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Report
Prepared for
Stockland and The Minto Group

Prepared by Stephen Hunt

5 April 2018

Traffic Engineering Evidence
Statement

Amendment C228 Casey Planning
Scheme

Minta Farm Precinct Structure Plan

Traffic: Evidence

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Prepared for:

Stockland and The Minta Group

Prepared by Stephen Hunt
Our reference Document1

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1 Statement of Witness:

Reference

- 1.1.1 Amendment C228 Casey Planning Scheme
- 1.1.2 Minta Farm Precinct Structure Plan
- 1.1.3 Soldiers Road, Berwick

Name

- 1.1.4 Stephen John Hunt

Position

- 1.1.5 Principal – Traffic, Ratio Consultants

Address

- 1.1.6 9 Clifton Street, Richmond, VIC 3121

Qualifications

- Bachelor of Engineering (Civil), 1975, Swinburne University of Technology.
- Graduate Diploma of Highway and Traffic Engineering, 1981, Chisholm Institute of Technology.

Experience

- 2017 – Present: Principal – Traffic, Ratio Consultants.
- 2010 – 2016: Group Manager – Cardno Victoria
- 2007 – 2010: Consultant, Cardno Grogan Richards.
- 1988 – 2006: Director, Grogan Richards.
- 1975 – 1988: Traffic Engineer with Cities of Doncaster and Templestowe, Caulfield and Prahran.

Professional Expertise

- 1.1.7 I have worked in the area of Traffic and Transportation Engineering throughout my career. My area of expertise includes traffic advice and assessment of a wide range of land use and development proposals for planning authorities, government agencies, corporations and developers.
- 1.1.8 My training, qualifications and experience including involvement with a wide variety of developments over a number of years, qualifies me to comment on the traffic implications of this proposal.

Instructions which define the scope of this report

- 1.1.9 I have been requested by Norton Rose Fulbright on behalf of The Minta Group and King and Wood Mallesons on behalf of Stockland Development Pty Ltd to review Amendment C228 to the Casey Planning Scheme, which seeks to facilitate the future development of the Minta Farm area through the incorporation of the Minta Farm Precinct Structure Plan (**PSP**) into the Casey Planning Scheme and to provide my opinions with respect the traffic and transport infrastructure issues.
- 1.1.10 My instructions, in a letter from Norton Rose Fulbright on behalf of The Minta Group dated 6th February 2018 were to:
 1. Review Amendment Documents and background materials;
 2. Confer with instructing solicitors and counsel where necessary;
 3. Prepare an expert witness report addressing traffic matters; and

4. If necessary, appear before Planning Panels Victoria at the hearing convened to consider submissions to the Amendment and present expert evidence.
- 1.1.11 I have been further instructed by King and Wood Mallesons on behalf of Stockland in a letter dated 6th March 2018 to prepare an expert evidence report within the scope of my expertise and to present evidence at the Panel hearing to express my opinion as to whether the Amendment is appropriate and to review and comment on traffic issues raised in written submissions to the amendment.
- 1.1.12 I am further instructed that The Minta Group and Stockland are the only landowners within the Minta Farm precinct and are cooperating in relation to the Amendment.

Facts, Matters and Assumptions Relied Upon

- 1.1.13 In the course of preparing this report the facts, matters and assumptions I have relied upon are outlined as follows:
- Site visit, Monday 19th February 2018.
 - Casey Planning Scheme Amendment C228 exhibited documents.
 - *Minta Farm Precinct Structure Plan – October 2017*, Victorian Planning Authority (VPA) (as exhibited).
 - *Minta Farm Background Report October 2017* prepared by VPA
 - *Traffic Engineering Assessment – Additional Modelling at Minta Farm PSP* - September 2017, prepared by Traffix Group for VPA.
 - *Minta Farm Precinct Structure Plan – Concept Road Design Report* – October 2017 prepared by Trafficworks for VPA.
 - *Strategic Transport Modelling Assessment (Ultimate Scenario) McPherson, Croskell and Minta Farm Precincts – August 2015*, prepared by Cardno for VPA.
 - Section 96A application by Stockland dated 2 June 2017.
 - *Minta Farm Berwick – S96A Transport Impact Assessment- October 2017*, prepared by OneMileGrid for Stockland.
 - Submissions received to the amendment as exhibited, including by City of Casey, The Minta Group and Stockland.
 - Casey Council Meeting Minutes dated 16th January 2018 endorsing officer's submission to the Amendment.
 - Revised Minta Farm PSP – Urban Structure Plan dated 14th March 2018 circulated by VPA.
 - *Minta City Proposal* – 14th March 2018 prepared on behalf of The Minta Group.
 - Casey Council response to Panel Direction 22 dated 16th March 2018, including details of existing permits and dwelling lots approved within the Clyde North PSP.

Identity of Persons Undertaking the Work

- 1.1.14 Stephen Hunt of Ratio Consultants, assisted by Hilary Marshall and Brett Young, also of Ratio Consultants.

Declaration

- 1.1.15 I confirm that I have read and that I understand the Planning Panels Victoria's 'Guide to Expert Evidence' and that I comply with the provisions of that guide.
- 1.1.16 I have no relationship with the clients other than a business engagement to comment on this matter.
- 1.1.17 My involvement in this project commenced in January 2018 and I was not involved directly in either the preparation of the PSP or strategic transport modelling undertaken by Cardno in 2015 for the VPA .
- 1.1.18 I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

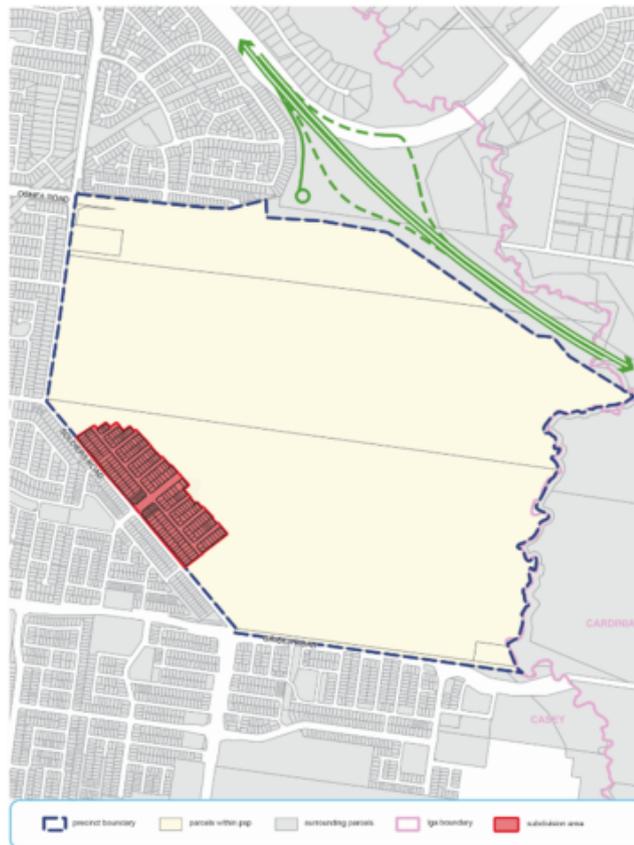


Stephen Hunt
Principal - Traffic
Ratio Consultants

2.1 Background

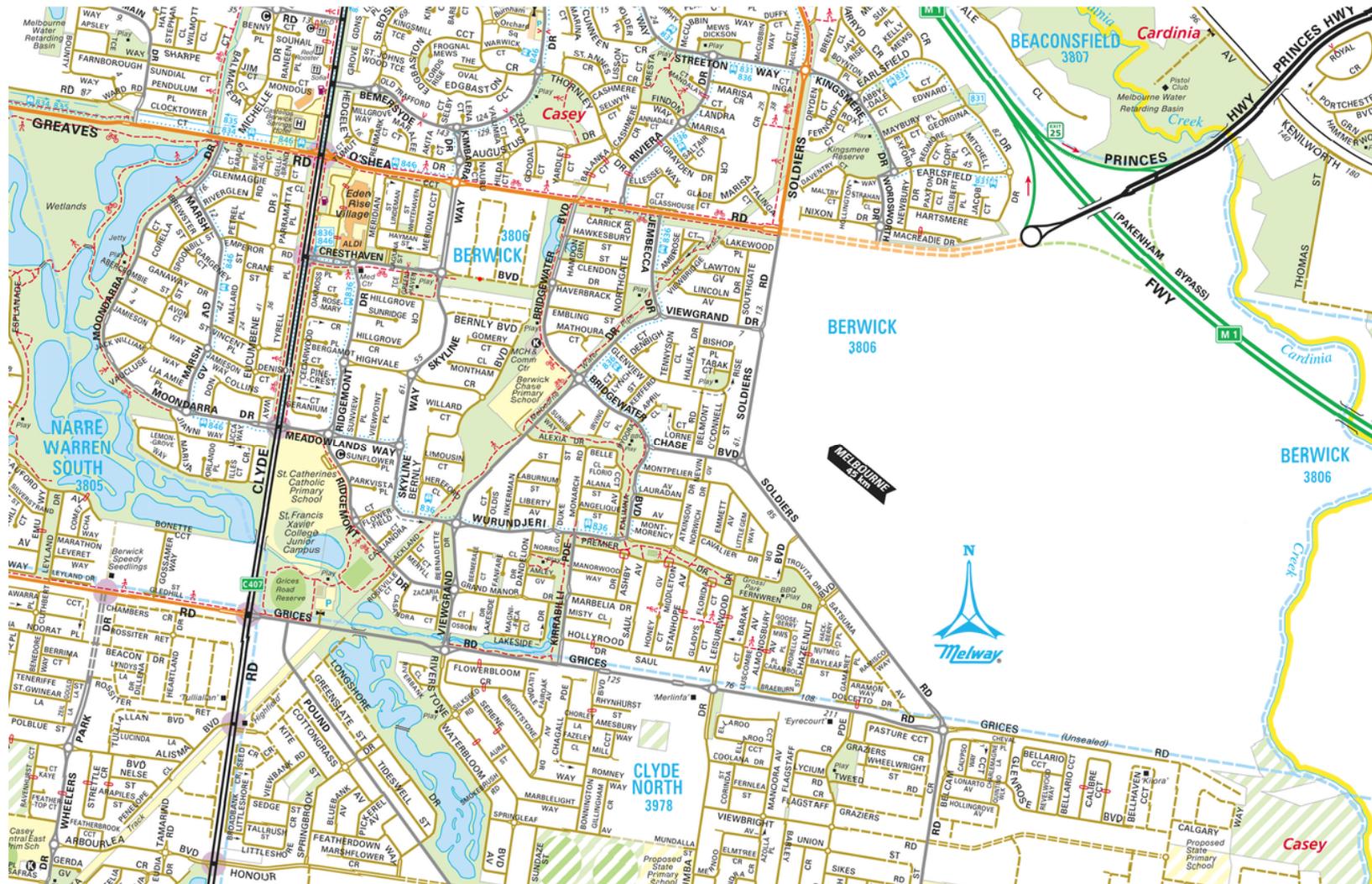
- 2.1.1 The VPA has prepared Amendment C228 to the Casey Planning Scheme which proposes to facilitate use and development of land within the Minta Farm Precinct Structure Plan area through introduction of the Urban Growth Zone Schedule 14 to the Casey Planning Scheme to amongst other things, include the *Minta Farm Precinct Structure Plan, October 2017* as an incorporated document in the Casey Planning Scheme.
- 2.1.2 The Amendment applies to an area of approximately 285 hectares to the east of Soldiers Road, Berwick, generally bound by Princes Freeway to the north, Cardinia Creek to the east and Grices Road to the south.
- 2.1.3 The amendment is a combined planning permit application and planning scheme amendment under Section 96A on the Planning and Environment Act.
- 2.1.4 Planning Permit Application PlnA00384/17 applies to Part of 2-106 Soldiers Road, Berwick and proposes subdivision for residential development, with Stages 1-4, which forms the application, proposing 231 residential lots.
- 2.1.5 The location of the PSP area and the Section 96A land is shown in Figure 2.1.

