

Minta Farm PSP 11 – Amendment C228 to the Casey Planning Scheme Traffic Engineering Assessment

Planning Panels Victoria

Panel Hearing Date: Monday 16th April, 2018

Report Date: 5th April, 2018

Prepared for the Applicant: Victorian Planning Authority
Instructed By: Harwood Andrews Lawyers

STATEMENT TO PLANNING PANELS VICTORIA BY WILLIAM DE WAARD, TRAFFIC ENGINEER

Traffic Engineering Assessment

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Document Control

Issue No.	Type	Date	Prepared By	Approved By
	Final	05/04/2018	W de Waard / B Hodges	W de Waard

Our Reference: G22294A-01B

Table of Contents

1	Introduction.....	1
2	Statement of Witness.....	1
2.1	Qualifications and Experience.....	1
3	Summary of Opinions.....	1
4	Background & Proposal	4
4.1	Amendment C228	4
4.2	96A Application	6
4.3	O’Shea Road Upgrade	6
4.3.1	O’Shea Road Duplication	6
4.3.2	O’Shea Road Extension & Beaconsfield Interchange.....	6
4.4	Interim Traffic Impact Analysis (Traffix Group, 2017).....	7
5	Existing Conditions	8
5.1	Subject Site.....	8
5.2	Land Use.....	9
5.3	Existing Road Network	11
5.1	Existing Traffic Data	12
5.1.1	Daily Traffic Volumes	12
5.1.2	Peak Hour Traffic Volumes.....	13
5.2	Public Transport	13
5.3	Pedestrian and Bicycle Facilities	14
6	C228 Public Exhibition Submissions	15
7	Traffic Engineering Assessment	17
7.1	Assessment Assumptions.....	17
7.2	Soldiers Road – Without Minta Farm Development.....	17
7.2.1	North-South Arterial Road	20
7.2.2	Potential Short-Term Management Options for Soldiers Road.....	20
7.3	96A Permit Application Review.....	22
7.3.1	Traffic Generation	23
7.3.2	Broad Traffic Distribution.....	24
7.3.3	Localised Route Selection	27
7.3.4	Daily Traffic Volume Capacity	28
7.3.5	Peak Hour Traffic Capacity	29
7.3.6	Recommendations for 96A Application	31
7.4	Facilitating the Delivery of the N-S Arterial Road	32
7.4.1	ICP Contribution.....	32

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

7.4.2	Lot Cap Proposal	32
7.4.3	Traffic Impact Associated with 1,000 Lots on Subject Site	32
7.4.4	Duplication of the N-S Arterial Road.....	33
8	Response to Public Exhibition Submissions	33
9	Conclusions.....	38

1 Introduction

I have been retained by Victorian Planning Authority (VPA) and instructed by Harwood Andrews Lawyers to undertake traffic engineering assessments and prepare traffic evidence in relation to Amendment C228 to the Casey Planning Scheme (Minta Farm PSP 11).

The scope of my engagement has specifically been focused on interim traffic modelling (short term) to review of the impacts and capacity of the surrounding road network associated with initial stages of development on the Minta Farm site.

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

2 Statement of Witness

2.1 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.

3 Summary of Opinions

Having inspected the site, perused relevant documents and plans and undertaken traffic engineering assessments, I am of the opinion that:

Soldiers Road – Without Minta Farm Development

- a) Recent traffic counts in 2018 indicate Soldiers Road (south of O’Shea Road) is currently carrying traffic volumes well beyond its collector road classification,
- b) Based on a review of future developable land in the Clyde North PSP area, I estimate an increase of 2,800-4,650 additional daily vehicle trips over the next 4 years. This results in total daily traffic volumes on Soldiers Road of up to 12,644-14,494 vehicles per day by 2022 (without any contribution from Minta Farm PSP area),
- c) I expect these traffic volumes will result in a range of issues including intersection capacity, property access and pedestrian issues on Soldiers Road,
- d) Council as the Road Authority for Soldiers Road will need to consider improvements to facilitate the traffic volumes in the interim conditions (even without any contribution from the Minta Farm PSP area). I have identified two potential options including:
 - i) **Option 1:** Modified Soldiers Road cross-section including a painted median and refuge islands, or
 - ii) **Option 2:** The early truncation of Soldiers Road at Grices Road and the provision of local traffic management to minimise ‘rat running’ traffic.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

- e) The construction of the N-S Arterial Road is the ultimate solution to resolve the existing issues on Soldiers Road and I would recommend that it is constructed as soon as possible once the Monash Freeway Upgrade Stage 2 works are complete.

96A Application Review

- f) The proposed 96A application incorporates 231 residential lots which are expected to generate approximately 1,848 vehicles per day and 185 vehicles per hour,
- g) I have distributed the expected daily traffic volumes on the surrounding road network. This analysis indicates that Soldiers Road is the only road that will carry volumes above its classification. However, as discussed above, Soldiers Road will operate outside its classification regardless of the contribution of the Minta Farm PSP area,
- h) A review of the peak hour volumes indicates that the 96A application will result a maximum volume of 63vph on any one movement (right out of Soldiers Road into O'Shea Road). These volumes represent approximately 1 additional movement per minute or 2 additional movements per traffic signal cycle and represent only a minor percentage of the background traffic volumes.
- i) I recommend the inclusion of Permit conditions for the 96A application as follows:
 - i) Construction of the modified Soldiers Road cross-section including a painted median to assist property access to the existing dwellings on the south/west side of the road and include pedestrian refuge islands at key pedestrian desire points. The construction of the modified cross-section should be limited to the frontage of the 96A application.
 - ii) In the interim condition when Soldiers Road traffic volumes are high, property access movements to lots fronting Soldiers Road from the Minta Farm PSP area would be difficult with the modified cross-section. On this basis, I recommend that no lots are constructed with direct property access to Soldiers Road in the interim condition. In the ultimate conditions when Soldiers Road is truncated and traffic volumes reduce, the lots fronting Soldiers Road can be constructed.

Facilitating the Construction of the N-S Arterial Road

- j) The construction of the N-S Arterial Road is critical to limit impacts to the adjacent road network surrounding the Minta Farm PSP area once the Monash Freeway Upgrade Stage 2 works are complete (i.e. the recently announced O'Shea Road duplication and extension to the Beaconsfield Interchange),
- k) The Minta Farm ICP includes contributions for the interim carriageway and interim intersections of the N-S Arterial Road. Funding of the ultimate arrangements is subject to future VicRoads funding,
- l) The VPA included a 1,000 lot cap on interim development (prior to the N-S Arterial Road) as part of the PSP public exhibition. This lot cap was generally set by the previous traffic modelling undertaken by my firm in 2017. This level of development will contribute substantial funds to the ICP for construction of the N-S Arterial Road,
- m) Unless outside funding sources are secured (i.e. state government or Council) or inclusion of financing for forward funding is sought through a supplementary levy, the only way to fund construction of the N-S Arterial Road is via the construction of interim lots within the Minta Farm PSP area,

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

- n) Given the significant changes to the background traffic volumes since my firm's previous assessment, I have reviewed the impact of construction of 1,000 lots on the Minta Farm site in the interim conditions as follows:
 - i) The 1,000 lots would be expected to generate 8,000 vehicles per day and 800 vehicles per hour.
 - ii) Soldiers Road has a finite capacity of approximately 18,000-20,000 vehicles per day with the 1,000 lots on the Minta Farm PSP area absorbing 8,000 vehicles per day of capacity. This will result in the redistribution of vehicle trips to/from the Clyde North PSP area via Grices Road and Thompsons Road to Clyde Road.
 - iii) Overall, I expect the localised road network to be under pressure during the interim period, however, allowing the development of 1,000 lots results in the N-S Arterial Road being delivered in the quickest manner (i.e. reducing the period of poor operating conditions on the surrounding road network).
 - iv) The location of the initial development within the Minta Farm PSP area should be reviewed, with a preference toward the Grices Road and O'Shea Road frontages to provide more route choice and limit impact on the surrounding roads.
 - v) I recommend that the developers within the Minta Farm PSP area and Council explore alternative funding arrangements for the N-S Arterial Road, ideally constructing the road as soon as possible (prior to the 1,000 lot level).
- o) Funding for the duplication of the N-S Arterial Road is subject to future funding from VicRoads, with the requirement for duplication largely driven by sub-regional traffic volumes. VicRoads in conjunction with Council will need to evaluate the need to provide for additional capacity for the N-S Arterial Road at the time of delivery (depending on the level of development surrounding the Minta Farm site).

4 Background & Proposal

4.1 Amendment C228

Amendment C228 to the Casey Planning Scheme applies to land at 'Minta Farm', bounded by Soldiers Road, Grices Road, Princes Freeway and the future extension of O'Shea Road.

The land which is subject to Amendment C228 is approximately 285 hectares and is currently used for agricultural purposes.

Amendment C228 proposes to adopt the Precinct Structure Plan (PSP) prepared by the Victorian Planning Authority (VPA) which includes the following key elements:

- 2,850 homes,
- 11,000 jobs within commercial, office, 'innovation & technology' and 'small local enterprise' areas,
- Town centre,
- School, and
- Local community facilities.

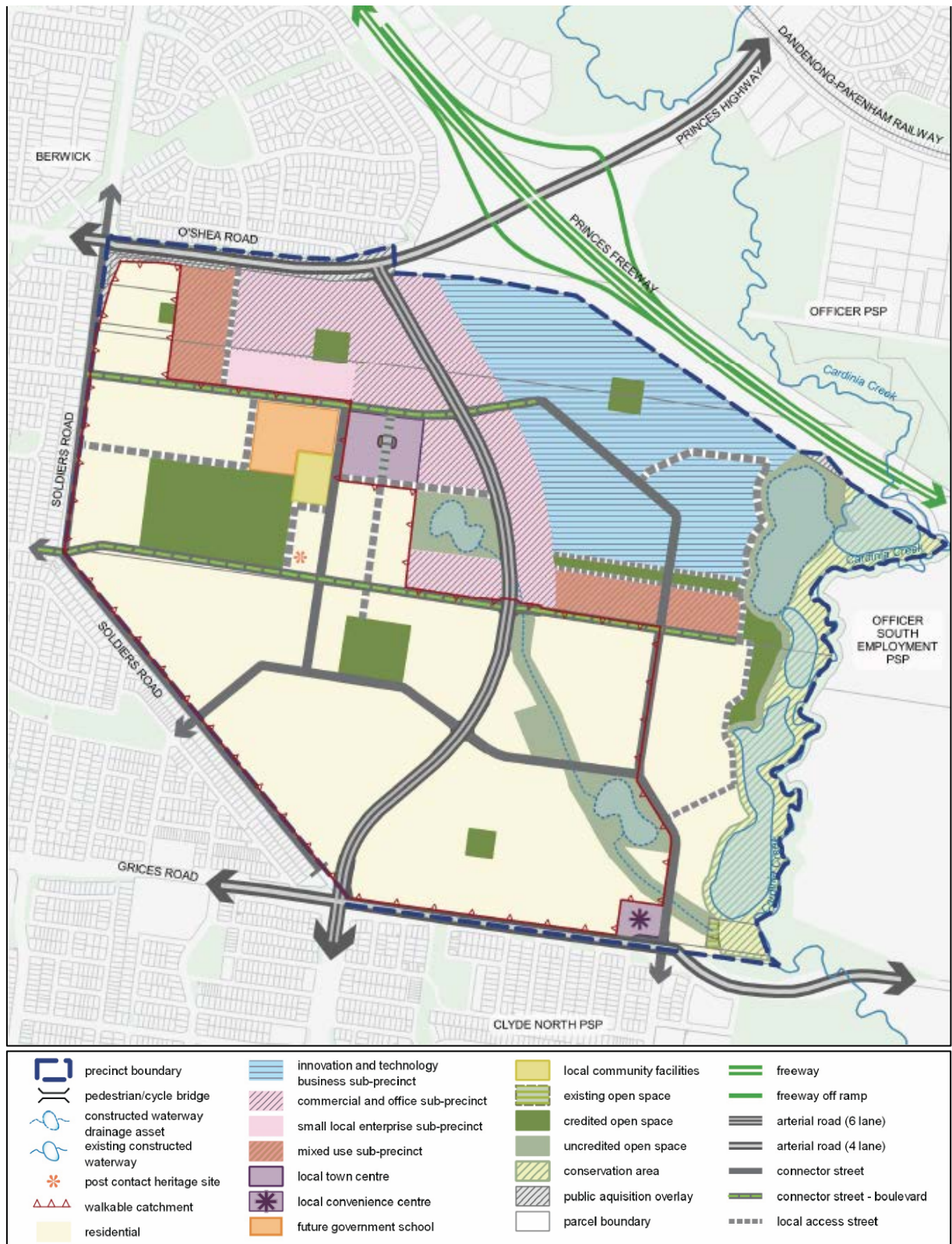
The proposed PSP includes guidance on the key future road network within the 'Minta Farm' area. A primary arterial road is proposed to be oriented in a north-south direction through the centre of the subject site. This N-S Arterial Road will form an intersection with Soldiers Road and Grices Road in the south. The PSP also shows the future extension of O'Shea Road from Soldiers Road and the completion of the Beaconsfield interchange on the Princes Freeway. We note that the construction/funding of these projects is not part of Amendment C228, with further discussion provided in Section 4.3.

The PSP also includes a connector road network which will be distributed throughout the site to provide access between the arterial road and the local road network. The connector roads will provide three links to Soldiers Road and one link to Grices Road.

Figure 1 below shows the layout of the Minta Farm Precinct Structure Plan (PSP).

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11



Source: Minta Farm Precinct Structure Plan October 2017

Figure 1: Exhibited Future Urban Structure – Minta Farm Precinct Structure Plan

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

4.2 96A Application

In conjunction with Amendment C228, a planning permit application (96A) for the first stage of development on the Minta Farm site is also being considered by the Panel.

The 96A application proposes the development of 231 residential lots located along the Solders Road frontage in the vicinity of Hazelnut Boulevard. The proposed layout includes the following key elements:

- A connector road 'stub' intersecting with Soldiers Road at Hazelnut Boulevard with a new roundabout,
- A local street extended parallel to Soldiers Road with a number of perpendicular local streets.
- Residential lots directly fronting Soldiers Road with an 'Access Street – Level 2' cross-section proposed for Soldiers Road, and
- Rear loaded lots between Soldiers Road and the local street on the proposed connector road.

4.3 O'Shea Road Upgrade

In March 2018 the state government announced funding for the construction of the Monash Freeway Upgrade Stage 2. Stage 2 of the upgrade project will add 36km of additional lanes to the Monash Freeway and also includes the duplication of the existing section of O'Shea Road (Clyde Road to Soldiers Road) and an extension of O'Shea Road from the intersection of Soldiers Road to Beaconsfield Interchange at the Princes Freeway. The works are scheduled to commence in late 2018 with works scheduled to be completed in 2022.

4.3.1 O'Shea Road Duplication

VicRoads has developed preliminary alignment plans for the duplication of O'Shea Road between Clyde Road and Soldiers Road. The plans indicate two stages as follows:

- Interim Design – two lanes in each direction (part of the Monash Stage 2 project), and
- Ultimate Design – three lanes in each direction.

The following intersection arrangements are proposed as part of the O'Shea Road duplication:

- Clyde Road / O'Shea Road – Signalised.
- O'Shea Road / Skyline Way – Signalised.
- O'Shea Road / Bridgewater Boulevard – Signalised.
- O'Shea Road / Jembecca Drive – Unsignalised (left in, right in, left out only).

4.3.2 O'Shea Road Extension & Beaconsfield Interchange

The Monash Freeway Upgrade Stage 2 includes the extension of O'Shea Road to the Beaconsfield Interchange. Ultimately this road will form a primary arterial route with three (3) lanes in each direction, with the interim layout to incorporate two (2) lanes of traffic in each direction.

The Beaconsfield interchange will be upgraded to incorporate additional traffic lanes on the Freeway overpass and outbound (east) on/off-ramps.

4.4 Interim Traffic Impact Analysis (Traffix Group, 2017)

My firm was previously engaged by the VPA in March 2017 to undertake traffic assessments associated with interim development on the Minta Farm precinct. I was the director responsible for this project.

The analysis focused on the capacity of the existing road network to cater for initial development on the Minta Farm site prior to the construction of the internal N-S Arterial Road (Our Ref: G22294R-01C dated 5/09/2017).

The analysis was prepared on the basis that the O'Shea Road duplication project (Clyde Road to Soldiers Road) would be complete with no other key changes to the surrounding road network.

The existing daily traffic volume data was sourced from previous traffic counts conducted by City of Casey between 2014 and 2016. The existing morning and afternoon peak traffic volumes data was sourced from turning movement counts conducted on the 29th of March, 2017 by Traffix Group and SCATS data from the 15th March, 2017 sourced from VicRoads.

The assessment modelled three (3) dwelling yield scenarios, as follows:

- 1,000 dwellings,
- 1,250 dwellings, and
- 1,500 dwellings.

The impacts to the surrounding road network considered against two (2) key criteria as follows:

- Midblock 'environmental' capacity of road links based on daily traffic volumes, and
- Intersection capacity at key locations in the network based on morning and afternoon peak traffic volumes.

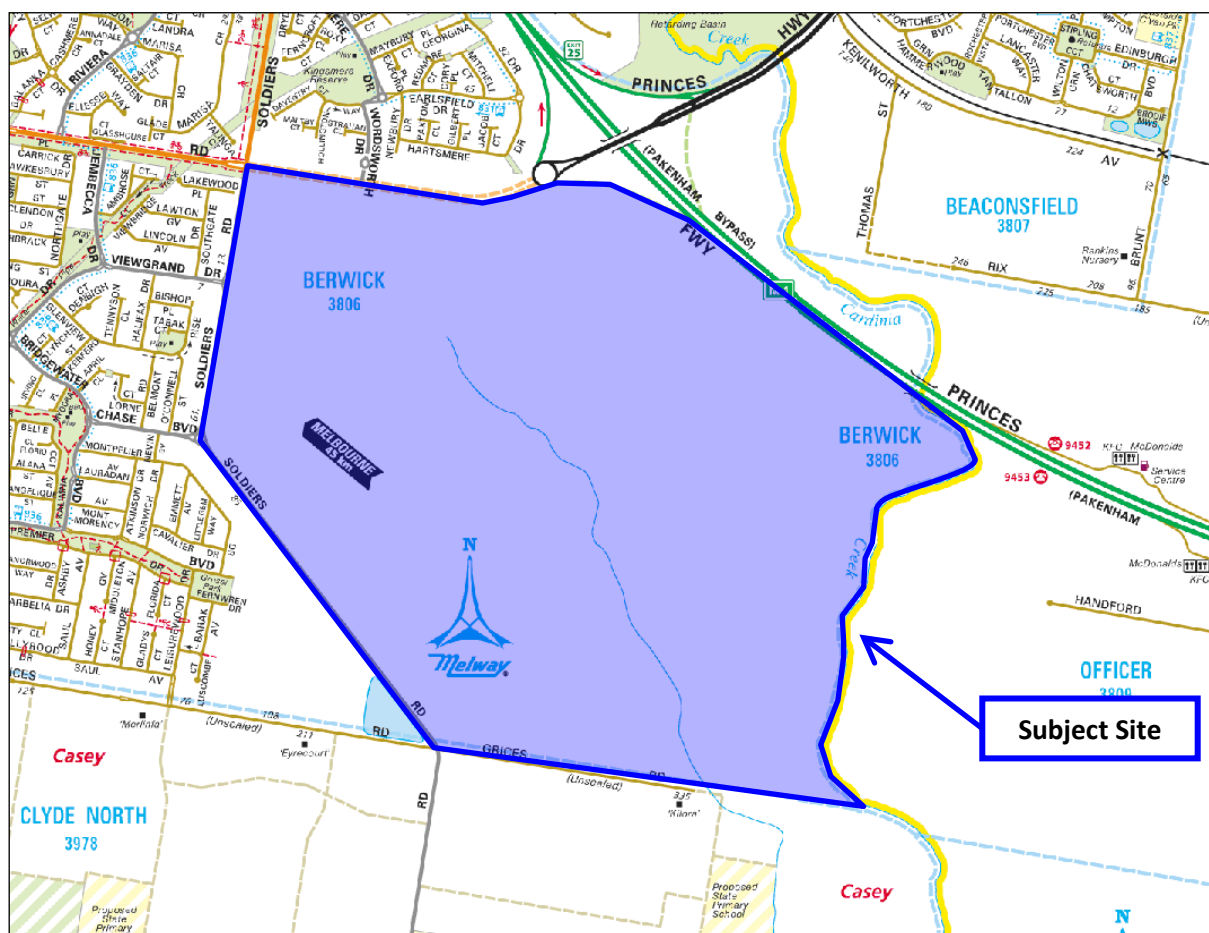
The assessment identified that the surrounding road network could cater for the interim development of up to 1,000 lot in the southwest corner on the Minta Farm site.

5 Existing Conditions

5.1 Subject Site

The subject site is Minta Farm, located on Soldiers Road in Berwick. The land affected by Amendment C228 is located on the east side of Soldiers Road in Berwick and is generally bounded by Soldiers Road in the west, Cardinia Creek in the east, Grices Road in the south and land south of Princes Freeway in the north.

A locality plan and aerial photograph of the site are provided at Figure 2 and Figure 3 below.

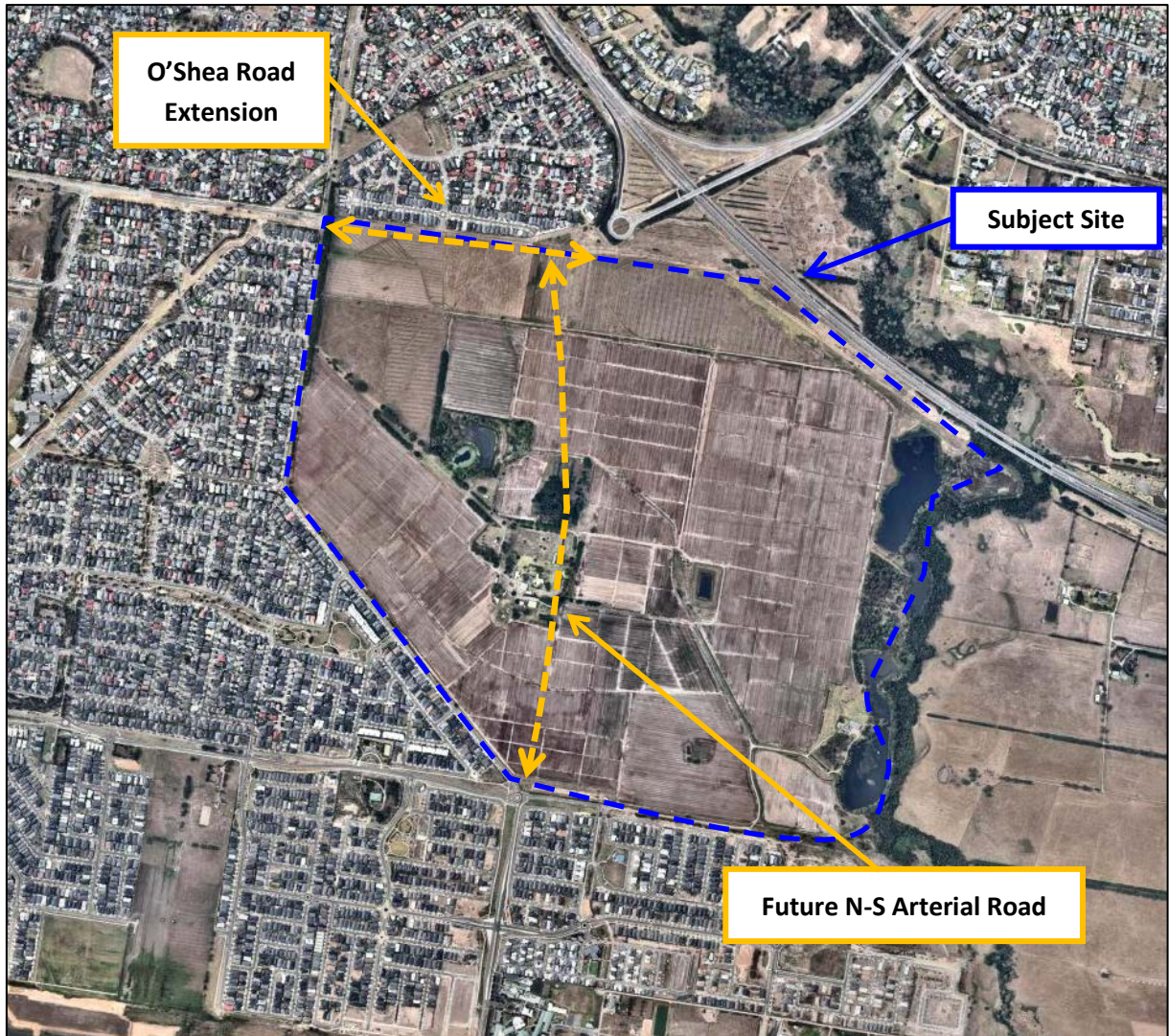


Reproduced with permission of Melway Publishing Pty Ltd

Figure 2: Locality Map

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11



Source: www.nearmap.com.au

Figure 3: Aerial Photograph

5.2 Land Use

The C228 site is currently zoned Urban Growth Zone (UGZ), as shown in Figure 4. The nearby land use is primarily urban growth and residential. Other key land uses includes the Princes Freeway to the north, Berwick Chase Primary School to the west and Hillcrest Christian College to the south.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

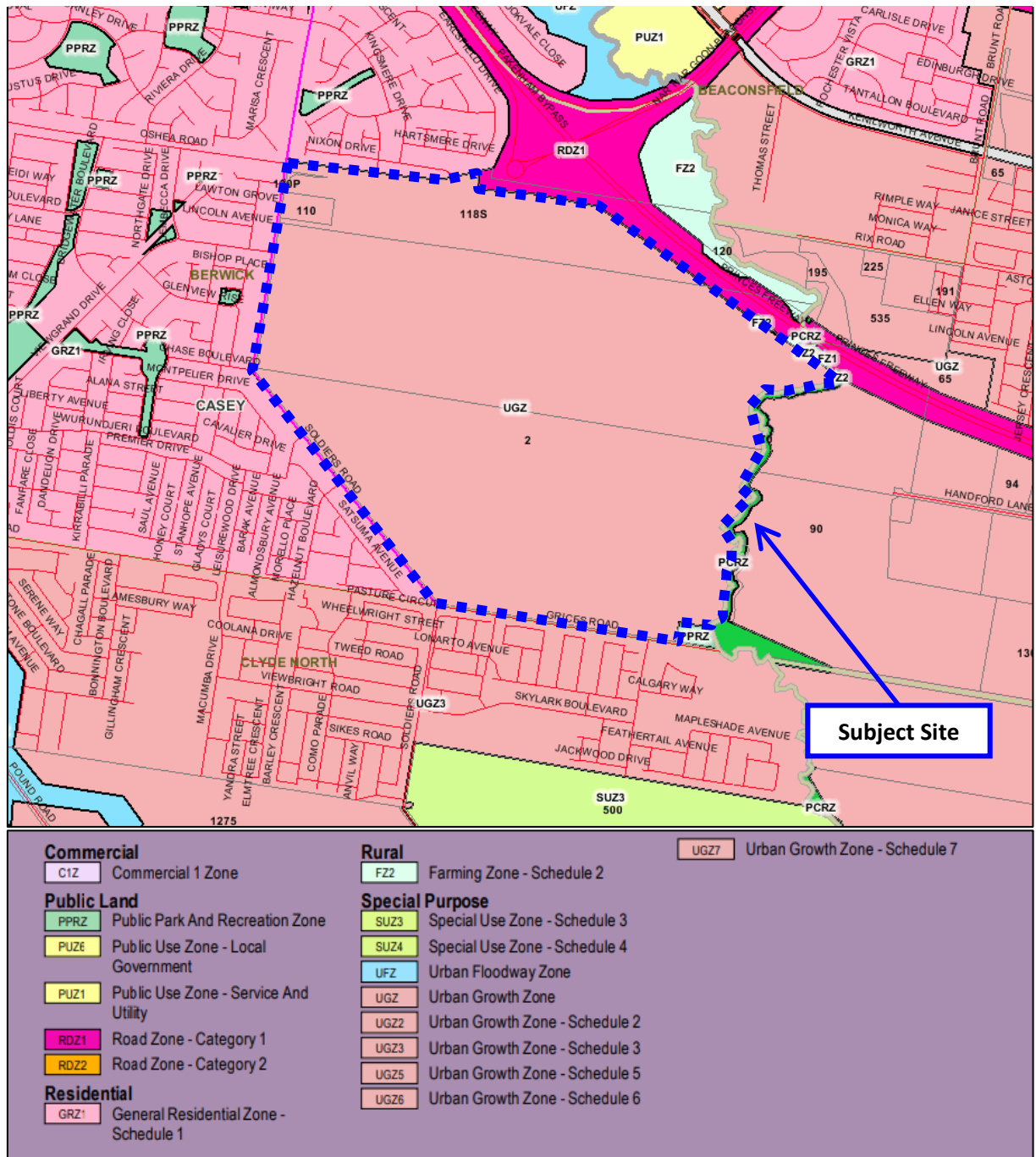


Figure 4: Land Use

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

5.3 Existing Road Network

A summary of the key roads in the vicinity of the Minta Farm PSP area is provided in Table 1 below.

