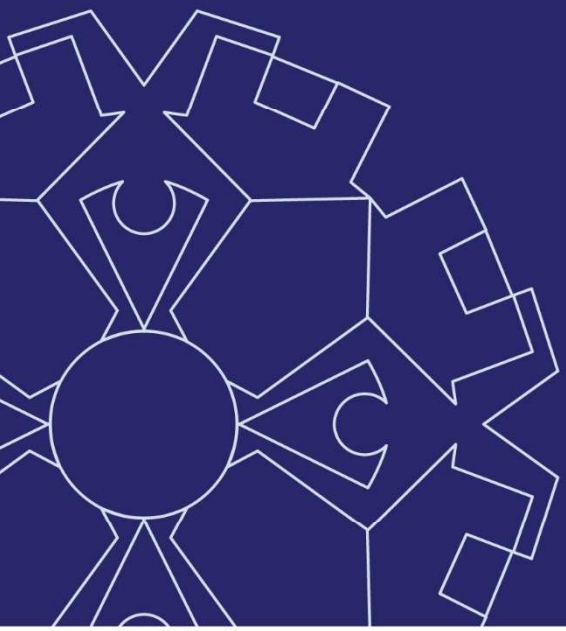
GEOLYSE

TRAFFIC STUDY
NARROMINE AERODROME SUBDIVISION

PREPARED FOR
NARROMINE SHIRE COUNCIL

JUNE 2015



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NARROMINE AERODROME SUBDIVISION

MITCHELL HIGHWAY NARROMINE

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POSTAL ADDRESS PO BOX 1842 DUBBO NSW 2830
LOCATION 1ST FLOOR, 62 WINGEWARRA STREET DUBBO NSW 2830
TELEPHONE 02 6884 1525 **FACSIMILE** 02 6884 1470
EMAIL DUBBO@GEOLYSE.COM **WEB SITE** WWW.GEOLYSE.COM

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Each lot would have road access to the front of the lot with a central taxiway servicing the rear of the lots and connecting to the aerodrome runway system.

The impact of the additional traffic generated by the Narromine Aerodrome subdivision on the surrounding road network has been assessed in terms of:

i) Traffic Volume;

ii) Site Access; and

iii) Intersection Capacity.

The estimated daily traffic generation from the Narromine Aerodrome subdivision is 260 vehicle trips per day and the nominal peak hour traffic generation is 24 vehicle trips per hour.

The impact of the additional traffic generated by the development of the Narromine Aerodrome subdivision on the existing traffic on Tom Perry Drive and the Mitchell Highway is minimal and the functional classification of the surrounding road network would not change following the development of the aerodrome subdivision.

In completing the assessment of the impact of the additional traffic generated by the development of the Narromine Aerodrome subdivision, the following recommendations are made:

- The increase in traffic volumes on the roads surrounding the aerodrome will not change the classification of the roads under a functional road hierarchy.
- The post development peak hour traffic on the Mitchell Highway is only 10.9% of the operational capacity of the road at Level of Service B and Tom Perry Drive is only operating at 6.7% of its operational capacity at a Level of Service C.
- Following the development of the aerodrome subdivision, all traffic movements at the intersection of Tom Perry Drive and the Mitchell Highway continue to operate at a Level of Service A.
- The section of Tom Perry Drive between the intersection with the Mitchell Highway and the intersection with the subdivision access road should be upgraded to an 8m bitumen sealed width so that the same standard of road is provided to the subdivision from the intersection with the Mitchell Highway through to the cul-de-sac heads at the ends of each subdivision road.
- A small central median with a Give Way sign is to be installed on the new subdivision access road at the intersection with Tom Perry Drive.
- A Give Way sign should be installed on the Tourist Park access road at the intersection with Tom Perry Drive.
- Give Way signs should be installed on Tom Perry Drive at its intersection with the Mitchell Highway to control traffic in conjunction with the existing hold line painted on the roadway at the intersection.
- The design and construction of all roadways are to be carried out to the appropriate standards and the requirements of Narromine Shire Council.

The implementation of the recommendations of this Traffic Study during the approval and development of the Narromine Aerodrome subdivision will see the operation of the subdivision with minimal impact on the surrounding road network.

Introduction

1.1 BACKGROUND

Narromine Shire Council intends to develop a subdivision for commercial purposes at the Narromine Aerodrome off the Mitchell Highway at Narromine.

Council intends to develop up to 29 lots along the southern side of the Narromine Aerodrome for commercial/aviation purposes and the subdivision would comprise up to 18 lots available for public access and up to 11 lots that would have restricted airside access only.

Each lot would have road access to the front of the lot with a central taxiway servicing the rear of the lots and connecting to the aerodrome runway system.

1.2 SITE LOCATION

The Narromine Aerodrome subdivision is located off the Mitchell Highway and is accessed via the existing intersection of the Mitchell Highway and Tom Perry Drive. Tom Perry Drive provides access to the aviation facilities within the Aerodrome, the Narromine Aviation Museum and the Narromine Tourist Park.

The proposed subdivision is to be developed on Part Lot 30 in DP1203864.

The site of the subdivision is bordered by the Mitchell Highway to the south and to the north, west and east by various operational facilities of the Narromine Aerodrome.

The location of the subdivision site is indicated on **Figure 1**.

1.3 TRAFFIC STUDY

Under State Environmental Planning Policy SEPP (Infrastructure) 2007, the proposed Narromine Aerodrome subdivision is not classified in accordance with the requirements set out in Schedule 3 of Clause 104 of the SEPP. Generally, developments not classified in the SEPP do not require referral to the RMS as part of the approval process.

However, it is noted that Narromine Shire Council requires the potential impact of the subdivision traffic to be assessed and a Traffic Study for the subdivision will be prepared to assist in the development assessment process for subdivision.

The Traffic Study will address the following specific issues:

- Traffic generated by the development of the commercial/aviation lots;
- Access to the proposed lots off the Mitchell Highway and the internal Aerodrome road system;
- Impact on the safety and amenity of the surrounding road network; and
- Recommendations for any traffic management measures to be implemented.

1.4 TRAFFIC STUDY METHODOLOGY

In carrying out the preparation of the Traffic Study, three (3) broad issues will need to be addressed as outlined below:

(a) Existing Site and Traffic Conditions

- Subdivision location;
- Road network hierarchy surrounding the development;
- Existing site access;
- Existing roadway capacity; and
- Existing traffic flow

(b) Proposed Subdivision

- Commercial/aviation subdivision development concepts;
- Internal and external traffic design principles; and
- Connectivity to the surrounding road network.

(c) Traffic Impact of the Proposed Subdivision

- Traffic generation from the proposed subdivision;
- Traffic distribution within and external to the subdivision and the connection to the Mitchell Highway;
- Impact of the traffic generated from the subdivision on existing traffic parameters; and
- Local area traffic management.

In order to satisfactorily address all the relevant traffic issues for the proposed subdivision, the following worktasks will need to be carried out:

1. Review all available background data, community concerns and traffic history relating to the area around the subdivision site.

2. Determine the traffic generating potential of the proposed subdivision, calculation of peak hour and daily traffic volumes and the distribution of the generated traffic within the subdivision and onto the surrounding road network to determine post development traffic volumes on the road network.

3. Assessment of the impact of the additional traffic generated by the development of the subdivision on the surrounding road network. The traffic impact assessment will carried out in terms of:

   - Road capacity;
   - Road safety; and
   - Access requirements.

4. Determination of a schedule of required works that may be necessary to alleviate any potential impacts caused to the surrounding road network by the development of the subdivision.

In summary, this Traffic Study will assess the existing traffic movements on the road network surrounding the development site, the expected traffic volumes generated by the proposed Aerodrome subdivision, the effect of the generated traffic on the surrounding road network and the determination of a safe and efficient means of providing access to the Narromine Aerodrome subdivision to cater for the additional traffic volume.

Consideration of SEPP (Infrastructure) 2007

Schedule 3 of State Environmental Planning Policy (Infrastructure) 2007 classifies developments based upon their potential to generate additional traffic onto the surrounding road network.

Developments listed in Schedule 3 of SEPP (Infrastructure) require referral to the Roads and Maritime Services (RMS) by the consent authority. The consent authority is required to take into consideration any submission that the RMS provides in response to the notice of the development. In addition the consent authority must consider, pursuant to clause 104(3) of SEPP (Infrastructure), the accessibility of the site concerned and any potential traffic safety, road congestion or parking implications of the development.

The proposed Narromine Aerodrome subdivision is not classified in accordance with the requirements set out in Schedule 3 of Clause 104 of the SEPP. Subdivisions creating in excess of 200 allotments or 50 allotments if connecting to a classified road require referral to the RMS as part of the approval process.

Whilst the proposed subdivision will connect to a classified road (Mitchell Highway), based on the proposed Aerodrome subdivision comprising only up to 29 lots, the subdivision is not classified in accordance with the requirements of the SEPP.

However, it is noted that Narromine Shire Council requires the potential impact of the subdivision traffic to be assessed and a Traffic Study for the subdivision will be prepared to assist in the development assessment process for subdivision.

Existing Traffic Conditions

3.1 ROAD NETWORK HIERACHY

The Roads and Traffic Authority (1984) proposes four basic road classes as the basis for the functional hierarchy of a road network.