Figure 2.1 – Minta Farm PSP Area and Section 96A Application Land



- 2.1.6 The road network serving the subject land and the surrounding developing area, including developing subdivisions to the south and the planned easterly extension of O'Shea Road to the Beaconsfield Interchange, is shown in Figure 2.2.

Figure 2.2 - Surrounding Road Network



- 2.1.7 The future construction of O'Shea Road between Soldiers Road and the Beaconsfield Interchange is facilitated by the Public Acquisition Overlay (PAO1) in favour of Vic Roads within the Casey Planning Scheme as shown in Figure 2.3.

Figure 2.3 – O'Shea Road Extension (PAO1) – Casey Planning Scheme



2.2 Minta Farm Precinct Structure Plan

Future Urban Structure

2.2.1 The proposed future urban structure for the Minta Farm PSP area as exhibited is shown in Figure 2.4.

Figure 2.4 – Minta Farm PSP – Future Urban Structure (as exhibited)



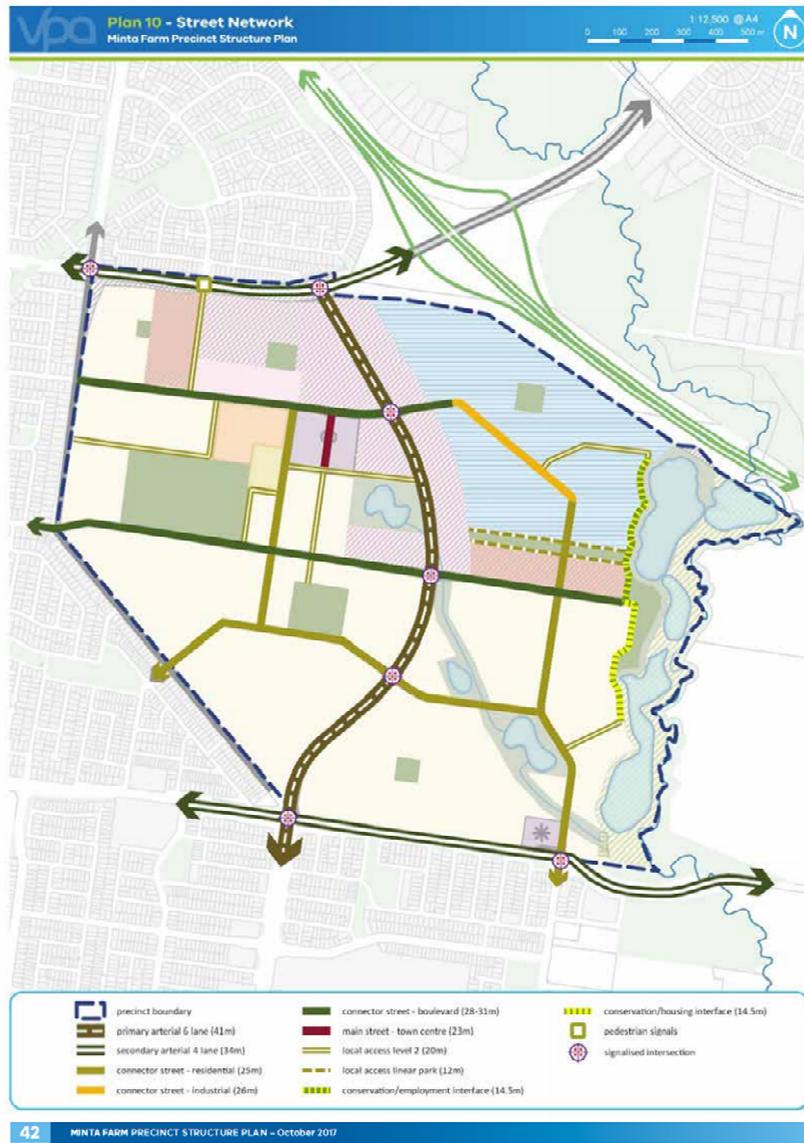
2.2.2 It is estimated that the precinct, will ultimately accommodate a population of approximately 8,000 people accommodated in 2,850 dwellings and provide 11,000 jobs within a regionally significant employment precinct proposed in the northern part of the PSP area.

2.2.3 It is also proposed that a local town centre, supported by a second convenience centre will provide for retail, entertainment, education and community facilities serving the local community.

Transport and Movement

2.2.4 The proposed street network to serve the precinct is shown in Figure 2.5.

Figure 2.5 – Minta Farm PSP – Street Network Plan



2.2.5 The street network is designed to not only service the local traffic requirements of the precinct, but to also (ultimately) provide for key strategic transport links which will supplement the arterial network servicing the broader growth corridor.

2.2.6 Development of the precinct is proposed to provide for, and partially facilitate, the construction of a new six lane arterial road (**North South Arterial**) through the precinct which will run north from Grices Road as an extension of Soldiers Road, to intersect with a future easterly extension of O'Shea Road.

2.2.7 O'Shea Road is proposed to be extended east from Soldiers Road along the northern boundary of the PSP area, with the State Government, through VicRoads, responsible for the construction of the road. The easterly extension of O'Shea Road will form a new connection to the Princes Freeway via a western leg of the Beaconsfield Interchange, with

the North South Arterial intersecting at a signalised T junction, approximately 250 metres west of the freeway interchange roundabout, also linking to the interchange via the O'Shea Road connection.

- 2.2.8 The construction of the North South Arterial, linking developing growth areas to the south in the Clyde North area to the Princes Freeway interchange, is designed to reduce pressure on Berwick Cranbourne (Clyde) Road and the existing Berwick interchange by providing an alternate connection to the freeway from the growth area.

Following completion of the North South Arterial, it is proposed to truncate the existing section of Soldiers Road north of Grices Road intersection. Soldiers Road will continue to connect to the north to O'Shea Road, forming part of the grid connector network servicing the wider local area.

- 2.2.9 Within the PSP area, a network of new connector streets and local roads is proposed supporting the future arterial network upgrades facilitated by the Minta Farm PSP. Three connector streets are proposed running east from Soldiers Road forming intersections with Soldiers Road at the following locations:

- Viewgrand Drive
- Chase Boulevard
- Hazelnut Boulevard.

- 2.2.10 These connections will facilitate east west access, providing links from existing residential areas to the west of Soldiers Road to the North South Arterial as well as connections from Minta Farm to Soldiers Road and existing local facilities in the Eden Rise Precinct.

- 2.2.11 The Public Transport and Path Network Plan shown as Plan 9 of the PSP, proposes that connector roads within the precinct will be "bus capable", with future bus connections shown at Chase Boulevard and Hazelnut Boulevard, potentially through extension of Route 836 which services that area.

Infrastructure Delivery

- 2.2.12 The PSP states that infrastructure will be provided within the precinct incorporating a number of mechanisms including:

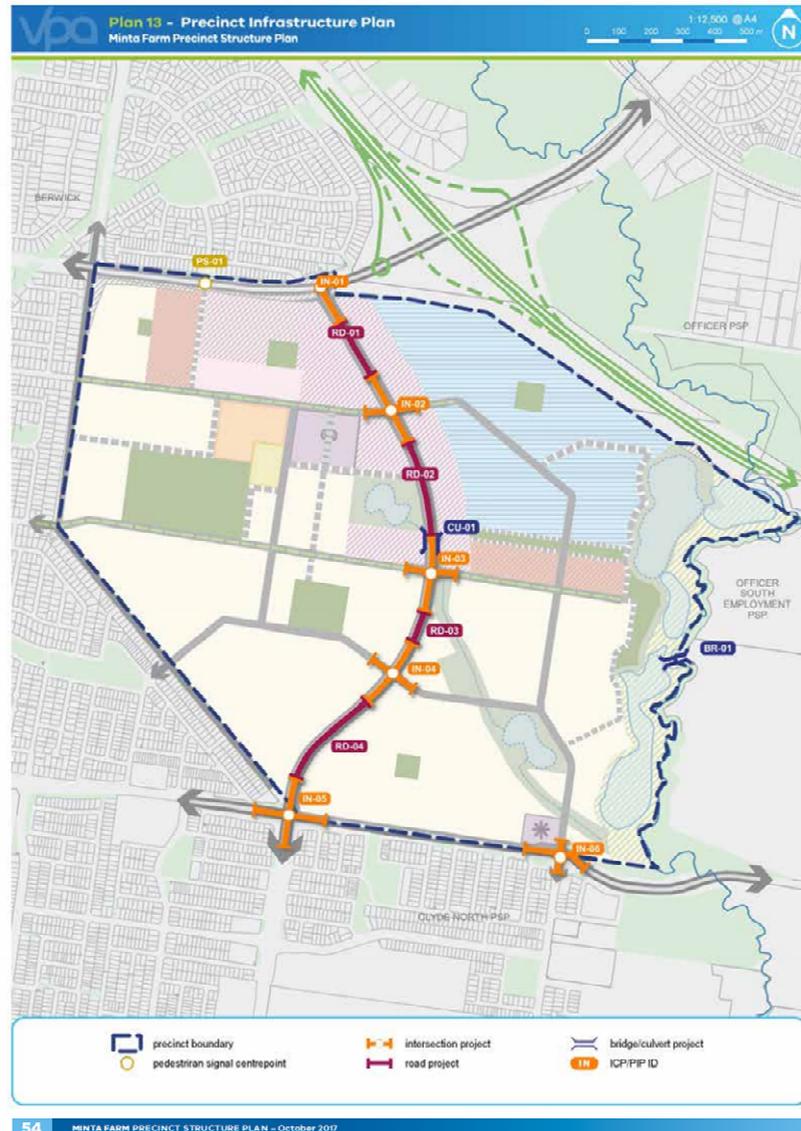
- Subdivision construction work by developers;
- Section 173 agreements;
- Minta Farm Infrastructure Contributions Plan;
- Relevant development contributions from adjoining areas; and
- Capital works projects by Council and State Government agencies.

- 2.2.13 The Minta Farm Infrastructure Contributions Plan (**ICP**) has not yet been exhibited, with the explanatory note within the amendment stating that the ICP will be incorporated into the Planning Scheme via a separate amendment process,

- 2.2.14 Plan 13 and Table 8 of the exhibited PSP illustrates the provision of infrastructure considered to be required in conjunction with the development of the PSP area.

- 2.2.15 The Precinct Infrastructure Plan (**PIP**) is shown in Figure 2.6.