Table 1: Existing Road Network

Road	Description
VicRoads Arterial Roads	
Clyde Road	<p>Clyde Road is a VicRoads primary arterial road extending north-south between Princes Highway, Berwick and Cameron Street, Cranbourne.</p> <p>Clyde Road generally provides for a duplicated carriageway with three (3) traffic lanes in each direction north of Meadowland Way and two (2) traffic lanes in each direction south of Meadowlands Way.</p> <p>Signalised intersections are provided at O'Shea Road, Cresthaven Boulevard, Meadowlands Way and Grices Road.</p> <p>The posted speed limit on Clyde Road is 80km/h.</p>
Council Arterial Roads	
O'Shea Road	<p>O'Shea Road is a Council arterial road that extends east-west between Clyde Road in the west and Soldiers Road in the east.</p> <p>Under the existing conditions, O'Shea Road provides for a two lane, two-way carriageway with a roundabout at Skyline Way and unsignalised intersections at Bridgewater Boulevard and Jembecca Drive.</p> <p>The posted speed limit on O'Shea Road is 70km/h.</p>
Soldiers Road (North of O'Shea Road)	<p>Soldiers Road, north of O'Shea Road operates as a Council arterial road providing a connection between O'Shea Road and Berwick including an overpass over the Princes Freeway.</p> <p>Under the existing conditions Soldiers Road generally provides for a lane of traffic in each direction with a roundabout at Kingsmere Drive / Streeton Drive.</p> <p>Soldiers Road north of O'Shea Road has a post speed limit of 70km/h.</p>
Grices Road	<p>Grices Road is a Council road that extends from Clyde Road in the east (where it continues as Glasscocks Road) to a termination at the Cardinia Creek in the west.</p> <p>Grices Road generally provides for a lane of traffic in each direction, with service roads providing for property access. Traffic signals are provided at Leisurewood Drive whilst roundabouts are provided at Viewgrand Drive, Kirrabilli Parade and Soldiers Road.</p> <p>The posted speed limit on Grices Road is 70km/h.</p>
Collector Roads	
Soldiers Road (South of O'Shea Road)	<p>Soldiers Road south of O'Shea Road is classified as a collector road extending south to Thompsons Road.</p> <p>Soldiers Road generally provides a lane of traffic in each direction, with formal kerb and channel on the west side and a sealed shoulder on the east side (along the Minta Farm frontage). Soldiers Road (south of O'Shea Road) generally provides for a 20m road reservation with the following key elements:</p> <ul style="list-style-type: none"> • Verge (south-west) – 4.5m • Parking Lane – 2-2.3m • Northbound traffic lanes – 3.05-4.3m • Southbound traffic lane – 3.15-4.7m • Verge (north-east) – 5.1-7.3m <p>The posted speed limit on Soldiers Road south of O'Shea Road is 60km/h.</p>

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Road	Description
Viewgrand Drive	<p>The local area to the west of the Minta Farm site contains a range of collector roads with varying alignments.</p> <p>The alignments of the collector roads are generally governed by the open space extending diagonally north-east to south-west through the local area. Whilst the majority of the road network has been completed, a single section of Cresthaven Boulevard is yet to be constructed between Skyline Way and Bridgewater Boulevard.</p> <p>The key components of the collector road network within the adjacent local area are a single lane of traffic in each direction and separated parking lanes</p> <p>The collector roads are subject to the default urban speed limit of 50km/h.</p>
Jembecca Drive	
Bridgewater Drive	
Chase Boulevard	
Wurundjeri Boulevard	
Kirrabilli Parade	
Skyline Way	
Meadowlands Way	
Ridgemont Drive	
Cresthaven Boulevard	

5.1 Existing Traffic Data

5.1.1 Daily Traffic Volumes

The City of Casey has undertaken a series of traffic counts in the local area to the west of the Minta Farm site between 2014 and 2016. Traffix Group also conducted five (5) additional tube counts on Soldiers Road and Chase Boulevard in March 2018. For the O'Shea Road count between Clyde Road and Skyline Way, the daily volume has been estimated from recent turning movement counts.

A summary diagram showing the two-way 24 hour volumes is provided in Figure 5 below, with the historical Council counts shown in 'black' and recent Traffix Group counts shown in 'red'.

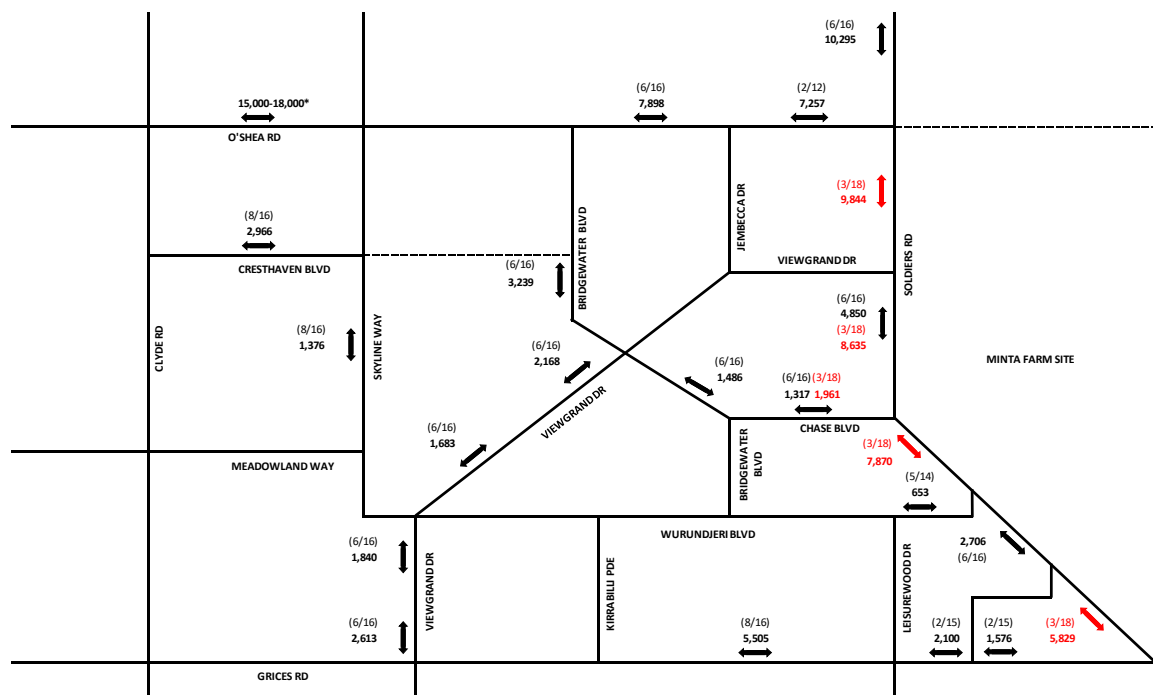


Figure 5: Existing Daily Traffic Volumes

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

I note that whilst no traffic count was conducted on Soldiers Road in the section between Wurundjeri Boulevard and Hazelnut Boulevard. However, I would estimate that the daily volume in this section would fall somewhere between 7,780vpd (observed between Chase Boulevard and Wurundjeri Boulevard) and 5,829vpd (observed between Ramisco Way and Grices Road).

5.1.2 Peak Hour Traffic Volumes

City of Casey has provided turning movements counts undertaken on Thursday, 15th February, 2018 between 7am-9am for the following intersections:

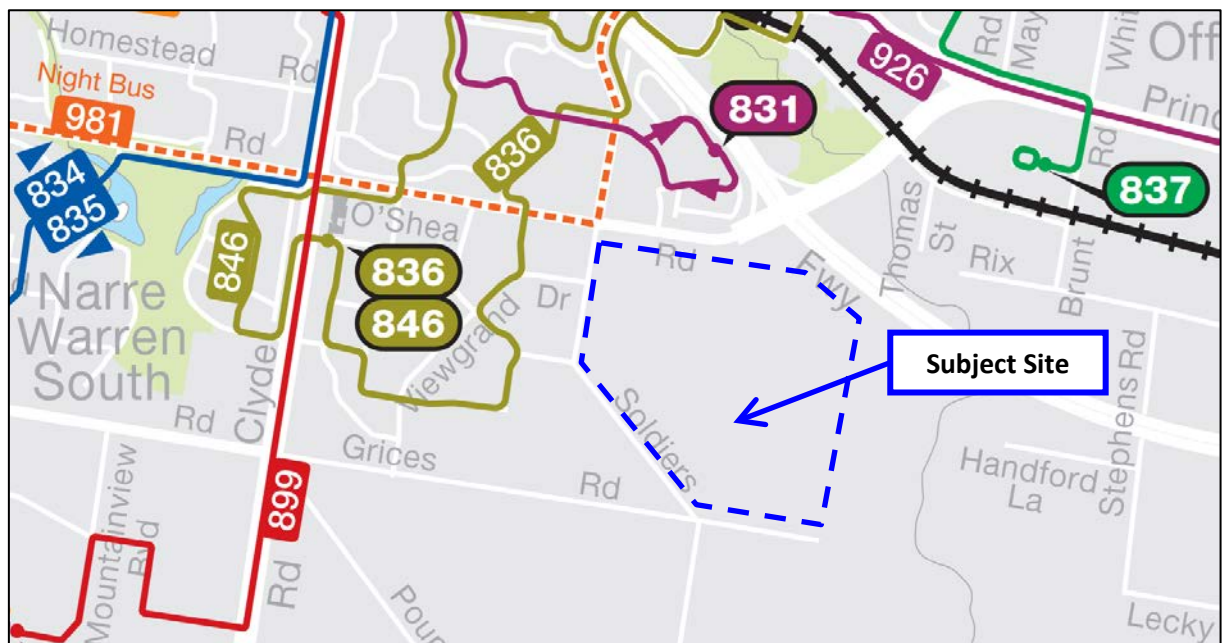
- Clyde Road / Grices Road,
- Clyde Road / O'Shea Road,
- O'Shea Road / Soldiers Road,
- Chase Boulevard / Soldiers Road, and
- Grices Road / Soldiers Road.

5.2 Public Transport

The following public transport services are provided in the vicinity of the subject site.

Bus route 836 provides a bus services between Berwick Station and Eden Rise Secondary College via Bridgewater Estate. A bus stop on route 836 is located on Bridgewater Boulevard approximately 1km west of the subject site.

The bus services operating within the vicinity of the subject site is shown in Figure 6.



Source: www.ptv.vic.gov.au

Figure 6: Public Transport Map

A summary of the key service statistics for the public transport services are shown in Table 2 below.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Table 2: Summary of Public Transport Services

Service	From	To	Average Headway		First Service	Last Service	Number of Daily Services
			AM Peak	PM Peak			
Bus Route 836	Weekday						
	Berwick Station	Eden Rise Secondary School	62 min	64 min	6:35am	9:34pm	16
	Eden Rise Secondary School	Berwick Station	62 min	49 min	5:45am	9:29pm	18
	Saturday						
	Berwick Station	Eden Rise Secondary School	60 min	60 min	8:06am	9:12pm	14
	Eden Rise Secondary School	Berwick Station	60 min	60 min	7:49am	8:59pm	14

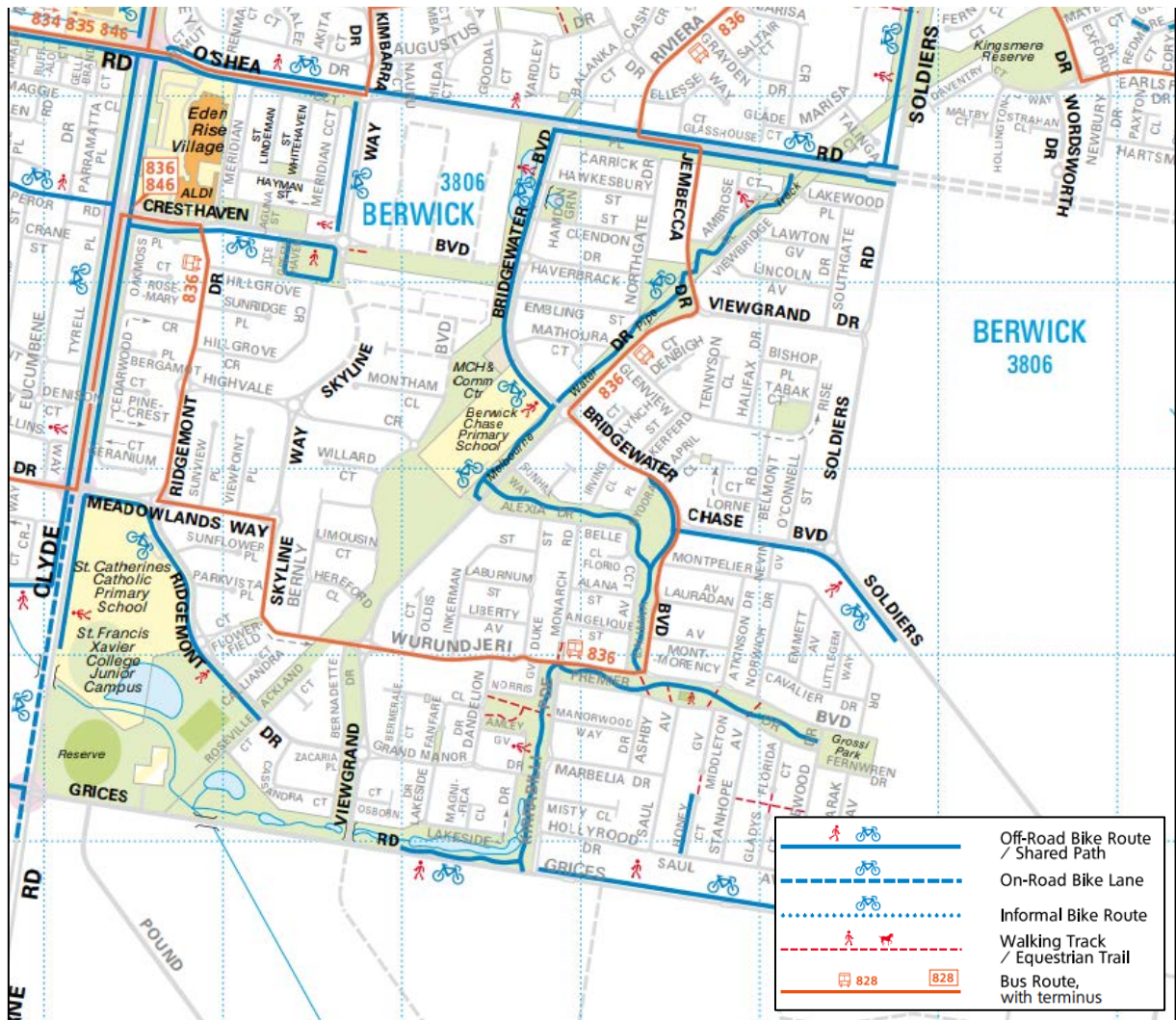
5.3 Pedestrian and Bicycle Facilities

Within close proximity of the subject site there are a range of off-road bike routes/ shared paths. Further to the east of the site is a bicycle lane on Clyde Road that extends from Cedarwood Crescent in the north to Thompsons Road in the south.

A summary of the shared use paths and bicycle lanes in the local area are shown in Figure 7 below.

All local roads bounded by Soldiers Road, O'Shea Road, Clyde Road and Grices Road have footpaths on both sides of the road. The south side of O'Shea Road, between Bridgewater Boulevard and Skyline Way, and Grices Road, west of Soldiers Road, currently does not have a footpath.

Amendment C228 to the Casey Planning Scheme Minta Farm PSP 11



Source: <http://www.casey.vic.gov.au>

Figure 7: Casey Travel Smart Map

6 C228 Public Exhibition Submissions

In late 2017, the VPA placed the Minta Farm PSP documentation along with a 96A application for the first stage of development on the Minta Farm site on public exhibition (Amendment C228). This public exhibition included the previous Traffix Group report in relation to the interim lot cap (detailed previously in Section 4.4) as well as various other background documents.

The table below presents a summary of the key traffic issues raised during the public exhibition of the Minta Farm documentation (those that are specifically related to the interim traffic assessments).

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Table 3: C228 Public Exhibition – Submission Summary

Item	Stakeholder Issue
City of Casey	
44.06	Traffic counts were taken on 29 March 2017 (two days before the end of school term). Consider traffic volumes may be higher and requests that counts be undertaken again including the mid-school term.
44.07	Confirm SCATS dates.
44.08	Does not support 25% reduction to daily traffic generation as there are no 'destinations' within the initial development area to warrant decrease.
44.09	Considers 2011 census data inadequate as there are likely to be some 'east' movements not captured. Review assumptions.
44.10	Rejects recommendation that Soldiers Road and Chase Boulevard can carry traffic above their classification (as per Council Road Register). Does not support early development proposal based on projected traffic impacts.
44.11	No average delay and 95th percentile queue lengths included in report as part of SIDRA analysis.
44.12	Considers that the modelling should be based on the current road network and intersection layouts (and not include upgrades for O'Shea and intersections for Clyde, Skyline, Bridgewater, and Soldiers as these are not funded).
44.13	Considers that modelling should consider implications during construction period during the 1-1500 lot period.
44.14	Asserts that the traffic modelling should have considered bus, cycling and walking infrastructure
Transport for Victoria	
41.21	Expresses concern about traffic management along Berwick-Cranbourne Road/Grices Road and Berwick-Cranbourne Road/O'Shea Road/Greaves Road intersections in the interim with the completion of development of the Clyde North PSP and the early development stages of Minta Farm, including the 96A.
42.22	There are also concerns with the ability of the one-lane roundabout at the Soldiers Road/Grices Road intersection to cater for existing and committed development, plus traffic from Minta Farm.
41.24	The traffic generation rates used in the Traffix Group- Traffic Engineering Assessment should be revised to comply to the RTA guide which do not include trips made internal to the subdivision, which may add up to additional 25%.
Local Community	
-	Concerns for traffic growth on O'Shea Road and requests for road upgrades on O'Shea Road.
-	Concerns for traffic growth on Soldiers Road and requests for road upgrades on Soldiers Road.
-	Concerns regarding the safety of the parking lanes on Soldiers Road. Requests to wider the parking lanes.
-	Concerns for impact to T-intersection at Soldiers Road / O'Shea Road.
-	Concerns for impact to signals at Clyde Road / Grices Road.
-	Concerned with impact during school peak periods, given the number of schools in the area (some comments specifically relating to the section of Soldiers Road north of O'Shea Road).
-	Broad objection on the basis that infrastructure is not provided prior to lots being developed or existing infrastructure cannot cope with additional volumes or congestion already an issue.
-	Proposes O'Shea Road and Soldiers Road increased to be double lanes prior to developing the PSP area.
-	Proposes a traffic assessment along Clyde Road, Princes Highway and Princes Freeway during peak hours.
-	Need the internal N-S Connector Road from the start of development.
-	Concerns for increased traffic volumes in Viewgrand Drive.

7 Traffic Engineering Assessment

The following sections outline my assessment of the capacity of the existing road network to cater for the proposed initial development on the Minta Farm site.

7.1 Assessment Assumptions

I have made the following key assumptions in relation to my traffic assessments for this project:

- **Horizon Year:** 2022
- **Road Network Upgrades Completed:** Monash Freeway Stage 2 project (O'Shea Road duplication, O'Shea Road extension and Beaconsfield Interchange upgrade).
- **Surrounding Development:** Continued development of the Clyde North and Thompson Road PSP areas including 'short' and 'medium' development assumptions provided by Council.

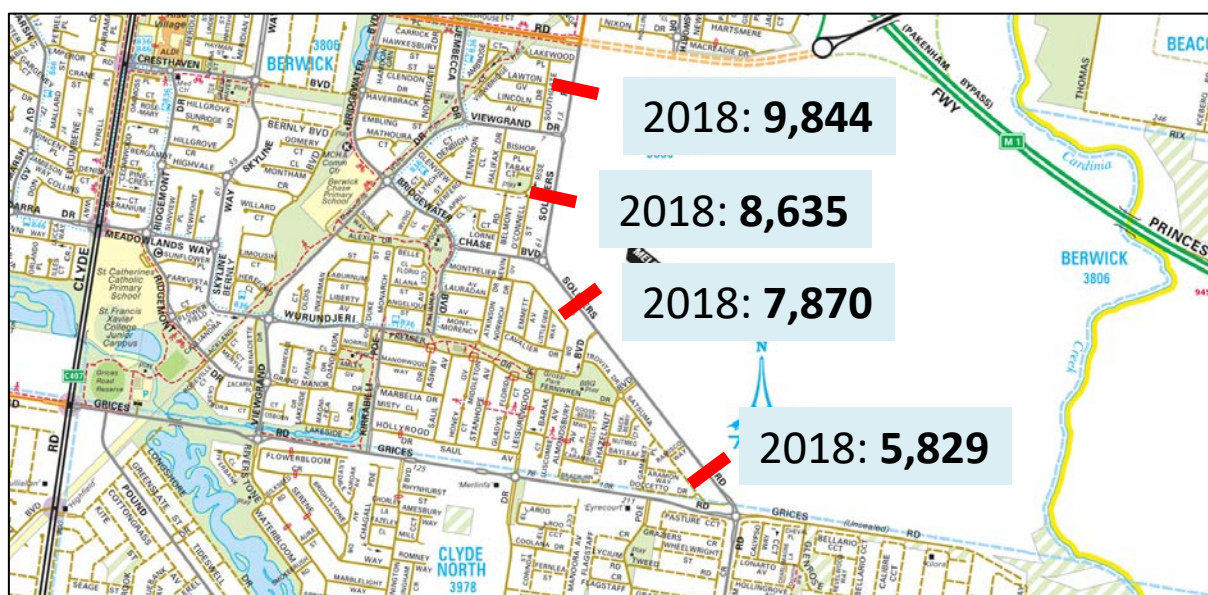
7.2 Soldiers Road – Without Minta Farm Development

The section of Soldiers Road adjacent to the Minta Farm site (i.e. south of O'Shea Road) is classified by Council as a collector road. Council's road register provides the following commentary in relation to collector roads:

'Collector roads are important local roads whose function is to distribute traffic between the arterial roads and the local road system and to provide access to the abutting property. A reasonable level of local amenity is maintained by restricting traffic volumes and vehicle speeds. The collector street may be used as a bus route.'

