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Long Term Pavement Performance monitoring of High Modulus Asphalt (HiMA) trial section on South Coast Road in eThekweni:

April 2013 survey

Version: 1.0

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| Abstract: | | | | |
| In August 2011, a trial section was paved with the recently introduced High Modulus Asphalt (HiMA) technology on South Coast road in Durban. This report contains a record of the condition of the trial section, scheduled to be assessed at six-month intervals for a period of two years. This report contains the results for the 3 rd survey, performed 20 months after construction. The results of the 1 st and 2 nd survey performed are contained in the reports CSIR/BE/IE/ER/2012/0003/B and CSIR/BE/TIE/IR/2012/0037/B respectively. The report forms part of the long term pavement performance (LTPP) monitoring of the trial section for the Southern African bitumen association (Sabita) as per project proposal CSIR/BE/IE/EP/2011/0008/C. | | | | |
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1. Introduction

1.1 Background

In August 2011, a trial section was paved with the recently introduced High Modulus Asphalt (HiMA) technology on South Coast road in Durban. This report contains a record of the condition of the trial section, scheduled to be assessed at six-month intervals for a period of two years. This report contains the results for 3rd survey, performed 20 months after construction. The results of the 1st and 2nd survey performed are contained in the report CSIR/BE/IE/ER/2012/0003/B and CSIR/BE/TIE/IR/2012/0037/B respectively.

A third visual inspection on the trial section was conducted by Mr Matsopole Nkgapele and Mr Julius Komba on Friday 05 April 2013. This inspection was performed in accordance with the procedures stipulated in TMH 9: *Pavement management systems: Standard visual assessment manual for flexible pavements* (1992). The inspection was carried out from the start of the section (chainage 280) towards the intersection with Bayhead road (chainage 0) as done previously. Falling Weight Deflectometer (FWD) and profile data measurements taken by VNA Consulting (VNAC) are also presented. Analysis of the visual condition data was performed to track any distress development on the section. Furthermore, FWD data were used to back-calculate the stiffness of the pavement layers. The survey is aimed at monitoring the performance of HiMA over time and can also be used for determining the maintenance needs for the section.

1.2 Objectives

The objective of this report is to present the results and findings of the survey conducted in April 2013 (20 months after construction).

2. General findings on visual condition

The results of the visual inspection are shown in Appendix A (Tables 7 to 20). Photos taken during the inspection are provided in Appendix B (Figures 8 to 16) to show the condition of the Stone Mastic Asphalt (SMA) surfacing, which is paved on top of the HiMA layers. In general the condition of the trial section has not changed significantly from the previous survey. The overall condition of the pavement is rated as "good" with few defects of degree not more than 3 (condition not yet warning). No critical distresses were apparent during the inspection apart from a few distresses observed on the surfacing discussed below. The section appears to be performing well after 20 months under the heavy traffic situation.

The most common distress type observed appears to be flushing (bleeding) on the SMA surfacing. The layer appears to have densified even further under heavy traffic after the second survey. In general the voids appear to vary from none to few in some segments of both lanes. There seems to be deterioration in surface texture and polishing of aggregates by traffic action (some appear smooth and rounded) on the SMA, and this condition has deteriorated since the previous survey. The surface texture was found variable from fine to medium for almost the entire section in both lanes, hence skid resistance could be an issue during rainy weather conditions. The conditions of both surface drainage and side drainage (which some are blocked, forming localised ponding) are of a concern too and need attention. Ineffective run-off drainage was observed during the inspection which could exacerbate the problems with skid resistance, and possibly weaken the pavement structure.

3. Falling Weight Deflectometer results

A third round of Falling Weight Deflectometer (FWD) measurements were performed 20 months after construction by VNA Consulting on the 11th of April 2013. FWD data measured previously (just after construction, 6 months and 12 month after construction) are also included in this report. The raw FWD data are presented in Appendix D. Tables 1 to 4 present the deflection bowl parameters i.e. maximum deflection (Ymax), base layer index (BLI), middle layer index (MLI) and lower layer index (LLI) for FWD measurements performed just after construction, 6,12 and 20 months respectively. Figures 1 and 2 show plots of maximum deflections and surface temperatures for slow and fast lanes respectively. Overall, higher deflections values were measured after 6 months as compared to other inspection measurements (just after construction, 12 and 20 months). It is also observed that higher temperatures were measured during the 6 month inspection. It is difficult to explain the differences in deflections, although temperature could have played a role.

Table 1: Deflection bowl parameters 20 months after construction (April 2013)

| | Station (m) | Deflection Bowl Parameters (mm) | | | | Temperature (°C) | |
|---------------------|----------------|---------------------------------|-------|-------|-------|------------------|------|
| | | Ymax | BLI | MLI | LLI | Surface | Air |
| SLOW LANE | 0 | 0.162 | 0.018 | 0.029 | 0.024 | 28.8 | 20.5 |
| | 50 | 0.136 | 0.017 | 0.026 | 0.021 | 27.8 | 20.7 |
| | 100 | 0.154 | 0.023 | 0.030 | 0.025 | 28.7 | 20.8 |
| | 150 | 0.155 | 0.019 | 0.028 | 0.024 | 28.6 | 20.7 |
| | 200 | 0.136 | 0.036 | 0.033 | 0.019 | 28.4 | 20.7 |
| | 250 | 0.041 | 0.024 | 0.010 | 0.002 | 27.3 | 20.6 |
| | 270 | 0.016 | 0.006 | 0.002 | 0.001 | 27.4 | 20.6 |
| FAST LANE | 0 | 0.214 | 0.033 | 0.042 | 0.032 | 28.5 | 21 |
| | 50 | 0.133 | 0.021 | 0.029 | 0.022 | 28.3 | 21.5 |
| | 100 | 0.165 | 0.028 | 0.040 | 0.028 | 28.2 | 21.4 |
| | 150 | 0.139 | 0.018 | 0.026 | 0.022 | 27.7 | 21.4 |
| | 201 | 0.130 | 0.025 | 0.028 | 0.021 | 27.6 | 21.7 |
| | 251 | 0.035 | 0.011 | 0.012 | 0.003 | 27.6 | 21.6 |
| | 274 | 0.119 | 0.036 | 0.048 | 0.024 | 27.0 | 21.4 |
| TURNING LANE | 0 | 0.248 | 0.040 | 0.055 | 0.044 | 30.1 | 21.9 |
| | 10 | 0.019 | 0.010 | 0.004 | 0.001 | 28.8 | 21.7 |
| | 20 | 0.032 | 0.012 | 0.007 | 0.000 | 28.2 | 21.6 |
| | 30 | 0.028 | 0.013 | 0.005 | 0.000 | 28.2 | 22.1 |
| | 40 | 0.025 | 0.013 | 0.005 | 0.000 | 28.3 | 22.1 |
| | 50 | 0.024 | 0.016 | 0.002 | 0.000 | 28.1 | 22.0 |

Table 2: Deflection bowl parameters 12 months after construction (Sep 2012)

| | Station (m) | Deflection Bowl Parameters (mm) | | | | Temperature (°C) | |
|---------------------|----------------|---------------------------------|-------|-------|-------|------------------|------|
| | | Ymax | BLI | MLI | LLI | Surface | Air |
| SLOW LANE | 0 | 0.176 | 0.001 | 0.042 | 0.034 | 25.4 | 22.7 |
| | 3 | 0.156 | 0.010 | 0.032 | 0.026 | 25.7 | 22.7 |
| | 50 | 0.152 | 0.023 | 0.032 | 0.024 | 25.5 | 22.9 |
| | 100 | 0.168 | 0.025 | 0.035 | 0.030 | 26.1 | 22.8 |
| | 151 | 0.147 | 0.021 | 0.028 | 0.024 | 26.5 | 22.9 |
| | 200 | 0.104 | 0.017 | 0.023 | 0.017 | 26.4 | 23.0 |
| | 251 | 0.042 | 0.027 | 0.009 | 0.002 | 26.6 | 22.9 |
| | 275 | 0.018 | 0.011 | 0.002 | 0.000 | 25.8 | 22.8 |
| FAST LANE | 0 | 0.241 | 0.055 | 0.050 | 0.036 | 26.8 | 22.5 |
| | 50 | 0.136 | 0.029 | 0.029 | 0.022 | 26.9 | 22.7 |
| | 100 | 0.190 | 0.042 | 0.040 | 0.030 | 26.9 | 22.7 |
| | 157 | 0.145 | 0.025 | 0.030 | 0.019 | 27.9 | 22.9 |
| | 200 | 0.146 | 0.017 | 0.034 | 0.026 | 27.7 | 22.8 |
| | 252 | 0.036 | 0.015 | 0.007 | 0.002 | 26.3 | 22.2 |
| | 275 | 0.148 | 0.037 | 0.031 | 0.021 | 25.8 | 22.1 |
| | | | | | | | |
| TURNING LANE | 0 | 0.210 | 0.047 | 0.048 | 0.035 | 28.0 | 22.6 |
| | 20 | 0.048 | 0.029 | 0.007 | 0.001 | 27.5 | 22.5 |
| | 40 | 0.037 | 0.018 | 0.009 | 0.001 | 26.5 | 22.3 |
| | 60 | 0.125 | 0.027 | 0.023 | 0.019 | 26.2 | 22.2 |

Table 3: Deflection bowl parameters 6 months after construction (February 2012)

| | Station (m) | Deflection Bowl Parameters (mm) | | | | Temperature (°C) | |
|------------------|----------------|---------------------------------|-------|-------|-------|------------------|------|
| | | Ymax | BLI | MLI | LLI | Surface | Air |
| SLOW LANE | 0 | 0.224 | 0.054 | 0.050 | 0.032 | 37.1 | 30.2 |
| | 50 | 0.208 | 0.050 | 0.048 | 0.031 | 38.9 | 30.2 |
| | 100 | 0.239 | 0.054 | 0.056 | 0.038 | 39.2 | 30.0 |
| | 150 | 0.204 | 0.039 | 0.044 | 0.032 | 39.9 | 30.1 |
| | 200 | 0.142 | 0.035 | 0.031 | 0.020 | 40.7 | 29.9 |
| | 250 | 0.062 | 0.031 | 0.015 | 0.004 | 40.2 | 29.6 |
| | 300 | 0.031 | 0.021 | 0.002 | 0.000 | 40.5 | 29.5 |
| FAST LANE | 0 | 0.166 | 0.037 | 0.039 | 0.024 | 37.4 | 30.9 |
| | 50 | 0.189 | 0.048 | 0.046 | 0.027 | 38.0 | 30.7 |
| | 100 | 0.229 | 0.055 | 0.060 | 0.039 | 38.1 | 30.6 |
| | 150 | 0.203 | 0.047 | 0.048 | 0.033 | 38.4 | 30.7 |
| | 200 | 0.241 | 0.059 | 0.065 | 0.039 | 38.7 | 30.4 |
| | 250 | 0.069 | 0.059 | 0.003 | 0.001 | 38.2 | 29.8 |
| | 300 | 0.268 | 0.100 | 0.058 | 0.029 | 38.7 | 30.2 |

Table 4: Deflection bow parameters just after construction (October 2011)

| | Station (m) | Deflection Bowl Parameters (mm) | | | | Temperature (°C) | |
|------------------|----------------|---------------------------------|-------|-------|-------|------------------|------|
| | | Ymax | BLI | MLI | LLI | Surface | Air |
| SLOW LANE | 0 | 0.080 | 0.022 | 0.011 | 0.011 | 34.2 | 26.9 |
| | 50 | 0.169 | 0.056 | 0.028 | 0.023 | 34.2 | 26.9 |
| | 100 | 0.109 | 0.021 | 0.022 | 0.018 | 33.5 | 27.2 |
| | 150 | 0.153 | 0.026 | 0.033 | 0.026 | 32.8 | 27.2 |
| | 200 | 0.146 | 0.024 | 0.030 | 0.022 | 32.4 | 27.3 |
| | 250 | 0.144 | 0.019 | 0.026 | 0.020 | 31.5 | 27.5 |
| | 300 | 0.167 | 0.029 | 0.037 | 0.026 | 33 | 27.9 |
| FAST LANE | 0 | 0.124 | 0.028 | 0.026 | 0.019 | 33.6 | 25.8 |
| | 100 | 0.165 | 0.037 | 0.038 | 0.028 | 33.3 | 25.8 |
| | 150 | 0.180 | 0.033 | 0.038 | 0.033 | 33.9 | 26 |
| | 200 | 0.174 | 0.037 | 0.038 | 0.028 | 34.3 | 26.3 |
| | 250 | 0.145 | 0.030 | 0.030 | 0.022 | 33.7 | 26.4 |
| | 300 | 0.153 | 0.034 | 0.029 | 0.023 | 34 | 26.3 |

It should be noted that measurements were taken from the lower end of section towards the intersection with Bayhead road but the recorded chainages by VNAC recorded are in the opposite order to the marked ones on site (taking the starting point as 0 as opposed 280).

