

CONTRACT REPORT

FWD Testing Results for Intermodal Terminal

Project No: PSS16279

by Huimin Moore

for CPB Contractors Pty Ltd

FWD Testing Results for Intermodal Terminal

for CPB Contractors Pty Ltd

ARRB Group Ltd
ABN 68 004 620 651

Victoria
500 Burwood Highway
Vermont South VIC 3133
Australia
P: +61 3 9881 1555
F: +61 3 9887 8104
info@arrb.com.au

Western Australia
191 Carr Place
Leederville WA 6007
Australia
P: +61 8 9227 3000
F: +61 8 9227 3030
arrb.wa@arrb.com.au

New South Wales
2-14 Mountain St
Ultimo NSW 2007
Australia
P: +61 2 9282 4444
F: +61 2 9280 4430
arrb.nsw@arrb.com.au

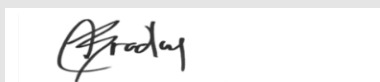
Queensland
123 Sandgate Road
Albion QLD 4010
Australia
P: +61 7 3260 3500
F: +61 7 3862 4699
arrb.qld@arrb.com.au

South Australia
Level 5, City Central,
Suite 507, 147 Pirie Street
Adelaide SA 5000
Australia
P: +61 8 7200 2659
F: +61 8 8223 7406
arrb.sa@arrb.com.au

International office
770 Pennsylvania Drive
Suite 112
Exton, PA 19341
USA
Tel: 610-321-8302
Fax: 610-458-2467

Reviewed

Project Leader



Clint Bradley

Quality Manager



Jim Johnson-Clarke

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FWD TESTING RESULTS FOR INTERMODAL TERMINAL

SUMMARY

ARRB Group Ltd (ARRB) was commissioned by CPB Contractors Pty Limited to collect the pre-construction FWD data of the proposed survey routes in relation to Intermodal Terminal.

The aim of the report is to present a basic summary of the FWD testing results as the pre-construction road condition of the study area.

The key findings of the baseline pre-construction condition assessment are as follows:

- Glenfield Road at 1.6km westbound lane 1 left wheel is found with over 1000 microns deflection, which might indicate potential weak pavement structure.
- All other sections are at good deflection state.



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1 INTRODUCTION

ARRB Group Ltd (ARRB) was commissioned by CPB Contractors Pty Limited to collect the pre-construction FWD data of the proposed survey routes in relation to Intermodal Terminal.

The aim of the report is to present a basic summary of the FWD testing results as the pre-construction road condition of the study area.

The testing included all wheel paths and lanes of the selected road sections as listed in Table 1.1.

Table 1.1 Surveyed road sections

ROAD	SECTION
Cambridge Ave	Moorebank Ave - Railway Overpass
Campbelltown Rd	Glenfield Rd - Camden Valley Way
Canterbury Rd Roundabout	Canterbury Rd CL - Canterbury Rd CL
Glenfield Rd	Railway Overpass - Railway Station Roundabout
Moorebank Ave	Railway Overpass - Cambridge Ave
Railway Station Roundabout	Glenfield Rd (from Cambridge) - Glenfield Rd (to Cambridge)

Figure 1.1 presents the surveyed routes on the map.

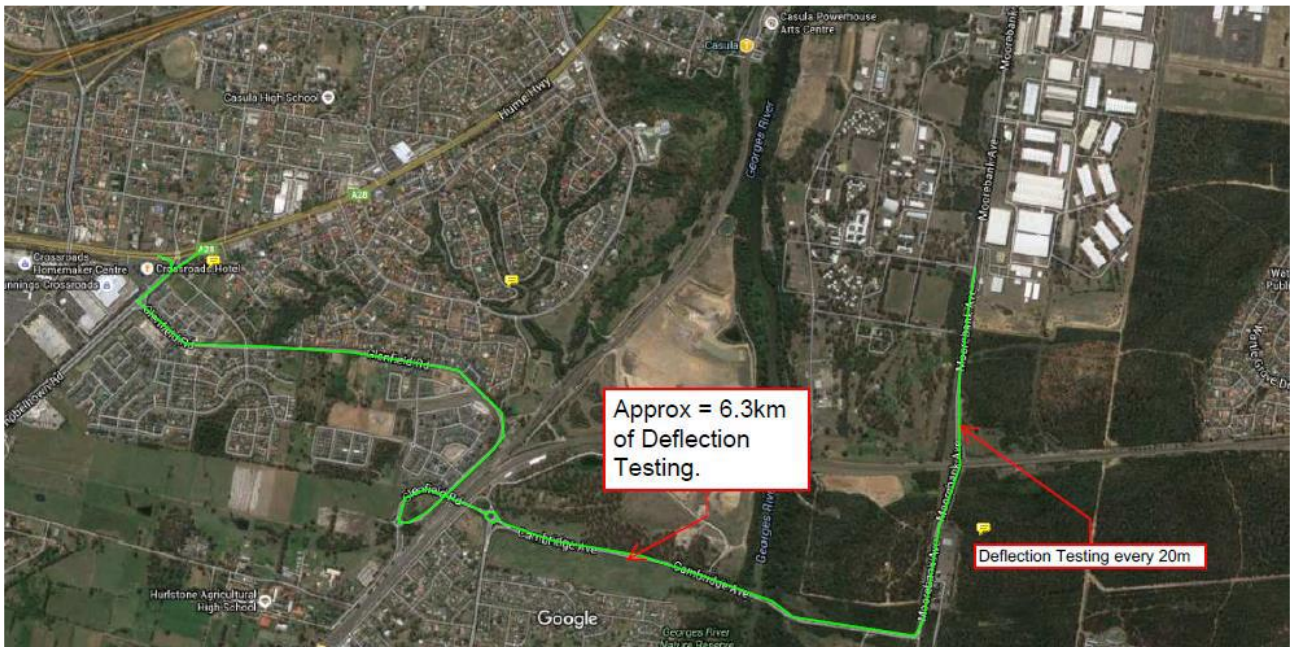


Figure 1.1: Survey routes

2 FWD TEST

The FWD testing is a form of non-destructive testing used to evaluate the physical properties of the pavement. Data is collected by the measurement of a dynamic load that is generated by dropping a mass from a pre-set height onto a 300 mm diameter plate (Figure 2.1). The machine is stopped at every test point (100m intervals for current work) with an impulse load delivered to the pavement by the applied load equivalent to the weight of a 10-tonne axle momentarily loading the road (as would happen for a large truck passing at about 80 km/h).

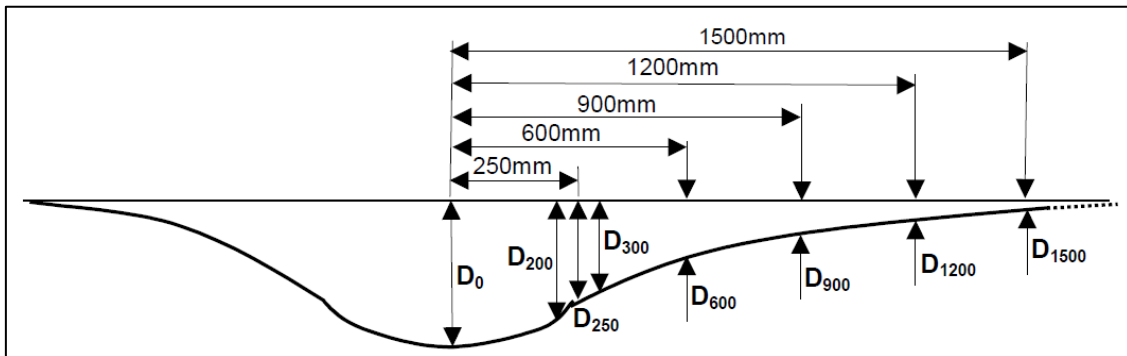
Figure 2.1: Falling weight deflectometer (FWD)



Source: ARRB Group Ltd

When the applied load hits the pavement surface, the surface deflects to form what is called a 'deflection bowl' (Figure 2.2). This bowl is automatically measured by the FWD sensors. The bowl shape is analysed to determine the condition of the pavement from a structural point of view. The numbers involved are very small, with a deflection of only about 1 mm, but when these deflections and the consequent bowl shape are measured very accurately they provide a lot of useful information about the nature and condition of the pavement.

Figure 2.2: Pavement deflection bowl (not to scale)



Source: Austroads (2005)

Various deflection data (e.g., d_0 , d_{200} and d_{900} in microns) from a particular point provide a basis for assessment of the pavement strength of that location; d_{200} (and d_0) together are used to assess the relative contribution to the overall strength by the upper portions of the pavement (the pavement stiffness). The value of d_{900} provides information about the lower pavement strength, in particular the founding natural subgrade.

The concrete road sections have been excluded from FWD testing. For the selected road sections, variation of d_0 over the length of the sections have been graphically presented in the following figures. These figures give an overview of overall pavement deflection showing variations over the length of the sections.

General knowledge suggests testing points with over 1000 microns d_0 values might indicate relatively weak pavement section. This could potentially be caused due to localised weak sections, cracking, under-road pipes etc.

3 DEFLECTION DATA PLOT

Figure 3.1: Deflection (d0) for Cambridge Avenue Eastbound Lane 1 left wheel path

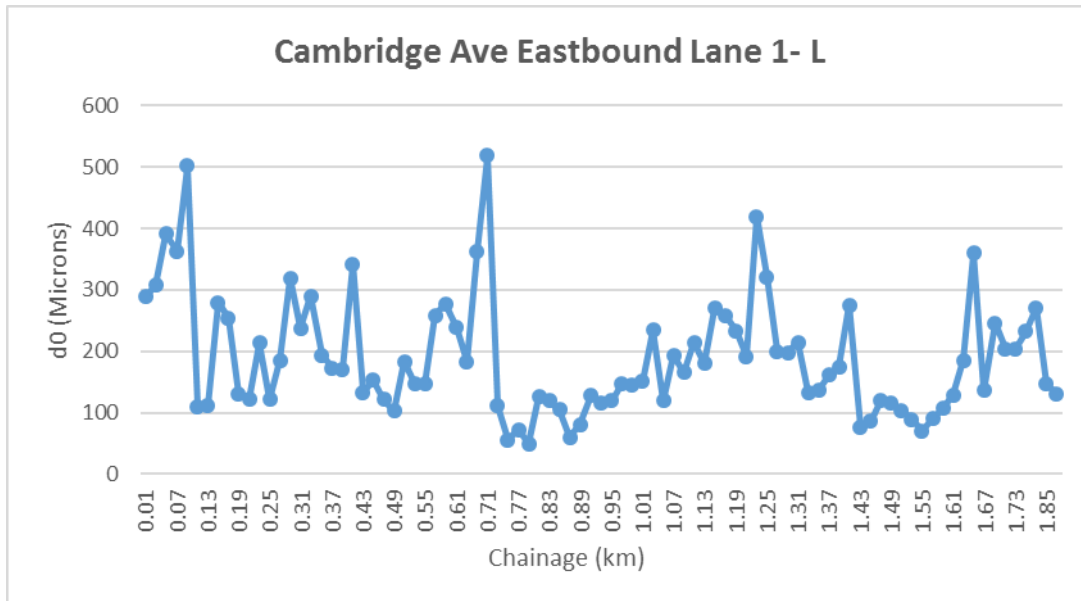


Figure 3.2: Deflection (d0) for Cambridge Avenue Eastbound Lane 1 right wheel path

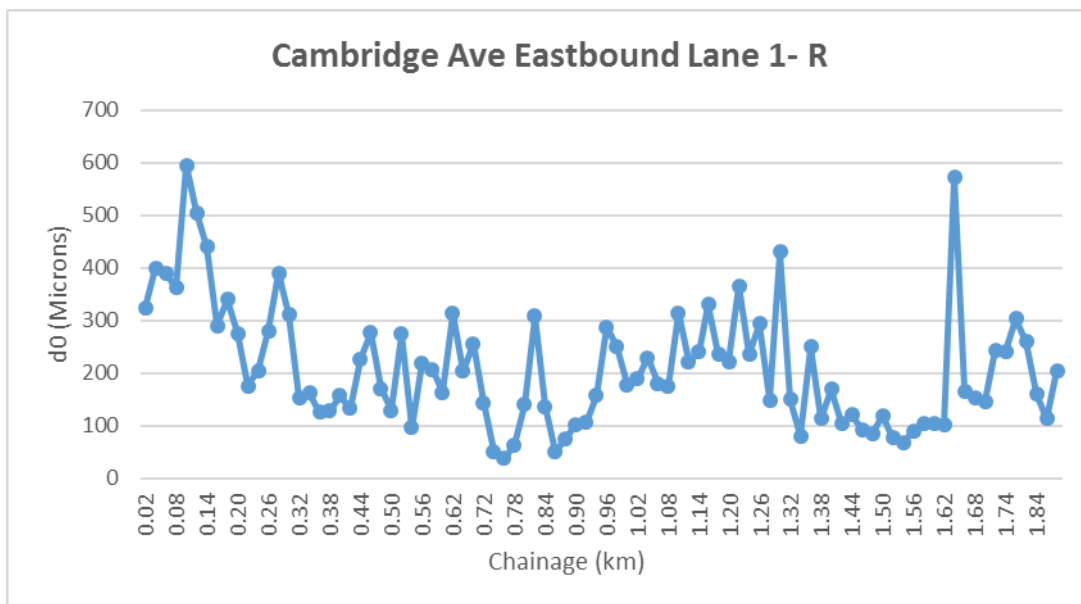


Figure 3.3: Deflection (d0) for Cambridge Avenue Eastbound Lane 2 left wheel path