Council's Road Management Plan provides a target volume for collector roads of 3,000-7,000 vpd.

Recent traffic counts (March, 2018) indicate that the daily volume on Soldiers Road varies between 5,829vpd in the vicinity of Grices Road and 9,844vpd in the vicinity of O'Shea Road. A summary of the 2018 volumes (two-way 24 hour) are shown in Figure 8 below.



Reproduced with permission of Melway Publishing Pty Ltd

Figure 8: Soldiers Road Traffic Volumes – March 2018

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

The current 2018 the daily volumes on Soldiers Road are generally above 'environmental' capacity of 3,000-7,000vpd set by Council (north of Wurrundjeri Boulevard).

A comparison of the recent traffic counts with historical counts provided by Council indicate that Soldiers Road traffic volumes have been growing significantly in recent years. For the traffic count located between Viewgrand Drive and Chase Boulevard, the volume has grown from 4,850 vpd in 2016 to 8,635 vpd in 2018 (increase of 3,785 vpd over two years). I am of the view that this volume increase is largely associated with the recent construction of dwellings in the residential area to the south of Grices Road (Clyde North PSP area) with drivers from this area choosing to use Solders Road in preference to other routes in the local area (i.e. Grices Road, Clyde Road, etc.).

As construction continues in the PSP areas to the south of Grices Road, I would expect traffic volumes on Soldiers Road to continue to rise (in the absence of construction of any new road links). I have reviewed information provided by City of Casey in relation to permit approvals within the Clyde North PSP area. I have specifically reviewed the catchment that will form the extension of Soldiers Road as shown in Figure 9 below.

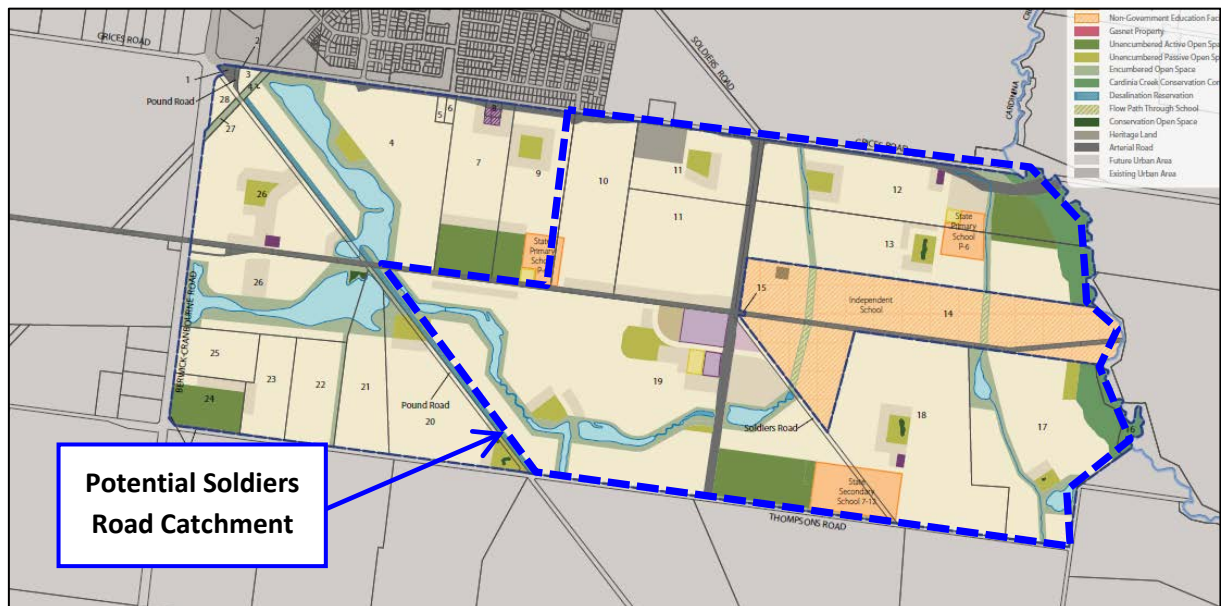


Figure 9: Clyde North PSP – Land Parcels Catchment

I have reviewed recent aerial photography to determine the approximate level of development already completed for each land parcel within the above area. On this basis, I have estimated the level of development that is still to occur within this catchment as shown in Table 4 below.

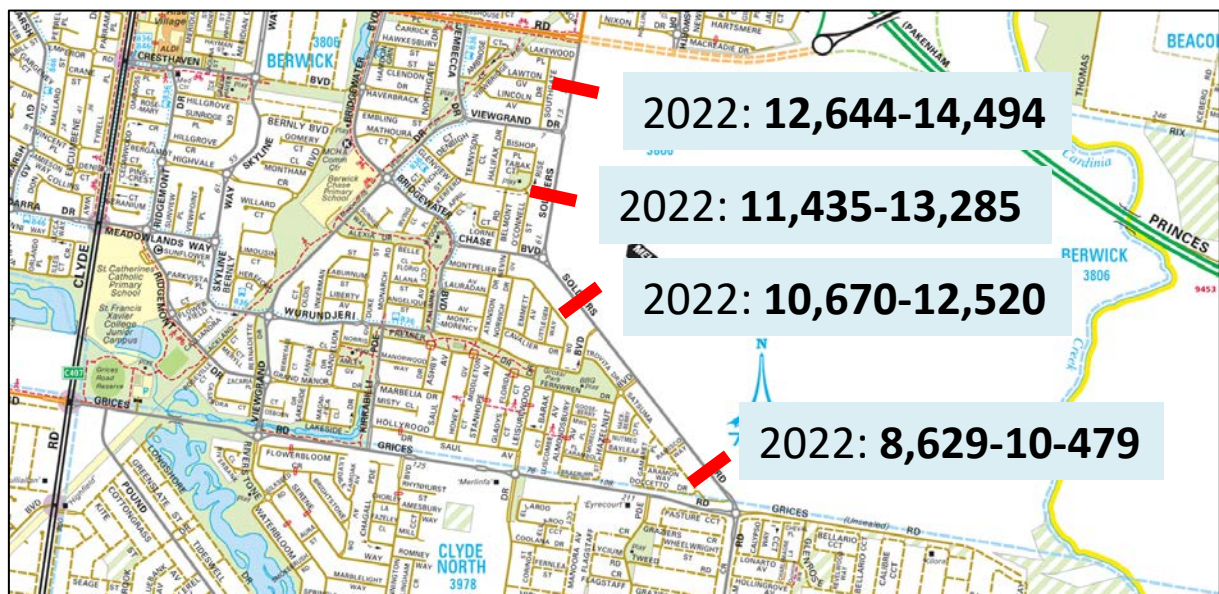
Amendment C228 to the Casey Planning Scheme
Minta Farm PSP 11

Table 4: Clyde North PSP – Undeveloped Lots within Soldiers Road Catchment

Property	Dwelling Lots	Estimated Percentage Already Complete	Undeveloped Lots	Daily Traffic Generation (8 trips/dwelling)
Property 10	335	100%	0	-
Property 11	572	80%	114	912
Property 12	347	100%	0	-
Property 13	318	60%	127	1,016
Property 17	925	0%	925	7,400
Property 18				
Property 19				
TOTAL	2,497	-	1,166	9,328

In view of the above, daily traffic generation of undeveloped lots within the potential catchment for Soldiers Road is 9,328vpd. I note there is also significant residential development occurring in the Thompsons Road PSP area, which is located in the area to the south of Thompsons Road. Whilst Council has not provided permit / yield information for this area, I am of the view that some traffic volumes from this area could also be expected to utilise Soldiers Road to access the Freeway (as an alternative to Clyde Road). On this basis, I consider my Soldiers Road catchment generation of 9,328vpd to be conservative.

I would expect that a portion of the trips within the catchment would utilise Soldiers Road to access the broader road network, particularly given the future connectivity to the Beaconsfield interchange. I have adopted a range of between 30-50% of the total volume for this area to potentially utilise Soldiers Road, this would result in growth of between approximately 2,800vpd and 4,650vpd when this area fully develops. On this basis, Figure 10 details the potential daily volumes along Soldiers Road in 2022 without any contribution from the Minta Farm site.



Reproduced with permission of Melway Publishing Pty Ltd

Figure 10: Estimated Soldiers Road Traffic Volumes – 2022

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

The above volumes would significantly exceed Council's environmental capacity for a connector road, even without any contribution from the Minta Farm site. I would expect a range of potential impacts as a result of these traffic volumes as follows:

- **O'Shea Road Intersection Capacity Issues:** The signalised intersection at O'Shea Road / Soldiers Road would be expected to show signs of poor performance. The proposed signalised intersection at O'Shea Road (part of the Monash Upgrade Stage 2) is proposed to incorporate a single left/through lane and a single right turn lane. I would expect the right turn movement to have heavy demands as vehicles head towards the freeway.
- **Viewgrand Drive Intersection:** Whilst the intersections in the southern portion of Soldiers Road (south of Chase Boulevard) have been provided with right turn lanes, Viewgrand Drive currently incorporates a 'T-deviation' style traffic management treatment. Due to the lack of flaring at the intersection, right turning vehicles into Viewgrand Drive would cause queues for southbound vehicle. Furthermore, right turn movements out of Viewgrand Drive would be difficult resulting in long delays.
- **Chase Boulevard Roundabout:** Local street roundabouts typically provide good levels of service due to the relatively balanced flows and relatively low levels of traffic. However, as volumes grow on Soldiers Road, movements out of Chase Boulevard are likely to become more difficult.
- **Property Access Difficulty:** Direct property access is provided to residential property along the whole western/southern side of Soldiers Road. Right turn movements into properties along the length will result in delays to southbound vehicles.
- **'Rat Running' through Local Streets:** If the above issues result in significant delays along Soldiers Road, drivers may choose to select alternative local road routes through the adjacent residential area to the west.

Based on the above volumes / impact, I am of the view that Council as the Road Authority will need to consider improvements on Soldiers Road, even if development on the Minta Farm site doesn't occur.

7.2.1 North-South Arterial Road

To reduce the localised impact to Soldiers Road, I am of the view that the preferred improvement option is the construction of the N-S Arterial Road identified in the Minta Farm PSP.

This road is a critical piece of sub-regional road infrastructure that should be delivered as early as practically possible. The N-S Arterial Road completes the arterial road network in the broader area and would establish a typical arterial road grid in the local area.

The construction of the N-S Arterial Road would result in the truncation of Soldiers Road at Grices Road, which would clearly resolve the traffic volume issues expected on Soldiers Road.

7.2.2 Potential Short-Term Management Options for Soldiers Road

If the N-S Arterial Road is not constructed, Council as the Road Authority will need to consider options to manage the traffic volumes expected on Soldiers Road (even without any development on the Minta Farm site). I have identified two (2) possible options that Council could consider to lessen the impact of the traffic volumes on Soldiers Road as follows:

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Option 1 – Modified Soldiers Road Cross-Section

Modification of the Soldiers Road cross-section to allow for a greater daily volume capacity. The key cross-sectional elements that would be modified are as follows:

- **Painted Median ‘Turn Lane’** – ‘Right In’ vehicle movements to property driveways limit capacity on two lane, two-way roads. As vehicle volumes rise, the time for a right turning driver to select a gap in the opposing traffic stream will increase. This in turn results in queues forming behind the stationary right turning vehicle. On this basis, it is desirable to provide dedicated space for right turning vehicles into property access points in the form of a painted median.
- **Refuge Islands** – As traffic volumes increase, pedestrians begin to have difficulty crossing the road. This can be resolved through the provision of refuge islands that stage pedestrian crossing movements into two distinct movements.

Based on the above modifications, I have prepared a potential cross-section for Soldiers Road shown in Figure 11 below. This cross-section could be constructed within the proposed ultimate kerb locations for Soldiers Road as an interim measure.

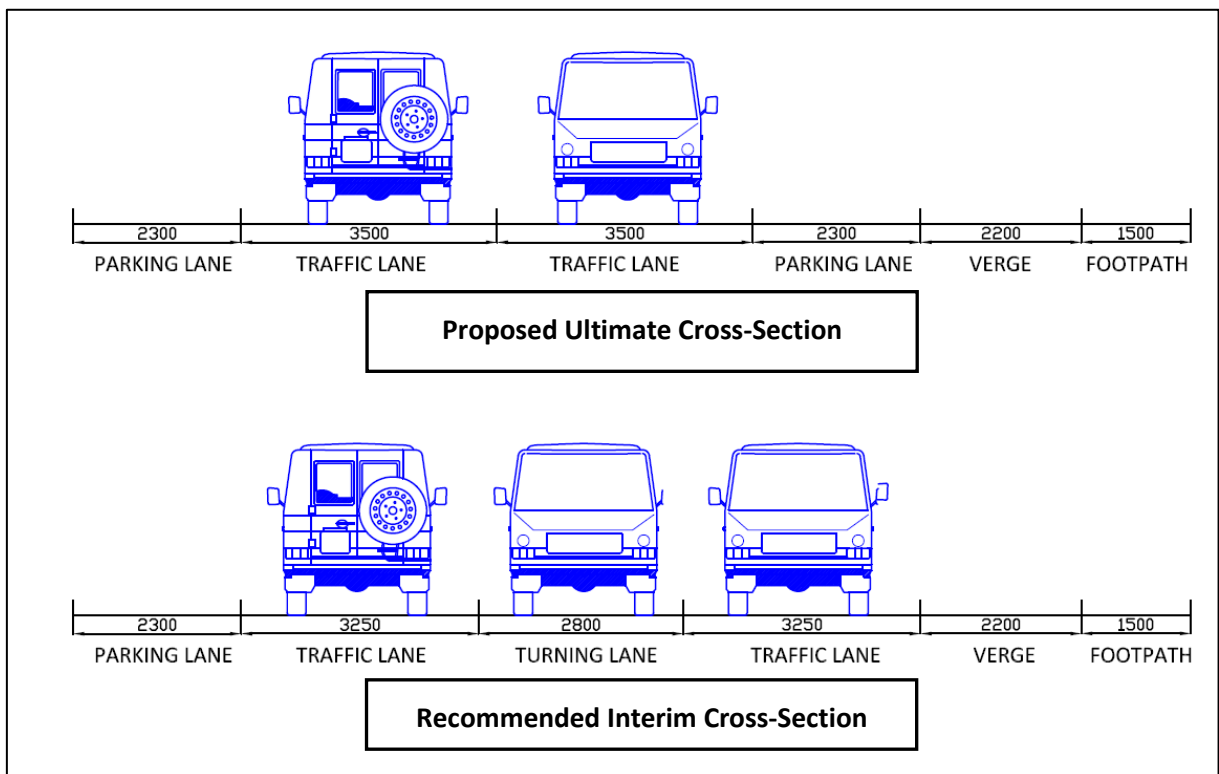


Figure 11: Proposed Interim Soldiers Road Cross-section

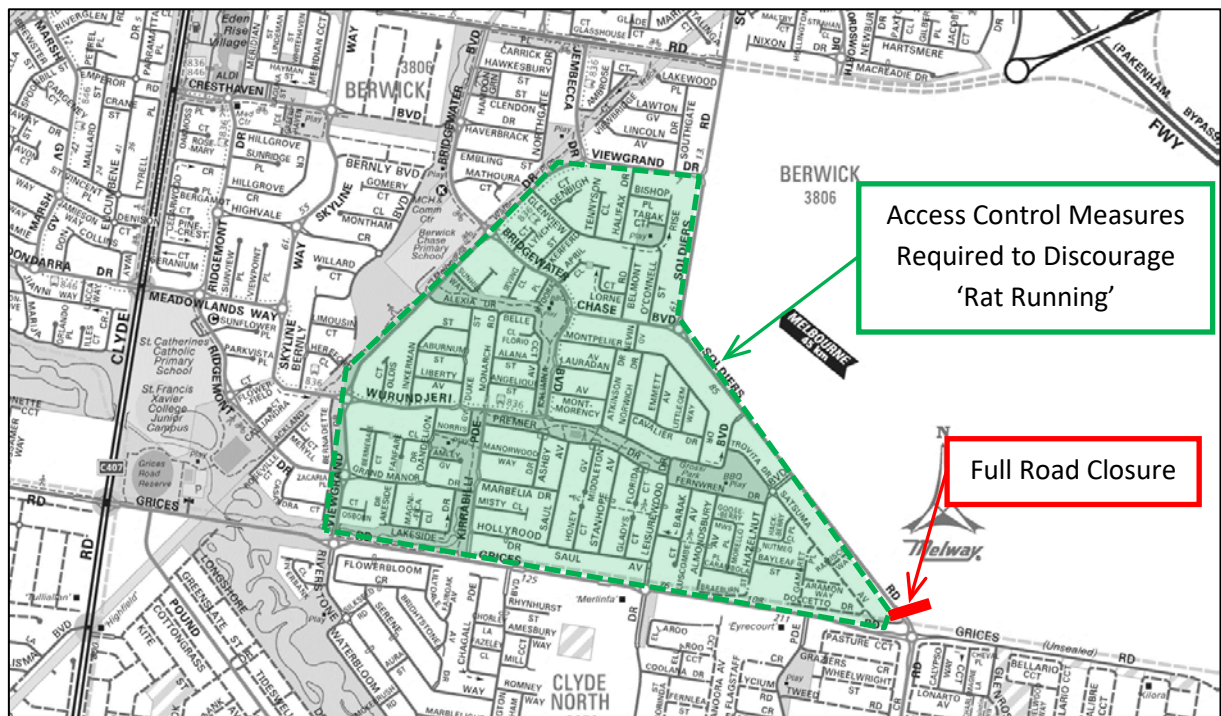
Option 2 – Truncation of Soldiers Road at Grices Road

The second option is to implement the truncation of Soldiers Road at Grices Road. I note that the PSP indicates that the ultimate arrangement will include a truncation of Soldiers Road, which downgrades Soldiers Road to an Access Street Level 2.

As an interim measure, Soldiers Road could be closed early at the Grices Road roundabout. This approach would be intended to re-distribute traffic volumes associated with the development in the Clyde North PSP area to the south along Grices Road.

Amendment C228 to the Casey Planning Scheme Minta Farm PSP 11

However, this approach would need to be supported by other measures in the local network to discourage 'rat running' through local streets and re-joining Soldiers Road.



Reproduced with Permission of Melway Publishing Pty Ltd

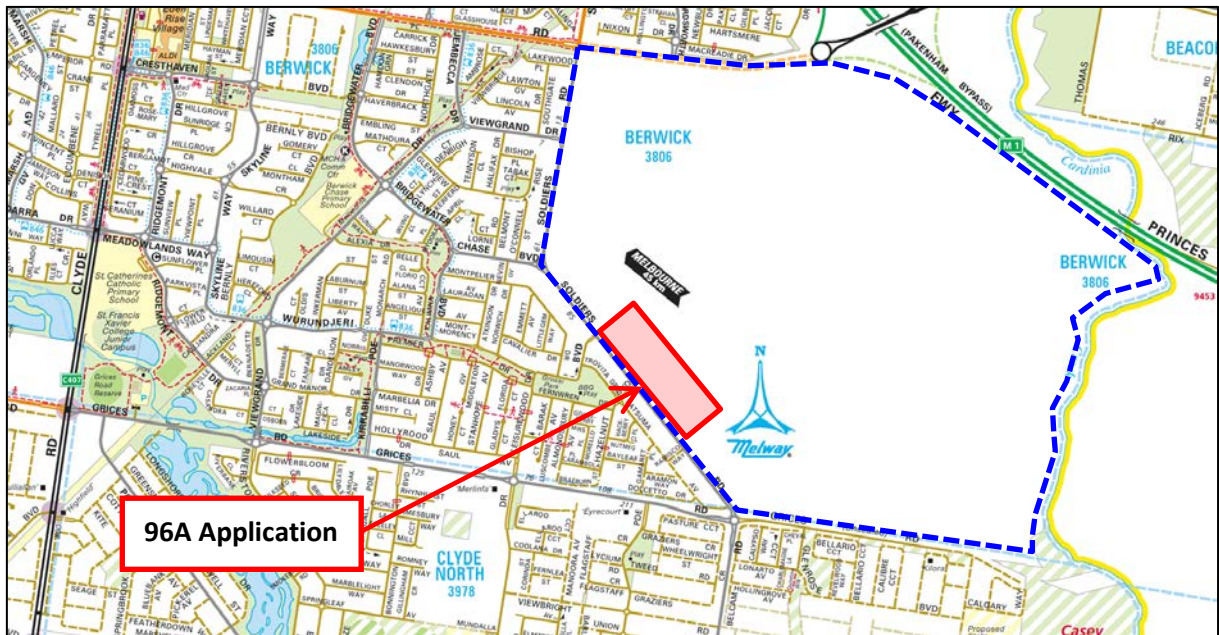
Figure 12: Soldiers Road - Road Closure Option

7.3 96A Permit Application Review

The 96A application proposes initial development of the Minta Farm site adjacent to Soldiers Road in the vicinity of Hazelnut Boulevard. Vehicle access to this site is proposed to occur via a single roundabout connection to Hazelnut Boulevard, with direct property access for the lot fronting Soldiers Road. A total of 231 residential lots are proposed as part of the initial development.

A locality plan showing the initial development on the Minta Farm site is shown in Figure 13 below.

Amendment C228 to the Casey Planning Scheme Minta Farm PSP 11



Reproduced with permission of Melway Publishing Pty Ltd

Figure 13: Location of Initial Development on Minta Farm Site

7.3.1 Traffic Generation

Traffic generation rates for residential subdivisions generally range between 6 trips/dwelling/day to 10 trips/dwelling/day. These rates include both 'external' trips outside of the subdivision and 'internal' trips within the subdivision.

The exact traffic generation figures are difficult to pinpoint for any one location. I note that the 2009-10 VISTA data indicated a trip generation rate of 5.7 trips/dwelling/day for the City of Casey, however, we note that this is for all dwellings types. Conversely, the NSW Road and Maritime Authority has published traffic generation rates for external trips only of 10.7 trips/dwelling/day within Sydney and 7.4 trips/dwelling/day in regional areas (Technical Direction TDT 2013/04A, 2013).

I am of the view that 8 trips/dwelling/day is reasonable and appropriate for the proposed development on the Minta Farm site. This rate is regularly adopted by my company for traffic assessments in the south-east growth area as has been accepted on numerous occasions by Council's, VicRoads and other authorities (i.e. VCAT). Peak hour trips typically represent approximately 10% of the daily volumes in each peak hour, therefore for the purposes of this assessment I have adopted 0.8 trips/dwelling/hours for the AM and PM peak periods.

Table 5 details the traffic generation expected for the 96A application proposal.

Table 5: Traffic Generation – 96A Application Proposal

Scenario	Dwellings	Traffic Generation Rate	Traffic Generation
Daily Traffic Generation	231	8 trips / household / day	1,848
Peak Hour Traffic Generation		0.8 trips / household / hour	185

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

7.3.2 Broad Traffic Distribution

For the broad distribution of traffic across the wider road network, I have adopted the Australian Bureau of Statistics 'Journey to Work' census data from 2016. Specially, I have reviewed the journey to work trips for existing residents living in the 'Berwick South' statistical area. These employment locations were broadly grouped into six directions from the subject site as follows:

- Clyde Road Freeway (westbound),
- O'Shea Road Freeway (westbound),
- Freeway (eastbound),
- Greaves Road,
- Clyde Road (northbound),
- Clyde Road / Soldiers Road (southbound), and
- Soldiers Road (northbound).

Figure 14 below displays the six locations on an aerial map of the Minta Farm area with a summary table of the proportion of traffic utilising these routes is provided in Table 6 below.

