Amendment C124 to the Mitchell Shire Planning Scheme

Planning Panels Victoria

Panel Hearing Date: 12th March, 2019

Report Date: 26th February, 2019

Prepared For: Lascorp Development Group (Aust) Pty Ltd

STATEMENT TO PLANNING PANELS VICTORIA BY HENRY TURNBULL, TRAFFIC ENGINEER
Traffic Engineering Assessment

Amendment C124 to the Mitchell Shire Planning Scheme

Proposed Mixed-Use Development

Document Control

<table>
<thead>
<tr>
<th>Issue No.</th>
<th>Type</th>
<th>Date</th>
<th>Prepared By</th>
<th>Approved By</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Initial Issue</td>
<td>26/02/20192nd</td>
<td>D. Milder/H. Turnbull</td>
<td>H. Turnbull</td>
</tr>
<tr>
<td></td>
<td></td>
<td>February 2019</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Our Reference: G16707A-01B
# Table of Contents

1 Executive Summary ............................................................................................................ 1
  1.1 Introduction .................................................................................................................. 1
  1.2 Qualifications and Experience....................................................................................... 1
  1.3 Summary of Opinions..................................................................................................... 1

2 Amendment C124 .................................................................................................................. 2

3 Background .......................................................................................................................... 2

4 Existing Conditions ............................................................................................................. 3
  4.1 Subject Site .................................................................................................................... 3
  4.2 Land Use ....................................................................................................................... 5
  4.3 Road Network ............................................................................................................... 6
  4.4 Existing Traffic Volumes .............................................................................................. 7

5 Proposal ............................................................................................................................... 8

6 Site Access .......................................................................................................................... 9
  6.1 Northern Highway Access ............................................................................................ 9
  6.2 Clarke Street Access ..................................................................................................... 9

7 Car Parking Assessment ...................................................................................................... 10
  7.1 Statutory Parking Requirement ..................................................................................... 10
  7.2 Car Parking Layout ....................................................................................................... 11

8 Traffic Considerations ......................................................................................................... 12
  8.1 Traffic Generation ......................................................................................................... 12
  8.1.1 Supermarket and Shops .......................................................................................... 12
  8.1.2 Medical Centre ........................................................................................................ 12
  8.1.3 Summary ................................................................................................................ 12
  8.2 Traffic Distribution ....................................................................................................... 13
  8.3 Traffic Impact ............................................................................................................... 14
  8.3.1 Northern Highway .................................................................................................. 14
  8.3.2 Clarke Street .......................................................................................................... 14
  8.3.3 Northern Highway/Clarke Street Intersection ................................................................ 14

9 Bicycle Facilities .................................................................................................................. 16

10 Loading ............................................................................................................................... 17

11 Submissions ....................................................................................................................... 18

12 Consideration of Draft Permit Conditions ....................................................................... 19

13 Summary of Opinions ....................................................................................................... 22
1 Executive Summary

1.1 Introduction

I have been retained by Lascorp Development Group (Aust) Pty Ltd to undertake traffic engineering assessments and prepare traffic evidence in relation to Amendment C124 to the Mitchell Shire Planning Scheme for rezoning and a mixed-use development on the northwest corner of Northern Highway/Clarke Street intersection in Kilmore.

I’ve also been engaged to assess and respond to the submissions in relation to this matter.

In preparing this report, I have relied upon the facts, matters and assumptions detailed in Appendix A.

1.2 Qualifications and Experience

Appendix A contains a statement setting out my qualifications and experience, and the other matters raised by “Planning Panels Victoria – Planning Panels – Expert Evidence”.

Appendix B contains my CV.

1.3 Summary of Opinions

Having undertaken a detailed traffic engineering assessment of the Amendment C124 to the Mitchell Shire Planning Scheme at Clarke Street, Kilmore, I am of the opinion that:

a) the proposed development has a statutory car parking requirement for 242 spaces,
b) the provision of 249 spaces exceeds the statutory parking requirement and the application does not seek a permit to reduce the statutory parking requirement,
c) the proposed car parking layout generally exceeds the design standards of both the relevant requirements of the Planning Scheme and Australian Standards and will operate in an appropriate and acceptable manner,
d) the new access via Northern Highway has been designed in accordance with Austroads Guide to Road Design Part 4A to cater for vehicles including semitrailers, and will operate in a safe and effective manner,
e) the proposed roadworks on Clarke Street and the Northern Highway will mitigate against any adverse impacts to the operation of Northern Highway, Clarke Street or the Northern Highway/Clarke Street signalised intersection,
f) the provision of bicycle parking and end of trip facilities is in accordance with Clause 52.34 of the Planning Scheme,
g) adequate loading provisions are made for the proposed development,
h) the VicRoads’ draft permit conditions concerning the functional layout plan for the Northern Highway/Clarke Street intersection have been met on the revised functional layout plan at Appendix E, and a suggested amended VicRoads’ condition is included in my Table 8 within, and
i) there are no traffic engineering reasons why the proposed rezoning and shopping centre development at Clarke Street in Kilmore, should not be approved.

2 Amendment C124

Amendment C124 to the Mitchell Shire Planning Scheme applies to 109 Northern Highway and 80 Clarke Street in Kilmore.

The Amendment is a combined Planning Scheme amendment and planning permit application. Specifically, the amendment will result in the following changes to the Mitchell Shire Planning Scheme:

- Rezone the land at 109 Northern Highway and 80 Clarke Street to the Commercial 1 Zone; and
- Amend Planning Scheme Map No. 16.

The Planning permit application seeks approval for

- Buildings and works associated with the development of a supermarket, associated shops and medical centre;
- Removal of native vegetation;
- Creation of an access to a road in a Road Zone Category 1; and
- The use of land for the sale of liquor.

3 Background

Traffix Group has been involved with this site from inception and I have been involved with the provision of traffic engineering advice and the preparation of the traffic report which accompanies the exhibited documents.

Since exhibition of the development plan, a number of amendments have been made in order to address matters that were raised as draft permit conditions, at the time.

As a consequence, the current plan before the panel is 160082/TP0D dated 1 February 2019 and it is this plan which I rely on for this evidence statement.
4 Existing Conditions

4.1 Subject Site

The subject site is located on the northwest corner of Clarke Street/Northern Highway intersection in Kilmore, as shown on the locality plan at Figure 1.

![Subject Site](source: maps.google.com.au)

**Figure 1: Locality Map**

The subject site is currently vacant undeveloped land.

An aerial image of the subject site and surrounds is presented at Figure 2.
Figure 2: Aerial View of Subject Site and Surrounds
4.2 Land Use

The subject site is located within an Industrial 1 Zone under the Mitchell Planning Scheme as shown in Figure 3 below.

Significant non-residential land uses nearby to the site include:

- McDonalds Restaurant on the south side of Clarke Street,
- Coles Supermarket on the south side of Clarke Street,
- BP service station on the east side of Northern Highway, southeast of the site,
- Coles Express service station on the south side of Clarke Street, and
- industrial and warehouse uses to the west of the site.
4.3 Road Network

**Northern Highway** in the vicinity of the subject site is a VicRoads declared road (Road Zone Category 1). Northern Highway extends in a north-south direction between Midland Highway to the north and Hume Freeway to the south.

In the vicinity of the subject site, Northern Highway is constructed with an undivided carriageway comprising a single lane of through traffic in each direction.

A posted speed limit of 60km/h applies to Northern Highway.

The intersection of Northern Highway/Clarke Street is signalised and Northern Highway provides dedicated left and right turn lanes on its approaches to the intersection.

**Clarke Street** is a local road that is aligned in an east-west direction.

In the vicinity of the subject site, Clarke Street is constructed with a sealed 8.9 metre (approx.) wide carriageway.

The urban default speed limit of 50km/h applies to Clarke Street.