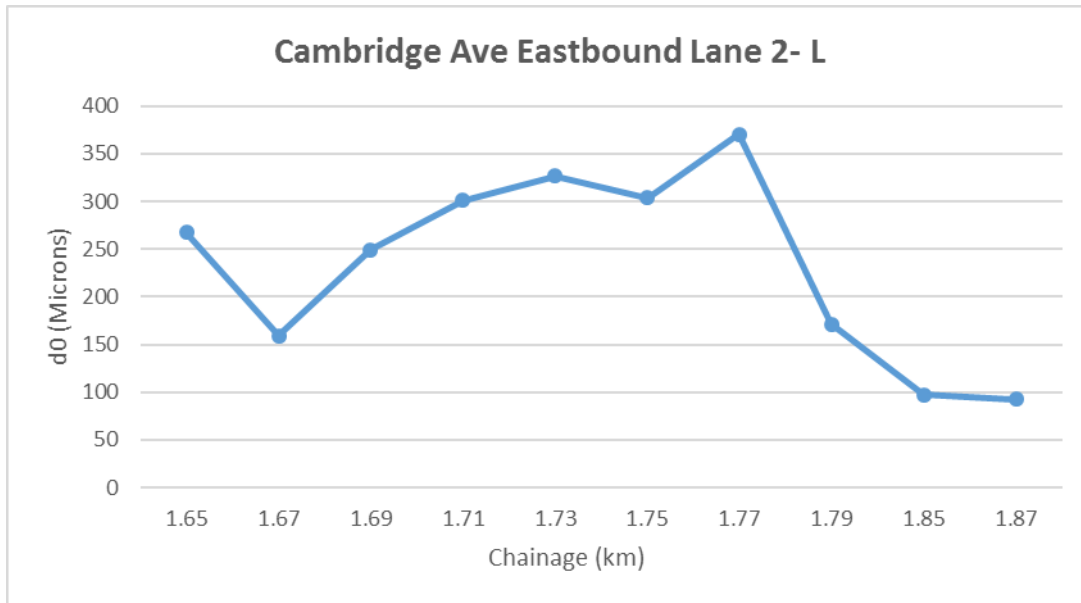


Figure 3.4: Deflection (d0) for Cambridge Avenue Eastbound Lane 2 right wheel path

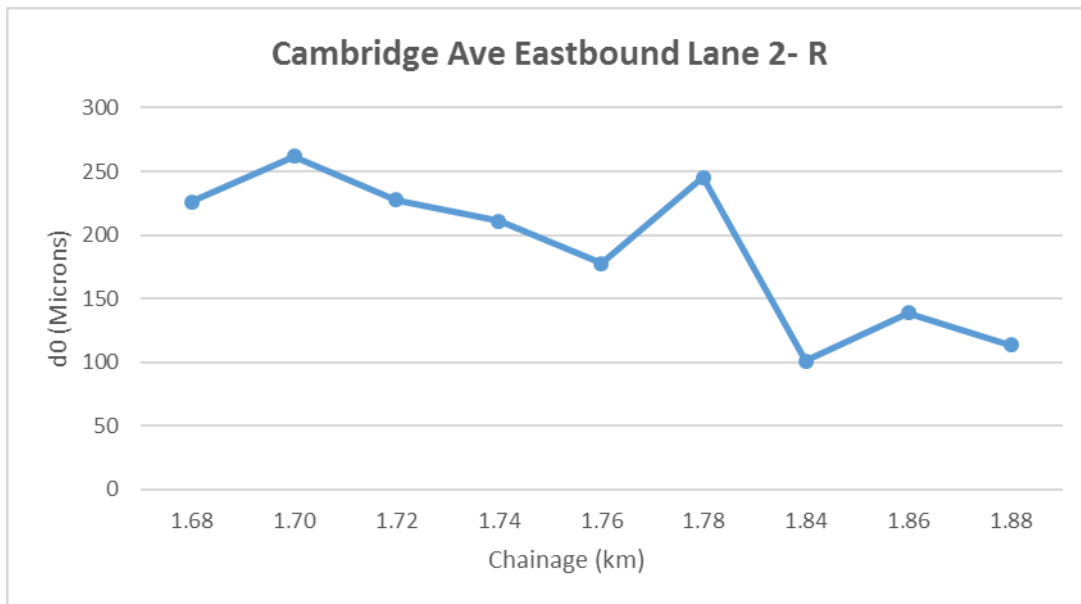


Figure 3.5: Deflection (d0) for Cambridge Avenue Westbound Lane 1 left wheel path

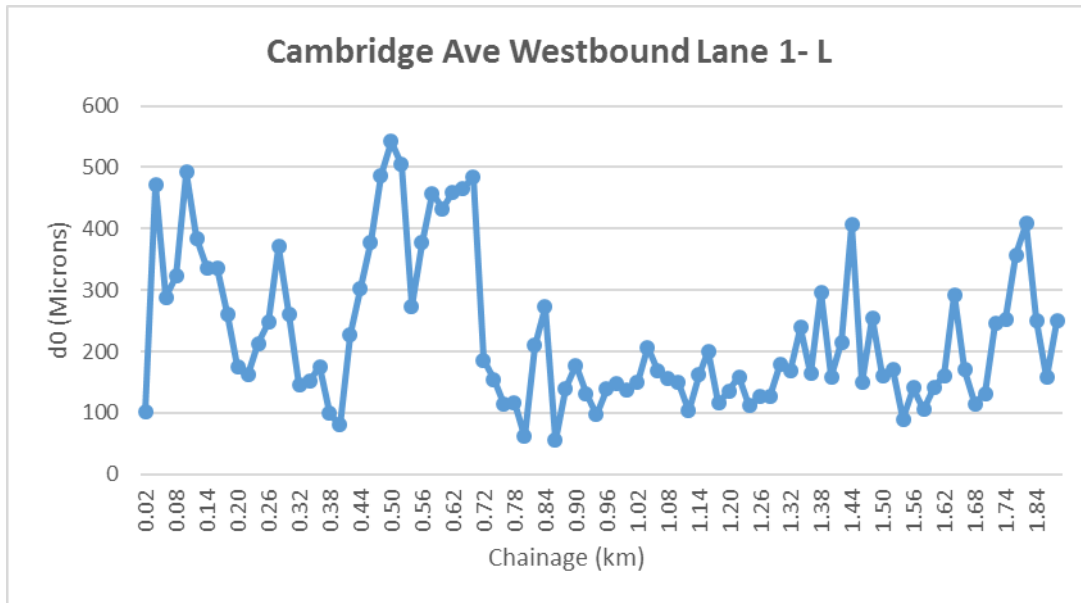


Figure 3.6: Deflection (d0) for Cambridge Avenue Westbound Lane 1 right wheel path

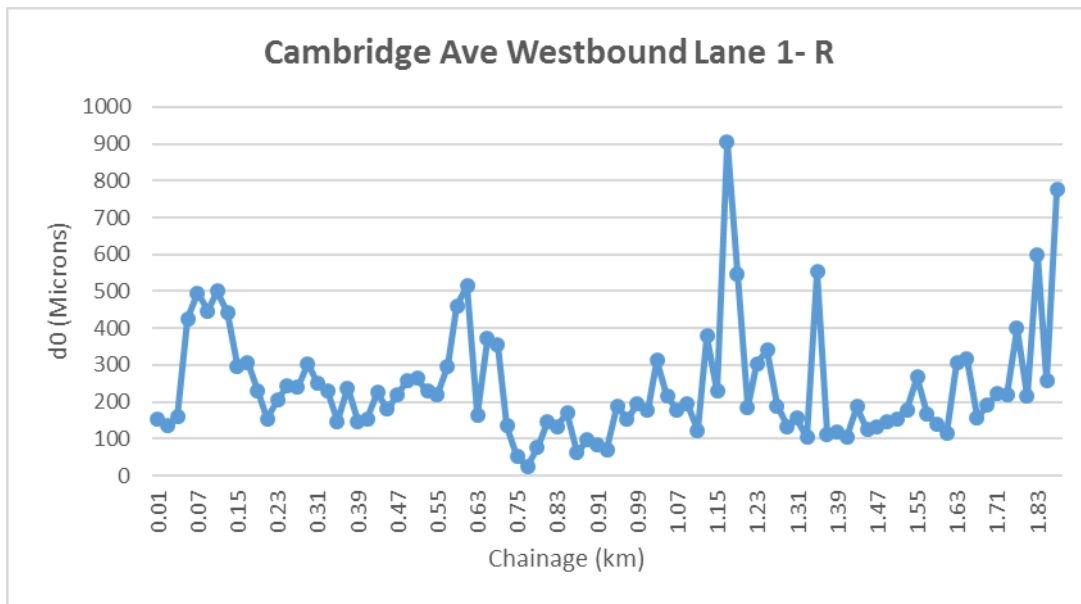


Figure 3.7: Deflection (d0) for Cambridge Avenue Westbound Lane 2 left wheel path

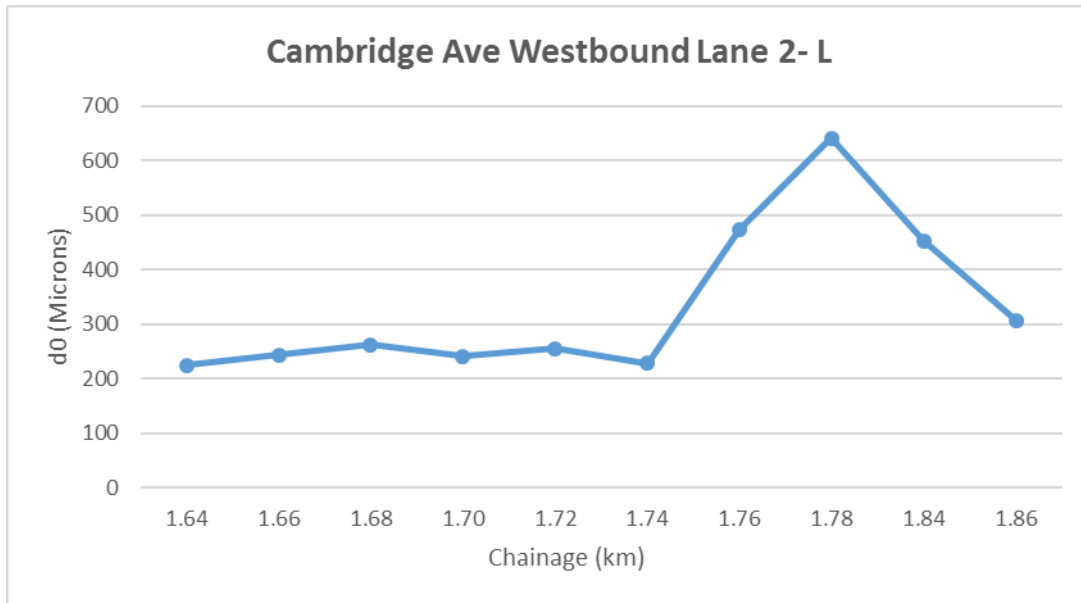


Figure 3.8: Deflection (d0) for Cambridge Avenue Westbound Lane 2 right wheel path