Amendment C228 to the Casey Planning Scheme
Minta Farm PSP 11

Table 6: Journey to Work Distribution – Berwick South

Direction	Number of Trips	Percentage Split
Clyde Road Freeway (Westbound)	2,734	26%
O'Shea Road Freeway (Westbound)	4,099	38%
Freeway (Eastbound)	429	4%
Greaves Road	1,456	14%
Clyde Road (North)	294	3%
Clyde Road / Soldiers Road (South)	852	8%
Soldiers Road (North)	788	7%
TOTAL	10,652	100%

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

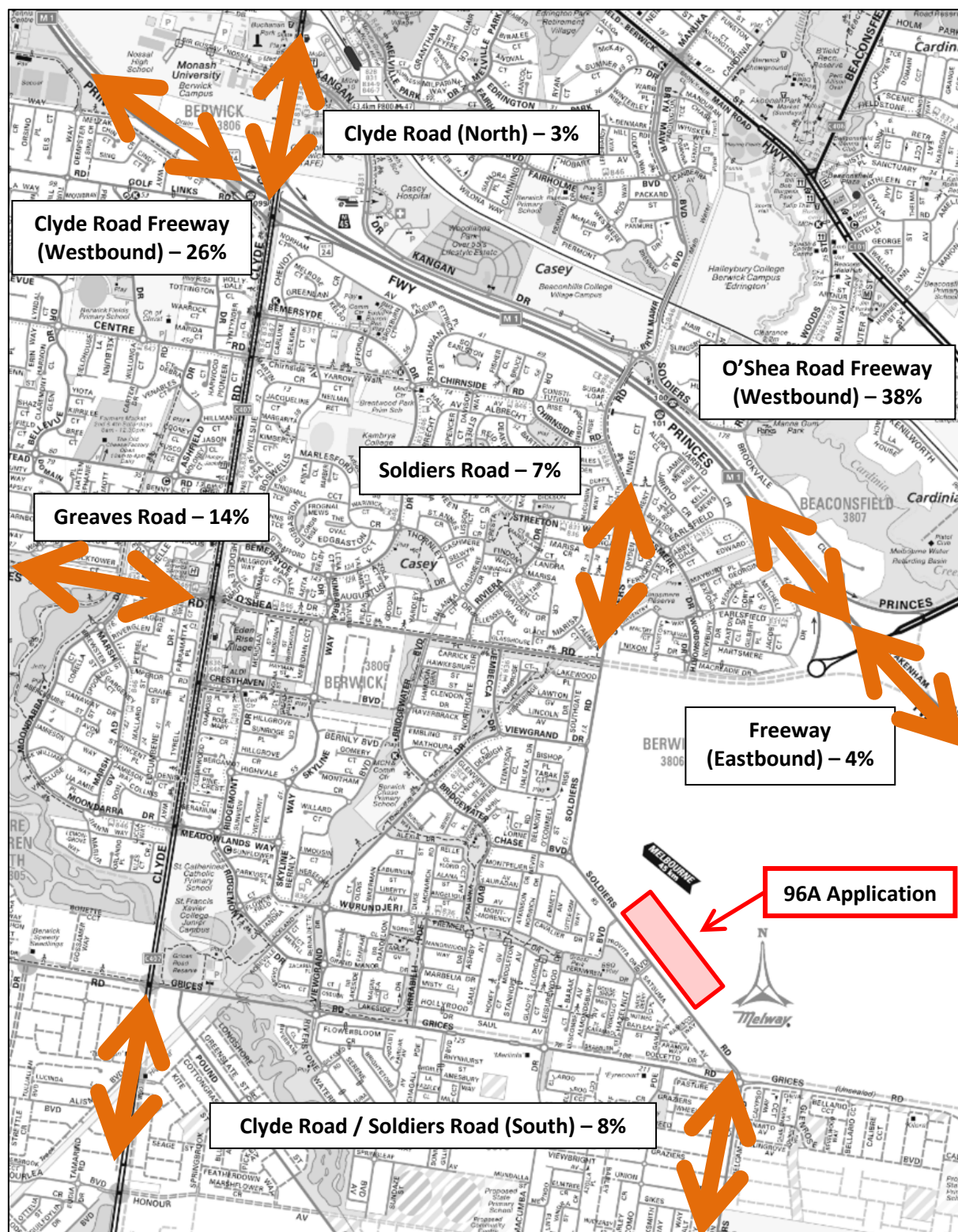


Figure 14: Journey to Work Broad Traffic Directions

Amendment C228 to the Casey Planning Scheme Minta Farm PSP 11

7.3.3 Localised Route Selection

For broad trip distribution identified above, I have assigned a localised route through the adjacent road network based on the most likely traffic routes. I have completed site inspections during both the AM peak and PM peak periods to review existing travel patterns and behaviours. This has informed my adoption of the percentages for each individual localised route.

A summary of the key routes identified through the road network are provided in Figure 15 below, with the summary of the adopted route selection shown in Table 7 below.

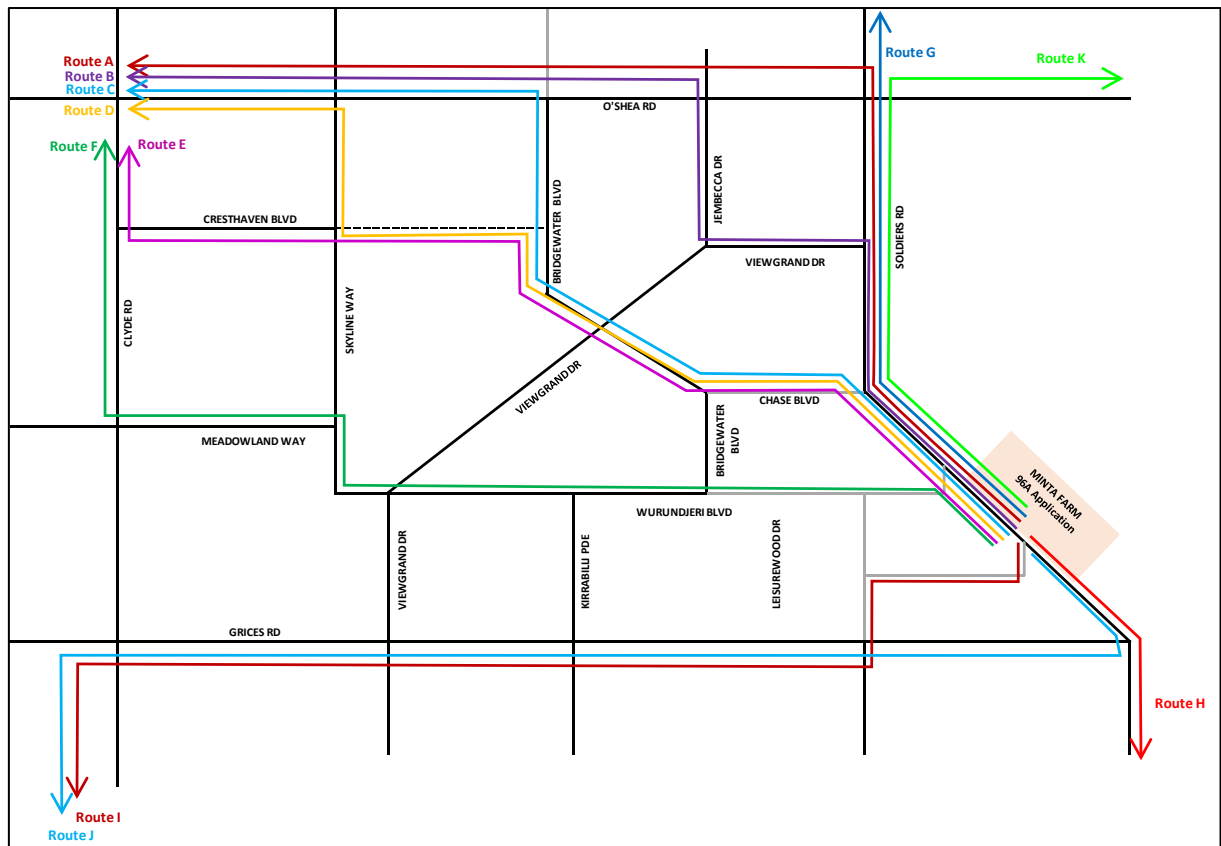


Figure 15: Localised Route Options

Table 7: Adopted Localised Route Selection

Route	A	B	C	D	E	F	G	H	I	J	K
O'Shea Rd Freeway (W)	-	-	-	-	-	-	-	-	-	-	100%
Clyde Rd Freeway (W)	75%	5%	5%	5%	5%	5%	-	-	-	-	-
Freeway (E)	-	-	-	-	-	-	-	-	-	-	100%
Greaves Rd	75%	5%	5%	5%	5%	5%	-	-	-	-	-
Clyde Rd (N)	75%	5%	5%	5%	5%	5%	-	-	-	-	-
Clyde Rd/Soldiers Rd (S)	-	-	-	-	-	-	-	5%	15%	80%	-
Soldiers Rd (N)	-	-	-	-	-	-	100%	-	-	-	-

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

The broad traffic distribution splits (Table 6) have been combined with the localised route options (Table 7) to determine the level of traffic associated with the 96A application along each route.

Table 8: 96A Applications – Daily Traffic Volumes on Each Route

Route	A	B	C	D	E	F	G	H	I	J	K
O'Shea Rd Freeway (W)	-	-	-	-	-	-	-	-	-	-	702
Clyde Rd Freeway (W)	360	24	24	24	24	24	-	-	-	-	-
Freeway (E)	-	-	-	-	-	-	-	-	-	-	74
Greaves Rd	194	13	13	13	13	13	-	-	-	-	-
Clyde Rd (N)	42	3	3	3	3	3	-	-	-	-	-
Clyde Rd/Soldiers Rd (S)	-	-	-	-	-	-	-	7	22	118	-
Soldiers Rd (N)	-	-	-	-	-	-	129	-	-	-	-
TOTAL	596	40	40	40	40	40	129	7	22	118	776

7.3.4 Daily Traffic Volume Capacity

I have reviewed the capacity of the road network to cater for the daily traffic volumes generated by the proposed 96A application. Given the 2022 horizon year, I have made allowances for the estimated traffic growth on the road network due to the Clyde North PSP area to the south (as discussed previously in Section 7.2).

Table 9 below presents a summary of my assessment the roads in the adjacent road network. Where multiple counts are provided on a single road I have assessed the highest existing traffic volume.

Table 9: Post Development - Daily Traffic Volume Assessment

Road	Existing Daily Volume	Background Traffic Growth to 2022	96A Traffic Volumes	Estimated 2022 Daily Volume	Target Volume	Comply
Soldiers Rd O'Shea-Viewgrand	9,844	2,800-4,660	1,502	14,146-16,006	3,000-7,000	No
O'Shea Rd Clyde-Skyline	15,000-18,000*	1,120-1,870	715	16,835-20,585	12,000-60,000	Yes
Grices Rd Kirrabilli-Leisurewood	5,505	3,730-5,600	140	9,375-11,245	12,000-60,000	Yes
Chase Blvd Bridgewater-Soldiers	1,961	-	119	2,080	<3,000	Yes
Bridgewater Blvd Nth of Viewgrand	3,239	-	119	3,358	3,000-7,000	Yes

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Road	Existing Daily Volume	Background Traffic Growth to 2022	96A Traffic Volumes	Estimated 2022 Daily Volume	Target Volume	Comply
Cresthaven Blvd Clyde-Skyline	2,966	-	40	3,006	3,000-7,000	Yes
Wurundjeri Boulevard Leisurewood-Soldiers	653	-	20	675	<3,000	Yes

*O'Shea Road daily traffic volume estimated from turning movement count data

Based on the above assessment, the only road to carry above its environmental capacity in the 2022 horizon year (including the contribution from the 96A development) is Soldiers Road.

As discussed previously, Soldiers Road will carry daily traffic volumes well beyond its environmental capacity even without any contribution from the Minta Farm site. The contribution of the 96A application of 1,502 vpd represents a small proportion of the overall traffic volumes (in the order of 10%). Given that the Minta Farm property has a frontage along the whole length of Soldiers Road, I am over the view that traffic associated with the Minta Farm PSP has some claim to a portion of the capacity along Soldiers Road.

Notwithstanding the above, I recommend that some modifications and permit conditions are placed on the 96A application to manage the broad traffic impacts on Soldiers Road (refer to Section 7.3.6 below).

7.3.5 Peak Hour Traffic Capacity

I have completed a high-level assessment of intersection capacity during the peak hours to review the traffic impact of the 96A application. I note that for the 2022 horizon year, when the Monash Stage 2 project is complete, broad traffic volumes in the area are likely to redistribute to account for the improved accessibility to the freeway. On this basis, the approach of adding growth to the existing conditions data set has limitations.

Peak Hour Volumes

Peak hour volumes generated by the 96A application have been developed for the key intersections along O'Shea Road, Soldiers Road and Clyde Road. The traffic generation and distribution are the same as previously presented for the daily traffic volumes.

The in/out split for residential development have been adopted as follows:

- AM Peak – 80% 'Out' / 20% 'In'
- PM Peak – 40% 'Out' / 60% 'In'

A summary of the AM and PM peak traffic volumes generated by the 96A application are presented in Figure 16 and Figure 17 below.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

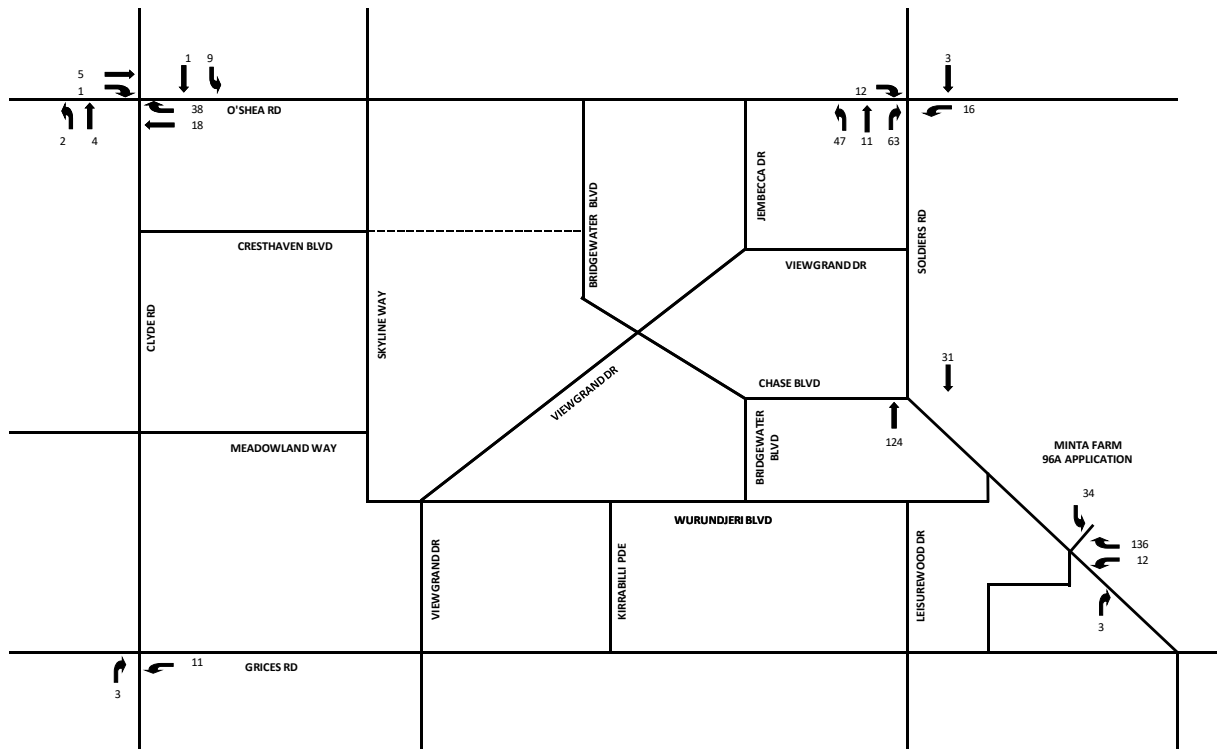


Figure 16: AM Peak – Traffic Volumes From 96A Application

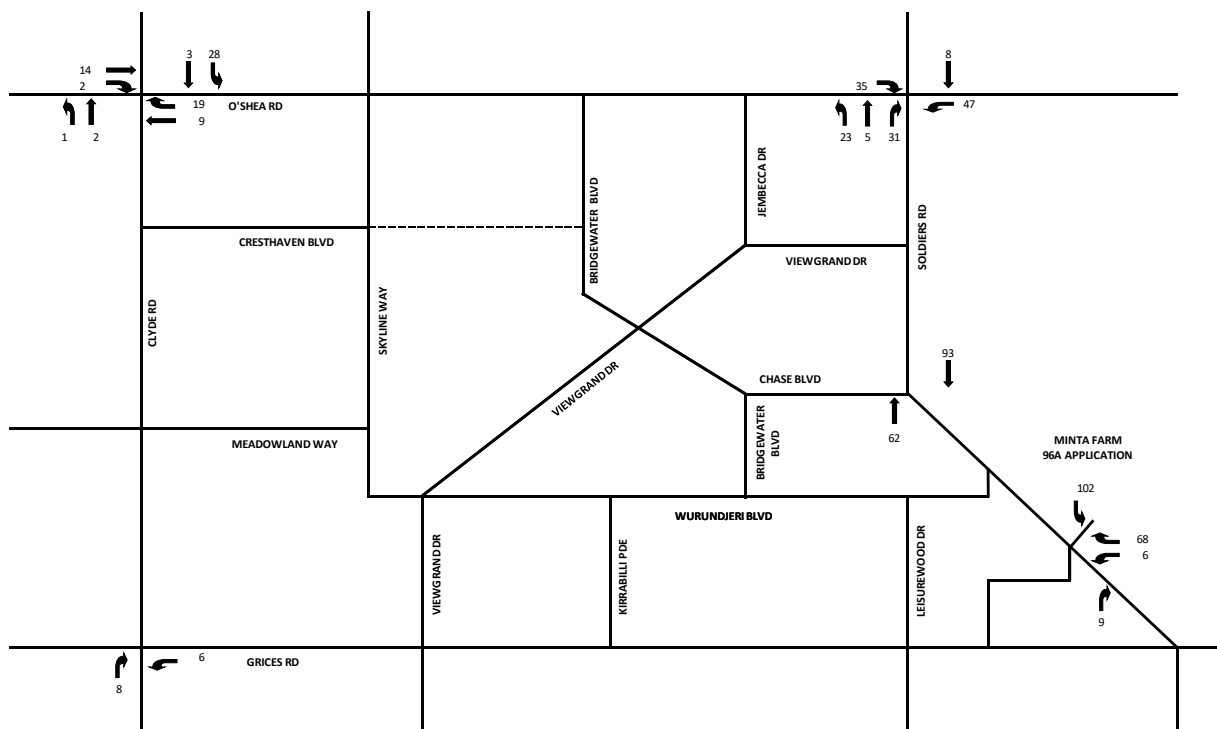


Figure 17: PM Peak – Traffic Volumes From 96A Application

The peak hour traffic volumes generated by the 96A application are modest. I noted that the maximum turning movement volumes are as follows:

AM Peak Period:

- Chase Boulevard – Northbound: 124vph (approximately 2 vehicles per minute)

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

- Soldiers Road right into O'Shea Road: 63vph (approximately 2 vehicles per traffic signal cycle)
- Soldiers Road left into O'Shea Road: 47vph (approximately 1.5 vehicles per traffic signal cycle)
- O'Shea Road right into Clyde Road: 38vph (approximately 1.3 vehicles per traffic signal cycle)

PM Peak Period:

- Chase Boulevard – Southbound: 93vph (approximately 1.6 vehicles per minute)
- O'Shea Road left into Soldiers Road: 47vph (approximately 1.6 vehicles per traffic signal cycle)
- O'Shea Road right into Soldiers Road: 35vph (approximately 1.2 vehicles per traffic signal cycle)
- Clyde Road left into O'Shea Road: 28vph (approximately 1 vehicles per traffic signal cycle)

The above volumes are low in comparison to the existing volumes and expected broader growth on the road network. On this basis, intersection capacity issues on the surrounding road network would be unlikely to be driven by volumes associated with the 96A application.

7.3.6 Recommendations for 96A Application

Based on my review of the impacts associated with the 96A application, I recommended a number of conditions to manage the impacts on Soldiers Road as follows:

- **Construction of the Modified Soldiers Road Cross-Section:** As outlined previously in Section 7.2.2, I am of the view that Council will need to consider a modified Soldiers Road cross-section, even in the event of no development on the Minta Farm site.

The modified cross-section would include a painted median to assist property access to the existing dwelling on the south/west side of the road and include pedestrian refuge islands at key pedestrian desire points.

I recommend that a condition is included on the permit that requires the construction of the modified cross-section along the Soldiers Road frontage of the 96A application. On this basis, the 96A application is contributing to the management of volumes along Soldiers Road prior to the construction of the N-S Arterial Road.

- **No Direct Property Access to Soldiers Road:** The current 96A application shows properties fronting Soldiers Road, which will take vehicle access directly via Soldiers Road. The configuration of the modified cross-section recommended above removes the parking lane from the north/east side of the road (Minta Farm side). On this basis, the southbound traffic lane would operate in the kerbside position.

In the interim condition when traffic volumes on Soldiers Road are high, the modified cross-section would make property access movements for lots fronting Soldiers Road difficult. On this basis, I recommend that no lots are developed in the interim condition with direct property access to Soldiers Road.

In the ultimate condition, the N-S Arterial Road will be constructed and Soldiers Road will be truncated reducing the daily traffic volumes on Soldiers Road. In the ultimate condition, the proposed lots with direct property access to Soldiers Road could be developed.

7.4 Facilitating the Delivery of the N-S Arterial Road

As outlined previously in Section 7.2, I am of the view that construction of the N-S Arterial Road is the primary upgrade in the road network that will reduce traffic impacts. The following sections review the potential arrangements to fund and deliver the N-S Arterial Road as soon as possible.

7.4.1 ICP Contribution

The Minta Farm ICP includes contributions for the construction of the first carriageway of the N-S Arterial Road (interim arrangements) and construction of the interim intersections along the N-S Arterial Road.

The ultimate arrangements, which consists of the duplication of the N-S Arterial Road carriageway is subject to future VicRoads funding.

7.4.2 Lot Cap Proposal

As part of the Minta Farm PSP public exhibition, the VPA included a 1,000 lot 'cap' on initial development within the Minta Farm site. This 1,000 lot cap was based on the previous traffic modelling undertaken by my firm in 2017.

I understand that the development of 1,000 residential lots would contribute substantial funds to the Minta Farm ICP which would then in turn contribute to the construction the N-S Arterial Road.

Outside of external funding from the state government or Council, the quickest way to construct the N-S Arterial Road is via the construction of interim lots on the subject site.

7.4.3 Traffic Impact Associated with 1,000 Lots on Subject Site

I note that background traffic volumes have varied substantially since my firms previous traffic assessment in 2017. On this basis, I have reviewed the traffic impact associated with the development of 1,000 lots in the interim condition. Table 10 below summarises the expected traffic generation.

Table 10: Traffic Generation – 1,000 Lots

Scenario	Dwellings	Traffic Generation Rate	Traffic Generation
Daily Traffic Generation	1,000	8 trips / household / day	8,000
Peak Hour Traffic Generation		0.8 trips / household / hour	800

Assuming continued development in the south-west corner of the Minta Farm site, I would expect vehicle access to predominantly occur to Soldiers Road. As a two lane, two-way road, Soldiers Road has an upper capacity of 18,000-20,000 vehicles per day. The traffic volumes generated by the Minta Farm site would absorb a portion of this capacity (i.e. 8,000vpd). Therefore, an equal level of vehicle trips originating in the area to the south of Grices Road (i.e. Clyde North PSP area) would be displaced to other routes as travel time and delays increase on the Soldiers Road route. The most obvious alternative route for these properties would be Clyde Road accessed from either Grices Road or Thompsons Road.

On this basis, I expect that the conditions on Soldiers Road would reach capacity and then remain at this level until the construction of the N-S Arterial Road. Broadly, the localised road network would be

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

expected to perform poorly for a period of time until sufficient funds are generated in the ICP for the construction of the N-S Arterial Road. I note that the re-distribution of volumes to Clyde Road via Grices Road and Thompsons Road would also have an impact on these key intersections. However, I note that both of these intersections are proposed for upgrades associated with the development in the Clyde North and Thompsons Road PSP area.

In order to mitigate some of these short-term impacts, I recommend that the spatial location of development of the initial 1,000 lots on the Minta Farm site is carefully considered. To limit traffic impacts the two preferable locations for development would be as follows:

- **Grices Road Frontage:** Development along the Grices Road frontage would allow for easier connections to Clyde Road via Grices Road. This allows for a greater spread of volumes in the local area.
- **O'Shea Road Frontage:** Development along the O'Shea Road frontage would have vehicle access directly to the arterial road, with close connections to the Beaconsfield interchange.

Overall, I am of the view that the development of approximately 1,000 lots in the interim condition is the is a reasonable option to generate funds in the ICP to contribute to construction of the N-S Arterial Road.

7.4.4 Duplication of the N-S Arterial Road

The Minta Farm ICP provides funding for the construction of the first carriageway for the N-S Arterial Road, the interim intersection arrangements and the ultimate land requirements. On this basis, the Minta Farm PSP funds the portion of the N-S Arterial Road required to support development of the site.

The construction of the second carriageway (duplication) will be subject to funding from VicRoads. The requirement for the duplication will be driven by the sub-regional traffic volumes that will utilise the N-S Arterial Road. VicRoads in conjunction with Council will need to evaluate the need to provide for additional capacity at the time of delivery of the N-S Arterial Road (depending on the level of development surrounding the Minta Farm site).

8 Response to Public Exhibition Submissions

I have provided a response to the traffic submissions received at the public exhibition stage in relation to the interim conditions traffic modelling.