Figure 2.6 – Minta Fram PSP – Precinct Infrastructure Plan



2.2.16 The PIP shows three major transport infrastructure projects within the precinct:

1. The North South Arterial, comprising delivery of land to accommodate the (ultimate) six lane arterial and the construction of a 2-lane (interim) carriageway between Grices Road and the future O'Shea Road intersection. (*Projects RD-01, RD-02, RD-03 and RD-04*).
2. Construction of the (interim) O'Shea Road / North South Arterial intersection (*Project IN-01*).
3. Delivery of land for (ultimate) North South Arterial / Grices Road intersection and construction of (interim) modifications to the existing intersection, including truncation of Soldiers Road north and construction of a new northern leg to form the connection to the North South Arterial (*IN-05*)

- 2.2.17 With the exception of a 50% contribution towards the Grices Road / North South Arterial intersection from the Clyde North DCP (recognising the construction of the existing roundabout already funded in conjunction with development in Clyde North), the delivery of the North South Arterial and associated O'Shea Road intersection is proposed to have no external funding, with Projects IN-01, RD-01, RD-02, RD-03 and RD-04 proposed to be 100% funded by the ICP.
- 2.2.18 The PIP also includes the provision of land for the (ultimate) construction of arterial / connector intersections at three locations along the North South Arterial and construction of (interim) intersection treatments (*IN-02, IN-03 and IN-04*) and at arterial /connector intersection to Grices Road (*IN-06*).
- 2.2.19 The construction and delivery of O'Shea Road between Soldiers Road and the Beaconsfield Interchange as a 4-lane arterial road is included in the PIP, with VicRoads being nominated as the lead agency, "subject to potential future declaration of the road". The provision of land for the delivery of O'Shea Road and either interim or ultimate construction is listed in Table 8 as not being included in the ICP.

Infrastructure Staging

- 2.2.20 Section 3.7.1 of the PSP, lists the following requirements and guidelines for development staging and infrastructure delivery.

3.7.1 Development staging

REQUIREMENTS	
R96	The north-south arterial road as funded by the Minta Farm ICP must be delivered prior to the subdivision of the 1,001 st aggregate residential lot unless otherwise agreed in writing by the relevant road management authority.
R97	Development abutting the north-south arterial road must prioritise early delivery of the road to the satisfaction of the responsible authority. The north-south arterial road must be constructed to property boundaries where an inter-parcel connection is intended or indicated in Plan 10 by any date or stage of development required by the responsible authority.
R98	Development staging must provide for the timely provision and delivery of: <ul style="list-style-type: none"> • The arterial road network and seek to co-ordinate the delivery of these roads in conjunction with the timing of the arterial road connections located external to the precinct. • Connector streets and connector street bridges. • Street connections between properties, constructed to the property boundary. • On- and off-road pedestrian and bicycle path connections.
GUIDELINES	
G68	Development staging will be determined largely by the development proposals on land within the precinct and the availability of infrastructure services. Development applications should demonstrate: <ul style="list-style-type: none"> • How the development will be integrated with adjoining developments, through the timely provision of connecting roads and pedestrian and bicycle paths, where practicable. • Where development does not directly adjoin the urban edge, how local open space will be provided in the early stages of the development to provide new residents with amenity. • How sealed road access will be provided to each new lot. • How trunk service extensions will be delivered, including confirmation of the agreed approach and timing by the relevant infrastructure or service provider. • How development will avoid and minimise impacts to conservation areas including with regard to the location of essential and other services.
G69	Development staging should provide for the early delivery of sports reserves, community facilities, parks and playgrounds.

- 2.2.21 In effect, R96 seeks to place a "lot cap" of 1000 lots on development of the PSP area, prior to the delivery of the North South Arterial.

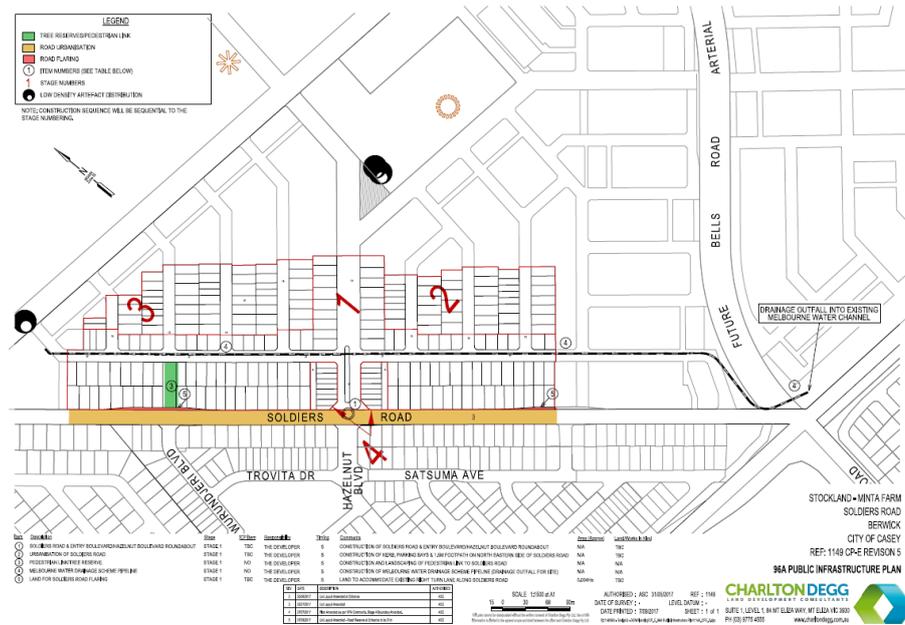
2.2.22 Due to the uncertainty as to the timing of the construction of O'Shea Road between Soldiers Road and the Beaconsfield Interchange, the PSP contemplates two options in relation to IN-01 and connection to the interchange as follows:

- Option 1 – Provision of land and construction of the intersection of North South Arterial / O'Shea Road intersection, assuming that O'Shea Road is either already constructed (or can be constructed in conjunction with the completion of the North South Arterial) to provide a connection to the Beaconsfield Interchange; or
- Option 2 – Provision of land and construction of a primary direct connection to the Beaconsfield Interchange, assuming that the O'Shea Road construction is not funded.

3.1 The Proposed Development

- 3.1.1 The Section 96A application lodged by Stockland, proposes initial development of approximately 12ha of land to provide a total of 231 residential lots over 4 stages, fronting Soldiers Road in the south west corner of the overall Stockland site,
- 3.1.2 The proposed subdivision is shown in Figure 3.1.

Figure 3.1 – Section 96A Application Proposal



- 3.1.3 The site forms part of the Stockland overall landholding within the southern portion of the Minta Farm PSP area, which consists of a total of 116ha, with western abuttal to Soldiers Road and southern abuttal to Grices Road.
- 3.1.4 It is estimated that, overall, the Stockland site will yield approximately 1,700-1,800 residential lots, subject to further planning permit approvals.

3.2 Access and Internal Road Network

- 3.2.1 Access to the subdivision is proposed via a connector street intersecting with Soldiers Road opposite the existing intersection with Hazelnut Boulevard, which is approximately midway between Chase Boulevard and Grices Road.
- 3.2.2 It is proposed that the intersection of the connector road with Soldiers Road / Hazelnut Boulevard will be controlled by a roundabout.
- 3.2.3 The majority of lots within the subdivision are proposed to be accessed via a network of access streets linking to the connector road, with 38 lots proposed to have frontage to, and direct access from, Soldiers Road.

4.1 City of Casey (Council)

- 4.1.1 Casey City Council have lodged a three part submission with respect to the proposed Amendment and Section 96A application, generally supporting the amendment and planning controls, subject to specific changes and further analysis.
- 4.1.2 Council however objects to the Section 96A application as the VPA has not incorporated recommend planning permit conditions, which would require the delivery of the North South Arterial and the connection to the Beaconsfield Interchange, prior to the first subdivision within the Minta Farm PSP occurring.
- 4.1.3 With respect to transport and road infrastructure provision issues, Council in its submission has expressed, in summary, the following views:
 - 1. The Minta Farm Precinct will ultimately facilitate the delivery of the North South Arterial, which is a key strategic transport link, providing an alternate route to the freeway for growth area communities in Clyde to the south of the PSP area.
 - 2. The delivery of the extension of O'Shea Road from Soldiers Road to the Beaconsfield Interchange, which is the responsibility of the State Government, will provide a vital east west link to the freeway reducing demand on alternate routes.
 - 3. In the absence of these planned connections, traffic demand from the south is resulting in increased congestion on existing roads, including Soldiers Road, O'Shea Road, Greaves Road and Clyde Road.
 - 4. Council officers have expressed concern with respect to the traffic modelling commissioned by the VPA and that the proposed 1,000 lot cap prior to delivery of the North South Arterial may not satisfactorily respond to traffic matters.
 - 5. Functional designs should be prepared and costed for the "Option 2" connection of the North South Arterial to the Beaconsfield Interchange to confirm that the option is feasible.
- 4.1.4 Council also have expressed concern with respect to the lack of exhibition of an Infrastructure Contributions Plan and the possibility of a supplementary ICP being required.

4.2 Transport for Victoria (TfV)

- 4.2.1 TfV is generally supportive of the amendment and did not express any comments with respect to the Section96A application.
- 4.2.2 With respect to traffic and transport issues, it is noted that the alignment of O'Shea Road extension and the North South Arterial have been agreed, together with the location of intersections along the North South Arterial.
- 4.2.3 A number of detailed comments were provided with respect to the adequacy of intersection layout plans prepared by Trafficworks for the VPA, and the need to undertake additional modelling to ensure appropriate intersection capacity will be established, particularly within the proposed employment precincts and at the Grices Road / North South Arterial intersection
- 4.2.4 In addition, comments are provided with respect to road cross-sections and provision for bicycle facilities.

- 4.2.5 In relation to development staging and the proposed 1,000 lot cap, TfV query the ability of existing arterial roads to accommodate all the traffic that will be generated by the completion of development in the Clyde North PSP area, in addition to the completion of early stages of Minta Farm.
- 4.2.6 The adequacy of the proposed interim construction standard of the North South Arterial, as a two lane road, is also queried, with concern expressed that inadequate capacity will be available until such time as a four lane divided cross-section is established.
- 4.2.7 It is noted that TfV consulted with VicRoads in preparation of the submission and that no separate submission from VicRoads has been received.

4.3 The Minta Group (TMG)

- 4.3.1 Urbis has prepared a response to the Amendment on behalf of The Minta Group, requesting that an alternate Urban Structure be adopted reflecting TMG's vision for the employment precincts.
- 4.3.2 With respect to transport issues, the submission notes the delivery of the O'Shea Road extension and connection to the Princes Freeway is an important piece of State infrastructure which needs to be delivered upfront by VicRoads to "unlock" the employment precinct.
- 4.3.3 TMG oppose the proposal to fund the construction of the "Option 2" connection of the North South Arterial to the Beaconsfield Interchange as part of the ICP.
- 4.3.4 It is also noted that the proposed implementation of a lot cap prior to the development of the North South Arterial is indicative of external demands for the route, which is not reflected in the apportionment of funds from external sources in the PIP or the anticipated ICP.
- 4.3.5 TMG submit that, if a lot cap is implemented, it should be related to "statement of compliance" rather than planning permit approval.

4.4 Stockland

- 4.4.1 Stockland have provided a submission to the Amendment, having entered into a contract of sale to purchase the southern portion of the Minta Farm landholding. It is the proponent of the Section 96A application.
- 4.4.2 With respect to traffic issues and the proposed lot cap, Stockland recognise that the North South Arterial is a key piece of infrastructure and accordingly, are agreeable to, prior to Statement of Compliance on the 1,200th lot, reserving the land for the road and constructing a single carriageway within the Stockland land holdings.
- 4.4.3 In relation to the required external roadworks, (ie the O'Shea Road extension and the Beaconsfield Interchange works), Stockland are of the opinion that these works are the core responsibility of VicRoads, serving a larger role in the arterial network for the South East Growth Corridor.