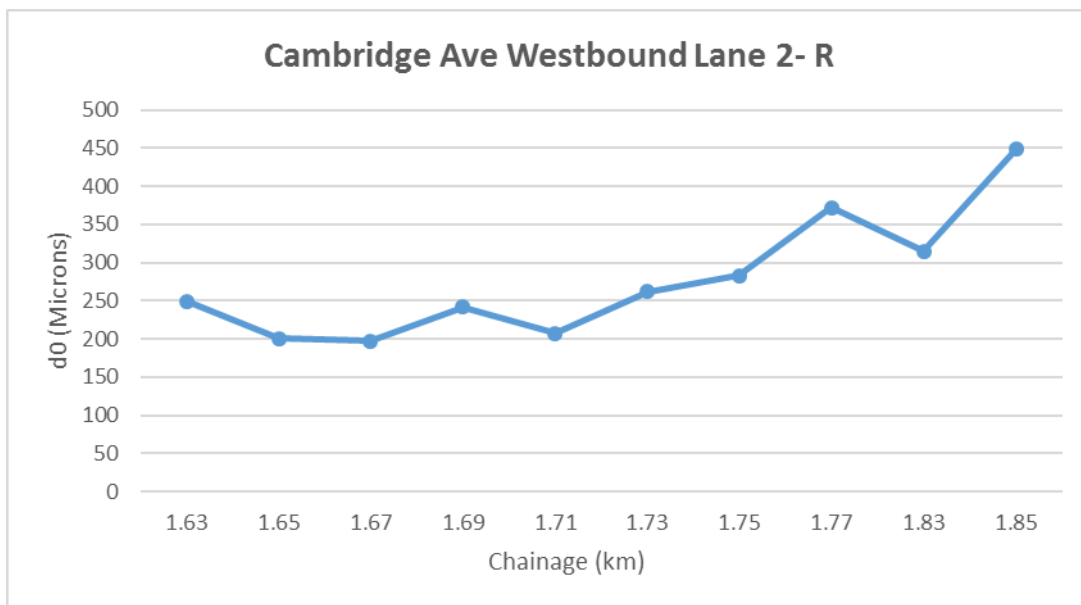


Figure 3.9: Deflection (d0) for Campbelltown Road Northbound Lane 1 left wheel path

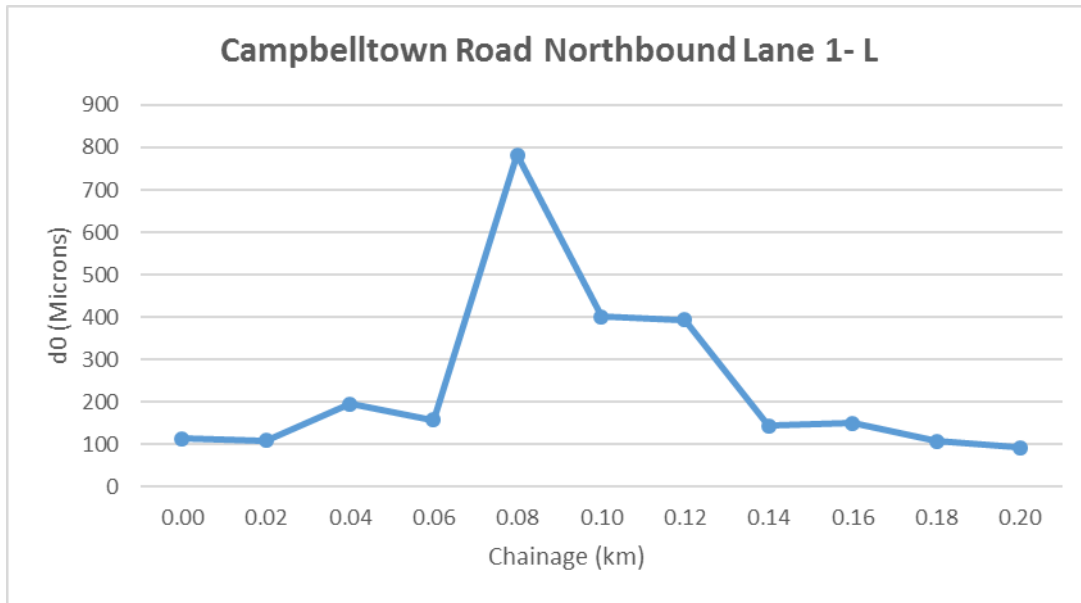


Figure 3.10: Deflection (d0) for Campbelltown Road Northbound Lane 1 right wheel path

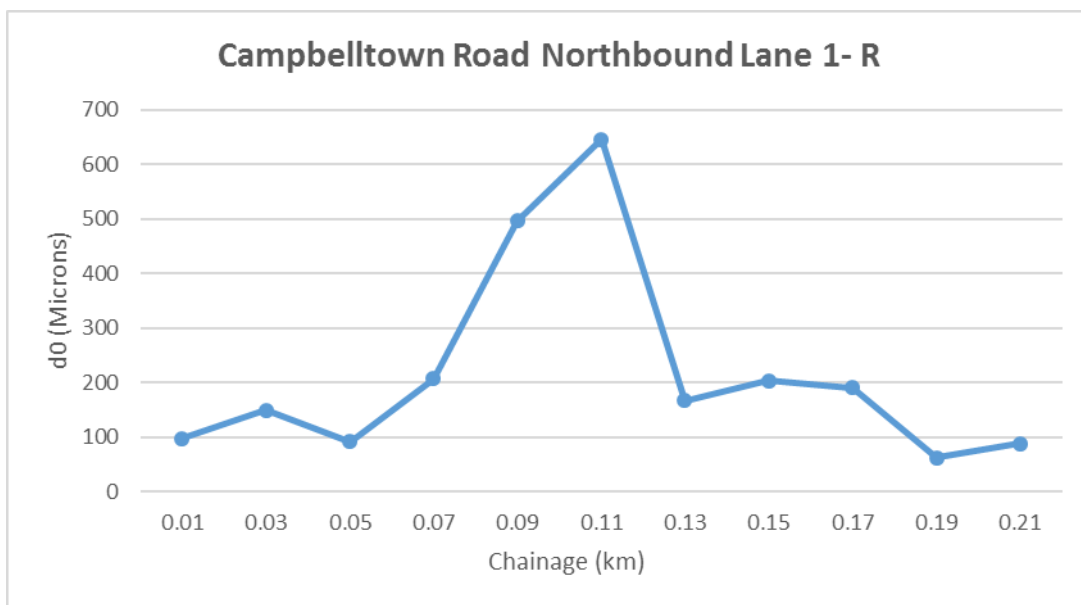


Figure 3.11: Deflection (d0) for Campbelltown Road Northbound Lane 2 left wheel path

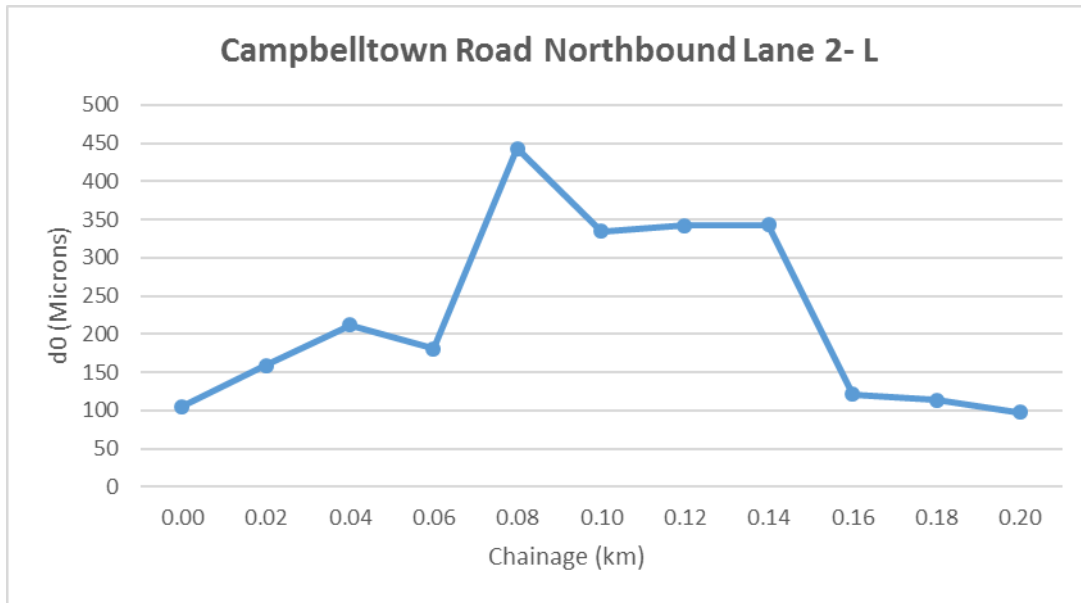


Figure 3.12: Deflection (d0) for Campbelltown Road Northbound Lane 2 right wheel path

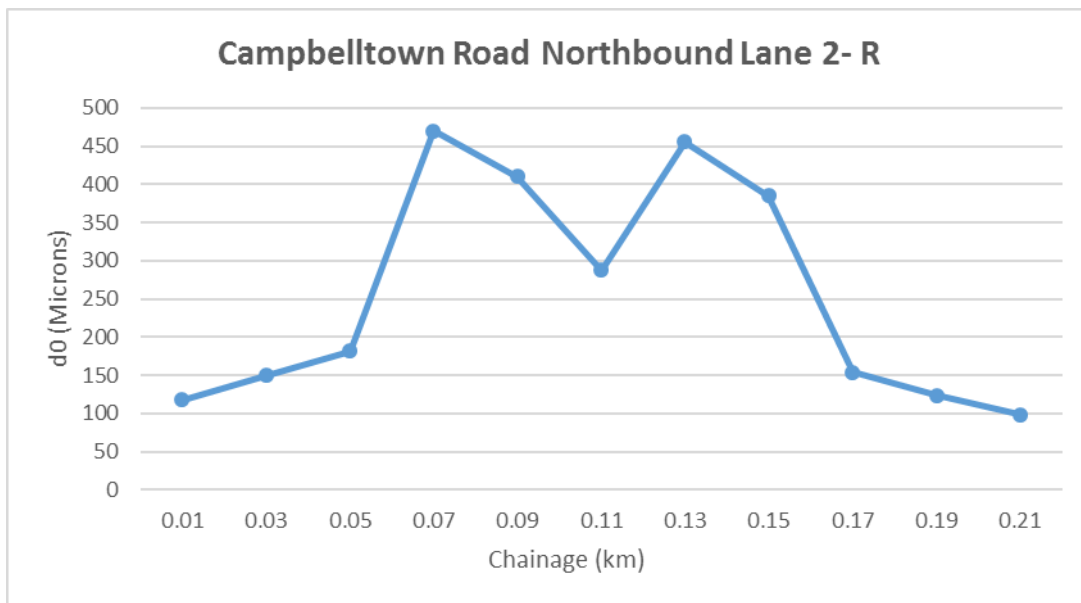


Figure 3.13: Deflection (d0) for Campbelltown Road Northbound Lane 3 left wheel path

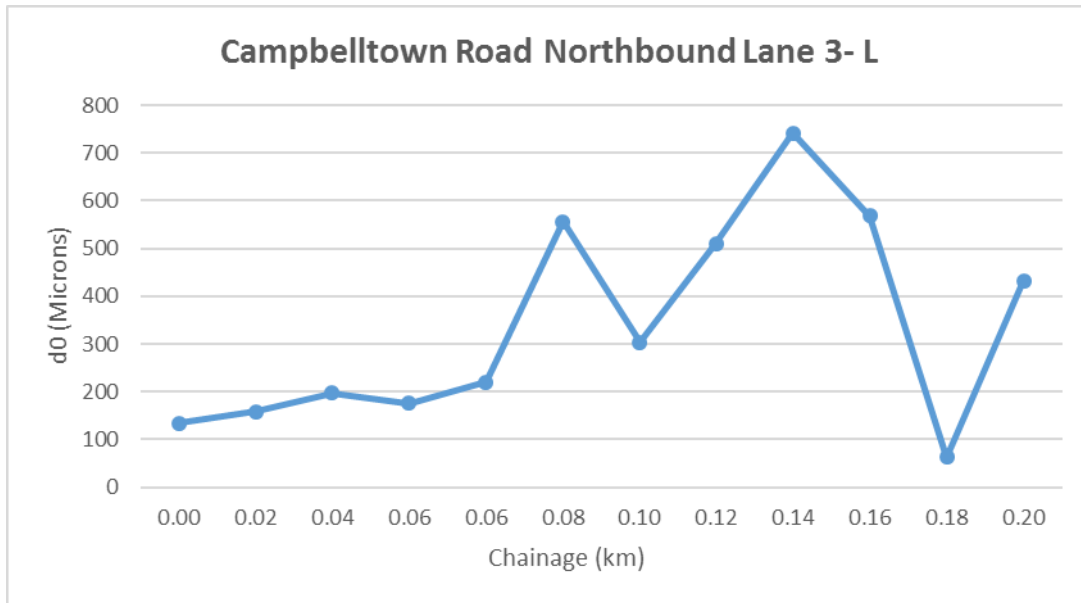


Figure 3.14: Deflection (d0) for Campbelltown Road Northbound Lane 3 right wheel path