Table 11: C228 Public Exhibition – Submission Summary

Item	Stakeholder Issue	Response
City of Casey		
44.06	<i>Traffic counts were taken on 29 March 2017 (two days before the end of school term). Consider traffic volumes may be higher and requests that counts be undertaken again including the mid-school term.</i>	The revised assessments have used 2018 data provided by Council and recent 2018 tube counts undertaken by Traffix Group.
44.07	<i>Confirm SCATS dates.</i>	

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Item	Stakeholder Issue	Response
44.08	<i>Does not support 25% reduction to daily traffic generation as there are no 'destinations' within the initial development area to warrant decrease.</i>	A revised traffic generation rate of 8 trips/dwelling/day and 0.8 trips/dwelling/peak hour have been adopted for the revised assessment.
44.09	<i>Considers 2011 census data inadequate as there are likely to be some 'east' movements not captured. Review assumptions.</i>	Data from the 2016 ABS Census has been used for the revised analysis.
44.10	<i>Rejects recommendation that Soldiers Road and Chase Boulevard can carry traffic above their classification (as per Council Road Register). Does not support early development proposal based on projected traffic impacts.</i>	<p>Recent traffic counts indicate that Soldiers Road is already carrying traffic volumes substantially above its connector street classification.</p> <p>I expect these volumes to continue to grow without any contribution from the Minta Farm site.</p> <p>My analysis indicates that the proposed 96A application will contribute a small level to the expected daily volumes by 2022 (approximately 10%). I am of the view that this is reasonable, considering Minta Farm has frontage along the whole east/north side of the road</p> <p>The solution to this issue is the construction of the N-S Arterial Road. However, sufficient funding cannot be sourced from the ICP until lots are constructed on the Minta Farm site. Outside of external funding from the state government or Council, lots need to be constructed on the Minta Farm site in the interim to generate funds for the ICP.</p>
44.11	<i>No average delay and 95th percentile queue lengths included in report as part of SIDRA analysis.</i>	Modelling has been revised without the usage of SIDRA.
44.12	<i>Considers that the modelling should be based on the current road network and intersection layouts (and not include upgrades for O'Shea and intersections for Clyde, Skyline, Bridgewater, and Soldiers as these are not funded).</i>	The horizon year for the assessments is 2022, which is the expected completion date for Monash Freeway Upgrade – Stage 2 works recently announced.
44.13	<i>Considers that modelling should consider implications during construction period during the 1-1500 lot period.</i>	<p>The traffic impacts of construction generated traffic volumes are typically off-set by the occupation of dwellings. For example, the dwellings being constructed are not occupied when construction is occurring, therefore, the volumes largely off-set each other.</p> <p>Whilst there are some periods when construction activity at individual houses may generate volumes higher than the residential allowance, all of the houses in the estate would not experience these construction peaks at the same time.</p> <p>In view of the above, it is not typical practice to undertake traffic assessments for construction periods.</p>
44.14	<i>Asserts that the traffic modelling should have considered bus, cycling and walking infrastructure</i>	<p>I have considered bus, cycling and walking infrastructure as part of this evidence statement.</p> <p>A connective walking and cycling network is already provided within the adjacent local area to the west. I have recommended that refuge islands are incorporated at key locations to assist bicycle / pedestrian movements crossing from the Minta Farm PSP area.</p> <p>The early stages of the Minta Farm development will progressively implement the walking and cycling infrastructure required under the PSP.</p>

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Item	Stakeholder Issue	Response
Transport for Victoria		
41.21	<i>Expresses concern about traffic management along Berwick-Cranbourne Road/Grices Road and Berwick-Cranbourne Road/O'Shea Road/Greaves Road intersections in the interim with the completion of development of the Clyde North PSP and the early development stages of Minta Farm, including the 96A.</i>	The Monash Freeway Upgrade – Stage 2 project has recently announced. This project includes duplication of O'Shea Road (including the Clyde Road intersection). Council is collecting contributions from the Clyde North PSP area for the upgrade of the Clyde Road / Grices Road intersection.
42.22	<i>There are also concerns with the ability of the one-lane roundabout at the Soldiers Road/Grices Road intersection to cater for existing and committed development, plus traffic from Minta Farm.</i>	I agree that a number of existing intersection will be under pressure in the interim period until the N-S Arterial Road is constructed. In this instance the Grices Road / Soldiers Road intersection will be converted into traffic signals when the N-S Arterial Road is constructed. The solution to this issue is the construction of the N-S Arterial Road. However, sufficient funding cannot be sourced from the ICP until lots are constructed on the Minta Farm site. Outside of external funding from the state government or Council, lots need to be constructed on the Minta Farm site in the interim to generate funds for the ICP.
41.24	<i>The traffic generation rates used in the Traffix Group-Traffic Engineering Assessment should be revised to comply to the RTA guide which do not include trips made internal to the subdivision, which may add up to additional 25%.</i>	A revised traffic generation rate of 8 trips/dwelling/day and 0.8 trips/dwelling/peak hour have been adopted for the revised assessment.
Stockland		
36.06	<i>Transport Network - Seeking reserving land and constructing a single carriageway (on the Stockland landholding only) prior to Statement of Compliance on the 1,200th lot on the Stockland project.</i>	I recommend that construction of the N-S Arterial Road to address the traffic issues identified in the local road network. However, sufficient funding cannot be sourced from the ICP until lots are constructed on the Minta Farm site. Outside of external funding from the state government or Council, lots need to be constructed on the Minta Farm site in the interim to generate funds for the ICP.
The Minta Group		
-	The Minta Group have proposed an alternative urban structure which broadly includes the following key changes from exhibited PSP: <ul style="list-style-type: none">Increased residential dwellings,Additional jobs, andModified road network along the N-S Arterial Road.	The Minta Farm alternative proposal does not provide any supporting traffic assessment. I note that the number of dwellings and jobs proposed is larger than the exhibited PSP structure. On this basis, further investigation of the impacts of the changes is required.
Local Community		
-	<i>Concerns for traffic growth on O'Shea Road and requests for road upgrades on O'Shea Road.</i>	The Monash Freeway Upgrade – Stage 2 project has recently announced. This project includes duplication of O'Shea Road and the extension to the upgraded Beaconsfield interchange.
-	<i>Concerns for traffic growth on Soldiers Road and requests for road upgrades on Soldiers Road.</i>	Recent traffic counts indicate that Soldiers Road is already substantially carrying traffic volumes above its connector street classification.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Item	Stakeholder Issue	Response
		<p>I expect these volumes to continue to grow without any contribution from the Minta Farm site.</p> <p>My analysis indicates that the proposed 96A application will contribute a small level to the expected daily volumes by 2022 (approximately 10%). I am of the view that this is reasonable, considering Minta Farm has frontage along the whole east/north side of the road</p> <p>The solution to this issue is the construction of the N-S Arterial Road. However, sufficient funding cannot be sourced from the ICP until lots are constructed on the Minta Farm site. Outside of external funding from the state government or Council, lots need to be constructed on the Minta Farm site in the interim to generate funds for the ICP.</p>
-	<i>Concerns regarding the safety of the parking lanes on Soldiers Road. Requests to wider the parking lanes.</i>	The existing parking lanes on Soldiers Road are approximately 2.3m wide. This width is standard for the provision of parking lanes.
-	<i>Concerns for impact to T-intersection at Soldiers Road / O'Shea Road.</i>	The Monash Freeway Upgrade – Stage 2 project has recently announced. This project includes the signalisation of the Soldiers Road / O'Shea Road intersection.
-	<i>Concerns for impact to signals at Clyde Road / Grices Road.</i>	Council is collecting contributions from the Clyde North PSP area for the upgrade of the Clyde Road / Grices Road intersection.
-	<i>Concerned with impact during school peak periods, given the number of schools in the area (some comments specifically relating to the section of Soldiers Road north of O'Shea Road).</i>	The traffic volume contribution from the existing school is captured within the existing conditions traffic data.
-	<i>Broad objection on the basis that infrastructure is not provided prior to lots being developed or existing infrastructure cannot cope with additional volumes or congestion already an issue.</i>	The Monash Freeway Upgrade – Stage 2 project has recently announced. This project includes duplication of O'Shea Road and the extension to the upgraded Beaconsfield interchange.
	<i>Need the internal N-S Connector Road from the start of development.</i>	<p>Recent traffic counts indicate that Soldiers Road is already substantially carrying traffic volumes above its connector street classification.</p> <p>I expect these volumes to continue to grow without any contribution from the Minta Farm site.</p> <p>My analysis indicates that the proposed 96A application will contribute a small level to the expected daily volumes by 2022 (approximately 10%). I am of the view that this is reasonable, considering Minta Farm has frontage along the whole east/north side of the road</p> <p>The solution to this issue is the construction of the N-S Arterial Road. However, sufficient funding cannot be sourced from the ICP until lots are constructed on the Minta Farm site. Outside of external funding from the state government or Council, lots need to be constructed on the Minta Farm site in the interim to generate funds for the ICP.</p>
-	<i>Proposes O'Shea Road and Soldiers Road increased to be double lanes prior to developing the PSP area.</i>	The Monash Freeway Upgrade – Stage 2 project has recently announced. This project includes duplication of O'Shea Road and the extension to the upgraded Beaconsfield interchange.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Item	Stakeholder Issue	Response
-	<i>Proposes a traffic assessment along Clyde Road, Princes Highway and Princes Freeway during peak hours.</i>	My assessment has considered the key road in the vicinity of the Minta Farm site.
-	<i>Concerns for increased traffic volumes in Viewgrand Drive.</i>	<p>My traffic distribution estimates that approximately 2% of interim Minta Farm traffic volume would utilise Viewgrand Drive. This represents 40vpd for the 96A application and approximately 173vpd for the 1,000 lot scenario.</p> <p>Overall this level of traffic is minor in the context of volumes expected on Viewgrand Drive.</p>

9 Conclusions

Having inspected the site, perused relevant documents and plans and undertaken traffic engineering assessments, I am of the opinion that:

Soldiers Road – Without Minta Farm Development

- a) Recent traffic counts in 2018 indicate Soldiers Road (south of O'Shea Road) is currently carrying traffic volumes well beyond its collector road classification,
- b) Based on a review of future developable land in the Clyde North PSP area, I estimate an increase of 2,800-4,650 additional daily vehicle trips over the next 4 years. This results in total daily traffic volumes on Soldiers Road of up to 12,644-14,494 vehicles per day by 2022 (without any contribution from Minta Farm PSP area),
- c) I expect these traffic volumes will result in a range of issues including intersection capacity, property access and pedestrian issues on Soldiers Road,
- d) Council as the Road Authority for Soldiers Road will need to consider improvements to facilitate the traffic volumes in the interim conditions (even without any contribution from the Minta Farm PSP area). I have identified two potential options including:
 - i) **Option 1:** Modified Soldiers Road cross-section including a painted median and refuge islands, or
 - ii) **Option 2:** The early truncation of Soldiers Road at Grices Road and the provision of local traffic management to minimise 'rat running' traffic.
- e) The construction of the N-S Arterial Road is the ultimate solution to resolve the existing issues on Soldiers Road and I would recommend that it is constructed as soon as possible once the Monash Freeway Upgrade Stage 2 works are complete.

96A Application Review

- f) The proposed 96A application incorporates 231 residential lots which are expected to generate approximately 1,848 vehicles per day and 185 vehicles per hour,
- g) I have distributed the expected daily traffic volumes on the surrounding road network. This analysis indicates that Soldiers Road is the only road that will carry volumes above its classification. However, as discussed above, Soldiers Road will operate outside its classification regardless of the contribution of the Minta Farm PSP area,
- h) A review of the peak hour volumes indicates that the 96A application will result a maximum volume of 63vph on any one movement (right out of Soldiers Road into O'Shea Road). These volumes represent approximately 1 additional movement per minute or 2 additional movements per traffic signal cycle and represent only a minor percentage of the background traffic volumes.
- i) I recommend the inclusion of Permit conditions for the 96A application as follows:
 - i) Construction of the modified Soldiers Road cross-section including a painted median to assist property access to the existing dwellings on the south/west side of the road and include pedestrian refuge islands at key pedestrian desire points. The construction of the modified cross-section should be limited to the frontage of the 96A application.
 - ii) In the interim condition when Soldiers Road traffic volumes are high, property access movements to lots fronting Soldiers Road from the Minta Farm PSP area would be difficult

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

with the modified cross-section. On this basis, I recommend that no lots are constructed with direct property access to Soldiers Road in the interim condition. In the ultimate situation when Soldiers Road is truncated and traffic volumes reduce, the lots fronting Soldiers Road can be constructed. **Facilitating the Construction of the N-S Arterial Road**

- j) The construction of the N-S Arterial Road is critical to limit impact to the adjacent road network surrounding the Minta Farm PSP area once the Monash Freeway Upgrade Stage 2 works are complete (i.e. the recently announced O'Shea Road duplication and extension to the Beaconsfield Interchange),
- k) The Minta Farm ICP includes contributions for the interim carriageway and interim intersections of the N-S Arterial Road. Funding of the ultimate arrangements is subject to future VicRoads funding,
- l) The VPA included a 1,000 lot cap on interim development (prior to the N-S Arterial Road) as part of the public exhibition of the PSP. This lot cap was generally set by the previous traffic modelling undertaken by my firm in 2017. This level of development will contribute substantial funds to the ICP for construction of the N-S Arterial Road,
- m) Unless outside funding sources are secured (i.e. state government or Council) or inclusion of financing for forward funding is sought through a supplementary levy, the only way to fund construction of the N-S Arterial Road is via the construction of interim lots on the Minta Farm PSP area,
- n) Given the significant changes to the background traffic volumes since my firm's previous assessment, I have reviewed the impact of construction of 1,000 lots on the Minta Farm site in the interim conditions as follows:
 - i) The 1,000 lots would be expected to generate 8,000 vehicles per day and 800 vehicles per hour.
 - ii) Soldiers Road has a finite capacity of approximately 18,000-20,000 vehicles per day with the 1,000 lots on the Minta Farm PSP area absorbing 8,000 vehicles per day of capacity. This will result in the redistribution of vehicle trips to/from the Clyde North PSP area via Grices Road and Thompsons Road to Clyde Road.
 - iii) Overall, I expect the localised road network to be under pressure during the interim period, however, allowing the development of 1,000 lots results in the N-S Arterial Road being delivered in the quickest manner (i.e. reducing the period of poor operating conditions on the surrounding road network).
 - iv) The location of the initial development within the Minta Farm PSP area should be reviewed, with a preference toward the Grices Road and O'Shea Road frontages to provide more route choice and limit impact on the surrounding roads.
 - v) I recommend that the developers within the Minta Farm PSP area and Council explore alternative funding arrangements for the N-S Arterial Road, ideally constructing the road as soon as possible (prior to 1,000 lot level).
- o) Funding for the duplication of the N-S Arterial Road is subject to future funding from VicRoads, with the requirement for duplication largely driven by sub-regional traffic volumes. VicRoads in conjunction with Council will need to evaluate the need to provide for additional capacity for the

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

N-S Arterial Road at the time of delivery (depending on the level of development surrounding the Minta Farm site).

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.

A handwritten signature in black ink, appearing to read 'W. Douglas de Waard'.

WILLIAM DOUGLAS DE WAARD

B.E. (Civil) Hons., M.I.E.Aust., M.V.P.E.L.A.

Appendix A: Practice Note – PNVCAT2 Expert Evidence

STATEMENT OF WITNESS

Name

William Douglas de Waard

Position

Director, Traffix Group

Address

Suite 8, 431 Burke Road

Glen Iris 3146

Qualifications and Experience

My qualifications and membership of professional associations are as follows:

- Bachelor of Civil Engineering (Honours), Swinburne Institute of Technology, Hawthorn,
- Masters of Traffic, Monash University (50% complete),
- Accredited Senior Road Safety Auditor with VicRoads,
- Member, Institution of Engineers, Australia,
- Member, Institute of Transportation Engineers, and
- Member, Victorian Planning & Environmental Law Association.

I have 25 years' experience in Traffic Engineering and Transport Planning including 8 years in local government in traffic engineering roles and 18 years as a Traffic Engineer and Planning Consultant with both Turnbull Fenner Pty Ltd and Traffix Group Pty Ltd where I am a company Director.

Area of Expertise

I have experience and expertise in traffic management, road safety engineering, parking management and strategy development, development impact assessment of a range of land-use developments, road design, construction and contract administration.

A copy of my CV is attached at Appendix C to this report.

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 Panel.

Engagement and Scope of Report

I was retained by VPA and instructed by Harwood Andrews Lawyers to undertake traffic engineering assessments and prepare traffic evidence in relation to Amendment C228 to the Casey Planning Scheme, in particular in relation to interim traffic modelling for the Minta Farm site.

Traffix Group previously prepared interim modelling for the VPA in 2017. I was the director responsible for this project.

Amendment C228 to the Casey Planning Scheme

Minta Farm PSP 11

Facts and Assumptions

As detailed in evidence.

Reference Documents

As detailed above and in evidence.

Experiments

I have visited the site to observe traffic activity within the nearby area.

My firm has conducted traffic counts in March 2018 on Soldiers Road and Chase Boulevard.

I have reviewed traffic volume surveys conducted by City of Casey from February 2018.

Summary of Opinions

See Conclusions section of the evidence statement.

Provisional Opinions

Not applicable.

Other members of Traffix Group involved in the preparation of Evidence

Brent Hodges (Associate) and Chris Blair (Traffic Engineer) assisted with the preparation of this report and site inspections.

Experienced technical officers employed by Traffix Group assisted with the traffic surveys detailed in this report.

Report Completeness

Final report.

Appendix B: CV

Curriculum Vitae

Will de Waard



Position	Director	Qualifications	Bachelor of Civil Engineering (Honours), Swinburne Institute of Technology, 1991 Master of Traffic, (Monash University) (50%) Accredited Senior Road Safety Auditor (VIC) Member, Engineers Australia Member, Victorian Planning and Environmental Law Association
Professional History	Traffix Group Pty Ltd: Since 1999, Manningham City Council: 1997 to 1999, Banyule City Council: 1995 to 1997, and City of Greater Dandenong: 1992 to 1995		
Location of Experience	The majority of Will's experience has been gained in Melbourne and regional Victoria, with some projects in ACT.		
Summary of Experience	Will de Waard (Director) has a Bachelor of Civil Engineering (Honours) and over 25 years' experience in the traffic engineering and transport planning field. Will's expertise includes traffic management, road safety engineering, parking management and strategy development, development impact assessment of a range of land-use developments, road design, construction and contract administration.		
Key Areas of Expertise	<p>DEVELOPMENT IMPACT ASSESSMENTS</p> <ul style="list-style-type: none"> Preparation of Development Impact Assessments as Traffic Reports and Evidence Statements for a range of land-use developments including: <ul style="list-style-type: none"> Medium density housing developments and residential subdivisions, and Retail, shopping centre, office, restaurant/café, medical centre, aged care, various industry and entertainment venue developments. Presentation of Expert Witness Evidence before the Victorian Civil and Administrative Tribunal on behalf of private sector and local government clients. Working within multi-disciplinary teams, providing traffic engineering design advice and negotiating on client's behalf with Council, VicRoads and service providers. Participation in community meetings at pre-application and objectors' mediation stages of the development process. <p>LOCAL AREA TRAFFIC MANAGEMENT (LATM) STUDIES</p> <p>Project manager for over 50 LATM studies for local government clients, encompassing a wide range of land-use and road network environments, study methodologies and approaches to community consultation.</p> <p>PARKING AND ACCESS STRATEGIES</p> <p>Completed major parking and access studies for local government clients, ranging from major Activity Centres to Neighbourhood Strip Shopping Centres and small regional towns.</p> <ul style="list-style-type: none"> Projects generally involve extensive data collection and the preparation of strategies for the provision and management of parking, and pedestrian and vehicular access improvements. Large-scale projects often involve working in multi-disciplinary teams including town planners, urban designers, civil engineers, social planners, etc. Projects involve extensive consultation with local traders and broader community. Completed major transport planning projects for local government, including Altona North Inland Container Port Development - Traffic Impact Study, Hobsons Bay Strategic Bicycle Plan and Williamstown Integrated Transport Strategy. <p>ROAD SAFETY AUDITS</p> <p>As a Senior Road Safety Auditor Will de Waard has undertaken numerous road safety audits for private clients, Local Government and VicRoads, including Existing Conditions, Feasibility/Development Audits, Preliminary & Detailed Design Stage Audits, Pre/Post Opening Audits, Traffic Management/Event Audits.</p>		

	<p>INVESTIGATION AND DEVELOPMENT OF TRAFFIC MANAGEMENT PROPOSALS</p> <ul style="list-style-type: none"> Completed major traffic management investigation and development projects for VicRoads and local government clients including data collection, investigation of issues, proposal development (including SIDRA analysis), evaluation of options (BCR) and development of functional and detailed design plans. Scoping of numerous Blackspot/length and potential Blackspot/length projects. <p>TRAFFIC MANAGEMENT PLANS</p> <ul style="list-style-type: none"> Preparation of traffic management plans for major events, including the Melbourne 2006 Commonwealth Games. Management of implementation of traffic management plans for major events. <p>DESIGN</p> <p>As Executive Manager of Traffix Group's Design Section, Will provides a wealth of experience ranging from conceptual design to detailed design on a range of traffic and transport related projects.</p>
--	---

Project Name	Project Scope	Year	Project Role
Ryman Aged Care Village – Brandon Park	Traffix Group were engaged by Ryman Healthcare to provide traffic engineering advice for the Aged Care Village at Brandon Park. Tasks include traffic impact advice/assessments associated with Development Plan, traffic development traffic impact assessment report and construction traffic management plan.	2015 - 17	Will is the Project Director responsible for this project attending regular meetings to develop the overall project with other consultants.
Taylor 2, ACT (Canberra)	Traffix Group was engaged by Indesco Consulting Engineers to undertake a traffic impact assessment for the Taylor 2 residential subdivision in Canberra, ACT. The project involved building on the earlier work undertaken for Taylor 1 to provide detailed traffic generation and distribution models to predict the likely internal traffic volumes and the resultant impact on the surrounding intersections with arterial roads.	2017	Will was the Project Director responsible for technical guidance and the review of the project outputs.
Thompsons Road, Lyndhurst – Preliminary Design Road Safety Audit	Preliminary design stage safety audit for the duplication of Thompsons Road in Lyndhurst/Cranbourne North between Frankston-Dandenong Road and Westernport Highway. Project involved site inspections and detail review of preliminary design to identify any potential safety hazards.	2016	Will was an audit team member for the investigation of potential safety issues associated with the design..
Bush Boulevard/ Plenty Road, Mill Park – Bus Improvements	Traffix Group was engaged to provide traffic engineering assistance to develop bus priority treatments at the intersection Bush Boulevard/ Plenty Road, Mill Park. Tasks included: traffic data collection, development of concept options, traffic modelling and concept design.	2016	Will was the Project Director responsible for development of concept design solutions and for the review of the project outputs.
Princes Hill LATM Study	Traffix Group were engaged by Yarra City Council to conduct a detailed local area traffic management study to identify traffic and parking issues and develop proposal to address community concerns. Included extensive community consultation with a Working Group consisting of Ward Councillors, local community representatives and Council officers.	2015	Will was the Project Director responsible for technical guidance and the review of the project outputs.
Cabrin Traffic & Parking Study	Traffix Group were engaged by Stonnington City Council to prepare a traffic and parking study for the on-street area surrounding the Cabrin Hospital. Project included extensive traffic and parking surveys, community consultation to develop traffic and parking management plans for the local area.	2013-15	Will was the Project Director responsible for technical guidance and the review of the project outputs.
Old Geelong Road/ Forsyth Road, Hoppers Crossing	Traffix Group was engaged by VicRoads for the preparation of construction plans including the traffic signal plan for signalisation of the intersection of Old Geelong Road/ Forsyth Road.	2013	Will was the Project Director responsible for the delivery of the project outputs.