A functional classification take into account the relative balance of the traffic mobility function and amenity/access functions of streets and roads and defines the purpose of a road within the context of a road network.

The four road classes are arterial, sub-arterial, collector and local roads and are defined below.

- **Arterial Roads**

  Roads whose main function is to carry through traffic from one region to another forming the principal means of communication for major traffic movements.

- **Sub-Arterial Roads**

  Those roads which supplement the arterial roads in providing for through traffic movement to an individually determined limit that is sensitive to both roadway characteristics and adjoining land uses.

- **Collector Roads**

  Roads that distribute traffic between the arterial roads and the local street system and provide access to adjoining property.

- **Local Roads**

  Subdivisional roads whose main traffic function is to provide access to adjoining property.

An assessment of the classification of the roads surrounding the development site and the Aerodrome's internal road system is indicated in **Table 3.1**.

Table 3.1 – Existing Road Classification

Road	Classification
Mitchell Highway	Arterial Road
Tom Perry Drive	Local Access Road
Aerodrome Perimeter Road	Airport Access Road
Narromine Tourist Park Access	Caravan Park Access Road

3.2 EXISTING ROADWAY CONDITIONS

The Mitchell Highway along the frontage of the Narromine Aerodrome is a two lane two way bitumen sealed road with a carriageway width of 7m (a 3.5m lane in each direction) with bitumen sealed shoulders approximately 1.5m on each side.

The Mitchell Highway is centreline and edgeline marked and is speed limited to 80km/hr along the frontage of the aerodrome and the intersection of the Highway with Tom Perry Drive.

The intersection of the Mitchell Highway and Tom Perry Drive comprises an AUR configuration for westbound traffic on the Highway turning right into Tom Perry Drive. The length of the diverge taper on the approach to the intersection is 55m. The full width auxiliary lane is 50m in length and merge taper on the departure side of the intersection is 50m in length.

A single barrier line preventing westbound traffic on the Highway from overtaking commences approximately 25m prior to the start of the diverge taper on the approach to the intersection. There is a short section of double barrier lines on the Highway to the west of the intersection with Tom Perry Drive.

The junction of Tom Perry Drive with the northern edge of the Mitchell Highway has significant flaring in excess of 19m between the culvert headwalls and would accommodate the swept turning path of semitrailers accessing the aerodrome. Whilst there is significant flaring of the turnout radii from Tom Perry Drive out onto the Highway, there are no Give Way signs installed even through there is a hold line painted on the pavement across the intersection.

Tom Perry Drive is bitumen sealed with a width of only 4m with no gravel shoulders or linemarking. A cattle grid is installed where Tom Perry Drive crosses the Mitchell Highway road reserve boundary into the aerodrome land. The cattle grid is approximately 6m wide.

Approximately 45m north from the cattle grid in Tom Perry Drive is a 4 way intersection. Straight through the intersection provides access to the general aerodrome facilities and in particular the Narromine Aviation Museum.

To the right at the 4 way intersection is an access road to the Narromine Tourist Park. This road is bitumen sealed with a width of only 4m with no gravel shoulders or linemarking.

To the left at the 4 way intersection is the Aerodrome Perimeter Road. This road is currently a gravelled road with a width of approximately 4m. The Aerodrome Perimeter Road will provide access to the proposed aerodrome subdivision.

Various photographs of the roads described in this Section of the Traffic Study are contained in the **Plates** Section of this Report.

Whilst the intersection of the Mitchell Highway and Tom Perry Drive provides good access to the Narromine Aerodrome, the internal road system will require upgrading to provide a satisfactory means of accessing the proposed aerodrome subdivision.

3.3 EXISTING ROADWAY CAPACITY

The provision of roads within an urban area provides four main functions:

i) to cater for moving vehicles;
ii) to cater for parked vehicles;
iii) to cater for pedestrians and bicycle traffic; and
iv) to allow for development and to provide access to adjoining property.

In carrying out the above functions, a road must also be capable of handling the traffic demands placed on it. Roads have varying capacities dependent on the function they are performing. The United States Highway Capacity Manual defines capacity as follows:

> *"Capacity is the maximum number of vehicles which has a reasonable expectation of passing over a given section of a lane or roadway in one direction (or in both directions for a two-lane or three-lane highway) during a given time period under prevailing roadway and traffic conditions."*

The physical characteristics of a roadway such as lane width, alignment, frequency of intersections etc make up the prevailing roadway conditions.

Based upon its capacity and a driver's expectations of the operational characteristics of a traffic stream is a qualitative measure denoted as the level of service of a road.

Level of service definitions combine such factors as speed, travel time, safety, convenience and traffic interruptions and fall into six levels of service categories ranging from A down to F.

The *AUSTROADS Guide to Traffic Engineering Practice* describes Level of Service A as:

> *"A condition of a free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high and the general level of comfort and convenience provided is excellent."*

The categories are graduated from Level of Service A down through six levels to Level of Service F that is a zone of forced flow. The amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdowns occur and queuing and delays result.

Based on the physical configurations of the surrounding road network, observations of traffic movements and the methodology outlined in Part 2 *Roadway Capacity* of *AUSTROADS Guide to Traffic Engineering Practice*, the capacity and Level of Service of the surrounding roads can be determined as indicated in **Table 3.2**.

Table 3.2 – Roadway Capacity and Level of Service

Road	Level of Service	Two Way Hourly Capacity
Mitchell Highway	Level of Service B	1,800 veh/hour
Tom Perry Drive	Level of Service C	600 veh/hour
Aerodrome Perimeter Road	Level of Service D	400 veh/hour
Narromine Tourist Park Access	Level of Service D	400 veh/hour

The lower Level of Service allocated to Tom Perry Drive (LOS C) and the other internal aerodrome roads (LOS D) is due to the limited width of the roads in their current configuration.

3.4 ANNUAL AVERAGE DAILY TRAFFIC

Annual Average Daily Traffic (AADT) is defined as the total volume of traffic passing a roadside observation point over a period of a year divided by the number of days in the year.

The Roads and Maritime Services have provided traffic data on the Mitchell Highway from Recording Station No. 93.074 located approximately 5km west of Narromine. The data was recorded in late 2011 and a copy of the summarised Virtual Week traffic data is attached in **Appendix A**.

The estimated 5 day average daily traffic as determined from the 2011 traffic counts was 1,820 vehicles per day and the 7 day average daily traffic was 1,690 vehicles per day.

As the traffic data was recorded in 2011, a natural growth factor of 2% per annum will be applied to determine an estimate of the 2015 traffic volume on the Mitchell Highway.

On this basis, the 5 day Monday to Friday 2015 AADT on the Mitchell Highway can be estimated as 1,970 vehicles per day and this traffic volume will be used to assess the potential impacts of the traffic generated by the development of the Narromine Aerodrome subdivision.

Specific traffic data is not available for Tom Perry Drive or the other internal aerodrome roadways. However, it is expected that these roads currently experience low volumes of daily traffic commensurate with the current operations and facilities at the aerodrome.

However, based on estimates of the number of employees at the aerodrome, visitor numbers to the Aviation Museum and the facilities available at the tourist park, an indication of the likely daily traffic volume within the aerodrome's internal road system can be made.

Information relating to operations within the aerodrome includes:

- General maintenance is carried out by a Narromine Shire Council employee.
- The Narromine Aviation Museum is operated by 2 volunteers on the days that the Museum is open with weekly visitor numbers ranging from 50 to 60 per week.
- The Narromine Tourist Park consists of 32 short term sites, 4 camp sites and 11 motel rooms. The tourist park is operated by 2 people.
- There are a number of air charter and aviation businesses that currently operate at the aerodrome.

Allocating estimates of daily vehicle generation to each of the facilities at the aerodrome, a daily traffic volume in the order of 160 vehicle trips per day can be determined for Tom Perry Drive.

3.5 PEAK HOUR TRAFFIC

The traffic count data on the Mitchell Highway at Recording Station No. 93.074 also provides the following information for the morning and evening peak hour traffic volumes:

- Morning Peak Hour 8.00am to 9.00am

  7 day count – 132 vehicles per hour

  Monday to Friday count – 144 vehicles per hour

- Evening Peak Hour 3.00pm to 4.00pm

  7 day count – 144 vehicles per hour

  Monday to Friday count – 158 vehicles per hour

The worst case peak hour traffic volume (Monday to Friday evening peak hour) will be used as the nominal peak hour traffic volume for the assessment of the potential impacts of the traffic generated by the development of the Narromine Aerodrome subdivision.

As was the case with the AADT traffic volume, the 2011 peak hour traffic volume will have the 2% per annum growth factor applied and the 2015 peak hour traffic volume on the Mitchell Highway can be estimated as 172 vehicles per hour.

Based on the information outlined for the daily traffic on Tom Perry Drive, an estimate of the peak hour traffic volume on the internal road system can also be made by taking 10% of the daily traffic volume.

Therefore the estimated peak hour traffic volume on Tom Perry Drive is 16 vehicle trips per hour.

Traffic Impact of the Proposed Development

4.1 PROPOSED DEVELOPMENT

Narromine Shire Council intends to develop a subdivision for commercial purposes at the Narromine Aerodrome off the Mitchell Highway at Narromine.