4.5 Other Submissions

- 4.5.1 A total of 37 additional submissions were received to the amendment, raising a number of issues with respect to traffic congestion and the need for provision of improved transport infrastructure in the area to address existing and future transport requirements.

4.6 Summary of Issues

- 4.6.1 Based upon my review of the exhibited PSP, submissions received to the exhibited amendment and my instructions, I have identified the following issues which I have sought to address in this evidence statement:
1. The adequacy of traffic modelling undertaken to inform the preparation of the PSP, including strategic modelling of longer term traffic impacts and analysis of traffic increases and impacts in the surrounding area prior to the construction of the NS Arterial, which forms the basis of inclusion of the 1000 lot cap.
 2. The adequacy of the street network proposed to be developed in association with the development of the PSP area and the implications of development of the North South Arterial on the regional network.
 3. The traffic implications of the Section 96A application on the local street network to the west, including Soldiers Road, and on the currently established arterial road network serving the area.
 4. The need (and the appropriateness of) requiring development of the North South Arterial and connection to the Beaconsfield Interchange as a permit condition on the Section 96A application prior to development proceeding (as sought by Council)
 5. The need (and the appropriateness of) the 1000 lot cap proposed on development prior to the establishment of the North South Arterial and connection to the Beaconsfield Interchange (as sought by the VPA and included in the exhibited PSP).

5.1 Strategic Transport Modelling

Modelling Undertaken

- 5.1.1 In 2015, the Metropolitan Planning Authority, now the VPA, commissioned Cardno to undertake strategic modelling within the South East Growth Corridor in order to inform preparation of draft Urban Structure Plans for the McPherson, Croskell and Minta Farm PSP areas.
- 5.1.2 I was employed by Cardno at that time but was not directly involved in the modelling undertaken or the preparation of the subsequent report.
- 5.1.3 Cardno undertook the modelling using the South East Growth Corridor version of the Victorian Integrated Transport Model (VITM), with a final report entitled “*Strategic Transport Modelling Assessment (Ultimate Scenario) – McPherson, Croskell and Minta Farm Precincts*” submitted in August 2015.
- 5.1.4 The Cardno report was exhibited as background documentation in association with the current amendment.
- 5.1.5 The key objectives of the modelling undertaken are summarized in Section 1.2 of the Cardno Report as follows:
- > Review the latest version for the South East Growth Corridor VITM (i.e. the model developed for the Thompsons Road, Clyde Creek and Casey Fields South PSPs), focusing on the PSP areas for McPherson, Croskell and Minta Farm and the road network surrounding the PSP areas.
 - > Update the VITM to reflect the road network and land uses envisaged for the subject PSPs.
 - > Run the updated VITM to assess the anticipated interim (2026) and ultimate (2046) traffic volumes on the network.
- 5.1.6 While the objectives of the study were to include modelling of an interim, 10 year plus development scenario (2026) and the ultimate 30 year plus scenario (2046), the Cardno Report only addresses and documents ultimate 2046 modeled volumes. The report, at Section 1.4, states as follows with respect to interim volume analysis.
- Both interim and ultimate traffic volumes will eventually be assessed as part of this study. The interim volumes represent the +10 year development scenario (~2026) and the ultimate volumes the +30 year development scenario (~2046). The interim volumes will be refined and used to inform the intersection works up to the interim scenario for inclusion in the DCPs and represent the works that will be used by the future community of the PSP area, whilst the ultimate volumes will be used to validate the ultimate road reservation requirements (including flaring requirements at intersections).
- This report focuses on the ultimate VITM analysis, following agreement on the outcomes of the ultimate modelling, the interim modelling will commence in accordance with the study brief.
- 5.1.7 Interim modeling outputs have not been published to my knowledge and were not included in the exhibited background documentation.

2046 Ultimate Modelling Results

- 5.1.8 2046 VITM modelling undertaken by Cardno was based on the following land use inputs for the Minta Farm PSP:
- Population – 8,067 people
 - Households – 2,970 dwellings
 - School Enrollments – 451 pupils
 - Total Jobs – 10,229 jobs
- 5.1.9 The modelled VITM Plot for the Minta Farm PSP area is shown the Cardno Report, reproduced in Figure 5.1, with a summary of modeled 2046 daily volumes, compared with existing daily volumes on key arterial roads in the vicinity of Minta Farm provided in Figure 5.1.

Figure 5.1 Daily VITM Plot _ Minta Farm 2014.

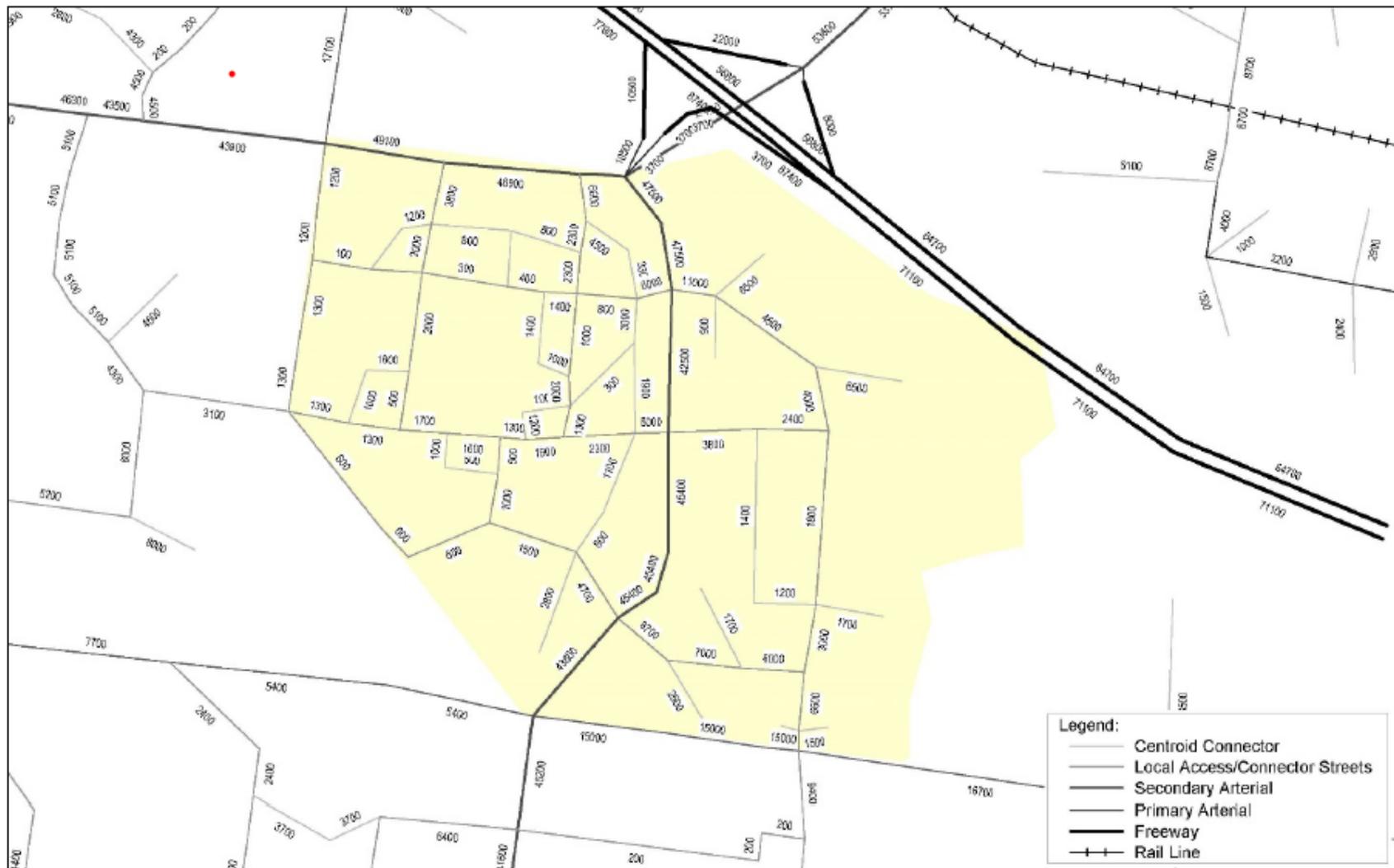


Table 5.1 - Minta Farm PSP Area – Existing v Ultimate Daily Volume Comparison (vpd)

Road	Section	2016 ¹	2046 ²
Arterial Roads			
Clyde Road	N of O'Shea	36,500	46,500 ³
	S of Grices	27,000	54,000 ³
Soldiers Road	N of O'Shea	9,100	17,100
O'Shea Rd	E of Clyde	23,250	46,300
	W of Monash	-	46,900
North South Arterial	S of O'Shea	-	42,500
	S of Grices ⁴	N/A	45,200
Grices Road	E of Clyde	5,500	12,700
	E of N S Arterial	N/A	15,000
Local Roads			
Soldiers Road	S of O'Shea	4,850	1,200
Chase Boulevard	W of Soldiers	1300	3,100
Bridgewater Bld	S of Chase	N/A	6,000
Wurundjeri Drive	W of Bridgewater	N/A	5,200
Meadowlands Way	E of Clyde	4750 ³	8,500

1. Traffic Report Figures 2,3 and 4.
2. Cardno Report Figure 5-3 and Appendix E
3. Extrapolated from peak hour counts
4. Currently Soldiers Road

- 5.1.10 It is clear from the modelling undertaken that, despite the additional transport infrastructure contemplated by the North South Arterial and the easterly extension of O'Shea Road, traffic volumes using existing arterial roads will continue to increase as development proceeds in the area.
- 5.1.11 Ultimately, it is expected that the North South Arterial through Minta Farm will carry in the order of 45,000 to 50,000 vehicles per day, with similar volumes utilising Clyde Road and O'Shea Road between Clyde Road and the Beaconsfield Interchange.
- 5.1.12 Strategic modelling of the local road network can only be considered as indicative due to the necessarily coarse grain of the strategic model network. The outputs suggest however that, while the truncation of Soldiers Road can be expected to reduce volumes on Soldiers Road south of Chase Boulevard, volumes using the local connector street network to the west can be expected to increase through as a consequence of further development in the area (including Minta Farm) even with the North South Arterial fully developed to a 6 lane arterial road.

- 5.1.13 In my opinion, this accurately reflects the likely usage of those roads as a means of increased access to facilities and services located within the Eden Rise area and within commercial precincts of Minta Farm.

