environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, 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, 2010 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 **1 September 2012**. 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 on 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? 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

WIDENING OF NATIONAL ROUTE 5 SECTION 1 (KM 0.0 TO 6.0), PROPOSED INTERCHANGE N5/R712 (KM 5.0) AND COSNTRUCTION OF A NEW BRIDGE (MURREY STREET)

Terra Works has been appointed by LEO Consulting (PTY) Ltd for South African National Roads Agency SOC Limited (SANRAL) to undertake a Basic Assessment application for the widening of National Route 5 Section 1 (KM 0.0 to 6.0), proposed interchange N5/R712 (KM 5.0) and the construction of new bridge over the Wilge River.

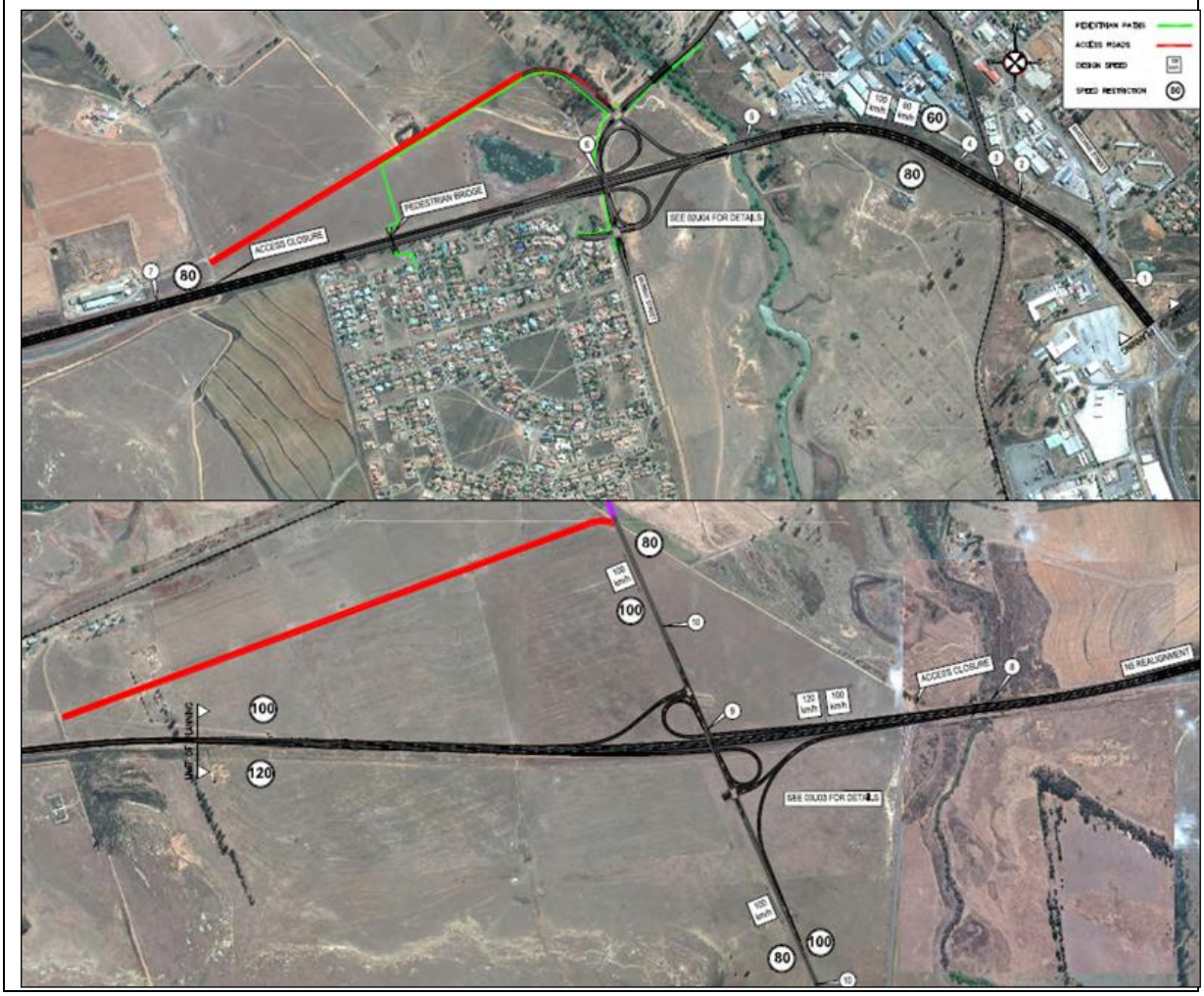


Diagram 1: Site Locations

The South African National Roads Agency SOC Limited (SANRAL) identified the need for the capacity upgrading of the portion of National Road No.5 Section 01 from the existing access interchange with the N3 Toll Road (km 0+00) in Harrismith to just west of the existing level-crossing T-junction with Provincial Road R712 to Puthaditjhaba (km 6+00), from where a construction contract is currently being executed.

The need for the project arose from increased road accidents and delays at the major intersections, declining levels of service on the freeway, and large sections of the road pavement being in terminal state. (Grobler, 2013)

The project objectives are understood as being to improve the alignment to design standard, provide future capacity by widening the road section to four lanes, address pertinent road safety hazards, improve intersection capacity including grade separation where justified, and rationalize access arrangements where potential exists.

The operation and safety at the grade intersection of the R712 has been a particular cause for concern in recent years due to the high frequency of serious traffic accidents and long delays. Following investigations of various options for improvement, the Employer resolved to grade-separate this intersection, and developed a design of an interchange. In line with frequent long delays caused by the current single lane only bridge on Murrey street giving access to Harrismith, SANRAL resolved to construct a second bridge next to the current bridge in order to allow traffic flow in and out Harrismith.

DESCRIPTION OF ROAD SECTION:

The project road is located within the boundaries of the Maluti-a-Phofung Local Municipality which is the most eastern local municipality of the Thabo Mofutsanyana District Municipality in the Free State Province of South Africa. The locality map is

provided at the beginning of this report as well as under Annexure A.

The existing facility comprises a two-lane single carriageway road adjoined in the east with the N3 Toll Road by means of a system interchange, and with four other level-crossing intersections along the road section. The road can generally be divided into two sub-sections:

- **The eastern sub-section, traversing a built-up area, having a local access function with the characteristics of an urban arterial, and an operating speed of 80km/h**
- **The western sub-section, traversing a rural environment, having a high mobility function with the characteristics of a rural highway, and an operating speed of 120km/h.**

The urban sub-section with its restricted roadway width often experiences delays as a result of road traffic incidents and points of conflict with side traffic, while the rural sub-section has become increasingly unsafe due to the combination of high traffic volumes at high speed, substandard geometry, undesirable low order accesses, and unsatisfactory intersection operations.

The general cross section is two lanes of 3.7m, with a raised sidewalk and narrow surfaced shoulder on the one side, and an un-surfaced shoulder on the other side. The western most portion of the road section over the Nuwejaarspruit has 2.5m surfaced shoulders and concrete side drains.

THE FOLLOWING UPGRADES IS PROPOSED:

- ***UPGRADING OF THE N5 BETWEEN HARRISMITH AND THE N3***

The rural freeway cross section being applied to the upgrading of the N5 between Harrismith and the N3 is shown under Facility illustrations, Annexure C. The cross section is shown for the case where slow lanes are required in both directions. It is proposed that the four-lane case be applied to the western sub-section of the subject project.

The following adaptations are envisaged in respect of the urban cross section on the eastern sub-section:

- **The 2.8m median island is provided as per the general cross section, comprising of a 1.8m kerbed island and a 0.5m channel on either side of the island,**
- **3.5m inner lane as for the general cross section,**
- **3.7m outer lane as for the general cross section,**
- **1.0m from the yellow line of the slow lane to the kerb, within which a concrete channel may be provided,**
- **The 2.5m emergency lane of the Rural Freeway cross section is substituted by a 2.0m raised pedestrian/bicycle path, accommodating lighting poles; guardrail kerb combination on high fills.**

The lane configurations of the intersections and the N5/R712 access interchange are determined from capacity analyses (see facility illustrations, Annexure C).

- *ACCESS MANAGEMENT*

It was agreed in consultation with SANRAL that the improvement and protection of the mobility function of the rural section of National Road No.5-01 be pursued to freeway standards where feasible. To this end the closure of Rivierdraai public road and the abattoir / treatment works access is contemplated. This will require the provision of an alternative access road that connects Rivierdraai siding to the northern extension of the R712, and an alternative access road that connects Wilgerpark North to the Wilgerpark intersection or side street. The connection roads are shown on the road scheme plan.

- *INTERSECTION DESIGN*

It is envisaged that the proposed detailed traffic study will consider several layout scenarios in order to establish the expected level of service in terms of its respective traffic flow capacity. Hence, recommendations regarding the alternatives for upgrading of the intersection between the project road and the local distributor road to Harrismith town centre across the Wilge River single-lane bridge (extension of Murray Street).

The initial assessment of this intersection indicated that the existing four-way stop may suffice in the short term; signalization would be warranted in the medium-term, while grade-separation would be required in the long term. A traffic circle would avoid signalization and would thus be much safer in the location, and it would postpone the need for grade separation. The disadvantage of a circle is that it does not provide priority to the main road. These options were investigated further as part of the traffic study.

- *PROPOSED N5/R712 ACCESS INTERCHANGE*

The consulting engineer has incorporated various changes to their preliminary design layout done before, in respect of the horizontal alignment of the approach of Road R712 to the interchange. This was done with the view to accommodate the most likely alignment of the future western bypass. The proposed change will also improve the approach sight distance of the R712 and eliminate the S-curve created by the preliminary design alignment. Lane configurations of the overpass across Road No.5-01 and the ramp terminals were determined through a capacity analysis as part of the traffic study. Specific reference should be made to the future anticipated traffic related to the local Spatial Development Framework and the eventuality of a western bypass. It is also proposed that the northern leg of the cross-road be utilised in the short- to medium-term as access for the future Industrial Corridor and Rivierdraai railway siding.

- *PAVEMENT REHABILITATION AND STRENGTHENING*

The intrusive soils investigations were conducted by Messrs Matrolab (Pty) Ltd as sub-service provider to the consulting engineer during the last two weeks of June and first

two weeks of July 2013. The consulting engineer's pavement specialist observed the test pitting of the existing Road N05-01 pavement, and concluded that the existing pavement layers of the western section which is intended to be upgraded, consists of very poor quality materials with high contents of clay minerals. In addition hereto it is envisaged that significant vertical re-alignment will be implemented, which necessitates the implementation of a new pavement structure.

The eastern portion (N05-01, km 0+00 to km 1+85) of the project road was reconstructed as recently as 2007, and the materials are generally of fair to good quality. However, the visual condition assessment conducted by the pavement specialist during June 2013 indicated that severe structural failures are already occurring within the reconstructed pavement areas, especially near the intersection with the Murray Street extension.

The minimum repair requirements of the eastern sub-section are as follows:

- **Localised repairs by means of mill and replace of the asphalt surfacing;**
- **Crack sealing of longitudinal and transverse cracking; and**
- **Reseal with 13/6 S2 (S-R1) bitumen-rubber modified double seal (larger stone size as first layer to increase bitumen application and smaller stone size as second layer to reduce noise levels).**

The design pavement structure for the rehabilitation sections is envisaged to be as follows:

- **20 mm stone mastic hot-mix asphalt (SMA) wearing course with polymer modified binder, aggregates from commercial quarry;**
- **50 mm continuously graded hot-mix asphalt binder course with polymer modified binder, aggregates from commercial quarry;**
- **150 mm graded crushed stone base overlay, constructed with materials from commercial quarry;**
- **300mm cement stabilised recycled sub-base layer.**

The pavement design of the new roads such as the interchange ramps and re-aligned cross-roads and access roads shall be addressed in the preliminary design. However, for the purpose of the preliminary cost estimate, it is assumed that a minimum Class ES3 pavement will be required for these road elements, consisting of:

- **20 mm SMA wearing course with polymer modified binder, aggregates from commercial sources;**
- **40 mm continuously graded HMA binder course with polymer modified binder, aggregates from commercial sources;**
- **150 mm graded crushed stone base layer, constructed with materials from commercial sources;**
- **150 mm cement stabilised sub-base layer, constructed with crushed natural gravel from the identified quarry; and**
- **300 mm selected layer, constructed with natural gravel from the identified**

borrow pit.