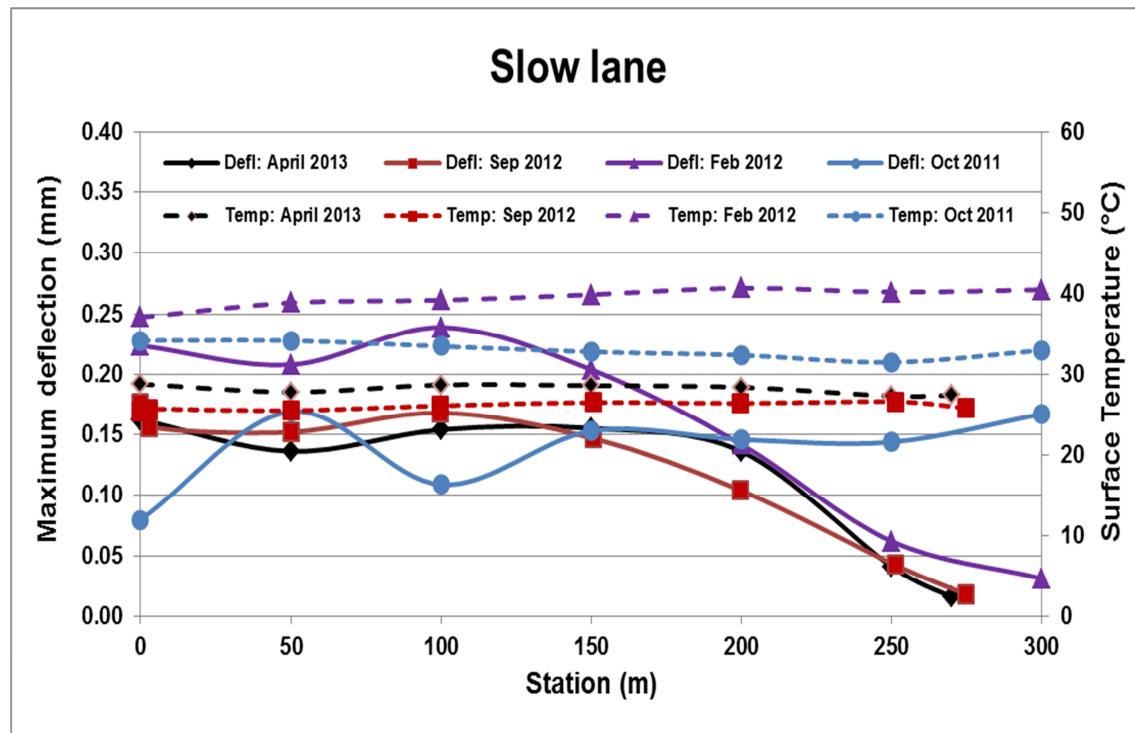


Figure 1: Maximum deflections and surface temperatures for the slow lane (40 kN load)

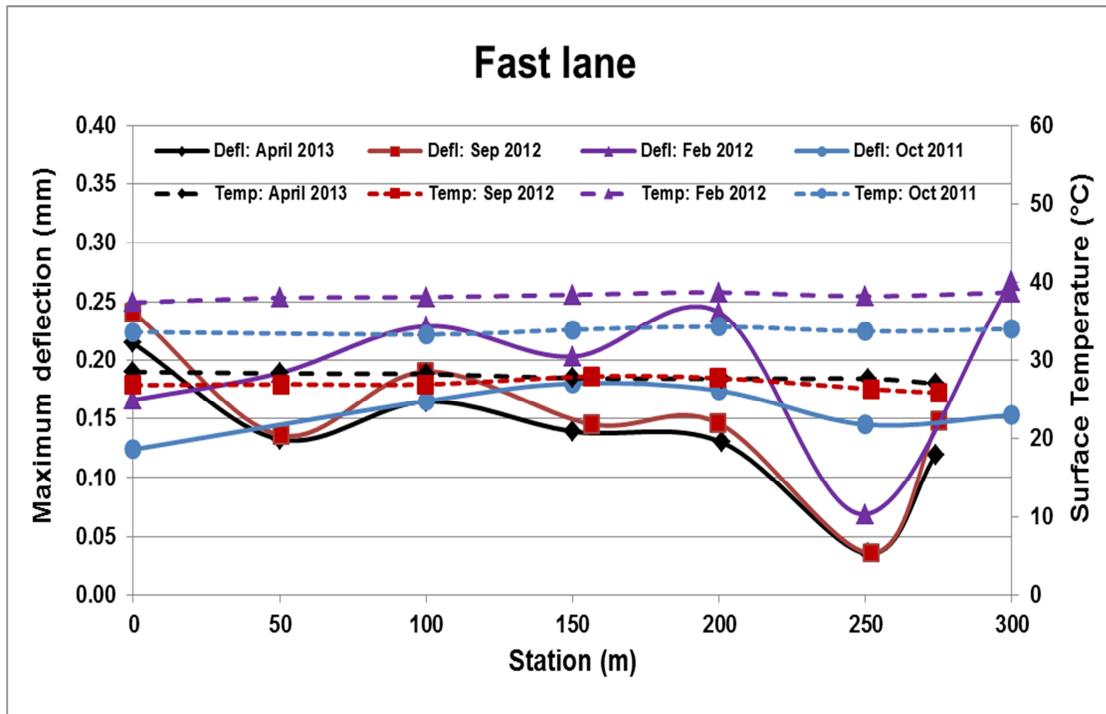


Figure 2: Maximum deflections and surface temperatures for the fast lane (40 kN load)

The FWD measurements were used to back-calculate the stiffness of the pavement layers using CSIR's latest version of BackGAMES software. Tables 5 to 8 present the average back-calculated stiffness of the pavement layers just after construction, 6, 12 and 20 months after construction respectively. Figures 3 and 4 show plots of the average stiffness values for fast and slow lanes, respectively. The average stiffness values for slow lane appear to be higher than those of the fast lane for both the SMA and the HiMA layers. It is also noted that the stiffness values calculated using 6 months deflection data are generally lower. This could be due to the fact that high deflections values were measured during the 6 months survey.

Table 5: Stiffness of pavement layers 20 months after construction (April 2013)

| | Average Stiffness (MPa) | | | | |
|------------------|-------------------------|-------|-------|---------|----------|
| | SMA | HIMA2 | HIMA1 | Macadam | Subgrade |
| Slow lane | 7277 | 17711 | 13455 | 1345 | 168 |
| Fast lane | 7375 | 18803 | 10874 | 628 | 158 |

Table 6: Stiffness of pavement layers 12 months after construction (September 2012)

| | Average Stiffness (MPa) | | | | |
|-----------|-------------------------|-------|-------|---------|----------|
| | SMA | HIMA2 | HIMA1 | Macadam | Subgrade |
| Slow lane | 7465 | 27482 | 16093 | 217 | 197 |
| Fast lane | 3178 | 12561 | 13633 | 547 | 187 |

Table 7: Stiffness of pavement layers 6 months after construction (February 2012)

| | Average Stiffness (MPa) | | | | |
|-----------|-------------------------|-------|-------|---------|----------|
| | SMA | HIMA2 | HIMA1 | Macadam | Subgrade |
| Slow lane | 832 | 10256 | 9238 | 503 | 160 |
| Fast lane | 772 | 8600 | 10416 | 414 | 185 |

Table 8: Stiffness of pavement layers just after construction (October 2011)

| | Average Stiffness (MPa) | | | | |
|-----------|-------------------------|-------|-------|---------|----------|
| | SMA | HIMA2 | HIMA1 | Macadam | Subgrade |
| Slow lane | 10085 | 23002 | 6562 | 1261 | 185 |
| Fast lane | 4730 | 15246 | 6706 | 891 | 191 |