Council intends to develop up to 29 lots along the southern side of the Narromine Aerodrome for commercial/aviation purposes and the subdivision would comprise up to 18 lots available for public access and up to 11 lots that would have restricted airside access only.

Each lot would have road access to the front of the lot with a central taxiway servicing the rear of the lots and connecting to the aerodrome runway system.

The public access lots would be developed and occupied by a range of aviation related businesses such as aircraft engine mechanics and engine overhaul specialists, avionics businesses and the sales and maintenance of general aviation equipment and supplies.

The restricted airside access lots would be developed for individual aircraft hangars by private owners and small charter operators.

Road access to both the public and restricted airside lots would be from an extension of the Aerodrome Perimeter Road from its intersection with Tom Perry Drive. The proposed road would have an 8m bitumen sealed width and cul-de-sac heads would be included at the end of both the public access road and the restricted airside access road to facilitate the turnaround of vehicles using the road.

It is expected that access to the airside lots would be controlled by gates where the airside lots access road crosses the existing bitumen taxiway within the aerodrome.

The overall layout of the proposed Narromine Aerodrome subdivision is indicated on **Figure 2**.

4.2 TRAFFIC GENERATION

The Roads and Traffic Authority's *Guide to Traffic Generating Developments* publishes data on the traffic generating potential of various developments ranging from residential subdivisions, commercial premises, retail premises and industrial developments.

Whilst the *Guide to Traffic Generating Developments* includes generation rates for transport facilities, general industries (factories, warehouses etc) and business parks, none of the available categories are fully applicable to the development of the Narromine Aerodrome subdivision.

Therefore, the traffic generation from the proposed subdivision and its intended usage will be determined from first principles and a combination of various generation data. The expected generation will be determined separately for the following components of the proposed subdivision:

- 18 public access lots
- 11 restricted airside lots

4.2.1 DAILY TRAFFIC GENERATION

The daily traffic generation from the proposed subdivision will be based on the following generation rates:

- Public access lots: 12 vehicle trips per day
- Restricted airside lots: 4 vehicle trips per day

On this basis, the daily traffic generation from the proposed subdivision can be estimated as:

- 18 lots x 12 trips per lot 216 trips per day
- 11 lots x 4 trips per lot 44 trips per day

Total Daily Traffic 260 trips per day

The estimated daily traffic generation of 260 trips per day will be adopted as the traffic generation from the proposed aerodrome subdivision and will be used to determine the potential impacts on the surrounding road network.

4.2.2 PEAK HOUR TRAFFIC GENERATION

The peak hour traffic generation from the proposed subdivision will be based on the following generation rates:

- Public access lots: 1 vehicle trips per hour
- Restricted airside lots: 0.5 vehicle trips per hour

On this basis, the peak hour traffic generation from the proposed subdivision can be estimated as:

- 18 lots x 1 trips per lot 18 trips per hour
- 11 lots x 0.5 trips per lot 5.5 trips per hour

Total Peak Hour Traffic 23.5 trips per hour

The estimated peak hour traffic generation of 24 trips per hour will be adopted as the traffic generation from the proposed aerodrome subdivision and will be used to determine the potential impacts on the surrounding road network.

4.3 TRAFFIC DISTRIBUTION

For the purposes of assessing the potential impacts of the traffic generated by the Narromine Aerodrome subdivision, it will be assumed that all traffic generated by the subdivision will have its origin and destination to and from Narromine.

The distribution of the daily traffic volume and peak hour traffic volume generated by the subdivision from Tom Perry Drive onto the Mitchell Highway are indicated on **Figure 3** and **Figure 4** respectively.

4.4 IMPACT OF THE GENERATED TRAFFIC

The impact of the additional traffic generated by the Narromine Aerodrome subdivision on the surrounding road network will be assessed in terms of:

i) Traffic Volume;

ii) Site Access; and

iii) Intersection Capacity.

4.4.1 TRAFFIC VOLUME

The traffic generated by the development of the Narromine Aerodrome subdivision has the potential to impact on the existing traffic volumes on Tom Perry Drive and the Mitchell Highway.

A comparison of the existing daily and peak hour traffic volumes on the subject roads and the post development traffic volumes is indicated in **Table 4.1**.

Table 4.1 – Comparison of Existing and Post Development Traffic Volumes

Road	Existing Traffic Volume	Post Development Traffic Volume	Percentage Increase
Tom Perry Drive – Daily Traffic Volume	160 trips per day	420 trips per day	162.5%
Tom Perry Drive – Peak Hour Traffic Volume	16 trips per hour	40 trips per hour	150.0%
Mitchell Highway – Daily Traffic Volume	1,970 trips per day	2,230 trips per day	13.2%
Mitchell Highway – Peak Hour Traffic Volume	172 trips per hour	196 trips per hour	13.9%

The increase in daily traffic volume and peak hour traffic volume on Tom Perry Drive is 162.5% and 150.0% respectively.

The increase in daily traffic volume and peak hour traffic volume on the Mitchell Highway is 13.2% and 13.9% respectively.

Whilst the percentage increases in traffic volume on Tom Perry Drive appear excessive, a comparison should be made with the actual traffic volume capacity of the road in its current configuration. The same comparison will be made with the increased traffic volume on the Mitchell Highway

Based on the roadway capacities determined in **Section 3.3** of this Traffic Study, a comparison of the post development peak hour traffic volume and the actual road capacity is indicated in **Table 4.2**. The operational capacity is the percentage of actual volume capacity that the road is functioning at.

Table 4.2 – Post Development Peak Hour Operational Capacity

Road	Post Development Peak Hour Traffic	Roadway Capacity at a Level of Service C and B (Refer to Section 3.3)	Operational Capacity
Tom Perry Drive	40 trips per hour	600 trips per hour	6.7%
Mitchell Highway	196 trips per hour	1,800 trips per hour	10.9%

Based on the information presented in **Table 4.2**, following the full development of the Narromine Aerodrome subdivision, both Tom Perry Drive and the Mitchell Highway are operating well below the operational capacity at a Level of Service C and B respectively.

Therefore the impact of the additional traffic generated by the development of the Narromine Aerodrome subdivision on the existing traffic using Tom Perry Drive and the Mitchell Highway is minimal.

4.4.2 SUBDIVISION ACCESS

Access to the proposed Narromine Aerodrome subdivision will be via the Mitchell Highway, Tom Perry Drive and then the general alignment of the Aerodrome Perimeter Road.

The intersection of the Mitchell Highway and Tom Perry Drive comprises an AUR configuration for westbound traffic on the Highway turning right into Tom Perry Drive. The length of the diverge taper on the approach to the intersection is 55m. The full width auxiliary lane is 50m in length and merge taper on the departure side of the intersection is 50m in length.

The existing intersection provides good access to the Narromine Aerodrome allowing westbound traffic on the Mitchell Highway to pass a vehicle turning right into the aerodrome.

The proposed subdivision roads are to have an 8m bitumen sealed width and cul-de-sac heads would be included at the end of both the public access road and the restricted airside access road to facilitate the turnaround of vehicles using the road.

The section of Tom Perry Road between the intersection with Mitchell Highway and the intersection with the subdivision access road does not meet the same standard as the proposed subdivision roads. It is recommended that the subject section of Tom Perry Drive is upgraded to an 8m bitumen sealed width so that the same standard of road is provided to the subdivision from the intersection with the Mitchell Highway through to the cul-de-sac heads at the ends of each subdivision road.

The upgrading of Tom Perry Drive to an 8m bitumen seal will require that the existing cattle grid be widened or if the cattle grid is no longer necessary then the cattle grid be removed.

In order to maintain an appropriate control of the interaction between the traffic generated by the proposed subdivision and the existing users of the aerodrome and the Narromine Tourist Park it is recommended that a small central median with a Give Way sign is installed on the new subdivision access road at the intersection with Tom Perry Drive.

The intersection of the subdivision access road (Aerodrome Perimeter Road) and Tom Perry Drive should be widened and flared to accommodate the swept turning paths of semitrailers into and out of the subdivision access road if Council determines that access for such vehicles is required for the businesses expected to be operating at the public access lots within the subdivision.

A Give Way sign should also be installed on the Tourist Park access road at the intersection with Tom Perry Drive.

This will create Tom Perry Drive as the main through road within the aerodrome with each of the side roads at the 4 way intersection being required to give way.

It is also recommended that Give Way signs be installed on Tom Perry Drive at its intersection with the Mitchell Highway to control traffic in conjunction with the existing hold line painted on the roadway at the intersection.

The design and construction of all roadways are to be carried out to the appropriate standards and the requirements of Narromine Shire Council.

4.4.3 INTERSECTION ASSESSMENT

The traffic generated from the development of the Narromine Aerodrome subdivision will have the potential to impact on the operation of the following intersections:

i) Aerodrome Perimeter Road and Tom Perry Drive; and

ii) Tom Perry Drive and the Mitchell Highway.

The post development peak hour traffic volume using the intersection of the Aerodrome Perimeter Road and Tom Perry Drive is only minimal at 40 vehicle trips per nominal peak hour.

It is not intended that the operational characteristics of the intersection the Aerodrome Perimeter Road and Tom Perry Drive be modelled for this Traffic Study.

However, the intersection of Tom Perry Drive and the Mitchell Highway will be modelled using the SIDRA Intersection Analysis computer program.