- *DRAINAGE STRUCTURES*

An initial assessment was conducted of the hydrology and hydraulics of the large drainage structures across the Wilge River (N05-01, km 1+20) and the Nuwejaarspruit (N05-01, km 4+20). The free board capacity of both bridges was found to be marginally insufficient to accommodate the 1:100 year design peak flood. However, it is not envisaged that the 1:100 year design peak flood will overtop the road-over-river bridges, and it is therefore not deemed economically feasible to raise the bridges to such a level as to accommodate the 1:100 year design peak flood risk free.

It is therefore recommended to keep the existing drainage structures at their existing levels and widen it to both sides to accommodate the proposed new cross-section. Various designs of both road-over-river bridges were executed, while it was agreed with SANRAL that the Nuwejaarspruit and the Wilge River bridge will be upgraded as part of the project.

- *OTHER STRUCTURES*

The road-over-road bridge at km 0+34 and the road-over-rail bridge at km 0+40 require widening to accommodate the proposed 4-lane divided single carriageway cross-section.

- *CONSTRUCTION OF A NEW BRIDGE ON MURREY STREET*

A new double lane bridge is proposed on the western side of the existing single lane bridge leading into Harrismith town. The proposed bridge will be situated next to the current bridge and will allow two-way traffic in town.

<u>ALTERNATIVES CONSIDERED:</u>

- *ALTERNATIVE 0: DO NOTHING*

This alternative is inconceivable in view of the safety hazards. The road pavement is also in terminal state. This alternative is not recommended for further consideration.

- *ALTERNATIVE 1: WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGES AT R712,GRADE SEPARATION AT WILGERPARK INTERSECTION, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS*

The project in this form will achieve all long term project objectives and render the development of the facility complete. If accident and road user costs are included, this alternative is expected to have the highest rate of return. Through this assessment, this alternative is assessed to be the preferred alternative.

- *ALTERNATIVE 2A: PAVEMENT REHABILITATION OF EASTERN SUB-SECTION, WIDENING TO FOUR LANES FURTHER WEST, INTERCHANGE AT R712, NO ACCESS OR INTERSECTION CONTROL CHANGES*

The cost of pavement rehabilitation is not deemed justified in light of the anticipated

year of saturation. The road pavement also requires strengthening for the design year scenario. The existing geometry of the road formation and roadside elements does not lend itself to raising levels. The pavement rehabilitation strategy is not deemed practical or economical and is not recommended for further consideration.

- ***ALTERNATIVE 2B: WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, NO ACCESS OR INTERSECTION CONTROL CHANGES***

This strategy is in line with priorities in terms of pavement conditions, capacity requirements, and safety hazards. The strategy is deemed practical and is expected to be economical. It is not advisable though not to formalize the access rationalization while the opportunity to do so exists now.

- ***ALTERNATIVE 2C: WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS***

The project in this form will achieve most long term project objectives, however the exclusion of grade separation of the Wilgerpark intersection will allow congestion and poor traffic flow to continue.

- ***ALTERNATIVE 3: REPAIR AND RESEAL OF EASTERN SUB-SECTION, WIDENING TO FOUR LANES FURTHER WEST, INTERCHANGE AT R712, NO ACCESS OR INTERSECTION CONTROL CHANGES***

This scope concurs with the scope of works on which the professional services tender was based. It is viewed as the absolute minimum works to be included in phase 1. The hold action will be short-lived and not cost-effective. This alternative is not recommended for further consideration.

Based on the preliminary considerations of the above mentioned alternatives, only alternative 1 and 2c will be assessed in this report. The other alternatives are deemed not economically viable and are not investigated further.

Alternative 1 will also include the following:
A slight alignment change in respect of the horizontal alignment of the approach of Road R712 to the interchange of the future western bypass. This is done with the view to accommodate the most likely alignment of the future western bypass. The proposed change will also improve the approach sight distance of the R712 and eliminate the S-curve creating the preliminary design alignment.

The existing pavement layers of the western section which is intended to be upgraded, consists of very poor quality materials with contents of clay minerals and the eastern portion of the project road material are generally of fair to good quality but have simple structural failures. Based on this the following will apply for the eastern section:
The minimum repair requirements of the eastern section are as follows:

- **Localised repairs by means if mill and replace of the asphalt surfacing;**
- **Crack sealing of longitudinal and transverse cracking;**
- **Reseal with 13/6 S2 (S-R1) bitumen-rubber modified double seal (larger stone size as first layers to increase bitumen application and smaller stone size as second layer to reduce noise levels).**

The pavement structure for the rehabilitation section is envisaged to be as follows:

- **20mm stone mastic hot-mix asphalt (SMA) wearing course with polymer modified binder, aggregates from commercial sources;**
- **40mm continuously graded HMA binder course with polymer modified binder, aggregates commercial sources;**
- **150mm graded crushed stone base layer, constructed with materials from commercial sources;**
- **150mm cement stabilized sub-base layer, constructed with crushed natural gravel from the identified quarry;**
- **300mm selected layer, constructed with natural gravel from the identified borrow pit**

ACTIVITY DESCRIPTION

Based on the project proposal the following listed activities are applicable and is all in terms of GN R. 544 under the National Environmental Management Act, Act 107 of 1998-:

Activity 11: The expansion of bridges over watercourse, construction of a new bridge, and the construction of bulk stormwater outlet structures along the road.

Activity 18: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, rock of more than 5 cubic metres from:
(i) a watercourse.

Construction work at the various brides as well as route alignment changes will entail the infilling and excavation of soil in order to position the bridges and new alignment of the N5.

Activity 22: The construction of a road, outside urban areas,
(i) with a reserve wider than 13,5 meters or,
(ii) where no reserve exists where the road is wider than 8 metres.

Widening of the N5 for a distance of approximately 1.6km proposed on the southern side of the existing N5.

Activity 39: **The expansion of: canals, channels, bridges.**

The widening of the Nuwejaarspruit and Wilge River bridge.

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

Listed activity as described in GN R.544	Description of project activity
GN R.544 Item 11(iii): The construction of bridges, where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	**The widening of the Nuwejaarspruit and Wilge River bridges, construction of a new bridge over the Wilge River (Murrey Street).**
GN R.544 Item 18(i): The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, rock of more than 5 cubic metres from a watercourse.	**The widening of the brides and route alignment changes involves the infilling and excavation of soil in order to position the bridges and new alignment of the N5.**
GN R.544 Item 22(i)(ii): The construction of a road, outside urban areas, with a reserve wider than 13,5 meters.	**Re-alignment of the N5 for a distance of approximately 1.6km proposed on the southern side of the existing N5.**
GN R 544 Item 39: The expansion of: canals, channels, bridges, weirs, bulk stormwater outlets, marinas – Within a watercourse or 32 metres from a watercourse, measured from the edge of the watercourse, where such development will result in an increased development footprint but excluding where such expansion will occur behind development setback line.	**The widening of the Nuwejaarspruit and Wilge River bridge.**

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 Regulation 22(2)(h) of GN R.543. 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.

NOTE:
The N5 route from the R712 interchange over the Nuwejaarspruit Bridge and the Wilge river bridge are existing road infrastructure within existing road reserve. A new interchange at the R712 crossing is proposed therefore new delineation outside the existing road servitude. Grade separation at the Wilgepark intersection is also proposed. A new access road is proposed to the Wilge WWTW, and other facilities just north of the N5. In this regard feasible and reasonable alternatives considered are in relation to the following activities:

a) **Expansion of existing bridge structures at the Nuwejaarspruit crossing and the Wilge River.**
b) **Road crossing interchange delineation changes.**
c) **Construction of alternative connection roads.**

Traffic volume and road safety problems necessitates the restore of the quality and safety of the road for its users and general public for sustainable economic activity in the area and region, and potential growth due to improve road infrastructure.

a) Site alternatives (Bridge expansions and construction)

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Wilge bridge widening	28°16'55.55"S	29°7'12.95"E
New bridge Wilge River (Murrey Street)	28°16'47.89"S	29°7'04.16"E
Nuwejaarspruit bridge widening	28°17'19.40"S	29°5'27.95"E
R712 interchange	28°17'22.19"S	29°5'03.26"E
Wilgepark connection intersection	28°16'59.17"S	29°6'58.19"E
Alternative connection roads	28°16'54.48"S	29°6'57.27"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
-		
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
-		

In the case of linear activities: **(Widening of the N5)**

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred)		
• Starting point of the activity	**28° 17′ 20.37″S**	**29° 05′ 19.42″E**
• Middle/Additional point of the activity	**28° 17′ 04.59″S**	**29° 06′ 36.19″E**
• End point of the activity	**28° 17′ 17.01″S**	**29° 08′ 02.22″E**
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.

List of coordinates taken every 250 meters along the N5 Section 1 route towards the N3.

No.	Latitude (S):	Longitude (E):
1	-28.289381	29.084961
2	-28.289095	29.087496
3	-28.288795	29.090023
4	-28.288486	29.092547
5	-28.288177	29.095070
6	-28.287869	29.097594
7	-28.287387	29.100080
8	-28.286470	29.102410
9	-28.285798	29.104839
10	-28.285198	29.107288
11	-28.284602	29.109752
12	-28.284004	29.112209
13	-28.283409	29.114666
14	-28.282841	29.117130
15	-28.282204	29.119574
16	-28.281624	29.122038
17	-28.281600	29.124565
18	-28.282506	29.126884
19	-28.283645	28.129085
20	-28.284900	29.131160
21	-28.286650	29.132784
22	-28.287856	29.133842

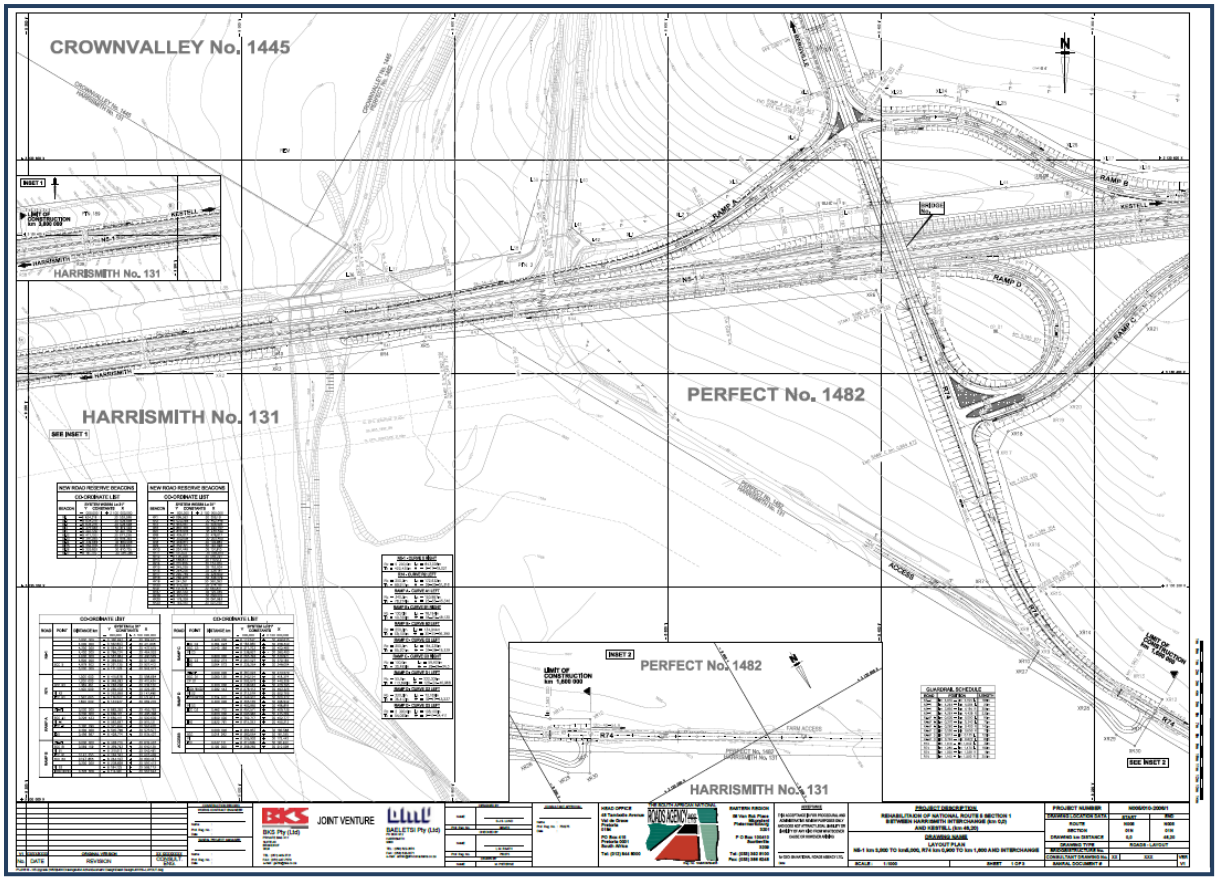
In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

b) Lay-out alternatives

Alternative 1:
The proposed project entails the reparation and upgrading of a portion of the N5 road. The upgrading also includes the widening of the N5 to four lanes from km 0 to 6, a new interchanges at the R712 as well as at the Wilgerpark connection, existing access to the Harrismith WWTW on the N5 will be closed, and the inclusion of a alternative connection road to the Wilge WWTW, as well as a connection road to the future industrial corridor north of the N5 at the R712 interchange area. Also included the construction of a new bridge on Murrey street leading into Harrismith.(see Appendix C, Facility Illustrations). This alternative proposal incorporates all required upgrading necessary to ensure a safer road to travel on.