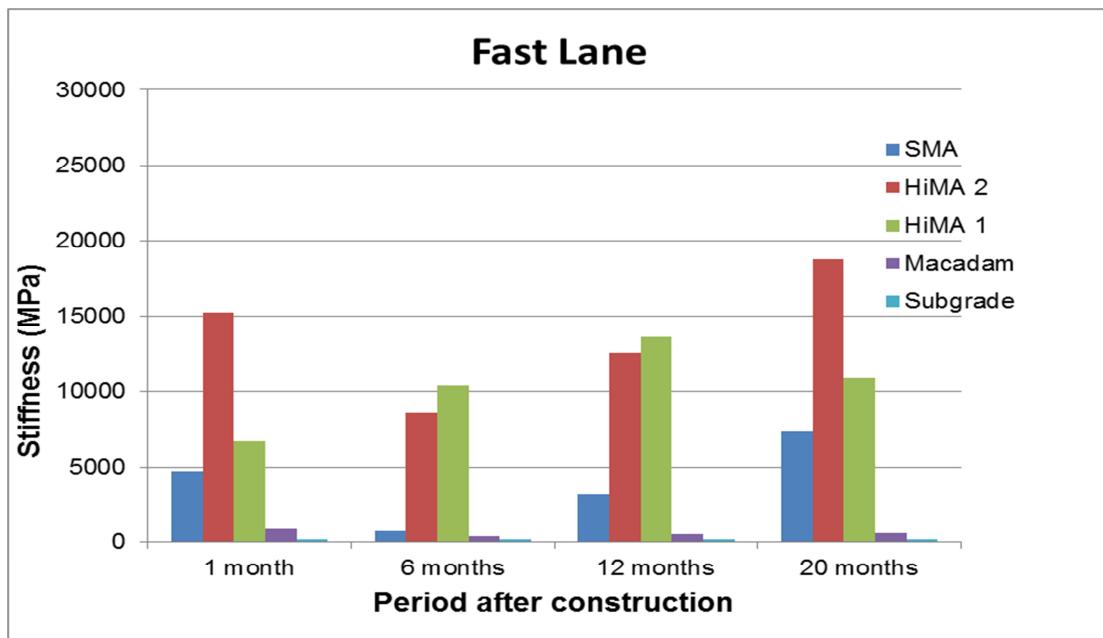


Figure 3: Pavement layer stiffness values for fast lane

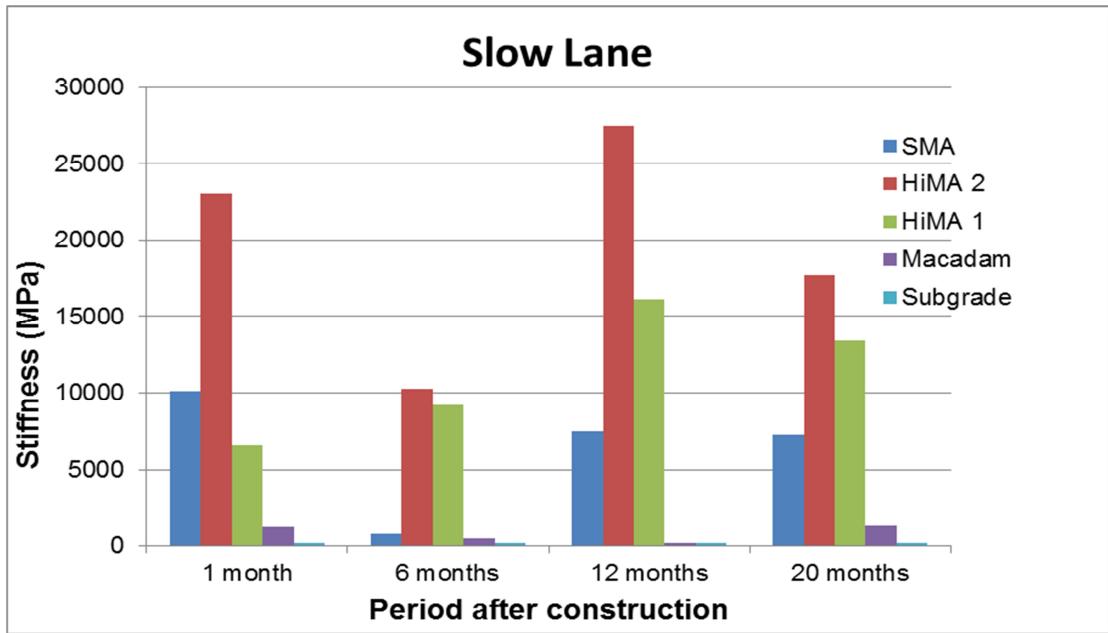


Figure 4: Pavement layer stiffness values for slow lane

4. Profilometer survey results

Appendix C contains the profile data measurements using the Digital laser profiler (DLP) performed by VNA Consulting. The DLP vehicle is driven at an average speed of 60km/h measuring rutting, International Roughness Index (IRI) and macro-texture at 20m intervals along the section.

4.1 Rutting

Several millimetres of rutting were recorded on the section for both lanes including the turning lane as shown in Figure 5, although this deformation seems to be limited to the SMA layer. Average rutting of 3.059 mm, 2.571mm and 5.497mm were measured in the slow, fast and turning lanes respectively. Analysis of the trend in permanent deformation has not been performed to detail, this will be performed after the last survey (August 2013), taking into account all the data from the time of construction.

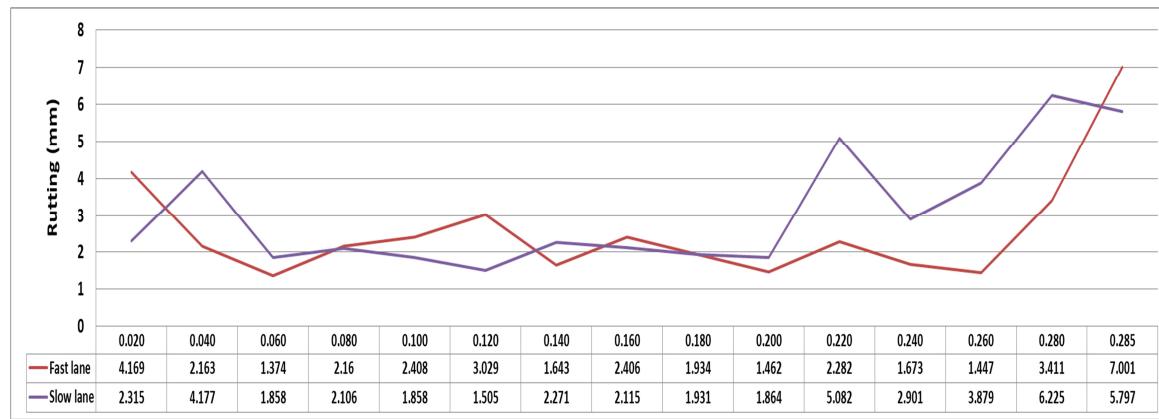


Figure 5: Rutting profile for slow and fast lanes

4.2 Mean Profile Depth

A summary of the measured Mean profile depth (MPD) related to the surface texture is contained in Appendix C. Figure 6 shows the average MPD values for the left and right wheel paths along the section for both lanes.

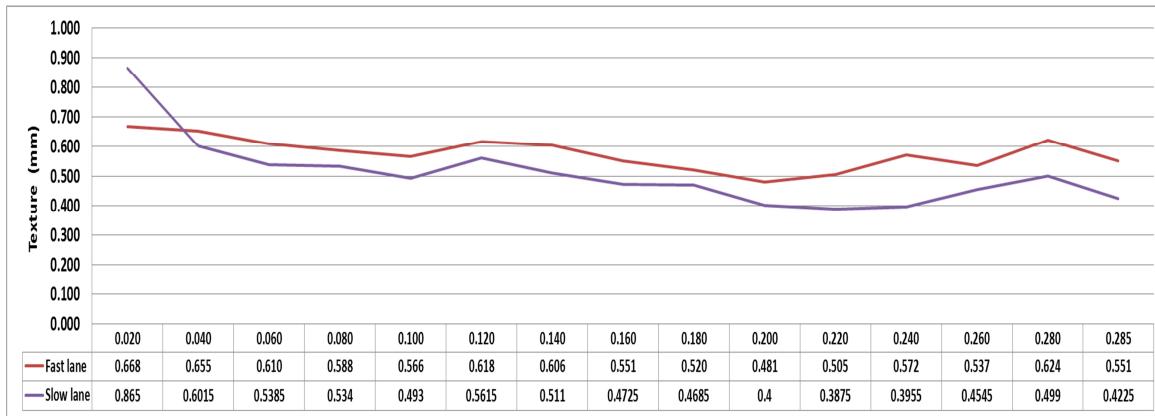


Figure 6: Mean profile depth for slow and fast lanes

4.3 Roughness

A summary of the measured roughness in terms of the International Roughness Index (IRI) is also contained in Appendix C. The roughness measured along the section averaged 1.999 m/km and 1.980 m/km for the slow lane and fast lane respectively. Figure 7 shows the average IRI measured along the section for both lanes.

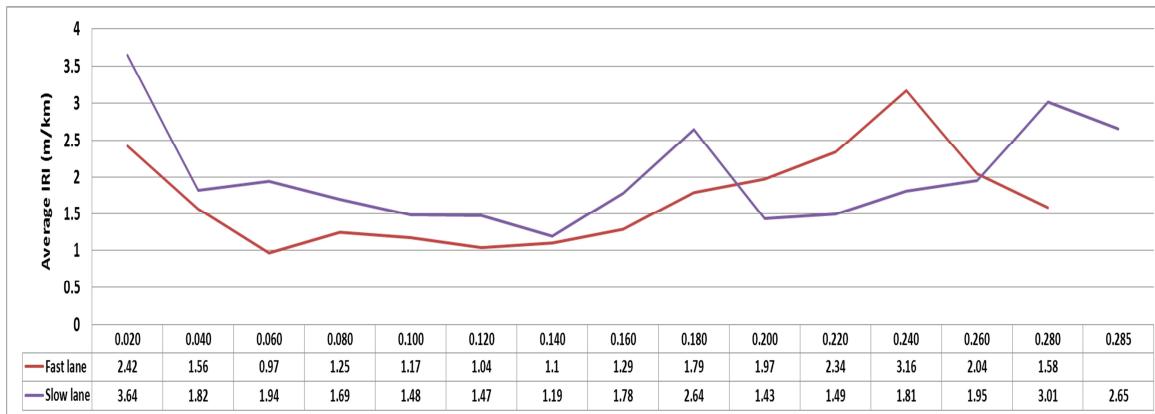


Figure 7: Roughness measurements for slow and fast lanes

Reference

TMH 9. 1992. *Pavement Management Systems: Standard Visual Assessment Manual for Flexible Pavements. CSRA.*

Appendix A: Visual condition ratings: From the lower end (chainage 280) towards the intersection (chainage 0)

Table 9: Slow lane - chainage 280 - 260

| Date | 05/04/2013 | | | | | | | | | |
|---|------------------------------------|---------------------------------|---|---|--------|--------|---|---|--------|--------|
| Surface Type | SMA | | | | | | | | | |
| Lane / Direction | Slow NorthBound | | | | | | | | | |
| Panel / Chainage | 280 - 260 metres from intersection | | | | | | | | | |
| Texture | Varying - Fine to medium | | | | | | | | | |
| Voids | Varying - None to few | | | | | | | | | |
| | Degree | | | | | Extent | | | | |
| | Slight | | | | Severe | Slight | | | Severe | Length |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| | | | | | | | | | | 5 |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| | | | | | | | | | | 5 |
| | Number of Patches & size | | | | | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| | | | | | | | | | | 5 |
| | Influencing Factors | | | | | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| | | | | | | | | | | 5 |
| | Drainage not effective | | | | | | | | | |
| Photos Taken (reference) | Number | Description | | | | | | | | |
| | 856 | General from 280 - 260 | | | | | | | | |
| | 857 | Texture in the outer wheel path | | | | | | | | |
| | 860 | Side drainage | | | | | | | | |
| Comments :- | | | | | | | | | | |
| Sunny weather condition during inspection | | | | | | | | | | |
| Inspection started at 11h00 | | | | | | | | | | |

Table 10: Fast lane - chainage 280 – 260

| Date | 05/04/2013 | | | | | | | | | | | | | | | |
|-----------------------|------------------------------------|---|---|---|--------|--------|---|---|---|--------|--------|--------------------------|------------------------|--|--------|--|
| Surface Type | SMA | | | | | | | | | | | | | | | |
| Lane / Direction | Fast NorthBound | | | | | | | | | | | | | | | |
| Panel / Chainage | 280 - 260 metres from intersection | | | | | | | | | | | | | | | |
| Texture | Varying - Fine to medium | | | | | | | | | | | | | | | |
| Voids | Varying - None to few | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number | |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| | | | | | | | | | | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| | | | | | | | | | | | | Number of Patches & size | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| | | | | | | | | | | | | Influencing Factors | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | Texture-fine/ Bleeding | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |

Table 11: Slow lane - chainage 260 - 240

| Date | 05/04/2013 | | | | | | | | | | | | | | |
|-------------------------------|------------------------------------|-----------------------------------|---|---|--------|--------|--------|-------------|---|--------|--------------------------|------------------------|-------|--|--------|
| Surface Type | SMA | | | | | | | | | | | | | | |
| Lane / Direction | Slow NorthBound | | | | | | | | | | | | | | |
| Panel / Chainage | 260 - 240 metres from intersection | | | | | | | | | | | | | | |
| Texture | Fine | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Centre of lane | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| | | | | | | | | | | | Number of Patches & size | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Influencing Factors | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Bleeding/ fine texture | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | |
| Photos Taken (reference) | Number | Description | | | | | Number | Description | | | | | | | |
| | | 863 Minor bleeding in wheel paths | | | | | | | | | | | | | |
| Comments :- | | | | | | | | | | | | | | | |
| Skid marks in the wheel paths | | | | | | | | | | | | | | | |

