

Transport Engineering

REF: N142021

DATE: 12 July 2019

Zhiva Living Dural Pty Ltd
C/- Planning Ingenuity
Suite 210, 531-533 Kingsway
MIRANDA NSW 2228

Attention: Mr David Waghorn (Principal Planner)

Dear David

RE: 3 QUARRY ROAD, DURAL - TRANSPORT IMPACT ASSESSMENT ADDENDUM

Background

GTA Consultants (GTA) previously completed a Transport Impact Assessment (TIA), reference N142020 dated 14 June 2018, for a proposed retirement village located on land at 3 Quarry Road, Dural. Following submission of a Development Application to Hornsby Shire Council and a subsequent deemed refusal, an appeal was lodged with the NSW Land and Environment Court (LEC). This ultimately resulted in a Court hearing in May 2019, with a revised development proposal submitted in March 2019 prior to the hearing, addressing a range of concerns raised by Council, referral agencies and the community. It is noted that the scale of the development has reduced since the original 2018 development application, with just under a 40 per cent reduction in independent living units. Accordingly, the AM and PM peak traffic generation has reduced from 48 and 77 vehicles to 32 and 42 vehicles respectively.

GTA prepared a revised TIA, reference N142021 dated 4 March 2019, to assess the traffic and transport related implications of the revised proposal. A traffic joint expert report dated 11 April 2019 was prepared between Brett Maynard representing the Applicant and Ken Hollyoak representing Hornsby Shire Council to address (and resolve where possible) a range of traffic-related matters and inform the Court hearing.

It is understood that there is currently an undetermined Site Compatibility Certificate (SCC) lodged with the Department of Planning and Environment, which is to be amended to reflect the scheme that was before the LEC in the above appeal, given that this scheme resolved a range of planning and technical issues.

This letter has been prepared as an addendum to the revised TIA (GTA Consultants, March 2019) to summarise the agreed traffic and transport outcomes of joint reporting and LEC proceedings, as well as provide the latest supporting traffic analysis and assessment for the proposed development. The additional information available to support the revised TIA (GTA Consultants, March 2019, included as Attachment 1), is as follows:

- Revised SIDRA intersection modelling following peer review (Attachment 2)
- Roads and Maritime Services response letter dated 30 March 2019 (Attachment 3)
- Indicative Vineys Road passing bay layout (Attachment 4)
- Bus stop access assessment to demonstrate compliance with SEPP Seniors (2004) requirements (Attachment 5)

Updates to Transport Impact Assessment (reference N142021 dated 04/03/19)

SIDRA Intersection Modelling

The SIDRA modelling prepared for the revised TIA (GTA Consultants, March 2019) has been reviewed, with updates made to intersection separation, intersection offsets, AM cruise speed due to the school zone, as well as other minor changes. It is noted that the layout of the potential future traffic signals at the Old Northern Road/ New Line Road intersection is intentionally consistent with the South Dural TMAP. It was agreed by both experts during joint reporting that the SIDRA models were acceptable for assessing the impacts of the proposed development. The updated intersection modelling results are included in Attachment 2.

Any minor differences in these results, compared with that presented in the TIA, do not impact the conclusions of the TIA.

Operation of Surrounding Intersections

As part of the transport assessment, the following intersections were analysed in SIDRA modelling software pre and post development:

- Old Northern Road/ New Line Road
- Old Northern Road/ Quarry Road
- Old Northern Road/ Vineys Road.

In summary, the additional traffic from the proposed development is expected to result in an increase of up to two seconds average delay for the overall intersections of Old Northern Road with Quarry Road and New Line Road. This is within the tolerance of the traffic analysis, noting that the SIDRA modelling accuracy for a 10 year design horizon is unlikely to be within 2 seconds of actual delays.

As the existing Old Northern Road/ New Line Road roundabout is operating close to capacity in 2021, delays are increasing exponentially (and disproportionately) with additional traffic. In such a situation, it is important to consider the magnitude of additional traffic, which in this case is low (total AM peak traffic generation 32 vehicles and PM peak traffic generation 42 vehicles). The south and west approach AM peak demand flows at the Old Northern Road/ New Line Road roundabout each increase by 7 vehicles.

As Old Northern Road is a State Road, the revised TIA (GTA Consultants, March 2019) and associated SIDRA modelling files were provided to Roads and Maritime Services for their review and comment on 18 March 2019. The Roads and Maritime Services response letter dated 30 March 2019, included as Attachment 2 notes that "the proposal will not have significant traffic generation during the peak period", with Roads and Maritime having no further comments on the amended development proposal.

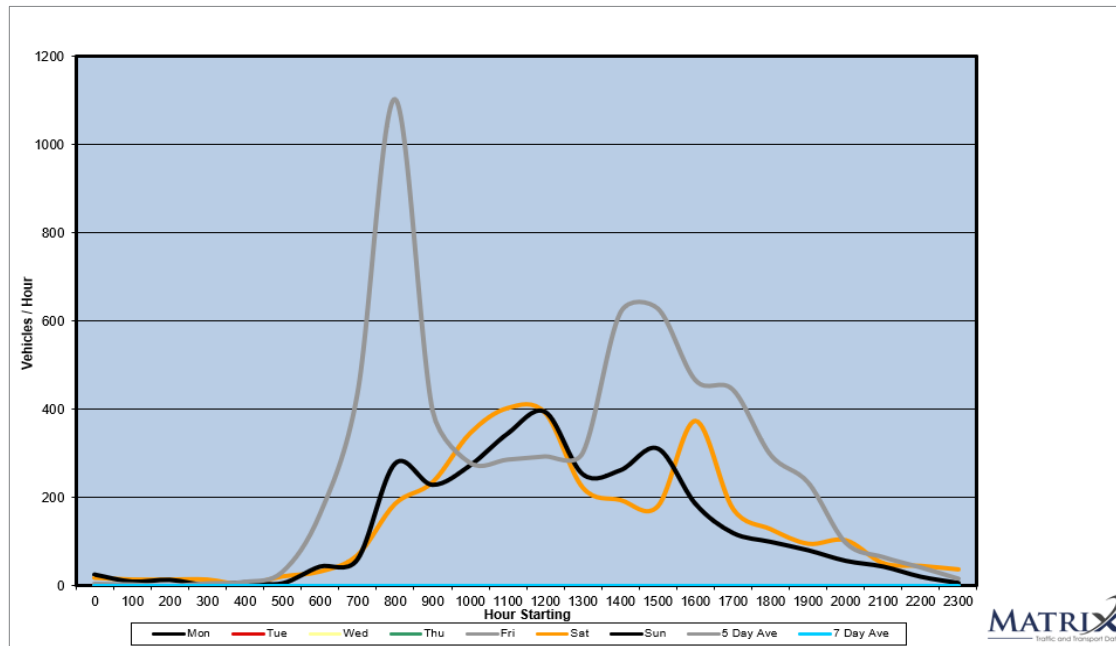
From a local traffic perspective, further assessment of existing traffic conditions on Quarry Road during the PM school peak during joint reporting identified that significant traffic queuing occurs for a short period (15-20 minutes). During this time, traffic queues can extend past the proposed site driveway location. It is expected that queued traffic would 'let in' right turning vehicles exiting the proposed development, noting this is an existing condition for other right-turn property egress movements. Vehicles exiting the proposed development during the PM school peak hour would also have the option of turning left and using Harris Road to join the back of the traffic queue or re-time their trip to avoid this brief period of congestion.

Traffic Impact of the Proposed Development during Weekend Peak Period

There were previously issues raised by Council and the community relating to the original TIA not assessing traffic conditions during the Saturday peak period, primarily associated with local sporting activities. Tube counts were completed along Quarry Road between Sunday 24 March 2019 and Saturday 30 March 2019. The results indicate that traffic volumes along Quarry Road on the weekend peaked at around 400 vehicles (two-way), while traffic volumes peaked around 1,130 and 690 in the weekday AM and PM peak hours respectively. Traffic volumes on Old Northern Road would also be lower on the weekend. The average weekday traffic volumes along Quarry Road in comparison to the Saturday and Sunday traffic volumes is shown in Figure 1. It was agreed by both experts during joint reporting that

traffic surveys have shown that the queuing on Quarry Road on a Saturday is not a significant issue. As such, the AM and PM peak hours are considered to be the critical peak hours for analysis, consistent with the detailed traffic modelling prepared for the revised TIA (GTA Consultants, March 2019).

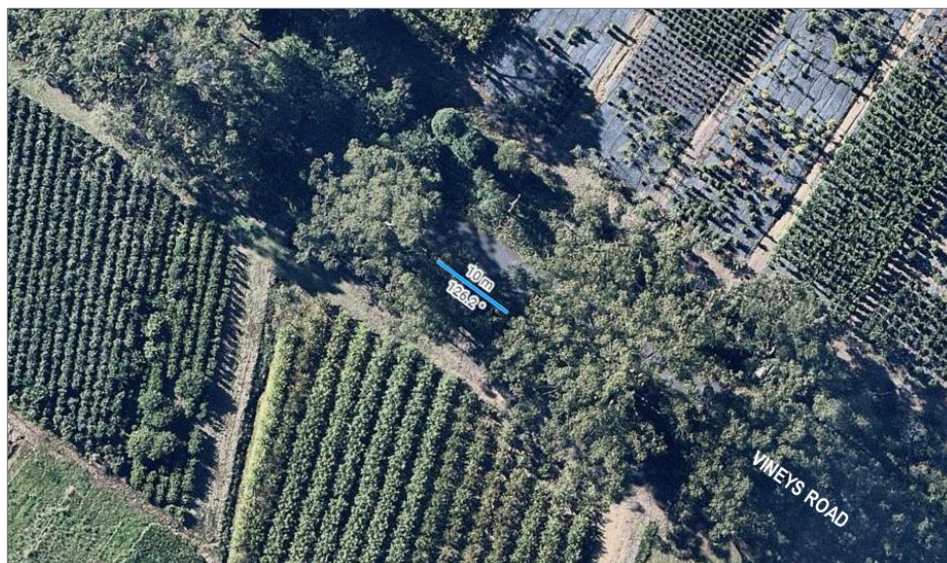
Figure 1: Quarry Road traffic volumes (two-way)



Two-way Traffic Operation on Vineys Road

The width of Vineys Road south of Vineys Lane is currently constrained in that vehicles are required to slow and move close to the edge of the carriageway (or partially onto the verge) to allow opposing vehicles to pass. There is currently adequate space for vehicles to pull over slightly on the southern side for the majority of the length of road between the site and Vineys Lane, with the exception of near the culvert located underneath the road. It was agreed by both experts during joint reporting that a single passing bay located centrally within this section of Vineys Road would improve the existing situation and mitigate any increased likelihood of vehicle conflicts. The potential passing bay location is shown in Figure 2, with the indicative Vineys Road passing bay layout as discussed during Court proceedings included in Attachment 4.