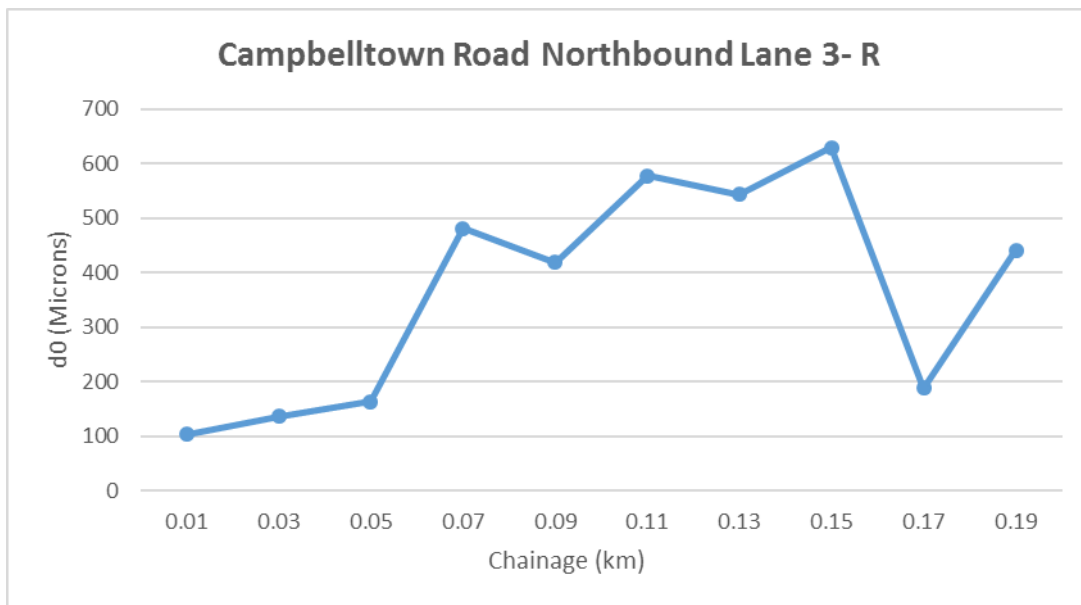


Figure 3.15: Deflection (d0) for Campbelltown Road Southbound Lane 1 left wheel path

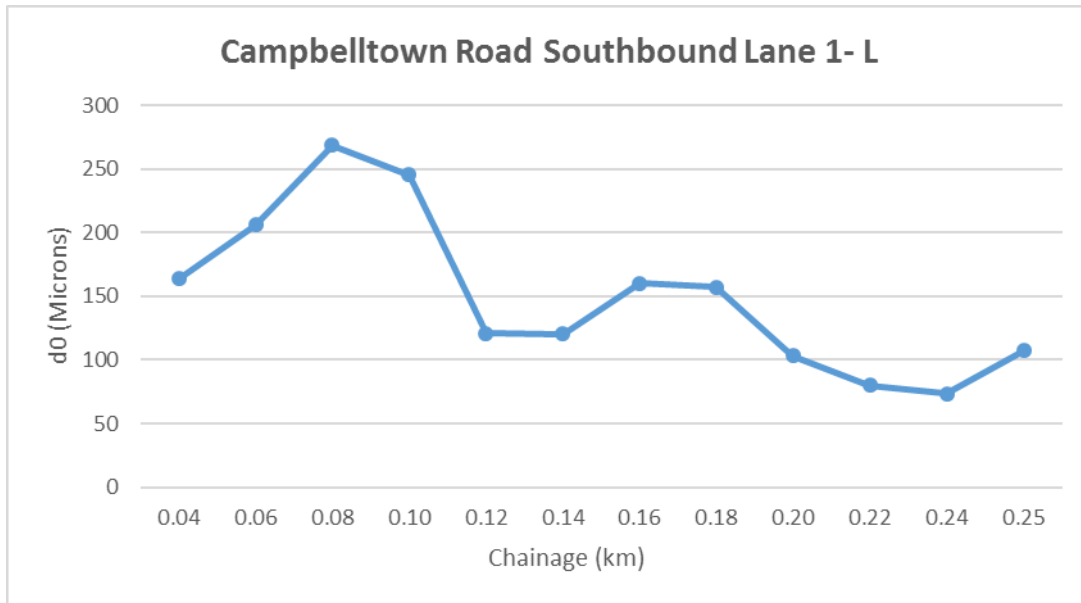


Figure 3.16: Deflection (d0) for Campbelltown Road Southbound Lane 1 right wheel path

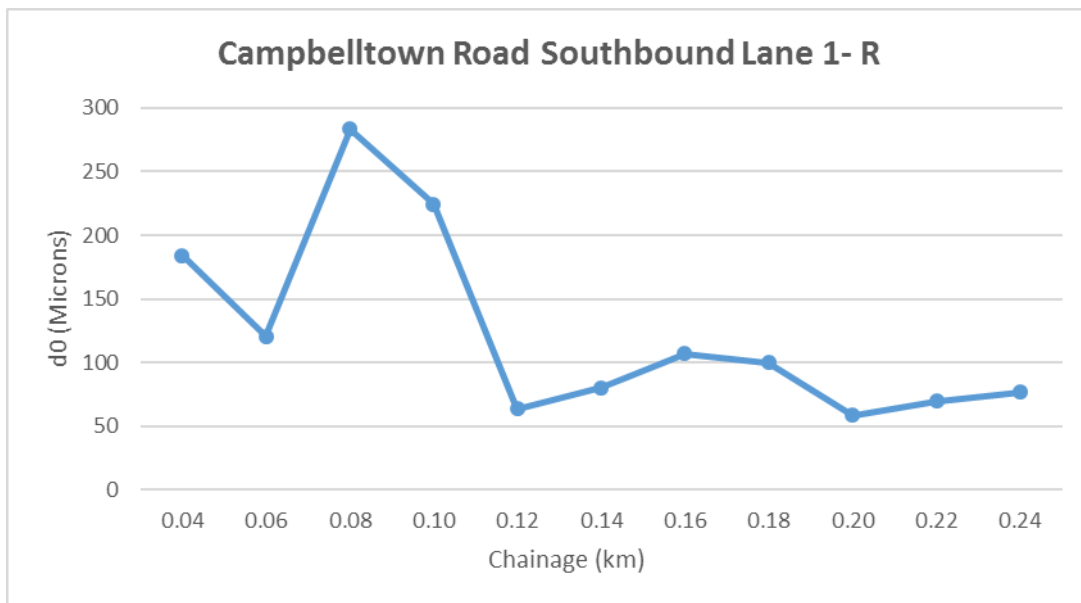


Figure 3.17: Deflection (d0) for Campbelltown Road Southbound Lane 2 left wheel path

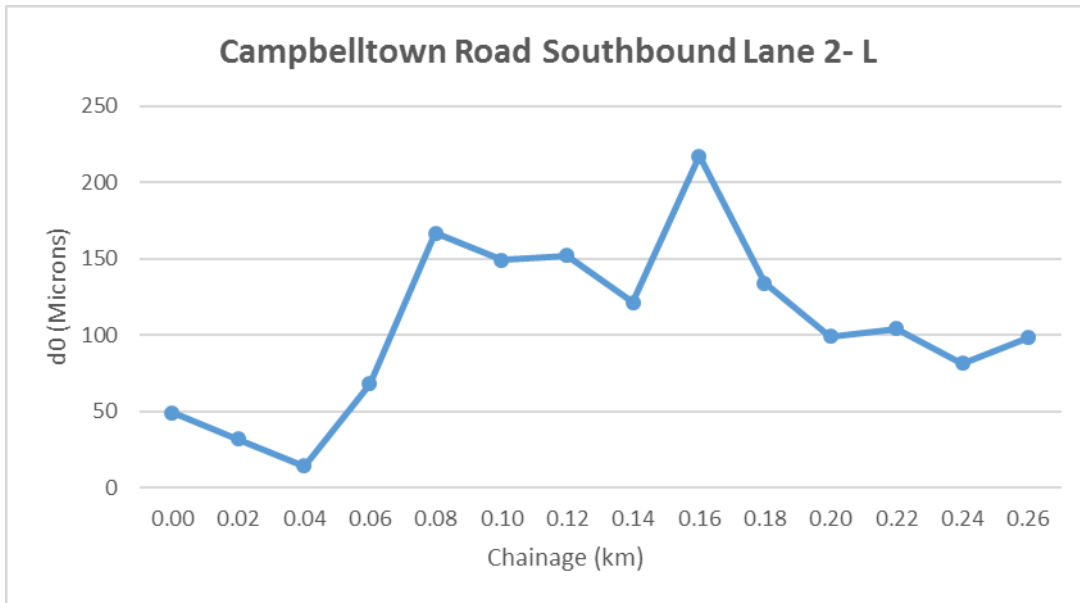


Figure 3.18: Deflection (d0) for Campbelltown Road Southbound Lane 2 right wheel path

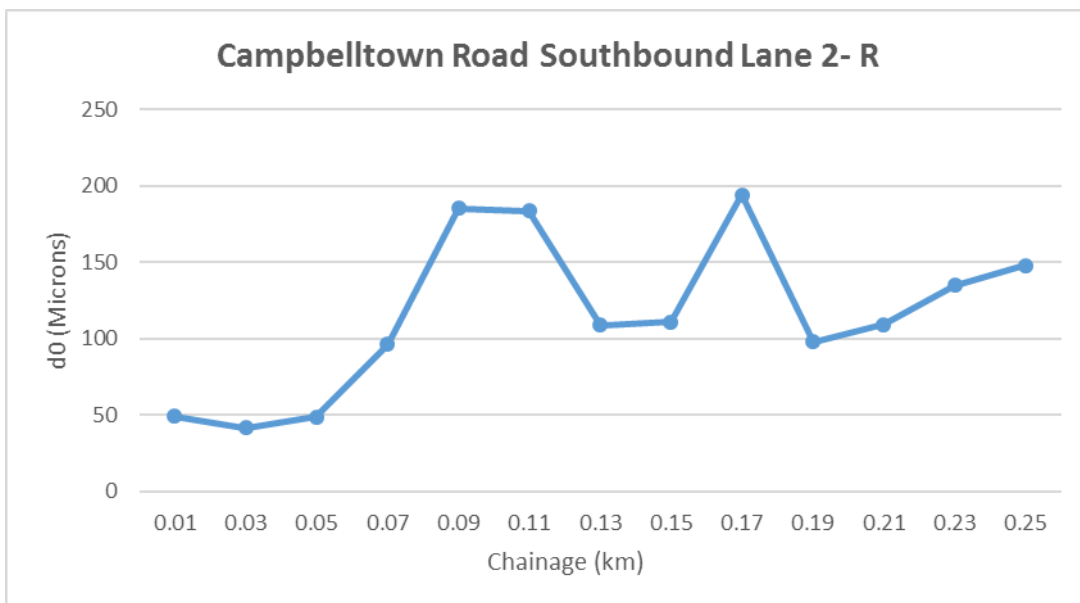


Figure 3.19: Deflection (d0) for Campbelltown Road Southbound Lane 3 left wheel path

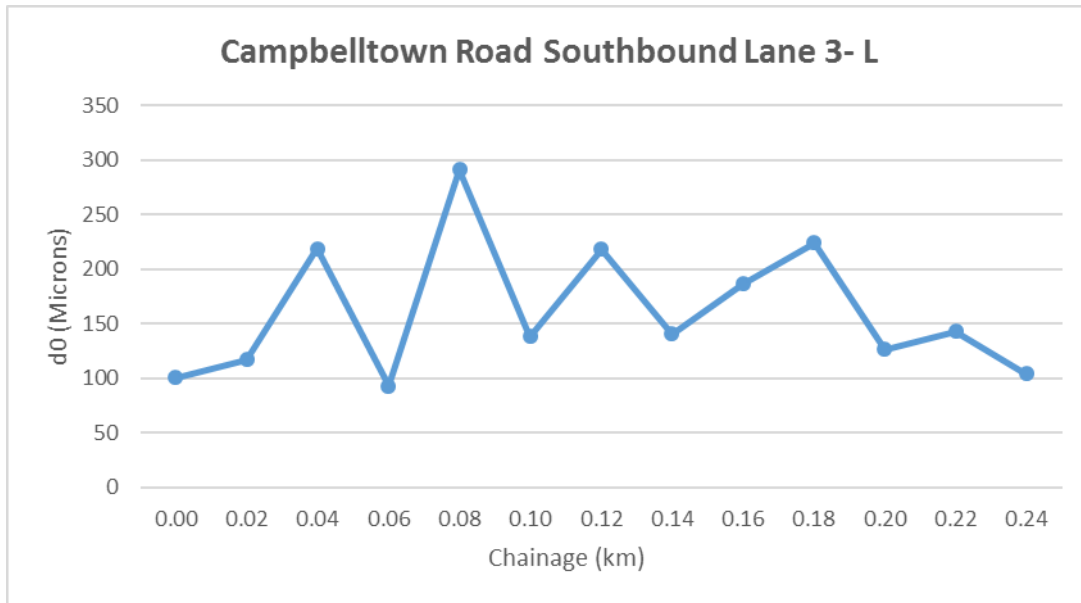


Figure 3.20: Deflection (d0) for Campbelltown Road Southbound Lane 3 right wheel path