Table 12: Fast lane - chainage 260 - 240

| Date | 05/04/2013 | | | | | | | | | | | | | | | |
|--------------------------|------------------------------------|---|---|---|--------|--------|--------|-------------|---|--------|--------------------------|------------------------|-------|--|--------|--|
| Surface Type | SMA | | | | | | | | | | | | | | | |
| Lane / Direction | Fast NorthBound | | | | | | | | | | | | | | | |
| Panel / Chainage | 260 - 240 metres from intersection | | | | | | | | | | | | | | | |
| Texture | Medium | | | | | | | | | | | | | | | |
| Voids | Few | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number | |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Skid marks | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| | | | | | | | | | | | Number of Patches & size | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Influencing Factors | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Bleeding/ fine texture | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Photos Taken (reference) | Number | Description | | | | | Number | Description | | | | | | | | |
| | | 864 Spillage on the surfacing, in wheel paths | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

Table 13: Slow lane - chainage 240 - 200

| Date | 05/04/2013 | | | | | | | | | | | | | | | |
|-----------------------|------------------------------------|---|---|---|--------|--------|---|---|---|--------|--------|--|--------------------------|--|--------|----------|
| Surface Type | SMA | | | | | | | | | | | | | | | |
| Lane / Direction | Slow NorthBound | | | | | | | | | | | | | | | |
| Panel / Chainage | 240 - 200 metres from intersection | | | | | | | | | | | | | | | |
| Texture | Fine | | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number | |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| | | | | | | | | | | | | | Number of Patches & size | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| | | | | | | | | | | | | | Influencing Factors | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | Bleeding |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | |

Table 14: Fast lane - chainage 240 - 200

| Date | 05/04/2013 | | | | | | | | | | | | | | | | |
|-----------------------|------------------------------------|---|---|---|--------|--------|---|---|---|--------|--------|--------------------------|----------|--|--------|--|--|
| Surface Type | SMA | | | | | | | | | | | | | | | | |
| Lane / Direction | Fast NorthBound | | | | | | | | | | | | | | | | |
| Panel / Chainage | 240 - 200 metres from intersection | | | | | | | | | | | | | | | | |
| Texture | Varying - Fine to Medium | | | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number | | |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | Number of Patches & size | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | Influencing Factors | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | Bleeding | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |

Table 15: Slow lane - chainage 200 - 150

| Date | 05/04/2013 | | | | | | | | | | | | | | | | |
|-----------------------|------------------------------------|---|---|---|--------|--------|---|---|---|--------|--|--|------------------------|--|--------------------------|--|--------|
| Surface Type | SMA | | | | | | | | | | | | | | | | |
| Lane / Direction | Slow NorthBound | | | | | | | | | | | | | | | | |
| Panel / Chainage | 200 - 150 metres from intersection | | | | | | | | | | | | | | | | |
| Texture | Varying - Fine to Medium | | | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | | | Length | | Width | | Number |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | Wheel Paths | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| | | | | | | | | | | | | | | | Number of Patches & size | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| | | | | | | | | | | | | | | | Influencing Factors | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | Bleeding | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | Drainage not effective | | | | |

Table 16: Fast lane - chainage 200 - 150

| Date | 05/04/2013 | | | | | | | | | | | | | | | | |
|-----------------------|------------------------------------|---|---|---|---|--------|--------|---|---|---|---|--------------------------|--------|-------|--------|--|--|
| Surface Type | SMA | | | | | | | | | | | | | | | | |
| Lane / Direction | Fast NorthBound | | | | | | | | | | | | | | | | |
| Panel / Chainage | 200 - 150 metres from intersection | | | | | | | | | | | | | | | | |
| Texture | Medium | | | | | | | | | | | | | | | | |
| Voids | Few | | | | | | | | | | | | | | | | |
| | Degree | | | | | | Extent | | | | | | Length | Width | Number | | |
| | Slight | | | | | Severe | Slight | | | | | Severe | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | skid marks | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | in wheel paths | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | Number of Patches & size | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | Influencing Factors | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Bleeding | | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Blocked drain | | | | | |

Table 17: Slow & Fast lane - chainage 150 - 100

| Date | 05/04/2013 | | | | | | | | | | | | |
|--|------------------------------------|-------------|---|---|--------|--------|-------------|---|--------|---|--------|----------------|--------|
| Surface Type | SMA | | | | | | | | | | | | |
| Lane / Direction | Slow & Fast NorthBound | | | | | | | | | | | | |
| Panel / Chainage | 150 - 100 metres from intersection | | | | | | | | | | | | |
| Texture | Fine | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | Width | Number |
| | Slight | | | | Severe | Slight | | | Severe | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | skid marks | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | on wheel paths | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| | Number of Patchs & size | | | | | | | | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| | Influencing Factors | | | | | | | | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Bleeding | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| Photos Taken (reference) | Number | Description | | | | Number | Description | | | | | | |
| Comments :- | | | | | | | | | | | | | |
| Block crack has stabilized since the previous inspection | | | | | | | | | | | | | |

Table 18: Slow & Fast lane - chainage 100 - 60

| Date | 05/04/2013 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------------------------|-------------|---|---|--------|--------|--------|-------------|---|--------|--------|----------------------------|-------|--|--------|--|--|--|--|--|--|--|--|--|--|
| Surface Type | SMA | | | | | | | | | | | | | | | | | | | | | | | | |
| Lane / Direction | Slow & Fast NorthBound | | | | | | | | | | | | | | | | | | | | | | | | |
| Panel / Chainage | 100 - 60 metres from intersection | | | | | | | | | | | | | | | | | | | | | | | | |
| Texture | Fine | | | | | | | | | | | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number | | | | | | | | | | |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | | | | | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Skid marks | | | | | | | | | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | More severe in Wheel Paths | | | | | | | | | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| | Number of Patches & size | | | | | | | | | | | | | | | | | | | | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| | Influencing Factors | | | | | | | | | | | | | | | | | | | | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Bleeding | | | | | | | | | | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | |
| Photos Taken (reference) | Number | Description | | | | | Number | Description | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Comments :- | | | | | | | | | | | | | | | | | | | | | | | | | |
| SMA densely closed up - Standing traffic & engine heat. | | | | | | | | | | | | | | | | | | | | | | | | | |
| skid marks | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 19: Fast lane - chainage 100 - 60

| VISUAL ASSESSMENT | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------------------|-------------|---|---|---|--------|--------|-------------|---|---|--------|--------------------------|--------|--|--|--|--|--|--|--|--|--|--|
| Date | 21/08/2012 | | | | | | | | | | | | | | | | | | | | | | |
| Surface Type | SMA | | | | | | | | | | | | | | | | | | | | | | |
| Lane / Direction | Fast NorthBound | | | | | | | | | | | | | | | | | | | | | | |
| Panel / Chainage | 100 - 60 metres from intersection | | | | | | | | | | | | | | | | | | | | | | |
| Texture | Varying - Fine to medium | | | | | | | | | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | | | | | | | | | |
| | Degree | | | | | | Extent | | | | | | Length | | | | | | | | | | |
| | Slight | | | | | Severe | Slight | | | | Severe | | Width | | | | | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | Number | | | | | | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | as a result of spillages | | | | | | | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Undulation/Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| | Number of Patches & size | | | | | | | | | | | | | | | | | | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Influencing Factors | | | | | | | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | Bleeding | | | | | | | | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | |
| Photos Taken (reference) | Number | Description | | | | | Number | Description | | | | | | | | | | | | | | | |
| Comments :- | | | | | | | | | | | | | | | | | | | | | | | |
| More spillages (oil/fuel) resulting in more bleeding | | | | | | | | | | | | | | | | | | | | | | | |

Table 20: Slow, fast and turning lane - chainage 60 - 0

| Date | 05/04/2013 | | | | | | | | | | | | | | | | |
|---------------------|---------------------------------|---|---|---|--------|--------|---|---|---|--------|--------|--------------------------|----------|--|--------|--|--|
| Surface Type | SMA | | | | | | | | | | | | | | | | |
| Lane / Direction | Slow, Fast & Turning NorthBound | | | | | | | | | | | | | | | | |
| Panel / Chainage | 60 - 0 metres from intersection | | | | | | | | | | | | | | | | |
| Texture | Fine | | | | | | | | | | | | | | | | |
| Voids | Varying - None to Few | | | | | | | | | | | | | | | | |
| | Degree | | | | | Extent | | | | | Length | | Width | | Number | | |
| | Slight | | | | Severe | Slight | | | | Severe | | | | | | | |
| Mechanical Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Other Failure | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Bleeding/Flushing | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Surface Cracks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Binder Condition | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Aggregate Loss | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Cracks Blocks | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Longitudinal | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Transverse | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Crocodile | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Cracks Parabolic | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Pumping | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Rutting | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Settlement | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Edgebreak | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Potholes | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Delamination | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | Number of Patches & size | | | | | |
| Patching | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| | | | | | | | | | | | | Influencing Factors | | | | | |
| Riding Quality | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Skid Resistance | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | Bleeding | | | | |
| Surface Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| Side Drainage | 0 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |

Appendix B: Pictures taken during the inspection



Figure 8: General impression of the trial section



Figure 9: General texture on the surfacing (almost voidless)



Figure 10: Aggregates appear smooth and rounded, polishing by traffic action

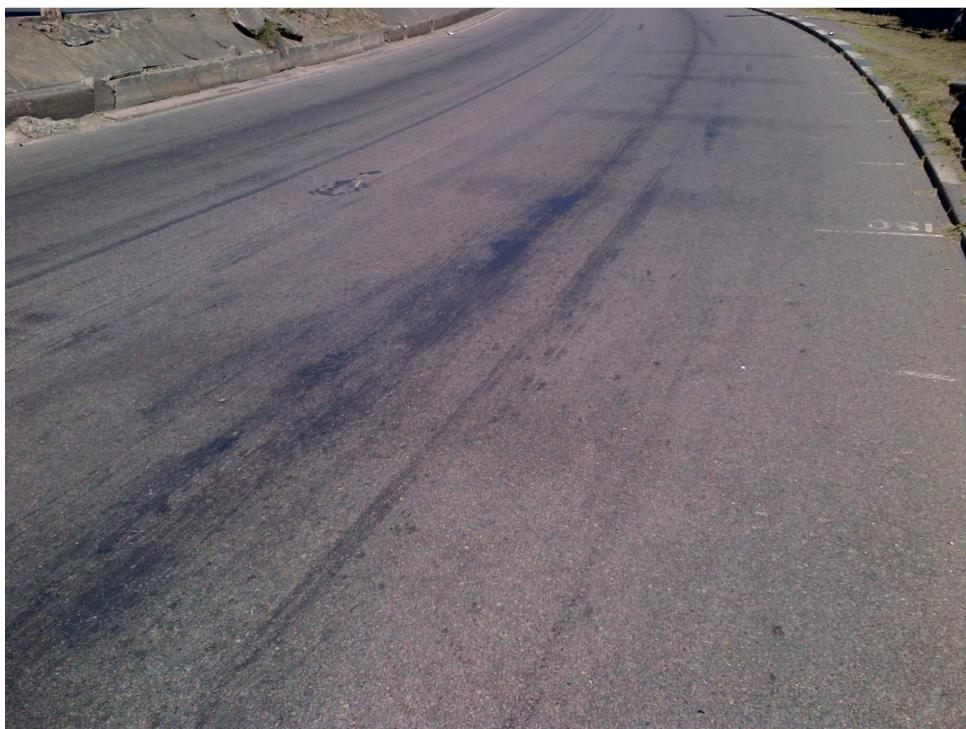


Figure 11: Flushing/bleeding in the wheel tracks



Figure 12: Block cracking observed with slight deformation, before and recently



Figure 13: Isolated spillages occurring frequently, some resulting in flushing



Figure 14: General impression of the section at intersection



Figure 15: Deformation with aggregate loss observed on the fast lane (just at the intersection)