Figure 2: Potential Vineys Road passing bay



Base image source: Nearmap dated 7 April 2019

Access to Public Transport

Pedestrian access to/from the site is proposed via Quarry Road, with a new pedestrian refuge proposed to connect to the existing southern footpath (with appropriate tie-in works to facilitate a continuous footpath). The revised TIA (GTA Consultants, March 2019) indicates that the bus stops are located 348 and 380 metres walking distance from the site access, which is less than the 400-metre SEPP Seniors (2004) requirement. A concrete footpath is available on the southern side of Quarry Road, with direct access to the southbound Old Northern Road bus stop, and a signalised pedestrian crossing of Old Northern Road available to access the northbound bus stop. The grades along Quarry Road and Old Northern Road generally range between 1.3 and 3.2 per cent, which is well below the maximum general gradient of 1:14 (7.1 per cent).

To further confirm appropriate access to public transport, Marchese Partners prepared a plan that summarises the gradient on Quarry Road and Old Northern Road between the site and bus stop at regular intervals (see Attachment 5). This plan confirms that the route is significantly flatter than the maximum allowable grades in SEPP Seniors.

Conclusion

Based on the analysis and discussions presented above, the following conclusions are made:

- as part of the Land and Environment Court hearing in May 2019, the traffic experts generally agreed that the proposed development would only have a minor impact on existing and future traffic conditions, with a range of potential and perceived issues resolved during the course of Court proceedings
- the traffic experts agreed that the proposed development fully complies with the SEPP Seniors (2004) requirements for public transport accessibility, specifically noting that bus services to several key destinations are available on Old Northern Road within 400 metres walk at a negligible gradient
- intersection impacts are considered negligible and not warranting any specific mitigation works
- local traffic issues on Quarry Road and Vineys Road have been addressed appropriately, with the proposed works satisfactorily addressing vehicle and pedestrian movement.

I trust the above provides the necessary information for the SCC. Should you have any questions or require any further information, please do not hesitate to contact me on (02) 8448 1800.

Yours sincerely

GTA CONSULTANTS



Brett Maynard
Director

encl.

Attachment 1 – Revised Transport Impact Assessment

Attachment 2 – Updated SIDRA Intersection Modelling results

Attachment 3 – Roads and Maritime correspondence (dated 18/03/19)

Attachment 4 – Indicative Vineys Road passing bay layout

Attachment 5 – Bus stop access assessment

ATTACHMENT 1

Revised Transport Impact Assessment



3 Quarry Road, Dural Retirement Village Transport Impact Assessment

Client // Zhiva Living Dural Pty Ltd
Office // NSW
Reference // N142021
Date // 04/03/19

3 Quarry Road, Dural

Retirement Village

Transport Impact Assessment

Issue: A 04/03/19

Client: Zhiva Living Dural Pty Ltd

Reference: N142021

GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	04/03/19	Final	Mackenzie Brinums	Brett Maynard	Brett Maynard	

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1. Introduction

1.1 Background

A Development Application (DA) was previously lodged in 2018 with Hornsby Shire Council (Council) for the proposed development on land located at 3 Quarry Road, Dural. The DA was refused by Council and is the subject of a Land and Environment Court appeal. The proposed scheme has been amended, with the new scheme comprising a retirement village with 91 independent living units (ILUs) and a 74-room residential aged care facility (RACF), along with ancillary site facilities including a restaurant, library, cinema and gardens.

Zhiva Living Dural Pty Ltd engaged GTA Consultants (GTA) to update the transport impact assessment for the proposed development based on the new scheme and Council's Statement of Facts and Contentions.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- i Existing traffic and parking conditions surrounding the site
- ii Suitability of the proposed parking in terms of supply (quantum) and layout
- iii Service vehicle requirements
- iv Pedestrian and bicycle requirements
- v The traffic generating characteristics of the proposed development
- vi Suitability of the proposed access arrangements for the site
- vii The transport impact of the development proposal on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- o An inspection of the site and its surrounds on 20 February 2018 and 7 February 2019
- o Hornsby Development Control Plan (DCP) 2013
- o Hornsby Local Environmental Plan (LEP) 2013
- o South Dural Development Transport Management and Access Plan (TMAP) 2016 dated WSP - Parsons Brinckerhoff Australia/ New Zealand (WSP - PB)
- o Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- o Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- o Australian Standard/ New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- o Traffic survey undertaken by Data Audit on Tuesday 20 February 2018 as referenced in the context of this report
- o Plans for the proposed development prepared by Marchese + Partners International, dated 4 March 2019
- o Sydney's Bus Future, Transport for NSW, dated December 2013
- o Other documents and data as referenced in this report.

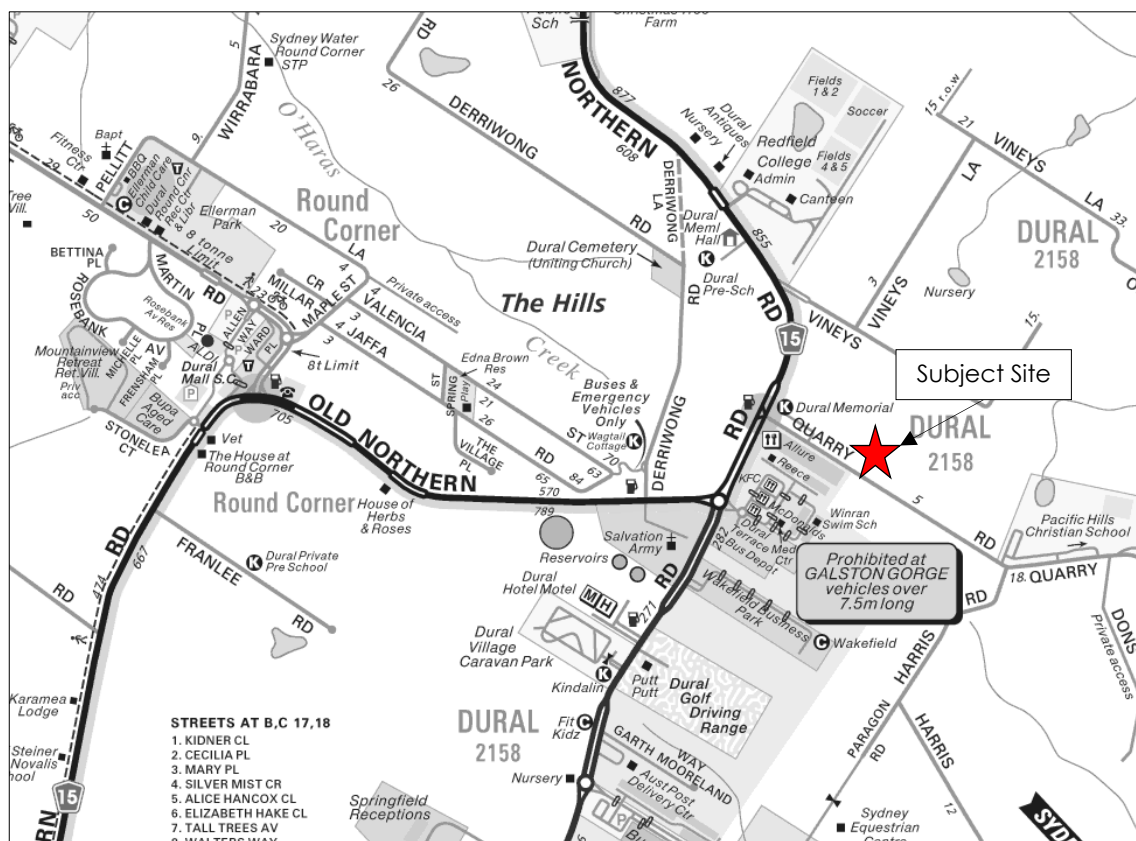
2. Existing Conditions

The subject site is located at 3 Quarry Road, Dural. The site of around 29,700 square metres has a frontage of about 80 metres to both Quarry Road along the south-western boundary and Vineys Road along its north-eastern boundary. According to the Hornsby LEP 2013, the site currently has a land use classification as RU2 (Rural Landscape) and is predominantly vacant, with the exception of a single residential dwelling located on each road frontage (Quarry Road and Vineys Road).

The surrounding properties predominantly consist of agricultural or vacant land north, west and southeast of the site, as well as residential developments east and southwest of the site. Dural Business Park is also located west of the site. In addition, New Hope School and Pacific Hills Christian School are located to the east, while Redfield College is located to the north.

The location of the subject site and its surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject site and its environs



Source: Sydway Publishing Pty Ltd

2.1 Road Network

2.1.1 Adjoining Roads

Old Northern Road

Old Northern Road is classified as a Roads and Maritime Services (Roads and Maritime) State Road and is aligned in a north-south direction near the site. It is a two-way road, generally configured

with two lanes in each direction, set within a 13-metre wide (approximate) carriageway and a 22-metre-wide road reserve.

Old Northern Road, shown in Figure 2.2 and Figure 2.3, has a posted speed limit of 60 kilometres per hour. Kerbside parking is not permitted on either side of the road.

Figure 2.2: Old Northern Road (looking north)



Figure 2.3: Old Northern Road (looking south)



Quarry Road

Quarry Road is classified as a Local Road and is aligned in an east-west direction. It is a two-way road, generally configured with one lane in each direction, set within an eight-metre wide carriageway and 20-metre wide road reserve (approximate).

Unrestricted kerbside parking is permitted on both sides of the road along the site frontage. Closer towards Old Northern Road, kerbside parking is only permitted on the southern side of the road and only outside the hours of 8am to 9:30am and 2:30pm to 4pm Monday to Friday.

Quarry Road is shown in Figure 2.4 and Figure 2.5.

Figure 2.4: Quarry Road (looking northwest)



Figure 2.5: Quarry Road (looking southeast)



Vineys Road

Vineys Road is classified as a Local Road and near the site, is aligned in an east-west direction. It is a two-way road, configured with one lane in each direction. Near Old Northern Road, Vineys Road has an approximately six-metre wide carriageway, which reduces to approximately five metres wide along the frontage of the site.

Parking is unrestricted, with on-site observations indicating that local residents generally park vehicles on the grassed verge. Vineys Road is shown in Figure 2.6 and Figure 2.7.