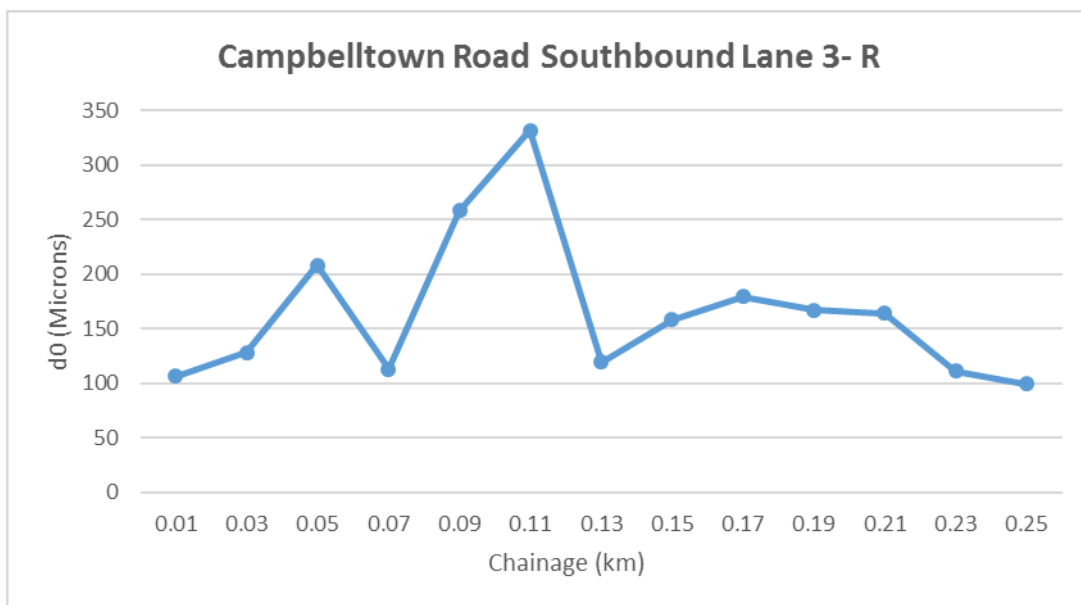


Figure 3.21: Deflection (d0) for Campbelltown Road Southbound Lane 4 left wheel path

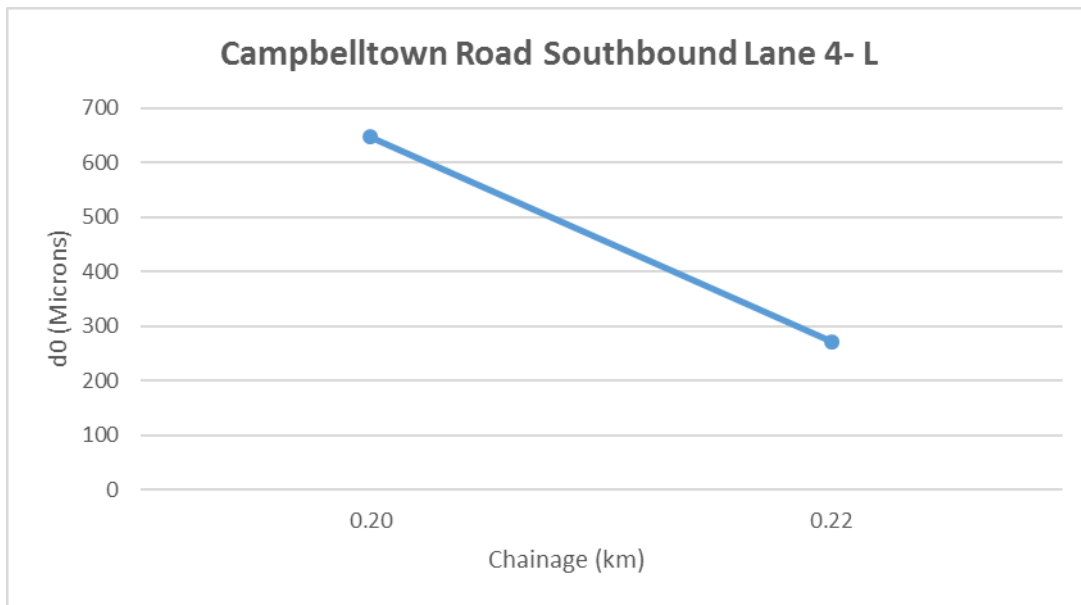


Figure 3.22: Deflection (d0) for Campbelltown Road Southbound Lane 4 right wheel path

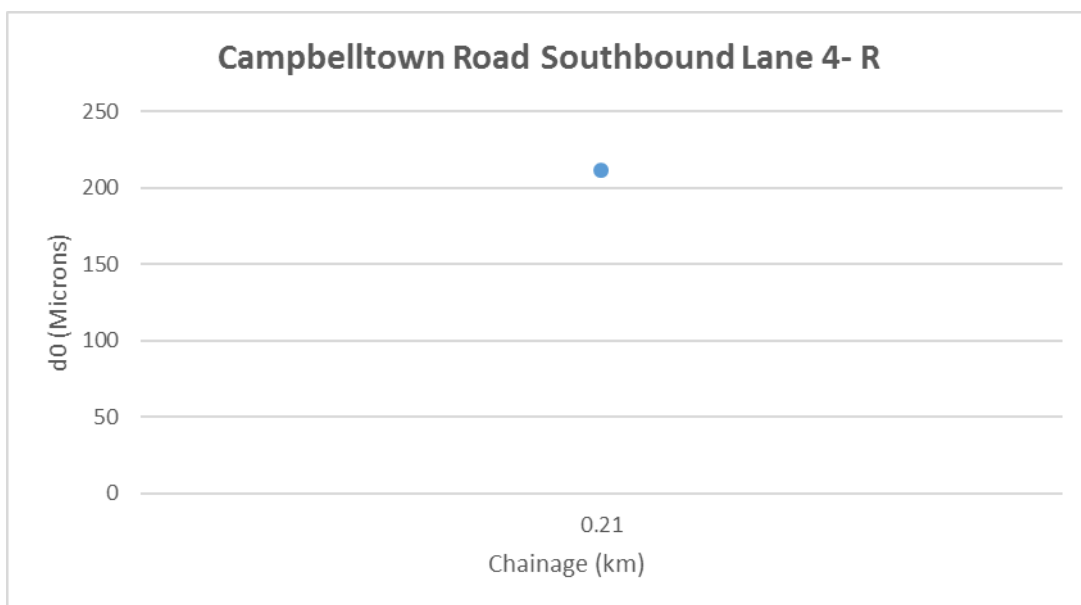


Figure 3.23: Deflection (d0) for Canterbury Road Roundabout Clockwise Lane 1 left wheel path

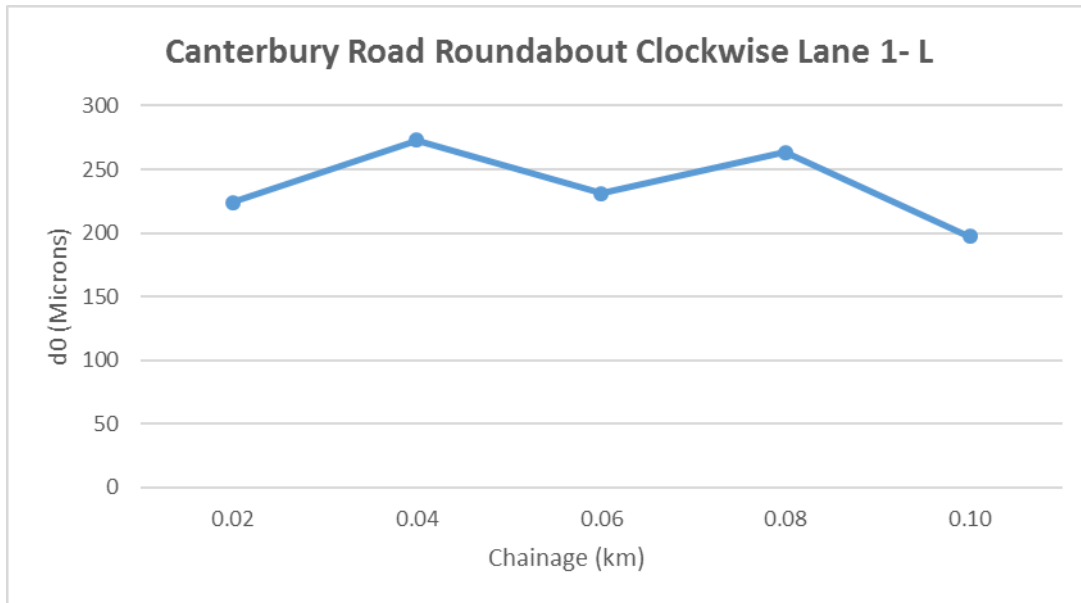


Figure 3.24: Deflection (d0) for Canterbury Road Roundabout Clockwise Lane 1 right wheel path

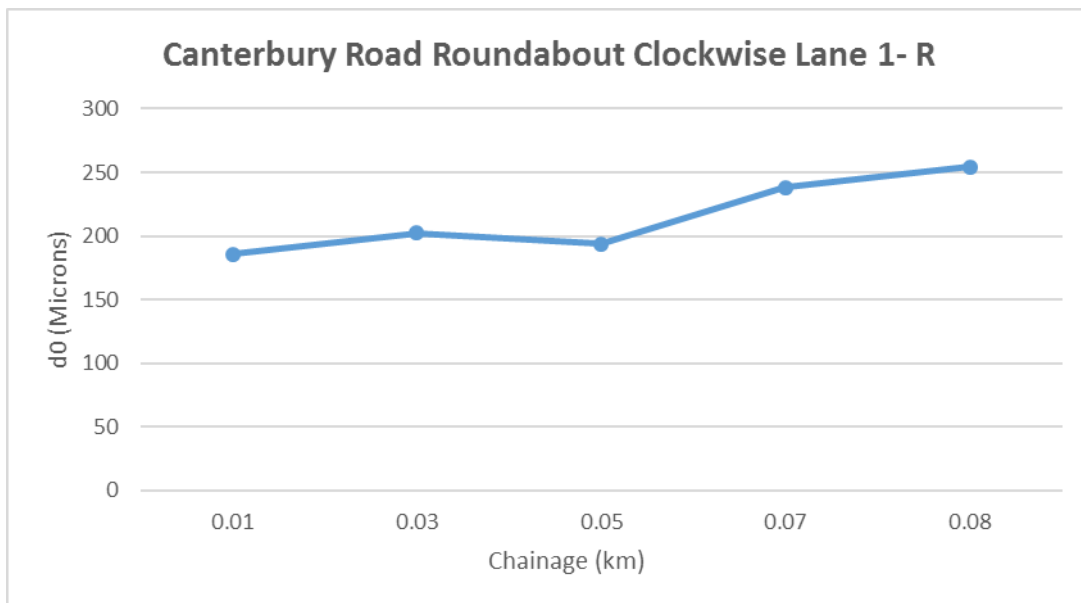


Figure 3.25: Deflection (d0) for Canterbury Road Roundabout Clockwise Lane 2 left wheel path

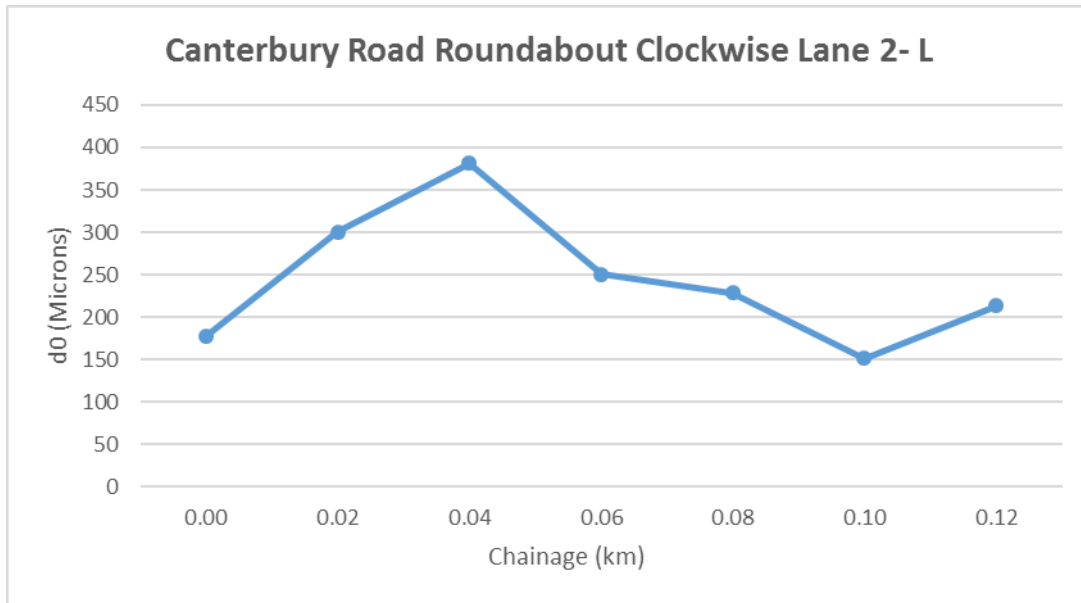


Figure 3.26: Deflection (d0) for Canterbury Road Roundabout Clockwise Lane 2 right wheel path