Alternative 2(c):
Alternative 2(c) has been considered as a viable option as it consist of the same upgrading measures as option 1, however without the grade separation at the Wilgepark connection.

Within these two alternatives, layout design options have been assessed, and include the R712 interchange position.



Alternative 2c: Preliminary layout of R712 interchange

Alternative 1: Preferred alternative R712 interchange

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Layout interchange with off-ramps from both sides of the N5. New delineation towards the R712 and northwards to allow for access to property north of the N5. This alternative layout allows for safer, access onto the N5.	28° 17′ 23.72″	29° 4′ 56.30″
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2c although mostly on the same alignment as alternative 1, do not allow for flyovers on both sides of the N5, degree of ease of access and safety requirements are less suitable than alternative 1.	28° 17′ 23.133″	29° 4′ 48.923″
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
-		

a) **Technology alternatives**

Alternative 1 (preferred alternative)
The compaction of a road is key aspect in the quality of a road and layers of the road must be compacted properly to ensure that the proper life span of the road is met. This, in turn, eliminates large costs as it slows down the road particle decaying process and therefore eliminates large maintenance costs during the lifespan of the road.
Alternative 2
No compaction of the road will lead to the rapid deterioration of the road and thus cannot be seen as an alternative.
Alternative 3
-

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

Alternative 1 (preferred alternative)
Operational Working hours during the construction activities of the road will be limited to 06:00 – 19:00. Stop / go's will not be implemented, while temporary bypass roads be used to allow traffic to flow during construction activities. Scheduling It is anticipated that the road works at the different bridges will be undertaken in the dry season as this will limit the impact on the flow of storm water during the rainy season. Design *ALTERNATIVE 1: WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGES AT R712 AND WILGERPARK, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS.* The project in this form will achieve all long term project objectives and render the

development of the facility complete. If accident and road user costs are included, this alternative is expected to have the highest rate of return. This alternative is to be the preferred alternative.
Alternative 2
Design *ALTERNATIVE 2A: PAVEMENT REHABILITATION OF EASTERN SUB-SECTION, WIDENING TO FOUR LANES FURTHER WEST, INTERCHANGE AT R712, NO ACCESS OR INTERSECTION CONTROL CHANGES* The cost of pavement rehabilitation is not deemed justified in light of the anticipated year of saturation. The road pavement also requires strengthening for the design year scenario. The existing geometry of the road formation and roadside elements does not lend itself to raising levels. The pavement rehabilitation strategy is not deemed practical or economical and is not recommended for further consideration. *ALTERNATIVE 2B: WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, NO ACCESS OR INTERSECTION CONTROL CHANGES* This strategy is in line with priorities in terms of pavement conditions, capacity requirements, and safety hazards. The strategy is deemed practical and is expected to be economical. It is not advisable though not to formalize the access rationalization while the opportunity to do so exists now. *ALTERNATIVE 2C: WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS* The project in this form will achieve most long term project objectives, however with the exclusion of grade separation at the Wilgepark intersection, traffic flow and will still be hampered. This strategy is also considered for future assessment.
Alternative 3
Design *ALTERNATIVE 3: REPAIR AND RESEAL OF EASTERN SUB-SECTION, WIDENING TO FOUR LANES FURTHER WEST, INTERCHANGE AT R712, NO ACCESS OR INTERSECTION CONTROL CHANGES* This scope concurs with the scope of works on which the professional services tender was based. It is viewed as the absolute minimum works to be included in phase 1. The hold action will be short-lived and not cost-effective. This alternative is not recommended for further consideration.

a) No-go alternative

This alternative is inconceivable in view of the safety hazards. The road pavement is also in terminal state. This alternative is not recommended for further consideration.

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:	**Size of the activity:**
Alternative A1[1] (preferred activity alternative)	Linear road
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative) N5 section to be upgraded	±6000m
Southern section at the R712	±1000m
Northern section at the R712	±650m
New delineation access at the Wilge River bridge	±1400m
New delineation access on the farm Perfect 1482	±1400m
New bridge (Murrey Street)	±80m
Alternative A2 (if any)	±6000m
Alternative A3 (if any)	±6000m

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

Alternative:	**Size of the site/servitude:**
Alternative A1 (preferred activity alternative)	Linear development within the N5 servitude
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

4. SITE ACCESS

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

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

Describe the type of access road planned:

The existing N5 main road will be used to access all construction sites and upgrading will take place within the existing servitude. Other traffic flow during the N5 upgrading will be managed in situ through traffic accommodation.

There will likely be various disruptions on the use of N5 road to motorists, surrounding inhabitants and industries between the R712 interchange towards the N3 during the proposed road upgrade and bridge expansion construction phase – including, but not limited to – delays caused by traffic control at the active construction areas. It is envisaged that no stop-go points will be used and that traffic can be accommodated through bypass lanes.

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 DWA);
- 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):

The upgrading of the road (including the design, technology and type) is of utmost importance and if no action is taken, the road will deteriorate further as the road will not be able to withstand the increase in traffic. The deterioration of the road leads to unsafe, uncomfortable driving experience for the road users.

1. Is the activity permitted in terms of the property's existing land use rights?	**YES**		Agreements have been reached with farm owners affected pertaining the re-alignment routes at the R712. SANRAL is in the process through land acquisition to obtain the rights to re-align as proposed.

2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES		One of Governments development priorities also reflected in the Free State Development Framework is to upgrade its road infrastructure and networks; this proposal is achieving just that. The design and layout of the different intersections and access points to private properties have been done in consultation with the Local Municipality and its Spatial Development Framework. This proposal fits into the current SDF thinking.
(b) Urban edge / Edge of Built environment for the area	YES		In terms of the Municipal Spatial Development Framework, Harrismith extension is towards the west with light industrial and residential extensions envisaged. Upgrading of the R712 will greatly improve traffic flow at this point of the town extension.
(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?).		NO	The integrity of the principles of both the IDP and SDF of Maluti A Phofung Local Municipality will not be compromised; in fact the proposal will be in line with priorities set in the municipal IDP. Various prior engagements with town planning (Local Municipality) to incorporate the N5 upgrade proposal to be in line with the current SDF have taken place and did the SDF inform the proposal as it is presented in this application.

(d) Approved Structure Plan of the Municipality	**YES**		No structure plan for Maluti A Phofung Local Municipality could be obtained.
(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 EMF applicable for Maluti A Phofung Local Municipality, or the specific area under investigation and assessment.
(f) Any other Plans (e.g. Guide Plan)	**YES**		The proposed activities will comply with the activities to be undertaken within the registered servitude of the road.
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**		Yes, road upgrades remains a priority in the Free State. Although, this upgrade is the competency of SANRAL, but still indirectly affects the Municipal areas traffic flow and safety.
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**		The aim of this proposal is based on road safety priorities. All road users will benefit from this proposal.
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 services will be affected by this upgrading proposal. N5 road service will be improved. It is proposed to close an access point to the Wilge WWTW, for safety reasons, a new access will however be constructed as part of this proposal.

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**		Various prior discussions and agreements have been reached with the infrastructure planning department; this proposal has been informed by the Municipality through their town planning and infrastructure planning departments. SANRAL is the custodian of all national roads and remain responsible to maintain these roads.
7. Is this project part of a national programme to address an issue of national concern or importance?	**YES**		Improved road and bridge infrastructure is of paramount importance to the whole country. Rehabilitation of National Route 5 between Harrismith Interchange and Kestell (46.2km), and the construction of a new intersection at N5-R712, and construction of passing lanes at the Nuwejaars Spruit Bridge all forms part of the different phases of upgrading the N5 route.
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**		Most of the upgrading will remain within the existing N5 servitude, while proposed route alignment changes favour safer access to facilities, and creating saver traffic flow.
9. Is the development the best practicable environmental option for this land/site?	**YES**		This application pertains to upgrading of existing infrastructure in order to improve road use. New road alignments proposed at certain sections considered environmental sensitive sites applicable.

10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES**		The project in this form will achieve all long term project objectives and render the development of the facility complete. If accident and road user costs are included, this alternative is expected to have the highest rate of return. To be verified by further investigations and analyses, this proposal accommodates the highest benefit to road users.
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		**NO**	The proposed activity forms part of rehabilitation actions on Section 1 of the N5 route.
12. Will any person's rights be negatively affected by the proposed activity/ies?		**NO**	Property owners (see attached public participation results) to be affected have been consulted and those areas required incorporating new alignments changes will be expropriated by SANRAL. Such agreements have been reached and formal expropriation processes are underway.
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		**NO**	The proposed layout of road rehabilitation with new access points have been designed in consultation with the Municipal roads infrastructure department, and is in line with their urban edge growth plan.

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	**YES**		Project 6 – Road maintenance. This proposal will indirectly contribute towards project 6 and will increase service delivery capacity, therefore a positive to road users and the Harrismith Municipality. Although it is an existing road, the upgrade of this road will form part of the SIP 7 as the road forms part of public transport system on a local and national level.

15. What will the benefits be to society in general and to the local communities?	**Positive**
The project will improve the road infrastructure and road safety in general. Improved road and bridge infrastructure will be of paramount benefit to the public at large, and specifically the industry and economic activities in the area. This will stimulate local economic development in the area. The road upgrade and bridge construction activities will not result in major direct and indirect increased employment opportunities , however short term employment and training opportunities for locals is envisaged. Where practical and skills permitting labour will be sort locally.	
16. Any other need and desirability considerations related to the proposed activity?	**YES**
The upgrading of the road (including the design, technology and type) is of utmost importance. The road is currently deteriorating and this causes an unsafe, uncomfortable driving experience for the road users. This, in turn, might lead to more cars being damaged by potholes and / or cause fatal accidents on the road. If no action is taken, the road will deteriorate further as the road will not be able to withstand the increase in traffic. The existing storm water management systems are not sufficient and the upgrading of the existing storm water management systems is needed. In addition, the widening of the road at certain identified areas is desired as this will improve the safety of the road users. A number of job opportunities will be provided to the people from the local community during the rehabilitation and upgrading of the road.	
17. How does the project fit into the National Development Plan for 2030?	
Better economic infrastructure in the transport section. These aspects form part of the vision for transportation for 2030 as indicated in the "National Development Plan: vision for 2030".	

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

According to Section 23 of NEMA, 1998, the following should be considered:

EIA process for listed activities should be followed

An application for environmental authorisation was submitted to DEA.
Baseline and specialist assessment was undertaken.
Compilation of a Draft Basic Assessment Report which includes the potential impacts identified during the assessments.
Submission of the draft reports to the respective competent authorities for perusal.
The final BAR was also made available to the respective competent authorities.

Compilation of an EMPr

An EMPr containing management measures to be implemented to limit environmental impacts are attached hereto.
All possible interested and / or affected parties were notified of the proposed project by means of letters, advertisement and site notices.
I&APs were given the opportunity to register and comment on the Draft BAR.
The Final BAR was also made available to registered I&APs.

Other necessary approvals should be obtained

Registration of water uses (upgrading of bridges at the Wilge River and Nuwejaarspruit), was submitted to DWA.
An application for the necessary water use authorisation for the water to be abstracted for uses related with this activity will be submitted to DWA, once the appointed contractor has identified the groundwater resource to be used.
An application for a mining permit on the farm Frasers Spruit has been submitted to the Department of Mineral Resources.

Need in terms of socio-economic level

The need in terms of the socio-economic level was assessed.

