

APPENDIX I – ALTERNATIVES – WRITTEN PROOF AND MOTIVATION

ALTERNATIVES – WRITTEN PROOF AND MOTIVATION

a. Preferred activity alternative

To rehabilitate the existing surface of the R504 Section 4 roadway footprint (7m wide) without any proposed geometric improvements.

The rehabilitation will consist of the following:

- Base patching and section rehabilitation (insitu recycling)
- Rut fill with Micro-surfacing and texture slurry
- Double Seal
- Shoulder shaping and re-compaction
- Existing cross-culverts are to be cleaned and some outlet channels to be excavated to allow culverts to daylight.
- Road-marking and road studs will be reinstated and new road signage will be replaced where required. Where guardrails are damaged or missing, it will be replaced and/or reinstated.
- Construction material will be commercially sourced.
- Upgrading of water crossings :

Leeudoringspruit Culvert (C0677)

- Minor rehabilitation and no widening of the structure will be required as part of the road upgrades.
- Spalling on the wing walls and headwalls will be repaired and the cracks in the wing walls sealed.
- The embankments should be backfilled with local material and protected by the provision of gabion mattresses.
- Addition of concrete side drains before and after the culvert to prevent future erosion of the embankments.
- Reparation of erosion in the stream bed by the installation of gabion mattresses both upstream and downstream
- Installation of new guardrails

Klipspruit Bridge (B1874)

- Backfilling of the eroded embankments
- Installation of gabion mattresses
- Reparation of minor spalling on piers and abutments
- Existing bridge joints to be replaced by Thorma-type joints.
- Existing steel railings be replaced with new F-shape parapets
- The addition of balustrade end-blocks will most likely be placed on the bridge deck, as no support walls were constructed as part of the existing abutments
- The settlement on the bridge approaches will be compensated for, and levelled out, during the re-surfacing of the road.

Vaal River Bridge (B28)

- Reparation of eroded south-eastern and North-western embankments
- The existing steel railings should be replaced with concrete F-shape type parapets
- Reparation of spalled piers to prevent further degradation of the pier columns with the possible introduction of additional skin of covercrete to the lower sections of the pier columns
- Coating and sealing of all columns to enhance protection of the piers from future degradation.

Advantages

The advantages of the preferred alternative are the following:

- It is simple to construct.
- It has a lower construction cost.
- The safety to the traveling public will be significantly improved.
- The upgraded water crossings will improve driving conditions and safety measures for road users.
- The environmental impact of the construction phase of the project is deemed to be low.

Disadvantages

The disadvantages of this alternative are the following:

- The upgrading of the R504 Section 4 will not alleviate traffic congestion currently experienced.

b. Activity Alternative 1

To rehabilitate and strengthen the existing base, infrastructure and surface of the R504 Section 4 roadway including proposed geometric improvements.

The rehabilitation and strengthening project will consist of the following:

- Strengthening of the existing pavement structure
- Constructing a new surfacing seal
- Widening of the existing paved area to accommodate two 3.7 m lanes + two 0.6 m paved shoulders + 1.7 m gravel shoulders with the same carriageway width of 12 m
- Realignment of one intersection requiring acquisition of land (T-Junction of D194 with R 504/4 at km 9.24)
- Upgrading the capacity of Major Culvert C0646 at km 14.59 (The addition of 7 cells x 3.6m W x 2.1m H for Class 3 road)
- Material will be sourced from a commercial source in Orkney or Stilfontein or a Quarry in Bamboesspruit

Advantages

The advantages of this alternative are the following:

- The safety to the traveling public will be significantly improved.
- Improved traffic flow, particularly during peak periods.
- Reduced congestion is anticipated
- The expanded main culvert will improve water flow and decrease the possibility of flooding.
- Improved travelling conditions will support economic growth.
- Environmental impacts of the construction phase is deemed to be low.

Disadvantages

The disadvantages of this alternative are the following:

- Higher construction costs making this alternative not economically viable.
- Existing and future estimated traffic volumes do not warrant the extensive upgrading.
- It is a more complicated construction method.
- The environmental impact at the main culvert construction site will be significantly higher during construction as a detour will have to be constructed allowing traffic through as there are no alternative roads for the R504 Section 4.

Site Selection Matrix

| Criteria | Preferred Alternative | Alternative 1 |
|------------------------------------|-----------------------|---------------|
| Low construction cost | Yes | No |
| Simple to construct | Yes | No |
| Low Environmental impact | Yes | Yes |
| Improve safety to traveling public | Yes | Yes |
| Improve traffic flow | Yes | Yes |
| Reduce congestion | Yes | Yes |