5.2 Traffix Local Area Modelling

Study Methodology

- 5.2.1 Traffix Group were engaged by the VPA in 2017 to undertake additional modelling in relation to the Minta Farm PSP, specifically to “*determine the level of development possible prior to the construction of the North South Arterial.*”
- 5.2.2 The findings of the Traffix modelling were provided in a report entitled “*Traffic Engineering Assessment – Additional Modelling at Minta Farm PSP*” - September 2017, which was exhibited with the Amendment.
- 5.2.3 The modelling and analysis undertaken considered scenarios for development of the south west portion of the Minta Farm PSP area only, on the basis that this area is likely to be where initial development will occur.
- 5.2.4 Three yield scenarios were considered (at least initially) assuming 1000, 1250 and 1500 dwellings being developed.
- 5.2.5 The traffic impact of development was then sought to be modelled using the following methodology.
1. Determination of existing traffic conditions on the road network to the west and north of the Minta Farm PSP area were determined through a combination of daily tube counts undertaken by Council on local streets in the area between 2014 and 2016, and peak hour turning movement counts at intersections along O’Shea Road undertaken on 29th March 2017 and SCATS data extracted each signalised intersections along Clyde Road.
 2. Spreadsheet modelling of the distribution of additional traffic for the three scenarios considered (1000, 1250 and 1500 lots) including sensitivity testing of a reduced traffic generation rate and variations of access configuration to Soldiers Road.
 3. Assessment of post development daily volumes on the surrounding road network and comparison with future volumes against acceptable daily volumes for selected streets, based on an assessment of the existing road classification and target volumes for the designated category contained in the VPA “*Engineering Design and Construction Manual*”.
 4. Modelling of future peak hour volumes at intersections along O’Shea Road and Clyde Road by superimposing modeled peak hour traffic increases (for the 1000 lot scenario only) onto existing volumes at each intersection and assessment of the future operation of each intersection utilizing SIDRA. It is noted that existing intersection analysis was not undertaken and consequently no assessment of relative intersection performance is provided.

Modelling Results and Conclusions

Daily Volume Increases

- 5.2.6 Traffix, having modelled future daily volumes on the street network in the vicinity of Minta Farm for the scenarios considered, compared the modelled volumes against target volumes for the nominated applicable classification for each street type.
- 5.2.7 The results are shown in Table 6 of the Traffix report, reproduced in Table 5.2 as follows.

Table 5.2 – Traffix Post Development Daily Traffic Volumes Assessment - (Table 6 September 2017 Report)

Road	Target Vol.	Scenario 1		Scenario 2		Scenario 3	
		Vol.	Comply	Vol.	Comply	Vol.	Comply
O'Shea Road Clyde Rd-Skyline Way	12,000-60,000	26,849	Yes	27,727	Yes	28,605	Yes
O'Shea Road Bridgewater Dr-Jembecca Dr		10,240	Yes	10,825	Yes	11,410	Yes
O'Shea Road Jembecca Dr-Soldiers Rd		8,428	Yes	8,720	Yes	9,013	Yes
Soldiers Road Chase Blvd-Viewgrand Dr	3,000-7,000	8,084	No	8,892	No	9,701	No
Soldiers Road Hazelnut Blvd-Wurundjeri Dr		5,347	Yes	6,007	Yes	6,667	Yes
Chase Boulevard Bridgewater Dr-Soldiers Rd	>3,000	2,990	Yes	3,408	No	3,826	No
Bridgewater Boulevard Chase Blvd-Viewgrand Dr	3,000-7,000	2,657	Yes	2,949	Yes	3,242	Yes
Bridgewater Boulevard O'Shea Rd-Viewgrand Dr		4,410	Yes	4,702	Yes	4,995	Yes
Grices Road Leisurewood Dr-Soldiers Rd	12,000-60,000	2,256	Yes	2,296	Yes	2,335	Yes
Grices Road Kirrabilili Dr-Leisurewood Dr		7,825	Yes	8,405	Yes	8,985	Yes
Viewgrand Drive Bridgewater Blvd-Wurundjeri Dr	3,000-7,000	2,168	Yes	2,168	Yes	2,168	Yes
Viewgrand Drive Ridgemont Dr-Wurundjeri Dr		2,587	Yes	2,774	Yes	2,961	Yes
Viewgrand Drive Grices Rd-Ridgemont Dr		3,360	Yes	3,547	Yes	3,734	Yes
Skyline Way Cresthaven Blvd-O'Shea Rd	3,000-7,000	796	Yes	796	Yes	796	Yes
Skyline Way Cresthaven Blvd-Meadowlands Way	>3,000	1,376	Yes	1,376	Yes	1,376	Yes
Cresthaven Boulevard Ridgemont Dr-Skyline Way	3,000-7,000	2,966	Yes	2,966	Yes	2,966	Yes

*Grices Road assumed to operate as an Arterial Road as per PSP classification, rather than local road as per current Road Management Plan classification.

- 5.2.8 It is noted that, of the streets considered, only Soldiers Road between Viewgrand Drive and Chase Boulevard exceeded the target daily classification volumes in Scenario 1 (1000 lots), while Chase Boulevard, if considered as a connector street, exceeded nominated target volumes of 3,000 vehicles per day for Scenarios 2 and 3 only (greater than 1250 lots).
- 5.2.9 All other streets were projected to carry daily volumes below the target range for the relevant street classification for development of up to 1,500 lots.

Peak Hour Intersection Operation

- 5.2.10 AM and PM peak SIDRA analysis undertaken for intersections along Clyde Road and O'Shea Road is provided in Table 8 of the Traffix report, reproduced in Table 5.3.

Table 5.3 - Traffix Post Development SIDRA Capacity Modelling Results - (Table 8 September 2017 Report)

Location	Intersection DOS		
	Scenario 1 (1,000 Lots)	Scenario 2 (1,250 Lots)	Scenario 2 (1,500 Lots)
AM Peak			
O'Shea Rd / Skyline Way	0.47	-	-
O'Shea Rd / Bridgewater Blvd	0.53	-	-
O'Shea Rd / Jembecca Dr	0.61	-	-
O'Shea Rd / Soldiers Rd	0.63	-	-
Clyde Road / O'Shea Road	0.89	-	-
Clyde Road / Cresthaven Blvd	0.47	-	-
Clyde Road / Meadowlands Way	0.87	-	-
Clyde Road / Grices Road	0.87	-	-
PM Peak			
O'Shea Rd / Skyline Way	0.39	-	-
O'Shea Rd / Bridgewater Blvd	0.45	-	-
O'Shea Rd / Jembecca Dr	0.34	-	-
O'Shea Rd / Soldiers Rd	0.41	-	-
Clyde Road / O'Shea Road	0.82	-	-
Clyde Road / Cresthaven Blvd	0.64	-	-
Clyde Road / Meadowlands Way	0.94	-	-
Clyde Road / Grices Road	0.87	-	-

- 5.2.11 The report noted that “intersection capacity analysis has not been undertaken for Scenario 2 or Scenario 3 as it was established that the daily traffic volumes on Soldiers Road would exceed its formal target volumes under Scenario 1”.
- 5.2.12 It is noted that the intersection analysis within the report only nominates one intersection along Clyde Road as operating close to capacity, Clyde Road / Meadowlands Way. This intersection is modelled as operating with a degree of saturation of 0.94 in the afternoon peak assuming development of 1000 lots in Minta Farm. All other intersections in both peaks operate below 0.90 as modelled which, as nominated in the SIDRA user guide, indicates acceptable operating conditions.

Traffix Conclusions

- 5.2.13 Having assessed the results of the analysis summarized above, the Traffix report concluded the following with respect to the outputs:
- d) “Under Scenario 1 (1,000 lots), the daily traffic volume (8084 vehicles per day) on Soldiers Road (between Chase Boulevard and Viewgrand Drive) would exceed the formal daily target volume (7000 vehicles per day) for a collector road
 - i. However, given the existing cross section of the significant role that Soldiers Road plays in the broader road network, we consider it appropriate for Soldiers Road to carry volumes of up to 10,000 vehicles per day.
 - e) Intersection capacity analysis indicates that under Scenario 1, a number of intersections along Clyde Road are likely to operate at a level close to their practical capacity.”

- 5.2.14 It is noted that the review of the daily traffic volumes on Soldiers Road identified that the section between Chase Boulevard and Viewgrand Drive would exceed the formal daily target volume of 7,000 vehicles per day for a collector road. It was however concluded that, given the existing cross-section of the road and the role it currently plays in the broader road network that *"it is appropriate for Soldiers Road to carry traffic volumes of up to 10,000 vehicles per day"*.
- 5.2.15 As shown in Table 5.2, Traffix, have modelled Soldiers Road as carrying less than 10,000 vehicles per day for all scenarios.
- 5.2.16 The only other road where daily volumes approached accepted environmental capacity was Chase Boulevard west of Soldiers Road, where volumes were modelled to approach the nominated target threshold of a connector road for Scenario 1 and exceed it for Scenarios 2 and 3.
- 5.2.17 Traffix nominate the Chase Boulevard as a collector road, given its constructed cross-section and function and hence conclude that the modelled volume increases are acceptable having regard to the criteria considered.

Council Review of Traffix Modelling

- 5.2.18 Council, in their submission to the Amendment express concern with respect to the analysis undertaken by Traffix, with issues raised summarized as follows:
- Traffic count data undertaken on 29th March 2017 may be influenced by the proximity to the end of school term.
 - Daily traffic generation data has been reduced by 25% to represent external trips only.
 - Global distribution is based on 2011 ABS Journey to Work Data, which may not reflect future "eastbound" trips attracted to future employment nodes.
 - Traffic volumes modelled on Soldiers Road exceed target volumes of between 3,000 and 7,000 vehicles per day appropriate for a Collector Road.
 - Council considers Chase Boulevard as a local road (not a connector road as nominated by Traffix) based on the existing construction standard. As such modelled traffic volumes exceed desirable target volumes.
 - Full SIDRA outputs are not provided within the Traffix Report.
 - The analysis does not consider the impact of future upgrading road works on O'Shea Road and Grices Road which may limit capacity during the construction phase.
 - The modelling does not consider sustainable transport principles.
- 5.2.19 Council also indicate within their submission that they intend to commission a separate traffic assessment to inform consideration of infrastructure within the precinct.

- 5.2.20 It is foreshadowed that this assessment will consider the following:
- Existing traffic movements in the area;
 - Anticipated traffic movements at various incremental development levels having regard to scenarios for infrastructure provisions, including:
 - No improvements;
 - Delivery of the easterly extension of O'Shea Road to the Beaconsfield Interchange;
 - Closure of Soldiers Road without delivery of the North South Arterial;
 - Closure of Soldiers Road with the North South Arterial; and
 - Closure of Soldiers Road with North South Arterial and O'Shea extension.
- 5.2.21 It is understood that Council have commissioned Jacobs to undertake this work, however, at the time of preparation of this evidence statement, I have not been provided with any further traffic analysis undertaken on behalf of Council.

5.3 Review of Traffix Modelling and Assumptions

Overview of Methodology

- 5.3.1 I have reviewed the analysis undertaken by Traffix and have formed the following views with respect to the analysis and the underlying assumptions adopted.
- 5.3.2 In preparing this review, I note that the scope of the analysis undertaken by Traffix was limited to determining the implications of initial development within the Minta Farm Precinct on traffic volumes on the surrounding road network for the sole purpose of identifying a "lot cap" on development prior to the North South Arterial being delivered.
- 5.3.3 The report does not seek to model overall progressive traffic increases and impacts within the broader growth corridor, effectively limiting the assessment to a review of the impacts of progressive development of Minta Farm (only) on the abutting local and arterial street network to the west. No account is made for simultaneous traffic growth which can be expected to occur during the initial development period of Minta Farm from development in the Clyde North Thompsons Road and McPherson PSP areas to the south. Development of these area can be expected to result in increases in traffic volumes beyond the level of traffic assessed within the Traffix analysis. This is clearly the predominant concern of Council.
- 5.3.4 As it relates to assessment of the initial incremental impact of the development of Minta Farm on the surrounding road network my opinions with respect to traffic generation and distribution assumptions adopted are as follows.