The proposed development has been adequately considered by trained and competent Environmental Assessment Practitioners and identified specialist, and all potential impacts that may have a significant impact on the receiving environment have been considered and mitigated to acceptable levels as required by the NEMA 2010 EIA regulations. The conclusions of the environmental impact assessment have been concisely summarised to adequately inform decision-making by the competent authority. A comprehensive Public Participation Process was also undertaken, which conformed to requirements in Chapter 6 of the Environmental Impact Assessment Regulations. Further all Interested and Affected Parties were given ample time to review and comment on all documents and reports.

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

An application for environmental authorisation was submitted to DEA.

DEA acknowledged receipt of the application and provided this office with a reference number. The results obtained from baseline and specialist assessments were used to assess the possible impacts (positive and negative) on an environmental as well as social level. The Draft BAR was made available to the relevant departments and to the public to comment. The comments received on the draft report was be assessed and included in the Final BAR to be approved (or not) by DEA.

Compilation of an EMPr

An EMPr containing management measures to be implemented on site was compiled by taking the possible impacts that the proposed project may have on the environment, into consideration.

Public participation process undertaken

The landowner and adjacent landowners were notified of the proposed project by means of a letter delivered by hand / e-mail / postage. In addition, site notices were placed at the on the route and a notification was published in a local news paper. The local municipality and the Free State Dept. of Economic, Tourism and Environmental Affairs were also notified of the proposed project. I&APs were given the opportunity to register and comment on the Draft BAR. A public open information day was also held and affected property owners were invited to attend. Comments received were assessed and included in the Final BAR.

Other necessary approvals should be obtained

Registration of water uses where applicable was submitted to DWA. The groundwater resource will be identified by the appointed contractor to undertake the reparation activities on the road. An application for the necessary water use authorisation of the water uses related with this activity will be submitted to DWA. An application for a mining permit on the farm Frasers Spruit was submitted to the Department of Mineral Resources.

Need in terms of socio-economic level

The upgrading of the road will ensure a safer medium to travel by for the general public as well as for the transportation of goods. This will ensure that more road users will utilise this road, providing the opportunity for economic growth in the area. In addition, the proposed project will provide employment opportunities for a number of people from the local community during the reparation and upgrading process. Refer to 10) **ACTIVITY MOTIVATION** for more information on the need of the proposed activity.

The principles of environmental management as set out in Section 2 of NEMA have been taken into account through the following means:

- There will be no loss of endangered or protected biological diversity;
- Pollution will be minimised;
- This activity will reduce the exploitation of non-renewable resources; and
- The only impact on people's environmental rights that may occur would be due to the generation of dust. Where ever possible this impact will be minimised.

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, 107 of 1998 (amended in 2010) National Environmental Management Act (NEMA) can be regarded as the most important piece of general environmental legislation. It provides a framework for environmental law reform and covers three areas, namely: • Land, planning and development. • Natural and cultural resources, use and conservation. • Pollution control and waste management. The law is based on the concept of sustainable development. The object of NEMA is to provide for co-operative environmental governance through a series of principles relating to: • the procedures for state decision-making on the environment; and • the institutions of state which make those decisions. The NEMA principles serve as: • a general framework for environmental planning; • guidelines according to which the state must exercise its environmental functions; and • a guide to the interpretation of NEMA itself and of any other law relating to the environment. *What are the NEMA principles?* Some of the most important	Regulations under NEMA in particular Regulation 544 require the following listed activities to undertake Basic Assessment. Listed activity - GN R.544 Item 11(iii)(vi): The construction of a bridge where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. GN R.544 Item 18(i): The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, rock of more than 5 cubic metres from a watercourse. GN R.544 Item 22(i)(ii): The construction of a road, outside urban areas, with a reserve wider than 13,5 meters. GN R 544 Item 39: The expansion of: canals, channels, bridges, weirs, bulk stormwater outlets, marinas – Within a watercourse or 32	Department of Environmental Affairs (DEA)	1998

principles contained in NEMA are that: • environmental management must put people and their needs first; • development must be socially, environmentally and economically sustainable; • there should be equal access to environmental resources, benefits and services to meet basic human needs; • government should promote public participation when making decisions about the environment; • communities must be given environmental education; • workers have the right to refuse to do work that is harmful to their health or to the environment; decisions must be taken in an open and transparent manner and there must be access to information; • the role of youth and women in environmental management must be recognised; the person or company who pollutes the • environment must pay to clean it up; • the environment is held in trust by the state for the benefit of all South Africans; and • the utmost caution should be used when permission for new developments is granted. The NEMA is enforced by the Department of Environmental Affairs. In the Free State Province this delegated role is fulfilled by the Department of Economic Development, Tourism and Environmental Affairs. Regulations 544 promulgated under NEMA require the following listed activities to	metres from a watercourse, measured from the edge of the watercourse, where such development will result in an increased development footprint but excluding where such expansion will occur behind development setback line.		

undertake Basic Environmental Assessment, which are the subject of this BAR:			
National Water Act, 36 of 1998 (Amended 2006) In terms of the NWA, the national government, acting through the Minister of Water Affairs (—the Minister), is the public trustee of South Africa's water resources, and must ensure that water is protected, used, development, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The Minister is responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values. The national government, acting through the Minister, has the power to regulate the use, flow and control of all water in South Africa. The most fundamental departure from the old legislation is the removal of the concept of water as private property. Instead, water will be made available through user licences and general authorizations, which may be issued for a maximum period of 40 years, subject to renewal. A priority of users has been established for the allocation of licences, with the environment near the top of the list of priorities. The following water uses, as defined in section 21 of the National Water Act 1998, have been identified which require general authorisation and applicable in this report.	The following water uses as defined in section 21 of the National Water Act 1998, have been identified which require general authorisation and is applicable in this report: 21(a) - Taking water from a water resource; 21(c) – Impeding or diverting the flow of water in a watercourse; 21(i) – Altering the beds, banks course or characteristics of a watercourse.	Department of Water Affairs	1998

National Heritage Resources Act, 25 of 1999 In terms of Section 38 of the National Heritage Resources Act (Act No 25 of 1999) the following developments require an Heritage Impact Assessment prior to proceeding with construction: • Any development or other activity which will change the character of a site • Exceeding 5 000 m^2 in extent; or • Involving three or more existing erven or subdivisions thereof; or • Involving three or more erven or divisions thereof which have been consolidated within the past five years; or • The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority; • The re-zoning of a site exceeding 10 000 m^2 in extent; or • Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.	SAHRA should be notified if any artefacts / graves / fossils / features of heritage importance are observed during the reparation process.	South African Heritage Resources Agency	1999
Mineral and Petroleum Resources Development Act (Act 28 of 2002)	Application for a mining permit for the mining of material to be utilised during the reparation process of the N5	Department of Mineral Resources (Welkom Office)	2002

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES
If YES, what estimated quantity will be produced per month?	±10 - 30m³

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

Construction waste generated from the upgrading of the Nuwejaars spruit en Wilge River bridges, new single lane bridge, road upgrading works and the passing lanes include spoil building material such as concrete, and cement. General waste will on a regular basis be moved, removed and emptied at the Municipal waste facility.

Waste bins will also be provided at the construction site for general (domestic) waste. These waste bins will be regularly emptied by the appointed construction contractor.

The appointed Contractor will collect waste on site and store it at a temporary waste collection area, before removing off-site by truck to dispose of at the Municipal waste facility. – see Draft Construction EMP attached.

In the event of any hazardous waste such as oils and grease; these will be collected by a competent waste handling contractor disposed at the registered hazardous waste site in Durban.

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

Solid waste will be disposed of at the Municipal landfill site at Harrismith.

All the various types of waste will be disposed at the appropriate municipal waste sites, and hazardous waste at the registered hazardous waste disposal sites. This disposal method will fit into existing municipal waste stream.

Will the activity produce solid waste during its operational phase?	NO
If YES, what estimated quantity will be produced per month?	N/A

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

N/A

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

N/A

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

N/A

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?	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.

Is the activity that is being applied for a solid waste handling or treatment facility?	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?	NO
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?	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?	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:

The proposed upgrading and bridge construction activities will not produce any liquid effluent.

There will be at least one (1) chemical toilet for every 22 workers. Disposal of sewerage from the chemical toilet will be done by the sub-contractor. Support documentation for such disposal will be kept on record by the appointed contractor. This record will be available to the authorities on request.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?		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:

Source of air pollution during construction activities will be limited to one main contributor:

The dust generated by the heavy earth moving machinery and tipper trucks will be the main source of air pollution at the bridge site. The typical ambient dust levels around the construction site due to vehicle movement are approximately 80 – 120 mg/m²/day. This is significantly low and well within the maximum allowable guidelines set by SANS 1929:2005.

The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?		**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**	
If YES, is it controlled by any legislation of any sphere of government?	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.
If NO, describe the noise in terms of type and level:

The natural ambient noise levels in the area are largely determined by natural sounds, i.e. birds, insects and the wind in the foliage of plants. Occasional anthropogenic sounds include vehicles moving on the N5 road and the occasional aircraft flying over the area. The estimated noise levels are comparatively lower (80-90dBA during the day and 30-40 dBA during the night) than those listed in the revised SABS 0103 standards. Movement of tipper trucks, excavators and other bridge construction equipment/machinery will create some noise – especially during daytime when operations are active. The noise levels will increase to 90-100 dBA during day time. There is however no dwellings or settlements within the immediate proximity to the R712 interchange. However towards Harrismith the N5 passes the Wilgepark residential extension.

Complaints can be expected if the difference between neighborhood noise levels and the ambient noise levels are more than 10dB. Alternatively noise levels in excess of 45dB would be a nuisance especially during the night when neighborhood noise levels are low.

13. WATER USE

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

Municipal		**Groundwater**	**River, stream, dam or lake**	

NOTE:
The contractor will be held responsible for obtaining any water to be utilized during the proposed project from a legal water supplier, be it from the municipality, or a landowner in the nearby area. If the water will be obtained from farmland, an application for the water use should be submitted to DWA. The registration of groundwater (Section 21(a)) from farmland adjacent to the N5 road will be investigated by the appointed contractor.

The proposed activities include the upgrading of bridges at the Nuwejaarspruit as well as the Wilge River and a new bridge at murrey Street, an application for registration of the necessary water uses (Section 21(c), (i)) will be submitted to DWA. Any activities associated with the rehabilitation and widening of the road on any storm water management structures within a defined watercourse will also be registered in terms of Section 21 and Section 39 of the National Water Act, 1998 (Act 36 of 1998) where required. Proof of submission to obtain any water related authorisation from DWA will be attached to the Final BAR.

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:	**900 000 litres**
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	**YES**

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

NOTE:
The appointed contractor will identify the preferred water sources and submit the necessary documentation to DWA. Proof thereof will be made available to DEA.

14. ENERGY EFFICIENCY

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

No specific energy efficient design measures are considered for the road upgrading and bridge construction.

The activity will involve consumption of the following forms of energy:

1. **Electricity**
   Electrical equipment and utilities will be used at the contractor's camp during the bridge construction phase. The construction equipment will use only a limited fraction of the available electricity and this will be for the duration of the expansion and/or construction of the bridges period ONLY.

2. **Fuel and oil**
   Delivery vehicle and other construction equipment will use petrol, diesel and oil. Use and number of such vehicles and machinery will be restricted to that which is absolutely necessary for the construction activities and deliveries.

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

There are no alternative sources of energy considered.

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): [ ]

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? [redacted] 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	Thabo Mofutsanyane
Local Municipality	Maluti-A-Phofung Local Municipality
Ward Number(s)	
Farm name and number	The farm Crownvalley 1445, The farm Perfect 1482, and the farm Harrismith Dorpsgronde 131
Portion number	Portions 171 and 172 of Harrismith Dorpsgronde 131

SG Code

F	0	1	5	0	0	0	0	0	0	0	0	1	4	8	2	0	0	0	0
F	0	1	5	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0
F	0	1	5	0	0	0	0	0	0	0	0	1	4	4	5	0	0	0	0
F	0	1	5	0	0	0	0	0	0	0	0	0	1	3	1	0	0	1	7	1
F	0	1	5	0	0	0	0	0	0	0	0	0	1	3	1	0	0	1	7	2
F	0	1	5	0	0	0	2	0	0	0	0	0	9	4	7	0	0	0	0	2

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:

Agriculture, Road Servitude

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? [redacted] NO

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	[redacted]	1:20 – 1:15	1:15 – 1:10	[redacted]

Alternative S2 (if any):

Flat	[redacted]	1:20 – 1:15	1:15 – 1:10	[redacted]

Alternative S3 (if any):

[redacted]

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	X
2.2 Plateau		2.5 Open valley	X	2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain	X	2.9 Seafront	

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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	YES	[redacted]
Dolomite, sinkhole or doline areas	NO	NO	
Seasonally wet soils (often close to water bodies)	YES	YES	
Unstable rocky slopes or steep slopes with loose soil	NO	NO	
Dispersive soils (soils that dissolve in water)	NO	NO	
Soils with high clay content (clay fraction more than 40%)	NO	NO	
Any other unstable soil or geological feature	NO	NO	
An area sensitive to erosion	YES	YES	

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 with scattered aliens[E]			
		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.