The intersection of Clarke Street/Murray Street is to be upgraded to a roundabout as part of the Eden Rise Estate – Stage 1. A plan prepared by Ausnet for this development showing the upgraded intersection is attached at Appendix C.
4.4 Existing Traffic Volumes

Traffix Group has sourced traffic volume data from VicRoads open data portal for Tuesday 12th February, 2018 at the intersection of Clarke Street/Northern Highway in Kilmore\(^1\).

A turning movement diagram of the intersection is presented at Figure 4 below.

---

\(^{1}\) I note that not each of the movements is counted individually however, due to the east part of Clarke Street not being constructed, I have assigned negligible movements to the east.
5 Proposal

The proposal is for the development of a shopping centre comprising the following uses:

Table 1: Schedule of Uses

<table>
<thead>
<tr>
<th>Use</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarket</td>
<td>3,600m²</td>
</tr>
<tr>
<td>Retail/Specialty Shop</td>
<td>1,135m³</td>
</tr>
<tr>
<td>Medical Centre</td>
<td>5 practitioners (300m²)</td>
</tr>
<tr>
<td>Car Parking</td>
<td>249 spaces</td>
</tr>
<tr>
<td>Bicycle Parking</td>
<td>30 spaces</td>
</tr>
</tbody>
</table>

I note that there are minor variations in the area calculations on the final plan however, I am instructed that the areas included in the table above are the relevant ones for the purpose of the amendment.

The application proposes a loading bay for the supermarket.

Access to the site is proposed via two new crossovers on Clarke Street and a new access to the Northern Highway.

A copy of the development plan prepared by Clarke Hopkins Clarke (160082/TP0D dated 1 February 2019), is attached at Appendix D.
6 Site Access

6.1 Northern Highway Access

Traffix Group has prepared a concept access layout plan in conjunction with VicRoads’ engineers for a new access on Northern Highway. This access includes the construction of a new left turn deceleration lane for northbound traffic on Northern Highway.

Based on an operating speed of 60km/h the left turn deceleration lane has been designed at 50 metres (including 20 metres taper)².

This access will provide left-in/left-out movements only.

A copy of the functional layout plans (Traffix Group Drawing No. 16707-01 and 16707-02) for the proposed access via Northern Highway is attached at Appendix E.

6.2 Clarke Street Access

Traffix Group has prepared a concept access layout plan for the proposed access points via Clarke Street.

A copy of the functional layout plan for the proposed access points via Clarke Street is attached at Appendix E.

² I note that part of the deceleration lane is provided within the intersection.
7 Car Parking Assessment

7.1 Statutory Parking Requirement

Clause 52.06 of the Planning Scheme sets out the statutory requirements for car parking as summarised at Table 2. The purpose of Clause 52.06 is:

- To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not adversely affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

Table 2: Statutory Car Parking Requirements

<table>
<thead>
<tr>
<th>Use</th>
<th>Measure</th>
<th>Rate</th>
<th>Requirement(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarket</td>
<td>3,600m²</td>
<td>5 spaces per 100m² of leasable floor area</td>
<td>180 spaces</td>
</tr>
<tr>
<td>Shop</td>
<td>1,135m²</td>
<td>4 spaces per 100m² of leasable floor area</td>
<td>45 spaces</td>
</tr>
<tr>
<td>Medical Centre</td>
<td>5 Practitioners</td>
<td>5 spaces to the first person providing health services and 3 spaces to each other person providing health services</td>
<td>17 spaces</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>242 spaces</td>
</tr>
</tbody>
</table>

(1) Clause 52.06-5 states ... “If in calculating the number of car spaces the result is not a whole number, the required number of car parking spaces is to be rounded down to the nearest whole number.”

The proposed development provides 249 parking spaces which exceeds the statutory requirement set out at Clause 52.06 and accordingly, the application is not seeking a permit to reduce the statutory car parking requirement.
7.2 Car Parking Layout

The proposed car parking layout and access arrangements have been assessed under the relevant sections of the Planning Scheme and the relevant Australian Standards.

Key elements of the design include:

**Design Standard 1 – Accessways**

- All accessways are at least 6.1m wide which allows for simultaneous two-way traffic flow.
- All vehicles can exit the site in a forwards direction in accordance with the requirements of the Planning Scheme.
- Adequate pedestrian sight triangles will be available at all the proposed crossovers.
- Articulated vehicles (i.e. 19m semi-trailer) are expected to enter via Northern Highway and exit via Clarke Street for the purposes of deliveries for the supermarket.

**Design Standard 2 – Car Parking Spaces**

- All standard car spaces are provided with dimensions in excess of the minimum requirements of the Planning Scheme.
- The proposed disabled car spaces are provided in accordance with AS/NZS 2890.6:2009.

Based on the foregoing, I am satisfied that the proposed car parking layout arrangements are appropriate and will work well.
8 Traffic Considerations

8.1 Traffic Generation

8.1.1 Supermarket and Shops

Traffix Group has recently undertaken detailed traffic generation counts of a similar site on the corner of Archer Street and Benalla Road in Shepparton, Victoria. Surveys were carried out on a Friday (busiest weekday) from 12:30pm-6:00pm. The peak hour was from 4:00pm-5:00pm when 751 vehicle movements were recorded for a floor area of approximately 6,800m², i.e. 11 vehicles per 100m².

Based on the floor area of the supermarket and shops of the proposed development, this would equate to in the order of 520 movements in the PM peak hour.

Allowing for the adjacent competition and the difference in the overall market catchment, I believe that the development is likely to achieve up to 75% of the Shepparton centre. Accordingly, I have adopted 390 movements in the PM peak hour as an appropriate estimation of the design traffic generation.

8.1.2 Medical Centre

The likely traffic generation for the proposed medical centre development is estimated from first principles, based on the following assumptions:

- consultations will be by appointment with an average consultation time of 12 minutes,
- all patients will drive to the site, i.e. up to 10 vehicle trip-ends per practitioner each hour (5 arriving and 5 leaving), and
- approximately 40% of patient trips will be shared shopping trips.

Based on the above assumptions, it is anticipated that 30 vehicle trip-ends may be generated by the site during any one hour. Staff would typically arrive prior to the scheduled appointment times, and depart after the last appointment, and accordingly the staff vehicle movements would not coincide with the busiest hour.

8.1.3 Summary

Based on the above assessments, up to 420 vehicle movements may be generated by the proposed development in the PM peak period.
8.2 Traffic Distribution

Based on the locality of the site in relation to the town centre of Kilmore and residential area I have made the following assumptions with relation to traffic distribution:

- there will be a 50/50 split of traffic entering and exiting the site,
- 50% of traffic will be to and from the south (town centre),
  - i) 90% via Northern Highway, and
  - ii) 10% via Clarke Street.
- 30% via Clarke Street to and from the west.
- 20% will be to and from the north.

Based on the above assumption, traffic movements generated to and from the site at some ten years after opening may be as shown in Figure 5.

![Traffic Distribution Diagram](image-url)

Figure 5: Traffic Distribution at 10 Years Post Centre Opening
8.3 Traffic Impact

8.3.1 Northern Highway

As part of the proposed development, a new access point is to be created via Northern Highway. This access point is to include a left turn deceleration lane. The deceleration lane will allow for vehicles entering the development to do so without impacting on the through movements on Northern Highway. The introduction of up to 42 new movements out onto Northern Highway will not have any adverse impacts as gaps will be created due to the downstream signals approximately 45m from the egress location.

8.3.2 Clarke Street

I understand that Clarke Street will ultimately be a connector street as part of the Murray Street project. Accordingly, the increased number of movements within Clarke Street is still well within the environmental capacity of a connector street and I believe the road will operate well.

8.3.3 Northern Highway/Clarke Street Intersection

Traffix Group has undertaken a SIDRA intersection analysis of Northern Highway/Clarke Street intersection for existing conditions, Centre Opening (assuming 50% of ultimate traffic generation), 10 years post Centre Opening (no Kilmore Bypass) and 10 years post Centre Opening (Kilmore Bypass).