Traffic Generation

- 5.3.5 Traffix have adopted a rate of 7.5 vehicle movements per household per day, with a peak hour rate of 0.8 movements per dwelling. The adopted daily rate is noted as having been "discounted" from 10 trips per household per day to take into account internal trips.
- 5.3.6 In my opinion, an overall rate of 8 vehicle movements per household per day (and 0.8 movements per household during peak hours) is an

appropriate design rate, based on recent data collected within growth areas of Melbourne.

- 5.3.7 A proportion of trips generated will be “locally destined”, largely to existing retail outlets, schools and other facilities developed in the including Eden Rise Shopping Centre. These trips, due to their local destinations, will not contribute to traffic increases on the broader regional arterial network.
- 5.3.8 As such the external daily generation of 7.5 movements per household per day is considered appropriate for assessment purposes.
- 5.3.9 Peak hour rates of 0.8 movements per dwelling per hour as adopted are also considered appropriate, corresponding to accepted industry standard rates.

Traffic Distribution and Estimated Daily Traffic Increases

- 5.3.10 Traffix have adopted a “global distribution” matrix for trip assignment which effectively results in traffic being distributed to the network based solely on 2011 ABS Census Journey to work data for the area.
- 5.3.11 The resultant global distribution adopted by Traffix, heavily “skews” trip distribution towards Clyde Road north (and the existing Berwick Interchange to the Princes Freeway) with 75% of overall trips assigned in this direction via a combination of routes, including various linkages via the connector road network to the west.
- 5.3.12 I have reviewed data on residential trip types recorded in 2009 Victorian Integrated Transport Survey (VISTA) for outer suburbs of Melbourne. This data reveals the following break up of residentially generated trips by purpose on a daily basis and during the AM and PM commuter peak periods.

Table 5.4 – 2009 VISTA Data – Vehicle Trip Purpose Percentage (Outer Metropolitan Melbourne)

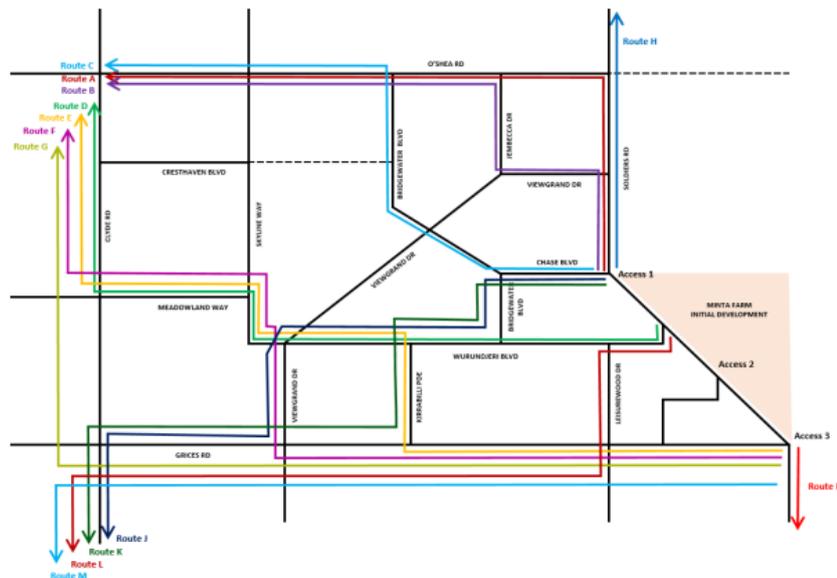
Trip Purpose	Percentage of Total Private Vehicle Trips		
	Daily	AM Peak	PM Peak
Shopping	17%	7%	18%
Education	10%	30%	17%
Work	26%	49%	31%
Pick up / Drop Off	19%	1%	3%
Social / Recreation	18%	7%	19%
Personal Business	8%	6%	12%
Other	2%	0%	0%
Total	100%	100%	100%

- 5.3.13 As can be seen, on a daily basis, work-based trips correspond to approximately 26% of overall trips, such that a distribution analysis based solely on journey to work data, may not reflect the broader range of trip purposes undertaken over the course of a typical day.



- 5.3.14 To test the implications of a revised distribution, assuming a broader range of trip purposes, I have undertaken a first principles assessment of trip distributions likely to be exhibited from Minta Farm in the early stages of development. This has been undertaken having regard to not only work trip data, but also the location of existing facilities such as schools, shops and personal services which will also attract trips.
- 5.3.15 The derived alternate daily distribution matrix for Minta Farm is shown in Table 5.5 on the following page.
- 5.3.16 The results indicate that, while a high proportion of trips are likely to be destined towards the north and Clyde Road as assumed by Traffix, a broader range of trip destinations is likely to result, including to local facilities in the Eden Rise Precinct, including shops, schools and other services. This will reduce the modelled concentration of traffic on Clyde Road as estimated by Traffix.
- 5.3.17 It is noted however that the Traffix distribution traffic model assigns trips to Clyde Road via a number of routes, utilising not only direct arterial connection to Clyde Road via O'Shea Road but also assigning trips along Chase Boulevard, Viewgrand Drive, Wurundjeri Boulevard, Meadowland Way and other connector streets in the area as shown in Figure 5.2.

Figure 5.2 – Traffix Assessment – Localised Route Options (Figure 7 September 2017 Report)



- 5.3.18 While I consider that the broader destination of trips generated from Minta Farm may differ from the assumed global distribution adopted by Traffix, a similar assignment of trips via the local street network to the west is likely to result, regardless of whether the ultimate destination is predominantly to the north via Clyde Road as assumed by Traffix, or to a broader range of destinations including local facilities such as Eden Rise Shopping Centre.
- 5.3.19 As such, I consider that the estimates of additional traffic daily traffic volumes prepared by Traffix for the three scenarios tested, provides a reasonable basis for understanding the incremental effects of initial development within Minta Farm.

Table 5.5 – Minta Farm PSP – Modified Global Trip Matrix

Trip Purpose	Local¹	Soldiers N	Clyde N	Greaves W	Soldiers S	Clyde S	Glasscocks W	Total
Shopping	50%	10%	25%	5%	0%	5%	5%	100%
Education	50%	10%	30%	0%	5%	5%	0%	100%
Work	5%	12%	70%	5%	2%	6%	0%	100%
Pick Up / Drop Off	40%	25%	30%	0%	5%	0%	0%	100%
Social / Recreation	25%	10%	30%	5%	5%	20%	5%	100%
Personal Business	25%	10%	30%	5%	5%	20%	5%	100%
Other	25%	10%	30%	5%	5%	20%	5%	100%
Total	29%	13%	40%	4%	3%	9%	2%	100%

1. Internal includes trips to local facilities in neighbouring areas including Eden Rise and Berwick Chase

Street Classification

5.3.20 For the purposes of the Traffix Assessment, street classifications in accordance with the City of Casey “Road Management Plan” for existing roads in the area have been adopted, as shown in Table 5.6.

Table 5.6 Road Classification – City of Casey Road Management Plan

Classification	Road
Secondary Arterial	<ul style="list-style-type: none"> • O’Shea Road • Soldiers Road (North of O’Shea)
Trunk Collector	<ul style="list-style-type: none"> • Skyline Way
Collector	<ul style="list-style-type: none"> • Soldiers Road (South of O’Shea) • Bridgewater Boulevard • Viewgrand Drive • Cresthaven Boulevard • Wurundjeri Boulevard (west of Kurrabilli Parade)
Local Access	<ul style="list-style-type: none"> • Grices Road • Chase Boulevard • Wurundjeri Boulevard (east of Kurrabilli Parade)

5.3.21 In association with their assessment, Traffix has assumed two variations to the Road Management Plan, reflecting their opinions with respect to actual or future street function as follows:

- Grices Road is upgraded to a **Secondary Arterial Road** in recognition of its classification in the Clyde North PSP.
- Chase Boulevard is upgraded to a **Collector Road** in recognition of the constructed cross-section of the street and with reference to the categorisation by Council of other roads with identical cross-section as collector roads.

5.3.22 I agree with the categorisation variations adopted by Traffix for both Grices Road and Chase Boulevard.

Target Daily Volumes

5.3.23 The Traffix report adopts a methodology of estimating future daily traffic volumes on the local road network in the vicinity of the Minta Farm PSP area and confirming compliance (or otherwise) daily target volumes sourced from the City of Casey Road Management Plan.

5.3.24 It is noted that the target volumes adopted for each road category as referenced from the Road Management Plan, are based on the following target volumes contained in the VPA Engineering Design and Construction Manual:

- Local Access – 1,000-3,000 vpd
- Collector Road – 3,000-7,000 vpd
- Truck Collector – 7,000 – 12,000 vpd, and
- Arterial Road - 12,000 – 60,000 vpd.

5.3.25 The target volumes as identified accord with normally adopted industry standards for the various street classifications and provide a useful guide as to ultimate upper limit target volumes having regard to environmental capacity.

5.3.26 In my opinion however, the range of volumes nominated for each category are indicative upper levels only and should not form the basis of a definitive assessment of acceptability of traffic impacts or as a basis for adoption of an interim “lot cap” which has been sought in this case.

5.3.27 It is also noted that external traffic growth on existing streets from development elsewhere in the growth corridor has not been considered.

Intersection Analysis

5.3.28 In my opinion, the intersection capacity analysis undertaken by Traffix is incomplete and does not provide a sound basis to support the lot cap subsequently sought to be adopted.

5.3.29 The analysis identifies only one intersection where “practical capacity” is exceeded in for future conditions, occurring in the PM peak period only.

5.3.30 No reference is made with respect to:

- Existing operation of the intersections reviewed.
- The relative impact of additional traffic levels from Minta Farm.
- The impact of growth in volumes of Clyde Road not associated with Minta Farm.
- Potential options for mitigating works at the intersection identified.

5.3.31 In my opinion the intersection analysis presented in the Traffix report is insufficient to either justify, or for that matter support, the proposed interim lot cap.

Overview and Basis of Report for Proposed Lot Cap

5.3.32 While It is considered that the modelling undertaken by Traffix provides a reasonable basis for assessing the incremental growth in daily volumes from initial development of the Minta Farm PSP area, it does not provide sufficient justification to support the proposed lot cap incorporated at R96 of the exhibited PSP.

5.3.33 The decision to apply a lot cap, based on the Traffix assessment, effectively relies on analysis suggesting:

- one section of Soldiers Road and potentially the eastern section of Chase Boulevard may have interim volumes above the target volume for connector roads, and
- the intersection of Clyde Road / Meadowlands Way is expected to experience volume increases such that a degree of saturation above 0.9 may occur in the PM peak (only).

5.3.34 In my opinion, the only basis for consideration of a lot cap is the likely proposition that Soldiers Road south of O’Shea Road will, until such time as the North South Arterial is constructed, carry interim volumes in excess of target volumes for its nominated function as a collector road.

5.3.35 In this regard, I agree with the conclusions within the Traffix Report that Soldiers Road, having regard to the existing cross-section and the role that it currently plays in the overall road network, can appropriately carry over 10,000 vehicles per day in the interim if required.

5.3.36 As such, the Traffix Report does not, in my opinion provide a sound basis for the adoption of the proposed lot cap as contemplated.

