wide diversity of species.
    - **Amphibians:** Amphibian species diversity is shown to be relatively low, with eight species (Minter, et al., 2004; du Preez & Carruthers, 2009 and ADU, 2011) having been recorded from the QDS area of 2726DD. One species was noted during the field survey, namely *Cacosternum boettgeri* (Boettger's caco) – a common, tolerant and widespread species. There is only one species of conservational concern that falls within the region that is considered significant to the proposed project, namely *Pyxicephalus adspersus* (Giant bullfrog). This species mostly occurs within grassland-embedded wetlands, where it over-winters in burrows along the periphery of seasonal pans and other wetland units. It emerges after the first good rains in spring (usually November) to breed in rain-filled depressions, pans and other wetlands. It usually breeds within the Grassland biome, but also has been shown to breed in wetlands within the Savanna, Thicket and Nama Karoo biomes. Limited habitat considered suitable for breeding occurs within the survey area and therefore the proposed development is thought to not have any significant impact on the ongoing conservation of this species. Impacts to wetland, riparian and aquatic habitats should, however, be avoided.

- **Invertebrates:** The invertebrate taxa that are of conservational concern include the Mygalomorph spiders, scorpions, certain butterfly (Lepidoptera) and dragonfly and damselfly (Odonata) species.
  - **Butterflies:** There are 61 butterfly species recorded from the region (ADU, 2014), none of which are of conservational concern. Habitat areas that remain important to butterfly conservation within the area are natural grasslands (limited within the survey area) and riparian/wetland habitats. These habitat units coincide with the areas identified as being of high ecological sensitivity, namely the wetland units.
  - **Spiders:** *Mygalomorph spiders* as a taxon, includes various families of trapdoor and baboon spiders. The family of Theraphosidae (baboon spiders) are a nationally protected taxa under CITES, prohibiting collection, trade and destruction without the applicable permits (subject also to provincial legislation). Mygalomorph spiders inhabit virtually all the habitat types that are represented throughout the survey area, including transformed habitat. General habitat conservation is therefore the most viable mitigation measure to abate undue impacts on these species – as is applicable to all biodiversity within the region.

Conclusions and Recommendations:

Mr Ross provided the following conclusions and recommendations in his Report:

- The survey area already suffers from ecologically-impacting features, which include existing infrastructure of equal magnitude, surrounding high-impact land uses and overall degraded ecological integrity;
- The proposed development activities are relatively localised in extent and therefore have a limited footprint area and associated impact;
- The proposed development will also be confined to existing road reserves that have been impacted already. Therefore no significant unspoilt/natural areas will be disturbed;
- No RDL faunal or floral features are thought to be directly impacted by the proposed development activities;
- Wetland habitat units were noted during the field survey. As these units are regarded as inherently ecologically sensitive features, it is recommended that these units be treated as no-go areas. However, a Wetland Assessment was undertaken to determine the ecological status of these wetlands. Refer to Section 5 below;
- It has been shown that the overall significance of the pertinent ecological impacts can be reduced an overall low (negative) impact and therefore no significant long term ecological impacts are expected to occur.
- Habitat loss, in all its many forms, was cited as the most pervasive threat facing amphibians and was listed for all species during the analysis for the frog atlas project (Minter, *et al.*, 2004) and therefore habitat destruction should be limited to the absolute minimum throughout the survey area. This is especially pertinent to riparian and wetland habitat units. The proposed development activities, however, should not unduly affect this habitat unit, as the vast majority of the impacting footprint will remain within the exiting road reserves and within existing bridges. Amphibians have been shown to be steadily declining as a world-wide phenomenon. Care should therefore be practised in conserving all suitable habitats to aid in abating declines in amphibian numbers and diversity.

It should be noted that, in order to conserve the faunal and floral species community structures within the region, a holistic conservation approach should be adopted. This includes keeping general habitat destruction to an absolute minimum. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival. This can only be achieved by the efforts of the contractor during the various processes of the construction phase.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO ✓	UNSURE
Non-Perennial River	YES	NO ✓	UNSURE
Permanent Wetland	YES ✓	NO	UNSURE
Seasonal Wetland	YES ✓	NO	UNSURE
Artificial Wetland	YES ✓	NO	UNSURE
Estuarine / Lagoonal wetland	YES	NO ✓	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

Three wetland types were identified in the study area. The wetlands associated with this project are an unchannelled valley bottom wetland and a digressional wetland. Refer to the Specialist Report summary below.

A Wetland Assessment and Delineation Study was undertaken by Dr Martin Ferreira from Jeffares & Green (Pty) Ltd for this project. The Wetland Assessment and Delineation Report is attached to Appendix D of this Basic Assessment Report.

A short summary of the findings, conclusions and recommendations of Mr Ferreira's Report is provided below:

The study area currently falls within the Middle Vaal Water Management Area (WMA) (DWA, 2004), and within Quaternary Catchment C42J. The study area does not fall within a freshwater protected area, in terms of the National Freshwater Ecosystem Protected Areas (NFEPA).

According to the "Wetland Map 3", which was compiled by the South African National Biodiversity Institute (SANBI), and augmented by the NFEPA programme, several wetland types occur within the study area including natural unchannelled and channelled valley bottom wetlands and depressions. These wetlands occur within the Vaal-Vet Sandy Grasslands vegetation type. The landscape of the study area is dominated by a plains with some scattered, irregular, undulating plains and hills. Low-tussock grassland dominates in the study area. The low cover of *Thermeda trianda* and the increase in *Elionurus muticus*, *Cymbopogon pospischilli* and *Aristida congesta in the study area,* are attributed to heavy grazing and the erratic rainfall (Mucina and Rutherford, 2006).

The wetlands in the study area have been completely transformed by rural housing and informal settlements, a road network, a railway line, and mining activities. When comparing the current study area with orthophotos from 1940, it can be seen that land use has changed significantly within the catchment. The study area was historically used for agriculture (croplands). Many of the roads and the railway line within the study area were designed poorly and no allowance has been made for maintaining the flow within the wetlands. As a result, shallow dams have formed above the structures and wetland seeps have formed below the structures. The numerous housing developments in the study area have also increased the hardened surface, with most of the

catchment developed in certain areas. This has caused an increase in stormwater and the related increase in stormwater management systems. Most of the stormwater and surface run-off, drains into the large channels that were created next to the mining activities to separate clean and dirty water. The water from the study area in particular drains into a channel which appears to ultimately drain into the Sand River approximately 12 km towards the south of the study area. Numerous dirt roads cross the wetland in the current study area adding to sediment loads within the system. A Waste Water Treatment Works also discharge effluent into the artificial wetlands draining into the main stormwater channel.

Based on the classification system of SANBI (2009), three wetland types were identified in the study area. The wetlands associated with the construction of the new interchange are an unchannelled valley bottom wetland and a depressional wetland. The two Hydrogeomorphic Units HGMs form a large wetland complex. The wetland associated with the upgrade of the section of the R730 is mainly a depressional wetland. Several other wetlands occur within the road reserve, but most of these wetlands are artificial wetlands. These wetlands have formed due to the over bank flooding of the stormwater channels that have been constructed. Two additional depression wetlands were identified towards the west of the interchange. These wetlands may be affected by the construction of the new road section. The different wetlands that have been identified are indicated on a map contained in the Wetland Assessment and Delineation Report attached to Appendix D. The Wetlands are referred to in the Wetland Assessment and Delineation Report as:

- UCVB (unchannelled valley bottom)
- D1 (depression 1)
- D2 (depression 2)
- D3 (depression 3)
- D4 (depression 4)

Proposed Mitigation Measures:

The potential impact on the wetlands can be mitigated by applying certain mitigation measures. The functioning of any wetland is not depended on a single component and changes to one aspect (such as hydrology) may ultimately cause changes in another (such as vegetation). As a result, a range of possible mitigation measures are listed below, all of which would minimise the potential impact of the road upgrade. The mitigation measures include the following approaches:

- Hazardous material and chemicals should not be kept or handled within wetland and riparian areas. Hazardous substances must be kept in a demarcated area on an impervious surface. Any spillages from hazardous material should be cleaned immediately and transported to a landfill site that accepts hazardous material.
- Cement and other material must be mixed in a demarcated area and not in wetland or buffer zones.
- Movement of contractors and vehicles within wetland and riparian areas should be minimised to avoid compaction of sediment and water pollution. Vehicle should also be serviced on a regular basis to avoid leaks and spills.
- Solid waste should be removed on a regular basis and chemical toilets should be provided and should be serviced on a regular basis.
- Any contractor's camps should not be placed near any wetlands, or within its associated buffer areas;.
- Topsoil and excavated soil must not be placed within the wetland or riparian areas. The soil that is excavated from these wetlands should not be used for construction, but rather for any rehabilitation processes.
- Road cuttings should be filled as soon as possible in order to prevent and / or minimise any erosion that could be caused and to avoid siltation of the wetlands.
- The removal of vegetation must be kept to a minimum where possible. The time that soil is exposed must be limited and re-vegetation or another covering method must be applied during the construction and post construction phase.
- Vegetation must be removed in sections, as construction is taking place, and should not be removed throughout the extent of the construction area.
- Re-vegetation must be completed using the appropriate wetland/endemic plants. Where possible, the vegetation must be removed intact to ensure that it can be planted again during rehabilitation.

- Where vegetation is removed, the compaction of wetland soils must be minimised to avoid an increase in surface runoff speeds.
- The establishment of exotic plants must be avoided.
- Where possible the area where construction will take place should be demarcated. Demarcation of the construction areas will ensure that only the required area is cleared of vegetation.
- Erosion protection must be used in all areas where erosion may occur. Selected areas may require rehabilitation and stabilisation prior to construction.
- Erosion may be correlated with flow regulation and connectivity therefore must be maintained within these systems.
- The use of single culverts should be avoided as this will concentrate flow, leading to erosion directly below the culverts. Poorly designed culverts will lead to damming of water at one end and head-cuts at the opposite end.
- The areas directly below and above any culverts must be stabilised through the use of appropriately planted vegetation or gabions to avoid erosion and siltation.
- Damming of water underneath culverts must be avoided thorough the appropriate engineering design.
- Suitable indicators must be identified and monitored by a qualified wetlands specialist to ensure that the impacts are minimised and corrected timeously.