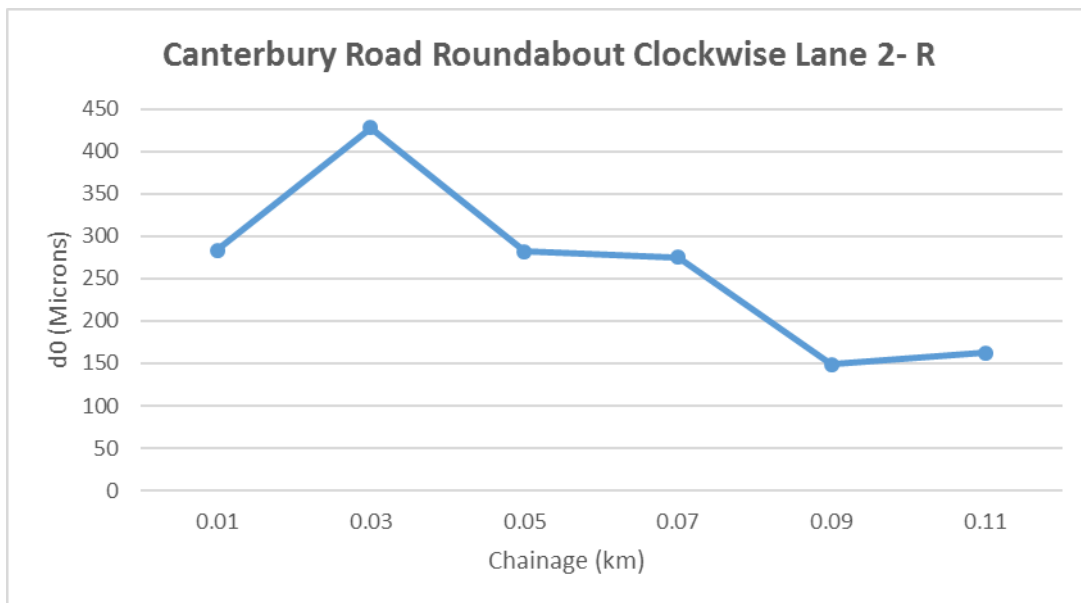


Figure 3.27: Deflection (d0) for Glenfield Road Eastbound Lane 1 left wheel path

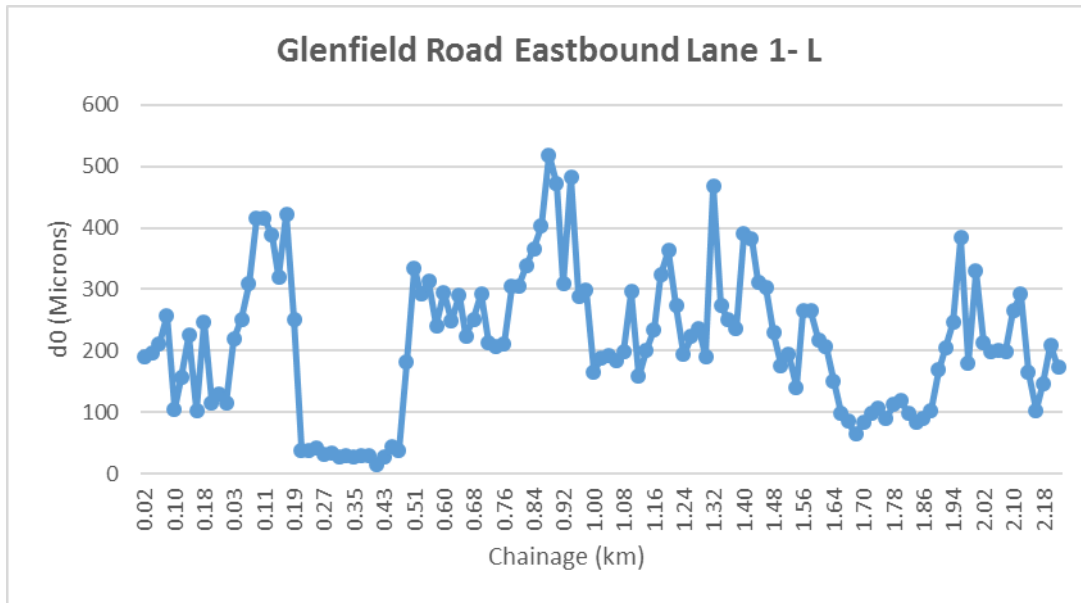


Figure 3.28: Deflection (d0) for Glenfield Road Eastbound Lane 1 right wheel path

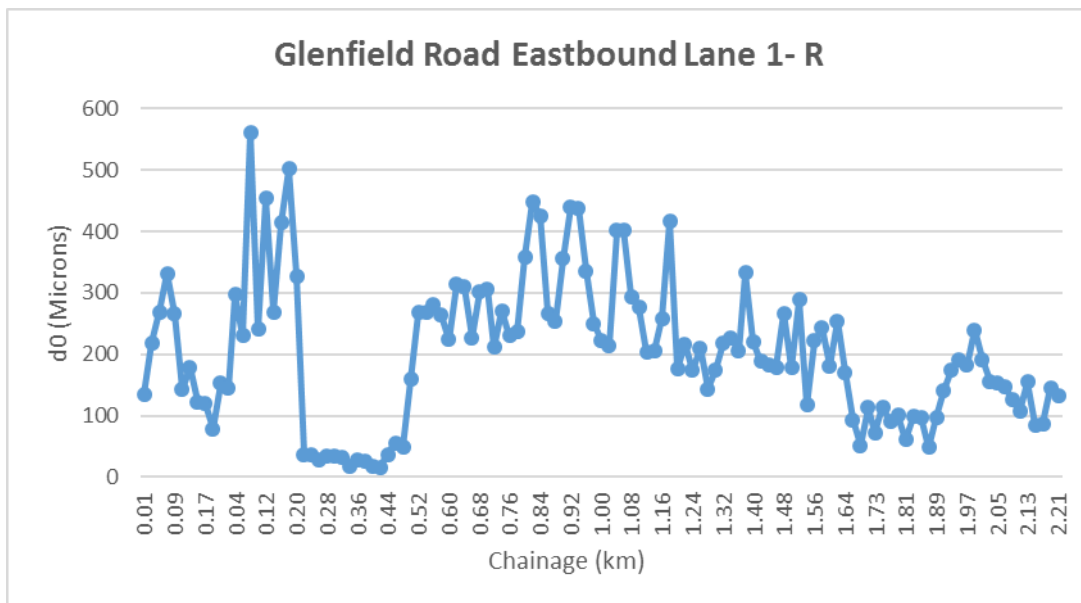


Figure 3.29: Deflection (d0) for Glenfield Road Eastbound Lane 2 left wheel path

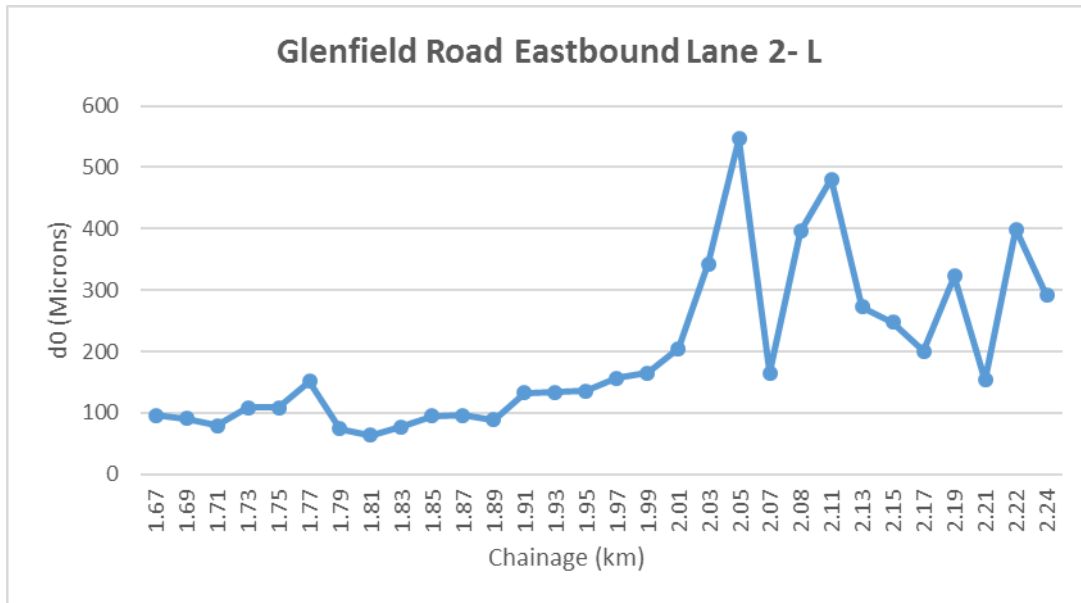


Figure 3.30: Deflection (d0) for Glenfield Road Eastbound Lane 2 right wheel path

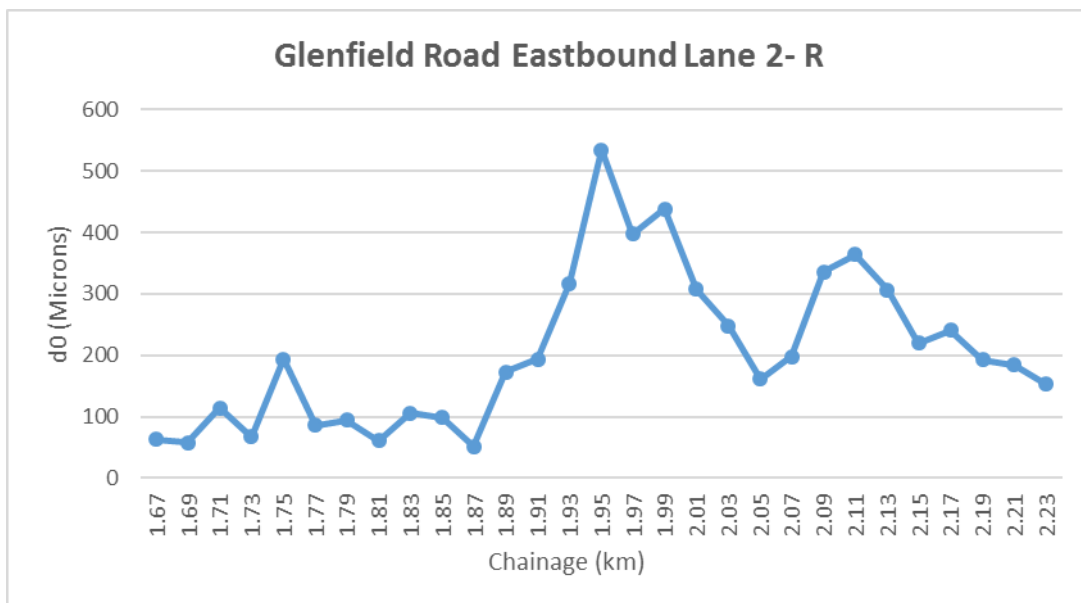


Figure 3.31: Deflection (d0) for Glenfield Road Westbound Lane 1 left wheel path

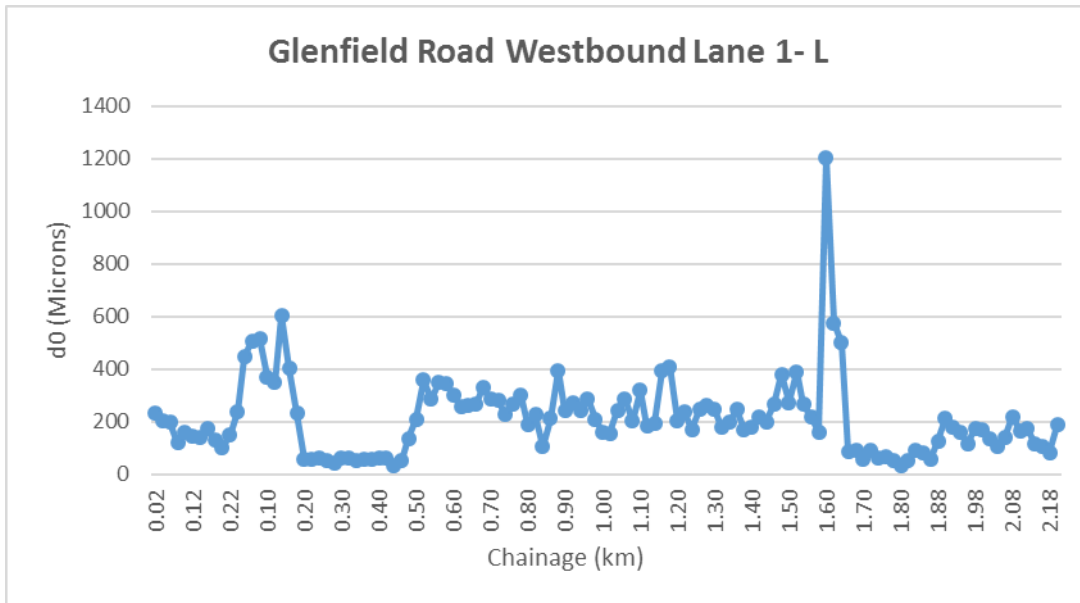


Figure 3.32: Deflection (d0) for Glenfield Road Westbound Lane 1 right wheel path