The project area falls within the Eastern Free State Sandy Grassland Gm4 Grassland Biome. Closed grasslands dominated by *Eragrostis curvula*, *Tristachya leucothrix* and *Themeda triandra*. Other dominant grasses include *E. capensis*, *E racemosa*, *Cymbopogon pospischilli*, *Elionurus muticus*, *Eragrostis plana* and *Aristida junciformis*. Soil class is defined as Red and Yellow structure less soils with a plinthic horizon (S3 Soil Class ID). Mudstone, sandstone and shale of the Baufort Group (Tarkastad Formation in the south and Adelaide Formation in the north). Sepane, Arcadia and Rensburg soil forms are typical for moist bottomlands. (Musina and Ruderfort, 2006)

Within the vicinity of the upgrading, three wetland types are found, including (see attached location maps):

- **Artificial wetland (Mesic Highveld Grassland Group);**
- **Two natural wetlands, of which the one is the Wilge River and the other north-west of the Murry road towards town (see attached wetland map).**

Two rivers are applicable, the Nuwejaarspruit and the Wilge River. The Nuwejaarspruit is at a C condition implying moderately modified, the Wilge is at AB, implying largely natural with few modifications.

5. SURFACE WATER

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

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

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

Within the vicinity of the road and bridge upgrading areas, three wetland types are found, including:

- **Artificial wetland (Mesic Highveld Grassland Group);**
- **Two natural wetland, of which the one is the Wilge River and the other north-west of the Murrey road towards town (see attached wetland map).**

Two rivers are applicable, the Nuwejaarspruit and the Wilge River. The Nuwejaarspruit is at a C condition implying moderately modified, the Wilge is at AB, implying largely natural with few modifications. See attached Freshwater Ecologist specialist report.

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		Filling station [H]
Medium density residential		Agriculture
Retail commercial & warehousing		River, stream or wetland
Light industrial	Sewage treatment plant [A]	
Medium industrial [AN]		
	Railway line [N]	
	Major road (4 lanes or more) [N]	

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

The existing N5 crosses over a railway line, the rail line will not be affected in any way.

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:

Towards the north-eastern side of the N5 some existing industrial facilities are located, these will also not be affected by road construction activities, and construction activities at this point will remain within the existing road reserve.

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:

An Engen filling station is located close to the N3 connection point. The filling station will not be affected by the construction activities, activities at this point will remain within the existing road reserve.

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

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

A cluster of possible Farm Graves, unmarked has been noted south of the R712 interchange. These graves are however outside the proposed new alignment towards the new R712 interchange and will not be affected by construction activities. (See sensitivity map)

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:

See attached Heritage, Archaeological and Palynological investigation report.

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

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

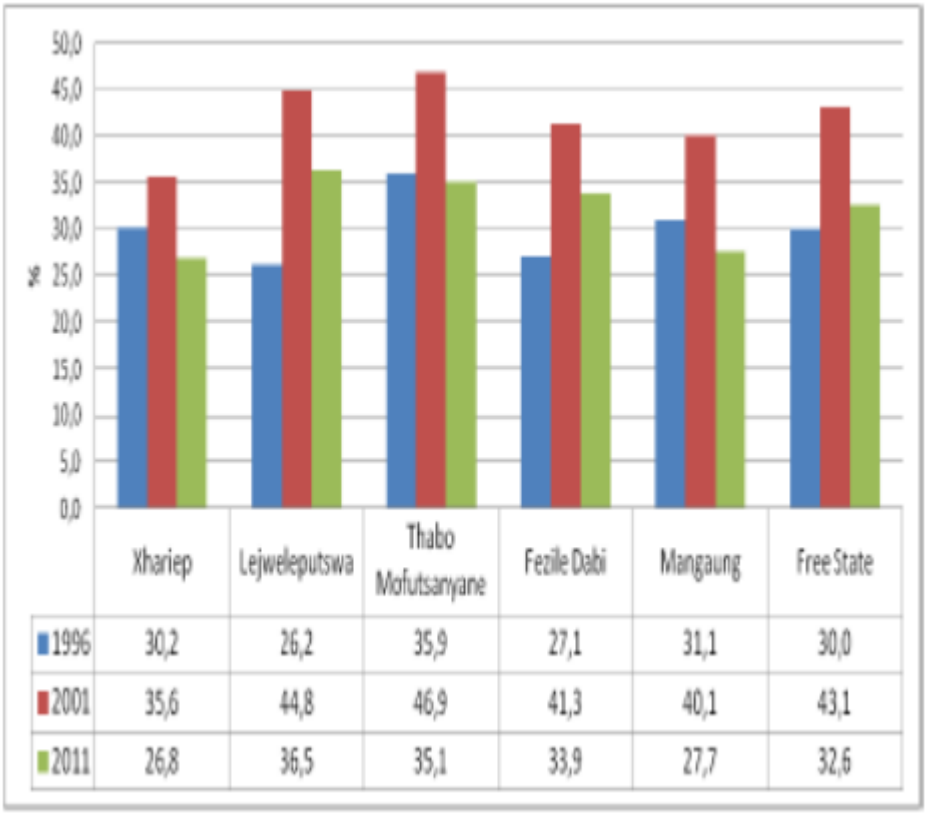
8. SOCIO-ECONOMIC CHARACTER

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:

Based on the 20013-14 district IDPs, an increase in unemployment is notable since 1996 until 2001, thereafter a decline is noted:



	Xhariep	Lejweleputswa	Thabo Mofutsanyane	Fezile Dabi	Mangaung	Free State
1996	30,2	26,2	35,9	27,1	31,1	30,0
2001	35,6	44,8	46,9	41,3	40,1	43,1
2011	26,8	36,5	35,1	33,9	27,7	32,6

Figure 2: Unemployment rate by district – 1996, 2001 and 2011 (Thabo Mofutsanyana Final IDP 2013-14)

Economic profile of local municipality:

Maluti A Phofung local municipality respectively contributed R3 968 873 (000) GVA-R and R4 544 146 (000) GDP-R in 2010. It was the highest contributor of the GVA-R and GDP-R in the district followed by Dihlabeng, Setsoto, Mantsopa, Nketoana and then Phumelela. Maluti A Phofung also had +1.63% average Real Economic Growth Rate (1996 – 2010) and was the highest local municipality in the district.

Total GVA Constant 2005 prices (R1 000) 2010	Gross Value Added by Region (GVA-R)		Gross Domestic Product by Region (GDP-R)
	Percentage (%) of Free State total	GDP-R Constant 2005 prices (R1 000) 2010	Percentage (%) of Free State total
Thabo Mofutsanyane	10 810 333 / 13.21	12 305 304	13.39

Figure 3: GDP-R

Level of education:

Although there are many high level skilled people in the district, but lack formal employment. The lack of a relevant career guidance path leads to limited practical experience and relevance for school leavers. The quality of education in the district varies from school to school, but the majority of schools achieve low pass rates yearly Existing tertiary facilities are situated in Bethlehem, Harrismith and Phuthaditjhaba. The Maluti FET College anticipates opening a satellite in Ficksburg. Most courses are practically orientated and students struggle to practice what they have learned since employers have not fully played their role in practical provision. The Office of the Premier, the District Executive Mayor and some SETAS notably the Services SETA are assisting in this regard. There exists a high level of illiteracy amongst community members, particularly amongst adults. There is limited access to ABET programmes although these courses are provided all through the area. Another cause for concern is that there are very limited opportunities for formal training as far as entrepreneurship development is concerned. The opportunity to develop a private tourism school in Clarens exists. The lack of cooperation between tertiary institutions and the private sector for practical experience for students (internship) should be addressed. It should be compulsory to institute a proper workplace skills development plan.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	**R350 million**
What is the expected yearly income that will be generated by or as a result of the activity?	**N/A**
Will the activity contribute to service infrastructure?	**YES**
Is the activity a public amenity?	**YES**
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	**Number to be determined by Contractor**
What is the expected value of the employment opportunities during the development and construction phase?	**R3 million**
What percentage of this will accrue to previously disadvantaged individuals?	**90%**
How many permanent new employment opportunities will be created during the operational phase of the activity?	**N/A**
What is the expected current value of the employment opportunities during the first 10 years?	**R1 million**
What percentage of this will accrue to previously disadvantaged individuals?	**90%**

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)	No biodiversity plan for the Free State
				There are however no formal or informal protected areas within the construction site area

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	5%	The three wetlands identifies are in its natural state (including the river crossings)
Near Natural (includes areas with low to moderate level of alien invasive plants)	35%	Part of registered servitude, other parts include areas proposed for re-aligning roads at the R712 interchange as well as the Harrismith /Murry road intersection.
Degraded (includes areas heavily invaded by alien plants)	0%	-
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	60%	The main area of upgrading of the N5 is within its current road reserve. Deviations and route realignments mostly traverse through transformed areas, including cultivated land.

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)	Endangered	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)	**YES**

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)

Terrestrial:

The project area falls within the Eastern Free State Sandy Grassland Gm4 Grassland Biome. Closed grasslands dominated by *Eragrostis curvula*, *Tristachya leucothrix* and *Themeda triandra*. Other dominant grasses include *E. capensis*, *E racemosa*, *Cymbopogon pospischilli*, *Elionurus muticus*, *Eragrostis plana* and *Aristida junciformis*.

Soil class is defined as Red and Yellow structure less soils with a plinthic horizon (S3 Soil Class ID). Mudstone, sandstone and shale of the Baufort Group (Tarkastad Formation in the south and Adelaide Formation in the north). Sepane, Arcadia and Rensburg soil forms are typical for moist bottomlands. (Musina and Ruderfort, 2006)

Aquatic:

Within the vicinity of the upgrading and bridge construction areas, three wetland types are found, including:

- **Artificial wetland (Mesic Highveld Grassland Group);**
- **Two natural wetland, of which the one is the Wilge River and the other north-west of the Murry road towards town (see attached wetland map).**

Two rivers are applicable, the Nuwejaarspruit and the Wilge River. He Nuwejaarspruit is at a C condition implying moderately modified, the Wilge is at AB, implying largely natural with few modifications. Nuwejaarspruit is one of the tributaries of the Wilge River close to Harrismith. Sterkfontein Dam is situated in the very upper reaches of the Vaal Dam catchment on the Nuwejaarspruit, a few kilometres from the edge of the Drakensberg Escarpment. It has a very small catchment area with negligible natural inflow with the result that it requires no spillway. The dam receives its water via the Tugela-Vaal Project which is a pumped-storage scheme involving the net transfer of up to 630 million m^3 of water from KwaZulu-Natal.

A Rapid study that was conducted during 2003 indicated the following. The overall PES (Ecostatus) category assigned to site EWR 1 in the Nuwejaarspruit (C81E) was a C (moderate). The Ecological Importance and Sensitivity for EWR 1 in the Nuwejaarspruit was determined to be moderate with a low confidence rating attached to this assessment.

