

BASIC ASSESSMENT REPORT FOR THE UPGRADING OF MAIN ROAD 254/1 FROM KM 0 TO KM 28

1. INTRODUCTION AND TERMS OF REFERENCE

Samani Consulting was requested by KwaZulu-Natal Department of Transport: Senior General Manager: Operations to undertake an assessment of Main Road 254 Section 1. The purpose of this assessment is to establish the existing conditions of the road.

2. FIELD WORK AND SCOPE OF ASSESSMENT

The field assessment was undertaken on the 20 February 2014 and comprised a drive-over survey of the road. The purpose of the driver-over survey was to ascertain the following existing conditions:

- ✿ The terrain through which the road passes;
- ✿ The horizontal and vertical alignment of the road;
- ✿ The nature of the gravel wearing course;
- ✿ The nature and effectiveness of storm water control measures; and
- ✿ Any other special features noted.

3. LOCALITY

P254/1 starts at the intersection with P22/1 and ends at the junction of P75/2 and P75/3. The road is 28 km long, passes through the Vulamehlo and Umzumbe RRTF Area and is part of the road network under jurisdiction of the Cost Centre Port Shepstone.

Start Coordinates: S – 30° 16,634'
 E – 30° 26,060'

End Coordinates: S – 30° 25,293'
 E – 30° 31,985'

4. TRIBAL AUTHORITY AND DEMOGRAPHICS

P 254/1 falls under the Dungeni Tribal Authority and passes through Wards 8 and 9 of the Vulamehlo Municipal Area and Ward 11 of the Umzumbe Municipal Area.

Between km 0 and km 9, the road passes through forestry areas and no houses are recorded along the road or in the catchment areas. From km 9 onwards, the density of houses increases with a medium to high density of houses located along the road and scattered in the catchment areas.

5. COMMUNITY FACILITIES

P254/1 provides access to three schools and the Mgyai Provincial Clinic. There are also several religious and informal trading facilities located along the road.

- Ekubusisweni Combined School;
- Gobume High School;
- Amahlaya Primary School.

6. EXISTING CONDITIONS

Road Category

Main Road 254/1 has been constructed to the KZN Department of Transport Type 6 District Gravel Road standards. The carriage width varies between 4.5m and 6.0 m. The road camber has in general been well maintained. However, at sharp bends and steep gradients, some deformation to the shape of the road has occurred.



Fig. 1: Well Maintained Road Camber



Fig 2: Deformation of road profile and formation of potholes

Terrain and Vertical and Horizontal Alignment

The first 9.0 kilometres of the road passes through gentle to semi-mountainous terrain. The road along this portion is characterised by shallow cuts and moderate road grades. From kilometre 9.0 onwards, the terrain becomes mountainous and road grades become steep to very steep. Approximately 20% of the road gradients from km 9.0 onwards exceed 8%. The side cuts range on average between 0.5 to 4 meters in height.

Horizontal curvatures along the first 9 kilometres are generally gentle but become sharp from kilometre 9 onwards due to the road passing through mountainous terrain.



Fig. 3: Sharp bends due to mountainous terrain.

Stormwater Control

Storm water is controlled mainly using V-shaped side drains. The side drains along the road are mostly over-grown and silted. Along steep gradients, severe erosions of the side drains have occurred due to increased surface flow velocity of storm water runoff.



Fig. 4: Over-grown and silted side drains

In areas where side drains are silted and over-grown, deep erosion channels have formed due to surface storm water flowing across the road.



Fig. 5: Formation of erosion channels

A number of storm water pipes are recorded. Most pipe inlets are silted and blocked and non-functional. A number of pipe crossings are recorded without any inlet and outlet structures.

Gravel Wearing Course

The gravel wearing course comprises semi-cohesive to non-cohesive Granite which varies in thickness between 0mm (where sub-grade is exposed) to 100mm. For most parts of the road, the gravel wearing course is generally well compacted and intact. However, at sharp bends and along steep gradients the gravel wearing course is loose making driving conditions at these points potentially dangerous due to poor tyre traction and poor skid resistance.



Fig. 6: Lack of gravel wearing course and exposed subgrade.

7. RIDABILITY

Ridability over most of the road length is rated as fair to good. In areas where potholes exist and along steep terrains where severe corrugations and erosion channels have formed, the ridability becomes poor and uncomfortable.