Figure 16: Drainage problems on the bridge deck at the intersection

Appendix C: Recent & previous survey profile data

Table 21: Slow lane profile data

|  <p>ETHEKWINI MUNICIPALITY</p> | Road | South Coast Road | Location | HiMA Trial Section | DATA COMPILED BY:  | Surface Profile Data South Coast Road Slow Lane | | | | | | | | | | | | | |
|--|-----------------------------------|------------------|------------------------------|------------------------------------|---|--|-------------------|-------------------|-------------------|------------------|------------------|-----------|----------|---------|----------|----------------|-----------------|--------------|--------|
| | Start Chainage | 0 | Region | Durban | | | | | | | | | | | | | | | |
| | End Chainage | 0.285 | DC | - | | | | | | | | | | | | | | | |
| | Total Length Surveyed (km) | 0.285 | District Municipality | eThekwin Municipality | | | | | | | | | | | | | | | |
| | Lane | Slow Lane | KZ | - | | | | | | | | | | | | | | | |
| | Date Surveyed | 17/4/2013 | Local Municipality | eThekwin Metropolitan Municipality | | | | | | | | | | | | | | | |
| | Time | 09h41 | | | | | | | | | | | | | | | | | |
| Chainage (km) | Rutting | | | SMTD Texture | | | | MPD Texture | | | | Roughness | | | | Co-ordinates | | | Events |
| | Rut Right | Rut Left | Rut Lane | SMTD Texture Right | SPTD Texture Right | SMTD Texture Left | SPTD Texture Left | MPD Texture Right | ETD Texture Right | MPD Texture Left | ETD Texture Left | IRI Right | IRI Left | IRI Avg | IRI Lane | Latitude (deg) | Longitude (deg) | Altitude (m) | |
| 0.020 | 2.273 | 0.744 | 2.315 | 0.496 | 1.235 | 0.595 | 1.479 | 0.767 | 0.814 | 0.963 | 0.97 | 4.79 | 2.48 | 3.64 | 3.14 | -29.8877995 | 30.98911325 | 6 | |
| 0.040 | 4.176 | 0.692 | 4.177 | 0.376 | 0.942 | 0.401 | 1.002 | 0.587 | 0.67 | 0.616 | 0.693 | 2.02 | 1.62 | 1.82 | 1.59 | -29.8876536 | 30.98922874 | 6.4 | |
| 0.060 | 1.855 | 0.366 | 1.858 | 0.359 | 0.899 | 0.354 | 0.888 | 0.555 | 0.644 | 0.522 | 0.618 | 1.92 | 1.95 | 1.94 | 1.67 | -29.8874983 | 30.98932631 | 7 | |
| 0.080 | 2.092 | 0.711 | 2.106 | 0.34 | 0.854 | 0.375 | 0.938 | 0.516 | 0.613 | 0.552 | 0.642 | 2.05 | 1.33 | 1.69 | 1.45 | -29.8873333 | 30.98940245 | 7.5 | |
| 0.100 | 1.751 | 0.834 | 1.858 | 0.326 | 0.819 | 0.295 | 0.743 | 0.509 | 0.608 | 0.477 | 0.582 | 1.52 | 1.43 | 1.48 | 1.19 | -29.8871622 | 30.98945531 | 8.3 | |
| 0.120 | 0.907 | 1.387 | 1.505 | 0.339 | 0.852 | 0.394 | 0.985 | 0.501 | 0.601 | 0.622 | 0.697 | 1.37 | 1.56 | 1.47 | 1.33 | -29.8869882 | 30.9894938 | 9.3 | |
| 0.140 | 1.194 | 2.245 | 2.271 | 0.304 | 0.766 | 0.355 | 0.89 | 0.452 | 0.562 | 0.57 | 0.656 | 1.22 | 1.15 | 1.19 | 1.1 | -29.8868139 | 30.98953132 | 10.3 | |
| 0.160 | 1.811 | 1.861 | 2.115 | 0.267 | 0.674 | 0.321 | 0.807 | 0.425 | 0.54 | 0.52 | 0.616 | 1.94 | 1.62 | 1.78 | 1.53 | -29.8866394 | 30.98957195 | 11.1 | |
| 0.180 | 1.183 | 1.842 | 1.931 | 0.288 | 0.727 | 0.3 | 0.755 | 0.456 | 0.565 | 0.481 | 0.585 | 2.65 | 2.64 | 2.64 | 2.54 | -29.8864661 | 30.9896252 | 11.8 | |
| 0.200 | 1.788 | 1.132 | 1.864 | 0.202 | 0.514 | 0.282 | 0.712 | 0.317 | 0.454 | 0.483 | 0.587 | 1.78 | 1.08 | 1.43 | 1.3 | -29.8863056 | 30.98971735 | 12.2 | |
| 0.220 | 5.082 | 0.353 | 5.082 | 0.245 | 0.619 | 0.222 | 0.563 | 0.418 | 0.535 | 0.357 | 0.485 | 1.85 | 1.12 | 1.49 | 1.32 | -29.8861639 | 30.98984156 | 12.6 | |
| 0.240 | 2.898 | 0.722 | 2.901 | 0.237 | 0.6 | 0.229 | 0.581 | 0.421 | 0.537 | 0.37 | 0.496 | 2.13 | 1.48 | 1.81 | 1.52 | -29.8860311 | 30.98997956 | 12.8 | |
| 0.260 | 3.879 | 1.072 | 3.879 | 0.263 | 0.663 | 0.262 | 0.662 | 0.461 | 0.569 | 0.448 | 0.558 | 1.83 | 2.07 | 1.95 | 1.63 | -29.8859026 | 30.99012122 | 12.7 | |
| 0.280 | 6.225 | 0.961 | 6.225 | 0.276 | 0.696 | 0.311 | 0.782 | 0.484 | 0.587 | 0.514 | 0.611 | 3.19 | 2.83 | 3.01 | 2.65 | -29.8857736 | 30.99026357 | 12.6 | |
| 0.285 | 5.797 | 0.738 | 5.797 | 0.243 | 0.616 | 0.252 | 0.637 | 0.433 | 0.546 | 0.412 | 0.529 | 3.18 | 2.11 | 2.65 | 2.35 | -29.8857403 | 30.9903002 | 12.6 | |
| Average | 2.861 | 1.044 | 3.059 | 0.304 | 0.765 | 0.330 | 0.828 | 0.487 | 0.590 | 0.527 | 0.622 | | | | | | | | |

|  | Road | South Coast Road | | | Location | HiMA Trial Section | | DATA COMPILED BY:  | Surface Profile Data <u>South Coast Road</u> <u>Left Lane</u> | | | | | | | | | |
|---|-----------------------------------|------------------|----------|---------------------|------------------------------|------------------------------------|--------------------|---|--|------------------|------------------|-----------|---------------------|---------|----------------|-----------------|--------------|---------------------------|
| | Start Chainage | 0.000 | | | Region | Durban | | | | | | | | | | | | |
| | End Chainage | 0.304 | | | DC | - | | | | | | | | | | | | |
| | Total Length Surveyed (km) | 0.304 | | | District Municipality | eThekwin Municipality | | | | | | | | | | | | |
| | Lane | Left Lane | | | KZ | - | | | | | | | | | | | | |
| | Date Surveyed | 10-09-2012 | | | Local Municipality | eThekwin Metropolitan Municipality | | | | | | | | | | | | |
| | Time | 09:51 | | | | | | | | | | | | | | | | |
| Chainage (km) | Rutting | | | SMTD Texture | | | MPD Texture | | | Roughness | | | Co-ordinates | | | Events | | |
| | Rut Right | Rut Left | Rut Lane | SMTD Texture Right | SPTD Texture Right | SMTD Texture Left | SPTD Texture Left | MPD Texture Right | ETD Texture Right | MPD Texture Left | ETD Texture Left | IRI Right | IRI Left | IRI Avg | Latitude (deg) | Longitude (deg) | Altitude (m) | |
| 0.100 | 2.960 | 2.740 | 3.940 | 0.361 | 0.904 | 0.316 | 0.793 | 0.511 | 0.608 | 0.467 | 0.574 | 2.58 | 2.25 | 2.42 | -29.88733272 | 30.98937905 | 7.6 | ASPHALT, TWO LANES |
| 0.200 | 1.270 | 5.640 | 5.660 | 0.322 | 0.810 | 0.374 | 0.936 | 0.426 | 0.540 | 0.554 | 0.643 | 1.51 | 1.47 | 1.49 | -29.88646709 | 30.98960814 | 11.5 | |
| 0.300 | 4.130 | 4.070 | 4.960 | 0.256 | 0.647 | 0.248 | 0.627 | 0.417 | 0.533 | 0.388 | 0.510 | X | X | X | -29.88576961 | 30.99024747 | 12.5 | NO LINES, BRIDGE ABUTMENT |
| 0.304 | 3.130 | 1.980 | 3.190 | 0.269 | 0.679 | 0.229 | 0.581 | 0.418 | 0.534 | 0.342 | 0.474 | 12.83 | 6.73 | 9.78 | -29.88574562 | 30.99027351 | 12.5 | |
| Average | 2.9 | 3.6 | 4.4 | 0.3 | 0.8 | 0.3 | 0.7 | 0.4 | 0.6 | 0.4 | 0.6 | 5.6 | 3.5 | 4.6 | | | | |