A Wetland Rehabilitation Plan was compiled by Ecotone Freshwater Consultants in June 2014 for the undertaking of Geotechnical Drilling activities within the wetland area for the proposed construction of the Interchange. This Wetland Rehabilitation Plan was attached to the General Authorisation Application to the Department of Water Affairs for the undertaking of drilling activities in the wetland area. The Department of Water Affairs issued a General Authorisation for the undertaking of the drilling activities on the 12th of June 2015. The Wetland Rehabilitation Plan compiled by Ecotone is attached to Appendix D of this Basic Assessment Report. . A copy of the General Authorisation is attached to Appendix J of this Basic Assessment Report

Conclusion and Recommendations:

The identified wetlands in the study area have been completely transformed. When compared to orthophotos from 1940, land use has changed significantly within the catchment. The area was historically used for agriculture (croplands). Currently most of the catchment has been transformed and rural housing and informal settlements are found throughout the catchment. Numerous roads and railway lines have also been constructed. Many of these roads and railway lines were poorly designed and no allowance has been made for maintaining flow within the wetlands. As a result, shallow dams have formed above the structures and wetland seeps have formed below the structures. The numerous housing developments in the study area have also increased the hardened surface, with most of the catchment developed in certain areas. This has caused an increase in stormwater and the related increase in stormwater management systems. With the study area already altered due to numerous activities, the proposed project will have a very low impact on the wetlands in general. This impact will also be a cumulative impact and no new impacts are expected to occur.

Suitable indicators must be identified and monitored by a qualified wetlands specialist to ensure that the impacts are minimised and corrected timeously.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School ✓	Landfill or waste treatment site ✓
High density residential ✓	Tertiary education facility	Plantation
Informal residential[A] ✓	Church	Agriculture
Retail commercial & warehousing ✓	Old age home	River, stream or wetland ✓
Light industrial ✓	Sewage treatment plant[A] ✓	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, koppie or ridge
Heavy industrial [AN]	Railway line [N] ✓	Museum
Power station	Major road (4 lanes or more) [N] ✓	Historical building
Office/consulting room ✓	Airport [N]	Protected Area
Military or police base/station/compound	Harbour	Graveyard ✓
Spoil heap or slimes dam[A] ✓	Sport facilities ✓	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "N "are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Railway line N

The R730 crosses a railway line at coordinates 27°58'36.80"S and 26°48'15.98"E. The existing bridge crossing is known as the Ross Kent South Bridge, and for the purposes of this project, the bridge was numbered "B2019".

The Ross Kent South bridge will be widened on the western side by 4m to accommodate the new on ramp from the Thanbong Interchange. This bridge will also be dualled in the eastern side of the existing bridge. The new dualled south bound cross-section of 20.4m and 21.3m at the supports must accommodate for 2 x 3.7m traffic lanes, a 1m shoulder next to the fast lane, a varying painted island in between the slow lane and the 4m off ramp with a 2m shoulder. The bridge is a single span simply supported (17.5m) type bridge which are supported on wall type abutment which are founded on piles. Total dualled bridge length of 35m and dualled width of 42m.

The bridge deck construction will consist of precast beam and in-situ slab construction. The rail traffic will only be affected over one weekend during the placing of the beams. Temporary support structures designed and approved by an engineer will be erected during the construction phase. SANRAL and the appointed contractor will inform Transnet when construction will commence. SANRAL and AECOM will obtain the necessary Wayleaves from Transnet to widen the existing bridge.

Major road (4 lanes or more) N

The section of the R730 South of the proposed new Thabong Interchange is a 4 lane road. This existing dual carriageway will be rehabilitated as part of this project.

Traffic flow will be disrupted during the rehabilitation phase. "Stop and Go's" with a time delay may be implemented during the construction phase, or traffic diversions could be implemented during the rehabilitation phase. This impact will be temporary in nature.

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not Applicable

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not Applicable

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	NO ✓
Core area of a protected area?	YES	NO ✓
Buffer area of a protected area?	YES	NO ✓
Planned expansion area of an existing protected area?	YES	NO ✓
Existing offset area associated with a previous Environmental Authorisation?	YES	NO ✓
Buffer area of the SKA?	YES	NO ✓

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	NO ✓
	Uncertain	

Refer to the Heritage Impact Assessment Report attached to Appendix D of this Basic Assessment Report. A Heritage Impact Assessment for the proposed project was undertaken by Dr J A van Schalkwyk.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Dr J A van Schalkwyk was appointed to undertake a Heritage Impact Assessment for the proposed project. Dr van Schalkwyk conducted a desktop assessment and field survey as part of the Heritage Impact Assessment. A summary of the findings and recommendations made by Dr van Schalkwyk is provided below. A copy of the Heritage Impact Assessment Report is attached to Appendix D of this Basic Assessment Report.

The aim of the Heritage Impact Assessment was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the area of the proposed development, to assess the significance thereof and to consider alternatives and plan for the mitigation of any adverse impact.

The cultural landscape qualities of the region is made up of pre-colonial elements consisting of limited Stone Age and Iron Age occupation, as well as a much later colonial (farmer) component, which gave rise to an urban component. The latter component only dated to the late 1940's and 1950's with the development of gold mining activities in the larger region.

As no sites, features or objects of cultural significance are known to exist in the study area, there would be no impact as a result of the proposed development. Therefore, from a heritage point of view, Dr van Schalkwyk recommended that the proposed development can continue on condition of the following recommended mitigation measures:

- If archaeological sites or graves are exposed during the development activities, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the find can be made.

Will any building or structure older than 60 years be affected in any way?	YES	NO ✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO ✓

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

In terms of the Census, 2011 information, the Mathjabeng Local Municipality had a total population of 406,451 in 2011. A breakdown of the official employment status, as per the Census 2011 data, for the Local Municipality as well as a breakdown for all affected Wards within the local Municipality is provided in Figure 2 below. Out of the total population, 17.66% of the total economically active population were unemployed in 2011.

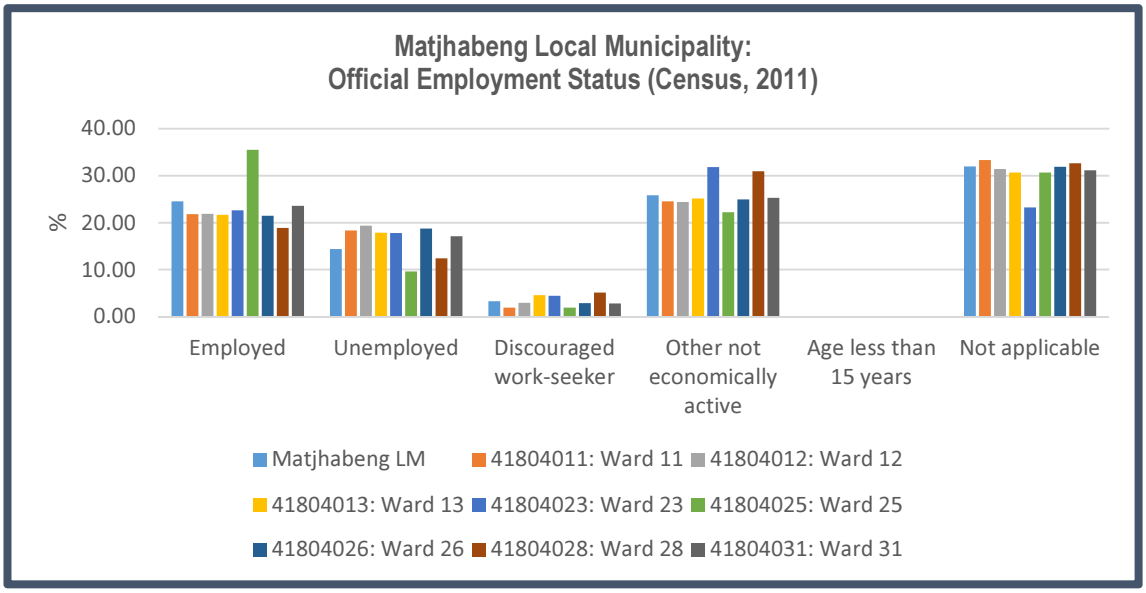


Figure 2: Matjhabeng LM, Official Employment Status (%), Census 2011

Economic profile of local municipality:

In terms of the Census, 2011 information, the Mathjabeng Local Municipality had a total population of 406,451 in 2011. A breakdown of the individual monthly income for the Local Municipality as well as a breakdown for all affected Wards within the local Municipality is provided in Figure 3 below. Out of the total population, 44.61% of the individuals earned less than R12,800.00 per month during 2011.

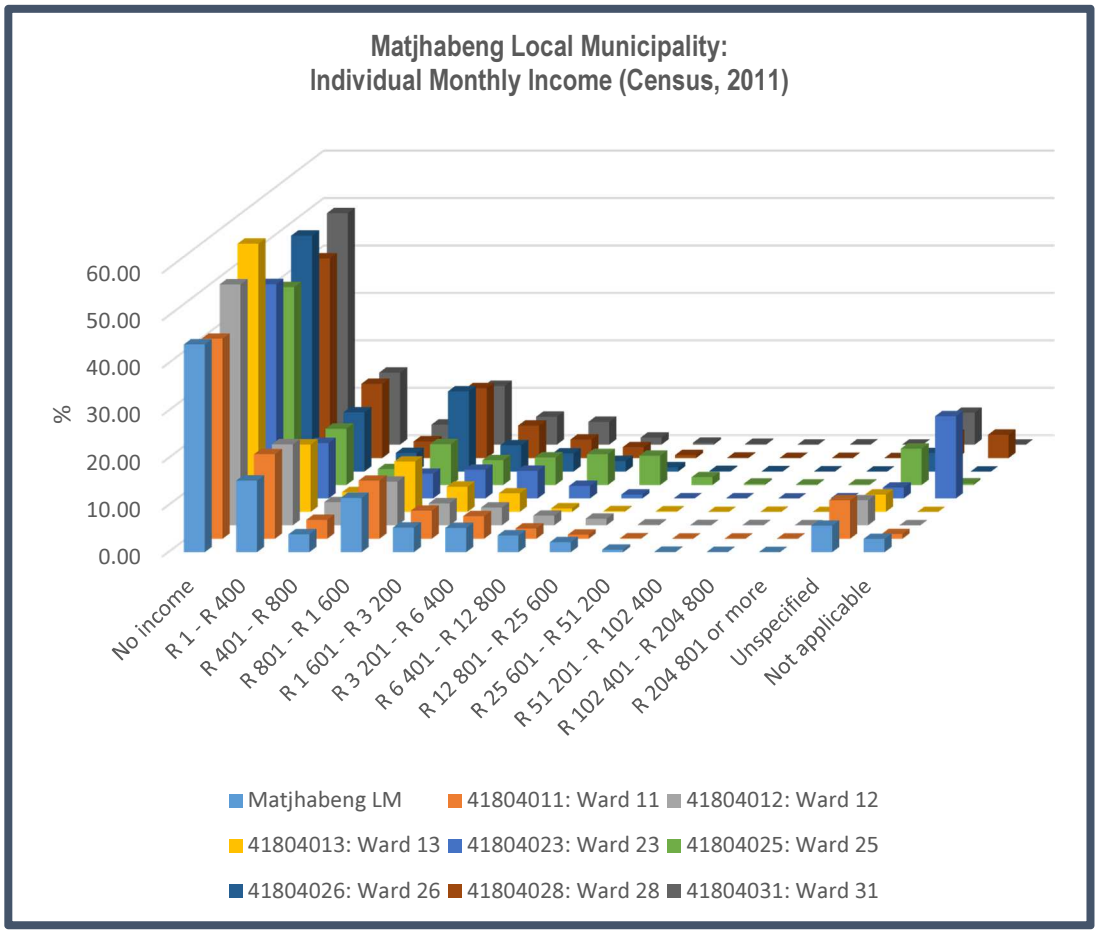


Figure 3: Matjhabeng LM, Individual Monthly Income (%), Census 2011

Level of education:

In terms of the Census, 2011 information, the Mathjabeng Local Municipality had a total population of 406,451 in 2011. A breakdown of the level of education for the Local Municipality as well as for thel affected Wards within the local Municipality is provided in Figure 4 below.

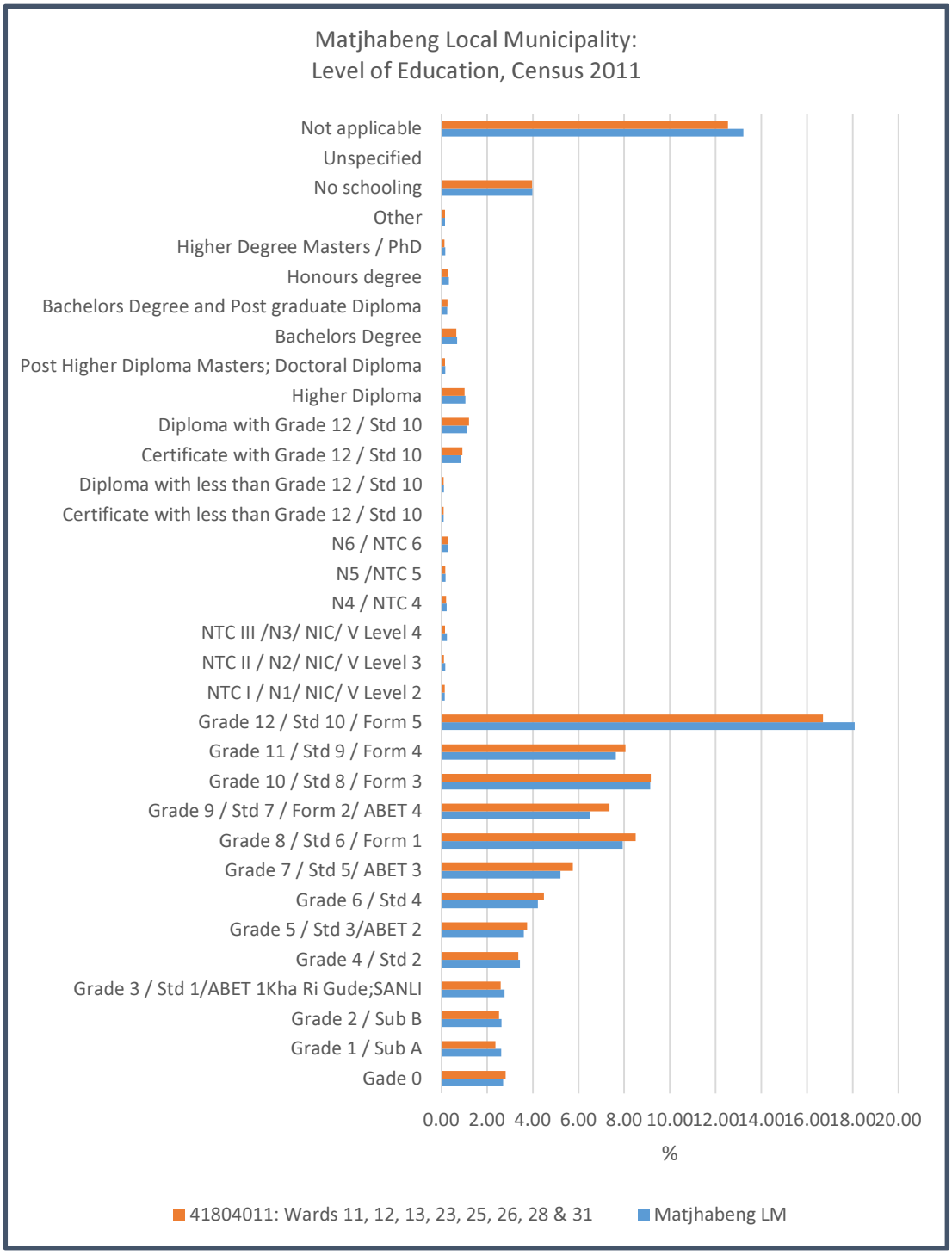


Figure 4: Matjhabeng LM, Level of Education (%), Census 2011

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 800 mil	
What is the expected yearly income that will be generated by or as a result of the activity? The expected yearly income is none/not-applicable during the operational phase (there is already a routine road maintenance contract in place for the road and there are no gantries or toll plazas on this portion of road).	R N/A	
Will the activity contribute to service infrastructure?	YES ✓	NO
Is the activity a public amenity?	YES ✓	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	120	
What is the expected value of the employment opportunities during the development and construction phase?	R 500 000	
What percentage of this will accrue to previously disadvantaged individuals?	60%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	0	
What is the expected current value of the employment opportunities during the first 10 years?	R 0.00	
What percentage of this will accrue to previously disadvantaged individuals?	0%	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR) ✓	In terms of the South African National Biodiversity Institute's (SANBI) biodiversity information there are threatened ecosystems within the study area. These areas consist of the Endangered Vaal-Vet Sandy Grasslands. However, in terms of the Ecological Assessment which was undertaken by Mr Mathew Ross from Enviross, the survey area already suffers from ecologically-impacting features, which include existing infrastructure of equal magnitude, surrounding high-impact land uses and overall degraded ecological integrity

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	**0**%	In terms of the Ecological Assessment which was undertaken by Mr Mathew Ross from Enviross, the survey area already suffers from ecologically-impacting features, which include existing infrastructure of equal magnitude, surrounding high-impact land uses and overall degraded ecological integrity.
Near Natural (includes areas with low to moderate level of alien invasive plants)	**10**%	
Degraded (includes areas heavily invaded by alien plants)	**30**%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	**60**%	Existing roads, and other adjacent infrastructure.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems						
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	Endangered ✓							
	Vulnerable							
	Least Threatened	YES ✓	NO	UNSURE	YES	NO	YES	NO

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Vegetation:

The proposed development area falls within a single vegetation unit, namely Vaal-Vet Sandy Grassland. This vegetation type falls within the Grassland biome and Dry Highveld Grassland bioregion. The vegetation unit is regarded as *Endangered* conservationally due to transformation of a large proportion of the unit by urbanisation, agriculture and mining developments, as well as a general overall lack of incorporation of this unit into formally conserved areas (Mucina & Rutherford, 2006).

Exotic vegetation was commonplace throughout the survey area, with the highest occurrences being that of exotic annual weeds (forbs) that are typical indicators of local disturbance features. The dominant exotic species included *Flaveria bidentis*, *Tagetes minuta, Schkuhria pinnata* and various *Conyza* species.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	• Initial Public Participation Phase: The Vista (Welkom and Thabong Areas) • Public Participation Phase for the new Application in terms of the EIA Regulations, 2014: The Vista (Welkom and Thabong Areas)	
Date published	16th of January 2014 - Initial Public Participation Phase 23 July 2015 - Public Participation Phase for the new Application in terms of the EIA Regulations, 2014	
Site notice position	**Latitude**	**Longitude**
	To be included in the Final BAR	To be included in the Final BAR
Date placed	• 20July 2015 - Public Participation Phase for the new Application in terms of the EIA Regulations, 2014	

Record of Site Notices Placed During the Initial Public Participation Phase which was undertaken in terms of the EIA Regulations of 2010, on the 18th of November 2013

Record of Site Notices Placed

Site Notice 1 Placed at Corner of Philander and R73, Bronville

Site Notice 2 Placed at Daycare Centre Ext 13

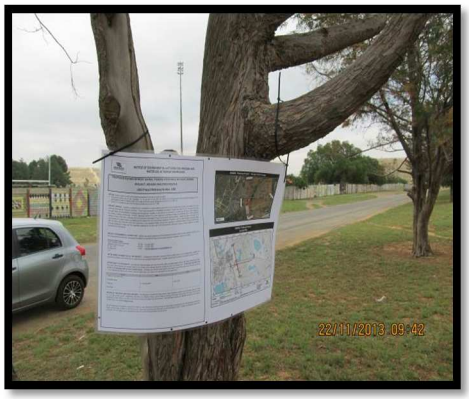
Site Notice 3 Placed at Entrance of Hani Park Clinic

Record of Site Notices Placed During the Initial Public Participation Phase which was undertaken in terms of the EIA Regulations of 2010, on the 18th of November 2013	
Record of Site Notices Placed	
	
Site Notice 4 Placed at the Intersection at New Main Road and Ext 21	
	
Site Notice 5 Intersection at Nkoane Road and R73,Ext 4	
	
Site Notice 6 Placed at a Motsethabong Post Office Ext 5	

Record of Site Notices Placed During the Initial Public Participation Phase which was undertaken in terms of the EIA Regulations of 2010, on the 18th of November 2013

Record of Site Notices Placed

Site Notice 7 Placed Next to Stadium Entrance,Cnr Philander & Waterboer Street,Bronville