8. PROPOSED UPGRADING STANDARDS

The proposed upgrade to black top standards will consist of a Type 3 Standard Provincial Road with a 8.5m wide black top surface with full surface drainage, including kerb and channel and concrete lined v-drains. The design speed will be 60km/hr with the minimum horizontal radius of 110m and a minimum K value of 16. The minimum pipe size will be a 600mm diameter 100D Spigot and socket type with collar and 450mm diameter 100D at accesses to properties with the associated inlet and outlet structures.

9. STORMWATER MAJOR CATCHMENT

All major catchments will be analysed and the run offs calculated accordingly. The required culverts sizes will be determined and designed appropriately. At natural water courses and stream crossings, pipe crossings or low level causeways using portal culverts will be constructed with associated inlet and outlet structures.

The construction of gabion baskets is recommended at inlet and outlet structures to prevent any erosion. Gabion baskets will be constructed at outlets to prevent eroding of the side slopes.

10. PAVEMENT DESIGN

The pavement design is likely to be for a medium to high trafficked road. The pavement layers will likely be as follows:

- 19mm + 9.5mm Double Seal
- 150mm G2
- 150mm C4
- 2 X 150 Selected layers

A traffic count will be commissioned and the pavement structure will be designed in line with TRH4.

11. PROPOSED SCOPE OF WORK

The project calls for the construction of a Type 3 (8.5m wide blacktop) Provincial Road, approximately 28.0 km long that involves the following work:

- Site establishment and de-establishment.
- Traffic accommodation for construction under traffic and wherever possible the construction and maintenance of detours;
- Construction of a 150mm G7 upper and lower selected sub grade layer compacted to 95% Modified AASHTO density.
- Construction of surface drainage, kerbing and concrete lined V Drains
- Construction of a 150mm C4 Sub-Base course compacted to 97% modified AASHTO density.
- Construction of a 150mm (G2) Graded crushed stone Base course compacted to 102% modified AASHTO density.
- Sweeping and Priming
- Surfacing using a 19mm and 9.5mm double seal. It is proposed that an asphalt surfacing is applied along very steep road gradients and at sharp bends.
- Road Furniture and Ancillary works
- Finishing and Tidying the Road and Road reserve

12. IMPLEMENTATION STRATEGY

The road is to be implemented using a combination of Vukuzakhe contractors and established contractors. Contracts will be unbundled to maximise employment opportunities and job creations in line with the EPWP objectives.

13. COST ESTIMATE

P254/1: SUMMARY OF CONSTRUCTION COST ESTIMATE

Item	Description	Amount
1	P & G's	R 10 600 000.00
2	Accommodation of Traffic	R 4,500 000.00
3	Overhaul	R 5 800 000.00
4	Clearing & Grubbing	R 3 500 000.00
5	Drains	R 3 300 000.00
6	Prefabricated Culverts	R 10 600 000.00
7	Concrete kerbing, concrete channeling, chutes and down pipes, and concrete lining for open drains	R 8 500 000.00
8	Borrow Material	R 1 800 000.00
9	Mass earthworks	R 22 175 000.00
10	Pavement layers of gravel material	R 12 775 000.00
11	Stabilization	R 6 000 000.00
12	Crushed stone	R 12 500,000.00

13	Prime coat	R 1 900 000.00
14	Double Seals	R 14 500 000.00
	SUB TOTAL	R 118 450 000.00
	Add Construction Escalation 10%	R 23 690 000.00
	SUB TOTAL	R 142 140 000.00
	Add 14% VAT	R 19 899 600.00
	TOTAL CONSTRUCTION COST	R 162 039 600.00

14. IMPLEMENTATION PROGRAMME

The anticipated implementation programme is 4 years from approval by the Senior General Manager which allows for 10 months planning and design phase and 38 months construction period.

The following milestone dates are anticipated:

- 01/04/2014 Approval from Senior Manager: Operations
- 21/04/2014 Survey – Call for quotations
- 21/04/2014 EIA – Call for quotations and appoint EIA Consultant
- 21/07/2014 Appointment of Surveyor
- 31/10/2014 Survey Complete
- 10/11/2014 Start Design
- 28/02/2015 Design Complete
- 14/03/2015 Prepare Tender documents
- 17/04/2015 Site inspection
- 01/05/2015 Tender close
- 29/05/2015 Adjudication report
- 31/07/2015 Award of contracts
- 17/08/2015 Contractor on site
- 17/10/2018 Road Complete

We trust that the foregoing report meets with your approval.

Please do not hesitate to contact our offices should you require any further information

Yours Faithfully

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S. SAMLALL
 For **SAMANI CONSULTING**

APPENDIX A
LOCALITY PLAN