Table 22: Fast lane profile data

|  <p>ETHEKWINI MUNICIPALITY</p> | Road | | South Coast Road | | Location | | HiMA Trial Section | | | | DATA COMPILED BY:  | Surface Profile Data | | | | | | | |
|--|-----------------------------------|----------|------------------|--------------------------|------------------------------|-------------------------|-------------------------------------|-------------------------|-------------------------|------------------------|---|-----------------------------|----------|---------|---------------|----------------|-----------------|--------------|--|
| | Start Chainage | | 0 | | Region | | Durban | | | | | | | | | | | | |
| | End Chainage | | 0.286 | | DC | | - | | | | | | | | | | | | |
| | Total Length Surveyed (km) | | 0.286 | | District Municipality | | eThekwini Municipality | | | | | | | | | | | | |
| | Lane | | Fast Lane | | KZ | | - | | | | | | | | | | | | |
| | Date Surveyed | | 17/4/2013 | | Local Municipality | | eThekwini Metropolitan Municipality | | | | | | | | | | | | |
| | Time | | 09h47 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Chainage (km) | Rutting | | | SMTD Texture | | | | MPD Texture | | | | Roughness | | | Events | | | | |
| | Rut Right | Rut Left | Rut Lane | SMTD Texture Right | Texture Right | SMTD Texture Left | SPTD Texture Left | MPP Texture Right | ETD Texture Right | MPD Texture Left | ETD Texture Left | IRI Right | IRI Left | IRI Avg | IRI Lane | Latitude (deg) | Longitude (deg) | Altitude (m) | |
| 0.020 | 4.167 | 1.138 | 4.169 | 0.433 | 1.08 | 0.399 | 0.997 | 0.662 | 0.729 | 0.673 | 0.738 | 2.45 | 2.39 | 2.42 | 2.15 | -29.88781949 | 30.98914036 | 5.7 | |
| 0.040 | 2.148 | 0.833 | 2.163 | 0.394 | 0.984 | 0.414 | 1.033 | 0.625 | 0.7 | 0.684 | 0.747 | 1.6 | 1.51 | 1.56 | 1.41 | -29.88767335 | 30.98925482 | 6.2 | |
| 0.060 | 1.361 | 0.519 | 1.3/4 | 0.38 | 0.95 | 0.383 | 0.959 | 0.5/6 | 0.661 | 0.643 | 0.715 | 0.8 | 1.15 | 0.9/ | 0.86 | -29.88751/36 | 30.9893522/ | 6.6 | |
| 0.080 | 2.132 | 0.792 | 2.16 | 0.361 | 0.904 | 0.359 | 0.899 | 0.575 | 0.66 | 0.601 | 0.681 | 1.26 | 1.24 | 1.25 | 0.9 | -29.88735537 | 30.98943046 | 7.1 | |
| 0.100 | 2.405 | 0.721 | 2.408 | 0.339 | 0.852 | 0.335 | 0.84 | 0.543 | 0.635 | 0.589 | 0.672 | 1.26 | 1.08 | 1.17 | 1.01 | -29.88718505 | 30.98948516 | 7.8 | |
| 0.120 | 3.026 | 1.201 | 3.029 | 0.38 | 0.95 | 0.376 | 0.941 | 0.586 | 0.669 | 0.65 | 0.72 | 0.87 | 1.22 | 1.04 | 0.9 | -29.88701162 | 30.98952618 | 8.6 | |
| 0.140 | 1.366 | 1.26 | 1.643 | 0.369 | 0.923 | 0.365 | 0.915 | 0.592 | 0.673 | 0.619 | 0.695 | 0.84 | 1.36 | 1.1 | 0.93 | -29.88683759 | 30.989564 | 9.4 | |
| 0.160 | 2.297 | 1.187 | 2.406 | 0.329 | 0.826 | 0.327 | 0.82 | 0.548 | 0.638 | 0.553 | 0.643 | 1.19 | 1.39 | 1.29 | 1.21 | -29.886662/3 | 30.98960485 | 10.2 | |
| 0.180 | 10.047 | 1.173 | 10.051 | 0.313 | 0.787 | 0.281 | 0.708 | 0.551 | 0.641 | 0.488 | 0.591 | 1.65 | 1.94 | 1.79 | 1.61 | -29.88648945 | 30.98965797 | 10.9 | |
| 0.200 | 1.401 | 0.951 | 1.462 | 0.267 | 0.675 | 0.266 | 0.671 | 0.478 | 0.583 | 0.484 | 0.587 | 1.62 | 2.32 | 1.97 | 1.72 | -29.88632603 | 30.98974276 | 11.5 | |
| 0.220 | 1.326 | 2.017 | 2.282 | 0.269 | 0.679 | 0.3 | 0.754 | 0.488 | 0.59 | 0.522 | 0.618 | 2.16 | 2.53 | 2.34 | 2.15 | -29.88618112 | 30.98986418 | 12 | |
| 0.240 | 1.547 | 0.857 | 1.673 | 0.288 | 0.725 | 0.386 | 0.967 | 0.526 | 0.621 | 0.617 | 0.694 | 3.28 | 3.05 | 3.16 | 2.97 | -29.88604881 | 30.99000239 | 12.2 | |
| 0.260 | 1.311 | 0.763 | 1.447 | 0.283 | 0.713 | 0.343 | 0.861 | 0.498 | 0.598 | 0.576 | 0.661 | 1.93 | 2.14 | 2.04 | 1.86 | -29.88591963 | 30.99014434 | 12.2 | |
| 0.280 | 3.407 | 0.509 | 3.411 | 0.357 | 0.896 | 0.347 | 0.871 | 0.63 | 0.704 | 0.617 | 0.693 | 1.78 | 1.39 | 1.58 | 1.28 | -29.88579047 | 30.99028476 | 12.1 | |
| 0.286 | 6.661 | 2.817 | 7.001 | 0.364 | 0.911 | 0.284 | 0.716 | 0.607 | 0.686 | 0.495 | 0.596 | 5.23 | 6.81 | 6.02 | 5.32 | -29.88575353 | 30.99032463 | 12.1 | |
| Average | 2.973 | 1.116 | 3.112 | 0.342 | 0.857 | 0.344 | 0.863 | 0.566 | 0.653 | 0.587 | 0.670 | | | | | | | | |

|  | Road | South Coast Road | | | Location | HiMA Trial Section | | DATA COMPILED BY:  | Surface Profile Data <u>South Coast Road</u> <u>Left Lane</u> | | | | | | | | |
|---|-----------------------------------|------------------|----------|--------------------|------------------------------|-------------------------------------|-------------------|---|--|------------------|------------------|-----------|--------------|---------|----------------|---------------|-----------------|
| | Start Chainage | 0.000 | | | Region | Durban | | | | | | | | | | | |
| | End Chainage | 0.305 | | | DC | - | | | | | | | | | | | |
| | Total Length Surveyed (km) | 0.305 | | | District Municipality | eThekweni Municipality | | | | | | | | | | | |
| | Lane | Left Lane | | | KZ | - | | | | | | | | | | | |
| | Date Surveyed | 10-09-2012 | | | Local Municipality | eThekweni Metropolitan Municipality | | | | | | | | | | | |
| | Time | 09:58 | | | | | | | | | | | | | | | |
| Chainage (km) | Rutting | | | SMTD Texture | | | MPD Texture | | | Roughness | | | Co-ordinates | | | Events | |
| | Rut Right | Rut Left | Rut Lane | SMTD Texture Right | SPTD Texture Right | SMTD Texture Left | SPTD Texture Left | MPD Texture Right | ETD Texture Right | MPD Texture Left | ETD Texture Left | IRI Right | IRI Left | IRI Avg | Latitude (deg) | | Longitude (deg) |
| 0.100 | 3.320 | 5.420 | 5.750 | 0.296 | 0.745 | 0.384 | 0.961 | 0.435 | 0.548 | 0.569 | 0.656 | 3.11 | 3.67 | 3.39 | -29.88735601 | 30.98941036 | 8.1 |
| 0.200 | 1.600 | 1.840 | 2.180 | 0.339 | 0.851 | 0.342 | 0.859 | 0.516 | 0.613 | 0.555 | 0.644 | 1.05 | 1.27 | 1.16 | -29.88649142 | 30.98964474 | 11.7 |
| 0.300 | 2.110 | 1.690 | 2.340 | 0.323 | 0.810 | 0.299 | 0.752 | 0.556 | 0.645 | 0.467 | 0.573 | X | X | X | -29.88577294 | 30.99030232 | 13.1 |
| 0.305 | 6.030 | 0.990 | 6.030 | 0.586 | 1.456 | 0.285 | 0.718 | 0.856 | 0.885 | 0.506 | 0.605 | X | X | X | -29.88574318 | 30.99033446 | 13.1 |
| Average | 3.3 | 2.5 | 4.1 | 0.4 | 1.0 | 0.3 | 0.8 | 0.6 | 0.7 | 0.5 | 0.6 | 2.1 | 2.5 | 2.3 | | | |

Table 23: Turning lane profile data

|  ETHEKWINI MUNICIPALITY | Road | South Coast Road | | | Location | HiMA Trial Section | | | | DATA COMPILED BY:  | Surface Profile Data <u>South Coast Road</u> Turning lane | | | | | | | | | |
|--|-----------------------------------|------------------|----------|---------------------|------------------------------|-------------------------------------|-------------------|--------------------|-------------------|---|--|------------------|----------|---------------------|----------|-----------------|----------------|-----------------|--------------|--|
| | Start Chainage | 0 | | | Region | Durban | | | | | | | | | | | | | | |
| | End Chainage | 0.055 | | | DC | - | | | | | | | | | | | | | | |
| | Total Length Surveyed (km) | 0.055 | | | District Municipality | eThekweni Municipality | | | | | | | | | | | | | | |
| | Lane | Turning lane | | | KZ | - | | | | | | | | | | | | | | |
| | Date Surveyed | 17/4/2013 | | | Local Municipality | eThekweni Metropolitan Municipality | | | | | | | | | | | | | | |
| | Time | 09h53 | | | | | | | | | | | | | | | | | | |
| Chainage (km) | Rutting | | | SMTD Texture | | | | MPD Texture | | | | Roughness | | Co-ordinates | | | Events | | | |
| | Rut Right | Rut Left | Rut Lane | SMTD Texture Right | SPTD Texture Right | SMTD Texture Left | SPTD Texture Left | MPD Texture Right | ETD Texture Right | MPD Texture Left | ETD Texture Left | IRI Right | IRI Left | IRI Avg | IRI Lane | IRI Centre Lane | Latitude (deg) | Longitude (deg) | Altitude (m) | |
| 0.055 | 5.487 | 0.968 | 5.497 | 0.687 | 1.704 | 0.56 | 1.391 | 1.13 | 1.104 | 0.997 | 0.997 | | | | | | -29.88574504 | 30.99034593 | 10.3 | |
| Average | 5.487 | 0.968 | 5.497 | 0.687 | 1.704 | 0.560 | 1.391 | 1.130 | 1.104 | 0.997 | 0.997 | | | | | | | | | |

|  ETHEKWINI MUNICIPALITY | Road | South Coast Road | | | Location | HiMA Trial Section | | | | DATA COMPILED BY:  | Surface Profile Data <u>South Coast Road</u> Turning Lane | | | | | | | | | | |
|--|-----------------------------------|------------------|----------|---------------------|------------------------------|-------------------------------------|-------------------|--------------------|-------------------|---|--|------------------|----------|---------------------|----------------|-----------------|---------------|--|--|--|--|
| | Start Chainage | 0.000 | | | Region | Durban | | | | | | | | | | | | | | | |
| | End Chainage | 0.074 | | | DC | - | | | | | | | | | | | | | | | |
| | Total Length Surveyed (km) | 0.074 | | | District Municipality | eThekweni Municipality | | | | | | | | | | | | | | | |
| | Lane | Turning Lane | | | KZ | - | | | | | | | | | | | | | | | |
| | Date Surveyed | 10-09-2012 | | | Local Municipality | eThekweni Metropolitan Municipality | | | | | | | | | | | | | | | |
| | Time | 10h43 | | | | | | | | | | | | | | | | | | | |
| Chainage (km) | Rutting | | | SMTD Texture | | | | MPD Texture | | | | Roughness | | Co-ordinates | | | Events | | | | |
| | Rut Right | Rut Left | Rut Lane | SMTD Texture Right | SPTD Texture Right | SMTD Texture Left | SPTD Texture Left | MPD Texture Right | ETD Texture Right | MPD Texture Left | ETD Texture Left | IRI Right | IRI Left | IRI Avg | Latitude (deg) | Longitude (deg) | Altitude (m) | | | | |
| 0.074 | 3.920 | 3.460 | 4.870 | 0.301 | 0.756 | 0.305 | 0.768 | 0.525 | 0.620 | 0.533 | 0.627 | X | X | X | -29.88573043 | 30.99037662 | 12.6 | | | | |
| Average | 3.9 | 3.5 | 4.9 | 0.3 | 0.8 | 0.3 | 0.8 | 0.5 | 0.6 | 0.5 | 0.6 | #DIV/0! | #DIV/0! | #DIV/0! | | | | | | | |