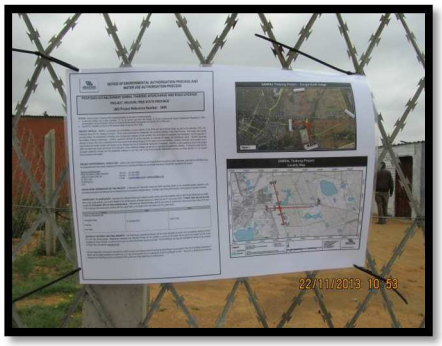


Site Notice 8 Placed at the Notice board Thabong Community Centre,Constantia Road

Site Notice 9 Placed at the Shop Hani Park

Record of Site Notices Placed During the Initial Public Participation Phase which was undertaken in terms of the EIA Regulations of 2010, on the 18th of November 2013

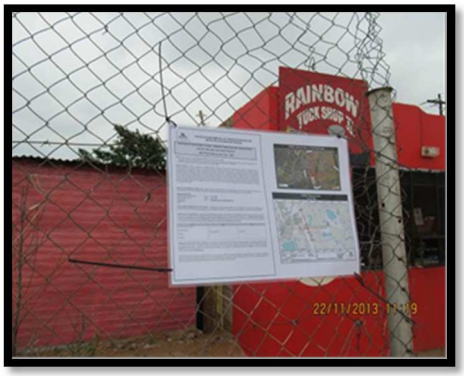
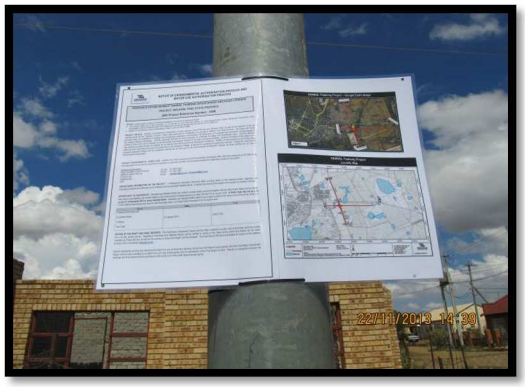
Record of Site Notices Placed



Site Notice 10 Placed at the Shopping Centre,Constantia Road, Ext 1

Site Notice 11 Placed at the Shopping Centre Nkoane Road, Ext 4

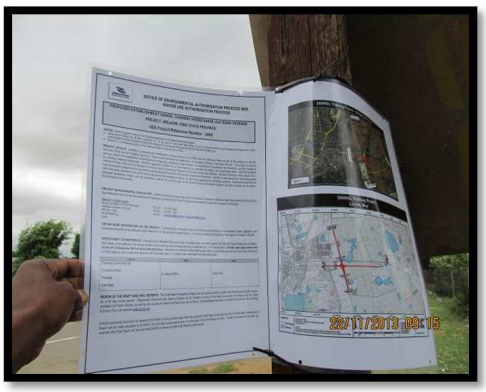
Site Notice 12 Placed at the Spaza Shop Hani Park

Record of Site Notices Placed During the Initial Public Participation Phase which was undertaken in terms of the EIA Regulations of 2010, on the 18th of November 2013	
Record of Site Notices Placed	
	
Site Notice 13 Placed at the Spaza Shop, Hani Park	
	
Site Notice 14 Placed at Taxi Tank, Intersection New Main Road and R73	
	
Site Notice 15 Placed at Thlulwane Road Ext 7	

Record of Site Notices Placed During the Initial Public Participation Phase which was undertaken in terms of the EIA Regulations of 2010, on the 18th of November 2013

Record of Site Notices Placed

Site Notice 16 Placed at Waterboer Street, next to Bronville Primary School



Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Name	Affiliation	Contact Details	Postal Address/Residential	E-mail Address
Jan Faber	Matjhabeng Local Municipality	084 404 9441 057 916 4028	Room 328, 1 Reinet Street PO BOX 708 Welkom, 9460	an.faber@matjhabeng.co.za
Reginald Victor	Ward Councillor-ward 11	073 832 0805 078 497 3926	983 Presbite Str BRONVILLE	Victor.Morris@matjhabeng.co.za
Rubben Kgorai	Ward Councillor-ward 13	072 383 3632	25372 New Stands THABONG	thelingoanetsokolo@yahoo.com

Name	Affiliation	Contact Details	Postal Address/Residential	E-mail Address
Luvuyo Goodman	Ward Councillor-ward 25	082 470 5879 Fax 057 352 1267 086 536 0696	22130 Milo Str JERUSALEM PARK	
Edward Funani	Ward Councillor-ward 28	072 822 1495 071 600 4849	2030 Nkasai Str THABONG	Taliwe@matjhabeng.co.za
Neville Vusimusi	Ward Councillor-ward 23	073 187 6596 076 797 7214	35261 Hani Park THABONG	
Abel Hlobohang	Ward Councillor-ward 31	072 378 9870	2329 Seutlwadi Str THABONG	Hlobohangm8@gmail.com
Joseph Sizakele	Ward Councillor-ward 26	073 297 6586 073 593 6990	12246 Mofokeng Street THABONG	
Debbie Benson	Harmony Mine	057 904 4321		Debbie.Benson@Harmony.co.za
Teboho Modise Acting Manager: EHFE (ABL) Agriculture and Bulk Liquids Business Unit Transnet Freight Rail	Transnet	083 854 2921 051 408 3019		Teboho.Modise@transnet.net
Councillor Rubben Tlake	Ward 12 Councillor	076 8127946		tlakerubben@gmail.com

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Name	Comment Made	Response Provided
Matshido Patricia Malema 073 797 0460	Ms Malema indicated that she is interested in training and employment opportunities.	Comment Noted. Approximately 90 local employment opportunities will be created during the construction phase. Recruitment will be undertaken by the Contractor
Lucas Letsielo 4248 Las Vegas Motse Thabong 9463 073 644 6297	Mr Letsielo indicated that she is interested in training and employment opportunities.	Comment Noted.
Job Ditabe 12184 Tsoai Street Thabong 072 1288 434	Mr Ditabe is of the opinion that the proposed project will be very good for the community of Thabong and also for employment opportunities for the youth. Further mentioned that the road upgrades would be good for the road users. Requested that the community should be provided with job opportunities, and that the Matjhabeng community should be given an opportunity to be part of the project.	Comment Noted
Leonard Nkonaone 20083 Jerusalem park Thabong 083 2592257	Mr Nkonaone if of the opinion that the project is a good idea which could create job opportunities for the Matjhabeng youth.	Comment Noted
Frai Maoko 6626 Doornpan Thabong 9463 078 0619629	Ms Maoko mentioned that she appreciates the work that is being done for the area.	Comment Noted
Sam Nkone 12316 Tsoai Street Thabong Location	Mr Nkone is of the opinion that the project is a great idea and he hopes that the project employ youth and benefit the community as a whole.	Comment Noted

Name	Comment Made	Response Provided
9463 071 9136728/084 0465234		
Dorothy Seitshiro 19406 Monyake Styreet Orange Groove Thabong 071 7588494	Ms Seitshiro mentioned that the pedestrian bridges are needed for the safety of the children and local community in general who has to cross the R730 on a daily basis to get to work and school. Also mentioned that a safe area for pedestrian will make it easier for the local community to walk to school and work, instead of making use of taxi's which will decrease unnecessary monthly expenses.	Comment Noted
Montene Daisy Mokoena 6740 Doorenpan Thabong 9463 078 8650327	Ms Mokoena indicated that she is interested in training and employment opportunities.	Comment Noted
Tmato Mankeke 078 4729983	Mentioned that job and training opportunities should be created for the local community.	Comment Noted
Richard Kobedi Makgemeng 074 0349754	Mr Makgemeng mentioned that job and training opportunities should be created for the local community, as this is much needed in the low income area of Thabong.	Comment Noted
Cllr Tsatsa 073 5936990	Cllr Tsatsa mentioned that Sections F-G of the road has poor lighting and this should be addressed as the road is too dark. Further mentioned that the library is a suitable venue for the report to be placed for public review. Requested that electronic copies should be sent to councillors.	Comment Noted
Debbie Benson 087 9044321	Ms Benson mentioned that traffic signals are very important at the intersection at the Harmony Mine. Required timeframes for the non-motorised transport project.	Comment Noted. The community project which involves the construction of pedestrian bridges and walkways forms part of the Basic Assessment process for the Thabong road upgrade project. Construction will commence should the project be authorised by the Department of Environmental Affairs. The intersection to the Harmony mine offices falls outside of the limit of construction. Construction only starts at km0.4 east of the intersection. However, this comment was forwarded to SANRAL.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Free State Department of Economic Development, Tourism and Environmental Affairs	Ms Grace Mkhosana	0514004812	051400 4848	mkhosana@detea.fs.gov.za	34 Markgraaf Street, Westdene, 9301
Matjhabeng Local Municipality Environmental and Town Planning Department	Mr Koos Duvenage	0579164123	086 5360 646	koosd@matjhabeng.co.za	319 Stateway street Welkom
Department of Water Affairs -Free State Regional office	Mr Pius Lerotholi	015 405 9000		LerotholiP@dws.gov.za	Sanlam Plaza, East Burger Street Bloemfontein 9301
South African Heritage Resources Agency	Dr Ragna Redelstorfff	(021) 462 4502		rredelstorff@sahra.org.za	111 Harrington St, Zonnebloem, Cape Town, 7925
Free State Heritage Resources Authority	Ms Ntando PZ Mbata	(051) 410 4750		ntandolicy@yahoo.com	Room 307, the SACR building, Cnr Hendry and East Burger Str, Bloemfontein, 9310

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Impact Assessment Methodology

The Environmental Impact Assessment Regulations, 2010, promulgated in terms of Section 24(5) of the National Environmental Management Act (Act 107 of 1998) prescribes requirements to be adhered to when undertaking impact assessments. Requirements for undertaking impact assessments for Basic Assessments and full Environmental Impact Assessments are outlined in the following sections of the EIA Regulations:

- Regulation 543, Section 22, 2(i) – Basic Assessment Impact Assessment Requirements: and
- Regulation 543, Section 32, 2(l) – Environmental Impact Assessment Requirements

In terms of these Regulations, the following should be considered when undertaking an impact assessment:

- A description and assessment of the significance of any environmental impacts, including –
  a. Cumulative impacts, that may occur as a result of the undertaking of the activity during project life cycle;
  b. Nature of the impact;
  c. Extent and Duration of Impact;
  d. The Probability of Impact Occurring;
  e. The degree to which the impact can be reversed;
  f. The degree to which the impact may cause irreplaceable loss of resources; and
  g. The degree to which the impact can be mitigated.