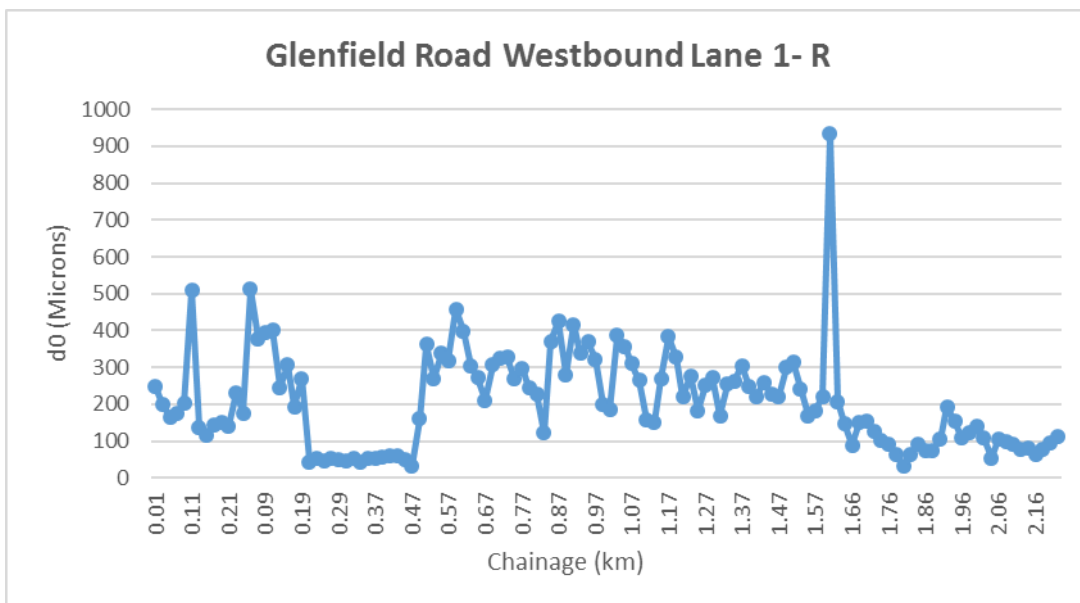


Figure 3.33: Deflection (d0) for Glenfield Road Westbound Lane 2 left wheel path

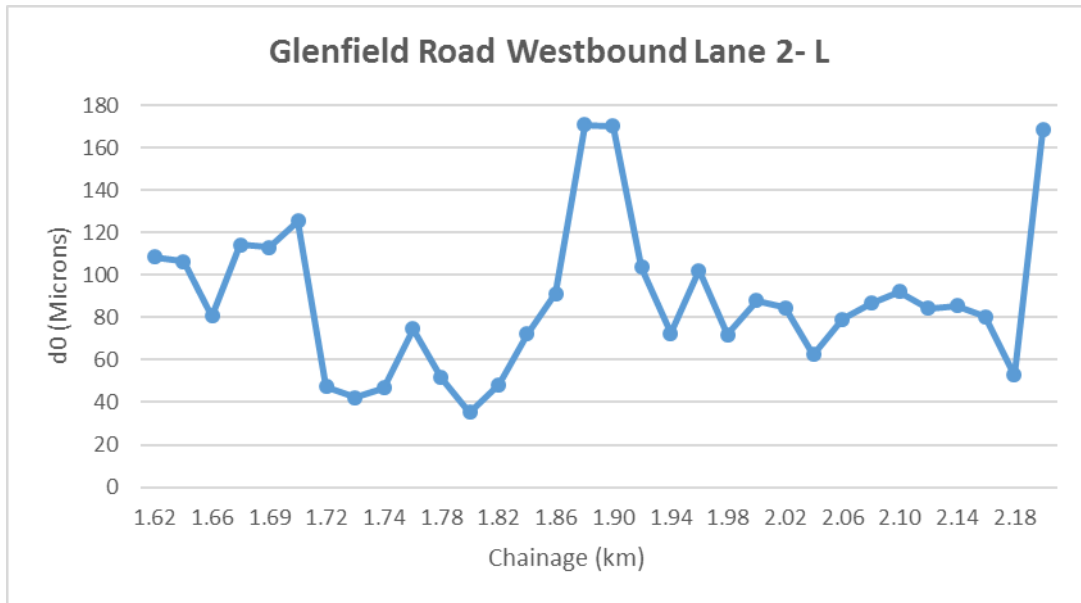


Figure 3.34: Deflection (d0) for Glenfield Road Westbound Lane 2 right wheel path

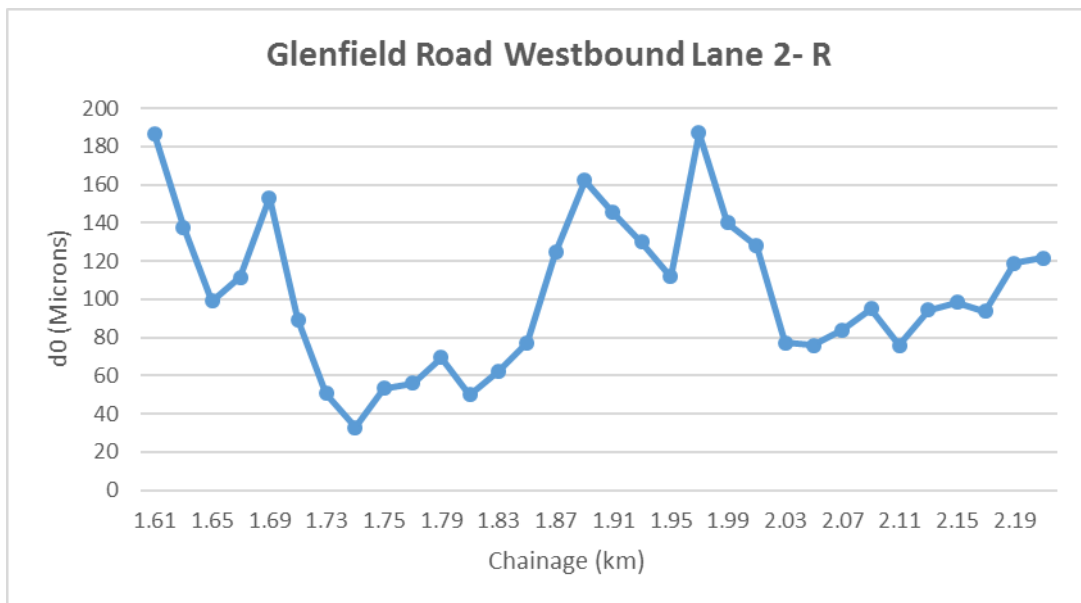


Figure 3.35: Deflection (d0) for Glenfield Road Westbound Lane 3 left wheel path

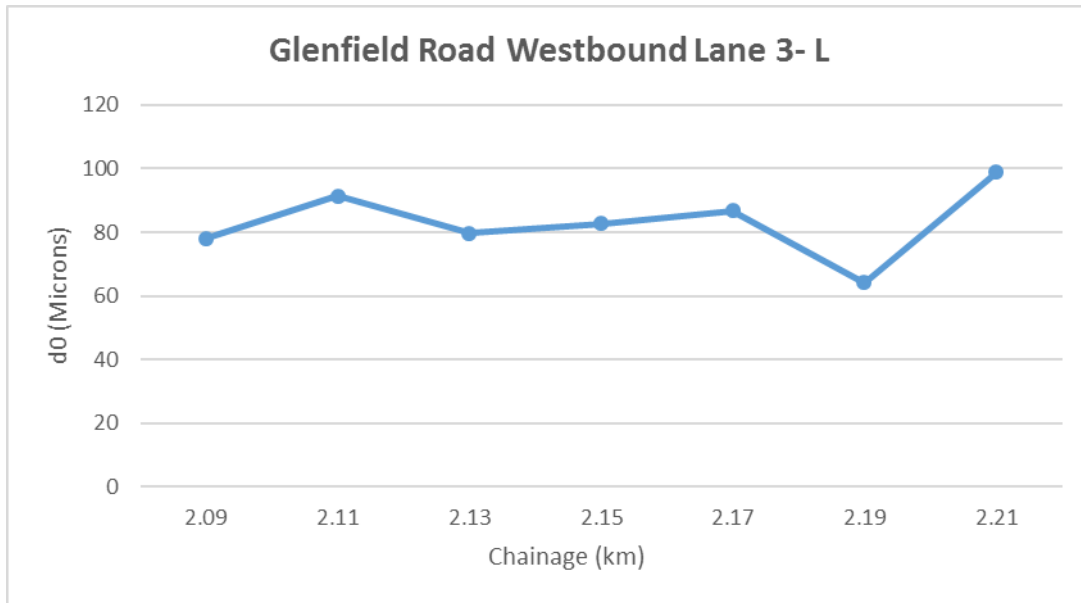


Figure 3.36: Deflection (d0) for Glenfield Road Westbound Lane 3 right wheel path

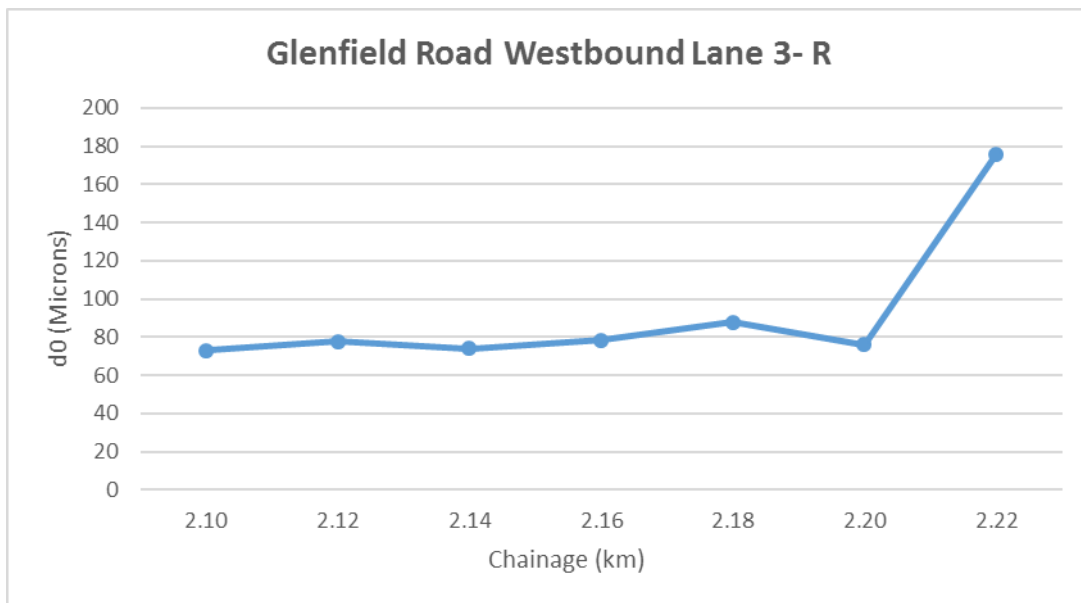


Figure 3.37: Deflection (d0) for Moorebank Ave Northbound Lane 1 left wheel path

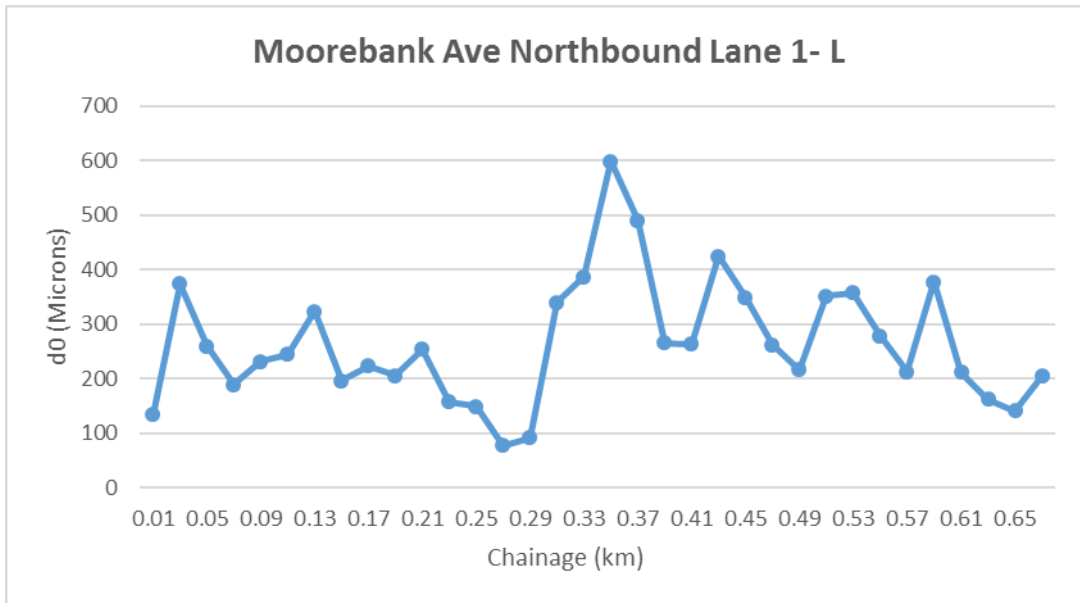


Figure 3.38: Deflection (d0) for Moorebank Ave Northbound Lane 1 right wheel path