Appendix D: FWD measurements

Table 24: FWD measurements after 20 months (11-April-2013)

| Chainage [m] | GEOPHONE READINGS | | | | | | | | | | | | | | | | kPa | kN | Air | Sur. | | |
|---------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|------|------|
| | D(1) | D(2) | D(3) | D(4) | D(5) | D(6) | D(7) | D(8) | D(9) | D(10) | D(11) | D(12) | D(13) | D(14) | D(15) | D(16) | D(17) | D(18) | | | | |
| SLOW LANE | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 162.2 | 148.6 | 143.8 | 132.4 | 122.2 | 114.5 | 106.4 | 96.8 | 90.9 | 80.6 | 81.3 | 69.7 | 65.7 | 56.2 | 53.9 | 43.8 | 146.4 | 141.8 | 595 | 42.09 | 20.5 | 28.8 |
| 50 | 136.3 | 123.3 | 118.7 | 109.5 | 99.2 | 92.9 | 85.5 | 77.1 | 71.9 | 62.5 | 63 | 53.5 | 50.4 | 42.3 | 41.3 | 32.5 | 122.4 | 118.8 | 539 | 38.13 | 20.7 | 27.8 |
| 100 | 154.1 | 139.4 | 131.4 | 120.7 | 108.7 | 100.6 | 91.4 | 82.1 | 76 | 66 | 64.1 | 55.4 | 50.8 | 42.4 | 39.8 | 32 | 134.4 | 126.4 | 581 | 41.08 | 20.8 | 28.7 |
| 150 | 155.2 | 142.8 | 136.3 | 125.9 | 115.5 | 108.4 | 99.9 | 90.6 | 84.1 | 73.9 | 73.5 | 64.2 | 58 | 48.2 | 45.7 | 36.3 | 142.5 | 137 | 555 | 39.25 | 20.7 | 28.6 |
| 200 | 136.2 | 113.2 | 100 | 86 | 74.4 | 67.2 | 59.8 | 52.4 | 47.8 | 39.5 | 40.5 | 33.5 | 31.7 | 26.6 | 27.7 | 20.1 | 111.1 | 102.2 | 551 | 38.96 | 20.7 | 28.4 |
| 250 | 41 | 20.5 | 16.6 | 11.4 | 7.9 | 6.8 | 6.1 | 4.1 | 5 | 0.7 | 8.2 | 2.8 | 5.4 | 1.7 | 9.3 | 2.6 | 22.3 | 21.3 | 560 | 39.6 | 20.6 | 27.3 |
| 270 | 15.7 | 9.4 | 10 | 8.8 | 7.4 | 8 | 7.8 | 6.2 | 7.3 | 5.1 | 8.9 | 5.7 | 7 | 4.7 | 12.8 | 4.8 | 9.1 | 12.5 | 556 | 39.29 | 20.6 | 27.4 |
| FAST LANE | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 214.4 | 192.3 | 181 | 166.3 | 150.5 | 139.2 | 127.1 | 114.8 | 106.7 | 93.4 | 93.3 | 79.9 | 74.5 | 64.4 | 62.7 | 51.1 | 190.6 | 181.1 | 570 | 40.26 | 21 | 28.5 |
| 50 | 132.6 | 118.5 | 111.5 | 101.2 | 90.5 | 82.8 | 75.1 | 66.1 | 60.7 | 51.5 | 52.3 | 42.4 | 40.5 | 32.9 | 34.7 | 25.4 | 116.3 | 110.2 | 568 | 40.17 | 21.5 | 28.3 |
| 100 | 164.5 | 146.3 | 136.5 | 121.8 | 107.7 | 97.4 | 86.5 | 76 | 68.9 | 57.6 | 56.6 | 46.2 | 42.1 | 34 | 33.6 | 25.3 | 142.8 | 133.4 | 554 | 39.19 | 21.4 | 28.2 |
| 150 | 139.2 | 126.6 | 120.7 | 111.6 | 101.7 | 94.5 | 86.6 | 78.3 | 72.6 | 62.3 | 62.8 | 53.2 | 49.7 | 41.2 | 40.3 | 31.1 | 124.7 | 120.2 | 555 | 39.22 | 21.4 | 27.7 |
| 201 | 130 | 112.4 | 104.9 | 94.3 | 83.8 | 76.6 | 69.2 | 61.1 | 56.3 | 47.2 | 48.7 | 40.1 | 37.9 | 30.3 | 32.1 | 23.8 | 111.4 | 105.5 | 558 | 39.44 | 21.7 | 27.6 |
| 251 | 35.4 | 24 | 23.9 | 16.8 | 13.4 | 11.9 | 11.4 | 8.6 | 9.3 | 5.6 | 10.7 | 6.8 | 8.2 | 5.9 | 11.3 | 5.4 | 24.8 | 25.5 | 565 | 39.96 | 21.6 | 27.6 |
| 274 | 119.3 | 98.4 | 82.8 | 64.5 | 47 | 34.7 | 23.5 | 14.3 | 10.8 | 3.9 | 7.9 | 2.4 | 5 | 1.9 | 9.1 | 1.5 | 100.9 | 94 | 557 | 39.39 | 21.4 | 27 |
| TURNING LANE | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 247.9 | 225.4 | 207.6 | 188.1 | 167.8 | 152.5 | 136.6 | 121.3 | 109.2 | 92.5 | 88.4 | 75.4 | 66 | 54 | 47.9 | 38.1 | 220.2 | 203.7 | 570 | 40.27 | 21.9 | 30.1 |
| 10 | 18.8 | 9.7 | 9.2 | 6.1 | 5.5 | 4.6 | 5.2 | 3.4 | 4.4 | 0.3 | 5.2 | 1.5 | 4.5 | 1.7 | 9.2 | 1.7 | 8 | 11.4 | 571 | 40.36 | 21.7 | 28.8 |
| 20 | 32.4 | 20 | 19.9 | 14.8 | 13.6 | 12.8 | 13.5 | 11.9 | 13.1 | 8.5 | 14.9 | 9.8 | 13.4 | 10.5 | 17.1 | 10.2 | 17.2 | 20.3 | 560 | 39.58 | 21.6 | 28.2 |
| 30 | 27.9 | 17.2 | 14.8 | 11.7 | 10.6 | 9.6 | 9.6 | 7.8 | 9.6 | 5.1 | 10.3 | 4.7 | 8.7 | 5.6 | 11.5 | 5.4 | 18 | 18.1 | 573 | 40.53 | 22.1 | 28.2 |
| 40 | 24.8 | 14.1 | 12.3 | 8.2 | 7.9 | 6.9 | 7 | 5.4 | 6.8 | 2.4 | 9 | 5.1 | 6.7 | 3.6 | 9.6 | 3.2 | 11.6 | 15 | 551 | 38.93 | 22.1 | 28.3 |
| 50 | 24.3 | 10.6 | 7.8 | 6.1 | 5.8 | 5.7 | 6.2 | 4.3 | 5.9 | 1.6 | 6.7 | 3.4 | 6 | 3.2 | 8.8 | 3.2 | 10.1 | 11.9 | 590 | 41.7 | 22 | 28.1 |

Table 25: FWD measurements after 12 months (10-Sep-2012)

| Station (km) | Load kN | Temperature | | D0 | D200 | D300 | D450 | D600 | D900 | D1200 | D1500 | D1800 | Deflection Bowl Parameters | | | |
|---------------------|------------|-------------|------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------------|-----|-----|-----|
| | | Surface | Air | [D1 μm] | [D2 μm] | [D3 μm] | [D4 μm] | [D6 μm] | [D9 μm] | [D12 μm] | [D15 μm] | [D18 μm] | Ymax | BLI | MLI | LLI |
| SLOW LANE | | | | | | | | | | | | | | | | |
| 0.000 | 40 | 25.4 | 22.7 | 176 | 194 | 175 | 157 | 133 | 100 | 74 | 58 | 54 | 176 | 1 | 42 | 34 |
| 0.003 | 40 | 25.7 | 22.7 | 156 | 154 | 147 | 132 | 114 | 89 | 67 | 52 | 48 | 156 | 10 | 32 | 26 |
| 0.050 | 40 | 25.5 | 22.9 | 152 | 138 | 129 | 113 | 96 | 72 | 54 | 43 | 41 | 152 | 23 | 32 | 24 |
| 0.100 | 40 | 26.1 | 22.8 | 168 | 152 | 143 | 126 | 107 | 77 | 55 | 40 | 35 | 168 | 25 | 35 | 30 |
| 0.151 | 40 | 26.5 | 22.9 | 147 | 133 | 126 | 112 | 98 | 74 | 55 | 42 | 37 | 147 | 21 | 28 | 24 |
| 0.200 | 40 | 26.4 | 23 | 104 | 93 | 87 | 76 | 64 | 47 | 33 | 25 | 24 | 104 | 17 | 23 | 17 |
| 0.251 | 40 | 26.6 | 22.9 | 42 | 21 | 16 | 10 | 7 | 5 | 3 | 3 | 7 | 42 | 27 | 9 | 2 |
| 0.275 | 40 | 25.8 | 22.8 | 18 | 8 | 7 | 6 | 5 | 5 | 3 | 3 | 7 | 18 | 11 | 2 | 0 |
| FAST LANE | | | | | | | | | | | | | | | | |
| 0.000 | 40 | 26.8 | 22.5 | 241 | 200 | 186 | 160 | 135 | 99 | 72 | 54 | 51 | 241 | 55 | 50 | 36 |
| 0.050 | 40 | 26.9 | 22.7 | 136 | 115 | 107 | 93 | 78 | 57 | 40 | 31 | 31 | 136 | 29 | 29 | 22 |
| 0.100 | 40 | 26.9 | 22.7 | 190 | 159 | 148 | 128 | 107 | 78 | 55 | 41 | 38 | 190 | 42 | 40 | 30 |
| 0.157 | 40 | 27.9 | 22.9 | 145 | 128 | 120 | 105 | 90 | 71 | 54 | 43 | 40 | 145 | 25 | 30 | 19 |
| 0.200 | 40 | 27.7 | 22.8 | 146 | 137 | 129 | 113 | 95 | 70 | 49 | 37 | 34 | 146 | 17 | 34 | 26 |
| 0.252 | 40 | 26.3 | 22.2 | 36 | 24 | 21 | 16 | 13 | 11 | 9 | 9 | 13 | 36 | 15 | 7 | 2 |
| 0.252 | 40 | 26.3 | 22.2 | 36 | 24 | 21 | 16 | 13 | 11 | 9 | 9 | 13 | 36 | 15 | 7 | 2 |
| 0.252 | 40 | 26.3 | 22.2 | 36 | 24 | 21 | 16 | 13 | 11 | 9 | 9 | 13 | 36 | 15 | 7 | 2 |
| 0.275 | 40 | 25.8 | 22.1 | 148 | 121 | 111 | 96 | 81 | 60 | 43 | 34 | 32 | 148 | 37 | 31 | 21 |
| TURNING LANE | | | | | | | | | | | | | | | | |
| 0.000 | 40 | 28 | 22.6 | 210 | 176 | 163 | 139 | 115 | 80 | 54 | 38 | 34 | 210 | 47 | 48 | 35 |
| 0.020 | 40 | 27.5 | 22.5 | 48 | 23 | 19 | 13 | 12 | 11 | 8 | 8 | 13 | 48 | 29 | 7 | 1 |
| 0.040 | 40 | 26.5 | 22.3 | 37 | 23 | 19 | 13 | 10 | 9 | 7 | 7 | 11 | 37 | 18 | 9 | 1 |
| 0.060 | 40 | 26.2 | 22.2 | 125 | 103 | 98 | 86 | 75 | 55 | 37 | 29 | 16 | 125 | 27 | 23 | 19 |