In terms of the above legislated requirements a standard impact assessment methodology was compiled. In order to compile the impact assessment methodology a review of existing impact assessment methodologies utilised by consultants in the field was undertaken. Furthermore, the following document as compiled by the former Department of Environmental Affairs and Tourism (DEAT) was utilised during the compilation for the impact assessment methodology:

- *DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria.*

A description of the method for assessing the above criteria as well as the method for determining impact risks are provided in Sections A to I below.

A. Cumulative Impacts

Cumulative impacts can occur over different temporal and spatial scales by interacting, combining and compounding so that the overall effect often exceeds the simple sum of previous effects. The spatial scale can be local, regional or global, whilst the frequency or temporal scale includes past, present and future impacts on a specific environment or region.

Cumulative effects can simply be defined as the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time.

Potential cumulative impacts on all elements of the receiving environment are addressed for all project phases (pre-construction, construction, operational and decommissioning), before and after implementation of mitigation measures.

B. Significance/Magnitude/Nature of Impacts

The significance or magnitude of an impact refers to the importance of an impact. When rating the extent of an impact, it is important to also rate the significance of an impact in order to determine the actual importance of an impact. For example, the size of an area affected by atmospheric pollution may be extremely large, but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be High or Very High, but if it is dilute it would be Very Low or Low.

The significance of impacts has been grouped into five classes, as outlined in the Table below

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any

		minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all – not even a very low impact on a party or system.

C. Extent of Impacts

The extent or spatial scale of an impact refers to whether an impact will occur at a local, regional, or global scale. The extent of impacts has been grouped into five classes, as outlined in the Table below.

RATING		DESCRIPTION
5	Global/National	The impact could/will occur on a national or global scale.
4	Regional/Provincial	The impact could/will occur at a Regional/Provincial Level
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the Boundary of the study site
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the development footprint.

D. Duration of Impacts and Degree to which impacts can be reversed

The duration or temporal scale of an impact refers to actual impact timeframe, i.e. how long will impacts to the environment last. The reversibility of impacts is directly linked to the duration of impacts. For e.g. permanent impacts are irreversible impacts, whereas, incidental impacts are immediately reversible. The duration and reversibility of impacts has been grouped into five classes, as outlined in the Table below.

RATING		DESCRIPTION	REVERSIBILITY
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.	Immediately reversible
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.	Quickly reversible
3	Medium term	The environmental impact identified will operate for the duration of life of the project.	Reversible over time
4	Long term	The environmental impact identified will operate beyond the life of the project.	Reversible over the long term
5	Permanent	The environmental impact will be permanent.	Irreversible, impact is permanent

E. Probability of Impact Occurring

The probability of an impact refers to the likelihood of an impact occurring. The probability of impacts has been grouped into five classes, as outlined in the Table below.

RATING	DESCRIPTION
1	Practically impossible that impact will occur
2	Unlikely that impact will occur
3	Impact could occur
4	Very Likely that impact will occur
5	Impact will occur or has already occurred

F. Degree to which the impact may cause irreplaceable loss of resources (Intensity or Severity of an Impact)

The degrees to which an impact may cause irreplaceable loss of resources are determined based on the outcome of the impact risk assessment. High risk impacts in sensitive areas are more likely to result in irreplaceable loss of resources compared to low risk impacts.

RATING	DESCRIPTION
High	Disturbance or pristine areas that have important conservation value. Destruction of rare or endangered species.
Medium	Disturbance of areas that have potential conservation value or rare of use as resources. Complete change in species occurrence or variety.
Low	Disturbance of degraded areas, which have little conservation value. Minor change is species occurrence or variety.

G. The degree to which the impact can be mitigated

The degree to which an impact can be mitigated are determined by comparing the impact risk class prior to implementation of mitigation measures to the impact risk class after implementation of mitigation measures. If for e.g. an impact risk class can be reduced from a high to very low, then it is likely that there is a high potential that an impact can be mitigated.

RATING	DESCRIPTION
High	High Potential to mitigate negative impacts to the level of insignificant effects.
Medium	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
Low	Little or no mechanism to mitigate negative impacts.

H. Degree of Certainty

As it is not possible to be 100% certain of all facts, a standard "degree of certainty" has been incorporated into this Impact Assessment Methodology to indicate the degree of the EAP's certainty regarding impact ratings.
As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale will be used as outlined in the Table below. When very detailed specialist studies are available or have been undertaken as part of a project, impacts can be more accurately determined.

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

I. Quantitative Description of Impacts

In order to describe impacts in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 has been used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and duration scale as described below:

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Duration})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

Impact	Significance	Spatial Scale	Duration Scale	Probability	
Impact to air quality – For e.g. construction vehicles travelling on areas where vegetation has been cleared could result in dust impact.	Low	Local	Medium-Term	Could Happen	
	2	3	3	3	

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to 5 classes as described in the table below.

Impact Risk Classes:

Rating	Impact Class	Description
0.1-1.0	1	Very Low
1.1-2.0	2	Low
2.1-3.0	3	Moderate
3.1-4.0	4	High
4.1-5.0	5	Very High

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

1. PLANNING DESIGN AND CONSTRUCTION PHASE

Activity	Impact summary	Significance	Proposed mitigation
Alternative 2 (preferred alternative)			
Geology	***Direct impacts:*** No Dolomite occurs on or near the site. The existing R730 and Jan Hofmeyer Road and their existing bridges and culverts already had an impact on geology in the area. Excavations for road layer works where the existing roads will be widened and for the construction of the Jan Hofemeyer Road extension will have a permanent impact on the geology in the area.	**Moderate**	Impact to geology is unavoidable. No blasting may be undertaken on site without a suitable blast design, compiled in line with relevant SANS codes and approved by an appropriately qualified professional. • Surface water drainage must be installed to make effective provision for the disposal of stormwater which falls on, or is intercepted by the embankment. A functioning subsurface drainage system must be provided for embankments in areas with a shallow groundwater water table and in wetlands to intercept and remove seepage water from the subgrade. • In terms of the Geotechnical Report compiled by AECOM, the envisaged upgrades along the approximately 5km section of the R730 in Thabong are feasible provided cognisance is taken of the findings contained in that report. It is imperative that the recommendations within the geotechnical report be re-visited once structural layouts, foundation types, foundation dimensions, loading and stresses have been agreed upon so that, if required, more site specific investigation can be conducted. • In addition, during construction an engineering geologist or geotechnical engineer should inspect all foundation excavations or auger shafts to ensure quality and that conditions at variance to those found during the subsurface investigations are assessed and addressed and to validate the findings of the Geotechnical Assessment Report. • As a precaution, sloping, benching, or other approved cave-in protection systems must be utilized during foundation or trench excavations. • Dewatering measures should also be put in place. • Although no side-wall collapse was observed in the test pits, measures must be put in place to temporarily case collapse zones within pile holes to ensure personnel safety during construction.
	Indirect impacts: None Expected	N/A	None Required.

Activity	Impact summary	Significance	Proposed mitigation
	Cumulative impacts: None Expected	N/A	None Required.
Topography & Drainage	***Direct impacts:*** The rehabilitation, upgrade and extension of Jan Hofmeyer Road will result in the alteration of surface topography and drainage patterns. However, surface topography and drainage patterns in the area have already been altered by existing development and by mining activities.	**Low**	The impact to surface topography is unavoidable. The following mitigation measures for the control of stormwater should be implemented. • Suitable temporary stormwater control measures to be implemented during the construction phase; • Temporary storm-water control measures should be installed in case a rain event should occur that has the potential to cause erosion of exposed soil; • Cut-off drains must be installed to facilitate the control of surface water runoff velocities; • Storm-water control barriers should be used to divert surface water runoff into grassland buffers and not directly into the exposed workings; • The Stormwater Management Plan compiled by AECOM should be finalised during the detailed engineering design phase to ensure that adequate stormwater management measures for the construction and operational phases are incorporated into the overall road design; • Stockpiles of soils and materials should be located on high ground out of the reach of flood flows; and • Stockpiles will be sited in areas demarcated for such purposes prior to the commencement of construction activities.
	Indirect impacts: None Expected	N/A	None Required.
	Cumulative impacts: None Expected	N/A	None Required.
Soils and Land Capability	***Direct impacts:*** • A Surface Geotechnical Investigation was undertaken by AECOM for this proposed project in March 2015. A copy of	**Moderate**	• Spread absorbent sand on areas where oil spills are likely to occur, such as the refueling area at the construction camp.

Activity	Impact summary	Significance	Proposed mitigation
	the Surface Geotechnical Investigation Report is attached to Appendix D of this Basic Assessment Report. This assessment found the following on site: • Seasonally wet soils are present on site as a result of the wetland areas; • Dispersive soils (soils that dissolve in water) are present on site; • Soils with high clay content (clay fraction more than 40%) are present on site; • Transported soils were described in the trial pit logs to have a "pinhole voided" structure, which is indicative of a potentially collapsible soil fabric. • It is anticipated that there could be areas sensitive to erosion due to the location of the wetlands. **Potential Impacts:** • During the construction phase, activities such as topsoil stripping, removal and stockpiling of subsoil, soil compaction, establishment of the site office, materials storage areas, batching plant, etc. as well as the construction of temporary road deviations will disturb the soils on site; • There is a risk of pollution by hydrocarbon spillages, and a risk of soil erosion, should a proper stormwater management plan not be implemented; • Soils will only be cleared and stockpiled during the construction phase. After construction, all disturbed areas will be rehabilitated.		• Oil-contaminated soils are to be removed to a contained storage area and bio-remediated or disposed of at a licensed facility • Ensure that soil is stockpiled in such a way as to prevent erosion by storm water. • Institute wind protection and implement a proper stormwater management plan during the construction phase to prevent soils erosion. • Drip trays shall also be provided in construction areas for stationary plant and for "parked" plant. • Drip trays, sumps and bunds must be emptied regularly, especially before a known rain event and after a rain event, and the contents disposed of at a licensed disposal facility. • All vehicles and equipment shall be kept in good working order and serviced regularly. • Leaking equipment shall be repaired immediately or removed from the site. • Should cement be mixed on site, mixing will take place within a demarcated fenced off concrete batching area which will be located within the road reserve of the existing R730, or the Jan Hofmeyer Road, outside of wetland areas, and the buffer zones of the wetland areas, or at the fenced off contractors camp site, which must also be located outside of wetlands and their associated buffer areas. Cement must be mixed on an impervious surface, and water from the batching area should be channeled to a conservancy tank for removal from the site to a licensed disposal facility. • A specific area will be demarcated for the coating and storage of stone chippings. Coating of stone chippings with pre-coating fluid should be undertaken on an impervious surface to avoid soil contamination. The coated stone chippings should be stored on an impervious surface, and stormwater from this storage area should be channeled to a conservancy tank for removal from the site to a licensed disposal facility. These mixing areas must be situated outside of wetland areas and its associated buffer areas.
	Indirect impacts:	N/A	None Required.