Historical water quality data (RQS – DWA) from the Sterkfontein Dam on the Nuwejaarspruit (C8R003) indicates very good water quality, with a slight increasing trend during a four year period (2005 – 2011), e.g. total dissolved salts. The average nutrient concentrations (N & P) were generally low and within the acceptable range for aquatic ecosystems, *i.e.* NO_3-N = 0.068 mg/L; PO_4-P = 0.017 mg/L. A one-off sample was taken from the Nuwejaarspruit at N5 bridge close to Harrismith (02 August, 2012) at the proposed rehabilitation bridge site. The physico-chemical results also indicate very good water quality. *In situ* measurements indicated high oxygen concentration (12.8 mg/L; 97.5 % saturation) and low water temperature, 4.3 ºC (12:30). The pH 6.6 indicate slightly acidic water with very low electrical conductivity of 9 mS/m (thus low dissolved salts), and very clear water (low turbidity; 4.84 NTU and low suspended material). Laboratory analyses show that the water is soft (hardness <50 mg/L), low dissolved salts (55 mg/L), low nutrient concentrations like nitrate, ammonium and phosphates. The *E. coli* concentration was 20 cfu/100 ml that is in the ideal range for full contact users. Natural water with *E. coli* concentrations <130 count per 100 ml is considered to be a low risk of gastrointestinal disorders. (Roos, 2013)

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Volksblad	
Date published	07 August 2013, 26 July 2013, 15 May 2013	
Site notice position	**Latitude**	**Longitude**
	28°17'18.26"	29°05'42.27"
	28°17'20.56"	29°05'13.72"
Date placed	26 March 2013	

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

2. DETERMINATION OF APPROPRIATE MEASURES

The following objectives were followed for the stakeholder engagement process for the N5 / R712 upgrading project:

- **To inform the public and provide the public with information and an understanding of the project, issues and solutions;**
- **Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed bridge development;**
- **Clearly outline the scope of the project, including the scale and nature of the proposed activity, and highlight the potential for environmental impacts, whether positive or negative.**

In order to achieve this, the following measures were implemented:

- **Site notices placed at various points along the N5 and R712 interchange, and smaller notices at strategic places in Harrismith town.**
- **Public adverts were placed to inform the public of the proposal, and were used to identify I&APs.**
- **Preparation of a Background Information Document.**
- **Identifying of affected property owners around the proposed upgrading areas.**
- **Identifying of relevant sector departments, issuing of BID and request to register as I&APs.**
- **Advert placed to invite all I&APs as well as sector departments and other stakeholders to a public information session in Harrismith.**
- **Public Information day held at Harrismith;**
- **Compiling of a Draft BAR and distributing to all I&APs for comments.**

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Cllr. M. Mofana	Tshiame Ward 1	Fax: 086743 0117
Cllr. T. Thebe	Harrismith Ward 22	E-mail: councilorthebe@webmail.co.za
Mr. Christo Spies	Harrismith Polo Club	E-mail: polojo@tekomsa.net
Mr. Douglas Judd	N3 Toll Concession	E-mail: douglasj@n3tc.co.za
Mr. Anesh Madonla	N3 Toll Concession	E-mail: aneshm@n3tc.co.za
Mr. LND Ntonbela	Maluti A Phofung Local Municipality	E-mail: kotano@map.ss.gov.za
Mr. Baasi Ungurere	Maluti A Phofung Local Municipality – Infrastructure	E-mail: baby@map.ss.gov.za
Mr. M.B. Mphahlele	Thabo Mofutsanyane District Municipality Municipality – Infrastructure	E-mail: malerothob@yahoo.com
Me. M Hlela	Maluti A Phofung Local Municipality – Town Planning	E-mail: machela@map.ss.gov.za
Mr. Fred Mathey	Department of Rural Development	E-mail: ladutapp@iafrica.com
Mr. Danie Badenhorst	Surrounding Land Owner	E-mail: djb.siloe@hotmail.com
Mr. John Venning	Swiss Valley pig farm and abattoir	E-mail: swissvalley@megawifi.co.za
Mr. Izak Venter	Department of Agriculture	izak@glen.agric.za
Mr. J. Mofokeng	Department of Water Affairs	E-Mail: mofokengj@dwa.gov.za
Me. G. Mkhosana	Department of Economic Development, Tourism and Environmental Affairs, Free State	E-mail: mkhosana@detea.fs.gov.za

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

Summary of main issues raised by I&APs	Summary of response from EAP
No response have been received by any of the registered I&APs on the submitted draft BAR.	N/A

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
Department of Agriculture, Forestry and Fisheries	Mr. I Venter	051-506-1613	051-448-1045	izak@glen.agric.za	Privet Bag X01 Glen 9360
Department of Rural Development	Mr. Fred Mathey			ladutapp@iafrica.com	
Thabo Mofutsanyane District Municipality (Infrastructure)	Mr. M.B Mphahlele	085-713 4485	085-713 0940	malerothob@yahoo.com	Private bag X810 Witsieshoek 9870
Maluti A Phofung Local Municipality	Mr. B. Ungurere			baby@map.ss.gov.za	Private Bag x805 Witsieshoek 9870
Department of Water Affairs, Gauteng Regional Office	Mr. J. Mofokeng	012-392 1426	-	mofokengj@dwa.gov.za	Bothongo Plaza East 15th Floor 285 Schoemans Street Pretoria 0001
Department of Economic Development, Tourism and Environmental Affairs	Me. Grace Mkhosana	051-400 4842	051400 4817	mkhosana@detea.fs.gov.za	Private Bag X20801, BFN

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, 2010, 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.

Risks and key issues were identified through an internal process based on similar developments and environmental assessment. The risks and key issues identified include:

1. **Topography;**
2. **Impact on air quality;**
3. **Biodiversity displacement and destruction;**
4. **Erosion;**
5. **Increased ambient noise levels;**
6. **Contamination of surface water; and**
7. **Traffic.**

In the event that a negative environmental impact is identified, it can be avoided, mitigated or off-set. The attached EMPr attempts to identify and mitigate potential environmental impacts at the construction phase of the project. The mitigation measures that are proposed, take cognizance of the final design and impacts that may ensue from the road upgrading and bridge widening activities.

Activity	Impact summary	Significance	Proposed mitigation
Alternative DESIGN 1 (preferred alternative) – Planning and Design phase			
N/A	***Direct impacts:*** No direct impact were identified	N/A	There are no mitigation measures to consider
	Indirect impacts: No indirect impact were identified	N/A	There are no mitigation measures to consider
	Cumulative impacts: No cumulative impact were identified	N/A	There are no mitigation measures to consider

Activity	Impact summary	Significance	Proposed mitigation
Alternative DESIGN 1 (preferred alternative) - Construction phase ***WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGES AT R712 AND WILGERPARK, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS, CONSTRUCTION OF A NEW BRIDGE (MURREY STREET).***			
▪ **Construction activities within a terrestrial and aquatic area.** ▪ **Vegetation clearing**	***Direct impacts:*** **Impact on the Surrounding Ecological Support Area**: Important Critical Biodiversity Areas (CBAs) contribute to the attainment of biodiversity conservation targets. In systematic conservation planning they are accorded this status because they contain representative samples of biodiversity and threatened species (flora and fauna) where they can persist over the long term. They also contain abiotic features and processes indispensible for biodiversity conservation, such as providing a system of natural pathways (corridors) facilitating the movement of fauna and flora. In terms of the biodiversity pattern aspect,	**Extent: Local (-2)** **Duration: Medium-term (-2)** **Intensity: Moderate (-2)** **Probability: Highly probable (-3)** **Significance: Medium (-9)**	Clearing of vegetation should be kept to a minimum and must be introduced in a phased manner, where rehabilitation is immediately undertaken as soon as a section of road construction is finished. No animals shall be harmed. Fire control should be implemented

Activity	Impact summary	Significance	Proposed mitigation
	of the affected area for construction most of the areas to be affected are not representative of significant biodiversity areas. New delineation areas represent previous cultivated land landuse, and others disturbed ground cover with weeds and alien vegetation. Aquatic areas to be influenced include the Nuwejaarspruit and the Wilge River; smaller functional wetlands are also applicable, however situated outside construction areas. In terms of the biodiversity process aspect, the movement of biota across the project area is no more influenced by the construction activity than it is by the presence of the existing N5 road, which is to say the impact is present, but is of medium negative status.		
Topography and Soils ▪ **Stripping of topsoil** ▪ **Excavations** ▪ **Soil compaction** ▪ **Topsoil management**	***Soil erosion and increased storm water run-off*** Erosion, Alteration and Disturbances (Topographical features will be affected at new road alignment areas) The preferred alternative will require construction activities at the Wilge River and Nuwejaarspruit. Impacts will include - • Alteration of topography due to	**Extent: Site (-1)** **Duration: Medium-term (-2)** **Intensity: High (-3)** **Probability: Definite (-3)** **Significance: Medium (-9)**	• **Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately by not leaving soils exposed for a long time to prevent soil erosion.** • **Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.** • **Topsoil that has been removed from excavation areas must be stored separately in a designated area and in a manner that erosion does not**

Activity	Impact summary	Significance	Proposed mitigation
	stockpiling of soil, rubble and building material. • Disturbance of surface soils, loss of topsoil, contamination and potential erosion. Soil erosion may occur where the soils' moisture absorption capacity and rate are decreased. This causes increased runoff which subsequently promotes erosion. During the construction phase, soil erosion may arise from activities which expose and/or compact the soil layer. Such activities (decreased ability for soil to absorb water), and may cause unnecessary soil erosion. Incorrect topsoil stripping and stockpile management can result in soil losses via erosion (wind and water). Since the construction phase is a short term, temporary phase, erosion must be monitored during earth work activities as guided by the specification of the EMPr. It is thus possible to prevent erosion to acceptable levels. This potential impact is of low negative significance within the existing road reserve area. No special efforts will be		**occur.** • **Stockpiles must not exceed 2 m in height and must be completely removed after construction is completed to prevent establishment of invasive and pioneer species which would alter the wetland vegetative composition.** • **Construction activities should be scheduled as far as possible to take place during winter / low flow periods when as little of the construction site and exposed sediment is in contact with the flow as possible.** • **No vehicles should be allowed to cross the wetland on site. Access to the construction site must be through use of the existing road and temporary deviations to be constructed.** • **Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible.** • **Refuelling of machinery must be done using a drip tray.** • **Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to contain 110% of the total volume of materials stored**

Activity	Impact summary	Significance	Proposed mitigation
	necessary to manage this as it is addressed by the SANRAL approved road construction standards. At the river crossings and inclined areas the potential for storm water erosion causing damage to the existing soil structures exists when there is heavy rain occurring. Unmitigated this potential impact is of medium significance, but can be reduced to low if effective mitigation measures as described in the accompanying EMPr are implemented.		**at any given time.** • **The storage areas must be regularly inspected to ensure their integrity and access should be limited to authorised employees only.** • **Mixing of cement must be done on an impervious lined material and any spillage must be immediately cleaned up.** • **The Contractor and employees must be trained on correct handling of spillages and precautionary measures that need to be implemented in order to minimise potential spillages.** • **The Contractor must ensure that spill kits are always available on site and any spillages must be recorded and reported to the responsible person.** • **Repair of equipment and vehicles must be undertaken only in the Contractor lay-down area.** • **The placing of erosion protection measures at culvert and drain inlets and outlets such as gabion baskets and mattresses, stone pitching, riprap etc.**

Activity	Impact summary	Significance	Proposed mitigation
Streams , Rivers, Wetlands ▪ **Construction activities within or near rivers, streams or non perennial tributaries**	***Impact on streams*** Pollution from construction waste and hazardous waste may enter the non perennial tributaries, streams, rivers or wetlands. Uncontrolled excavation or stock piling may result in river sedimentation.	**Extent: Site (-1)** **Duration: Medium-term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• **Skips for the disposal of general waste should be provided around the site. The skips should have a well-fitting lid to prevent wind from blowing away the litter and they should be emptied regularly and disposed off at a licensed waste disposal site.** • **Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible.** • **Storage areas for machines and equipment must be located outside of the wetland boundaries (at least 50 m away).** • **Refuelling of machinery must be done using a drip tray and no vehicle refuelling is allowed within the wetland and buffer area.** • **The extent of the construction site at the stream crossings must be kept as minimal as possible and must be clearly demarcated. Construction activities must be restricted to defined areas.** **The road upgrade at these crossings must:** ▪ **be seated at the same ground level as the existing structure and**

Activity	Impact summary	Significance	Proposed mitigation
			follow the present gradient, so as not to change present hydraulic flows to or cause hydraulic disturbance at outlet points ▪ **restrict the removal or disturbance of aquatic or riverine vegetation to areas of direct construction only and such area shall be kept to the minimum possible.** ▪ **be provided with appropriate anti – erosion measures to reduce and manage scour at the interface of the structure and streambed or erosion of the base or banks of the watercourse in question.** ▪ **no diversion of an existing stream or water course is permitted, without approval.** ▪ **No plant material, fish or fauna may be removed from the site under any circumstances.**
Use of construction machinery and vehicles	***Increased noise generation*** Excessive noise pollution from the construction sites may impact the surrounding environment. Construction machinery (e.g. jackhammer) and construction vehicles (e.g. trucks loaded with stone) will create noise. Such noise will be generated in a discontinuous fashion during daytime only while the road upgrade activities commence.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	Dust and noise during construction must be monitored and controlled so as to minimise disturbance to nearby residents especially at Wilgepark. Factors such as wind can often affect the intensity to which these impacts are experienced.. All material stockpiles are to be covered with a temporary cover, such as heavy duty shade cloth or tarpaulin, in order to control dust and migration of the material