Having regard to Table 8-3 of the Kilmore Wallan Bypass, the construction of the Kilmore Bypass (Western Route) will result in a reduction of 24% of daily traffic volumes on Northern Highway in Kilmore. Accordingly, the same reduction has been made to predict future traffic volumes 10 years post centre opening bypass construction scenario.

A summary of the SIDRA outputs for the intersection is shown in Tables 3 to 5.

Table 3: SIDRA Degree of Saturation Comparison

<table>
<thead>
<tr>
<th>Approach</th>
<th>Degree of Saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td>South – Northern Highway</td>
<td>0.501</td>
</tr>
<tr>
<td>East – Clarke Street</td>
<td>0.112</td>
</tr>
<tr>
<td>North – Northern Highway</td>
<td>0.394</td>
</tr>
<tr>
<td>West – Clarke Street</td>
<td>0.487</td>
</tr>
</tbody>
</table>

1 SIDRA has been run with standard settings for all future assessments
4 These intersections are assessed on the basis of no pedestrian crossing on the southern leg.
Table 4: SIDRA Average Delay Comparison

<table>
<thead>
<tr>
<th>Approach</th>
<th>Average Delay (sec)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Centre Opening</td>
<td>10 Years Post Centre Opening (No Bypass)</td>
<td>10 Years Post Centre Opening (Bypass)</td>
</tr>
<tr>
<td>South – Northern Highway</td>
<td>13.7</td>
<td>24.7</td>
<td>47.0</td>
<td>27.1</td>
</tr>
<tr>
<td>East – Clarke Street</td>
<td>43.0</td>
<td>43.0</td>
<td>43.0</td>
<td>43.0</td>
</tr>
<tr>
<td>North – Northern Highway</td>
<td>15.7</td>
<td>13.3</td>
<td>15.0</td>
<td>15.6</td>
</tr>
<tr>
<td>West – Clarke Street</td>
<td>35.6</td>
<td>35.4</td>
<td>45.1</td>
<td>35.4</td>
</tr>
</tbody>
</table>

Table 5: SIDRA 95th Percentile Queue Length Comparison

<table>
<thead>
<tr>
<th>Approach</th>
<th>95th Percentile Queue (m)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Centre Opening</td>
<td>10 Years Post Centre Opening (No Bypass)</td>
<td>10 Years Post Centre Opening (Bypass)</td>
</tr>
<tr>
<td>South – Northern Highway</td>
<td>83.2</td>
<td>115.0</td>
<td>204.9</td>
<td>110.9</td>
</tr>
<tr>
<td>East – Clarke Street</td>
<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
</tr>
<tr>
<td>North – Northern Highway</td>
<td>66.1</td>
<td>59.8</td>
<td>77.5</td>
<td>57.9</td>
</tr>
<tr>
<td>West – Clarke Street</td>
<td>47.6</td>
<td>70.9</td>
<td>103.6</td>
<td>87.2</td>
</tr>
</tbody>
</table>

I note that for signalised intersection degrees of saturation (DoS) less than 0.9 are considered good operating conditions. As shown in the above table, the DoS for each approach is less than 0.9 and therefore considered to be acceptable.

While the queues may extend further than the existing conditions, I am of the opinion that the average delay does not represent any significant adverse impacts to the operation of the intersection.

A full copy of the SIDRA outputs is attached at Appendix F.
9 Bicycle Facilities

Clause 52.34 of the Planning Scheme sets out the statutory requirements for bicycle facilities. The purpose of Clause 52.34 is:

- To encourage cycling as a mode of transport.
- To provide secure, accessible and convenient bicycle parking spaces and associated shower and change facilities.

The number of bicycle spaces required under Clause 52.34 is set out below.

Table 6: Statutory Bicycle Parking Requirement

<table>
<thead>
<tr>
<th>Use</th>
<th>Measure</th>
<th>Rate</th>
<th>Requirement(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Retail</td>
<td>1,135m²</td>
<td>1 space to each 300m² of leasable floor area</td>
<td>4 space</td>
</tr>
<tr>
<td>Supermarket</td>
<td>3,600m²</td>
<td>1 space to each 600m² of leasable floor area if the leasable floor area exceeds 1,000m²</td>
<td>6 spaces</td>
</tr>
<tr>
<td>Medical Centre</td>
<td>5 practitioners</td>
<td>1 space to each eight practitioners</td>
<td>1 space</td>
</tr>
<tr>
<td>Shopper/Visitor Retail</td>
<td>1,1135m²</td>
<td>1 space to each 500m² of leasable floor area</td>
<td>2 spaces</td>
</tr>
<tr>
<td>Supermarket</td>
<td>3,600m²</td>
<td>1 space to each 500m² of leasable floor area if the leasable floor area exceeds 1,000m²</td>
<td>7 spaces</td>
</tr>
<tr>
<td>Medical Centre</td>
<td>5 practitioners</td>
<td>1 space to each four practitioners</td>
<td>1 space</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>21 spaces</td>
</tr>
</tbody>
</table>

(1) Clause 52.34 states... “If in calculating the number of bicycle facilities the result is not a whole number, the required number of bicycle facilities is the nearest whole number. If the requirement is one-half, the requirement is the next whole number.”

The proposed development has a statutory requirement for 21 bicycle spaces, comprising 11 employee spaces and 10 visitor spaces.

A total of 30 bicycle parking spaces are provided on-site comprising 12 within a secure area for employees and 24 spaces provided at horizontal for visitors spread throughout the site.

A single shower/change room facility is provided within the secure bicycle parking.

Accordingly, the bicycle and end of trip facility requirements set out at Clause 52.34 of the Planning Scheme are met.
10 Loading

Clause 65\(^5\) of the Planning Scheme states:

“Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate:

- The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts.”

Two loading docks are provided for the supermarket in the northwest corner of the site and an indented loading bay is provided adjacent to the amenities for waste collection.

Given the small size of the retail premises and the nature of the proposed development, it would be appropriate to for the retail tenancies deliveries to be undertaken using the on-site car parking.

Accordingly, I believe that an adequate provision for loading has been made for the proposed development.

---

\(^5\) I note that as part of Planning Scheme amendment VC142, the loading requirements of Clause 52.07 have been removed from the Planning Scheme, and loading impacts are now to be considered as part of Clause 65.
11 Submissions

A total of 10 submissions were received by the planning authority in response to the formal advertising of Amendment C124. Table 7 below summarises and responds to the traffic engineering related issues raised in the submissions.

Table 7: Response to Traffic Engineering Matters Raised in Submissions

<table>
<thead>
<tr>
<th>Traffic Engineering Issues Raised</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concern that trucks will reverse directly into the centre for deliveries off Clarke Street creating a safety hazard.</td>
<td>Truck access is proposed via Northern Highway and there are no site-specific conditions that would suggest that trucks would reverse into the site from Clarke Street.</td>
</tr>
<tr>
<td>Concern that the ultimate number of intersections on Clarke Street will create a safety hazard.</td>
<td>The functional layout plans at Appendix E show how all of the access points in this section of Clarke Street will interact with each other. While there will be an increase in traffic on Clarke Street, I do not expect any significant increase in safety concerns as a result of the access arrangements.</td>
</tr>
</tbody>
</table>

Recommendations for:

- *Relocation of the cycling facilities from the rear of the centre to a more prominent location.*
- *Consideration should be given to pedestrian and cycle connections.*

Visitor cycle facilities are located in front of each of the building access points.

Pedestrian paths are proposed along the site’s Northern Highway and Clarke Street frontages and an on-road bicycle lane is shown on Northern Highway. Accordingly, I believe that the proposed development has considered pedestrian and cycle connections and provides a good outcome for these users.
# Amendment C124 to the Mitchell Shire Planning Scheme

**Proposed Mixed-Use Development**

## 12 Consideration of Draft Permit Conditions

Table 8 below addresses the permit conditions suggested by Council’s engineering department which were set out in the Council Officer’s report dated 17th December, 2018.