Activity	Impact summary	Significance	Proposed mitigation
	None Expected		
	Cumulative impacts: None Expected	N/A	None Required.
Land Use	***Direct impacts:*** In areas where the existing R730 and Jan Hofmeyer Road will be rehabilitated and upgraded, the land use will remain unchanged. Where the existing road servitudes will be widened for the upgrading and rehabilitation of these roads, the land use of the affected properties will change. However, all properties affected by the widening of the road servitude belong to the Matjhabeng Local Municipality and are currently vacant. The extension of Jan Hofmeyer Road will be undertaken within the existing area proclaimed for the construction of a road, where the land is currently vacant. The construction activities could have a negative visual and noise impact on the surrounding land uses, especially the Thabong area.	**Moderate**	All issues and concerns communicated by the local municipality and the local community will be captured in the Environmental Management Programme (EMP).
	Indirect impacts: None Expected	N/A	None Required.
	Cumulative impacts: None Expected	N/A	None Required.
Surface Water, Groundwater and Wetland Areas	***Direct impacts:*** • Waste generated during the construction phase may enter the environment through surface water runoff i.e. litter or pollution, such as hydrocarbons, can be washed into aquatic systems, affecting those systems negatively; • Stormwater flowing over the site will also mobilise loose sediments, which may enter the surface water environment affecting water quality;	**Moderate**	• Hazardous material and chemicals should not be kept or handled within wetland and riparian areas. Hazardous substances must be kept in a demarcated area on an impervious surface. Any spillages from hazardous materials should be cleaned immediately and transported to a landfill site that accepts hazardous materials. • Cement and other material must be mixed in a demarcated area and not in wetland or buffer zones. • Movement of contractors and vehicles within wetland and riparian areas should be minimised to avoid compaction of sediment and water pollution.

Activity	Impact summary	Significance	Proposed mitigation
	• Storm water can also be contaminated from batch plants, the stone chipping pre-coating area, materials storage areas, by excess fertiliser from rehabilitated areas, etc. • There is a risk that stormwater could become contaminated with hydrocarbons or oils during the construction phase, however, all stormwater that may potentially be contaminated by fuel or oil spills should be directed to a separator unit prior to exiting the site, as per current standard practice, and in fulfilment of the requirements of the National Water Act (Act 36 of 1998) and SABS 089 current version. • Movement of vehicles and contractors within wetland areas could lead to compaction of sediment and water pollution.		• Vehicles should be serviced on a regular basis to avoid leaks and spills. • Solid waste should be removed on a regular basis and chemical toilets should be provided and should be serviced on a regular basis. • Any contractor's camps must not be placed near any wetlands. • Topsoil and excavated soil must not be placed within the wetland or riparian areas. The soil that is excavated from these wetlands should not be used for construction, but rather for any rehabilitation processes. • Road cuttings should be filled as soon as possible in order to prevent and / or minimise any erosion that could be caused and to avoid siltation of the wetlands. • The removal of vegetation must be kept to a minimum where ever possible. The time that soil is exposed must be limited and re-vegetation or another covering method must be applied during the construction and post construction phases. • Vegetation must be removed in sections, as construction is taking place, and should not be removed throughout the extent of the construction area. • Re-vegetation must be completed using the appropriate wetland/endemic plants. Where possible, the vegetation must be removed intact to ensure that it can be planted again during rehabilitation. • Where vegetation is removed, the compaction of wetland soils must be minimised to avoid an increase in surface runoff speeds. • The establishment of exotic plants must be avoided. • Where possible the area where construction will take place should be demarcated. Demarcation of the construction areas will ensure that only the required area is cleared of vegetation. • Erosion protection must be used in all areas where erosion may occur. Selected areas may require rehabilitation and stabilisation prior to construction. • Erosion may be correlated with flow regulation and connectivity therefore must be maintained within these systems.

Activity	Impact summary	Significance	Proposed mitigation
			• The use of single culverts should be avoided as this will concentrate flow, leading to erosion directly below the culverts. Poorly designed culverts will lead to damming of water at one end and head-cuts at the opposite end. • The areas directly below and above any culverts must be stabilised through the use of appropriately planted vegetation or gabions to avoid erosion and siltation. • Damming of water underneath culverts must be avoided through the appropriate engineering design. • Suitable indicators must be identified and monitored by a qualified wetlands specialist to ensure that the impacts are minimised and corrected timeously. • Demarcated areas where waste can be safely contained and stored on a temporary basis during the construction phase should be provided at the construction camp; • When adequate volumes have accumulated all waste is to be removed from site and disposed of at a licensed facility; • Waste is not to be buried on site; • Hydro-carbons should be stored in a bunded storage area; • Spill-sorb or similar type product must be used to absorb hydrocarbon spills in the event that such spills should occur; • Care must be taken to ensure that, in removing vegetation, adequate erosion control measures are implemented; • The Stormwater Management Plan compiled by AECOM should be finalised during the detailed engineering design phase to ensure that adequate stormwater management measures for the construction and operational phases are incorporated into the overall road design; • Should cement be mixed on site, mixing will take place within a demarcated fenced off concrete batching area which will be located at the contractor's camp. This must be situated outside of wetland areas and its associated buffer areas. Cement must be mixed on an impervious surface, and water

Activity	Impact summary	Significance	Proposed mitigation
			from the cement mixing area should be channelled to a conservancy tank for removal from the site to a licensed disposal facility; and • A specific area will be demarcated for the coating and storage of stone chippings. Coating of stone chippings with pre-coating fluid should be undertaken on an impervious surface to avoid soil contamination. The coated stone chippings should be stored on an impervious surface, and stormwater from this storage area should be channelled to a conservancy tank for removal from the site to a licensed disposal facility.
	Indirect impacts: Water pollution due to accidental leaks and spills of hazardous or dangerous materials, and sedimentation of watercourses and wetland areas could contaminate water downstream of the construction areas.	**Moderate**	As per the above mitigation measures.
	Cumulative impacts: None Expected	N/A	None Required.
Fauna & Flora	***Direct impacts:*** **Habitat destruction:** Some vegetation loss will occur to accommodate the proposed development within the construction footprint and supporting areas, but this will be limited due to the vast majority of the activities occurring within the existing road reserves and coupled to existing infrastructure. **Impacts on RDL floral & faunal species:** • This is regarded as an insignificant impact as it is highly unlikely that any RDL species occur within the footprint area of the proposed development. This is largely due to the existing degradation and ongoing pressures and drivers of ecological change within the area. The proposed development activities will also be largely confined to existing road reserves.	**Low**	**Habitat destruction:** • Limit this impact to the footprint and immediate support areas only; • Avoid indiscriminate destruction of habitat. **Impacts on RDL floral & faunal species:** • Limit this impact to the footprint and immediate support areas only; • Avoid indiscriminate destruction of habitat; • If any RDL species are noted, they must be removed as part of a rescue and relocation plan. **Impacts on floral communities:** • Limit this impact to the footprint and immediate support areas only; • Avoid indiscriminate destruction of habitat. • Construction teams should not be allowed to harvest resources from the surrounding area, which includes firewood. **Impacts on faunal communities:**

Activity	Impact summary	Significance	Proposed mitigation

	Impacts on floral communities:
	• Vegetation removal and site disturbances leading to shifts in floral community and habitat unit structures
	  ○ Disturbances of the flora will lead to transformation of the vegetation structures, potentially enhancing the encroachment of exotic species, pioneering species and plagioclimax population structures. This is not thought a significant impact as the vegetation within the proposed development footprint area are already suffering from transformation and do not represent primary grasslands of the vegetation type. Much of the development will be confined to existing road reserves as well.
	• Depletion of floral biodiversity through indiscriminate collecting and harvesting of floral species by construction teams
	  ○ Harvesting floral resources from within the area will place an artificial external pressure on the vegetation and should be avoided. This is, however, not considered a significant impact.
	
	Impacts on faunal communities:
	• Habitat destruction leading to loss of faunal diversity
	  ○ Vegetation that will be impacted through removal to accommodate various aspects of the proposed development will have a direct impact on the faunal species that depend on the retention of the ecological integrity of the habitat.
	  ○ The construction activities will be largely confined to an area of high existing impacts and therefore this feature is not thought to be significant.
	• Impacts on faunal communities by indiscriminate collecting and hunting by construction teams
			• Limit this impact to the footprint and immediate support areas only;
			• Avoid indiscriminate destruction of habitat.
			• Construction teams should not be allowed to harvest resources from the surrounding area.
			
			Impacts on RDL species – Habitat destruction leading to displacement:
			• Limit this impact to the footprint and immediate support areas only;
			• Avoid indiscriminate destruction of habitat.
			
			Compaction of soils:
			• Movement of heavy vehicles to be restricted to designated access points only. Upon completion, the impacted areas can be ripped to loosen the soils and enhance revegetation.
			