Figure 2.6: Vineys Road (looking northwest)



Figure 2.7: Vineys Road (looking southeast)



New Line Road

New Line Road is classified as a Roads and Maritime State Road and near the site, is aligned in a north-south direction. It is a two-way road, configured with one lane in each direction set within about a seven-metre wide carriageway and a 22-metre wide road reserve.

New Line Road, shown in Figure 2.8 and Figure 2.9, has a posted speed limit of 60 kilometres per hour. Kerbside parking is permitted in designated zones along the western side of the road, south of the intersection with Old Northern Road, along the western side of the road.

Figure 2.8: New Line Road (looking north)



Figure 2.9: New Line Road (looking south)



2.1.2 Surrounding Intersections

The following key intersections exist near the site:

- Old Northern Road/ New Line Road (roundabout)
- Old Northern Road/ Quarry Road (signalised)
- Old Northern Road/ Vineys Road (unsignalised).

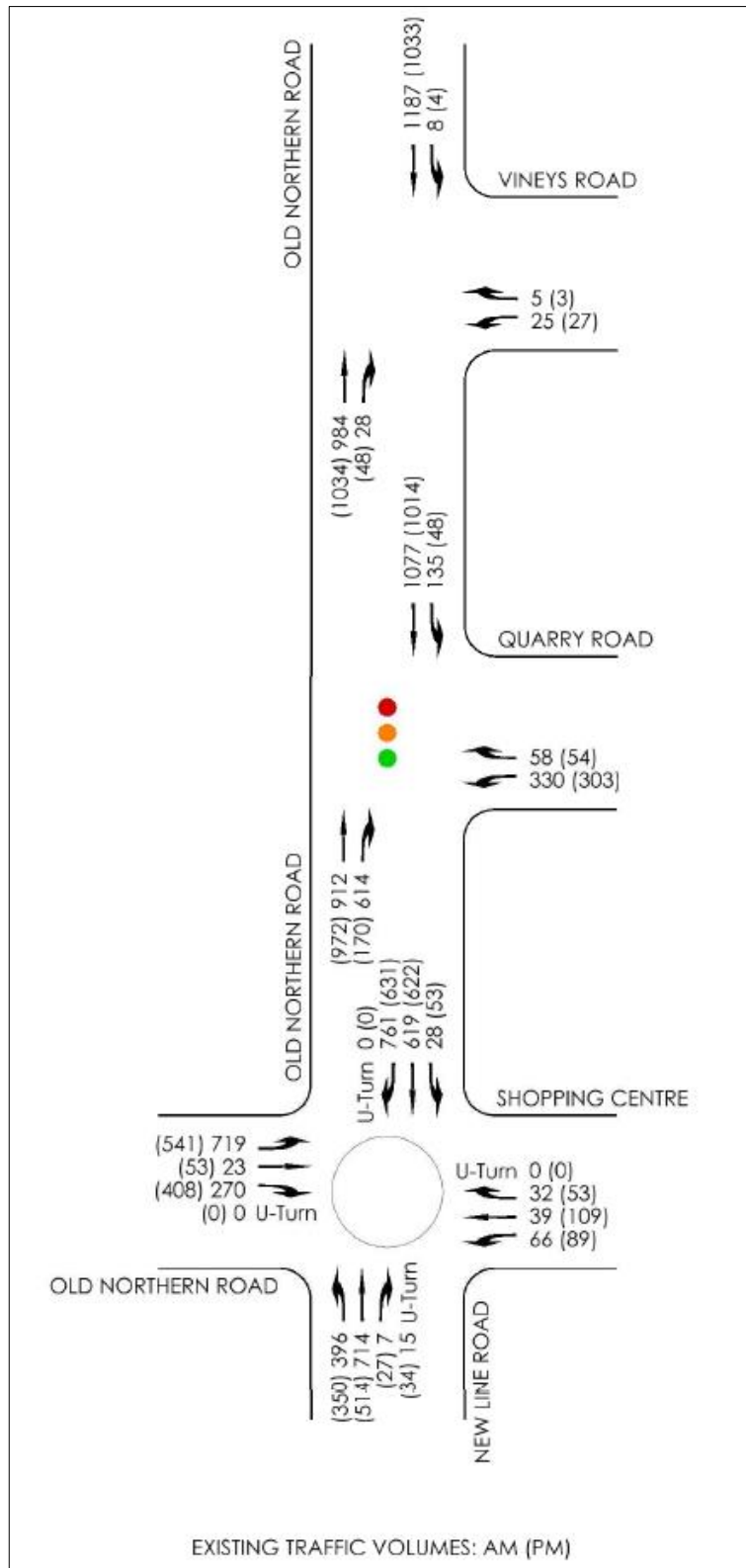
2.2 Traffic Volumes

GTA commissioned turning movement surveys on the key intersections specified in Section 2.1.2 on Tuesday 20 February 2018 during the following peak periods:

- AM peak: 7am and 9am
- PM peak: 4pm and 6pm.

The AM and PM peak hour traffic volumes are summarised in Figure 2.10, with full results contained in Appendix A.

Figure 2.10: Existing AM and PM peak hour traffic volumes



2.3 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA Intersection¹, version 7.0, a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by Roads and Maritime, is vehicle delay. SIDRA Intersection determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shows the criteria that SIDRA Intersection adopts in assessing the level of service. A level of service of D or better is generally considered to indicate acceptable operating conditions.

Table 2.1: SIDRA Intersection level of service criteria

Level of service	Average delay per vehicle (secs/veh)	Traffic signals and roundabout	Give way and stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Given the close proximity between the assessed intersections, the intersections have been modelled in SIDRA network. SIDRA models have been calibrated based on queue lengths, relative delays and signal cycle times observed on-site during the AM and PM peak hours on 20 February 2018.

Table 2.2 presents a summary of the existing operation of the key intersections, with full results presented in Appendix B of this report. For signalised intersections the level of service is based on the average delay for the whole intersection, whereas the level of service for unsignalised intersections is based on the worst approach.

¹ Program used under license from Akcelik & Associates Pty Ltd.

Table 2.2: Existing 2018 operating conditions

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	0.90	50	145	D
		East	0.16	14	10	A
		North	0.81	16	77	B
		West	0.96	28	155	B
	PM	South	0.70	27	52	B
		East	0.36	15	17	B
		North	0.91	26	128	B
		West	0.63	18	36	B
Old Northern Road/ Quarry Road	AM	South	0.91	26	191	B
		East	0.38	31	95	C
		North	0.85	43	285	D
		Overall	0.91	33	285	C
	PM	South	0.36	13	75	A
		East	0.53	43	111	D
		North	0.54	20	162	B
		Overall	0.54	20	162	B
Old Northern Road/ Vineys Road	AM	South	0.14	24	3	B
		Southeast	0.12	70	2	E
		North	0.67	5	0	A
	PM	South	0.27	30	10	C
		East	0.05	46	1	D
		North	0.57	5	0	A

Table 2.2 indicates that queuing forms largely on New Line Road and Old Northern Road. On-site observations confirm that queues for the right turn from Old Northern Road into Quarry Road extend into the New Line Road/ Old Northern Road intersection. Notwithstanding this, the Old Northern Road/ Quarry Road intersection operates with a satisfactory overall level of service of C or better during the peak hours.

The Old Northern Road/ Vineys Road intersection is the only surveyed intersection near the site that is operating at an unsatisfactory level of service of E, during the AM peak hour. Modelling results and on-site observations show that vehicles turning right out of Vineys Road experience high delays due to the heavy through movements along Old Northern Road. This results in vehicles turning right out of Vineys Road having insufficient gaps in through traffic to turn into Old Northern Road.

2.4 South Dural Development TMAP (WSP - PB, September 2016)

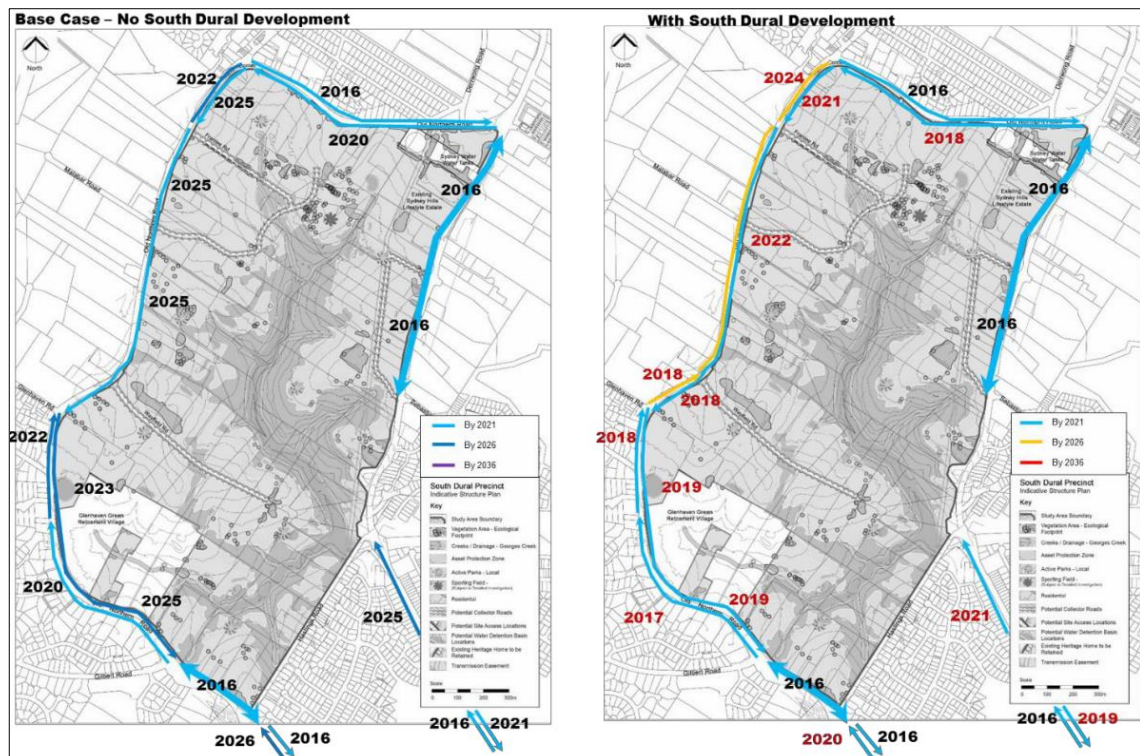
WSP Parsons Brinckerhoff (WSP) on behalf of Lyon Group Australia prepared a Transport Management Accessibility Plan (TMAP) in September 2016, to assess the traffic and transport impact associated with the proposed South Dural residential development on the surrounding road network.