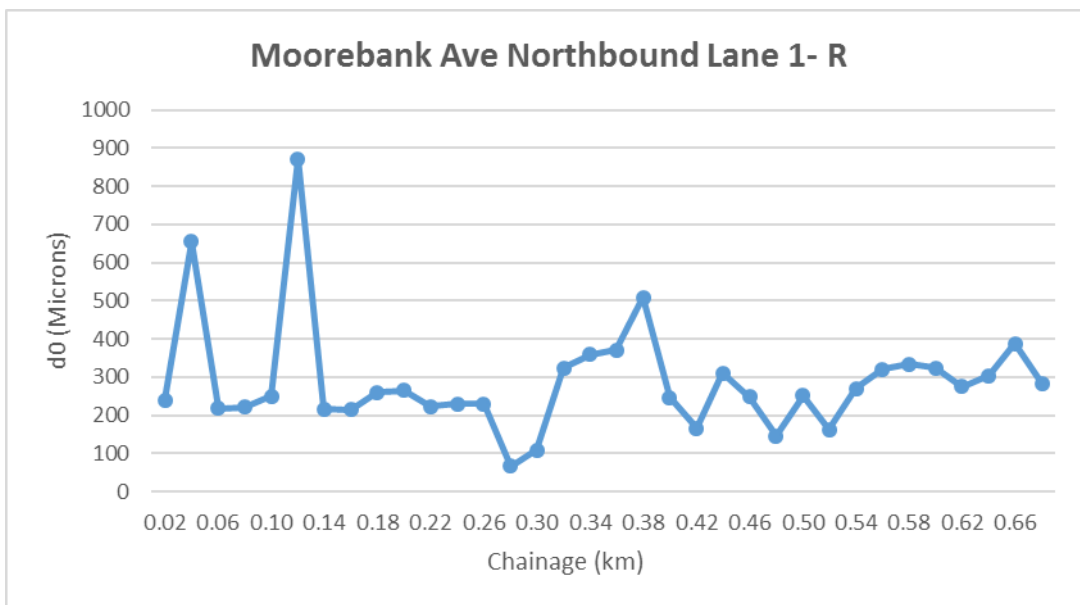


Figure 3.39: Deflection (d0) for Moorebank Ave Southbound Lane 1 left wheel path

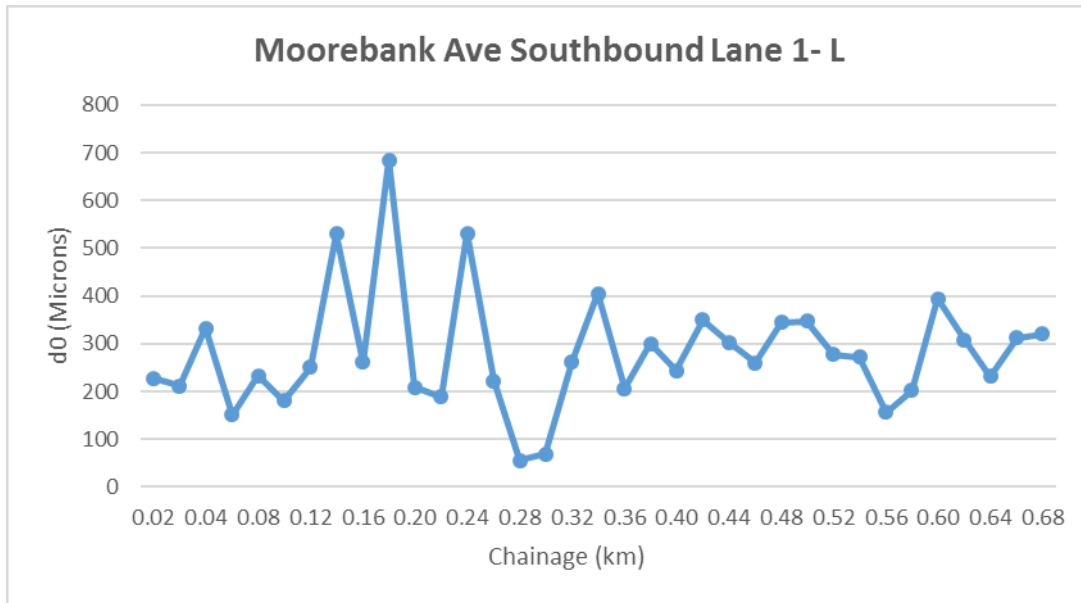


Figure 3.40: Deflection (d0) for Moorebank Ave Southbound Lane 1 right wheel path

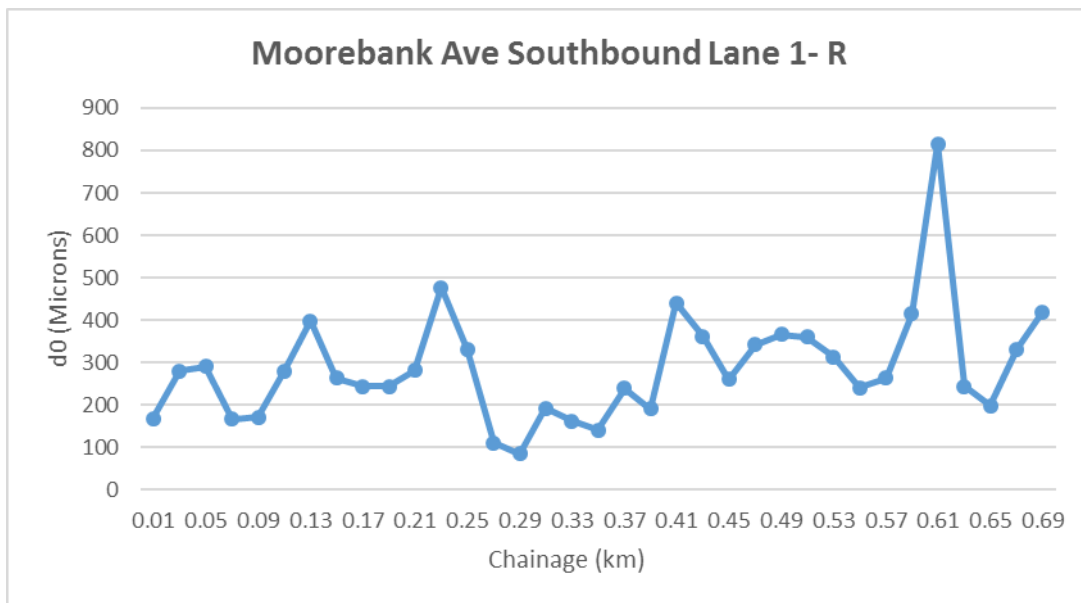


Figure 3.41: Deflection (d0) for Railway Station Roundabout Clockwise Lane 1 left wheel path

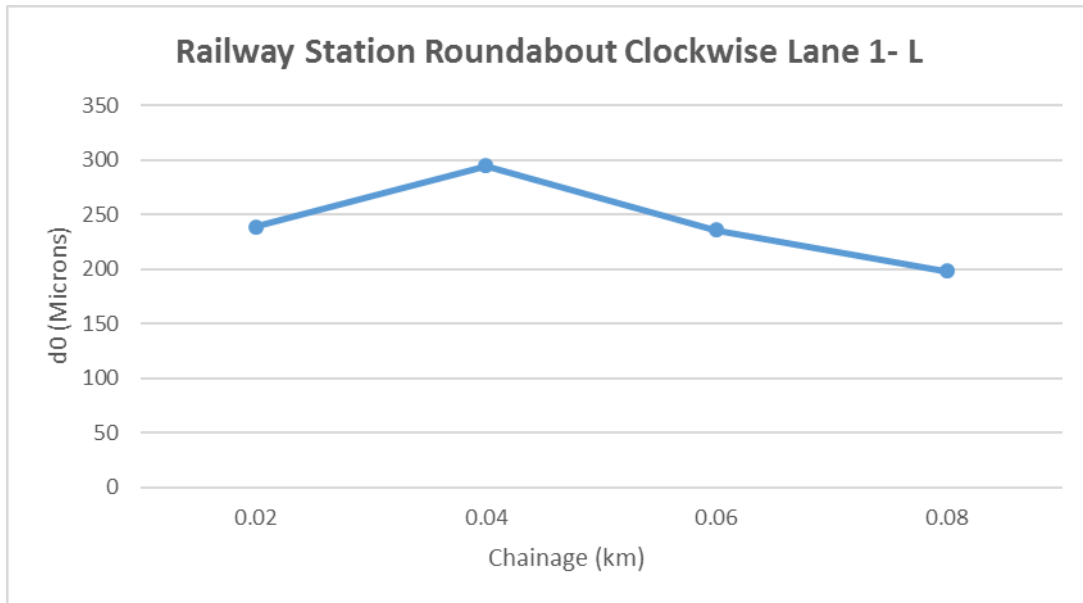
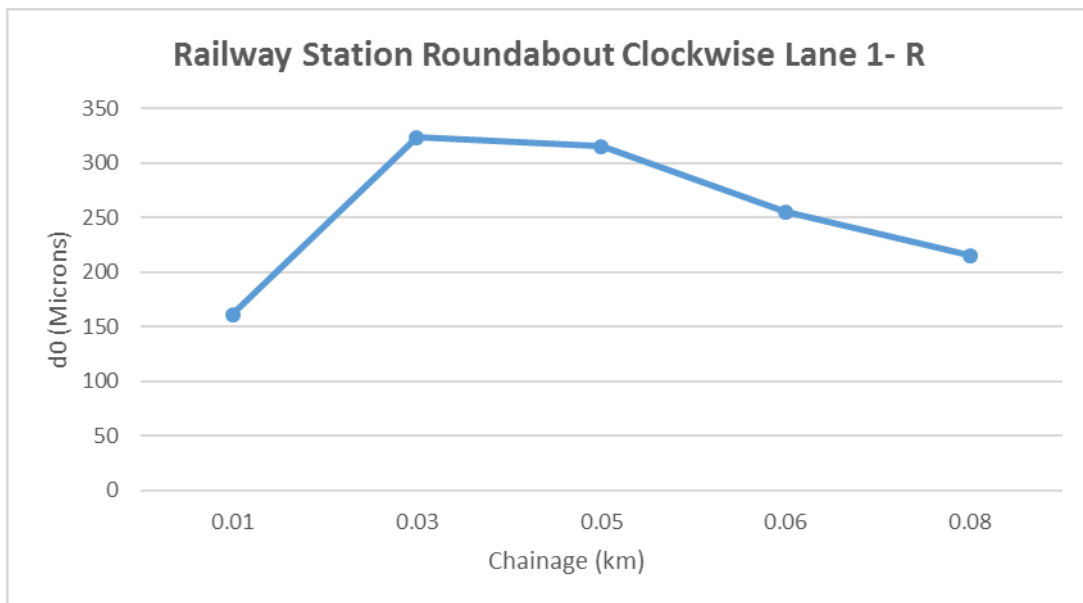


Figure 3.42: Deflection (d0) for Railway Station Roundabout Clockwise Lane 1 right wheel path



Glenfield Road westbound lane 1 left wheel at 1.6km is found with over 1000 microns deflection, which might indicate potential weak pavement structure. Road sections with close to 1000 microns deflection points include 1.6km of Glenfield Road westbound lane 1 right wheel path and Cambridge Avenue westbound lane 1 right lane.

4 CONCLUSIONS

The findings of the new baseline pre-construction condition assessment are as follows:

- Glenfield Road at 1.6km westbound lane 1 left wheel is found with over 1000 microns deflection, which might indicate potential weak pavement structure.
- All other sections are at good deflection state.

5 DATA FILES

The following data files have been delivered:

Survey date	Data files
29/03/2017	PSS16279 FWD_CPB Contractors_Intermodal Terminal.xlsx