### Table 8: Consideration of Draft Permit Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prior to commencement of development, amended plans and documents to</td>
<td>The functional layout plans attached at Appendix E show how the proposed development will connect in with the ultimate Clarke Street/Murray Street alignment, including the proposed roundabout at this intersection.</td>
</tr>
<tr>
<td>the satisfaction of the Responsible Authority must be submitted ...</td>
<td>As specified in section 10 of this evidence, the formal loading bays provided on-site are for use of the supermarket only which will be serviced by trucks up to 19m in length.</td>
</tr>
<tr>
<td>generally in accordance with the revised application plans lodged on 16</td>
<td></td>
</tr>
<tr>
<td>December, 2017 but further modified to show:</td>
<td></td>
</tr>
<tr>
<td>a) Vehicle access to the site from Clarke Street in the South-West corner</td>
<td></td>
</tr>
<tr>
<td>of the site is to be realigned to ensure operational compliance with the</td>
<td></td>
</tr>
<tr>
<td>ultimate Clarke Street/Murray Street alignment as identified in the Kilmore</td>
<td></td>
</tr>
<tr>
<td>Structure Plan unless otherwise agreed in writing by the Responsible</td>
<td></td>
</tr>
<tr>
<td>Authority.</td>
<td></td>
</tr>
<tr>
<td>e) The loading bay areas for each use/shop on the layout or floor plans</td>
<td></td>
</tr>
<tr>
<td>and to include details of the maximum size of vehicle to service the</td>
<td></td>
</tr>
<tr>
<td>particular use.</td>
<td></td>
</tr>
<tr>
<td>The functional layout plans attached at Appendix E show how the proposed</td>
<td></td>
</tr>
<tr>
<td>development will connect in with the ultimate Clarke Street/Murray Street</td>
<td></td>
</tr>
<tr>
<td>alignment, including the proposed roundabout at this intersection.</td>
<td></td>
</tr>
<tr>
<td>As specified in section 10 of this evidence, the formal loading bays</td>
<td></td>
</tr>
<tr>
<td>provided on-site are for use of the supermarket only which will be</td>
<td></td>
</tr>
<tr>
<td>serviced by trucks up to 19m in length.</td>
<td></td>
</tr>
<tr>
<td>16. All loading and unloading must be carried out within the designated</td>
<td>I agree with this condition.</td>
</tr>
<tr>
<td>loading areas to the satisfaction of the Responsible Authority.</td>
<td></td>
</tr>
<tr>
<td>17. The loading areas must be maintained in good order and appearance to</td>
<td>I agree with this condition.</td>
</tr>
<tr>
<td>the satisfaction of the Responsible Authority.</td>
<td></td>
</tr>
<tr>
<td>25. Before the use starts, the permit holder must construct each vehicle</td>
<td>I agree with this condition.</td>
</tr>
<tr>
<td>crossing to the development to an industrial standard in accordance with</td>
<td></td>
</tr>
<tr>
<td>Mitchell Shire Council’s Standard Drawings to the satisfaction of the</td>
<td></td>
</tr>
<tr>
<td>Responsible Authority, unless otherwise agreed in writing by the</td>
<td></td>
</tr>
<tr>
<td>Responsible Authority.</td>
<td></td>
</tr>
<tr>
<td>26. The internal common driveway/carpark area must be constructed to an</td>
<td>I agree with this condition.</td>
</tr>
<tr>
<td>appropriate all-weather finish with drainage provided to adequately</td>
<td></td>
</tr>
<tr>
<td>drain the areas to the satisfaction of the Responsible Authority.</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Comment</td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>27. Before the development is occupied, a Car Parking Management Plan addressing movement within the car park, delineation of parking bays as necessary, loading and unloading of goods and materials and any other relevant matters, prepared by an appropriately qualified traffic consultant must be submitted to and approved by the Responsible Authority.</td>
<td>I agree with this condition.</td>
</tr>
<tr>
<td>28. The Car Parking Management Plan must be implemented at all times to the satisfaction of the Responsible Authority. No alternations may be made without the prior written consent of the Responsible Authority.</td>
<td>I agree with this condition.</td>
</tr>
<tr>
<td>32. Before the use starts, the permit holder must design and construct a fully sealed car park in general accordance with the Mitchell Shire Planning Scheme and/or with AS/NZS 2890.1 and AS/NZS 2890.6 to the satisfaction of the Responsible Authority.</td>
<td>The car park areas are designed with minimum dimensions which exceed both the Planning Scheme and Australian Standard design requirements.</td>
</tr>
<tr>
<td>33. Unless otherwise agreed in writing by the Responsible Authority, before the use starts, the permit holder must construct a shared footpath 2.5 metres wide along both the Northern Highway and Clarke Street frontages adjacent the development to the satisfaction of the Responsible Authority.</td>
<td>A footpath in accordance with this condition is included on the plan.</td>
</tr>
<tr>
<td>34. Unless otherwise agreed in writing by the Responsible Authority, before the use starts, the permit holder must upgrade the Northern Highway site frontage to incorporated kerb and channel, underground drainage and associated seal widening to the satisfaction of the Responsible Authority.</td>
<td>These works are included as part of the development and shown on the functional layout plan at Appendix E.</td>
</tr>
<tr>
<td>37. Prior to the commencement of the development, detailed construction plans to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority. The plans must include...</td>
<td>The proposed development includes provision for a future bus bay in Clarke Street along the south frontage of the site as shown in the figure below.</td>
</tr>
</tbody>
</table>

f) Demonstrate the future provision of a PTV compliant indented bus bay can be accommodated in Clarke Street along the South frontage of the site.
Prior to the development hereby approved by this permit commences use:

a) A functional layout play (FLP) must be submitted and approved by the Roads Corporation. The FLP must be generally in accordance with Traffix Group FLP (Drawings No. G16707-01, Dated 12th October, 2017) annotated as but modified to show the following:
   i. A 1.5-metre-wide (min) bicycle lane on the northbound departure leg on the Northern Highway/Clark Street intersection commencing from between the through and proposed left turn lane extending to the northern limit of works along the Northern Highway;
   ii. A 1.2-metre-wide (min) raised median island on the Northern highway (north of Clarke Street) in accordance with Austroads Guide to Road Design Part 3, Table 4.15.
   iii. The following turn lanes at the intersection of the Northern Highway and Clarke Street must have their storage lengthened (unless otherwise agreed by VicRoads)
      A. The northern approach right turn lane – by 18 metres; and
      B. The western approach left turn lane – by 12 metres.
   iv. All zebra crossings must be removed from the FLP
   v. Kerb and channel along the full length of the proposed left-turn lane and left-in, left-out extending to the northern side of the Northern Highway left-in, left-out access;
   vi. Swept paths of the following vehicles entering and exiting the Northern Highway:
      A. An 8.8 metre length delivery vehicles) plus 0.5 metre clearances); and
      B. 12.5 metre length rigid vehicle (as a check vehicle).

The functional layout plans attached at Appendix E have been modified to reflect the permit condition requirements. Accordingly, I recommend that the following amended condition be included.

Prior to the occupation of the development hereby approved by this permit:

a) Detailed design plans generally in accordance with the Traffix Group Functional Layout Plan (Drawing No. G16707-01, Issue E dated: 21st February 2019) must be submitted to and approved by the Roads Corporation. The detailed design plans must be drawn to scale, clearly dimensioned and include (but not be limited to) the following:
   i) A swept path diagram for a 19m semi-trailer vehicle entering the site from the Northern Highway, and
   ii) Intersection lighting in accordance with AS1158.

b) A detailed design Road Safety Audit at the detailed design stage in accordance with VicRoads’ Road Safety Audit Policy. The audit findings and the consultant’s responses to the findings must be provided to the Roads Corporation for review and approval. Any mitigating works arising out of the audit must be carried out by the applicant at no cost and to the satisfaction of the Roads Corporations.

c) A VicRoads signed Memorandum of Authorisation must be completed by the applicant and returned to VicRoads permitting the installation of any Major Traffic Control Items required as part of this development (e.g. Give Way signs etc.).

d) All arterial road roadworks must be completed to the satisfaction of and at no cost to the Roads Corporation.