The existing and post development peak hour turning movement volumes at the intersection of Tom Perry Drive and the Mitchell Highway are indicated on **Figure 5**.

The existing and post development SIDRA modelling results for the operation of the intersection are included in **Appendix B**.

The SIDRA modelling assessed the operation of the subject intersection for the parameters of Average Delay and subsequent Queue Length for vehicles using the intersection.

A summary of the SIDRA modelling for the operation of the intersection of Tom Perry Drive and the Mitchell Highway is indicated in **Table 4.3**.

Table 4.3 – Tom Perry Drive and Mitchell Highway Intersection Operational Parameters

Traffic Movement	Existing Traffic Average Delay (sec)	Post Development Average Delay (sec)	Increase in Average Delay (sec)	Existing Traffic Queue Length (No. of cars)	Post Development Queue Length (No. of cars)	Increase in Queue Length (No. of cars)
Mitchell Highway Westbound						
Right Turn	10.6	10.6	0.0	0.2	0.2	0.0
Straight Through	0.1	0.1	0.0	0.2	0.2	0.0
Mitchell Highway Eastbound						
Straight Through	0.0	0.0	0.0	0.0	0.0	0.0
Left Turn	10.1	10.1	0.0	0.0	0.0	0.0
Tom Perry Drive						
Left turn	8.2	8.2	0.0	0.0	0.1	0.1
Right Turn	8.3	8.2	- 0.1	0.0	0.1	0.1

It should be noted that the SIDRA program requires at least 1 traffic turning movement to be included for all possible movements at an intersection and thus a dummy turning movement to and from the west on the Mitchell Highway has been introduced.

All existing traffic movements at the intersection of Tom Perry Drive and the Mitchell Highway operate at a Level of Service A. Following the development of the Narromine Aerodrome subdivision, all traffic movements at the intersection continue to operate at a Level of Service A.

The operation of the existing intersection is not impacted by the development of the Narromine Aerodrome subdivision.

4.4.4 TRAFFIC IMPACT SUMMARY

The impact of the additional traffic generated by the Narromine Aerodrome subdivision on the surrounding road network has been assessed in terms of:

i) Traffic Volume;

ii) Site Access; and

iii) Intersection Capacity.

The estimated daily traffic generation from the Narromine Aerodrome subdivision is 260 vehicle trips per day and the nominal peak hour traffic generation is 24 vehicle trips per hour.

The increase in daily traffic volume and peak hour traffic volume on Tom Perry Drive is 162.5% and 150.0% respectively.

The increase in daily traffic volume and peak hour traffic volume on the Mitchell Highway is 13.2% and 13.9% respectively.

Whilst the percentage increases in traffic volume on Tom Perry Drive appear excessive, Tom Perry Drive is only operating at 6.7% of its operational capacity at a Level of Service C.

The impact of the additional traffic generated by the development of the Narromine Aerodrome subdivision on the existing traffic on Tom Perry Drive and the Mitchell Highway is minimal and the functional classification of the surrounding road network would not change following the development of the aerodrome subdivision.

All existing traffic movements at the intersection of Tom Perry Drive and the Mitchell Highway operate at a Level of Service A. Following the development of the Narromine Aerodrome subdivision, all traffic movements at the intersection continue to operate at a Level of Service A and the operation of the existing intersection is not impacted by the Narromine Aerodrome subdivision.

The section of Tom Perry Drive between the intersection with the Mitchell Highway and the intersection with the subdivision access road should upgraded to an 8m bitumen sealed width so that the same standard of road is provided to the subdivision from the intersection with the Mitchell Highway through to the cul-de-sac heads at the ends of each subdivision road.

In order to maintain an appropriate control of the interaction between the traffic generated by the proposed subdivision and the existing users of the aerodrome and the Narromine Tourist Park a small central median with a Give Way sign is to be installed on the new subdivision access road at the intersection with Tom Perry Drive.

The intersection of the subdivision access road (Aerodrome Perimeter Road) and Tom Perry Drive should be widened and flared to accommodate the swept turning paths of semitrailers into and out of the subdivision access road if Council determines that access for such vehicles is required for the businesses expected to be operating at the public access lots within the subdivision.

A Give Way sign should also be installed on the Tourist Park access road at the intersection with Tom Perry Drive.

It is also recommended that Give Way signs be installed on Tom Perry Drive at its intersection with the Mitchell Highway to control traffic in conjunction with the existing hold line painted on the roadway at the intersection.

The design and construction of all roadways are to be carried out to the appropriate standards and the requirements of Narromine Shire Council.

Recommendations

The impact of the additional traffic generated by the Narromine Aerodrome subdivision on the surrounding road network has been assessed in terms of:

i) Traffic Volume;

ii) Site Access; and

iii) Intersection Capacity.

The estimated daily traffic generation from the Narromine Aerodrome subdivision is 260 vehicle trips per day and the nominal peak hour traffic generation is 24 vehicle trips per hour.

The impact of the additional traffic generated by the development of the Narromine Aerodrome subdivision on the existing traffic on Tom Perry Drive and the Mitchell Highway is minimal and the functional classification of the surrounding road network would not change following the development of the aerodrome subdivision.

In completing the assessment of the impact of the additional traffic generated by the development of the Narromine Aerodrome subdivision, the following recommendations are made:

- The increase in traffic volumes on the roads surrounding the aerodrome will not change the classification of the roads under a functional road hierarchy.
- The post development peak hour traffic on the Mitchell Highway is only 10.9% of the operational capacity of the road at Level of Service B and Tom Perry Drive is only operating at 6.7% of its operational capacity at a Level of Service C.
- Following the development of the aerodrome subdivision, all traffic movements at the intersection of Tom Perry Drive and the Mitchell Highway continue to operate at a Level of Service A.
- The section of Tom Perry Drive between the intersection with the Mitchell Highway and the intersection with the subdivision access road should upgraded to an 8m bitumen sealed width so that the same standard of road is provided to the subdivision from the intersection with the Mitchell Highway through to the cul-de-sac heads at the ends of each subdivision road.
- A small central median with a Give Way sign is to be installed on the new subdivision access road at the intersection with Tom Perry Drive.
- A Give Way sign should be installed on the Tourist Park access road at the intersection with Tom Perry Drive.
- Give Way signs should be installed on Tom Perry Drive at its intersection with the Mitchell Highway to control traffic in conjunction with the existing hold line painted on the roadway at the intersection.
- The design and construction of all roadways are to be carried out to the appropriate standards and the requirements of Narromine Shire Council.

The implementation of the recommendations of this Traffic Study during the approval and development of the Narromine Aerodrome subdivision will see the operation of the subdivision with minimal impact on the surrounding road network.

References

AUSTROADS (1988) Guide to Traffic Engineering Practice. Part 2. Roadway Capacity.

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Ogden, K.W. and Bennett, D.W. (Eds) 1984) Traffic Engineering Practice. Third Edition. Dept of Civil Engineering Monash University.

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Traffic Authority of NSW (1985) Policies Guidelines and Procedures for Traffic Generating Developments. Part F.

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Roads and Traffic Authority Road Design Guide 1991 Section 4 - Intersections at Grade.

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Figures

GEOLYSE

NOT TO SCALE
IMAGE SOURCE: SPATIAL INFORMATION EXCHANGE
DATE: 16/06/2015
REF: 115102_01A_FIG01-FIG05

FIGURE 1
SITE LOCALITY

Pt. LOT 30

D.P. 1203864

500m RADIUS FROM ANHYDROUS AMMONIA TANK

400m RADIUS FROM ANHYDROUS AMMONIA TANK

300m RADIUS FROM ANHYDROUS AMMONIA TANK

WIND SOCK

PROPOSED RIGHT OF CARRIAGEWAY 20 WIDE
(8 METRE WIDE BITUMEN SEALED ROAD)

323.59

32.325

20

73.405

24.48

G.I. SHED

RAD 15

11	10	9	8	7	6	5	4	3	2	1
3750 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²

PROPOSED TAXIWAY 60 WIDE - BOUNDARY TO BOUNDARY

60 m

EXISTING BITUMEN TAXIWAY

(9 METRE WIDE BITUMEN SEALED TAXIWAY)

EXISTING BITUMEN

RAD 28.5

RAD 90

ARC 39.625

ARC 32.4

ARC 25.415

4.81

29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12
3032 m²	2491 m²	2274 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2250 m²	2790 m²

115.41

89.845

77.92

23.195

30.125

50

102.42

195.265

G.I. SHED

35.5

35.435

RAD 15

PROPOSED RIGHT OF CARRIAGEWAY 20 WIDE (8 METRE WIDE BITUMEN SEALED ROAD)