			Soil impacts:
			• Earthmoving and construction equipment should be serviced regularly to avoid fuel and oils leaks;
			• Accidental spillages must be immediately reported to the ECO and clean up procedures implemented immediately. This would include the removal of the contaminated soils, which should be taken to a registered disposal facility.
			• Soil erosion is readily mitigated for by the implementation of geotextiles and silt fencing on areas of steeper slopes, especially near aquatic and wetland habitats.
			General:
			• Disturbed areas should be properly rehabilitated as per the EMP.
			• All construction areas should be demarcated prior to construction to ensure that the footprint of the impacts are limited (including areas where vehicles may traverse);
			• All alien invasive species on site should be removed and follow up monitoring and removal programmes should be initiated once construction is complete;
			• Reseed cleared areas with local grasses to prevent soil erosion; and

Activity	Impact summary	Significance	Proposed mitigation
	○ Harvesting faunal resources (informal hunting and snaring) from within the area will place an artificial external pressure on the fauna and should be avoided. • Increased disturbance factors that will displace sensitive faunal species. ○ Sensitive faunal species that occur within the area may not be able to accommodate the disturbance features and will be displaced. This is, however, not thought to be a significant impacting feature as, due to the overall degradation of the area, sensitive species are not thought to occur in viable numbers within the area. **Impacts on RDL species – Habitat destruction leading to displacement:** • Direct impacts due to inclusion of RDL species nesting/roosting sites in vegetation removal or habitat destruction leading to RDL species displacement. ○ This is not thought to be a significant impact due to the transformed and degraded nature of the proposed footprint and surrounding area. **Compaction of soils:** • Movement of heavy machinery leading to soil compaction that will modify habitat, destroy vegetation and inhibit re-vegetation. ○ This is not thought to be a significant impact as the development will be largely confined to areas of existing similar infrastructure where soils have already been compacted and transformed to accommodate the existing roadways. **Soil impacts:** • Soil contamination		• No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been rehabilitated. • All construction areas should be demarcated prior to construction to ensure that the footprint of the impacts are limited (including areas where vehicles may traverse); • No animal, reptile or bird of any sort found on site may be killed. This specifically includes snakes or other animals considered potentially dangerous discovered on site. If such an animal is discovered on site an appropriately skilled person should be summoned to remove the animal from the site. Consideration should be given to selection and nomination of such a person prior to site establishment. If no-one is available, training should be provided to at least two site staff members. • No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been rehabilitated.

Activity	Impact summary	Significance	Proposed mitigation
	○ Pollution of soils due to oil/fuel leaks & wastes that will affect biodiversity. This will impact on floral communities as well as pose a threat to the surface water resources within the area. • Soil erosion ○ Soil erosion may result from disturbed areas on steeper slopes. Severe soil erosion may result in impacts to the surface water resources within the area. The roads are generally constructed on embankments to raise them above the flood levels of the wetlands and to provide suitable stable foundation material. The sides of these embankments are subject to erosive forces.		
	Indirect impacts: Disturbance / destruction of vegetation makes ecosystems vulnerable and can lead to the introduction and spread of alien invasive vegetation. Alien vegetation could spread into adjacent areas.	**Low**	As above.
	Cumulative impacts: None Expected	N/A	None Required
Archaeological or Cultural	***Direct impacts:*** No sites, features or objects of cultural significance are known to exist in the study area, and therefore there would be no impact as a result of the proposed development.	**Very Low**	• Known sites should be clearly marked in order that they can be avoided during construction activities. • The contractors and workers should be notified that archaeological sites might be exposed during the construction work. • Should any heritage artefacts be exposed during excavation, work in the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible; • All discoveries shall be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;

Activity	Impact summary	Significance	Proposed mitigation
			• Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and • Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Socio-Economic	***Direct impacts:*** The area around the Thabong Interchange is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities and injuries are probably much higher than the statistics used in the assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads. Without this project, unsafe conditions in the area will remain. Approximately 90 local employment opportunities will be created during the construction phase. Recruitment will be undertaken by the Contractor • Construction camps and construction activities could result in a negative visual impact for adjacent land uses.	**Moderate** (**Moderate** *Positive Impact and* **Moderate** *Negative Impact)*	• The contractor and all staff should attend Environmental Awareness training, to be conducted by the appointed ECO, prior to the commencement of construction activities. During this training session, personnel should be made aware that they are not allowed to trespass onto any other properties, and that machinery and equipment may only be operated in designated working areas. • All conditions requested by the local municipality and adjacent landowners should be included in the Final EMP. • Prior to commencement of site establishment activities, SANRAL and the Contractor should put agreements in place with the affected Local Municipality and adjacent landowners (where necessary) with regards to compensation for damage to property caused as a result of construction activities (where applicable). • Any damage caused to adjacent properties or infrastructure as a result of construction activities should be fixed by the Contractor to the satisfaction of the landowner. • The ECO should have meetings with adjacent landowners monthly to ensure that landowner issues and concerns are dealt with according to agreements made between SANRAL; the contractor and the landowner. • During the set up phase of the project, the Contractor needs to make contact with those people that are interested or affected by the development (IAPs);

Activity	Impact summary	Significance	Proposed mitigation
	• Furthermore unauthorised movement on private properties can occur during the construction phase. • Construction activities could impact on current land uses; • During the construction phase, damage to private property can occur. • Crime may become an issue due to an influx of job seekers. • Disruptions of services could occur as a result of construction activities. • Heavy vehicles transporting construction materials to site may have an impact on current traffic volumes. In addition, construction vehicles can be a safety hazard for pedestrians, especially children.		• Limit construction activities to daylight hours; • Develop and implement a grievance procedure; • Construction traffic must travel outside peak traveling times; • Road safety events at local schools; • Inform communities in advance of disruptions in services; • Create and communicate a recruitment strategy.
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Noise	***Direct impacts:*** • During the construction phase, the operation of machinery and equipment, as well as the construction vehicle traffic will create a noise impact.	**Moderate**	• All equipment should be kept in good working order; • Equipment should be operated within its specifications and capacity and should not be overloaded; • All machinery/plant should be serviced and lubricated regularly to ensure a good working order; • The provisions of SABS 1200A will apply to all areas within audible distance of residents; • No amplified music will be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. will not be permitted unless at a level that does not serve as an intrusion to adjacent land-owners; • Construction activities generating output levels of 85 dB or more will be confined to the hours 08h00 to 17h00 Mondays to Fridays; • The Contractor will take preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools.

Activity	Impact summary	Significance	Proposed mitigation
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Traffic	***Direct impacts:*** • During the construction phase, construction vehicles will travel to and from the site delivering construction materials. This will have an impact on traffic volumes in the area. • Road deviations and "stop and go" points will have an impact on traffic as it will slow down normal traffic flows. • Non-construction related heavy vehicles using the road deviations could cause traffic hazards when not abiding to temporary road signage for construction purposes.	**Moderate**	• Provide enough heavy vehicle storage areas in the proposed contractors camp; • Ensure that all road diversions and closures are clearly marked and appropriate road signage displayed; • Ensure that vehicle traffic which may obstruct traffic flow is scheduled outside of peak travelling time in the morning or afternoon; • Ensure that heavy / large load traffic is appropriately routed and appropriate safety precautions are taken to prohibit road collisions and traffic incidences; and • Ensure that vehicle operators are suitably licensed, have had appropriate environmental and safety induction, are aware of specific site procedures, and are well rested and cognisant when operating heavy or unsafe vehicles / machinery.
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Visual	***Direct impacts:*** The removal of vegetation, construction equipment, stockpiles and activities undertaken during the construction phase may have a negative visual impact on the adjacent residential area	**Moderate**	• Advertising and lighting will be in accordance with the South African National Roads Agency requirements and will not constitute an eyesore / hazard to users of the road. • Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas. • The site will be shielded from the adjacent landowners to minimise the visual impact where this is feasibly possible; and • Site structures, albeit temporary, must be fitted with appropriate cladding and colouring to ensure reduced reflection and to minimise visual pollution.
	Indirect impacts:	N/A	None Required

Activity	Impact summary	Significance	Proposed mitigation
	None Expected		
	Cumulative impacts: None Expected	N/A	None Required
Air Quality	**Direct impacts:** Dust generation from stockpiles and soil stripping during the construction phase, as well as vehicle traffic on dirt roads deviations and construction vehicle fumes will have an impact on air quality	**Moderate**	• Heavy vehicles and machinery should be serviced regularly to minimise exhaust fume pollution; • Soil stockpiles will be located in sheltered areas to limit the erosive effects of the wind; • Removal of vegetation will be avoided until such time as soil stripping is required. • Limit vehicle speeds on dirt road deviations to 60km/h; • Water should be sprayed onto gravel roads when required; and • Environmental friendly soil stabilisers may be used as additional measures to control dust on gravel road and construction area and all roads used for traffic accommodation will be surfaced.
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required

2. OPERATIONAL PHASE

Activity	Impact summary	Significance	Proposed mitigation
Alternative 2 (preferred alternative)			
Topography	***Direct impacts:*** The road, associated bridges, and culverts will have a medium term impact on the topography and surface water drainage patterns in the study area, as this impact will last for the life of the project.	**Moderate**	The Stormwater Management Plan compiled by AECOM should be finalised during the detailed engineering design phase to ensure that adequate stormwater management measures for the operational phase is incorporated into the overall road design.
	Indirect impacts: None Expected	N/A	None Required.
	Cumulative impacts: None Expected	N/A	None Required.
Soils and Land Capability	***Direct impacts:*** The road widening and extension, the interchange and its associated bridges and culverts swill have a hard impacted footprint. The impact to soils and Land Capability where hard impacted footprint occurs will be a medium term impact, as the impact will last for the life of the project. Accidental hydrocarbons or oil leaks or spillages from maintenance vehicles or equipment may contaminate the soils within the road servitude. Maintenance vehicles may also compact soils within the road servitude and could destroy vegetation occurring within the road servitude.	**Low**	Refer to the construction phase mitigation measures which should be implemented during the undertaking of road maintenance activities.
	Indirect impacts: None Expected	N/A	None Required.
	Cumulative impacts: None Expected	N/A	None Required.

Activity	Impact summary	Significance	Proposed mitigation
Surface Water, Groundwater and Wetland Areas	***Direct impacts:*** Accidental hydrocarbons or oil leaks or spillages from maintenance vehicles or equipment may contaminate the soils, as well as surface and groundwater during the undertaking of road maintenance activities. However, this impact is insignificant as the road will be used by many vehicles which also cause such impacts. Wetland areas may be negatively impacted during the undertaking of maintenance activities.	**Low**	All maintenance vehicles should be kept in good working order and serviced regularly, and all equipment of machinery used during maintenance should be checked for leaks. The maintenance team should have spill kits available to clean any accidental leaks and spillages, and all areas disturbed or damaged during maintenance should be rehabilitated. All mitigation measures as provided under the construction phase should be implemented.
	Indirect impacts: None Expected	N/A	None Required.
	Cumulative impacts: None Expected	N/A	None Required.