Swept path diagrams have been prepared, attached at Appendix G which show inbound and outbound movements by a 19m semi-trailer.
3 Summary of Opinions

Having undertaken a detailed traffic engineering assessment of the Amendment C124 to the Mitchell Shire Planning Scheme at Clarke Street, Kilmore, I am of the opinion that:

a) the proposed development has a statutory car parking requirement for 242 spaces,

b) the provision of 249 spaces exceeds the statutory parking requirement and the application does not seek a permit to reduce the statutory parking requirement,

c) the proposed car parking layout generally exceeds the design standards of both the relevant requirements of the Planning Scheme and Australian Standards and will operate in an appropriate and acceptable manner,

d) the new access via Northern Highway has been designed in accordance with Austroads Guide to Road Design Part 4A to cater for vehicles including semitrailers, and will operate in a safe and effective manner,

e) the proposed roadworks on Clarke Street and the Northern Highway will mitigate against any adverse impacts to the operation of Northern Highway, Clarke Street or the Northern Highway/Clarke Street signalised intersection,

f) the provision of bicycle parking and end of trip facilities is in accordance with Clause 52.34 of the Planning Scheme,

g) adequate loading provisions are made for the proposed development,

h) the VicRoads’ draft permit conditions concerning the functional layout plan for the Northern Highway/Clarke Street intersection have been met on the revised functional layout plan at Appendix E, and a suggested amended VicRoads’ condition is included in my Table 8 above, and

i) there are no traffic engineering reasons why the proposed rezoning and shopping centre development at Clarke Street in Kilmore, should not be approved.

I have made all the inquiries that I believe are desirable and appropriate and there are no matters of significance which I regard as relevant which, to the best of my knowledge, have been withheld from the Panel.

HENRY H TURNBULL, RFD
B.E.(Civil), M.I.E.Aust., M.I.T.E., F.V.P.E.L.A.
26th February, 2019
Appendix A:
Practice Note – PNVCAT2
Expert Evidence
STATEMENT OF WITNESS

Name
Henry Hume Turnbull

Position
Principal Consultant, Traffix Group

Address
Suite 8, 431 Burke Road
GLEN IRIS
VICTORIA 3146

Qualifications
My qualifications and membership of professional associations are as follows:-

- Bachelor of Civil Engineering, University of Melbourne
- Life Member, Institute of Transportation Engineers
- Member, Institution of Engineers, Australia
- Life Fellow, Victorian Planning & Environmental Law Association

Experience
I have approximately 40 years’ experience in Engineering including:

- ten years Country Roads Board of Victoria,
- two years with TTM Consulting, and
- twenty-eight years with Turnbull Fenner Pty Ltd/Traffix Group Pty Ltd.

Additional activities and appointments include:-

- Member, Priority Development Panel (2004 - 2010)
- Councillor, Shire of Euroa (1980-1983)
  Shire President (1982-1983)
- President, Victorian Planning and Environmental Law Association (1999-2002)
- Bail Justice (Victoria)

Area of Expertise
I have substantial experience and expertise in major road design and construction, contract administration, road construction material and construction methods, development impact assessment, including traffic generation and parking generation characteristics, traffic management and general traffic engineering, road safety and transportation planning.

I was a member of the former Ministers for Planning Advisory Committees making a review of Clause 52.06 (Car Parking) that led to changes being incorporated into the scheme on 5th June, 2012.
Amendment C124 to the Mitchell Shire Planning Scheme
Proposed Mixed-Use Development

Disclosure of Interests
I disclose that I have no private relationship with the permit applicant. Traffix Group has worked with other companies involved in this application.

These relationships have not impacted on my ability to provide impartial Expert Evidence to the Tribunal.

Engagement and Scope of Report
I was retained by Lascorp Development Group (Aust) Pty Ltd to undertake traffic engineering assessments and to prepare an evidence statement for the proposed rezoning and mixed-use development at 109 Northern Highway and 80 Clarke Street, Kilmore.

Facts and Assumptions
As detailed in evidence.

Reference Documents
I have reviewed the following documents as part of my assessment:

- Various Planning Application material including plans and planning report,
- Council’s Planning Delegation Report,
- Mitchell Shire Planning Scheme Amendment C124 Explanatory Report,
- third party submissions,
- permit number PLP203/17 draft permit conditions,
- Relevant sections of the Mitchell Shire Planning Scheme, and
- Relevant experience.

Summary of Opinions
See Conclusions section of the evidence statement.

Provisional Opinions
Not applicable.

Identity of Persons Undertaking Work
Henry H Turnbull as per the evidence statement.

Daniel Milder (Traffic Engineer, Traffix Group) assisted with preparation of the evidence report.

Report Completeness
Final report.
Appendix B: CV
HENRY TURNBULL

Qualifications: Bachelor of Civil Engineering (Melbourne University)

Professional Affiliations: Life Member, Institute of Transportation Engineers
Life Member, Institute of Engineers, Australia
Life Fellow, Victorian Planning and Environmental Law Association

Key Activities:
Sessional Member Planning Panels Victoria (1982 - 2017)
President, Victorian Planning and Environmental Law Association, 1999 - 2002
Member Priority Development Panel (2004-2010)
Bail Justice (Victoria)

1988 to 2002: Turnbull Fenner Pty Ltd
2002 to 2014: Traffix Group Pty Ltd
Since 2014: Principal Consultant – Traffix Group Pty Ltd

Founding Principal and Managing Director of Turnbull Fenner Pty Ltd, now Traffix Group Pty Ltd, until July 2014 and currently appointed as the Principal Consultant to the company, Henry has managed numerous traffic engineering assessments for major developments and other significant commissions including:

- Redevelopment of Freemasons Hospital
- National Bank Head Office at Victoria Harbour (Docklands)
- Construction advice and supervision for Euroa Bypass and the Yass Bypass on the Hume Freeway
- Co-ordination of a development contribution plan for the City of Maribyrnong including extensive traffic investigations and assessments
- TAC funding strategies and priority assessment for VicRoads - Northern Region
- Setting of speed limits for the Warrnambool Region of VicRoads
- Preparation of Parking Precinct Plans for Ocean Grove and Belmont (City of Greater Geelong)
HENRY TURNBULL (CONT.)

- Oakleigh Modal Interchange
- Preston and Fairfield Parking and Access Strategy Studies including PPPs.
- Traffic studies for future residential development strategies at Echuca, Beaconsfield, Plenty Corridor, Pakenham, Toolern and Bendigo
- West Gate Bridge resurfacing traffic management strategy
- South Morang Retail Development for National Mutual
- Guidelines for the Redevelopment of the Austin and Repatriation Hospital site for Banyule City Council
- Assessment of the PANCH redevelopment for Darebin City Council, and
- Bicycle Plans for the Rural City of Mildura, Swan Hill and Warrnambool.

Henry has also managed numerous other projects including local and district traffic management studies, road pavement assessments for quarries and broiler farms in rural areas, pedestrian safety research, public transport passenger surveys and route studies, property rezoning, office and retail development impact assessment and health care projects.

A large part of his practice is providing a peer review of the traffic engineering work undertaken by other consultants. In addition, he regularly appears before Planning Panels and the Victorian Civil and Administrative Tribunal as an expert witness.

Henry was the longest serving sessional Planning Panels Victoria Member with over thirty five years’ service. He was regularly appointed as a Planning Panel (either as the Chairman or as a Member) by the Minister for Planning.