MITCHELL STATE HIGHWAY

14
D.P. 1041297

320
D.P. 1198226

Pt. LOT 30
D.P. 1203864

31
D.P. 1203864

32
D.P. 1203864

33
D.P. 1203864

TOM PERRY DRIVE

Pt. 30
D.P. 1203864

101
D.P. 788788

100
D.P. 788766

Pt. 30
D.P. 1203864
EXISTING SEWER PUMP STATION

82.76

77.52

20.015

42.515

44.630

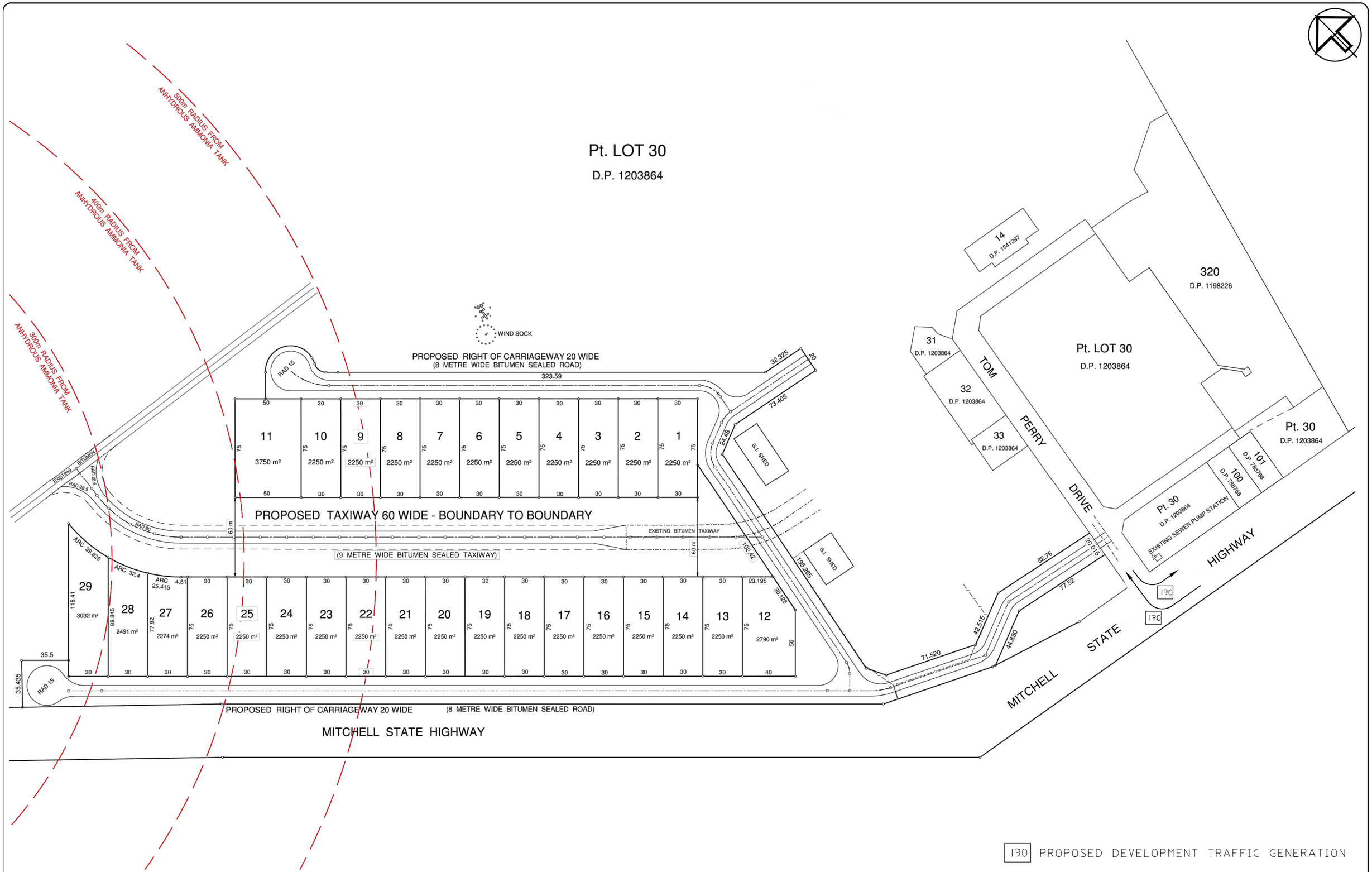
71.520

MITCHELL STATE HIGHWAY

GEOLYSE

NOT TO SCALE
SOURCE: IMRIE, ASTLEY & ASSOCIATES
DATE: 16/06/2015
REF: 115102_01A_FIG01-FIG05

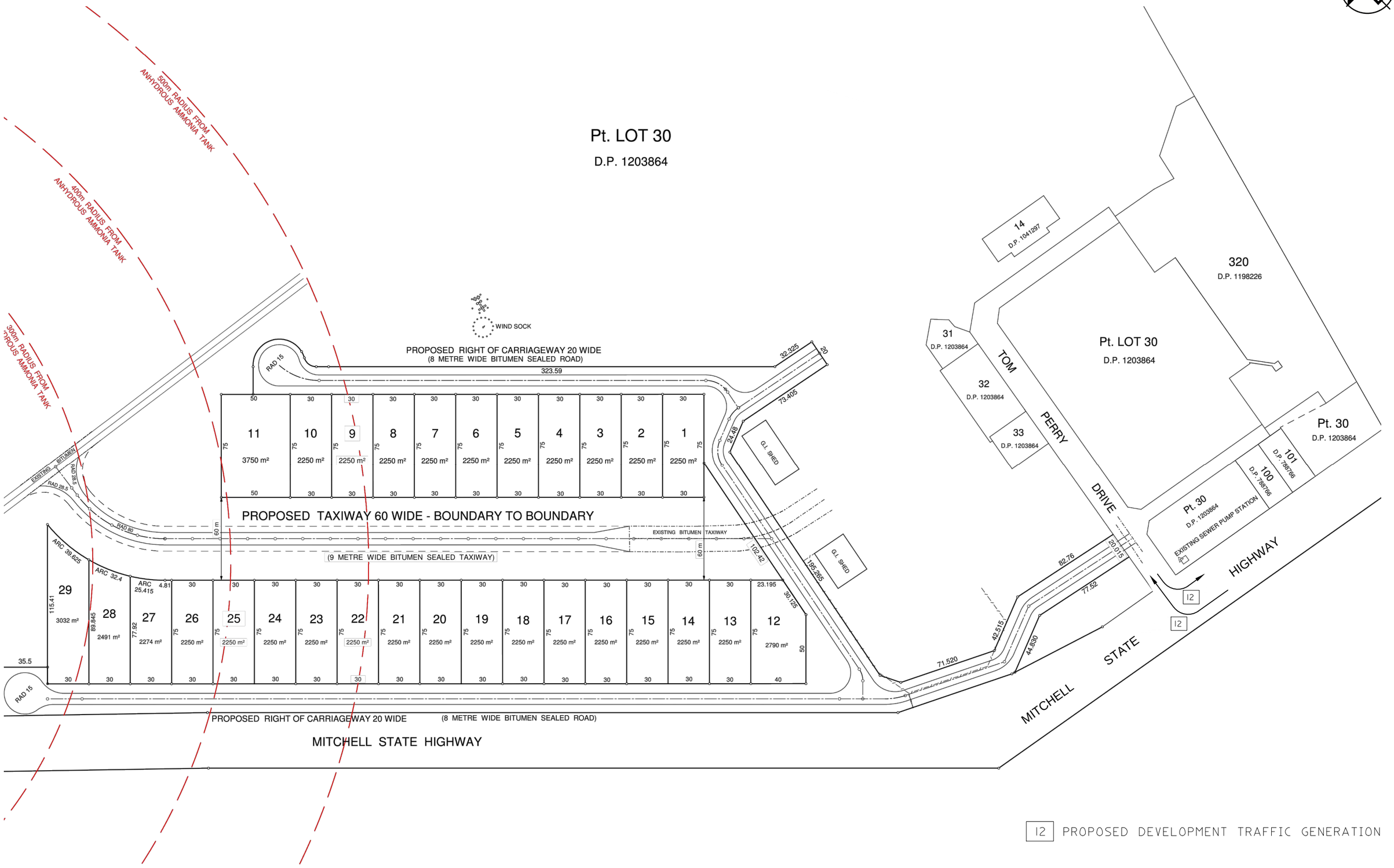
FIGURE 2
PROPOSED SITE LAYOUT



GEOLYSE

NOT TO SCALE
SOURCE: IMRIE, ASTLEY & ASSOCIATES
DATE: 16/06/2015
REF: 115102_01A_FIG01-FIG05

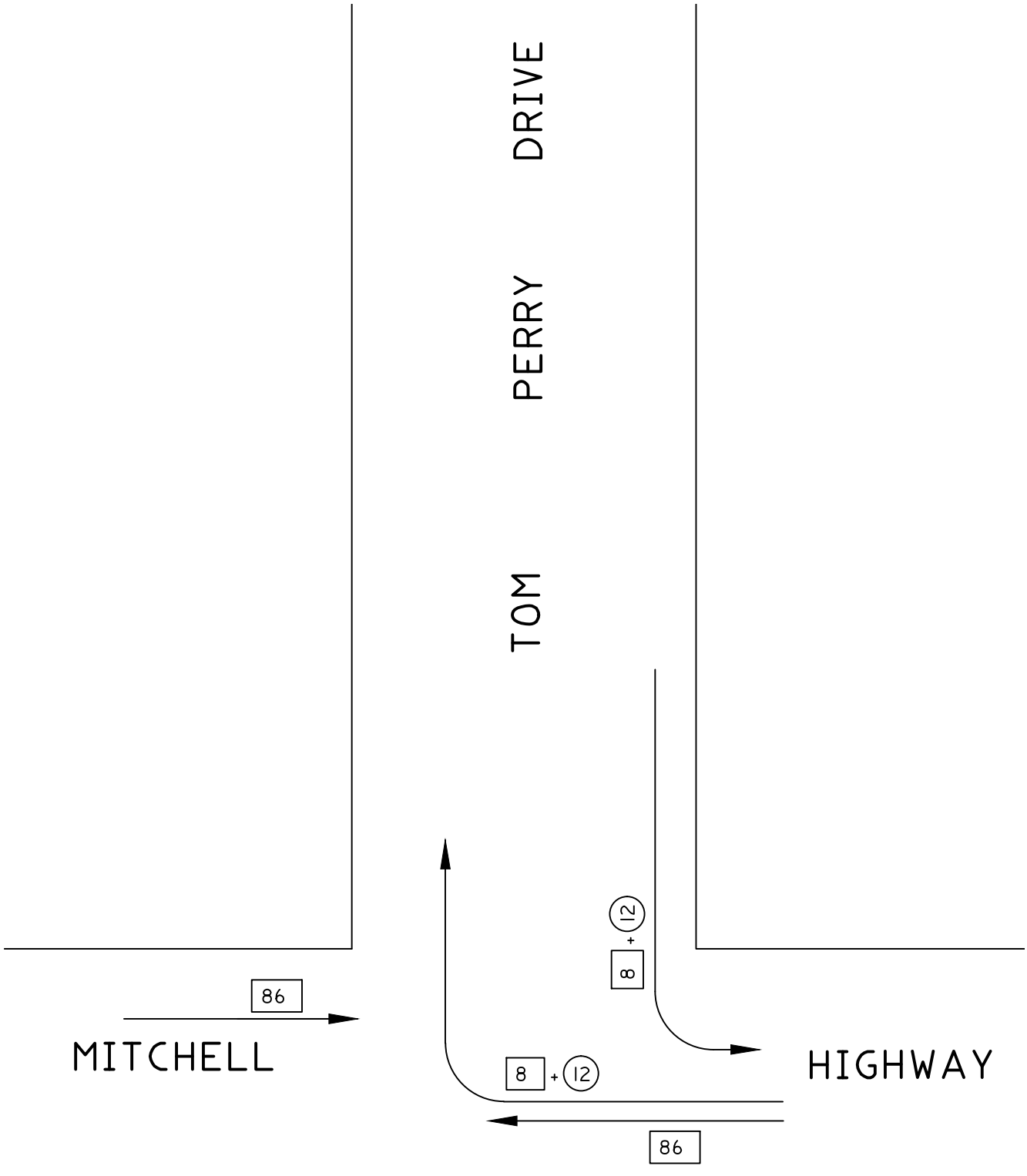
FIGURE 3
DAILY TRAFFIC DISTRIBUTION GENERATED BY PROPOSED DEVELOPMENT



GEOLYSE

NOT TO SCALE
SOURCE: IMRIE, ASTLEY & ASSOCIATES
DATE: 16/06/2015
REF: 115102_01A_FIG01-FIG05

FIGURE 4
PEAK HOUR TRAFFIC DISTRIBUTION GENERATED BY PROPOSED DEVELOPMENT



86 EXISTING TRAFFIC VOLUME

12 ADDITIONAL TRAFFIC VOLUME

GEOLYSE

NOT TO SCALE
DATE: 16/06/2015
REF: 115102_01A_FIG01-FIG05

FIGURE 5
PEAK HOUR TURNING MOVEMENTS AT THE INTERSECTION OF MITCHELL HIGHWAY AND TOM PERRY DRIVE

Plates

Plate 1: Mitchell Highway looking westbound approaching the intersection access to the Narromine Aerodrome.

Plate 2: Mitchell Highway looking westbound with the roadway tapering to the full width AUR turning and passing lanes.

Plate 3: Mitchell Highway looking westbound showing full width AUR passing lane.