Appendix C: Traffic Count Summaries



Traffic Data Collection Services

Traffix Survey Pty Ltd
ABN 57 120 461 510

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
survey@traffixgroup.com.au
www.traffixgroup.com.au

Soldiers Road, Berwick
Between
O'Shea Road & Viewgrand Drive

Prepared for
Traffix Group Pty Ltd

March 2018

Reference: 38971181

TRAFFIC COUNT SUMMARY



Soldiers Road, Berwick At: mid-block Between O'Shea Road & Viewgrand Drive

CUSTOMER: Traffix Group Pty Ltd
TYPE COUNT: 7 days, Speed Vol Class
DATE START: 14/03/18
TIME START: 0000
DIRECTION-1: Southbound
COUNTER NO:
CLASSES: 1 - 12

MAP REF: 131 F4
ACTUAL DURATION: 15 days
DATE FINISH: 20/03/18
TIME FINISH: 2300
DIRECTION-2: Northbound
SPEED LIMIT: 60
SPEEDS: All

ALL VEHICLES	Southbound	Northbound	COMBINED
24 Hour Week Day Average	4558	5286	9844
24 Hour 7 Day Average	4130	4732	8862
A.M. Peak Hour Volume	402	618	968
A.M. Peak Hour	0800-0859	0700-0759	0800-0859
P.M. Peak Hour Volume	540	607	963
P.M. Hour	1800-1859	1500-1559	1500-1559

COMMERCIAL VEHICLE	Southbound	Northbound	COMBINED
Total Volume	837	1543	2380
%	2.9%	4.7%	3.8%

SPEEDS	Southbound	Northbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.0	0.0
>89km/h	0.1	0.1	0.1
>79km/h	0.9	0.4	0.6
>69km/h	8.5	4.8	6.5
>59km/h	56.7	39.3	47.4
>49km/h	95.7	90.9	93.1
>39km/h	99.6	98.4	99.0
>29km/h	100.0	99.3	99.6
>19km/h	100.0	99.7	99.9
85%ile	66.6	64.0	65.4
Mean	60.7	57.8	59.1

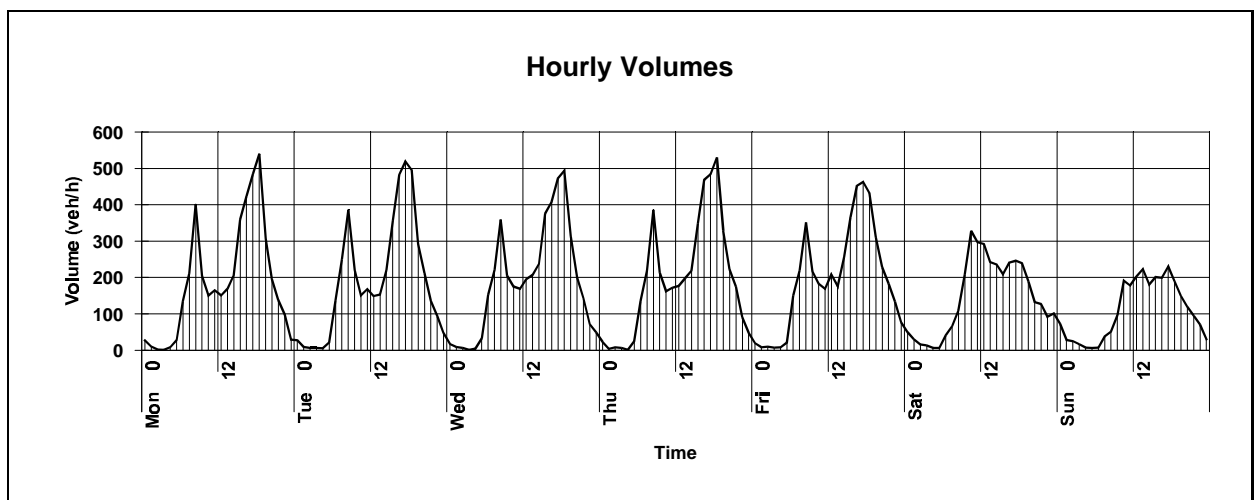
Notes

Traffix Survey Traffic Count Traffic Volume Analysis



Site No: 3897118
Site location: Soldiers Road, Berwick
Between : O'Shea Road & Viewgrand Drive
Direction : Southbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	27	27	17	23	19	49	72	23	33
0100-0159	10	9	9	4	8	30	28	8	14
0200-0259	2	6	6	8	10	16	25	6	10
0300-0359	1	6	1	6	7	13	16	4	7
0400-0459	8	5	4	1	8	6	7	5	6
0500-0559	27	21	32	25	21	6	6	25	20
0600-0659	135	137	153	135	150	41	7	142	108
0700-0759	211	250	221	218	219	66	38	224	175
0800-0859	402	386	359	386	351	110	51	377	292
0900-0959	204	220	205	213	217	209	96	212	195
1000-1059	150	151	175	162	183	328	191	164	191
1100-1159	165	168	169	172	169	297	178	169	188
1200-1259	151	149	195	177	208	292	203	176	196
1300-1359	169	153	207	198	176	242	223	181	195
1400-1459	207	220	237	219	256	236	181	228	222
1500-1559	360	356	376	348	366	209	201	361	317
1600-1659	424	482	408	469	452	241	199	447	382
1700-1759	485	519	473	484	463	246	230	485	414
1800-1859	540	495	494	530	432	239	189	498	417
1900-1959	306	292	313	329	311	189	149	310	270
2000-2059	196	212	199	222	228	132	119	211	187
2100-2159	138	135	143	175	183	127	95	155	142
2200-2259	99	94	71	90	133	92	70	97	93
2300-2359	29	47	49	48	76	101	30	50	54
TOTALS									
12Hr 7-19	3468	3549	3519	3576	3492	2715	1980	3521	3186
24Hr 0-24	4446	4540	4516	4642	4646	3517	2604	4558	4130
24/12 Fact	1.28	1.28	1.28	1.30	1.33	1.30	1.32	1.29	1.30
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1000-1059		
PEAK	402	386	359	386	351	328	191		
PM HR	1800-1859	1700-1759	1800-1859	1800-1859	1700-1759	1200-1259	1700-1759		
PEAK	540	519	494	530	463	292	230		



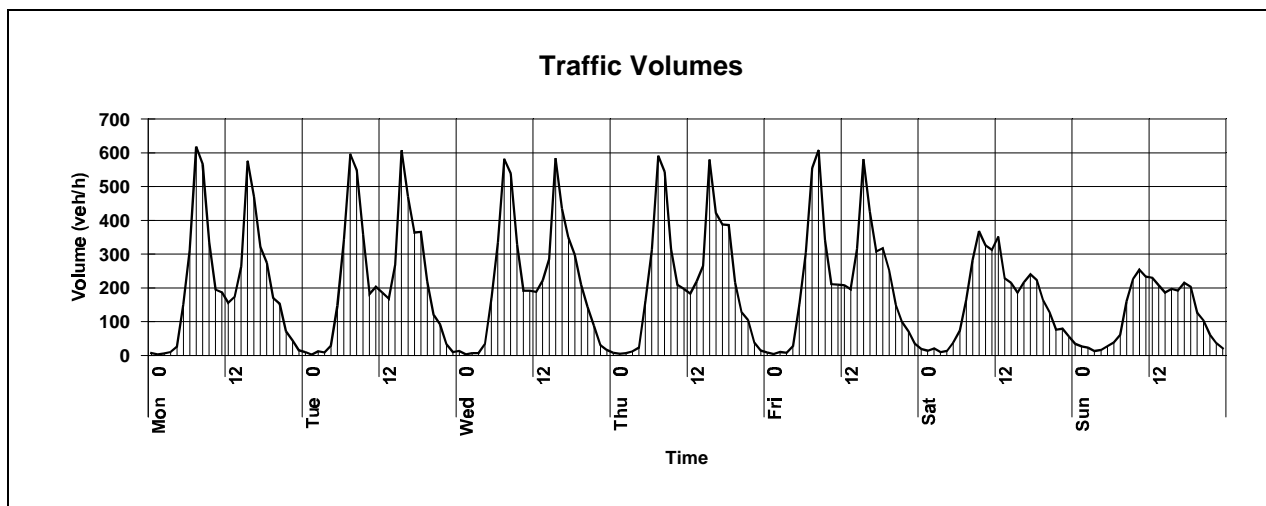
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897118
Site location: Soldiers Road, Berwick
Between : O'Shea Road & Viewgrand Drive
Direction : Northbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	7	10	13	8	9	19	34	9	14
0100-0159	3	2	3	5	4	14	27	3	8
0200-0259	6	12	7	7	10	21	23	8	12
0300-0359	10	9	7	12	8	10	13	9	10
0400-0459	26	29	34	23	28	13	16	28	24
0500-0559	151	147	170	161	152	38	27	156	121
0600-0659	312	344	335	313	305	73	38	322	246
0700-0759	618	597	582	591	555	164	61	589	453
0800-0859	566	549	539	544	608	282	160	561	464
0900-0959	336	357	329	315	341	368	227	336	325
1000-1059	195	182	192	209	211	326	254	198	224
1100-1159	187	203	192	197	210	313	233	198	219
1200-1259	156	186	188	183	208	352	230	184	215
1300-1359	174	168	222	219	196	228	208	196	202
1400-1459	263	268	285	265	316	215	186	279	257
1500-1559	576	607	584	580	581	186	197	586	473
1600-1659	469	470	435	422	426	217	192	444	376
1700-1759	321	364	349	388	308	240	215	346	312
1800-1859	275	366	298	386	317	223	203	328	295
1900-1959	170	220	209	216	252	163	126	213	194
2000-2059	153	120	144	127	151	128	103	139	132
2100-2159	71	92	88	105	99	76	61	91	85
2200-2259	44	33	30	37	72	79	36	43	47
2300-2359	15	10	16	14	35	56	21	18	24
TOTALS									
12Hr 7-19	4136	4317	4195	4299	4277	3114	2366	4245	3815
24Hr 0-24	5104	5345	5251	5327	5402	3804	2891	5286	4732
24/12 Fact	1.23	1.24	1.25	1.24	1.26	1.22	1.22	1.25	1.24
AM HR	0700-0759	0700-0759	0700-0759	0700-0759	0800-0859	0900-0959	1000-1059		
PEAK	618	597	582	591	608	368	254		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1200-1259		
PEAK	576	607	584	580	581	352	230		



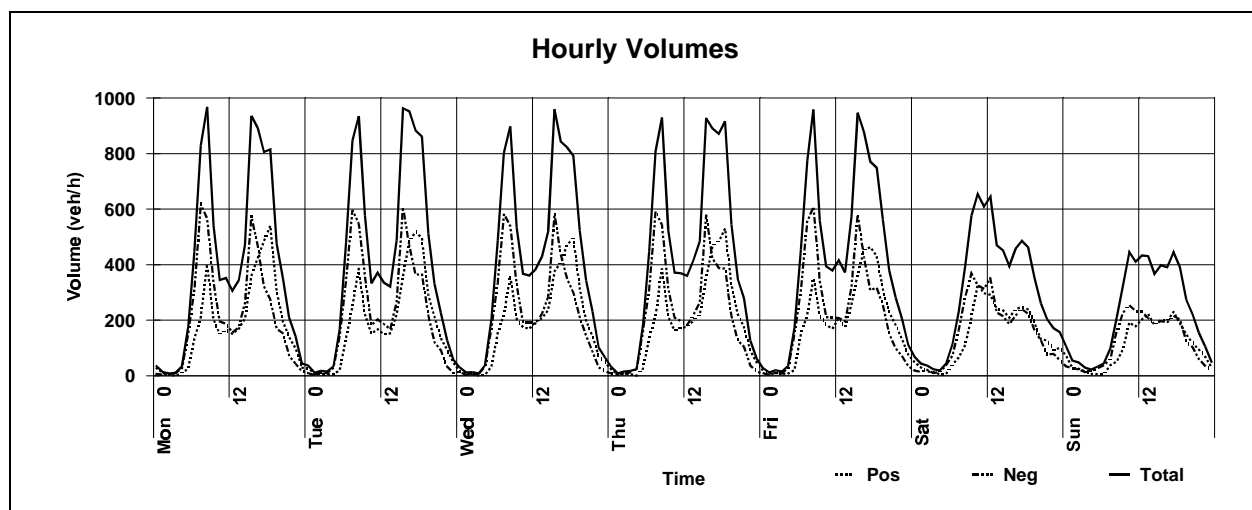
Traffic Survey Traffic Count

Traffic Volume Analysis



Site No: 3897118
Site location: Soldiers Road, Berwick
Between : O'Shea Road & Viewgrand Drive
Direction : Southbound & Northbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	34	37	30	31	28	68	106	32	48
0100-0159	13	11	12	9	12	44	55	11	22
0200-0259	8	18	13	15	20	37	48	15	23
0300-0359	11	15	8	18	15	23	29	13	17
0400-0459	34	34	38	24	36	19	23	33	30
0500-0559	178	168	202	186	173	44	33	181	141
0600-0659	447	481	488	448	455	114	45	464	354
0700-0759	829	847	803	809	774	230	99	812	627
0800-0859	968	935	898	930	959	392	211	938	756
0900-0959	540	577	534	528	558	577	323	547	520
1000-1059	345	333	367	371	394	654	445	362	416
1100-1159	352	371	361	369	379	610	411	366	408
1200-1259	307	335	383	360	416	644	433	360	411
1300-1359	343	321	429	417	372	470	431	376	398
1400-1459	470	488	522	484	572	451	367	507	479
1500-1559	936	963	960	928	947	395	398	947	790
1600-1659	893	952	843	891	878	458	391	891	758
1700-1759	806	883	822	872	771	486	445	831	726
1800-1859	815	861	792	916	749	462	392	827	712
1900-1959	476	512	522	545	563	352	275	524	464
2000-2059	349	332	343	349	379	260	222	350	319
2100-2159	209	227	231	280	282	203	156	246	227
2200-2259	143	127	101	127	205	171	106	141	140
2300-2359	44	57	65	62	111	157	51	68	78
TOTALS									
12Hr 7-19	7604	7866	7714	7875	7769	5829	4346	7766	7000
24Hr 0-24	9550	9885	9767	9969	10048	7321	5495	9844	8862
24/12 Fact	1.26	1.26	1.27	1.27	1.29	1.26	1.26	1.27	1.27
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1000-1059		
PEAK	968	935	898	930	959	654	445		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1700-1759		
PEAK	936	963	960	928	947	644	445		





Traffic Data Collection Services

Traffix Survey Pty Ltd
ABN 57 120 461 510

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
survey@traffixgroup.com.au
www.traffixgroup.com.au

Soldiers Road, Berwick
Between
Viewgrand Drive & Chase Boulevard

Prepared for
Traffix Group Pty Ltd

March 2018

Reference: 38971191

TRAFFIC COUNT SUMMARY



Soldiers Road, Berwick At: mid-block Between Viewgrand Drive & Chase Boulevard

CUSTOMER: Traffix Group Pty Ltd
TYPE COUNT: 7 days, Speed Vol Class
DATE START: 14/03/18
TIME START: 0000
DIRECTION-1: Southbound
COUNTER NO:
CLASSES: 1 - 12

MAP REF: 131 F5
ACTUAL DURATION: 15 days
DATE FINISH: 20/03/18
TIME FINISH: 2300
DIRECTION-2: Northbound
SPEED LIMIT: 60
SPEEDS: All

ALL VEHICLES	Southbound	Northbound	COMBINED
24 Hour Week Day Average	4020	4614	8635
24 Hour 7 Day Average	3634	4127	7761
A.M. Peak Hour Volume	384	588	927
A.M. Peak Hour	0800-0859	0800-0859	0800-0859
P.M. Peak Hour Volume	471	554	885
P.M. Hour	1800-1859	1500-1559	1500-1559

COMMERCIAL VEHICLE	Southbound	Northbound	COMBINED
Total Volume	902	1498	2400
%	3.5%	5.2%	4.4%

SPEEDS	Southbound	Northbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.1	0.0	0.1
>89km/h	0.2	0.1	0.2
>79km/h	1.2	0.6	0.9
>69km/h	12.7	4.7	8.5
>59km/h	72.4	40.0	55.2
>49km/h	97.7	91.9	94.6
>39km/h	99.5	99.0	99.2
>29km/h	99.9	99.7	99.8
>19km/h	100.0	99.9	99.9
85%ile	68.3	64.0	66.5
Mean	62.8	58.2	60.3

Notes

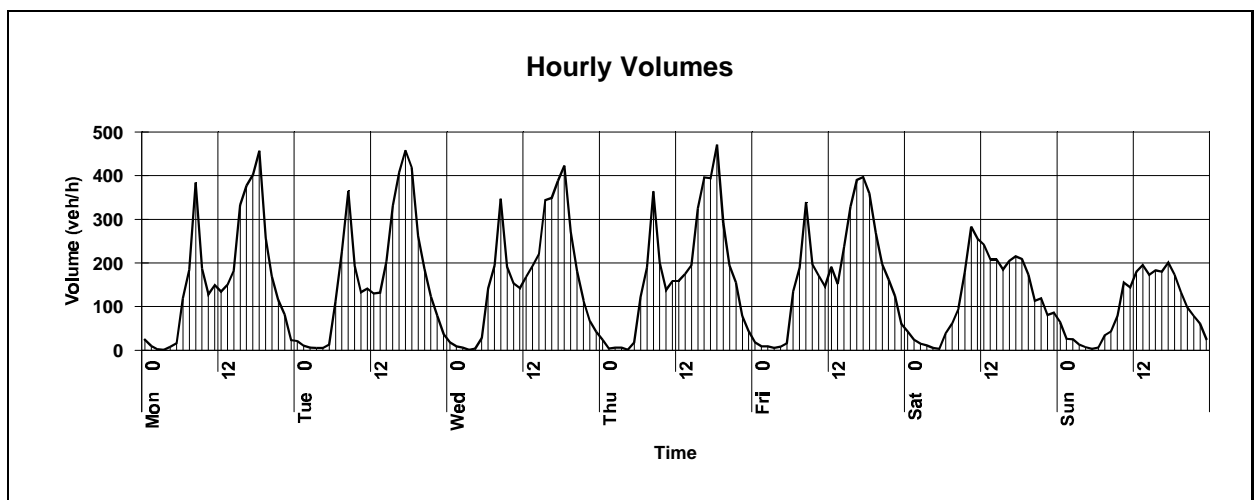
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897119
Site location: Soldiers Road, Berwick
Between : Viewgrand Drive & Chase Boulevard
Direction : Southbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	24	21	18	24	18	43	64	21	30
0100-0159	10	10	9	4	9	24	26	8	13
0200-0259	2	6	6	6	9	15	25	6	10
0300-0359	1	5	1	6	5	11	13	4	6
0400-0459	8	5	4	1	8	5	7	5	5
0500-0559	16	13	28	18	16	3	3	18	14
0600-0659	119	112	142	122	135	39	6	126	96
0700-0759	184	227	194	189	189	61	34	197	154
0800-0859	384	365	347	364	339	95	43	360	277
0900-0959	187	193	191	200	197	179	78	194	175
1000-1059	128	133	153	138	171	283	155	145	166
1100-1159	149	141	142	158	146	255	144	147	162
1200-1259	134	130	168	159	191	242	180	156	172
1300-1359	150	132	193	175	152	209	195	160	172
1400-1459	183	203	220	195	237	208	173	208	203
1500-1559	333	331	344	325	329	185	183	332	290
1600-1659	377	408	349	396	390	205	180	384	329
1700-1759	402	458	388	394	397	215	201	408	351
1800-1859	457	418	423	471	359	209	173	426	359
1900-1959	257	262	271	291	269	173	133	270	237
2000-2059	169	186	180	194	197	113	98	185	162
2100-2159	115	123	114	155	162	119	79	134	124
2200-2259	82	79	67	78	124	81	61	86	82
2300-2359	23	37	42	43	60	86	26	41	45
TOTALS									
12Hr 7-19	3068	3139	3112	3164	3097	2346	1739	3116	2809
24Hr 0-24	3894	3998	3994	4106	4109	3058	2280	4020	3634
24/12 Fact	1.27	1.27	1.28	1.30	1.33	1.30	1.31	1.29	1.29
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1000-1059		
PEAK	384	365	347	364	339	283	155		
PM HR	1800-1859	1700-1759	1800-1859	1800-1859	1700-1759	1200-1259	1700-1759		
PEAK	457	458	423	471	397	242	201		



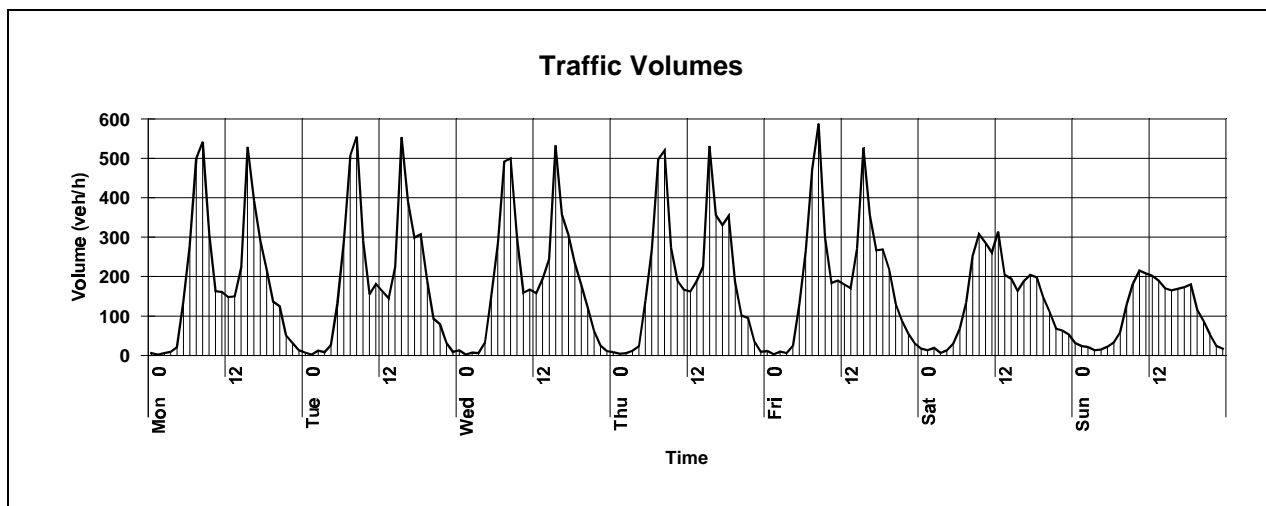
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897119
Site location: Soldiers Road, Berwick
Between : Viewgrand Drive & Chase Boulevard
Direction : Northbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	6	7	13	8	11	17	31	9	13
0100-0159	2	2	2	4	3	13	24	3	7
0200-0259	6	12	7	6	10	19	21	8	12
0300-0359	9	8	6	12	6	6	13	8	9
0400-0459	21	26	32	23	25	13	15	25	22
0500-0559	136	131	155	139	131	30	22	138	106
0600-0659	278	293	285	270	267	68	33	279	213
0700-0759	499	507	492	498	473	134	59	494	380
0800-0859	542	555	500	520	588	252	128	541	441
0900-0959	310	291	297	273	300	308	182	294	280
1000-1059	163	155	159	190	184	286	215	170	193
1100-1159	161	181	167	167	190	261	208	173	191
1200-1259	148	163	158	162	180	314	202	162	190
1300-1359	150	145	195	189	171	204	190	170	178
1400-1459	223	224	244	225	271	195	170	237	222
1500-1559	529	554	533	531	527	164	165	535	429
1600-1659	393	391	357	356	356	189	169	371	316
1700-1759	290	299	307	331	267	204	173	299	267
1800-1859	216	307	235	354	269	198	180	276	251
1900-1959	136	190	180	186	218	148	116	182	168
2000-2059	125	93	123	101	131	111	88	115	110
2100-2159	51	79	62	95	88	68	53	75	71
2200-2259	32	31	25	35	55	63	24	36	38
2300-2359	13	9	11	9	30	53	17	14	20
TOTALS									
12Hr 7-19	3624	3772	3644	3796	3776	2709	2041	3722	3337
24Hr 0-24	4439	4653	4545	4684	4751	3318	2498	4614	4127
24/12 Fact	1.22	1.23	1.25	1.23	1.26	1.22	1.22	1.24	1.24
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	1000-1059		
PEAK	542	555	500	520	588	308	215		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1200-1259		
PEAK	529	554	533	531	527	314	202		



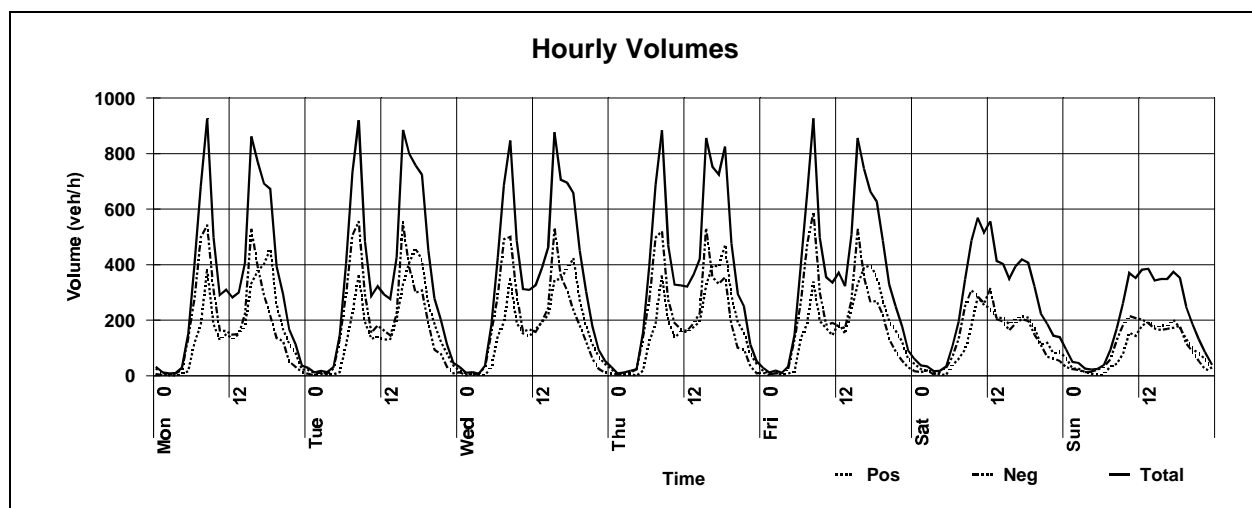
Traffic Survey Traffic Count

Traffic Volume Analysis



Site No: 3897119
Site location: Soldiers Road, Berwick
Between : Viewgrand Drive & Chase Boulevard
Direction : Southbound & Northbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	30	28	31	32	29	60	95	30	44
0100-0159	12	12	11	8	12	37	50	11	20
0200-0259	8	18	13	12	19	34	46	14	21
0300-0359	10	13	7	18	11	17	26	12	15
0400-0459	29	31	36	24	33	18	22	31	28
0500-0559	152	144	183	157	147	33	25	157	120
0600-0659	397	405	427	392	402	107	39	405	310
0700-0759	683	734	686	687	662	195	93	690	534
0800-0859	926	920	847	884	927	347	171	901	717
0900-0959	497	484	488	473	497	487	260	488	455
1000-1059	291	288	312	328	355	569	370	315	359
1100-1159	310	322	309	325	336	516	352	320	353
1200-1259	282	293	326	321	371	556	382	319	362
1300-1359	300	277	388	364	323	413	385	330	350
1400-1459	406	427	464	420	508	403	343	445	424
1500-1559	862	885	877	856	856	349	348	867	719
1600-1659	770	799	706	752	746	394	349	755	645
1700-1759	692	757	695	725	664	419	374	707	618
1800-1859	673	725	658	825	628	407	353	702	610
1900-1959	393	452	451	477	487	321	249	452	404
2000-2059	294	279	303	295	328	224	186	300	273
2100-2159	166	202	176	250	250	187	132	209	195
2200-2259	114	110	92	113	179	144	85	122	120
2300-2359	36	46	53	52	90	139	43	55	66
TOTALS									
12Hr 7-19	6692	6911	6756	6960	6873	5055	3780	6838	6147
24Hr 0-24	8333	8651	8539	8790	8860	6376	4778	8635	7761
24/12 Fact	1.25	1.25	1.26	1.26	1.29	1.26	1.26	1.26	1.26
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1000-1059		
PEAK	926	920	847	884	927	569	370		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1300-1359		
PEAK	862	885	877	856	856	556	385		





Traffic Data Collection Services

Traffix Survey Pty Ltd
ABN 57 120 461 510

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
survey@traffixgroup.com.au
www.traffixgroup.com.au

Soldiers Road, Berwick
Between
Chase Boulevard & Wurundjeri Boulevard

Prepared for
Traffix Group Pty Ltd

March 2018

Reference: 38971201

TRAFFIC COUNT SUMMARY



Soldiers Road, Berwick

At: mid-block

Between

Chase Boulevard & Wurundjeri Boulevard

CUSTOMER:	Traffix Group Pty Ltd	MAP REF:	131 F6
TYPE COUNT:	7 days, Speed Vol Class	ACTUAL DURATION:	12 days
DATE START:	11/03/18	DATE FINISH:	17/03/18
TIME START:	0000	TIME FINISH:	2300
DIRECTION-1:	Southbound	DIRECTION-2:	Northbound
COUNTER NO:		SPEED LIMIT:	60
CLASSES:	1 - 12	SPEEDS:	All