Significant Panels and EES Inquiries include:

- Major retail expansions for Chadstone, Forest Hill and Como,
- Traralgon Bypass,
- Webb Dock expansion,
- Melbourne Airport Rail Link,
- Geelong Bypass Section 3,
- Kilmore Bypass,
- Armstrong Creek Structure Planning,
- Barwon Heads Bridge refurbishment, and
HENRY TURNBULL (Cont.)

- Frankston Bypass (Peninsula Link).

Henry has served successive Governments on Advisory Committees to assist with policy development including:
  - Steering committee on the development of Practice Notes for Parking Precinct Plans,
  - Reference Group for Residential Code 2000,
  - Armstrong Creek Precinct Structure Plans (Feb 10),
  - Review of Clause 52.06 – Carparking (adopted Jun 12), and
  - Punt Road Advisory committee.

He is regularly retained to advise on major parking studies and the introduction of parking overlays into municipal planning schemes.

Land Acquisition & Compensation

During his career, Henry has often been retained to provide expert evidence, both for Government and private clients, in relation to land acquisition and compensation matters. His appearances include Compulsory Conferences, VCAT and the Supreme Court in Victoria.


Senior Traffic Engineer responsible for the management of traffic engineering transportation planning projects including the following major projects:
  - Greensborough District Centre, Shire of Diamond Valley/Lend Lease Developments
  - Broadmeadows District Centre, City of Broadmeadows (via Wilson Sayer Core Pty Ltd)
  - Calder Technology Park, The Jane Corporation
  - La Trobe University Tech Park, Witan Investments Pty Ltd
  - Herald Street Local Area, City of Moorabbin Traffic Management Study
HENRY TURNBULL (CONT.)

As an engineer with the Country Roads Board, Henry gained experience in Traffic Engineering, Metropolitan, Plans and Surveys, and Major Project Divisions.

Main areas of work included major road/freeway contract administration and direct works construction, major road/freeway design (both detail and functional), drainage design, road planning and municipal development approval coordination. In addition, Henry (with Colin Horman) developed analysis methods for roundabouts and pioneered their use in Victoria (and Australia). Henry was instrumental in roundabout intersection design, signalised and unsignalised intersection analysis, gap acceptance and traffic volume and road capacity analysis.

Royal Australian Engineers (Army Reserve) (1974 – 2000)
As an engineer with the Royal Australian Engineers, Henry rose from the rank of Sapper to finish his military career with the rank of Major. The majority of his service was with 22 Construction Regiment including as Officer Commanding 105 Construction Squadron.

As part of his military engineering, Henry was involved with the design, construction and maintenance of both civilian and military roads and creek crossings.

Technical papers:
Turnbull, H.H. & Horman, C.B., Design and Analysis of Roundabouts, Australian Road Research Board Proceedings, 1974
Turnbull, H.H. & Cottrell, T.E., Parking and the Planning Scheme, 2nd Australian Parking Convention, 1990
Appendix C:
Proposed Development Plan
Appendix D:
Murray Street/Clarke Street
Roundabout Upgrade Plan
Appendix E: Functional Layout Plans
MOVEMENT SUMMARY

Site: 101 [Existing PM Peak Hour]

Northern Highway/Clarke Street Intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

### Movement Performance - Vehicles

#### South: Northern Highway

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total 80/19</th>
<th>Deg. Satn 80/19</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance veh</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L2</td>
<td>89</td>
<td>0.0</td>
<td>0.064</td>
<td>8.3</td>
<td>LOS A</td>
<td>0.9</td>
<td>6.3</td>
<td>0.28</td>
<td>0.64</td>
</tr>
<tr>
<td>2</td>
<td>T1</td>
<td>421</td>
<td>10.0</td>
<td>0.501</td>
<td>14.7</td>
<td>LOS B</td>
<td>11.0</td>
<td>83.2</td>
<td>0.71</td>
<td>0.62</td>
</tr>
<tr>
<td>3</td>
<td>R2</td>
<td>5</td>
<td>0.0</td>
<td>0.013</td>
<td>22.4</td>
<td>LOS C</td>
<td>0.1</td>
<td>0.9</td>
<td>0.65</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approach</td>
<td>516</td>
<td>8.2</td>
<td>0.501</td>
<td>13.7</td>
<td>LOS B</td>
<td>11.0</td>
<td>83.2</td>
<td>0.64</td>
</tr>
</tbody>
</table>

#### East: Clarke Street

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total 80/19</th>
<th>Deg. Satn 80/19</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance veh</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>L2</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>44.9</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
</tr>
<tr>
<td>5</td>
<td>T1</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>39.3</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
</tr>
<tr>
<td>6</td>
<td>R2</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>44.8</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approach</td>
<td>16</td>
<td>0.0</td>
<td>0.112</td>
<td>43.0</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.68</td>
</tr>
</tbody>
</table>

#### North: Northern Highway

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total 80/19</th>
<th>Deg. Satn 80/19</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance veh</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>L2</td>
<td>5</td>
<td>0.0</td>
<td>0.394</td>
<td>19.5</td>
<td>LOS B</td>
<td>8.7</td>
<td>66.1</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>8</td>
<td>T1</td>
<td>346</td>
<td>10.0</td>
<td>0.394</td>
<td>14.0</td>
<td>LOS B</td>
<td>8.7</td>
<td>66.1</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>9</td>
<td>R2</td>
<td>55</td>
<td>0.0</td>
<td>0.154</td>
<td>26.0</td>
<td>LOS C</td>
<td>1.5</td>
<td>10.7</td>
<td>0.73</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approach</td>
<td>406</td>
<td>8.5</td>
<td>0.394</td>
<td>15.7</td>
<td>LOS B</td>
<td>8.7</td>
<td>66.1</td>
<td>0.68</td>
</tr>
</tbody>
</table>

#### West: Clarke Street

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total 80/19</th>
<th>Deg. Satn 80/19</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance veh</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>L2</td>
<td>120</td>
<td>0.0</td>
<td>0.304</td>
<td>34.8</td>
<td>LOS C</td>
<td>4.0</td>
<td>28.3</td>
<td>0.88</td>
<td>0.77</td>
</tr>
<tr>
<td>11</td>
<td>T1</td>
<td>5</td>
<td>0.0</td>
<td>0.487</td>
<td>30.7</td>
<td>LOS C</td>
<td>6.8</td>
<td>47.6</td>
<td>0.93</td>
<td>0.80</td>
</tr>
<tr>
<td>12</td>
<td>R2</td>
<td>187</td>
<td>0.0</td>
<td>0.487</td>
<td>36.2</td>
<td>LOS D</td>
<td>6.8</td>
<td>47.6</td>
<td>0.93</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approach</td>
<td>313</td>
<td>0.0</td>
<td>0.487</td>
<td>35.6</td>
<td>LOS D</td>
<td>6.8</td>
<td>47.6</td>
<td>0.79</td>
</tr>
</tbody>
</table>

#### All Vehicles

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total 80/19</th>
<th>Deg. Satn 80/19</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance veh</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All Vehicles</td>
<td>1251</td>
<td>6.1</td>
<td>0.501</td>
<td>20.2</td>
<td>LOS C</td>
<td>11.0</td>
<td>83.2</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

### Movement Performance - Pedestrians

#### South: Northern Highway

<table>
<thead>
<tr>
<th>Description</th>
<th>Demand Flows ped/h</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>Average Back of Queue Distance ped</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 South Full Crossing</td>
<td>11</td>
<td>34.2</td>
<td>LOS D</td>
<td>0.0</td>
<td>0.0</td>
<td>0.93</td>
</tr>
<tr>
<td>P3 North Full Crossing</td>
<td>11</td>
<td>32.4</td>
<td>LOS D</td>
<td>0.0</td>
<td>0.0</td>
<td>0.90</td>
</tr>
<tr>
<td>P4 West Full Crossing</td>
<td>53</td>
<td>15.7</td>
<td>LOS B</td>
<td>0.1</td>
<td>0.1</td>
<td>0.63</td>
</tr>
<tr>
<td>All Pedestrians</td>
<td>74</td>
<td>20.7</td>
<td>LOS C</td>
<td>0.71</td>
<td>0.71</td>
<td></td>
</tr>
</tbody>
</table>