Plate 4: Signage at the Mitchell Highway intersection with Tom Perry Drive.

Plate 5: Mitchell Highway looking westbound departing the intersection with Tom Perry Drive.

Plate 6: Mitchell Highway looking westbound with an existing aerodrome hangar in the background.

Plate 7: Mitchell Highway looking westbound west of the merging taper on the departure side of the AUR intersection.

Plate 8: Intersection entrance to Tom Perry Drive showing the existing hold line on the pavement, flaring of the intersection turnout and the cattle grid.

Plate 9: Entry cattle grid and general view northwards of Tom Perry Drive.

Plate 10: Tom Perry Drive north of the intersection with the Aerodrome Perimeter Road.

Plate 11: Access road to the Narromine Tourist Park.

Plate 12: Aerodrome Perimeter Road just west of the intersection with Tom Perry Drive.

Plate 13: Aerodrome Perimeter Road parallel to the Mitchell Highway.

Plate 14: General alignment of the roadway that will provide access to the restricted airside lots.

Appendix A

MITCHELL HIGHWAY TRAFFIC DATA

HW7 Mitchell Highway, 5km west of Narromine
Weekly Vehicle Counts (Virtual Week)

Datasets:

Site: **[93.074] hw7 5km west of narromine both direction**
Direction: 8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration: 13:58 Wednesday, 19 October 2011 => 13:05 Wednesday, 2 November 2011
Algorithm: Factory default
Data type: Axle sensors - Paired (Class/Speed/Count)

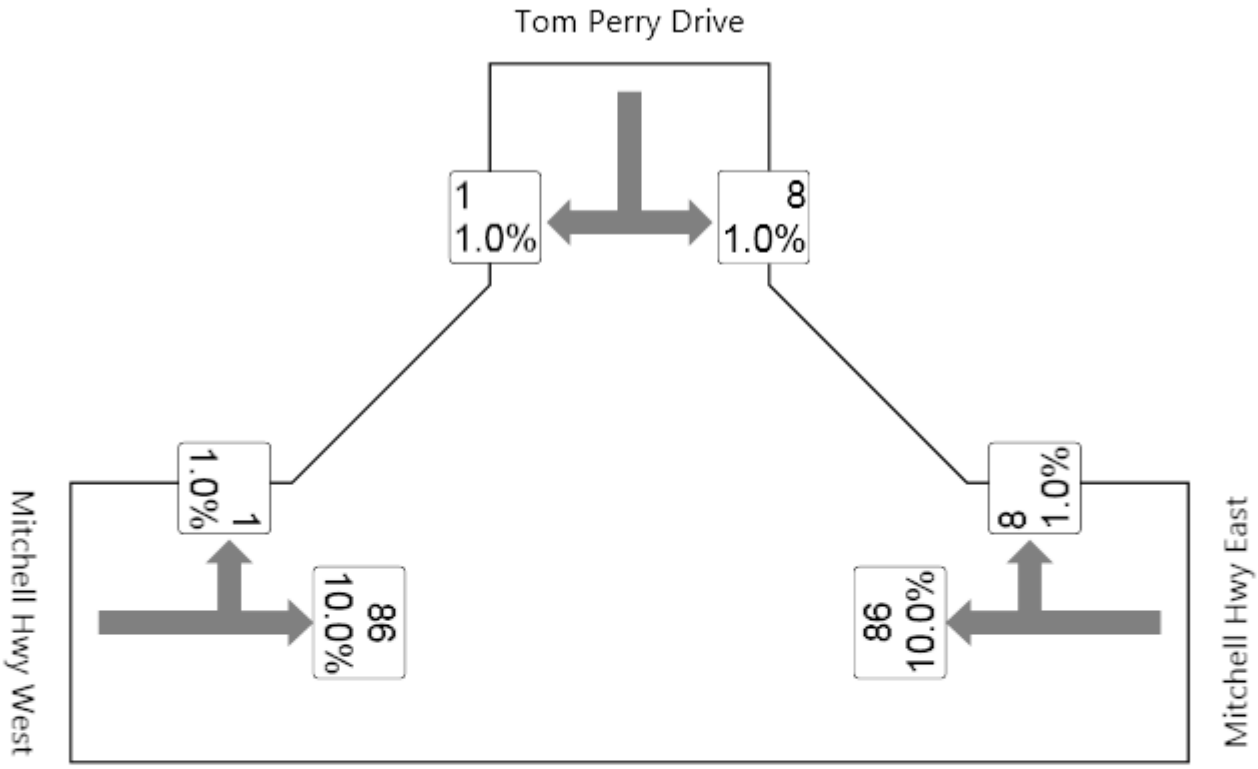
Profile:

Filter time: **13:58 Wednesday, 19 October 2011 => 13:05 Wednesday, 2 November 2011**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 200 km/h.
Direction: East, West (bound)
Separation: All - (Headway)
Scheme: Vehicle classification (AustRoads94)
Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile: Vehicles = 23757 / 23770 (99.95%)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	5.5	3.0	6.5	5.0	7.0	7.5	15.0	5.4	7.1
0100-0200	6.0	9.0	7.0	6.5	8.0	6.5	9.0	7.3	7.4
0200-0300	6.5	6.0	4.0	7.5	7.5	9.0	6.0	6.3	6.6
0300-0400	2.5	10.5	5.0	7.0	8.5	9.5	6.5	6.7	7.1
0400-0500	10.5	10.5	15.0	13.0	11.0	8.5	5.5	12.0	10.6
0500-0600	26.5	24.0	19.5	27.5	16.5	15.5	7.0	22.8	19.5
0600-0700	69.5	70.0	67.5	59.5	52.5	35.5	18.5	63.8	53.3
0700-0800	120.0	103.0	114.5	99.0	91.0	54.0	29.5	105.5	87.3
0800-0900	**142.5<**	**138.0<**	133.0	**145.5<**	150.5	88.5	57.5	141.9	122.2
0900-1000	138.0	136.5	**147.0<**	145.0	151.0	124.0	85.0	**143.5<**	**132.4<**
1000-1100	137.0	122.5	122.5	130.5	**158.5<**	**128.5<**	86.5	134.2	126.6
1100-1200	111.5	110.5	107.0	107.5	152.0	122.5	**113.0<**	117.7	117.7
1200-1300	130.0	119.5	104.5	115.5	125.5	**109.0<**	110.5	119.0	116.4
1300-1400	121.0	106.5	48.7	134.5	112.5	100.5	105.5	99.5	100.5
1400-1500	122.0	125.0	139.5	139.0	162.5	106.0	**122.0<**	137.6	130.9
1500-1600	**151.5<**	**135.5<**	**165.5<**	167.5	172.5	107.0	107.0	**158.5<**	**143.8<**
1600-1700	124.5	125.0	165.0	**167.5<**	**172.5<**	90.5	112.0	150.9	136.7
1700-1800	121.0	131.0	136.0	144.0	150.5	90.5	96.5	136.5	124.2
1800-1900	78.0	81.5	90.0	88.5	122.0	59.0	77.5	92.0	85.2
1900-2000	53.5	45.0	64.5	55.0	69.0	47.5	49.5	57.4	54.9
2000-2100	37.0	31.5	43.0	41.0	55.5	31.0	39.0	41.6	39.7
2100-2200	26.0	27.0	34.5	37.5	43.5	28.5	31.5	33.7	32.6
2200-2300	13.0	15.0	18.0	19.5	17.0	17.5	18.0	16.5	16.9
2300-2400	8.0	7.5	7.0	11.5	14.5	16.5	7.5	9.7	10.4
Totals									
0700-1900	1497.0	1434.5	1473.2	1584.0	1721.0	1180.0	1102.5	1536.8	1423.8
0600-2200	1683.0	1608.0	1682.7	1777.0	1941.5	1322.5	1241.0	1733.3	1604.3
0600-0000	1704.0	1630.5	1707.7	1808.0	1973.0	1356.5	1266.5	1759.5	1631.5
0000-0000	1761.5	1693.5	1764.7	1874.5	2031.5	1413.0	1315.5	1820.0	1689.8
AM Peak	0800	0800	0900	0800	1000	1000	1100		
	142.5	138.0	147.0	145.5	158.5	128.5	113.0		
PM Peak	1500	1500	1500	1600	1600	1200	1400		
	151.5	135.5	165.5	167.5	172.5	109.0	122.0		

Appendix B

SIDRA MODELLING RESULTS

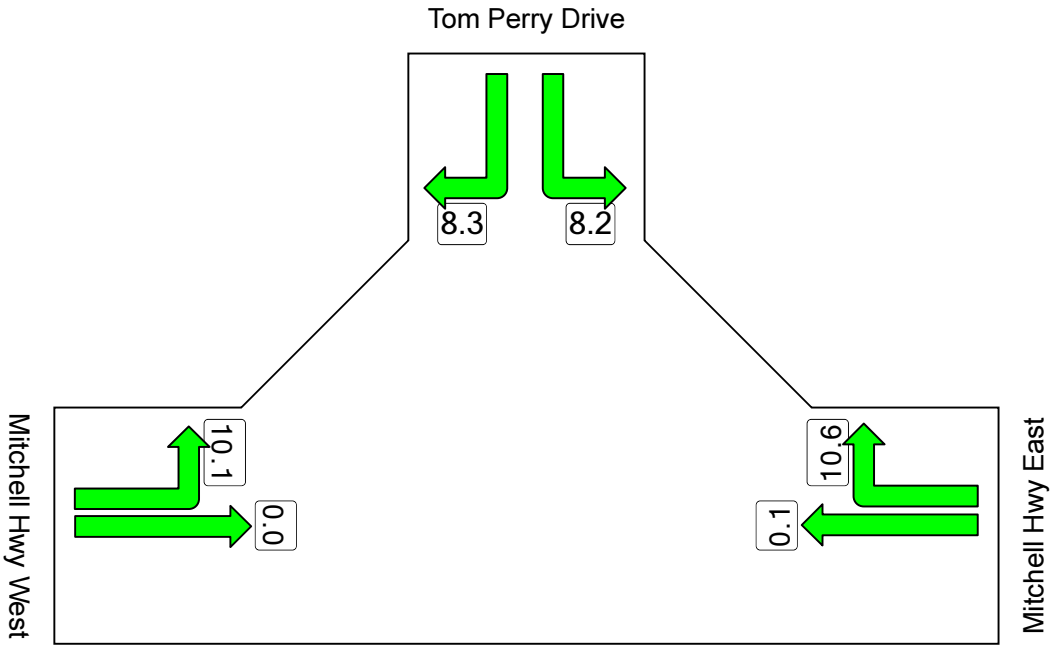

Tom Perry Drive
1
1.0%
8
1.0%
1
1.0%
8
1.0%
86
10.0%
86
10.0%
Mitchell Hwy West
Mitchell Hwy East

DELAY (AVERAGE)

Site: Pre-Development

Average control delay per vehicle, or average pedestrian delay (seconds)

Tom Perry Drive Intersectiion
Giveway / Yield (Two-Way)



Colour code based on Level of Service

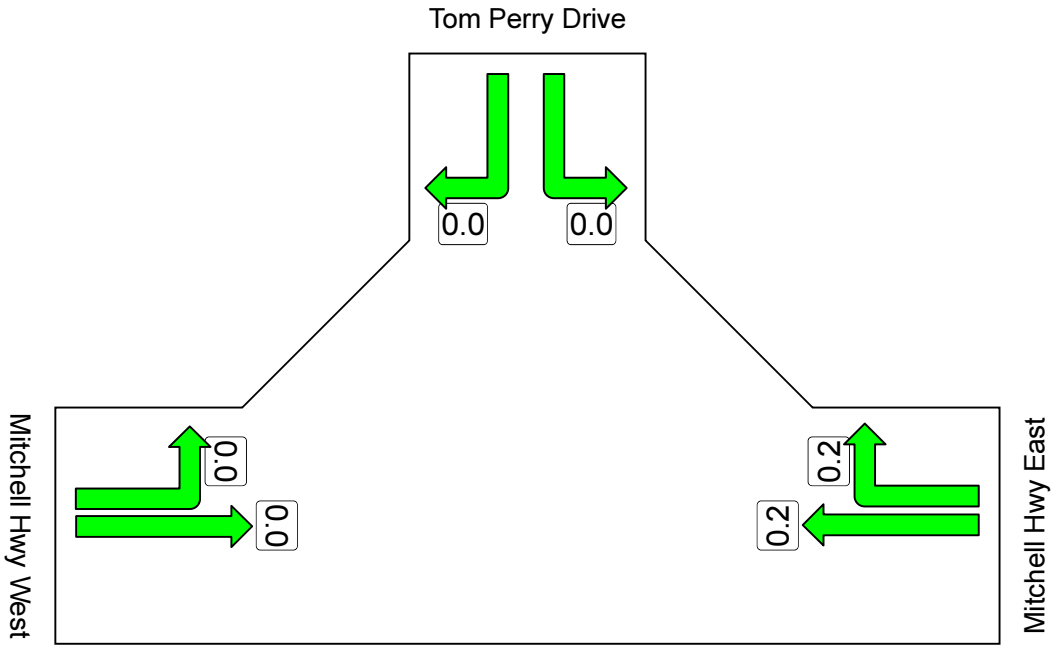
LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method used in this display: Delay (RTA NSW)

QUEUE

Largest 95% Back of Queue for any lane used by movement (vehicles)

Tom Perry Drive Intersectiion
Giveway / Yield (Two-Way)