Table 26: FWD measurements 6 months after construction (20-Feb-2011)

|  | | Road | South Coast Road | | | Location | | | HiMA Paving Trial - SMA Layer | | | | | | DATA COMPILED BY: | | | | | | Falling Weight Deflectometer Data | | | | | | | | | | | | | |
|---|-------|---------------------------|------------------|-------------|-----|-----------------------|---------|---------|--------------------------------------|---------|---------|---------|---------|---------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------------------------------|----------------------------|------|-----|-----|-----|--|--|--|--|--|--|--|--|
| | | Start Chainage | 0.0 | | | DC | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | End Chainage | 300.0 | | | Region | | | Durban | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Total Length Surveyed (m) | 300.0 | | | District Municipality | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Date Surveyed | 20-Feb-12 | | | KZ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Vehicle | FWD Transporter | | | Local Municipality | | | Etheekwini Metropolitan Municipality | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Station (m) | Load | Temperature | D0 | D200 | D300 | D450 | D520 | D610 | D700 | D800 | D900 | D1000 | D1100 | D1200 | D1500 | D1700 | D1800 | -D200 | -D300 | Deflection Bowl Parameters | | | | | | | | | | | | |
| | | | kN | Surface | Air | [D1 µm] | [D2 µm] | [D3 µm] | [D4 µm] | [D5 µm] | [D6 µm] | [D7 µm] | [D8 µm] | [D9 µm] | [D10 Åµm] | [D11 Åµm] | [D12 Åµm] | [D13 Åµm] | [D14 Åµm] | [D15 Åµm] | [D17 Åµm] | [D18 Åµm] | Ymax | BLI | MLI | LLI | | | | | | | | |
| SLOW LANE | 0.0 | 40 | 37.1 | 30.2 | 224 | 187 | 170 | 145 | 135 | 120 | 107 | 96 | 88 | 75 | 75 | 65 | 60 | 52 | 51 | 190 | 176 | 224 | 54 | 50 | 32 | | | | | | | | | |
| | 50.0 | 40 | 38.9 | 30.2 | 208 | 169 | 158 | 134 | 124 | 110 | 96 | 86 | 79 | 65 | 65 | 55 | 50 | 42 | 40 | 168 | 155 | 208 | 50 | 48 | 31 | | | | | | | | | |
| | 100.0 | 40 | 39.2 | 30 | 239 | 201 | 185 | 157 | 144 | 129 | 112 | 101 | 91 | 75 | 75 | 63 | 57 | 47 | 44 | 196 | 178 | 239 | 54 | 56 | 38 | | | | | | | | | |
| | 150.0 | 40 | 39.9 | 30.1 | 204 | 175 | 165 | 143 | 134 | 121 | 107 | 97 | 89 | 75 | 74 | 65 | 57 | 48 | 44 | 172 | 162 | 204 | 39 | 44 | 32 | | | | | | | | | |
| | 200.0 | 40 | 40.7 | 29.9 | 142 | 112 | 107 | 92 | 85 | 76 | 68 | 63 | 56 | 47 | 47 | 39 | 36 | 29 | 29 | 114 | 107 | 142 | 35 | 31 | 20 | | | | | | | | | |
| | 250.0 | 40 | 40.2 | 29.6 | 62 | 35 | 31 | 23 | 19 | 16 | 15 | 12 | 12 | 8 | 8 | 7 | 7 | 6 | 5 | 35 | 31 | 62 | 31 | 15 | 4 | | | | | | | | | |
| | 300.0 | 40 | 40.5 | 29.5 | 31 | 10 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 6 | 6 | 5 | 8 | 12 | 31 | 21 | 2 | 0 | | | | | | | | | | |
| FAST LANE | 0.0 | 40 | 37.4 | 30.9 | 166 | 137 | 129 | 109 | 101 | 90 | 80 | 72 | 66 | 55 | 45 | 35 | 35 | 33 | 32 | 135 | 126 | 166 | 37 | 39 | 24 | | | | | | | | | |
| | 50.0 | 40 | 38 | 30.7 | 189 | 153 | 141 | 117 | 108 | 95 | 84 | 75 | 68 | 55 | 47 | 46 | 41 | 34 | 33 | 151 | 136 | 189 | 48 | 46 | 27 | | | | | | | | | |
| | 100.0 | 40 | 38.1 | 30.6 | 229 | 190 | 174 | 143 | 131 | 114 | 97 | 85 | 75 | 60 | 47 | 47 | 40 | 31 | 28 | 188 | 170 | 229 | 55 | 60 | 39 | | | | | | | | | |
| | 150.0 | 40 | 38.4 | 30.7 | 203 | 168 | 156 | 132 | 122 | 108 | 94 | 84 | 75 | 61 | 55 | 50 | 44 | 36 | 34 | 167 | 153 | 203 | 47 | 48 | 33 | | | | | | | | | |
| | 200.0 | 40 | 38.7 | 30.4 | 241 | 202 | 182 | 149 | 135 | 117 | 101 | 88 | 78 | 62 | 54 | 51 | 45 | 36 | 35 | 200 | 178 | 241 | 59 | 65 | 39 | | | | | | | | | |
| | 250.0 | 40 | 38.2 | 29.8 | 69 | 15 | 10 | 8 | 8 | 7 | 7 | 6 | 6 | 5 | 4 | 4 | 3 | 3 | 3 | 15 | 11 | 69 | 59 | 3 | 1 | | | | | | | | | |
| | 300.0 | 40 | 38.7 | 30.2 | 268 | 196 | 168 | 136 | 125 | 110 | 98 | 88 | 81 | 68 | 62 | 58 | 54 | 44 | 41 | 189 | 161 | 268 | 100 | 58 | 29 | | | | | | | | | |

Table 27: FWD measurements just after construction (29-Oct-2011)

|  | | Road | South Coast Road | | | Location | | | HiMA Paving Trial - SMA Layer | | | | | | DATA COMPILED BY: | | | | | | Falling Weight Deflectometer Data | | | | | | | | | | | | | |
|---|-------|---------------------------|------------------|-------------|-----|-----------------------|---------|---------|--------------------------------------|---------|---------|---------|---------|---------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------------------------------|----------------------------|------|-----|-----|-----|--|--|--|--|--|--|--|--|
| | | Start Chainage | 0.0 | | | DC | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | End Chainage | 300.0 | | | Region | | | Durban | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Total Length Surveyed (m) | 300.0 | | | District Municipality | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Date Surveyed | 29-Oct-11 | | | KZ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Vehicle | FWD Transporter | | | Local Municipality | | | Etheekwini Metropolitan Municipality | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Station (m) | Load | Temperature | D0 | D200 | D300 | D400 | D500 | D600 | D700 | D800 | D900 | D1000 | D1100 | D1300 | D1500 | D1700 | D1900 | -D200 | -D300 | Deflection Bowl Parameters | | | | | | | | | | | | |
| | | | kN | Surface | Air | [D1 µm] | [D2 µm] | [D3 µm] | [D4 µm] | [D5 µm] | [D6 µm] | [D7 µm] | [D8 µm] | [D9 µm] | [D10 Åµm] | [D11 Åµm] | [D12 Åµm] | [D13 Åµm] | [D14 Åµm] | [D15 Åµm] | [D17 Åµm] | [D18 Åµm] | Ymax | BLI | MLI | LLI | | | | | | | | |
| SLOW LANE | 0.0 | 40 | 34.2 | 26.9 | 80 | 62 | 58 | 54 | 49 | 47 | 43 | 39 | 36 | 31 | 30 | 27 | 25 | 20 | 19 | 60 | 58 | 80 | 22 | 11 | 11 | | | | | | | | | |
| | 50.0 | 40 | 34.2 | 26.9 | 169 | 120 | 113 | 104 | 95 | 85 | 78 | 69 | 62 | 51 | 50 | 43 | 38 | 31 | 26 | 112 | 102 | 169 | 56 | 28 | 23 | | | | | | | | | |
| | 100.0 | 40 | 33.5 | 27.2 | 109 | 95 | 88 | 81 | 72 | 66 | 60 | 53 | 48 | 40 | 40 | 34 | 31 | 26 | 24 | 92 | 88 | 109 | 21 | 22 | 18 | | | | | | | | | |
| | 150.0 | 40 | 32.8 | 27.2 | 153 | 138 | 127 | 116 | 104 | 94 | 85 | 76 | 68 | 57 | 56 | 49 | 44 | 36 | 32 | 134 | 127 | 153 | 26 | 33 | 26 | | | | | | | | | |
| | 200.0 | 40 | 32.4 | 27.3 | 146 | 130 | 122 | 112 | 101 | 92 | 85 | 76 | 70 | 62 | 59 | 53 | 48 | 41 | 37 | 130 | 123 | 146 | 24 | 30 | 22 | | | | | | | | | |
| | 250.0 | 40 | 31.5 | 27.5 | 144 | 132 | 125 | 116 | 107 | 99 | 93 | 85 | 79 | 68 | 65 | 63 | 58 | 51 | 48 | 131 | 127 | 144 | 19 | 26 | 20 | | | | | | | | | |
| | 300.0 | 40 | 33 | 27.9 | 167 | 150 | 138 | 125 | 112 | 101 | 92 | 82 | 75 | 66 | 63 | 55 | 50 | 43 | 40 | 144 | 136 | 167 | 29 | 37 | 26 | | | | | | | | | |
| FAST LANE | 0.0 | 40 | 33.6 | 25.8 | 124 | 104 | 96 | 87 | 78 | 70 | 64 | 56 | 51 | 44 | 43 | 37 | 35 | 29 | 27 | 99 | 93 | 124 | 28 | 26 | 19 | | | | | | | | | |
| | 100.0 | 40 | 33.3 | 25.8 | 165 | 140 | 128 | 114 | 101 | 90 | 80 | 70 | 62 | 53 | 51 | 44 | 40 | 33 | 31 | 140 | 130 | 165 | 37 | 38 | 28 | | | | | | | | | |
| | 150.0 | 40 | 33.9 | 26 | 180 | 159 | 147 | 134 | 120 | 109 | 98 | 86 | 76 | 65 | 62 | 54 | 47 | 39 | 34 | 154 | 144 | 180 | 33 | 38 | 33 | | | | | | | | | |
| | 200.0 | 40 | 34.3 | 26.3 | 174 | 149 | 137 | 123 | 111 | 99 | 89 | 78 | 71 | 61 | 59 | 51 | 46 | 39 | 35 | 149 | 139 | 174 | 37 | 38 | 28 | | | | | | | | | |
| | 250.0 | 40 | 33.7 | 26.4 | 145 | 125 | 115 | 104 | 93 | 85 | 77 | 68 | 63 | 54 | 53 | 47 | 44 | 38 | 36 | 124 | 117 | 145 | 30 | 30 | 22 | | | | | | | | | |
| | 300.0 | 40 | 34 | 26.3 | 153 | 128 | 119 | 109 | 99 | 90 | 82 | 73 | 67 | 57 | 55 | 47 | 41 | 32 | 26 | 148 | 148 | 153 | 34 | 29 | 23 | | | | | | | | | |