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
MOVEMENT SUMMARY

Northern Highway/Clarke Street Intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total veh/h</th>
<th>HV %</th>
<th>Demand Satn v/c</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance m</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
<th>Total HV Vehicles</th>
<th>Distance m</th>
</tr>
</thead>
<tbody>
<tr>
<td>South: Northern Highway</td>
<td>1</td>
<td>L2</td>
<td>95</td>
<td>0.0</td>
<td>0.091</td>
<td>14.1</td>
<td>LOS B</td>
<td>1.7</td>
<td>11.8</td>
<td>0.49</td>
<td>0.69</td>
<td>0.49</td>
<td>47.6</td>
</tr>
<tr>
<td>2</td>
<td>T1</td>
<td>421</td>
<td>10.0</td>
<td>0.751</td>
<td>27.0</td>
<td>LOS C</td>
<td>15.1</td>
<td>115.0</td>
<td>0.92</td>
<td>0.85</td>
<td>1.00</td>
<td>41.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>R2</td>
<td>5</td>
<td>0.0</td>
<td>0.015</td>
<td>26.8</td>
<td>LOS C</td>
<td>0.1</td>
<td>1.0</td>
<td>0.72</td>
<td>0.66</td>
<td>0.72</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td>521</td>
<td>8.1</td>
<td>0.751</td>
<td>24.7</td>
<td>LOS C</td>
<td>15.1</td>
<td>115.0</td>
<td>0.84</td>
<td>0.82</td>
<td>0.90</td>
<td>42.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East: Clarke Street</td>
<td>4</td>
<td>L2</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>44.9</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>34.6</td>
</tr>
<tr>
<td>5</td>
<td>T1</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>39.3</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>35.2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>R2</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>44.8</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>34.5</td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td>16</td>
<td>0.0</td>
<td>0.112</td>
<td>43.0</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>34.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North: Northern Highway</td>
<td>7</td>
<td>L2</td>
<td>5</td>
<td>0.0</td>
<td>0.365</td>
<td>17.0</td>
<td>LOS B</td>
<td>7.9</td>
<td>59.8</td>
<td>0.62</td>
<td>0.54</td>
<td>0.62</td>
<td>49.3</td>
</tr>
<tr>
<td>8</td>
<td>T1</td>
<td>346</td>
<td>10.0</td>
<td>0.365</td>
<td>11.4</td>
<td>LOS B</td>
<td>7.9</td>
<td>59.8</td>
<td>0.62</td>
<td>0.54</td>
<td>0.62</td>
<td>50.4</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>R2</td>
<td>77</td>
<td>0.0</td>
<td>0.236</td>
<td>21.6</td>
<td>LOS C</td>
<td>1.7</td>
<td>12.2</td>
<td>0.85</td>
<td>0.74</td>
<td>0.85</td>
<td>43.2</td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td>428</td>
<td>8.1</td>
<td>0.365</td>
<td>13.3</td>
<td>LOS B</td>
<td>7.9</td>
<td>59.8</td>
<td>0.66</td>
<td>0.57</td>
<td>0.66</td>
<td>49.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West: Clarke Street</td>
<td>10</td>
<td>L2</td>
<td>120</td>
<td>0.0</td>
<td>0.225</td>
<td>19.3</td>
<td>LOS B</td>
<td>2.5</td>
<td>17.7</td>
<td>0.80</td>
<td>0.75</td>
<td>0.80</td>
<td>44.6</td>
</tr>
<tr>
<td>11</td>
<td>T1</td>
<td>5</td>
<td>0.0</td>
<td>0.764</td>
<td>37.8</td>
<td>LOS D</td>
<td>10.1</td>
<td>70.9</td>
<td>1.00</td>
<td>0.90</td>
<td>1.16</td>
<td>35.1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>R2</td>
<td>243</td>
<td>0.0</td>
<td>0.764</td>
<td>43.3</td>
<td>LOS D</td>
<td>10.1</td>
<td>70.9</td>
<td>1.00</td>
<td>0.90</td>
<td>1.16</td>
<td>34.6</td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td>368</td>
<td>0.0</td>
<td>0.764</td>
<td>35.4</td>
<td>LOS D</td>
<td>10.1</td>
<td>70.9</td>
<td>0.93</td>
<td>0.85</td>
<td>1.04</td>
<td>37.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Vehicles</td>
<td>1334</td>
<td>5.8</td>
<td>0.764</td>
<td>24.2</td>
<td>LOS C</td>
<td>15.1</td>
<td>115.0</td>
<td>0.81</td>
<td>0.75</td>
<td>0.86</td>
<td>42.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Vehicle movement LOS values are based on average delay per movement. Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Description</th>
<th>Demand Flow ped/h</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>Average Back of Queue Distance m</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3</td>
<td>North Full Crossing</td>
<td>11</td>
<td>34.2</td>
<td>LOS D</td>
<td>0.0</td>
<td>0.0</td>
<td>0.93</td>
</tr>
<tr>
<td>P4</td>
<td>West Full Crossing</td>
<td>53</td>
<td>24.1</td>
<td>LOS C</td>
<td>0.1</td>
<td>0.1</td>
<td>0.78</td>
</tr>
<tr>
<td>All Pedestrians</td>
<td>63</td>
<td>25.8</td>
<td>LOS C</td>
<td>0.80</td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
## MOVEMENT SUMMARY

### Site: 101 [10 Years Post Centre Opening (No Bypass) - PM Peak Hour]

**Northern Highway/Clarke Street Intersection**  
**Site Category:** (None)  
**Signals - Fixed Time Isolated**  
**Cycle Time = 80 seconds (Site User-Given Cycle Time)**