The proposed development includes 240 hectares of infill with up to 2,900 dwellings, new roads and infrastructure, sporting fields, parks, opportunities for shared pedestrian and cycle paths, both within and external to the site. The proposed development has frontages to Old Northern Road, New Line Road and Hastings Road and will be developed in stages over an approximate 15-year period.

The TMAP identified the infrastructure measures required to manage the additional travel demand resulting from the proposed development, and reviewed opportunities to maximise the use of public transport, walking and cycling to reduce reliance on the private car.

The preliminary analysis for the proposed development was prepared using SIDRA Intersection. The analysis was based on 2016 traffic surveys, future growth estimates from recent assessments and historical growth to forecast year 2031 traffic volumes. The analysis indicated that the some of the surrounding roads would be at or approaching capacity by 2016, with more sections and intersections requiring road upgrades in 2026. The majority of the road network surrounding the South Dural development will require upgrading in one or both directions regardless of whether the development proceeds in 2036. The indicative year that the road links require upgrades is shown in Figure 2.11.

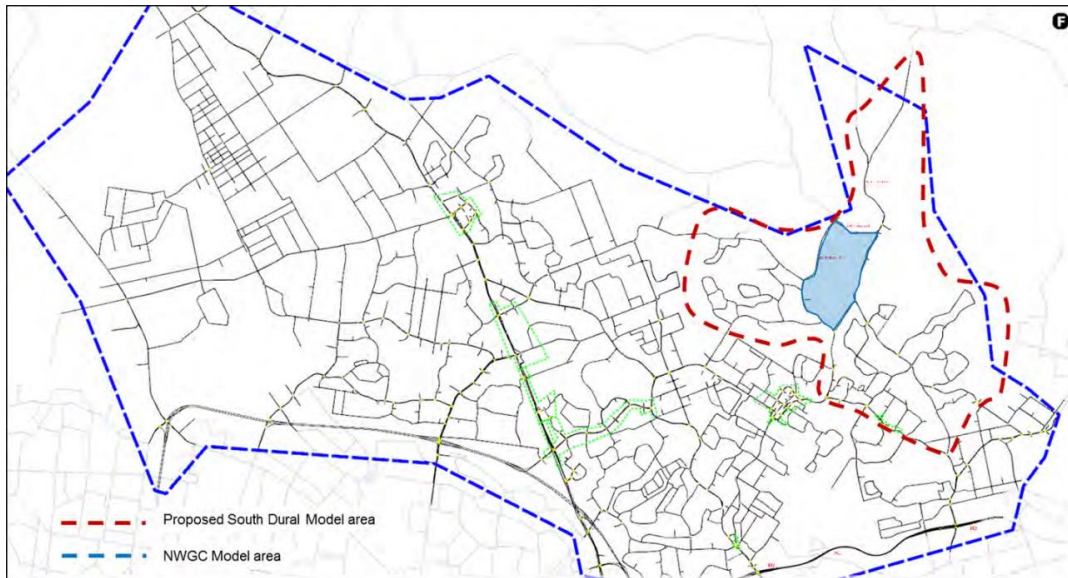
Figure 2.11: Comparison of road upgrades and approximate timings with and without the South Dural development



Source: WSP – South Dural Development TMAP, September 2016

In addition, an Aimsun mesoscopic traffic model was developed for the NorthWest Metro project and adopted for the South Dural Development. As such, the model was calibrated for base year 2014 and future years including 2026 and 2036. The model boundary that covers the area surrounding the South Dural Development is shown in Figure 2.12.

Figure 2.12: Cut of the NorthWest Metro Aimsun model to cover the area surrounding the South Dural Development



Source: WSP – South Dural Development TMAP, September 2016

This model was developed to determine the impact of the proposed development on the surrounding road network. The following annual compound growth rates were adopted for the study:

- Year 2016 to 2021:
 - AM Peak: 1.4 per cent per annum
 - PM Peak: 1.8 per cent per annum.
- Year 2021 to 2036:
 - AM Peak: 1.3 per cent per annum
 - PM Peak: 1.4 per cent per annum.

Road sections relevant for the subjected site that require widening to two lanes in each direction in 2021 are as follows:

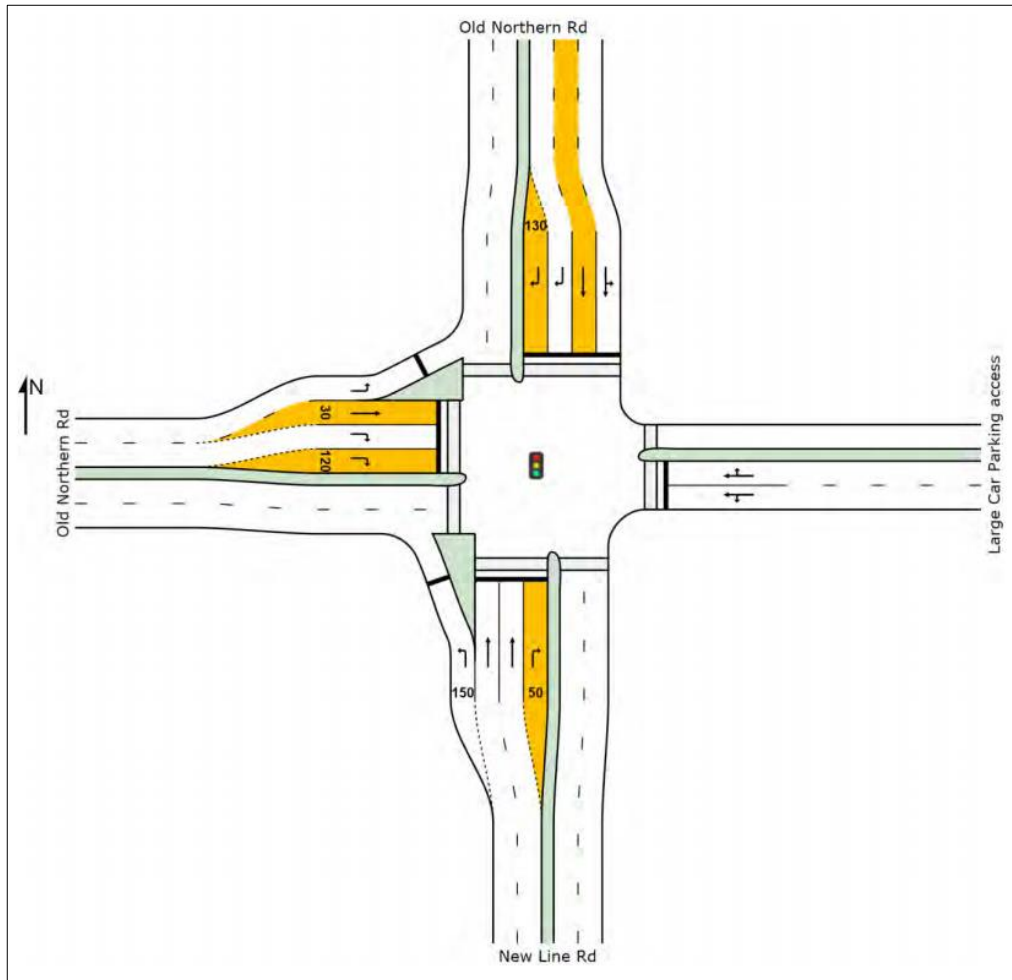
- Old Northern Road between Kenthurst Road and New Line Road
- Road widening to two lanes in each direction: New Line Road between Old Northern Road and Sebastian Drive.

Furthermore, the Old Northern Road/ New Line Road intersection was identified as requiring the following upgrades by 2026:

- Conversion from roundabout to traffic signals
- Additional southbound lane on Old Northern Road from Quarry Road to New Line Road
- Additional 130-metre long right turn bay from Old Northern Road into Old Northern Road
- Additional 120-metre long right turn bay from Old Northern Road into New Long Road
- Additional 30-metre long through lane on Old Northern Road into Dural Business Park access
- Additional 50-metre long right turn lane on New Line Road into Dural Business Park access.

The proposed intersection layout is shown in Figure 2.13.

Figure 2.13: Proposed Old Northern Road/ New Line Road intersection upgrade



Source: WSP – South Dural Development TMAP, September 2016

The TMAP also suggested that cyclist facilities (either as kerbside lanes or a widened shared path) on Old Northern Road and New Line Road, should be incorporated as part of the proposed road widening.

2.5 Car Parking

A review of publicly available car parking near the site is summarised in Table 2.3.

Table 2.3: Summary of publicly available car parking near subject site

Road	Location	Type of parking	Restrictions	Time in effect
Quarry Road (near Old Northern Road)	Both sides	Parallel	Restricted/ Unrestricted	Outside 8am-9:30am and 2:30am-4pm (near Old Northern Road) Unrestricted all other places
Vineys Road	Both sides	Informal parallel	Unrestricted	Unrestricted
Old Northern Road (west of New Line Road)	Both sides	Parallel	Unrestricted	Unrestricted