Activity	Impact summary	Significance	Proposed mitigation
			beyond the storage area. Where necessary and feasible water may be sprayed as a dust suppressant. Progressive replacement of vegetation cover as construction is completed along the route must be undertaken. As far as is practically possible use is to be made of species occurring within 100 m of the road route during revegetation and rehabilitation.
▪ **Vehicle movement on dust roads.** ▪ **Exposure of soil.** ▪ **Excavation activities.**	***Increased Dust Generation*** Movement of machinery and haul vehicles to the site is likely to lead to increased dust. Besides its nuisance factor to humans, increased dust deposition on roadside vegetation may negatively affect plant growth and wildlife grazing on this vegetation.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	
▪ **Excavations**	***Damage to Cultural Resources*** Only one site of cultural impotence was noted near the project site and included a clump of graves, unmarked. These graves are however situated outside the new interchange proposed at the R712. However, cultural, heritage and paleontological artefacts may potentially be uncovered during excavation and/or possibly damaged by construction activity.	**Extent: Site (-1)** **Duration: Medium-term (-2)** **Intensity: Moderate (-2)** **Probability: Highly probable(-3)** **Significance: Medium (-8)**	Continued care should be taken to observe any site of heritage significance during construction. Should any archaeological artefacts and paleontological remains be exposed during construction, work on the area where artefacts were found will cease immediately and appropriate department and/ or person will be notified as soon as possible.
▪ **Incorrect disposal of construction waste**	***Waste Management Impact – loss of natural habitat and impact on the visual landscape*** The incorrect disposal of construction waste could lead to a negative visual impact and loss of natural habitat. With appropriate mitigation this impact will be reduced to an insignificant level. There is	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Low (-5)**	A well-organized site must be kept to ensure minimal negative visual impact. Construction rubble and waste must not be allowed to be dumped permanently at the site, but must be removed by the contractor. The contractor must provide adequate waste disposal and sanitation facilities. Portable toilets must be provided and

Activity	Impact summary	Significance	Proposed mitigation
	not a lot of rubble generated with the construction of a road. The bulk will be concrete and this will be spoiled in borrow pits and in Landfills.		adequate facilities for the cooking needs of the construction workers should be provided. During construction, wastes must be separated at source and disposed at relevant suitably licensed facilities. Waste should be separated into recyclable and non-recyclable materials and distributed for recycling where applicable. During the construction phase, construction waste will be used as fill material and as foundation for the proposed upgrade processes where possible. The re-use of construction waste materials will minimize the amount of waste that will need to be disposed of at registered municipal waste facilities. Only inert, non-hazardous construction material will be re-used.
▪ **Acquisition of contract workers**	***Job Creation*** The project will include temporary job creation for the local communities. In terms of sustainability, selected workers will be provided prior to construction, which will allow for skill development in the community.	**Extent: Site (+1)** **Duration: Short term (+1)** **Intensity: Low (+2)** **Probability: Highly probable (+3)** **Significance: Medium (+7)**	No mitigation is required.
	Indirect impacts:		
▪ **Activities that may result in soil erosion (see soil erosion above)**	***Loss of Habitat*** The indirect impact of erosion and sedimentation, as described above, may result in sediment deposition within the aquatic habitats within the Nuwejaarspruit	**Extent: Site (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Medium (-6)**	Erosion should be managed in order to prevent the indirect impacts of sedimentation.

Activity	Impact summary	Significance	Proposed mitigation
	and Wilge River. Where soil erosion accelerates due to alteration in water volume and levels, there is a reduction in bank stability, and therefore, an increase in sediment loading. These fine sediments can increase the turbidity of the water, clouding it and preventing sufficient light penetration, which adversely affects the health of the flora and fauna. This may result in a decrease in the ecological state of the aquatic habitat. Loss of wildlife habitat, loss of species and biodiversity, and introduction of alien species are among the consequences of such changes. However, construction impacts are temporary in nature, whereas sedimentation due to ongoing erosion and deterioration of the existing track/road is ongoing and long term.		
Safety	***Safety*** Activities on site that could pose a indirect impact in the form of safety risks include: • Movement of construction vehicles. • Operation of equipment and machines. • Demolition of the existing structures and construction of new ones.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Low (-5)**	• **Low speed limits at the construction site must be adhered to.** • **All workers on site must wear the appropriate PPE equipment at all times.** • **All employees operating machinery and equipment must be properly trained on the use.** • **A safe and designated crossing point for community members must be demarcated.** • **Clear signage must be provided at any excavations and trenches to**

Activity	Impact summary	Significance	Proposed mitigation
			avoid people falling in. • A safety officer must be appointed for the entire duration of the construction period. • The existing farm accesses close to the site will be assessed and considered during the work programme to ensure the safety of road users. • Guard rails must be erected and maintained at the bridges.
	Cumulative impacts:		
	No cumulative impacts are anticipated		

Activity	Impact summary	Significance	Proposed mitigation
Alternative DESIGN 2 - Construction phase ***WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS, NO GRADE SEPARATION AT THE WILGEPARK CONNECTION***			
▪ **Construction activities within a terrestrial and aquatic area.** ▪ **Vegetation clearing**	***Direct impacts:*** **Impact on the Surrounding Ecological Support Area**: Important Critical Biodiversity Areas (CBAs) contribute to the attainment of biodiversity conservation targets. In systematic conservation planning they are accorded this status because they contain representative samples of biodiversity and threatened species (flora and fauna) where they can persist over the long term. They	**Extent: Local (-2)** **Duration: Medium-term (-2)** **Intensity: Moderate (-2)** **Probability: Highly probable (-3)** **Significance: Medium (-9)**	Clearing of vegetation should be kept to a minimum and must be introduced in a phased manner, where rehabilitation is immediately undertaken as soon as a section of road construction is finished. No animals shall be harmed. Fire control should be implemented

Activity	Impact summary	Significance	Proposed mitigation
	also contain abiotic features and processes indispensible for biodiversity conservation, such as providing a system of natural pathways (corridors) facilitating the movement of fauna and flora. In terms of the biodiversity pattern aspect, of the affected area for construction most of the areas to be affected are not representative of significant biodiversity areas. New delineation areas represent previous cultivated land landuse, and others disturbed ground cover with weeds and alien vegetation. Aquatic areas to be influenced include the Nuwejaarspruit and the Wilge River; smaller functional wetlands are also applicable, however situated outside construction areas. In terms of the biodiversity process aspect, the movement of biota across the project area is no more influenced by the construction activity than it is by the presence of the existing N5 road, which is to say the impact is present, but is of medium negative status.		
Topography and Soils ▪ **Stripping of topsoil** ▪ **Excavations** ▪ **Soil compaction** ▪ **Topsoil**	***Soil erosion and increased storm water run-off*** Erosion, Alteration and Disturbances (Topographical features will be affected at new road alignment areas)	**Extent: Site (-1)** **Duration: Medium-term (-2)** **Intensity: High (-3)** **Probability: Definite (-3)** **Significance: Medium (-9)**	• **Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately by not leaving soils exposed for a long time to prevent soil erosion.** • **Topsoil should be used for**

Activity	Impact summary	Significance	Proposed mitigation
management	The preferred alternative will require construction activities at the Wilge River and Nuwejaarspruit. Impacts will include - • Alteration of topography due to stockpiling of soil, rubble and building material. • Disturbance of surface soils, loss of topsoil, contamination and potential erosion. Soil erosion may occur where the soils' moisture absorption capacity and rate are decreased. This causes increased runoff which subsequently promotes erosion. During the construction phase, soil erosion may arise from activities which expose and/or compact the soil layer. Such activities (decreased ability for soil to absorb water), and may cause unnecessary soil erosion. Incorrect topsoil stripping and stockpile management can result in soil losses via erosion (wind and water). Since the construction phase is a short term, temporary phase, erosion must be monitored during earth work activities as		**rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.** • **Topsoil that has been removed from excavation areas must be stored separately in a designated area and in a manner that erosion does not occur.** • **Stockpiles must not exceed 2 m in height and must be completely removed after construction is completed to prevent establishment of invasive and pioneer species which would alter the wetland vegetative composition.** • **Construction activities should be scheduled as far as possible to take place during winter / low flow periods when as little of the construction site and exposed sediment is in contact with the flow as possible.** • **No vehicles should be allowed to cross the wetland on site. Access to the construction site must be through use of the existing road and temporary deviations to be constructed.** • **Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible.** • **Refuelling of machinery must be done using a drip tray.**

Activity	Impact summary	Significance	Proposed mitigation
	guided by the specification of the EMPr. It is thus possible to prevent erosion to acceptable levels. This potential impact is of low negative significance within the existing road reserve area. No special efforts will be necessary to manage this as it is addressed by the SANRAL approved road construction standards. At the river crossings and inclined areas the potential for storm water erosion causing damage to the existing soil structures exists when there is heavy rain occurring. Unmitigated this potential impact is of medium significance, but can be reduced to low if effective mitigation measures as described in the accompanying EMPr are implemented.		• **Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to contain 110% of the total volume of materials stored at any given time.** • **The storage areas must be regularly inspected to ensure their integrity and access should be limited to authorised employees only.** • **Mixing of cement must be done on an impervious lined material and any spillage must be immediately cleaned up.** • **The Contractor and employees must be trained on correct handling of spillages and precautionary measures that need to be implemented in order to minimise potential spillages.** • **The Contractor must ensure that spill kits are always available on site and any spillages must be recorded and reported to the responsible person.** • **Repair of equipment and vehicles must be undertaken only in the Contractor lay-down area.** • **The placing of erosion protection measures at culvert and drain inlets and outlets such as gabion baskets and mattresses, stone pitching,**

Activity	Impact summary	Significance	Proposed mitigation
			riprap etc.
Streams , Rivers, Wetlands ▪ **Construction activities within or near rivers, streams or non perennial tributaries**	***Impact on streams*** Pollution from construction waste and hazardous waste may enter the non perennial tributaries, streams, rivers or wetlands. Uncontrolled excavation or stock piling may result in river sedimentation.	**Extent: Site (-1)** **Duration: Medium-term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• **Skips for the disposal of general waste should be provided around the site. The skips should have a well-fitting lid to prevent wind from blowing away the litter and they should be emptied regularly and disposed off at a licensed waste disposal site.** • **Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible.** • **Storage areas for machines and equipment must be located outside of the wetland boundaries (at least 50 m away).** • **Refuelling of machinery must be done using a drip tray and no vehicle refuelling is allowed within the wetland and buffer area.** • **The extent of the construction site at the stream crossings must be kept as minimal as possible and must be clearly demarcated. Construction activities must be restricted to defined areas.** **The road upgrade at these crossings must:** ▪ **be seated at the same ground level as the existing structure and**

Activity	Impact summary	Significance	Proposed mitigation
			follow the present gradient, so as not to change present hydraulic flows to or cause hydraulic disturbance at outlet points ▪ **restrict the removal or disturbance of aquatic or riverine vegetation to areas of direct construction only and such area shall be kept to the minimum possible.** ▪ **be provided with appropriate anti – erosion measures to reduce and manage scour at the interface of the structure and streambed or erosion of the base or banks of the watercourse in question.** ▪ **no diversion of an existing stream or water course is permitted, without approval.** ▪ **No plant material, fish or fauna may be removed from the site under any circumstances.**
Use of construction machinery and vehicles	***Increased noise generation*** Excessive noise pollution from the construction sites may impact the surrounding environment. Construction machinery (e.g. jackhammer) and construction vehicles (e.g. trucks loaded with stone) will create noise. Such noise will be generated in a discontinuous fashion during daytime only while the road upgrade activities commence.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	Dust and noise during construction must be monitored and controlled so as to minimise disturbance to nearby residents especially at Wilgepark. Factors such as wind can often affect the intensity to which these impacts are experienced.. All material stockpiles are to be covered with a temporary cover, such as heavy duty shade cloth or tarpaulin, in order to control dust and migration of the material