### Movement Performance - Vehicles

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn ID</th>
<th>Demand Flow Total veh/h HV %</th>
<th>Deg. Satn v/c</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue veh</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Average Speed km/h</th>
<th>Total HV Vehicles Distance m</th>
</tr>
</thead>
<tbody>
<tr>
<td>South: Northern Highway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 L2</td>
<td>100</td>
<td>0.0</td>
<td>0.096</td>
<td>14.1</td>
<td>LOS B</td>
<td>1.8</td>
<td>12.5</td>
<td>0.49</td>
<td>0.69</td>
<td>0.49</td>
<td>47.6</td>
</tr>
<tr>
<td>2 T1</td>
<td>505</td>
<td>10.0</td>
<td>0.947</td>
<td>53.7</td>
<td>LOS D</td>
<td>27.0</td>
<td>204.9</td>
<td>1.00</td>
<td>1.24</td>
<td>1.55</td>
<td>31.9</td>
</tr>
<tr>
<td>3 R2</td>
<td>5</td>
<td>0.0</td>
<td>0.017</td>
<td>27.7</td>
<td>LOS C</td>
<td>0.1</td>
<td>1.0</td>
<td>0.74</td>
<td>0.66</td>
<td>0.74</td>
<td>40.1</td>
</tr>
<tr>
<td>Approach</td>
<td>611</td>
<td>8.3</td>
<td>0.947</td>
<td>47.0</td>
<td>LOS D</td>
<td>27.0</td>
<td>204.9</td>
<td>0.91</td>
<td>1.15</td>
<td>1.37</td>
<td>33.8</td>
</tr>
<tr>
<td>East: Clarke Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 L2</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>44.9</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>34.6</td>
</tr>
<tr>
<td>5 T1</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>39.3</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>35.2</td>
</tr>
<tr>
<td>6 R2</td>
<td>5</td>
<td>0.0</td>
<td>0.112</td>
<td>44.8</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>34.5</td>
</tr>
<tr>
<td>Approach</td>
<td>16</td>
<td>0.0</td>
<td>0.112</td>
<td>43.0</td>
<td>LOS D</td>
<td>0.6</td>
<td>4.3</td>
<td>0.96</td>
<td>0.68</td>
<td>0.96</td>
<td>34.8</td>
</tr>
<tr>
<td>North: Northern Highway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 L2</td>
<td>5</td>
<td>0.0</td>
<td>0.448</td>
<td>18.2</td>
<td>LOS B</td>
<td>10.2</td>
<td>77.5</td>
<td>0.67</td>
<td>0.59</td>
<td>0.67</td>
<td>48.5</td>
</tr>
<tr>
<td>8 T1</td>
<td>416</td>
<td>10.0</td>
<td>0.448</td>
<td>12.7</td>
<td>LOS B</td>
<td>10.2</td>
<td>77.5</td>
<td>0.67</td>
<td>0.59</td>
<td>0.67</td>
<td>49.6</td>
</tr>
<tr>
<td>9 R2</td>
<td>99</td>
<td>0.0</td>
<td>0.379</td>
<td>24.4</td>
<td>LOS C</td>
<td>2.3</td>
<td>16.3</td>
<td>0.94</td>
<td>0.76</td>
<td>0.94</td>
<td>41.8</td>
</tr>
<tr>
<td>Approach</td>
<td>520</td>
<td>8.0</td>
<td>0.448</td>
<td>15.0</td>
<td>LOS B</td>
<td>10.2</td>
<td>77.5</td>
<td>0.72</td>
<td>0.62</td>
<td>0.72</td>
<td>47.9</td>
</tr>
<tr>
<td>West: Clarke Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 L2</td>
<td>120</td>
<td>0.0</td>
<td>0.215</td>
<td>18.7</td>
<td>LOS B</td>
<td>2.5</td>
<td>17.2</td>
<td>0.78</td>
<td>0.75</td>
<td>0.78</td>
<td>44.9</td>
</tr>
<tr>
<td>11 T1</td>
<td>5</td>
<td>0.0</td>
<td>0.917</td>
<td>50.1</td>
<td>LOS D</td>
<td>14.8</td>
<td>103.6</td>
<td>1.00</td>
<td>1.06</td>
<td>1.53</td>
<td>31.4</td>
</tr>
<tr>
<td>12 R2</td>
<td>298</td>
<td>0.0</td>
<td>0.917</td>
<td>55.6</td>
<td>LOS E</td>
<td>14.8</td>
<td>103.6</td>
<td>1.00</td>
<td>1.06</td>
<td>1.53</td>
<td>31.0</td>
</tr>
<tr>
<td>Approach</td>
<td>423</td>
<td>0.0</td>
<td>0.917</td>
<td>45.1</td>
<td>LOS D</td>
<td>14.8</td>
<td>103.6</td>
<td>0.94</td>
<td>0.97</td>
<td>1.32</td>
<td>34.0</td>
</tr>
<tr>
<td>All Vehicles</td>
<td>1569</td>
<td>5.9</td>
<td>0.947</td>
<td>35.8</td>
<td>LOS D</td>
<td>27.0</td>
<td>204.9</td>
<td>0.86</td>
<td>0.92</td>
<td>1.13</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Vehicle movement LOS values are based on average delay per movement. Intersection and Approach LOS values are based on average delay for all vehicle movements.

**SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.**

**Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).**

**HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.**

### Movement Performance - Pedestrians

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Description</th>
<th>Demand Flow ped/h</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>Average Back of Queue ped</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3 N</td>
<td>North Full Crossing</td>
<td>11</td>
<td>34.2</td>
<td>LOS D</td>
<td>0.0</td>
<td>0.0</td>
<td>0.93</td>
</tr>
<tr>
<td>P4 W</td>
<td>West Full Crossing</td>
<td>53</td>
<td>24.9</td>
<td>LOS C</td>
<td>0.1</td>
<td>0.1</td>
<td>0.79</td>
</tr>
<tr>
<td>All Pedestrians</td>
<td></td>
<td>63</td>
<td>26.4</td>
<td>LOS C</td>
<td></td>
<td></td>
<td>0.81</td>
</tr>
</tbody>
</table>

Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

### Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). **Vehicle movement LOS values are based on average delay per movement.**

**Intersection and Approach LOS values are based on average delay for all vehicle movements.**

**SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.**

**Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).**

**HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.**
## MOVEMENT SUMMARY

### Site: 101 [10 Years Post Centre Opening (Bypass) - PM Peak Hour]

**Northern Highway/Clarke Street Intersection**  
**Site Category:** (None)  
**Signals - Fixed Time Isolated**  
**Cycle Time = 80 seconds**

### Movement Performance - Vehicles

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Turn</th>
<th>Demand Flows Total veh/h</th>
<th>HV %</th>
<th>Deg. Satn v/c</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>95% Back of Queue Veh</th>
<th>Distance m</th>
<th>Prop Queued</th>
<th>Effective Stop Rate</th>
<th>Aver. No. Cycles</th>
<th>Aver. Speed</th>
<th>Total HV Vehicles</th>
<th>Distance km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>South: Northern Highway</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 L2</td>
<td>100</td>
<td>0.0</td>
<td>0.096</td>
<td>14.1</td>
<td>LOS B</td>
<td>1.8</td>
<td>12.5</td>
<td>0.49</td>
<td>0.69</td>
<td>0.49</td>
<td>47.6</td>
<td>7.8</td>
<td>0.777</td>
<td>27.1</td>
</tr>
<tr>
<td>2 T1</td>
<td>384</td>
<td>10.0</td>
<td>0.777</td>
<td>30.5</td>
<td>LOS C</td>
<td>14.6</td>
<td>110.9</td>
<td>0.94</td>
<td>0.89</td>
<td>1.07</td>
<td>40.0</td>
<td>7.8</td>
<td>0.777</td>
<td>30.5</td>
</tr>
<tr>
<td>3 R2</td>
<td>5.0</td>
<td>0.0</td>
<td>0.016</td>
<td>29.2</td>
<td>LOS C</td>
<td>0.2</td>
<td>1.1</td>
<td>0.76</td>
<td>0.66</td>
<td>0.76</td>
<td>39.5</td>
<td>7.8</td>
<td>0.777</td>
<td>29.2</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>489</td>
<td>7.8</td>
<td>0.777</td>
<td>27.1</td>
<td>LOS C</td>
<td>14.6</td>
<td>110.9</td>
<td>0.85</td>
<td>0.85</td>
<td>0.95</td>
<td>41.3</td>
<td>7.8</td>
<td>0.777</td>
<td>27.1</td>
<td>LOS C</td>
</tr>
</tbody>
</table>

### Movement Performance - Pedestrians

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>Description</th>
<th>Demand Flow ped/h</th>
<th>Average Delay sec</th>
<th>Level of Service</th>
<th>Average Back of Queue Ped</th>
<th>Distance m</th>
<th>Prop Queued</th>
<th>Effective Stop Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3</td>
<td>North Full Crossing</td>
<td>11</td>
<td>32.4</td>
<td>LOS D</td>
<td>0.0</td>
<td>0.0</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>P4</td>
<td>West Full Crossing</td>
<td>53</td>
<td>26.5</td>
<td>LOS C</td>
<td>0.1</td>
<td>0.1</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td>All Pedestrians</td>
<td></td>
<td>63</td>
<td>27.5</td>
<td>LOS C</td>
<td>0.83</td>
<td>0.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Site Level of Service (LOS) Method: Delay (SIDRA)

- **Vehicle movement LOS values are based on average delay per movement.**
- **Intersection and Approach LOS values are based on average delay for all vehicle movements.**
- **SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.**
- **Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).**
- **HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.**

---

**Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)**

- Pedestrian movement LOS values are based on average delay per pedestrian movement.
- **Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.**

---

**SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: TRAFFIX GROUP PTY LTD | Processed: Tuesday, 28 February 2019 1:33:48 PM
Project: P:\Synergy\Projects\GRP\1GRP16707\Sidra\16707 - Feb 2019.sip8
Appendix G:
Swept Path Diagrams