6.1 Adequacy of Traffic Modelling Undertaken

Strategic Modelling Undertaken by Cardno

- 6.1.1 Modelling undertaken by Cardno on behalf of the VPA in 2015, utilized the the Victorian Integrated Transport Model (VITM) within the South East Growth Corridor, refining modelling previously undertaken by Aecom in 2014.
- 6.1.2 The refined model, incorporating updated inputs related to expected development within the Minta Farm, Croskell and McPherson PSP areas was subsequently used to model 2046 ultimate traffic volumes, corresponding to expected full development within the Growth Corridor including the Minta Farm PSP area being considered.
- 6.1.3 The outputs of the VITM analysis were compared to a “first principles traffic generation demand assessment” undertaken by Cardno which indicated that VITM was suitably forecasting traffic demands for the PSPs under consideration, including Minta Farm.
- 6.1.4 On the basis of the inputs documented, the reported model calibration undertaken by Cardno and an understanding that the inputs and assumptions were refined in consultation with the VPA, Council and VicRoads at the time, I am satisfied that the modelled 2046 volumes provide a reasonable basis for assessing the future transport network required to serve the area.
- 6.1.5 It is noted in the Cardno report that, while the 2046 ultimate analysis was undertaken, modelling of an interim 10 year development (2026) scenario was not completed as originally contemplated in the brief.
- 6.1.6 Section 6.2 of the Cardo Report, concludes the following with respect to the need to complete the interim 2026 modelling:

Consultation on the ultimate scenario modelling outcomes with VicRoads and the City of Casey was undertaken in July 2015. This process considered the need to complete the interim (2026) modelling for the purpose of informing functional layout plans for the required intersections within the PSP areas. Given the current application of template intersections from the Growth Area Road Network Planning Guidance and Policy Principles it was agreed that interim modelling was no longer required.

- 6.1.7 It is understood that, on that basis, interim 2026 modelling was not undertaken, with concept functional designs for intersections included in the PIP subsequently prepared by Trafficworks, prepared based on “template” designs corresponding to the adopted intersecting roads functional classification.
- 6.1.8 In my opinion, interim 2026 modelling should have been completed at the time of the Cardno Study in 2015 in accordance with the initial brief. Interim modelling , while informing intersection concept design, would most instructively have documented traffic growth in the corridor as a consequence of the projected roll out of PSP areas and potentially identified overall requirements for initial staging of regional road infrastructure.

Interim Modelled Volumes

- 6.1.9 It is clear, on the basis of the submission lodged by the City of Casey, that concern has now emerged with respect to the impacts of development within the corridor prior to additional arterial road infrastructure being

delivered. As a consequence, Casey Council have commissioned Jacobs to undertake additional modelling which is understood to consider:

- Updated existing conditions counts on Soldiers Road, Grices Road and O'Shea Road.
- Modelling, based on population projections within the Clyde North area, of traffic increases as a consequence of approved development in Clyde North in the short to medium term.
- The implications of various development levels within Minta Farm generating additional traffic for a range of road infrastructure improvement scenarios.

6.1.10 In my opinion, this additional modelling will assist in providing a clearer understanding of traffic conditions which can be expected in the area, and in particular, identify traffic increases which will occur on Soldiers Road, Grices Road and O'Shea Road as a consequence of approved development within the Clyde North area, regardless of commencement of development of Minta Farm.

6.1.11 In response to Panel Direction 22, the Casey Council has released a table summarising permits issued for subdivisions within the Clyde North PSP area to the south of Grices Road, summarised in Table 6.1.

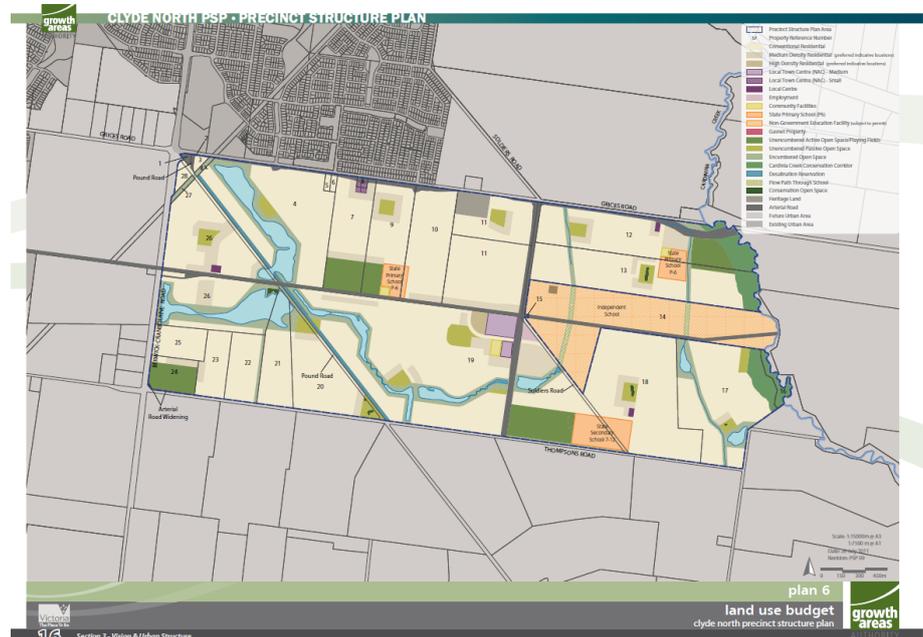
Table 6.1 Clyde North PSP – Subdivision Permits Issued (Source : City of Casey)

Clyde North PSP Property Reference Number (Plan 6)	Estate Name	Permit Number	Dwelling Lots
4	Berwick Waters	PlnA00716/11.A	327
4	Waterfront	PlnA00514/14.A	95
7	The Boulevard	P604/11.A	221
9	161 Grices Road	PlnA00599/16	241
10	Heritage Hill	PlnA00714/11.B	335
11	Circa	PlnA0099015.A	572
12	Kilora park	PlnA00387/12.B	347
13	College Green	PlnA00335/15.C	318
19	Honour Village	PlnA00286/15	925
20,21,22	New Bloom	PlnA00889/15	469
23	Thompsons Run	PlnA00286/15	165
25	Bloom	PlnA00991/12	127
26	Waterside	PlnA00374/14.A	362
Total			4504 lots

6.1.12 The table shows that approximately **4,500** dwellings have been approved in Clyde North to date, which can be assumed to be progressively developed over the next few years. Of note, approximately **1250**

subdivision lots have been approved in Land Budget areas 11, 12 and 13 of the Clyde North PSP located either side of Soldiers Road immediately south of Clyde Road as shown in Figure 6.1.

Figure 6.1 Clyde North PSP - Plan 6 Land Budget



- 6.1.13 This area alone can be expected to generate up to 10,000 vehicle movements per day, (1250 x 8) with a significant proportion of this traffic expected to use Soldiers Road between Grices Road and O'Shea Road for daily access given the existing configuration of the road network.
- 6.1.14 The “existing” daily volumes, which formed the basis of the Traffic analysis, were sourced from “a series of counts undertaken by Council between 2014 and 2016,” prior to significant development within Areas 11,12 and 13.
- 6.1.15 At the time of those counts (2014-2016), Soldiers Road carried **2,700** vpd north of Grices Road and **4,850** vpd north of Chase Boulevard. (Source: Fig 2 Traffic Report).
- 6.1.16 Additional volume data was collected by Traffic through a series of peak hour turning movement counts in March 2017. Counts undertaken at the intersection of O'Shea Road and Soldiers Road suggest that, at that time, volumes on Soldiers Road, south of O'Shea Road had increased to approximately **7,000** vpd.
- 6.1.17 Assuming that half of all traffic generated by completion of development within Areas 11,12 and 13 of the Clyde North PSP utilises Soldiers Road, traffic increases of up to 5,000 vpd on Soldiers Road could be expected following development of these land parcels. The implications of this is that, before development of Minta Farm commences, volumes on Soldiers Road can be expected to increase to approximately **7,500** vehicles per day north of Grices Road, and **10,000** vehicles per day between Chase Boulevard and O'Shea Road.
- 6.1.18 My expectation is that modelling to be undertaken by Jacobs will identify higher existing daily volumes on Soldiers Road than those adopted as

“base volumes” by Traffix, potentially of a similar magnitude to the estimates provided above.

6.2 Adequacy of Street Network Proposed

North South Arterial

- 6.2.1 Based on the modelling undertaken for ultimate development of the growth corridor, it is evident that the street network proposed within the Minta Farm PSP has been designed to cater for not only development levels contemplated by the development of the PSP area, but to contribute significantly to the future transport infrastructure required to serve the region as a whole.
- 6.2.2 As an integral component of the street network, the Minta Farm PSP proposes the delivery and construction of a new primary arterial road, running as a northerly extension of Soldiers Road between the existing Grices Road intersection and the proposed easterly extension of O’Shea Road. The development of the North South Arterial as proposed, will allow the downgrading of Soldiers Road between Grices Road and O’Shea Road.
- 6.2.3 It is intended that the North South Arterial will form a key component of the arterial network serving the Growth Corridor, providing a new connection to the Princes Freeway at the existing Beaconsfield Interchange. It is noted that the route is designed to serve not just the Minta Farm PSP area, but the entire corridor by providing an alternate connection to the Princes Freeway, reducing traffic growth and pressure on Clyde Road.
- 6.2.4 Modelling undertaken by Cardno for the VPA in 2015 estimates that the North South Arterial will ultimately carry in excess of 40,000 vehicles per day, and as such, the PSP proposes an ultimate divided 6 lane roadway, within a 41 metre reservation.
- 6.2.5 I am satisfied that the proposed North South Arterial is required to supplement the existing arterial network and the road reservation proposed, allowing ultimate upgrade to a six lane primary arterial road is appropriate within that regional context.
- 6.2.6 It is noted that the PIP, as exhibited, proposes that the provision of land to facilitate ultimate road construction will be included in the ICP, together with the construction of a two lane road way, ultimately forming part of the duplicated road. The responsibility for the ultimate duplication is not specified, but presumably will be dependent on declaration of the road by VicRoads and external funding.
- 6.2.7 It is expected that upon completion of construction, including provision of the link to the Beaconsfield Interchange via O’Shea Road, the North South Arterial will initially attract significant volumes of traffic, commensurate with its designated arterial function. In my opinion, the road will almost certainly initially attract volumes of between 10,000 and 15,000 vehicles per day when established, largely generated by traffic with origins and / or destinations outside of the Minta Farm PSP area including from Clyde North to the south.
- 6.2.8 Duplication of an arterial road to provide a divided four lane carriageway would usually be considered when daily volumes approach 15,000 to 20,000 vehicles per day. I am instructed that the option of upgrading the initial construction standard of the road from the two lane carriageway as

contemplated in the PIP as an ICP item, to a four lane divided road is being pursued, with the additional construction costs sought to be funded by use of GAIC contributions.

- 6.2.9 In my opinion, given the regional significance of the North South Arterial and the connection provided to the Princes Freeway, the use of GAIC funds to duplicate the road is appropriate.