Activity	Impact summary	Significance	Proposed mitigation
▪ **Vehicle movement on dust roads.** ▪ **Exposure of soil.** ▪ **Excavation activities.**	***Increased Dust Generation*** Movement of machinery and haul vehicles to the site is likely to lead to increased dust. Besides its nuisance factor to humans, increased dust deposition on roadside vegetation may negatively affect plant growth and wildlife grazing on this vegetation.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	beyond the storage area. Where necessary and feasible water may be sprayed as a dust suppressant. Progressive replacement of vegetation cover as construction is completed along the route must be undertaken. As far as is practically possible use is to be made of species occurring within 100 m of the road route during revegetation and rehabilitation.
▪ **Excavations**	***Damage to Cultural Resources*** Only one site of cultural impotence was noted near the project site and included a clump of graves, unmarked. These graves are however situated outside the new interchange proposed at the R712. However, cultural, heritage and paleontological artefacts may potentially be uncovered during excavation and/or possibly damaged by construction activity.	**Extent: Site (-1)** **Duration: Medium-term (-2)** **Intensity: Moderate (-2)** **Probability: Highly probable(-3)** **Significance: Medium (-8)**	Continued care should be taken to observe any site of heritage significance during construction. Should any archaeological artefacts and paleontological remains be exposed during construction, work on the area where artefacts were found will cease immediately and appropriate department and/ or person will be notified as soon as possible.
▪ **Incorrect disposal of construction waste**	***Waste Management Impact – loss of natural habitat and impact on the visual landscape*** The incorrect disposal of construction waste could lead to a negative visual impact and loss of natural habitat. With appropriate mitigation this impact will be reduced to an insignificant level. There is not a lot of rubble generated with the construction of a road. The bulk will be	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Low (-5)**	A well-organized site must be kept to ensure minimal negative visual impact. Construction rubble and waste must not be allowed to be dumped permanently at the site, but must be removed by the contractor. The contractor must provide adequate waste disposal and sanitation facilities. Portable toilets must be provided and adequate facilities for the cooking needs of the construction workers should be

Activity	Impact summary	Significance	Proposed mitigation
	concrete and this will be spoiled in borrow pits and in Landfills.		provided. During construction, wastes must be separated at source and disposed at relevant suitably licensed facilities. Waste should be separated into recyclable and non-recyclable materials and distributed for recycling where applicable. During the construction phase, construction waste will be used as fill material and as foundation for the proposed upgrade processes where possible. The re-use of construction waste materials will minimize the amount of waste that will need to be disposed of at registered municipal waste facilities. Only inert, non-hazardous construction material will be re-used.
▪ **Acquisition of contract workers**	***Job Creation*** The project will include temporary job creation for the local communities. In terms of sustainability, selected workers will be provided prior to construction, which will allow for skill development in the community. With Alternative 2 considered the number of job opportunities will be less.	**Extent: Site (+1)** **Duration: Short term (+1)** **Intensity: Low (+1)** **Probability: Highly probable (+2)** **Significance: Low (+5)**	No mitigation is required.
	Indirect impacts:		
▪ **Activities that may result in soil erosion (see soil erosion above)**	***Loss of Habitat*** The indirect impact of erosion and sedimentation, as described above, may result in sediment deposition within the aquatic habitats within the Nuwejaarspruit	**Extent: Site (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Medium (-6)**	Erosion should be managed in order to prevent the indirect impacts of sedimentation.

Activity	Impact summary	Significance	Proposed mitigation
	and Wilge River. Where soil erosion accelerates due to alteration in water volume and levels, there is a reduction in bank stability, and therefore, an increase in sediment loading. These fine sediments can increase the turbidity of the water, clouding it and preventing sufficient light penetration, which adversely affects the health of the flora and fauna. This may result in a decrease in the ecological state of the aquatic habitat. Loss of wildlife habitat, loss of species and biodiversity, and introduction of alien species are among the consequences of such changes. However, construction impacts are temporary in nature, whereas sedimentation due to ongoing erosion and deterioration of the existing track/road is ongoing and long term.		
	Safety Activities on site that could pose a indirect impact in the form of safety risks include: • Movement of construction vehicles. • Operation of equipment and machines. • Demolition of the existing structures and construction of new ones.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Low (-5)**	• **Low speed limits at the construction site must be adhered to.** • **All workers on site must wear the appropriate PPE equipment at all times.** • **All employees operating machinery and equipment must be properly trained on the use.** • **A safe and designated crossing point for community members must be demarcated.** • **Clear signage must be provided at any excavations and trenches to**

Activity	Impact summary	Significance	Proposed mitigation
			avoid people falling in. • A safety officer must be appointed for the entire duration of the construction period. • The existing farm accesses close to the site will be assessed and considered during the work programme to ensure the safety of road users. • Guard rails must be erected and maintained at the bridges.
	Cumulative impacts:		
	No cumulative impacts are anticipated		

SUMMARY OF IMPACTS AND AVERAGE POINTS ALLOCATED TO EACH ALTERNATIVE DURING THE CONSTRUCTION PHASE		
IMPACT (ACTIVITY)	**ALTERNATIVE 1**	**ALTERNATIVE 2**
Construction activities	-9	-9
Topography and soils	-9	-9
Streams, Rivers and Wetlands	-7	-7
Use of construction machinery	-4	-4
Excavations	-8	-8
Waste disposal	-5	-5
Acquisition of contract workers	+7	+5

Activity	Impact summary	Significance	Proposed mitigation
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Alternative DESIGN 1 (preferred alternative) – Operational Phase ***WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS, NEW BRIDGE AT MURREY STREET***			
Chemicals and wastes generated from vehicles and residents.	Due to the nature of this project and since it is an existing road that will be upgraded, the only activities that will be associated with this phase are the use of the road by the public. **Storm Water pollution** Runoff from roads and impervious surfaces may collect petrol, motor oil, heavy metals, general waste or other pollutants generated from vehicles. This may enter the storm water drains, which may ultimately contaminate surface and underground waters.	**Extent: Site (-1)** **Duration: Long term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Low (-5)**	The responsibility lies with the road users and surrounding communities to practice proper waste management i.e. Prevent littering, dumping of both hazardous and general waste. Although, listed, this impacted is considered relatively low as no significant contamination is expected for the project area.
Improvement of road conditions and safety of road users	Upgrading of the N5 section 1 as proposed under this alternative will incorporate all aspects pertaining the making of this stretch safer for road users and will improve road surface in the long term. The various intersections proposed will alleviate congestion especially at the Wilgepark intersection.	**Extent: Site (+2)** **Duration: Long term (+4)** **Intensity: High (+4)** **Probability: Highly probable (+3)** **Significance: Medium (+13)**	No mitigations required.

Activity	Impact summary	Significance	Proposed mitigation
Activity	Impact summary	Significance	Proposed mitigation
Alternative DESIGN 2 – Operational Phase ***WIDENING TO FOUR LANES FROM KM 0 TO 6, INTERCHANGE AT R712, ACCESS CLOSURES, ALTERNATIVE CONNECTION ROADS, NO GRADE SEPARATION AT THE WILGEPARK CONNECTION***			
Chemicals and wastes generated from vehicles and residents.	Due to the nature of this project and since it is an existing road that will be upgraded, the only activities that will be associated with this phase are the use of the road by the public. **Storm Water pollution** Runoff from roads and impervious surfaces may collect petrol, motor oil, heavy metals, general waste or other pollutants generated from vehicles. This may enter the storm water drains, which may ultimately contaminate surface and underground waters.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Highly probable (-2)** **Significance: Low (-5)**	The responsibility lies with the road users and surrounding communities to practice proper waste management i.e. Prevent littering, dumping of both hazardous and general waste. Although, listed, this impacted is considered relatively low as no significant contamination is expected for the project area.
Improvement of road conditions and safety of road users	Upgrading of the N5 section 1 as proposed under this alternative will incorporate all aspects pertaining the making of this stretch safer for road users and will improve road surface in the long term. This design alternative however only considers grade separation at the Wilgepark intersection at a later stage. Road safety at this intersection will therefore not improve, making the crossing unsafe and at high risk for accidents.	**Extent: Site (+1)** **Duration: Long term (+3)** **Intensity: High (+3)** **Probability: Highly probable (+2)** **Significance: Low (+9)**	No mitigations required.

Activity	Impact summary	Significance	Proposed mitigation
Activity	Impact summary	Significance	Proposed mitigation
Alternative DESIGN 1 (preferred alternative) – No-go option			
Upgrading of the N5 section, and construction of the R712 interchange and associated construction of access roads and upgrading of bridges	Safety measures need to be taken as the current road is deteriorating and poses safety risks to the public using the road. If the no-go alternative is decided on, the road will deteriorate further and the safety risk will increase.	**Extent: Site (-1)** **Duration: Long term (-3)** **Intensity: High (-4)** **Probability: Highly probable (-4)** **Significance: Low (-12)**	No mitigation proposed.

SUMMARY OF IMPACTS AND AVERAGE POINTS ALLOCATED TO EACH ALTERNATIVE DURING THE OPERATIONAL PHASE		
IMPACT (ACTIVITY)	**ALTERNATIVE 1**	**ALTERNATIVE 2**
Waste pollution	-5	-5
Road safety and social	+13	+9

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 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 1 (preferred alternative)

The likelihood of the expected impacts occurring will be low if all the recommended mitigation measures and Best Practices are implemented throughout all the phases of the project. Due to the nature of the proposed activity (i.e. rehabilitation of the existing road), the expected impacts will be temporary and localised to the part of the road under repair as well as to the temporary camp site (if necessary). If proper management measures are implemented during the Construction Phase in terms of the collection and disposal of

general waste, storage / handling of potential hazardous substances as well as the management of the temporary toilet facilities, the significance of the potential impacts expected to be associated with the repair of the road will be low.

Nuwejaarspruit and Wilge bridges

The existing bridges will be upgraded (including widened) and a new bridge is proposed at Murrey Street. The activities associated with the bridges will include the alteration of bed banks and the impeding of water flow. It should be noted that the impacts associated with these activities will be temporary (during the reparation of the existing bridges). The likelihood that these activities will occur is high. However, the impacts associated with the upgrading of the bridges will not be significant if proper mitigation measures are implemented, as these (possible erosion, loss of vegetation, etc) will be localised and no damming of stream water will occur.

The following mitigation measures will be implemented:

- Strict erosion control measures are to be taken to ensure no erosion of the bed or banks take place.
- Rehabilitation of the riparian habitat integrity by ensuring that during rehabilitation only indigenous shrubs and grasses are used in restoring the bio-diversity.
- Removal of alien vegetation.
- The bridge will be able to handle flow events upstream of the road to ensure unrestricted flow of runoff water.
- Precautionary measures will be taken to prevent the accidental discharge or spill of any product into the spruit.

R712 interchange, Wilge Park intersection and other new access roads

Construction work for the R712 interchange as well as the Wilge Park intersection will occur outside the current N5 road reserve. These new delineation footprints will have a permanent impact on the receiving land cover. Sensitive environments in close proximity to these new alignments include artificial wetlands, as well as the Wilge River. None of these environments will be directly impacted upon by the new alignments. However, strict mitigation measures as described in the EMP will have to be followed by the appointed contractor in order not to adversely degrade these environments.

Alternative 2

Impacts will be synonymous with the Preferred alternative (1) in the planning, design and construction phase.

However, in the operational phase, this alternative will not improve grade separation at the Wilgepark intersection, and therefore still leave the road users with a unsafe situation, and escalate traffic congestion on the N5 at this intersection. SANRAL has the mandate and

responsibility to maintain safe traffic flow on their national roads; these include roads passing through towns.

No-go alternative (compulsory)

The current status of the road poses a safety risk and does not accommodate the traffic volumes currently experienced. The status quo is therefore not preferred.

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	

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).

N/A

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.

1. **The key mitigation measure is that construction should be managed through the effective implementation of the Construction Environmental Management Program (EMP).**

2. **The following mitigation measures have been included in the Construction EMP:**

• Limit disturbance in the riverbed and the surrounding riparian zones when working on the Nuwejaarspruit and Wilge River bridges.
• Rehabilitate the disturbed areas after construction by planting suitable indigenous riparian vegetation.
• Remove invasive alien plants within the construction and disturbed areas.
• Monitor disturbed areas to prevent infestation by invasive alien plants after the construction phase is complete - ideally this should take place every 6 to 12 months for a 3-year period.
• Remove any temporary or disused in-stream structures immediately after completion of the construction phase.
• Prevent contaminated runoff from construction sites flowing directly into affected streams.
• Minimise the duration and extent of construction activities in the Wilge River and Nuwejaarspruit.
• Clear all construction debris and hard rubble associated with the construction activities after construction.
• Implement a dust control program to minimize the generation of dust, including spraying water on exposed surfaces and roads whenever required.
• Ensure that exposed areas and material stockpiles are adequately protected against wind.
• Maintain all construction machinery and vehicles in good working order so that noise is minimized.
• Adhere to any regulations and local by-laws regarding the generation of noise and hours of operation.
• Display warning signs and traffic control notifications well in advance on either side of the construction activity.

Is an EMPr attached?	YES	

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.

Samuel Pauw (Terra Works)
NAME OF EAP

SIGNATURE OF EAP

01 July 2014
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