2.6 Public Transport

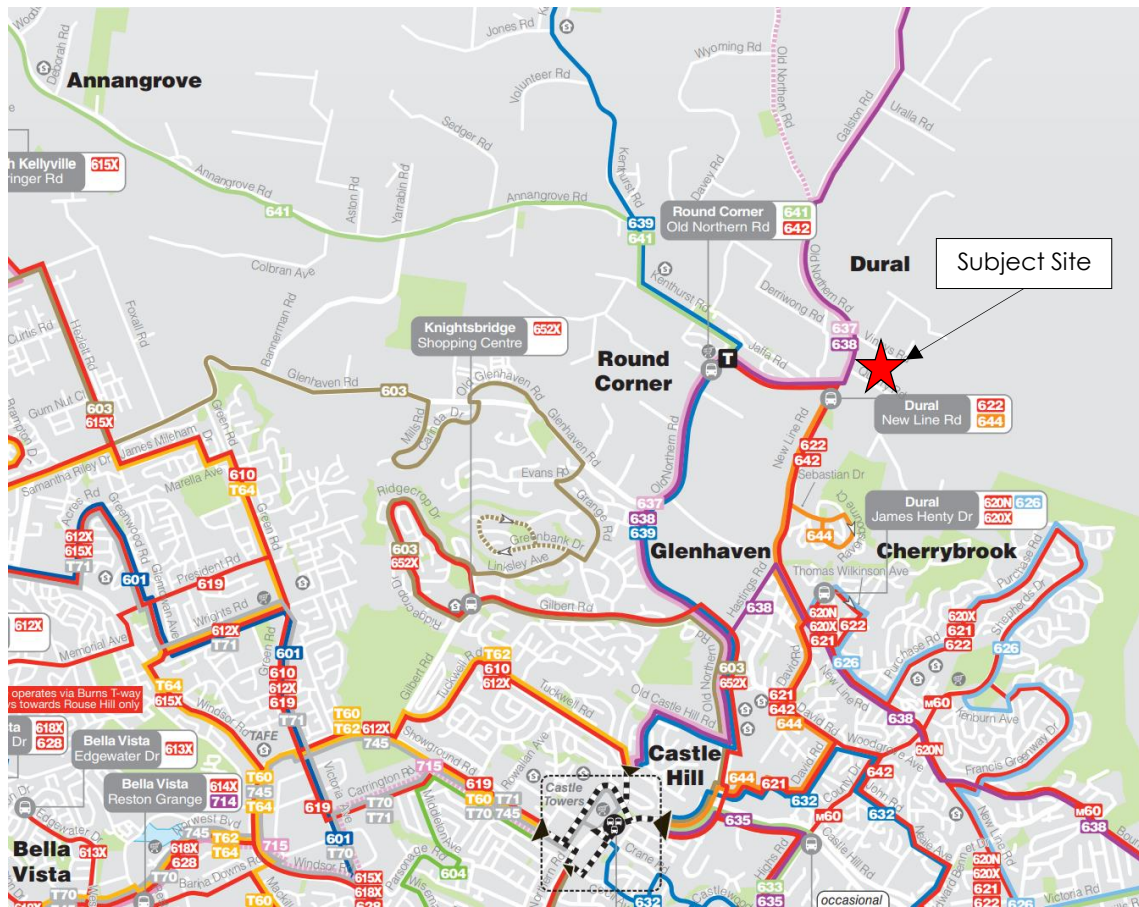
The site has access to public transport services with bus stops located on the Old Northern Road and New Line Road. Key destinations include Sydney CBD, Castle Hill and Pennant Hills. These services connect to major transport nodes such as Pennant Hills Railway Station and public transport corridor's bus stops, services and routes such as Pennant Hills Road, to provide further connections to key Sydney locations such as Parramatta.

A review of the public transport available near the site is summarised in Table 2.4, with the bus network shown in Figure 2.14.

Table 2.4: Public transport provision

Service	Route number	Route description	Location of stop	Distance to nearest stop	Frequency on/ off peak
Bus	637	Glenorie to Castle Hill	Old Northern Road before New Line Road	< 400 metres	30 mins/ 60 mins
	638	Berrilee to Pennant Hills			30 mins (peak direction only)
	644	Dural to Castle Hill	New Line Road at the Hillsbus Dural Depot	520 metres	60 mins/ 60 mins
	620N	Dural to Wynyard			10-20 mins (peak direction only)
	620X				5 mins morning peak/ 30-60 mins (early morning only)
	622	Dural to Milsons Point			20 mins AM peak, 30 mins PM peak (peak direction only)
	642	Round Corner Dural to Wynyard	Old Northern Road near BP Station	760 metres	Irregular
	642X	Round Corner Dural to Wynyard			10 mins/ 60 mins

Figure 2.14: Bus network map



Source: <https://www.cdcbus.com.au>, accessed 22 February 2019

2.7 Walking and Cycling Infrastructure

Pedestrian paths are provided in the following locations:

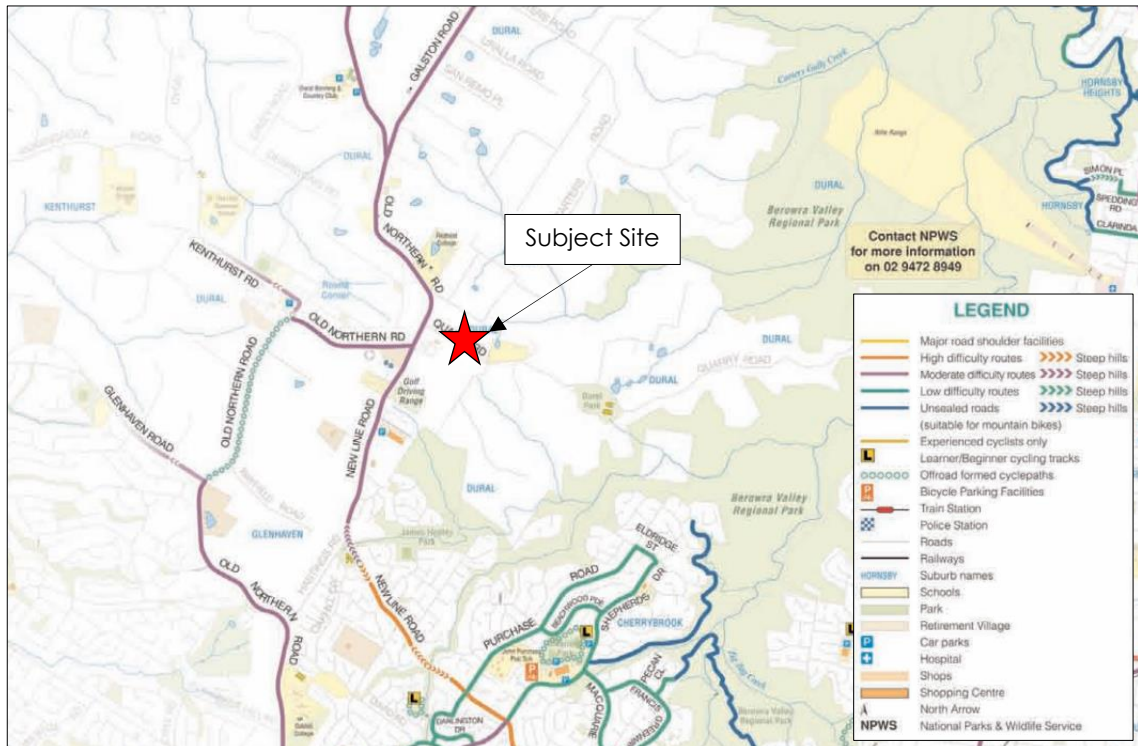
- Quarry Road (southwestern side) – 1.5-metre-wide path, from the intersection with Old Northern Road, terminating near the Quarry Road and Harris Road intersection. This pedestrian path provides access to the retail and commercial complex (Dural Business Park) located west of the site as well to the Pacific Hills Christian and New Hope schools located east of the site. It is noted that there is currently a section of this pathway which has been removed opposite 1 Quarry Road.
- Old Northern Road (eastern side) – 1.5-metre-wide path from the intersection with Quarry Road in the southwest direction, terminating near the roundabout with New Line Road. This path provides pedestrian access to Dural Business Park located west of the site.
- Old Northern Road (western side) – 1.5-metre-wide path along the street.

Signalised pedestrian crossings are provided on the eastern and southern legs of the Old Northern Road/ Quarry Road intersection. No other pedestrian crossing facilities such as refuges or marked crossings are provided near the site.

There are on-road (mixed traffic) cycle routes along Old Northern Road and New Line Road.

Figure 2.15 highlights the network of cycling routes within the local area.

Figure 2.15: Hornsby Council Bicycle Network



Source: https://www.hornsby.nsw.gov.au/resources/documents/lifestyle/biking/HS_BikeMap_2008.pdf

2.8 Crash History Analysis

Roads and Maritime provided GTA with recorded historical crash data on surrounding roads, including Old Northern Road, New Line Road, Quarry Road and Vineys Road. The data provided was for the most recent five-year period of finalised data (January 2012 to December 2016), as well as provisional data (January 2017 to February 2018). The data is shown graphically in Figure 2.16 and indicates that a total of 50 crashes occurred since January 2012.

24 (48 per cent) of the 50 crashes involved an injury with no fatality reported.

Figure 2.16: Full crash data history



There was a high proportion of crashes on Old Northern Road, west of New Line Road. They were predominantly classified as crashes occurring between vehicles travelling in the same direction, including rear end collisions and side swipe collisions.

One crash that resulted in injury occurred outside the subject site along Quarry Road. This was as a result of a vehicle leaving the carriageway and colliding with an object.

Three crashes occurred at the intersection of Quarry Road/ Old Northern Road including rear end collisions and side impacts. One crash involving a pedestrian also occurred at this intersection, where a pedestrian was struck from the near side travel lane to the footpath.

3. Development Proposal

3.1 Land Uses

The proposal includes the construction of a retirement village with 91 independent living units (ILUs) and a 74-room residential aged care facility (RACF), as summarised in Table 3.1. The proposed development also includes ancillary facilities such as a restaurant, library, cinema and garden.

The proposed site plan and surrounding road network is shown in Figure 3.1.

Table 3.1: Development Schedule

Use	Dwelling type	Number of bedrooms
ILU	2-bedroom	41
	3-bedroom	50
Subtotal		91
RACF	-	74

Figure 3.1: Site plan

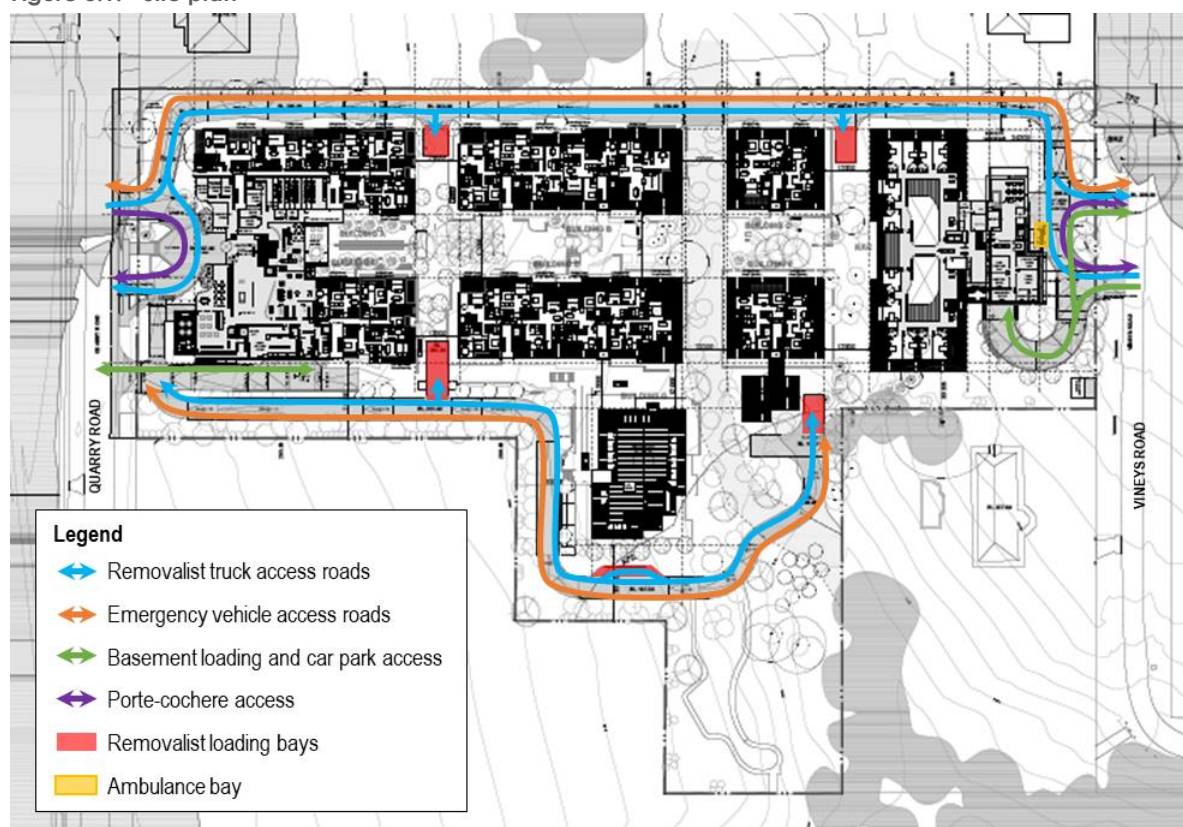


Image source: Marchese Partners – 3 Quarry Road, Dural, Drawing DA2.05 dated 4 March 2019