ALL VEHICLES	Southbound	Northbound	COMBINED
24 Hour Week Day Average	3328	3693	7021
24 Hour 7 Day Average	3054	3369	6423
A.M. Peak Hour Volume	425	589	996
A.M. Peak Hour	0800-0859	0800-0859	0800-0859
P.M. Peak Hour Volume	403	524	870
P.M. Hour	1700-1759	1500-1559	1500-1559

COMMERCIAL VEHICLE	Southbound	Northbound	COMBINED
Total Volume	1162	815	1977
%	5.4%	3.5%	4.4%

SPEEDS	Southbound	Northbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.0	0.0
>89km/h	0.1	0.0	0.1
>79km/h	0.4	0.2	0.3
>69km/h	4.0	1.6	2.8
>59km/h	41.3	19.6	29.9
>49km/h	92.6	82.2	87.2
>39km/h	98.9	98.4	98.6
>29km/h	99.6	99.4	99.5
>19km/h	99.9	99.9	99.9
85%ile	63.9	60.2	62.4
Mean	58.3	54.6	56.4

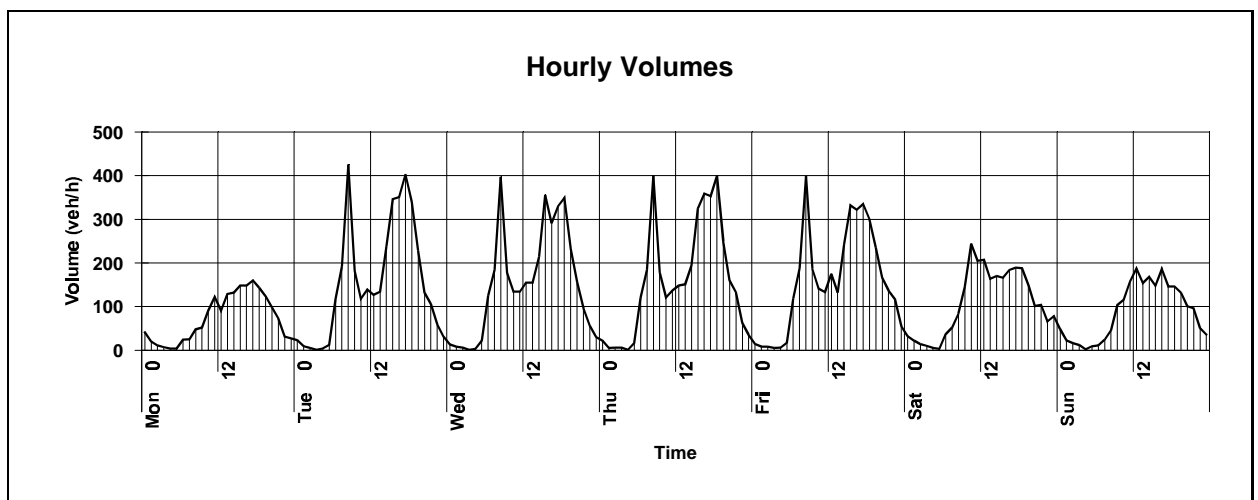
Notes

Traffix Survey Traffic Count Traffic Volume Analysis



Site No: 3897120
Site location: Soldiers Road, Berwick
Between : Chase Boulevard & Wurundjeri Boulevard
Direction : Southbound
Time range: 0000 11/03/18 to 2300 17/03/18
Filters: Class: 1-12, Speeds: All

Date	12/03/18	13/03/18	14/03/18	15/03/18	16/03/18	17/03/18	11/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	41	23	13	22	14	32	48	23	28
0100-0159	20	9	8	5	8	22	22	10	13
0200-0259	11	5	6	6	8	14	16	7	9
0300-0359	7	1	1	6	5	10	12	4	6
0400-0459	4	4	3	1	6	5	2	4	4
0500-0559	4	12	22	16	17	3	9	14	12
0600-0659	24	117	125	120	118	37	11	101	79
0700-0759	25	192	184	184	188	52	24	155	121
0800-0859	48	425	397	400	399	84	46	334	257
0900-0959	52	181	177	178	187	145	104	155	146
1000-1059	92	118	134	121	141	244	116	121	138
1100-1159	122	139	134	137	133	205	158	133	147
1200-1259	91	127	155	148	175	207	187	139	156
1300-1359	129	134	155	151	132	164	154	140	146
1400-1459	132	238	214	194	243	170	168	204	194
1500-1559	148	346	356	325	332	166	148	301	260
1600-1659	148	351	291	359	322	184	186	294	263
1700-1759	160	403	330	353	335	189	146	316	274
1800-1859	143	341	349	400	300	188	146	307	267
1900-1959	124	228	232	250	235	149	132	214	193
2000-2059	98	132	156	160	166	101	101	142	131
2100-2159	73	106	96	132	137	104	96	109	106
2200-2259	31	59	56	62	117	66	51	65	63
2300-2359	27	31	30	35	55	78	36	36	42
TOTALS									
12Hr 7-19	1290	2995	2876	2950	2887	1998	1583	2600	2368
24Hr 0-24	1754	3722	3624	3765	3773	2619	2119	3328	3054
24/12 Fact	1.36	1.24	1.26	1.28	1.31	1.31	1.34	1.28	1.29
AM HR	1100-1159	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1100-1159		
PEAK	122	425	397	400	399	244	158		
PM HR	1700-1759	1700-1759	1500-1559	1800-1859	1700-1759	1200-1259	1200-1259		
PEAK	160	403	356	400	335	207	187		



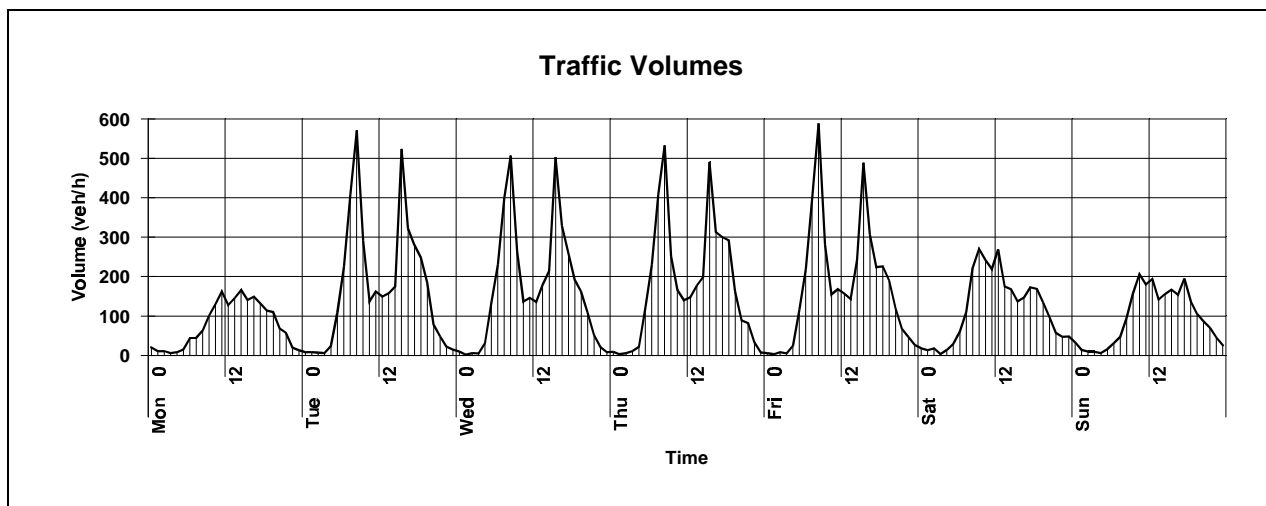
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897120
Site location: Soldiers Road, Berwick
Between : Chase Boulevard & Wurundjeri Boulevard
Direction : Northbound
Time range: 0000 11/03/18 to 2300 17/03/18
Filters: Class: 1-12, Speeds: All

Date	12/03/18	13/03/18	14/03/18	15/03/18	16/03/18	17/03/18	11/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	20	8	10	9	6	18	33	11	15
0100-0159	11	8	2	3	3	13	14	5	8
0200-0259	11	7	6	6	8	18	10	8	9
0300-0359	6	6	5	11	5	3	9	7	6
0400-0459	8	24	31	22	25	14	6	22	19
0500-0559	15	109	136	122	116	29	16	100	78
0600-0659	43	225	231	231	219	60	31	190	149
0700-0759	45	408	400	408	400	109	47	332	260
0800-0859	63	571	507	533	589	222	95	453	369
0900-0959	101	291	265	252	281	270	157	238	231
1000-1059	130	137	137	166	155	242	206	145	168
1100-1159	162	162	146	140	168	219	180	156	168
1200-1259	128	149	136	147	157	269	194	143	169
1300-1359	146	158	180	177	143	175	142	161	160
1400-1459	166	175	214	199	242	168	156	199	189
1500-1559	141	524	503	491	489	137	167	430	350
1600-1659	149	322	329	313	307	147	154	284	246
1700-1759	132	280	260	300	224	173	195	239	223
1800-1859	114	249	192	292	226	169	137	215	197
1900-1959	110	185	161	162	190	134	105	162	150
2000-2059	68	78	109	89	119	97	86	93	92
2100-2159	57	48	51	82	67	57	70	61	62
2200-2259	20	22	21	33	47	47	45	29	34
2300-2359	13	15	8	7	26	48	26	14	20
TOTALS									
12Hr 7-19	1477	3426	3269	3418	3381	2300	1830	2994	2729
24Hr 0-24	1859	4161	4040	4195	4212	2838	2281	3693	3369
24/12 Fact	1.26	1.21	1.24	1.23	1.25	1.23	1.25	1.23	1.23
AM HR	1100-1159	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	1000-1059		
PEAK	162	571	507	533	589	270	206		
PM HR	1400-1459	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1700-1759		
PEAK	166	524	503	491	489	269	195		



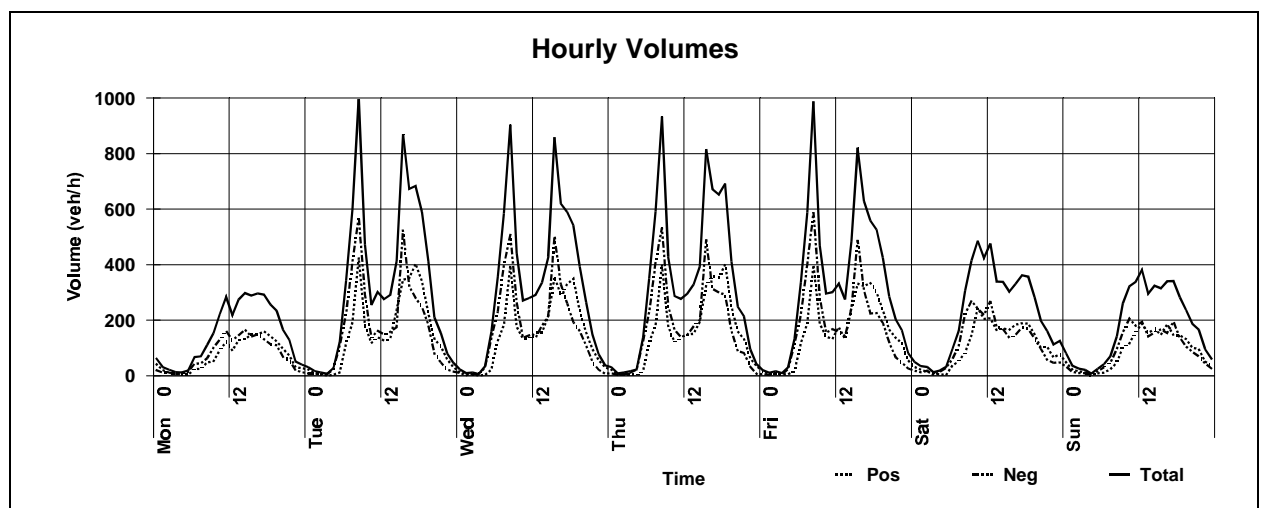
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897120
Site location: Soldiers Road, Berwick
Between : Chase Boulevard & Wurundjeri Boulevard
Direction : Southbound & Northbound
Time range: 0000 11/03/18 to 2300 17/03/18
Filters: Class: 1-12, Speeds: All

Date	12/03/18	13/03/18	14/03/18	15/03/18	16/03/18	17/03/18	11/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	61	31	23	31	20	50	81	33	42
0100-0159	31	17	10	8	11	35	36	15	21
0200-0259	22	12	12	12	16	32	26	15	19
0300-0359	13	7	6	17	10	13	21	11	12
0400-0459	12	28	34	23	31	19	8	26	22
0500-0559	19	121	158	138	133	32	25	114	89
0600-0659	67	342	356	351	337	97	42	291	227
0700-0759	70	600	584	592	588	161	71	487	381
0800-0859	111	996	904	933	988	306	141	786	626
0900-0959	153	472	442	430	468	415	261	393	377
1000-1059	222	255	271	287	296	486	322	266	306
1100-1159	284	301	280	277	301	424	338	289	315
1200-1259	219	276	291	295	332	476	381	283	324
1300-1359	275	292	335	328	275	339	296	301	306
1400-1459	298	413	428	393	485	338	324	403	383
1500-1559	289	870	859	816	821	303	315	731	610
1600-1659	297	673	620	672	629	331	340	578	509
1700-1759	292	683	590	653	559	362	341	555	497
1800-1859	257	590	541	692	526	357	283	521	464
1900-1959	234	413	393	412	425	283	237	375	342
2000-2059	166	210	265	249	285	198	187	235	223
2100-2159	130	154	147	214	204	161	166	170	168
2200-2259	51	81	77	95	164	113	96	94	97
2300-2359	40	46	38	42	81	126	62	49	62
TOTALS									
12Hr 7-19	2767	6421	6145	6368	6268	4298	3413	5594	5097
24Hr 0-24	3613	7883	7664	7960	7985	5457	4400	7021	6423
24/12 Fact	1.31	1.23	1.25	1.25	1.27	1.27	1.29	1.26	1.26
AM HR	1100-1159	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1100-1159		
PEAK	284	996	904	933	988	486	338		
PM HR	1400-1459	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1200-1259		
PEAK	298	870	859	816	821	476	381		





Traffic Data Collection Services

Traffix Survey Pty Ltd
ABN 57 120 461 510

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
survey@traffixgroup.com.au
www.traffixgroup.com.au

Soldiers Road, Berwick

Between

Ramisco Way & Grices Road

Prepared for
Traffix Group Pty Ltd

March 2018

Reference: 38971211

TRAFFIC COUNT SUMMARY



Soldiers Road, Berwick At: mid-block Between Ramisco Way & Grices Road

CUSTOMER: Traffix Group Pty Ltd
TYPE COUNT: 7 days, Speed Vol Class
DATE START: 14/03/18
TIME START: 0000
DIRECTION-1: Southbound
COUNTER NO:
CLASSES: 1 - 12

MAP REF: 131 G8
ACTUAL DURATION: 15 days
DATE FINISH: 20/03/18
TIME FINISH: 2300
DIRECTION-2: Northbound
SPEED LIMIT: 60
SPEEDS: All

ALL VEHICLES	Southbound	Northbound	COMBINED
24 Hour Week Day Average	2786	3043	5829
24 Hour 7 Day Average	2448	2653	5101
A.M. Peak Hour Volume	415	444	828
A.M. Peak Hour	0800-0859	0800-0859	0800-0859
P.M. Peak Hour Volume	284	465	740
P.M. Hour	1500-1559	1500-1559	1500-1559

COMMERCIAL VEHICLE	Southbound	Northbound	COMBINED
Total Volume	648	1854	2502
%	3.8%	10.0%	7.0%

SPEEDS	Southbound	Northbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.0	0.0
>89km/h	0.2	0.1	0.1
>79km/h	0.7	0.7	0.7
>69km/h	5.6	5.8	5.7
>59km/h	39.7	42.0	40.9
>49km/h	93.9	91.1	92.5
>39km/h	99.1	98.7	98.9
>29km/h	99.6	99.5	99.6
>19km/h	99.9	99.9	99.9
85%ile	64.4	64.7	64.5
Mean	58.4	58.3	58.4

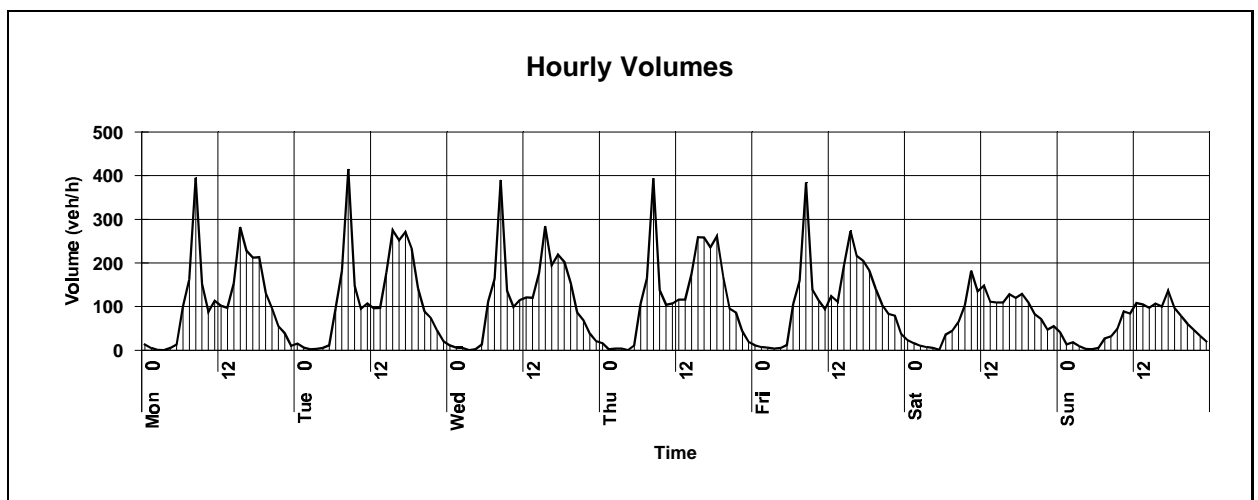
Notes

Traffix Survey Traffic Count Traffic Volume Analysis



Site No: 3897121
Site location: Soldiers Road, Berwick
Between : Ramisco Way & Grices Road
Direction : Southbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	13	15	11	16	11	23	41	13	19
0100-0159	5	6	6	2	7	16	13	5	8
0200-0259	1	2	5	4	6	10	18	4	7
0300-0359	0	3	0	4	4	7	9	2	4
0400-0459	5	5	2	0	5	5	3	3	4
0500-0559	13	11	13	11	12	1	2	12	9
0600-0659	99	95	112	106	106	36	5	104	80
0700-0759	162	182	163	165	159	44	27	166	129
0800-0859	395	415	390	394	384	65	32	396	296
0900-0959	152	147	136	137	139	102	49	142	123
1000-1059	88	95	99	104	114	182	89	100	110
1100-1159	113	107	115	107	94	135	84	107	108
1200-1259	102	96	121	116	124	148	108	112	116
1300-1359	97	97	120	116	111	111	105	108	108
1400-1459	153	178	177	174	196	109	97	176	155
1500-1559	282	275	284	259	273	109	107	275	227
1600-1659	228	252	195	258	216	128	100	230	197
1700-1759	212	271	219	236	205	120	136	229	200
1800-1859	213	232	202	261	182	129	96	218	188
1900-1959	132	141	154	168	140	110	79	147	132
2000-2059	96	89	87	95	104	83	61	94	88
2100-2159	55	74	69	86	83	71	47	73	69
2200-2259	39	45	38	43	79	47	33	49	46
2300-2359	10	20	21	19	37	55	20	21	26
TOTALS									
12Hr 7-19	2197	2347	2221	2327	2197	1382	1030	2258	1957
24Hr 0-24	2665	2853	2739	2881	2791	1846	1361	2786	2448
24/12 Fact	1.21	1.22	1.23	1.24	1.27	1.34	1.32	1.23	1.25
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1000-1059		
PEAK	395	415	390	394	384	182	89		
PM HR	1500-1559	1500-1559	1500-1559	1800-1859	1500-1559	1200-1259	1700-1759		
PEAK	282	275	284	261	273	148	136		



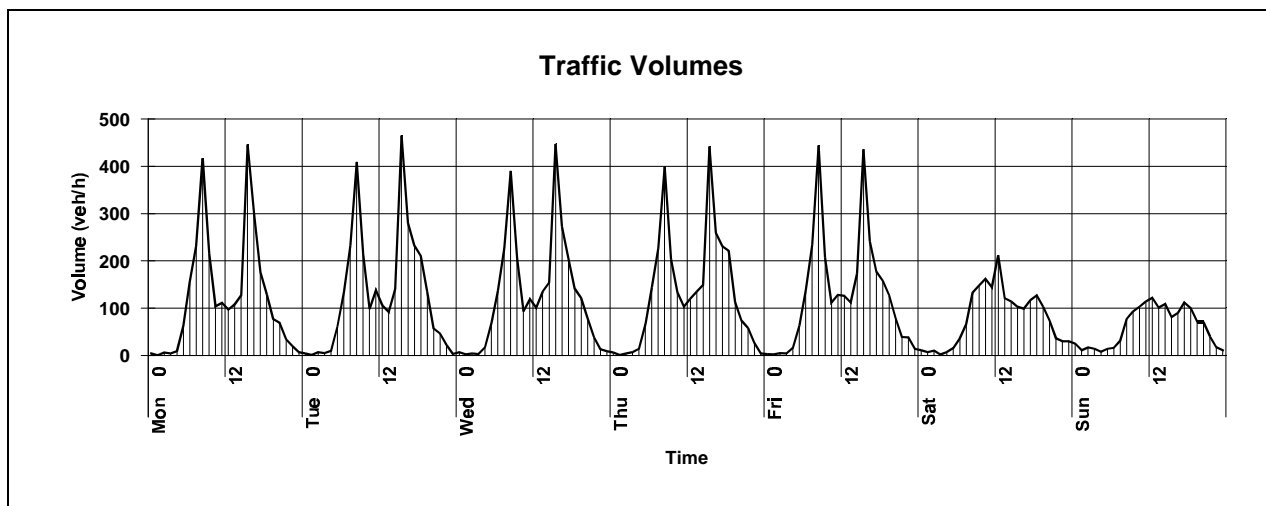
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897121
Site location: Soldiers Road, Berwick
Between : Ramisco Way & Grices Road
Direction : Northbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	4	4	7	6	3	11	25	5	9
0100-0159	0	1	2	1	2	7	11	1	3
0200-0259	6	7	4	4	5	10	17	5	8
0300-0359	4	5	3	7	4	2	14	5	6
0400-0459	9	10	17	14	16	7	8	13	12
0500-0559	62	61	69	66	63	16	14	64	50
0600-0659	155	134	137	144	138	36	16	142	109
0700-0759	231	232	227	226	234	66	31	230	178
0800-0859	417	409	390	399	444	133	77	412	324
0900-0959	216	215	206	203	207	148	93	209	184
1000-1059	104	98	93	133	112	162	103	108	115
1100-1159	111	138	119	103	128	144	114	120	122
1200-1259	97	106	101	120	126	212	122	110	126
1300-1359	108	92	135	135	112	121	101	116	115
1400-1459	127	140	154	149	173	114	109	149	138
1500-1559	446	465	447	442	436	103	81	447	346
1600-1659	301	280	273	259	241	99	90	271	220
1700-1759	176	232	206	231	177	117	112	204	179
1800-1859	129	210	141	221	158	127	100	172	155
1900-1959	77	135	121	113	127	103	72	115	107
2000-2059	69	57	79	73	79	74	70	71	72
2100-2159	34	46	38	58	39	36	40	43	42
2200-2259	20	22	13	26	38	30	17	24	24
2300-2359	7	3	9	4	14	30	11	7	11
TOTALS									
12Hr 7-19	2463	2617	2492	2621	2548	1546	1133	2548	2203
24Hr 0-24	2910	3102	2991	3137	3076	1908	1448	3043	2653
24/12 Fact	1.18	1.19	1.20	1.20	1.21	1.23	1.28	1.19	1.20
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1100-1159		
PEAK	417	409	390	399	444	162	114		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1200-1259		
PEAK	446	465	447	442	436	212	122		