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0] Continuous

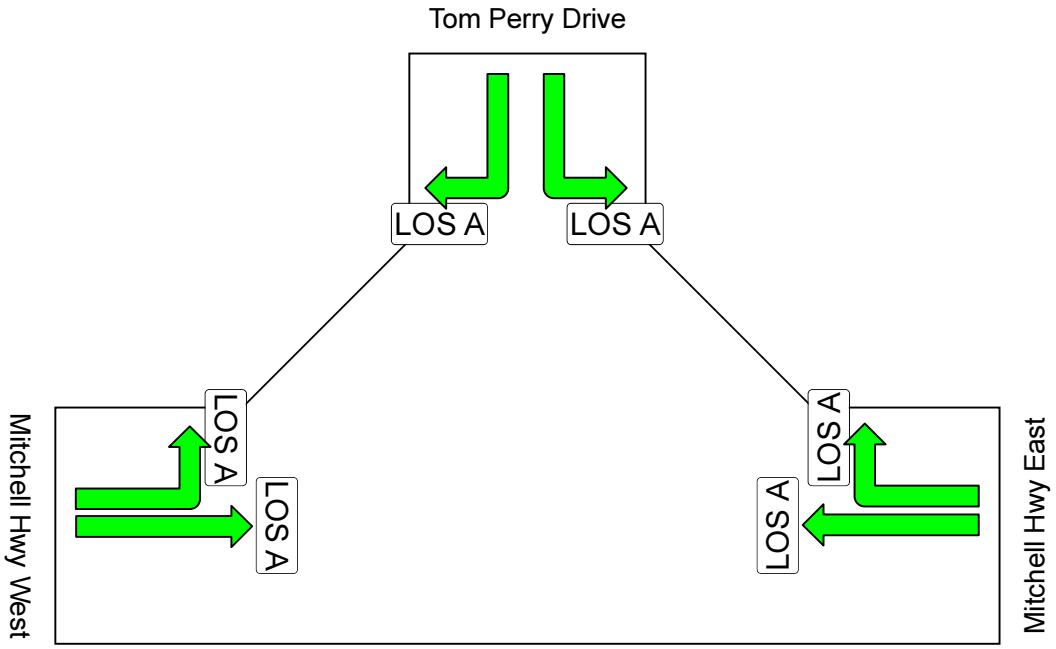
SIDRA INTERSECTION

LEVEL OF SERVICE

Level of Service Method: Delay (RTA NSW)

Site: Pre-Development

Tom Perry Drive Intersectiion
Giveway / Yield (Two-Way)



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

SIDRA INTERSECTION

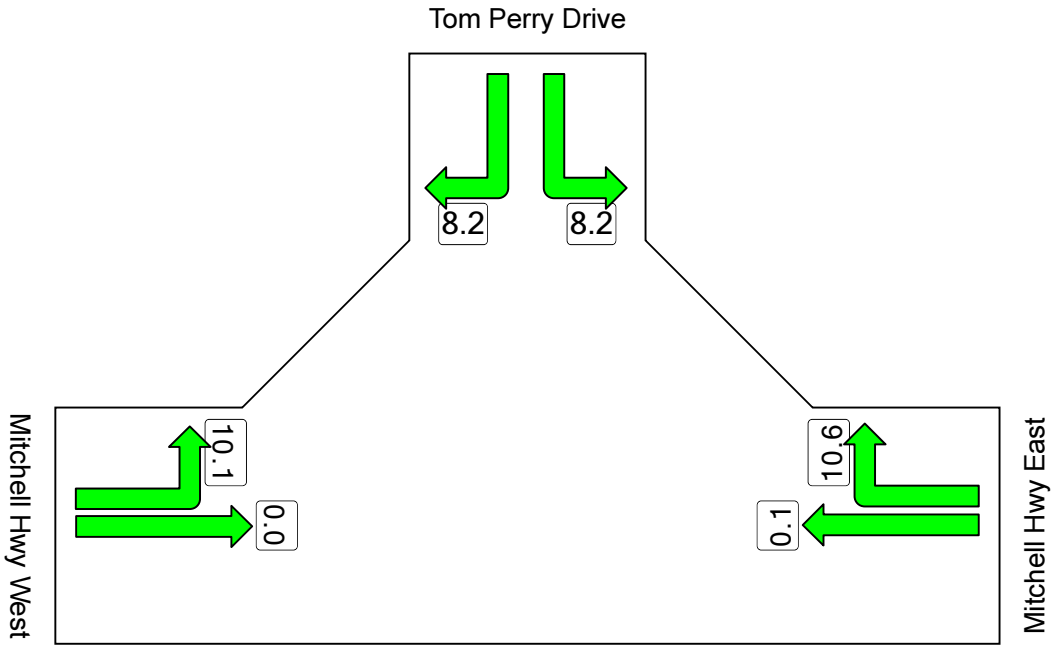
Tom Perry Drive
1
1.0%
20
1.0%
1
1.0%
86
10.0%
86
10.0%
20
1.0%
Mitchell Hwy West
Mitchell Hwy East

DELAY (AVERAGE)

Site: Post-Development

Average control delay per vehicle, or average pedestrian delay (seconds)

Tom Perry Drive Intersectiion
Giveway / Yield (Two-Way)



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

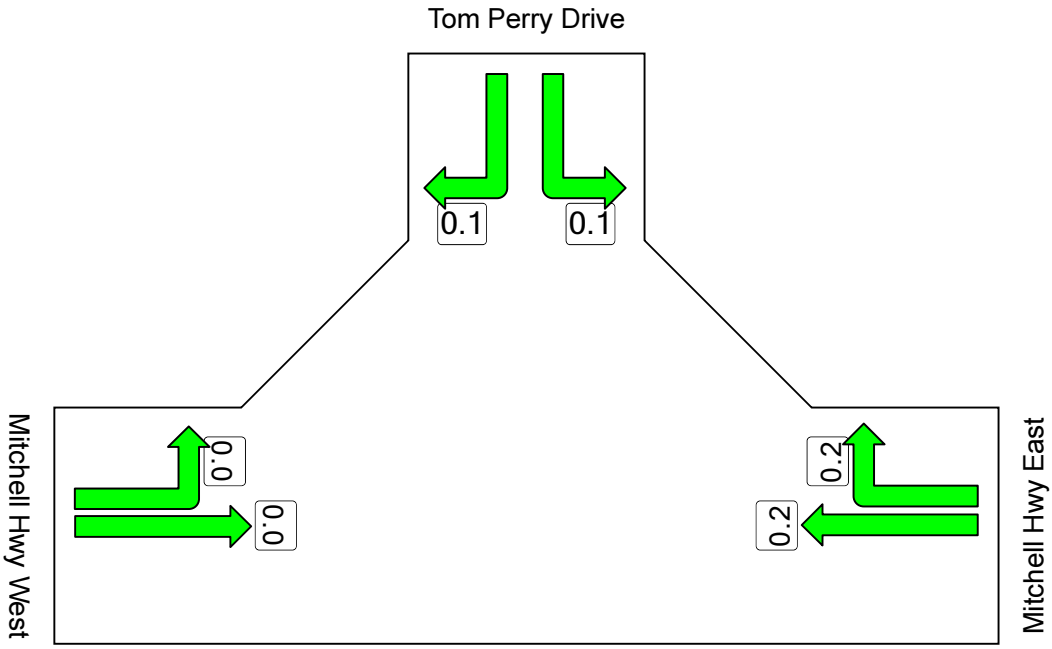
Level of Service Method used in this display: Delay (RTA NSW)

SIDRA INTERSECTION

QUEUE

Largest 95% Back of Queue for any lane used by movement (vehicles)

Tom Perry Drive Intersectiion
Giveway / Yield (Two-Way)



Colour code based on Queue Storage Ratio

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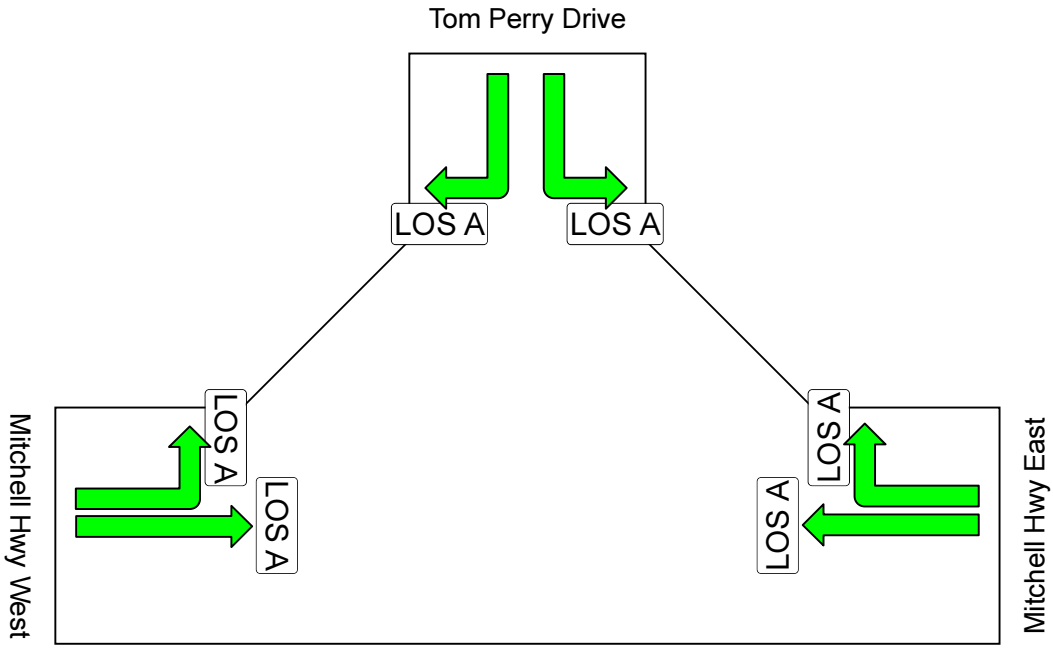
SIDRA INTERSECTION

LEVEL OF SERVICE

Level of Service Method: Delay (RTA NSW)

Site: Post-Development

Tom Perry Drive Intersectiion
Giveway / Yield (Two-Way)



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

SIDRA INTERSECTION