3.2 Vehicle Access

Site access is proposed via five vehicle crossovers along Quarry Road and Vineys Road. These include:

- One-way separate entry and exit crossovers for the porte-cochere on Quarry Road, which also connects to the western access road
- A two-way driveway to/ from the basement car parking and loading dock on Quarry Road, which also connects to the eastern access road
- One-way separate entry and exit crossovers for the porte-cochere on Vineys Road, also providing access to the RAC basement car parking and loading. The Vineys Road access also connects to the western access road.

3.3 Internal Access Roads

Western Access Road

An internal access road is proposed on the north-western side of the site between the Quarry Road and Vineys Road driveway to facilitate access for removalist vehicles (up to 8.8 metre MRVs) and emergency vehicles (up to 10.1m fire appliances). This access road would have a minimum width of 5.5 metres, with wider areas and removalist vehicle bays that can be used for passing and turn-around when required. Including the adjacent low plantings/ landscaping, there is an 8 metre-wide zone available for emergency vehicle access.

In the event of an emergency, the western access road would provide a two-way connection for fire appliances in particular between Quarry Road and Vineys Road that is not currently available. This has the potential to reduce travel distances for emergency vehicle movements and provide operational flexibility.

Eastern Access Road

An internal access road is also proposed on the south-eastern side of the site, which is accessed from Quarry Road and terminates near Building F. A turning area is provided at the end of the access road, which allows removalist vehicles (up to 8.8 metre MRVs) and emergency vehicles (up to 10.1m fire appliances) to turn around and exit via Quarry Road in a forward direction. The eastern access road has a minimum width of 5.5 metres, with a passing/ parking bay provided adjacent to Building G.

Access Road Surface Treatment and Operation

It is proposed that the eastern and western access roads have a reinforced (structural) grass surface capable of providing all-weather access for the above heavy vehicles, as detailed further in the landscape and civil engineering documentation. Bridge structures are provided over the drainage swale and would also have an appropriate heavy vehicle load rating.

A paved footpath with a suitable subgrade to also accommodate heavy vehicle loads would also be provided within the access road cross-section for internal site permeability and recreational purposes. These roads would be an informal low-speed shared environment with low vehicle usage.

Access to these internal roads would be controlled by boom gate to limit vehicle movements. On-site management would operate the boom gates, with bookings required for day-to-day operation (i.e. removalist vehicles). In the event of an emergency, on-site management would open the boom gates upon request and leave them open for the duration of the incident.

3.4 Car Parking

The development proposes a total of 225 car parking spaces over typically three basement levels, with 177 spaces for ILU use and 48 spaces for RACF use.

The suitability of the car parking provision and layout is discussed in Section 4 of this report.

3.5 Pick-Up/ Set-Down Activity

The proposed development includes a porte-cochere along Quarry Road at ground level, adjacent to the western side of the lobby/ reception area for the ILUs. A second porte-cochere is proposed along Vineys Road at ground level, adjacent to the eastern side of the RACF building. The porte-cocheres will be predominantly used by cars, taxis, hire cars and rideshare vehicles, and operated as a one-way (clockwise) loop.

The operation of the porte-cocheres is considered critical for the overall functionality of the proposed ILU and RACF uses and will likely require a detailed management plan to ensure efficient use and avoid any interruptions to Quarry Road and Vineys Road traffic movements.

3.6 Pedestrian Facilities

Pedestrian access is proposed via Quarry Road, with a new pedestrian refuge proposed to connect to the existing southern footpath. The development also includes the provision of well-connected internal two-metre wide pedestrian paths linking the ILUs and RACF building to key site amenities including car parking, bus stops and pick-up/ set-down (porte-cochere) areas, with crossing facilities in key locations to facilitate access.

3.7 Cyclist Facilities

As discussed in Section 3.3, it is proposed that the internal access road be designed as a mixed traffic street.

3.8 Loading Areas

Two on-site loading areas for loading/ unloading and waste collection are proposed within basement one, with one loading area provided to the southwest of the site, servicing the ILU component of the development while the other loading area is proposed underneath the RACF building servicing the RACF use. Both loading areas offer flexibility for different delivery types, with no raised dock area required.

The loading and waste collection areas for the ILU use have been designed to accommodate up to 12.5 metre heavy rigid vehicles (HRVs), in accordance with Council requirements.

Given that the RACF is commercial (non-residential) use and the RACF operator would appoint their own private service provider, the loading and waste collection area for the RACF use has been designed to accommodate up to 6.4-metre small rigid vehicles (SRVs).

On-site loading area access is proposed to be shared with the general traffic access to/ from the basement car park. All service vehicles will enter and exit the site in a forward direction via Quarry Road and Vineys Road. Swept path assessment for the ILU loading area confirms that HRVs will require the full loading area for manoeuvring, with no other vehicles present. ILU On-site

management would be responsible for waste collection and delivery scheduling such that only one large vehicle is on-site at any given time.

A swept path assessment has been completed to assess the proposed loading areas, as provided in Appendix C.

4. Car Parking

4.1 Car Parking Requirements

4.1.1 SEPP 2004 and Roads and Maritime Guide

A review of Hornsby Shire Council Development Control Plan (DCP) 2013 indicates that no specific car parking rate is nominated for ILUs or RACFs. DCP 2013 states that the rate for seniors housing should be referenced from the State Environment Planning Policy (SEPP) – Housing for Seniors or People with a Disability, 2004 (SEPP Seniors).

A summary of the relevant SEPP Seniors minimum parking requirements is provided in Table 4.1.

Table 4.1: SEPP Seniors car parking requirements

Description	SEPP Seniors minimum parking rate
ILU	0.5 spaces per bedroom
RACF	1 space per 10 beds (or 1 space per 15 beds if the facility provides care <u>only</u> for persons with dementia)
	1 staff space per 2 staff
	1 ambulance space

The Roads and Maritime Guide has also been referenced to better understand the parking requirements for visitors. These parking requirements are provided in Table 4.2.

Table 4.2: Roads and Maritime Guide car parking requirements

Use	Roads and Maritime minimum parking rate
Self-contained units (resident funded development)	1 visitor space per 5 units
Self-contained units (subsidised development)	1 visitor space per 10 units
Nursing homes	1 visitor space per 10 beds

Based on the rates identified in Table 4.1 and Table 4.2, it is recommended that the following minimum car parking rates be applied for the proposed development:

- ILUs:
 - 0.5 resident car spaces per one-bedroom dwelling
 - 1 resident car spaces per two-bedroom dwelling
 - 1.5 resident car spaces per three-bedroom dwelling
 - 0.2 visitor spaces per dwelling.
- RACFs:
 - 1 visitor car space for every 10 beds (or 1 space per 15 beds if the facility provides care only for persons with dementia)
 - 1 car space for every 2 residential care facility staff
 - 1 ambulance space.

Based on the recommended parking rates, the proposed parking rates for the ILU and RACF uses are summarised in Table 4.3. These parking requirements have been developed based on:

- SEPP parking rates for ILU residents and RACF visitors, staff and ambulance spaces
- Roads and Maritime Guide parking rates for ILU visitor and ambulance spaces.

Table 4.3: SEPP 2004 and Roads and Maritime Guide parking requirements

Description	Use	Parking rate	Size	Parking requirement
ILU	Two-bedroom [1]	1/ apartment	41 apartments	41 spaces
	Three-bedroom	1.5/ apartment	50 apartments	75 spaces
	Visitor	0.2/ apartment	91 apartments	18 spaces
Subtotal				134 spaces
RACF	Visitor	0.1/ bed	74 beds	8 spaces
	Staff	0.5/ staff	25 staff	13 spaces
	Ambulance	1 ambulance space	1	1 space
Subtotal				22 spaces
Total				156 spaces

[1] Two-bedroom plus study is categorised under two-bedroom.

Table 4.3 indicates that the proposed development would require a minimum of 134 car parking spaces for ILU and minimum 22 spaces (including one ambulance space) for the RACF to be in accordance with SEPP 2004 and Roads and Maritime Guide parking requirements. This equates to a minimum of 156 car parking spaces.

In addition, a review of the Building Code of Australia (BCA) suggests that the proposed development (assuming Class 3 and Class 9A) generates an accessible car parking requirement of one accessible space for every 100 spaces or part thereof. As such, it is recommended that a minimum two accessible spaces be provided off-street.

4.1.2 Hornsby DCP 2013 Car Parking Requirement

A comparison of the higher multi dwelling housing rates set out in the Hornsby DCP 2013 has also been completed for the ILU use, as summarised in Table 4.5. The higher rates recognise the nature of the area while also considering the need for residents of such development to still have access to a private vehicle.

Table 4.4: Hornsby DCP 2013 parking requirements

Description	Use	Parking rate	Size	Parking requirement
ILU	Two-bedroom	2 spaces/ apartment	41 apartments	82 spaces
	Three-bedroom		50 apartments	100 spaces
	Subtotal		91 apartments	182 spaces
	Visitor	0.2 spaces/ apartment	91 apartments	18 spaces
Total				200 spaces

Table 4.5 indicates that the proposed development would be required to provide 200 car parking spaces for the ILU use to be in accordance with the Hornsby DCP 2013 requirements.