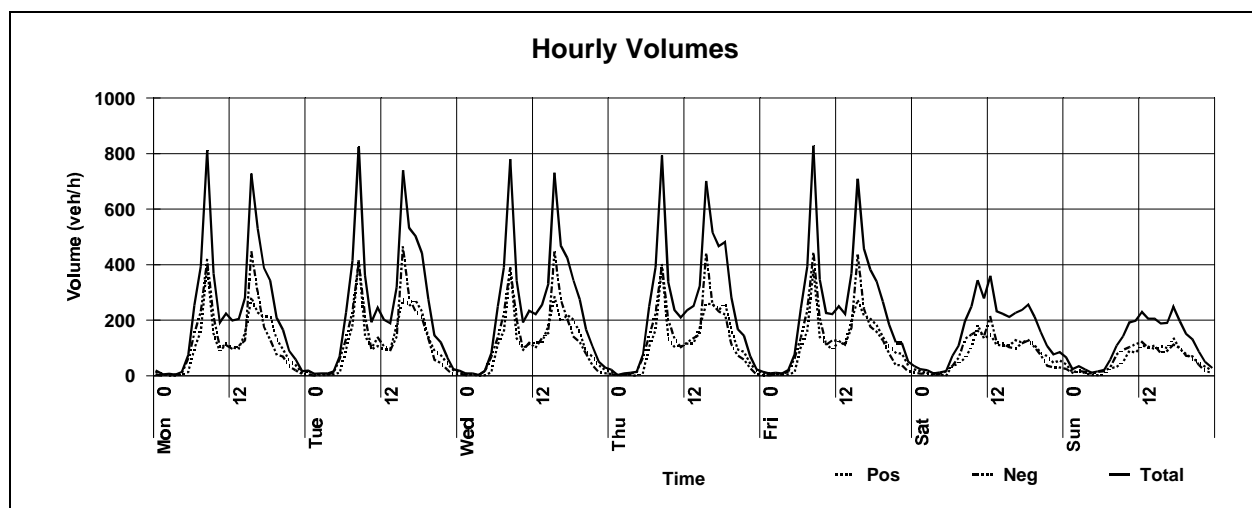
Traffic Survey Traffic Count

Traffic Volume Analysis



Site No: 3897121
Site location: Soldiers Road, Berwick
Between : Ramisco Way & Grices Road
Direction : Southbound & Northbound
Time range: 0000 14/03/18 to 2300 20/03/18
Filters: Class: 1-12, Speeds: All

Date	19/03/18	20/03/18	14/03/18	15/03/18	16/03/18	17/03/18	18/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	17	19	18	22	14	34	66	18	27
0100-0159	5	7	8	3	9	23	24	6	11
0200-0259	7	9	9	8	11	20	35	9	14
0300-0359	4	8	3	11	8	9	23	7	9
0400-0459	14	15	19	14	21	12	11	17	15
0500-0559	75	72	82	77	75	17	16	76	59
0600-0659	254	229	249	250	244	72	21	245	188
0700-0759	393	414	390	391	393	110	58	396	307
0800-0859	812	824	780	793	828	198	109	807	621
0900-0959	368	362	342	340	346	250	142	352	307
1000-1059	192	193	192	237	226	344	192	208	225
1100-1159	224	245	234	210	222	279	198	227	230
1200-1259	199	202	222	236	250	360	230	222	243
1300-1359	205	189	255	251	223	232	206	225	223
1400-1459	280	318	331	323	369	223	206	324	293
1500-1559	728	740	731	701	709	212	188	722	573
1600-1659	529	532	468	517	457	227	190	501	417
1700-1759	388	503	425	467	382	237	248	433	379
1800-1859	342	442	343	482	340	256	196	390	343
1900-1959	209	276	275	281	267	213	151	262	239
2000-2059	165	146	166	168	183	157	131	166	159
2100-2159	89	120	107	144	122	107	87	116	111
2200-2259	59	67	51	69	117	77	50	73	70
2300-2359	17	23	30	23	51	85	31	29	37
TOTALS									
12Hr 7-19	4660	4964	4713	4948	4745	2928	2163	4806	4160
24Hr 0-24	5575	5955	5730	6018	5867	3754	2809	5829	5101
24/12 Fact	1.20	1.20	1.22	1.22	1.24	1.28	1.30	1.21	1.23
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1100-1159		
PEAK	812	824	780	793	828	344	198		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1700-1759		
PEAK	728	740	731	701	709	360	248		





Traffic Data Collection Services

Traffix Survey Pty Ltd
ABN 57 120 461 510

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
survey@traffixgroup.com.au
www.traffixgroup.com.au

Chase Boulevard, Berwick
Between
O'Connell Street & Soldiers Road

Prepared for
Traffix Group Pty Ltd

March 2018

Reference: 38971221

TRAFFIC COUNT SUMMARY



Chase Boulevard, Berwick At: mid-block Between O'Connell Street & Soldiers Road

CUSTOMER:	Traffix Group Pty Ltd	MAP REF:	131 F6
TYPE COUNT:	7 days, Speed Vol Class	ACTUAL DURATION:	15 days
DATE START:	10/03/18	DATE FINISH:	16/03/18
TIME START:	0000	TIME FINISH:	2300
DIRECTION-1:	Eastbound	DIRECTION-2:	Westbound
COUNTER NO:		SPEED LIMIT:	50
CLASSES:	1 - 12	SPEEDS:	All

ALL VEHICLES	Eastbound	Westbound	COMBINED
24 Hour Week Day Average	927	812	1739
24 Hour 7 Day Average	815	720	1535
A.M. Peak Hour Volume	159	121	268
A.M. Peak Hour	0800-0859	0800-0859	0800-0859
P.M. Peak Hour Volume	157	114	269
P.M. Hour	1500-1559	1600-1659	1500-1559

COMMERCIAL VEHICLE	Eastbound	Westbound	COMBINED
Total Volume	203	65	268
%	3.6%	1.3%	2.5%

SPEEDS	Eastbound	Westbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.0	0.0
>89km/h	0.0	0.0	0.0
>79km/h	0.0	0.0	0.0
>69km/h	0.0	0.0	0.0
>59km/h	0.0	0.0	0.0
>49km/h	0.1	1.3	0.6
>39km/h	6.8	34.6	19.8
>29km/h	75.5	93.4	83.9
>19km/h	98.2	99.2	98.7
85%ile	36.9	42.0	40.1
Mean	32.5	37.5	34.8

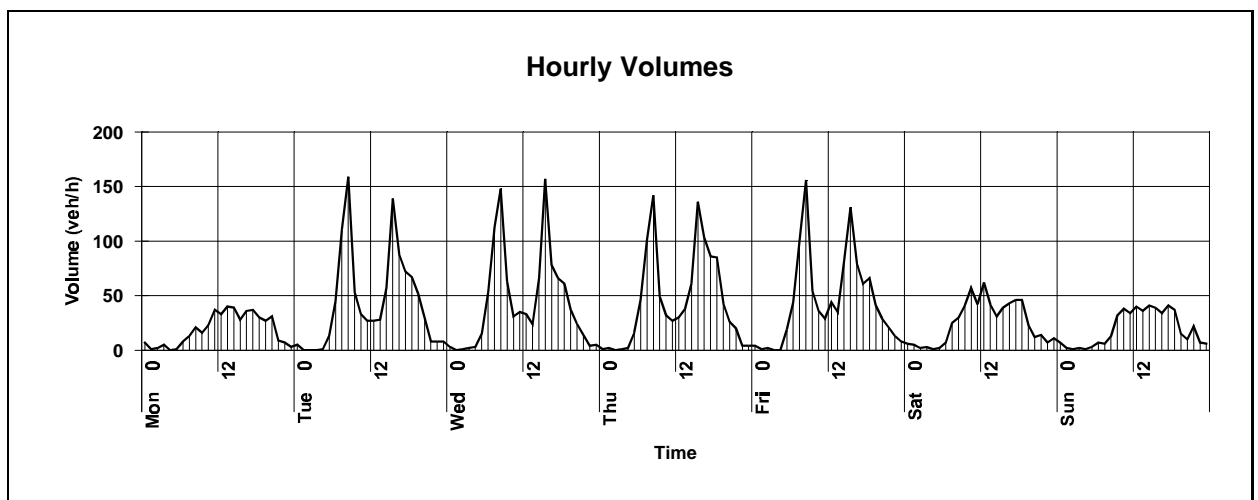
Notes

Traffix Survey Traffic Count Traffic Volume Analysis



Site No: 3897122
Site location: Chase Boulevard, Berwick
Between : O'Connell Street & Soldiers Road
Direction : Eastbound
Time range: 0000 10/03/18 to 2300 16/03/18
Filters: Class: 1-12, Speeds: All

Date	12/03/18	13/03/18	14/03/18	15/03/18	16/03/18	10/03/18	11/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	7	5	3	1	4	6	7	4	5
0100-0159	1	0	0	2	1	5	2	1	2
0200-0259	2	0	1	0	2	2	1	1	1
0300-0359	5	0	2	1	0	3	2	2	2
0400-0459	0	1	3	2	0	1	1	1	1
0500-0559	1	13	15	16	19	2	3	13	10
0600-0659	8	45	53	46	44	7	7	39	30
0700-0759	13	111	113	101	101	25	6	88	67
0800-0859	21	159	148	142	156	30	13	125	96
0900-0959	16	53	63	49	55	41	32	47	44
1000-1059	23	33	31	32	36	57	38	31	36
1100-1159	37	27	35	27	29	42	34	31	33
1200-1259	33	27	33	30	44	62	40	33	38
1300-1359	40	28	24	38	35	42	36	33	35
1400-1459	39	57	66	61	82	31	41	61	54
1500-1559	28	139	157	136	131	39	39	118	96
1600-1659	36	88	78	103	80	43	34	77	66
1700-1759	37	72	66	86	61	46	41	64	58
1800-1859	30	67	61	85	66	46	37	62	56
1900-1959	27	52	37	43	41	23	15	40	34
2000-2059	31	30	24	26	29	12	10	28	23
2100-2159	9	8	14	20	21	14	22	14	15
2200-2259	7	8	4	4	13	7	7	7	7
2300-2359	3	8	5	4	8	11	6	6	6
TOTALS									
12Hr 7-19	353	861	875	890	876	504	391	771	679
24Hr 0-24	454	1031	1036	1055	1058	597	474	927	815
24/12 Fact	1.29	1.20	1.18	1.19	1.21	1.18	1.21	1.20	1.20
AM HR	1100-1159	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1000-1059		
PEAK	37	159	148	142	156	57	38		
PM HR	1300-1359	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1400-1459		
PEAK	40	139	157	136	131	62	41		



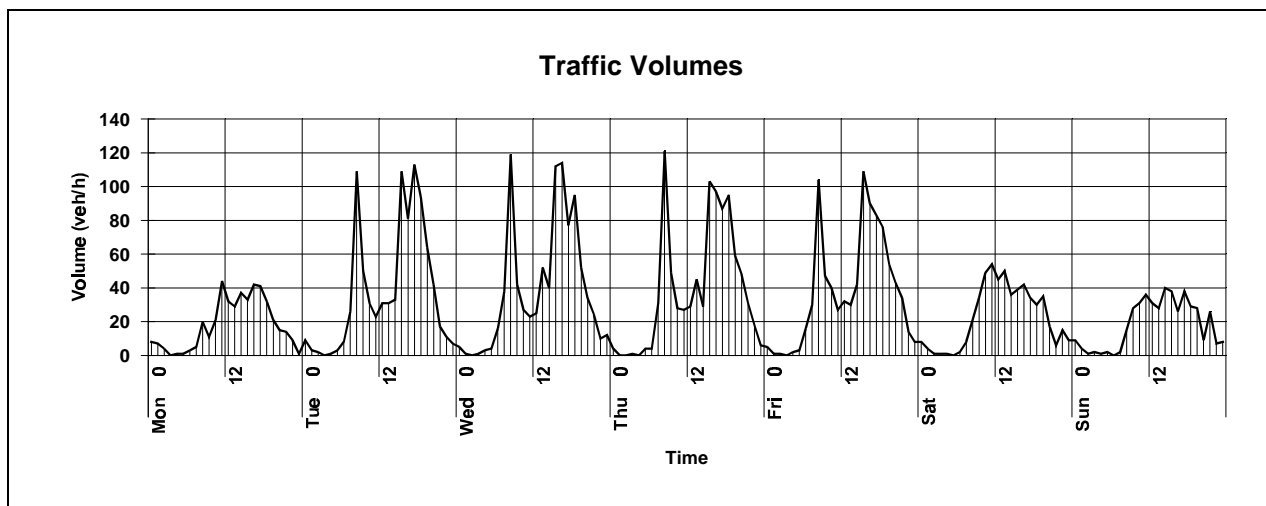
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3897122
Site location: Chase Boulevard, Berwick
Between : O'Connell Street & Soldiers Road
Direction : Westbound
Time range: 0000 10/03/18 to 2300 16/03/18
Filters: Class: 1-12, Speeds: All

Date	12/03/18	13/03/18	14/03/18	15/03/18	16/03/18	10/03/18	11/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	8	9	5	4	5	8	9	6	7
0100-0159	7	3	1	0	1	4	4	2	3
0200-0259	4	2	0	0	1	1	1	1	1
0300-0359	0	0	1	1	0	1	2	0	1
0400-0459	1	1	3	0	2	1	1	1	1
0500-0559	1	3	4	4	3	0	2	3	2
0600-0659	3	8	16	4	16	2	0	9	7
0700-0759	5	26	38	31	30	8	2	26	20
0800-0859	20	109	119	121	104	21	15	95	73
0900-0959	11	50	42	49	47	34	28	40	37
1000-1059	21	31	27	28	40	49	31	29	32
1100-1159	44	23	23	27	27	54	36	29	33
1200-1259	32	31	25	29	32	45	31	30	32
1300-1359	29	31	52	45	30	50	28	37	38
1400-1459	37	33	40	29	42	36	40	36	37
1500-1559	33	109	112	103	109	39	38	93	78
1600-1659	42	81	114	97	90	42	26	85	70
1700-1759	41	113	77	87	83	34	38	80	68
1800-1859	32	94	95	95	76	30	29	78	64
1900-1959	21	64	52	59	54	35	28	50	45
2000-2059	15	42	34	48	43	17	9	36	30
2100-2159	14	17	24	31	34	6	26	24	22
2200-2259	9	11	10	18	14	15	7	12	12
2300-2359	1	7	12	6	8	9	8	7	7
TOTALS									
12Hr 7-19	347	731	764	741	710	442	342	659	582
24Hr 0-24	431	898	926	916	891	541	439	812	720
24/12 Fact	1.24	1.23	1.21	1.24	1.25	1.22	1.28	1.23	1.24
AM HR	1100-1159	0800-0859	0800-0859	0800-0859	0800-0859	1100-1159	1100-1159		
PEAK	44	109	119	121	104	54	36		
PM HR	1600-1659	1700-1759	1600-1659	1500-1559	1500-1559	1300-1359	1400-1459		
PEAK	42	113	114	103	109	50	40		



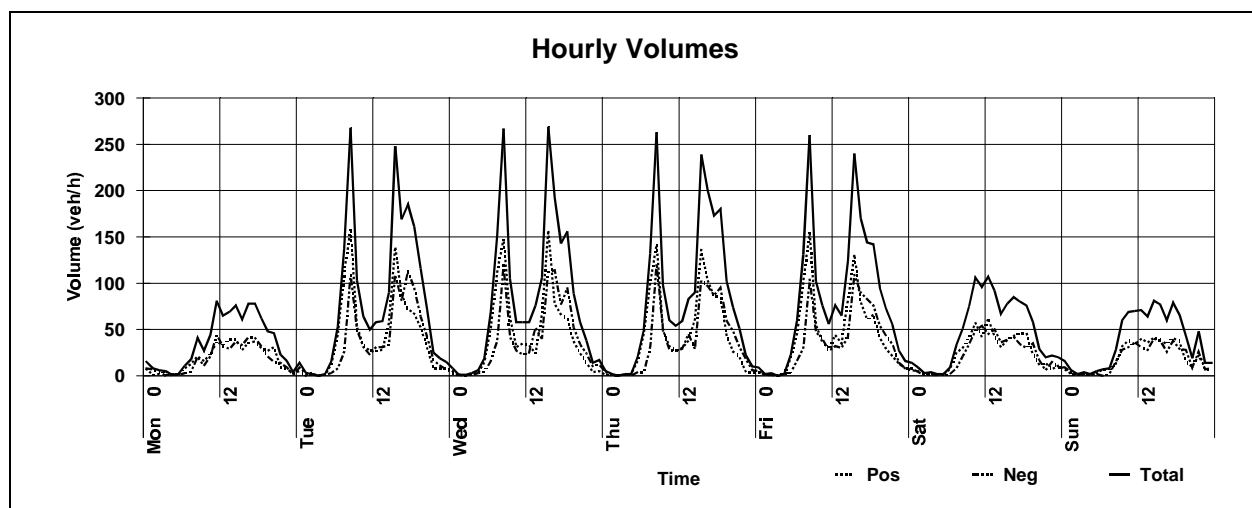
Traffic Survey Traffic Count

Traffic Volume Analysis



Site No: 3897122
Site location: Chase Boulevard, Berwick
Between : O'Connell Street & Soldiers Road
Direction : Eastbound & Westbound
Time range: 0000 10/03/18 to 2300 16/03/18
Filters: Class: 1-12, Speeds: All

Date	12/03/18	13/03/18	14/03/18	15/03/18	16/03/18	10/03/18	11/03/18	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	15	14	8	5	9	14	16	10	12
0100-0159	8	3	1	2	2	9	6	3	4
0200-0259	6	2	1	0	3	3	2	2	2
0300-0359	5	0	3	2	0	4	4	2	3
0400-0459	1	2	6	2	2	2	2	3	2
0500-0559	2	16	19	20	22	2	5	16	12
0600-0659	11	53	69	50	60	9	7	49	37
0700-0759	18	137	151	132	131	33	8	114	87
0800-0859	41	268	267	263	260	51	28	220	168
0900-0959	27	103	105	98	102	75	60	87	81
1000-1059	44	64	58	60	76	106	69	60	68
1100-1159	81	50	58	54	56	96	70	60	66
1200-1259	65	58	58	59	76	107	71	63	71
1300-1359	69	59	76	83	65	92	64	70	73
1400-1459	76	90	106	90	124	67	81	97	91
1500-1559	61	248	269	239	240	78	77	211	173
1600-1659	78	169	192	200	170	85	60	162	136
1700-1759	78	185	143	173	144	80	79	145	126
1800-1859	62	161	156	180	142	76	66	140	120
1900-1959	48	116	89	102	95	58	43	90	79
2000-2059	46	72	58	74	72	29	19	64	53
2100-2159	23	25	38	51	55	20	48	38	37
2200-2259	16	19	14	22	27	22	14	20	19
2300-2359	4	15	17	10	16	20	14	12	14
TOTALS									
12Hr 7-19	700	1592	1639	1631	1586	946	733	1430	1261
24Hr 0-24	885	1929	1962	1971	1949	1138	913	1739	1535
24/12 Fact	1.26	1.21	1.20	1.21	1.23	1.20	1.25	1.22	1.22
AM HR	1100-1159	0800-0859	0800-0859	0800-0859	0800-0859	1000-1059	1100-1159		
PEAK	81	268	267	263	260	106	70		
PM HR	1600-1659	1500-1559	1500-1559	1500-1559	1500-1559	1200-1259	1400-1459		
PEAK	78	248	269	239	240	107	81		



Appendix D: 96A Application – Daily Traffic Volume Calculations

Localised Route Selection

Route	Directional Split	A	B	C	D	E	F	G	H	I	J	K
O'Shea Road Freeway (West)	38%											100%
Clyde Road Freeway (West)	26%	75%	5%	5%	5%	5%	5%					
Freeway (East)	4%											100%
Greaves Road	14%	75%	5%	5%	5%	5%	5%					
Clyde Road (North)	3%	75%	5%	5%	5%	5%	5%					
Clyde Road / Soldiers Road (South)	8%								5%	15%	80%	
Soldiers Road (North)	7%							100%				
	100%											

Route Traffic Volumes

Route		A	B	C	D	E	F	G	H	I	J	K
O'Shea Road Freeway (West)	702	0	0	0	0	0	0	0	0	0	0	702
Clyde Road Freeway (West)	480	360	24	24	24	24	24	0	0	0	0	0
Freeway (East)	74	0	0	0	0	0	0	0	0	0	0	74
Greaves Road	259	194	13	13	13	13	13	0	0	0	0	0
Clyde Road (North)	55	42	3	3	3	3	3	0	0	0	0	0
Clyde Road / Soldiers Road (South)	148	0	0	0	0	0	0	0	7	22	118	0
Soldiers Road (North)	129	0	0	0	0	0	0	129	0	0	0	0
	1848	596	40	40	40	40	40	129	7	22	118	776

Background Growth (Clyde North DCP)

Background Growth	Low	High
Soldiers Road (sth)	2798	4664
Grices Road	5597	3731
O'Shea Road	1119	1866

*10% south via Thompsons and remainder via Grices Road
*40% of Soldiers Road via O'Shea Road

Daily Traffic Volumes

Road	Section	Existing	Growth		96A Volume	2022 Volume		Classification	Target Volume	Comply
			Low	High		Low	High			
Soldiers Rd	O'Shea-Viewgrand	9,844	2800	4660	1502	14,146	16,006	collector	3,000-7,000	No
O'Shea Rd	Clyde-Skyline	18,000	1120	1870	715	19,835	20,585	arterial	12,000-60,000	Yes
Grices Rd	Kirrabilli-Leisurewood	5,505	3730	5600	140	9,375	11,245	arterial	12,000-60,000	Yes
Chase Blvd	Bridgewater-Soldiers	1,961	-	-	119	2,080	2,080	local	>3,000	Yes
Bridgewater Blvd	Nth of Viewgrand	3,239	-	-	119	3,358	3,358	collector	3,000-7,000	Yes
Cresthaven Blvd	Clyde-Skyline	2,966	-	-	40	3,006	3,006	Collector	3,000-7,000	Yes
Wurundjeri Boulevard	Leisurewood-Soldiers	653	-	-	22	675	675	local	>3,000	Yes

Existing volume estimated on TMC data

Appendix E: 96A Application – Peak Hour Traffic Volume Calculations

GRP22294: Minta Farm PSP 11
Traffic Generation and Distribution

Trip Generation

Development Yield		
Residential	231	dwellings

Traffic Generation Rate

Residential	8	trips/dwelling/day
Residential	10.0%	daily trips occurring in each peak hour

Peak Hour Directional Split		
	AM Peak	PM Peak
IN	20%	60%
OUT	80%	40%

JTW Direction	JTW Trips	Split
Fwy -Clyde	2,734	26%
Fwy -O'Shea	4,099	38%
Greaves (W)	1,456	14%
Clyde (N)	294	3%
Fwy (E)	429	4%
Soldiers (N)	788	7%
Clyde (S)	852	8%
Total	10,652	100%

GRP22294: Minta Farm PSP 11
Traffic Generation and Distribution

Route	Route Splits	Daily Volume (vpd)
Fwy (Clyde)		
A	75%	356
B	5%	24
C	5%	24
D	5%	24
E	5%	24
F	5%	24
Sub-Total	100%	474
Fwy (O'Shea)		
K	100%	711
Sub-Total	100%	711
Greaves (W)		
A	75%	189
B	5%	13
C	5%	13
D	5%	13
E	5%	13
F	5%	13
Sub-Total	100%	253
Clyde (N)		
A	75%	38
B	5%	3
C	5%	3
D	5%	3
E	5%	3
F	5%	3
Sub-Total	100%	51
Fwy (E)		
K	100%	74
Sub-Total	100%	74
Soldiers (N)		
G	100%	137
Sub-Total	100%	137
Clyde (S)		
H	5%	7
I	15%	22
J	80%	118
Sub-Total	100%	148
Total		1,848

Peak Hour Volumes

Approach	Movement	AM Peak Hour Volumes								PM Peak Hour Volumes							
		F-Clyde	F-O'Shea	Greaves	Clyde (N)	Fwy (E)	Soldiers (N)	Clyde (S)	Post	F-Clyde	F-O'Shea	Greaves	Clyde (N)	Fwy (E)	Soldiers (N)	Clyde (S)	Post
Clyde Road / Greaves Road / O'Shea Road																	
South	Left	-	-	2	-	-	-	-	2	-	-	1	-	-	-	-	1
South	Through	4	-	-	0	-	-	-	4	2	-	-	0	-	-	-	2
South	Right	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
East	Left	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
East	Through	-	-	18	-	-	-	-	18	-	-	9	-	-	-	-	9
East	Right	34	-	-	4	-	-	-	38	17	-	-	2	-	-	-	19
North	Left	9	-	-	1	-	-	-	9	26	-	-	3	-	-	-	28
North	Through	1	-	-	0	-	-	-	1	3	-	-	0	-	-	-	3
North	Right	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
West	Left	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
West	Through	-	-	5	-	-	-	-	5	-	-	14	-	-	-	-	14
West	Right	-	-	1	-	-	-	-	1	-	-	2	-	-	-	-	2
O'Shea Road / Soldiers Road																	
South	Left	28	-	15	3	-	-	-	47	14	-	8	2	-	-	-	23
South	Through	-	-	-	-	-	11	-	11	-	-	-	-	-	5	-	5
South	Right	-	57	-	-	6	-	-	63	-	28	-	-	3	-	-	31
North	Through	-	-	-	-	-	3	-	3	-	-	-	-	-	8	-	8
North	Right	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
East	Left	-	14	-	-	1	-	-	16	-	43	-	-	4	-	-	47
West	Right	7	-	4	1	-	-	-	12	21	-	11	2	-	-	-	35
Soldiers Road / Chase Boulevard																	
South	Left	6	-	3	1	-	-	-	9	3	-	2	0	-	-	-	5
South	Through	30	57	16	3	6	11	-	124	15	28	8	2	3	5	-	62
North	Through	8	14	4	1	1	3	-	31	23	43	12	2	4	8	-	93
North	Right	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
West	Left	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
West	Right	1	-	-	-	-	-	-	1	4	-	-	-	-	-	-	4
Soldiers Road / Site Access																	
South	Through	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
South	Right	-	-	-	-	-	-	3	3	-	-	-	-	-	-	9	9
North	Left	9	14	5	1	1	3	-	34	28	43	15	3	4	8	-	102
North	Through	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0
East	Left	-	-	-	-	-	-	12	12	-	-	-	-	-	-	6	6
East	Right	38	57	20	4	6	11	-	136	19	28	10	2	3	5	-	68
Clyde Road / Grices Road																	
South	Right	-	-	-	-	-	-	3	3	-	-	-	-	-	-	8	8
East	Left	-	-	-	-	-	-	11	11	-	-	-	-	-	-	6	6