Fauna & Flora	***Direct impacts:***
	
	Biodiversity impacts
	• Exotic vegetation encroachment following soil disturbances during the undertaking of maintenance activities.
	  ○ Exotic vegetation encroachment is a common occurrence within the survey area. Soil disturbances enhance the encroachment of exotic vegetation, which displaces natural flora diversity and decreased biodiversity in general.
	• The proposed interchange is aimed at increasing the efficiency of the interchange, which will result in the increased speed and volume of traffic. This could result in increased road deaths of faunal species that attempt to cross the road.
	  ○ Numbers and diversity of faunal species are considered low within the area due to overall ecological degradation. This is regarded as an insignificant impact.
		Low	**Biodiversity impacts**
			• Encroachment of exotic vegetation should be monitored and controlled.
			• Rumble strips or speed bumps could be fitted if areas of high impact are noted, but associated costs and the impact to the efficiency of traffic flow deem this mitigation measure largely non-feasible.

Activity	Impact summary	Significance	Proposed mitigation
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Socio-Economic	***Direct impacts:*** During maintenance, damage to private property can occur. The newly upgraded roads and the new interchange will significantly decrease the number of accidents occurring in the study area. In addition, the two pedestrian bridges as well as pedestrian walkways, will make it safer and easier for the local community to cross the busy roads.	**Low negative impact & High positive impact**	Any damage caused to adjacent properties or infrastructure as a result of maintenance activities should be fixed to the satisfaction of the landowner by SANRAL as per the EMP agreements;
	Indirect impacts: Welkom is the second largest town in the Free State province, and is well known for its mining activities. The R730 is the main road providing access to Welkom. The new improved R730 will improve traffic flow along this road and will have a positive impact on local businesses, industries, etc.	**High positive impact**	None Required
	Cumulative impacts: None Expected	N/A	None Required
Noise	***Direct impacts:*** Current noise levels generated by traffic travelling on the R730 and Jan Hofmeyer Road will remain.	**Low**	None Required
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Traffic	***Direct impacts:*** Current traffic volumes travelling on the R730 and Jan Hofmeyer Road will remain. Traffic flow will increase due to the upgrade of	**High positive impact**	None Required

Activity	Impact summary	Significance	Proposed mitigation
	the road and the interchange, and direct access into the Thabong area via the new Jan Hofmeyer Road will exist.		
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Visual	***Direct impacts:*** Current visual impacts experienced by the existing road network will remain.	**Low**	None Required
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required
Air Quality	**Direct impacts:** Current pollution levels generated by the existing road network will remain.	**Low**	None Required
	Indirect impacts: None Expected	N/A	None Required
	Cumulative impacts: None Expected	N/A	None Required

3. CLOSURE / DECOMMISSIONING PHASE

Is not anticipated that the R730 road will ever be decommissioned as it is a provincial road. It is also not anticipated that the Jan Hofmeyer Road and its proposed extension will ever be decommissioned. However, should decommissioning ever take place, all impacts as addressed in terms of the construction phase will apply.

4. NO-GO Alternative

The area around the Thabong Interchange is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities

and injuries are probably much higher than the statistics used in the assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads. Without this project, unsafe conditions in the area will remain.

The existing land use will also remain unchanged and land would not be required for the widening of the road servitude. Current site conditions will remain unchanged.

The no-go alternative will result in a high negative Socio-Economic Impact Risk for residents in the study area, as the current unsafe conditions will remain. In addition, the existing poor stormwater management conditions in the study area will remain, with occasional flooding, as no improvements to the stormwater management system will be made. Socio-economic upliftment, usually associated with high class infrastructure will not take place.

The impact assessment for the no-go alternative is provided below:

Impact Assessment: No-Go Alternative	**Before Mitigation**		**Mitigation Measure Proposed**	**After Mitigation**	
	Impact Significance	Impact Risk		Impact Significance	Impact Risk
Geology	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Topography	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Soils and Land Capability	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Land Use	MODERATE	MODERATE	None Required	**Very Low**	**Very Low**
Surface and Ground Water	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Fauna, Flora and Avifauna	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Archaeological or Cultural	No Impact	Current Impact will remain	None. Current impact will remain.	N/A	
Socio-Economic	**HIGH**	HIGH	Current unsafe conditions for traffic and pedestrian will remain.	**Very Low**	**Very Low**
Noise	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Traffic	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Visual	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	
Air Quality	Current Impact will remain	Current Impact will remain	None. Current impact will remain.	N/A	

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

A summary of the impact assessment is provided below. The majority of the impacts expected during the construction phase are of moderate risk, but the intensity/severity rating of all these impacts are low and these impact are also reversible. With the implementation of mitigation measures, these impacts will be of low to very low risk. Refer to Appendix F for a detailed breakdown of the impact assessment which was undertaken.

Pre-Construction & Construction Phase Impacts		Before Mitigation					After Mitigation		
		Impact Risk		Intensity / Severity	Reversibility		Impact Risk		Degree of Mitigation
Geology	Direct Impact	2.20	Moderate	Low	Irreversible, impact is permanent	5	1.80	Low	Medium
Topography & Drainage	Direct Impact	1.80	Low	Low	Reversible over the long term	4	1.80	Low	Medium
Soils and Land Capability	Direct Impact	2.13	Moderate	Low	Reversible over time	3	1.20	Low	High
Land Use	Direct Impact	2.13	Moderate	Low	Reversible over time	3	1.20	Low	High
Surface Water, Groudwater & Wetlands	Direct Impact	2.13	Moderate	Low	Reversible over time	3	1.00	Very Low	High
	Indirect Impact	2.13	Moderate	Low	Reversible over time	3	1.20	Low	High
Fauna & Flora	Direct Impact	1.20	Low	Low	Reversible over time	3	1.00	Very Low	High
	Indirect Impact	1.40	Low	Low	Reversible over time	3	1.00	Very Low	High
Archaeological or Cultural	Direct Impact	0.93	Very Low	Low	Quickly reversible	2	0.40	Very Low	High
Socio-Economic	Direct Impact	2.13	Moderate	Low	Reversible over time	3	1.20	Low	High
Noise	Direct Impact	2.13	Moderate	Low	Quickly reversible	2	1.40	Low	High
Traffic	Direct Impact	2.13	Moderate	Low	Quickly reversible	2	1.40	Low	High

Visual	Direct Impact	2.13	Moderate	Low	Quickly reversible	2	1.20	Low	High
Air Quality	Direct Impact	2.13	Moderate	Low	Quickly reversible	2	1.20	Low	High

The majority of the impacts expected during the operational phase are of low risk, the intensity/severity rating of all these impacts are low and these impact are also reversible. With the implementation of mitigation measures, these impacts will be of low to very low risk.

Operational Phase Impacts		Before Mitigation					After Mitigation		
		Impact Risk		Intensity / Severity	Reversibility		Impact Risk		Degree of Mitigation
Topography	Direct Impact	2.40	Moderate	Low	Reversible over the long term	4	1.40	Low	Medium
Soils and Land Capability	Direct Impact	1.87	Low	Low	Reversible over time	3	1.00	Very Low	High
Land Use	Direct Impact	2.13	Moderate	Low	Reversible over time	3	1.20	Low	High
Surface Water, Groudwater & Wetlands	Direct Impact	1.87	Low	Low	Reversible over time	3	1.00	Very Low	High
Fauna & Flora	Direct Impact	1.20	Low	Low	Reversible over time	3	1.00	Very Low	High
Socio-Economic	Direct Impact	1.60	Low	Low	Reversible over time	3	1.20	Low	High
	Indirect Impact	4.33	High Positive Impact	N/A	N/A	N/A	N/A	N/A	N/A
Noise	Direct Impact	1.80	Low	Low	Irreversible, impact is permanent	5	2.00	Low	High
Traffic	Direct Impact	1.60	Low	Low	Immediately reversible	1	1.20	Low	High
Visual	Direct Impact	2.00	Low	Low	Irreversible, impact is permanent	5	1.80	Low	High
Air Quality	Direct Impact	2.00	Low	Low	Reversible over time	3	2.00	Low	High

Alternative B

[redacted]

Alternative C

[redacted]

No-go alternative (compulsory)

The area surrounding the Thabong Interchange is responsible for 23% of all motor vehicle and pedestrian accidents occurring between Virginia and Welkom. In terms of the Road Safety investigation which was undertaken by AECOM, the crash statistics provided in their report are likely to be underreported, as the actual number of accidents, fatalities and injuries are probably much higher than the statistics used in the assessment. The proposed upgrade of the Thabong Interchange is likely to significantly decrease the number of accidents occurring in this area. In addition, the project will include the construction of two pedestrian bridges as well as pedestrian walkways, in order to make it safer and easier for the local community to cross the busy roads. Without this project, unsafe conditions in the area will remain.

The existing land use will also remain unchanged and land would not be required for the widening of the road servitude. Current site conditions will remain unchanged.

The no-go alternative will result in a high negative Socio-Economic Impact Risk for residents in the study area, as the current unsafe conditions will remain. Socio-economic upliftment, usually associated with improved, high class infrastructure will not take place. In addition, the existing poor stormwater management conditions in the study area will remain, with occasional flooding, as no improvements to the stormwater management system will be made.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES ✓	NO

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

Not Applicable

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

- All recommendations made by the specialists and all mitigation measures proposed by the specialists in their specialists assessments, as incorporated in the EMP should be implemented and adhered to; and
- All other conditions, monitoring and mitigation measures as provided in the EMP should be adhered to.

Is an EMPr attached?	YES ✓	NO

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

_____

NAME OF EAP

_____ _____

SIGNATURE OF EAP DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

APPENDIX A: MAPS

APPENDIX B: PHOTOGRAPHS

APPENDIX C: FACILITY ILLUSTRATION(S)

APPENDIX D: SPECIALIST REPORTS (INCLUDING TERMS OF REFERENCE)

APPENDIX E: PUBLIC PARTICIPATION

Appendix E 1: Proof of Newspaper Advertisement and Site Notice

Appendix E 2: Key Stakeholder Notification

Appendix E 3: Comments and Responses from I&AP's and Comments and Response Report

Appendix E 4: Proof of Notification to Organs of State

Appendix E 5: List of Interested and Affected Parties

Appendix E 6: Minutes of Meetings

A Public Open Day was held for this project. Comments received during the Public Open Day were captured and addressed in the Issues and Response Register attached to Appendix E 5.

APPENDIX F: IMPACT ASSESSMENT

APPENDIX G: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

APPENDIX H: DETAILS OF EAP AND EXPERTISE

APPENDIX I: SPECIALIST'S DECLARATION OF INTEREST

APPENDIX J: ADDITIONAL INFORMATION