4.2 Adequacy of Parking Supply

A summary of the parking requirements and provisions for the proposed development is shown in Table 4.5.

Table 4.5: Car parking summary

Description	SEPP Seniors and Roads and Maritime Guide	DCP 2013	Proposed parking provision
ILU	134	200	177
SEPP Seniors and Roads and Maritime Guide			
RACF	22	22	48
Total	155	222	225

With 177 spaces (including 18 visitor spaces and 6 staff spaces) for ILU use and 48 spaces for RACF use, the overall parking provision of 225 spaces exceeds the SEPP Seniors and Roads and Maritime Guide, but is consistent in terms of overall total with the Hornsby DCP 2013 parking requirements and is therefore acceptable.

One ambulance space would be provided at ground level, adjacent to the RACF main entrance. Such a location would allow for a quick and efficient departure from the site via Vineys Road.

4.3 Motorcycle Parking

A review of DCP 2013 indicates that all developments are required to provide one motorcycle parking space for every 50 car parking spaces, or part thereof. Based on a total of 225 car parking spaces, the development is required to provide a minimum of five motorcycle parking spaces.

Motorcycle bays should be 2.5 metres long by 1.2 metres wide, in accordance with the DCP 2013 and located away from vehicle manoeuvring areas to avoid motorcycles being damaged. The basement car parking areas are capable of accommodating the additional motorcycle parking spaces as part of future detailed design.

4.4 Car Parking Layout Review

The car park layout has been reviewed against the requirements of the Australian Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009) and Off Street Commercial Vehicle Facilities (AS/NZS2890.2:2018). This assessment included a review of the following:

- Bay and aisle width
- Adjacent structures
- Turnaround facilities
- Circulation roads and ramps
- Ramp grades
- Height clearances
- Internal queuing
- Pick-up/ set-down area
- Parking for persons with disabilities
- Ambulance parking.

The swept path assessment is included in Appendix C of this report.

This review indicates that the proposed car parking layout is expected to operate satisfactorily, subject to minor modifications which can be addressed at the detailed design stage. Ramps have been designed to accommodate HRVs and SRVs for the ILU and RACF respectively. The swept path assessment also confirms vehicles up to 8.8 metre MRVs and 10.1 metre fire appliances can access the internal roads around the perimeter of the site.

5. Sustainable Transport Infrastructure

This section discusses potential measures that could encourage alternative means of travel to the private car and encourage the use of more environmentally sustainable forms of travel.

5.1 Cycle Network

A review of the Council bicycle network indicates that the existing bicycle pathways provide users with connectivity and access to residential areas, popular trip generators and destinations within Dural. These routes directly benefit cyclists of the subject site by improving cycling accessibility around the site.

5.2 Bicycle End of Trip Facilities

The Hornsby DCP 2013 does not provide bicycle parking requirements for ILU and RACF uses. However, in acknowledgement of general changing travel patterns and the increased use of active modes of travel (especially for staff and visitors), the potential to incorporate these facilities has been reviewed. This is also consistent with Council's Ecologically Sustainable Development objective ESD 9, which aims to encourage the use of public transport, cyclist and pedestrian trips in the development and design process.

Reference to the Planning Guidelines for Walking and Cycling (Department of Planning, 2004) suggests the following bicycle parking provisions:

- Aged or disabled self-contained housing facility:
 - Resident (long-term use) – Rate of three to five per cent of apartments
 - Visitor (short-term use) – Rate of three to five per cent of apartments.
- Nursing/ convalescent homes:
 - Staff (long-term use) – Rate of three to five per cent of staff
 - Visitor (short-term use) – Rate of five to 10 per cent of staff.

A summary of the recommended bicycle spaces for the proposed development are summarised in Table 5.1.

Table 5.1: Planning Guidelines for Walking and Cycling Bicycle Parking Guide

Description	Use	Suggested parking rate	Size	Suggested parking provision
ILU	Resident	3% to 5% of apartments	91 apartments	3 to 5 spaces
	Visitor			3 to 5 spaces
Subtotal				6 to 10 spaces
RACF	Visitor	3% to 5% of staff	74 beds	1 to 2 spaces
	Staff	5% to 10% of staff	25 staff	2 to 3 spaces
Subtotal				3 to 5 spaces
Total				9 to 15 spaces

Based on Table 5.1, the proposed development should provide between 9 and 15 bicycle spaces. Therefore, it is recommended that a minimum of 9 bicycle spaces are provided for resident, staff and visitors. There is adequate space within the site to accommodate these requirements.

Bicycle parking spaces would be designed in accordance with relevant Australian Standard (AS2890.3 – Bicycle Parking Facilities). To comply with the Australian Standard, the bicycle parking spaces for residential tenants will need to be provided as Class 1 bicycle spaces (i.e. individual bicycle lockers with dimensions of 1,840 millimetres by 715 millimetres), while visitor bicycle spaces will need to be provided as Class 3 bicycle spaces (i.e. bicycle racks in public area at 1,200 millimetres centre to centre). Secure racks for use by staff should be provided in a secure location (i.e. individual locker of secure room/ enclosure).

5.3 Pedestrian Facilities

Local Pedestrian Facilities

Pedestrian access to the site is proposed via three entries at ground level along the Quarry Road and Vineys Road frontages. The lobby/ reception area provides linkages from Quarry Road to the internal footpaths within the site and connects to Vineys Road, ensuring good permeability with the on-site facilities including gardens, pond, green village and pergolas.

Given there is only a footpath on the southern side of Quarry Road, it is recommended that a pedestrian refuge island be provided along Quarry Road west of the porte-cochere. The pedestrian refuge island will assist pedestrians to cross Quarry Road safely by providing a space to wait for a gap in the traffic to complete the crossing in two stages. The proposed crossing provides connection to the surrounding retail and commercial areas on the southern side of Quarry Road via the footpaths on Quarry Road and Old Northern Road.

Figure 5.1: Proposed pedestrian refuge and crossing

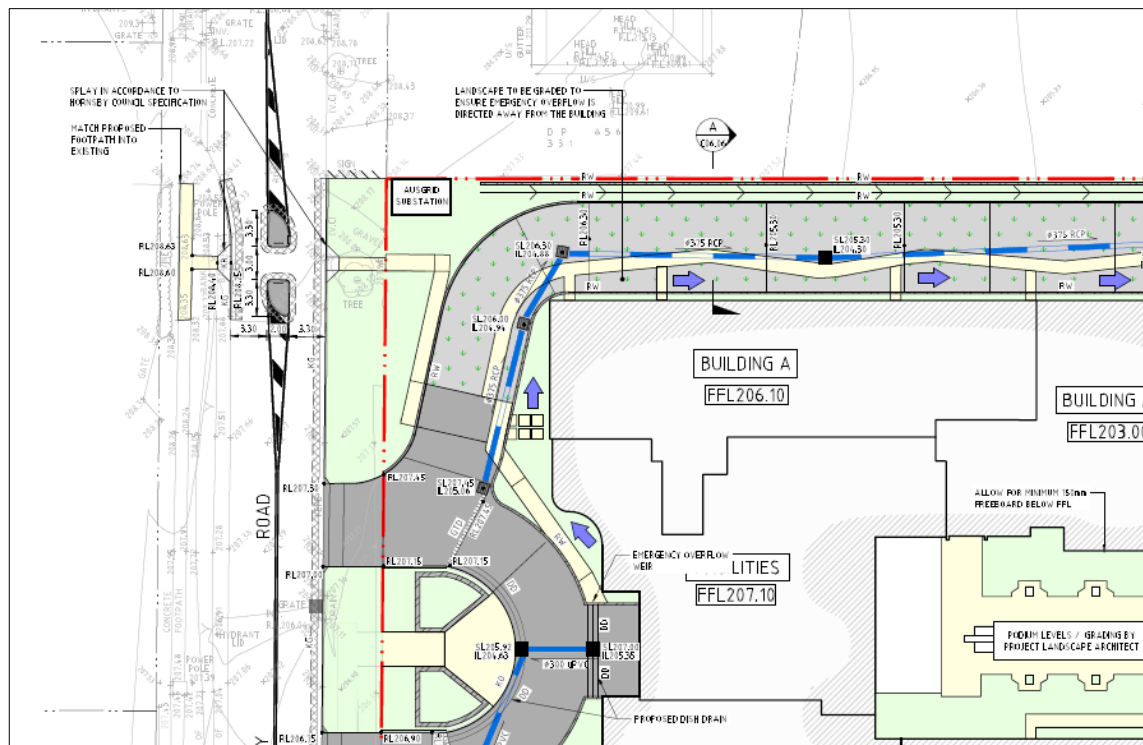


Image source: Northrop – 3 Quarry Road, Dural Concept Siteworks and Stormwater Management Plan dated 1 March 2019

Broader Pedestrian Accessibility

While there are currently signalised pedestrian crossings located at the Old Northern Road/ Quarry Road intersection, other connection and crossing opportunities along Old Northern Road and New Line Road is currently limited. As part of the South Dural TMAP (WSP, 2016), it is proposed that pedestrian crossing facilities be provided at the proposed signalised intersection of Old Northern Road/ New Line Road. The crossings facilitate convenient pedestrian access to/ from the site to other developments to the west of New Line Road and along Old Northern Road (especially Round Corner village centre).

Pedestrian Access to Public Transport

GTA completed a site visit on 7 February 2019 to confirm compliance with Clause 26 of SEPP Seniors. The site visit confirmed the closest bus stops are located 321 and 353 metres away from western boundary of the site on Quarry Road, as measured using a trundle wheel and checked against the feature level survey. The width of Quarry Road is 17 metres (measured from centre of southern footpath to site boundary) and the proposed pedestrian refuge is 10 metres east of the site boundary as shown in more detail in Figure 5.1. The pedestrian access point to the site is at the proposed pedestrian refuge location and therefore the bus stops are located 348 and 380 metres walking distance from the site access, which is less than the 400-metre requirement. The proposed development would therefore comply with Clause 26 of SEPP Seniors with respect to walking distance. Relevant distances measured during the site visit are shown in Figure 5.2.

The Old Northern Road bus stops (bus routes 637 and 638) provide public transport access to banking service providers, community services, recreation facilities, general medical practitioners and other retail/ commercial services at Castle Towers (regional shopping centre) and local shops at Glenorie.

GTA has reviewed the feature and level survey and confirm gradients along the pathway adhere to Clause 26 of SEPP Seniors. Grades along Quarry Road and Old Northern Road generally range between 1.3 and 3.2 per cent, which is well below the maximum general gradient of 1:14 (7.1 percent).