Intersections with East West Boulevard Connector Streets

- 6.2.10 The PSP proposes creation of two boulevard connector streets running east from Soldiers Road as extensions of Viewgrand Drive and Chase Boulevard, establishing a 400m grid of connector streets which will serve the employment / commercial precincts in the northern portion of the PSP area.
- 6.2.11 The connector boulevards are proposed to intersect with the North South Arterial forming signalised intersections, such that the updated Street Network Plan proposes signalised intersections at approximately 400m spacing along the North South Arterial.
- 6.2.12 Given the future traffic function of the North South Arterial, VicRoads can be expected to require a high level of capacity to be established at the signalised intersections to facilitate regional north south traffic movements. It is noted that the concept intersection layouts prepared by Trafficworks have been prepared based on standard intersection templates and show minimal intersection flaring.
- 6.2.13 In my opinion, in association with finalisation of the PIP and ICP, further modelling of intersection design volumes is desirable to enable preliminary capacity analysis to be undertaken. This will enable a better understanding of required intersection configuration to be established, in particular to ensure that sufficient land is set aside to accommodate intersection flaring which is likely to be required.
- 6.2.14 I have been provided with a copy of a document entitled "Minta City Proposal" which has been prepared on behalf of the Minta Group to enunciate the vision for the future urban structure for the employment / commercial areas proposed within the Minta Farm PSP.
- 6.2.15 It is noted that the recommended Urban Structure for Minta City proposes a finer grain east west street network, potentially introducing additional signalised intersections along the North South Arterial. While I support the proposed overall structure and recognise the benefits of enhanced east west connectivity provided, I consider that additional modelling is required to confirm that the proposed intersection spacing can be achieved having regard to the significant north south traffic function proposed for the route and the potential for vehicle queuing analysis to influence possible spacing of signalised intersections.

6.3 Traffic Implications of Section 96a Application

- 6.3.1 The 96A application lodged by Stockland which is being considered in association with the amendment, proposes initial development of the Minta Farm PSP area, establishing a total of 231 residential lots, with access via a connector road to Soldiers Road at Hazelnut Boulevard.

- 6.3.2 I have also assessed the objection to the application lodged by the City of Casey who are seeking for a condition to be placed on any permit issued, requiring construction of the North South Arterial prior to subdivision commencing.
- 6.3.3 The proposed initial subdivision can be expected to generate a total of approximately **1850** vehicle movements per day, which, at least in the first instance, will be distributed to the road network via the proposed roundabout at the intersection of Soldiers Road and Hazelnut Boulevard. The Section 96a application proposal can be expected to increase volumes on Soldiers Road between Hazelnut Boulevard and Chase Boulevard by approximately 1500 vehicle per day.
- 6.3.4 As discussed in Section 6.1 above, it is likely that, as a consequence of approved development within the Clyde North PSP to the south, volumes on Soldiers Road will increase to at least **7,500** vehicles per day. Accordingly, total volumes using this section of Soldiers Road may increase to approximately **9,000** vehicles per day following completion of the initial subdivision, further exceeding the recommended upper limit for a connector road as defined in the VPA Guidelines.
- 6.3.5 In my opinion, while the total volumes are in excess of the prescribed target volumes for a collector road, the overall traffic implications are acceptable for the following reasons.
1. Volumes on Soldiers Road are already approaching or exceeding target volumes for a collector road as a consequence of subdivisions which have been approved and / or completed in the immediate area, such that the incremental increases are relatively small.
 2. The existing function of the road, effectively acting as a sub-arterial road providing access to developing subdivisions is well established, and not altered as a consequence of initial development as proposed in the Section 96A application.
 3. The physical capacity of the road, providing a single traffic lane in each direction, with a separate parking lane along the western kerb, and turning lanes or roundabouts at intersections, is capable of accommodating total volumes of between 10,000 and 15,000 vpd
 4. Abutting development is, at this stage, confined to the western side of the road only, such that from an amenity perspective, friction with passing traffic is limited.
 5. Traffic volume concentrations will occur in the interim only, with future construction of the North South Arterial and truncation of Soldiers Road at Grices Road, resulting in redirection of through traffic and reduction of volumes to “acceptable” levels.

- 6.3.6 Accordingly, in this context, I consider that the traffic implications of the proposed application are acceptable, with development of 231 additional lots in the precinct resulting in only relatively minor impacts on the operation of the surrounding road network. This view aligns with the conclusion reached in the Onemilegrid Transport Impact Assessment report submitted with the application.
- 6.3.7 In my opinion, having regard to the increasing volume of traffic which can be expected to utilise Soldiers Road in the interim, largely generated by subdivision to the south, it is desirable to restrict development of lots with direct access to Soldiers Road until such time as the North South Arterial is established.
- 6.3.8 Accordingly, it is recommended that the Section 96A application be amended to not include lots with direct lot access to the east side of Soldiers Road, with development of these lots occurring in conjunction with future, later stages of the overall subdivision.
- 6.3.9 Alternatively, development of lots fronting Soldiers Road as a Display Village would be acceptable. Vehicular access could be provided from a car park established within the Estate, with pedestrian access from the car park to the display homes fronting Soldiers Road. Direct driveway access from Soldiers Road or frontage parking would be unnecessary in this scenario, only required when the display homes are sold and occupied, most appropriately following construction of the North South Arterial and reduction in the traffic function of Soldiers Road.
- 6.3.10 In my opinion, the condition sought by Council to require the construction of the North South Arterial prior to commencement of the proposed subdivision is unnecessary and, ultimately counter-productive in the context of seeking early delivery of the required regional road infrastructure.

6.4 The Need For a Lot Cap

- 6.4.1 In my opinion, while the importance of the early delivery of the North South Arterial to serve the Growth Corridor is inarguable, the relative impact of traffic generated from the Stockland Section 96A application or, for that matter, the early stages of Minta Farm up to 1000 lots as modelled, is largely inconsequential in relation to the overall performance and operation of the existing road network serving the corridor.
- 6.4.2 The real issue is that the proposed road passes through the Minta Farm PSP and, as the Public Acquisition Overlay does not apply to the land required, such that without development of the PSP, the road will not be delivered.
- 6.4.3 In reality, the North South Arterial, while forming part of the internal road network serving the PSP area, is not required (as an arterial road) to facilitate the development of the Minta Farm PSP. An arterial road is however required to serve the corridor as a whole.
- 6.4.4 In traffic terms the provision of an arbitrary lot cap as a “stick” to development of Minta Farm, applied to force early delivery of the road, is in my opinion, unnecessary and arguably inequitable.
- 6.4.5 Traffic movements generated by early development stages of Minta Farm with access via Soldiers Road can be accommodated with acceptable interim impacts on the immediate surrounding street

network. As such a lot cap is unnecessary and largely meaningless in the context of the ongoing development of the PSP area.

- 6.4.6 I agree with the observation in the Traffix Report that, in the interim condition, Soldiers Road can accommodate volumes in excess of 7,000 vpd given the single sided frontage and existing road geometry.
- 6.4.7 Chase Boulevard forms part of a permeable network of connector streets through the residential precinct to the west, and as recognized and modeled by Traffix, traffic generated will dissipate through the network, including Chase Boulevard, to access Clyde Road as well as local facilities such as schools and the Eden Rise Shopping Village. I am satisfied that modelling shows that the spread of traffic generated by development to, and beyond, 1000 lots will be comfortably accommodated within the environmental capacity of the local street network to the west.
- 6.4.8 Clyde Road currently carries approximately 25,000 to 30,000 vehicles per day south of O'Shea Road (estimated by extrapolating peak hourly volumes documented in the Traffix Report). Modelling undertaken by Cardno indicates that, at ultimate development of the area, including full development of the proposed North South Arterial, Clyde Road will carry in excess of 40,000 vehicles per day south of O'Shea Road, indicating similar overall traffic function to the proposed North South Arterial.
- 6.4.9 Traffic increases on Clyde Road as a consequence of development of initial stages of the Minta Farm PSP will be relatively inconsequential, noting that volumes will remain well below modelled volumes following full development of the corridor and construction of the North South Arterial.
- 6.4.10 I note the "offer" put by Stockland in the submission to the amendment, agreeing to a condition to reserve the land for the road North South Arterial reservation and constructing the two-lane carriageway (within Stockland landholding only) prior to the statement of compliance of the 1,200 lot.
- 6.4.11 In my opinion, this is an appropriate commitment to delivery of the road and is a far more effective mechanism for establishment of the route than the lot cap as proposed in the PSP.
- 6.4.12 I also support initial development of the North South Arterial as a four-lane divided road and the potential construction of the second carriageway using GAIC generated funding.

7 Summary and Conclusions:

Based on my review of the exhibited Minta Farm PSP and supporting documentation, I have concluded the following with respect to traffic and transport infrastructure issues identified.

1. Strategic traffic modelling undertaken by Cardno for the 2046 “Ultimate Development Scenario” confirms that the proposed North South Arterial is required to supplement the regional transport network, justifying the planned ultimate configuration as a six lane divided arterial road.
2. The North South Arterial Road is expected to ultimately carry in excess of 50,000 vpd, operating with a similar function and volume to Clyde Road.
3. The proposed reservation for North South Arterial, running through the Minta Farm PSP area, is not subject to a Public Acquisition Overlay such that the road is only likely to be delivered, if constructed in association with the progressive development the PSP area (with associated funding through an ICP).
4. The Minta Farm PIP assigns costing responsibility for the provision of the ultimate road reservation, ultimate intersections and the construction of one carriageway to the proposed Minta Farm ICP, with no external funding contribution identified.
5. The early delivery of the North South Arterial Road in conjunction with the development of the Minta Farm PSP area is not required to facilitate initial development as contemplated in the Section 96A application. As such, the permit condition sought by Council, requiring construction of the road prior to development commencing is unnecessary and, in all probability, counter-productive to the early delivery of the road.
6. The Section 96A application can be expected to generate a total of approximately 1850 vehicle movements per day increasing volumes on Soldiers Road between Hazelnut Boulevard and Chase Boulevard by approximately 1500 vehicle per day.
7. While the total volumes on Soldiers Road will be in excess of the prescribed target volumes for a collector road, the overall traffic implications are acceptable for the following reasons.
 - Volumes on Soldiers Road are already approaching or exceeding target volumes for a collector road as a consequence of subdivisions which have been approved and / or completed in the immediate area, such the incremental increases is relatively small.
 - The existing function of the road, effectively acting as a sub-arterial road providing access to developing subdivisions is well established, and not altered as a consequence of initial development as proposed in the Section 96A application.
 - The physical capacity of the road is capable of accommodating total volumes of between 10,000 and 15,000 vpd
 - Traffic volume concentrations will occur in the interim only, with future construction of the North South Arterial and truncation of Soldiers Road at Grices Road, resulting in redirection of through traffic and reduction of volumes to “acceptable” levels.
8. Modelling undertaken by Traffix, while providing a reasonable basis for assessing the incremental growth in daily volumes from initial development of the Minta Farm PSP area, does not provide sufficient justification to support the proposed 1000 lot cap incorporated at R96 of the exhibited PSP.

9. The “offer” put by Stockland in the submission to the amendment, agreeing to a condition to reserve the land for the road North South Arterial reservation and constructing the two-lane carriageway (within Stockland landholding only) prior to the statement of compliance of the 1,200 lot is considered an appropriate commitment to delivery of the road and is an effective mechanism for establishment of the route.

10. The initial development of the North South Arterial as a four lane divided road and the potential construction of the second carriageway using GAIC generated funding is supported, given the regional function of the road, and preliminary estimates that the route can be expected to carry initial volumes of between 10,000 and 15,000 vpd when constructed.