Considering Castle Towers has a major transport interchange and is currently being upgraded to accommodate Sydney Metro, pedestrian access between the shopping centre immediately adjacent and the bus interchange can be assumed to be DDA compliant. A site visit to the local shops at Glenorie also confirmed gradients are in-line with the SEPP Seniors requirements, with a pedestrian refuge available to assist the crossing of Old Northern Road.

Figure 5.2: Distances to the nearest bus stops on New Line Road



5.4 Public Transport

5.4.1 Rail

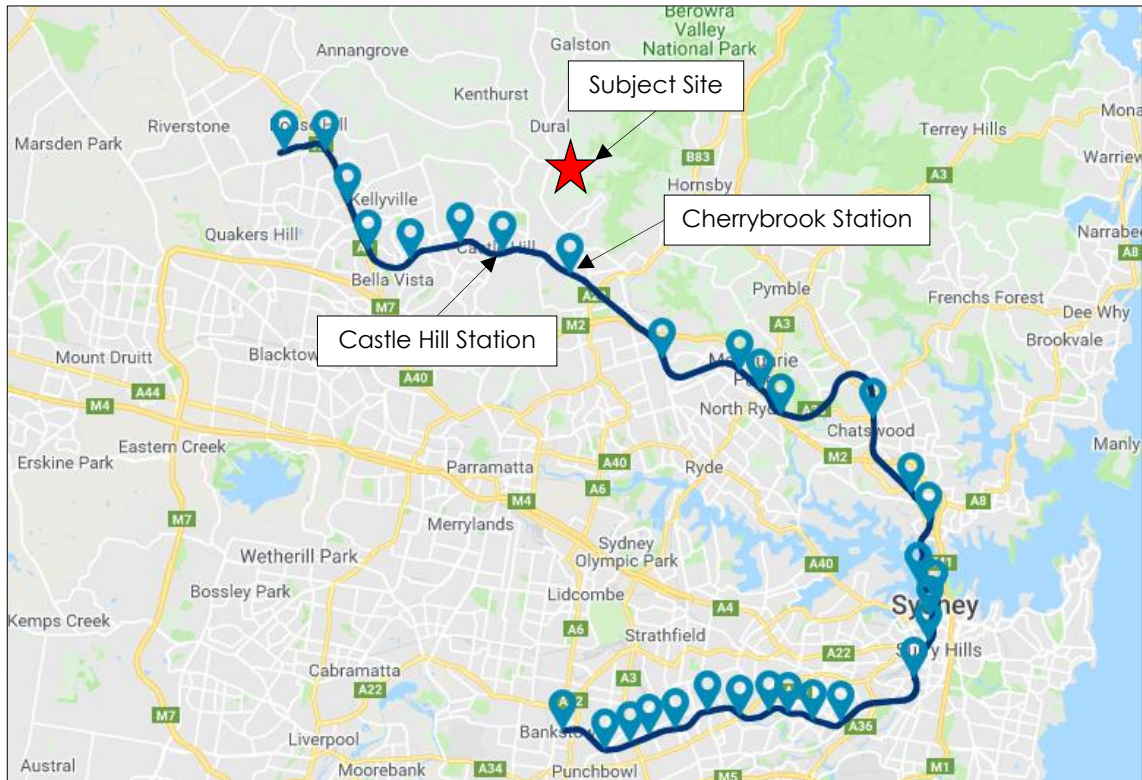
Sydney Metro Northwest, formerly the North West Rail Link, is the first stage of the Sydney Metro and will extend from Cudgegong Road, Schofields to Chatswood. This stage is expected to be opened in 2019. Stage 2 of Sydney Metro will extend south from Chatswood, under Sydney Harbour, via new underground station precincts within the Sydney CBD and through the existing heavy rail line to Bankstown.

Sydney Metro Northwest is delivering eight new railway stations and 4,000 commuter car parking spaces to Sydney's growing Northwest. Trains will run every four minutes in the peak; that is 15 trains an hour operating as a walk up 'no timetable' service.

Of all the new stations along the route, Castle Hill Station and Cherrybrook Station will be the closest and within a 10 minute drive of the site. Castle Hill Station will be an underground station beneath Arthur Whiting Park, opposite the Castle Towers Shopping Centre and will include seven kiss and ride spaces. Cherrybrook Station will be a suburban village station located adjacent Castle Hill Road between Franklin Road and Robert Road, and will include 400 commuter car parking spaces and 14 kiss and ride spaces.

An overview of the future Sydney Metro is shown in Figure 5.3, with the location of Norwest Station in the context of the proposed development.

Figure 5.3: Sydney Metro planned route alignment



Base image source: <https://www.sydneymetro.info/>

5.4.2 Bus

The site is relatively well serviced by public transport, particularly in the peak periods, with regular bus services provided along Old Northern Road and New Line Road. The closest bus stops to the site are located within 400 metres walking distance from the site (approximately a five minute walk). Signalised pedestrian crossings are provided at the Old Northern Road/ Quarry Road intersection allowing for safe connection in conjunction with the proposed new pedestrian refuge across Quarry Road adjacent to the site.

Further, the opening of the Northwest Metro Line in 2019 will introduce a rapid and frequent service to Dural given its proximity to the Castle Hill and Cherrybrook stations.

As part of the South Dural TMAP (WSP, 2016), it is recommended to increase the existing bus level of service through the following measures:

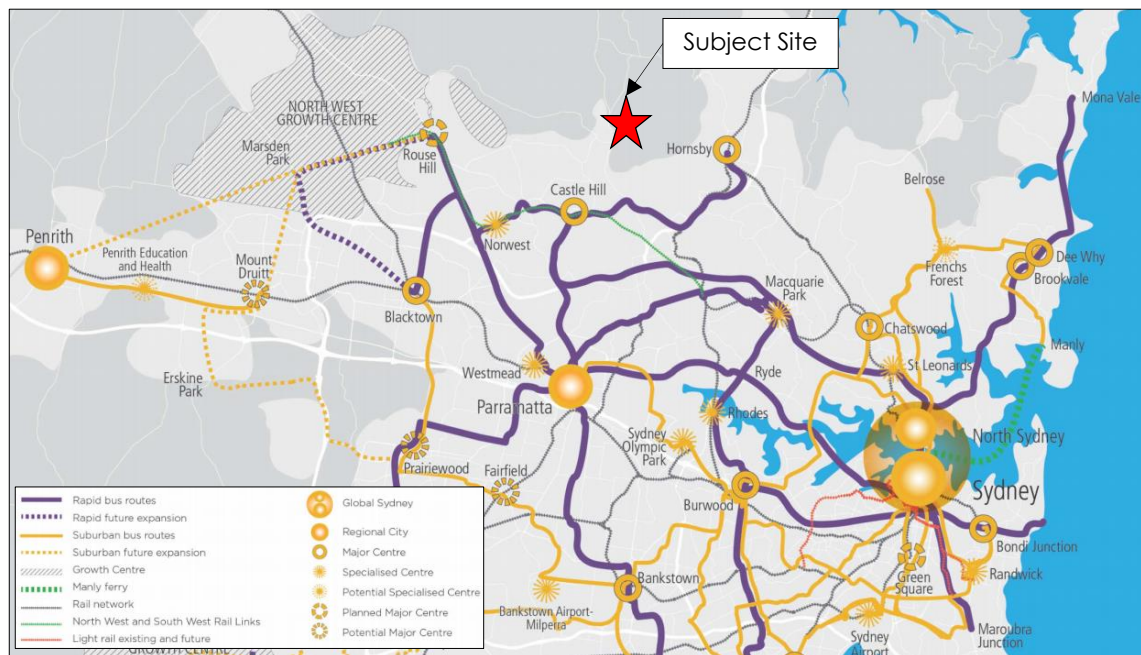
- The Old Northern Road bus routes (637, 638 and 639) increase from a 30-minute frequency to a 15-minute frequency in the peak direction during the peak period, which is an increase of six services
- An additional two services per hour in the peak direction during the peak period on one or more of bus routes 620N, 620X, 622, 642 or 642X
- Increase route 644 to a 15-minute frequency in the peak direction during peak periods
- Increase service levels during non-peak times (during the middle of the weekday, in the evening and on weekends).

There are currently varying levels of bus stop infrastructure within South Dural ranging from a bus stop identification plate bolted to a power pole to a stop with shelter, seating and a printed

timetable. As part of the South Dural TMAP (WSP, 2016), it is recommended the bus stops be upgraded to bus shelters with seating and a bicycle rack/ U-Stems.

While the Sydney's Bus Future (Transport for NSW, 2013) does not propose rapid or suburban routes that would directly service the Dural area, the proposed routes will improve connections to Castle Hill by allowing interchange to rapid routes to Norwest, Parramatta and Hornsby.

Figure 5.4: Sydney's Bus future surrounding the study area



Base image source: <http://www.rms.nsw.gov.au/>

Sydney's Bus Future also includes plans to improve servicing and infrastructure around Dural. These improvements to the bus network will enhance the existing bus service surrounding the Dural area by providing linkages to the Northwest Metro. They include:

- Additional bus services along existing routes with extended operating hours
- Bus Head Start Program, including travel options for new developments
- New bus interchange facilities at each of the Northwest Metro stations.

5.4.3 Shuttle Bus Service

While it is recognised that the site is within walking distance of bus stops on Old Northern Road, there are opportunities to reduce private car travel.

Several opportunities exist to provide staff, residents and tenants with incentives to consider alternative modes of travel to and from the development. The following recommendations are high level strategies that would need to be developed in greater detail and through consultation with relevant stakeholders closer to the opening of the proposed development:

- Provide an on-demand shuttle bus service between bus stops along Old Northern Road and New Line Road and the proposed development for residents/ tenants to further reduce reliance on private vehicles.
- Provide a shuttle bus service between bus stops along Old Northern Road and New Line Road and the proposed development, aligned with staff shifts. A regular, flexible service is likely to increase staff perception of convenience and reliability.

- Develop shuttle bus routes targeting major retail/ commercial areas near the proposed development.

Whilst not required to achieve compliance with SEPP Seniors, these suggestions will help encourage the use of non-vehicle mode transport through active transport choices.

6. Traffic Impact Assessment

6.1 Traffic Generation

6.1.1 Design Rates

ILU

Technical Direction TDT 2013/ 04 Guide to Traffic Generating Developments Updated traffic surveys (TDT 2013/ 04) provides traffic generation survey data on several Independent Living facilities around Sydney metropolitan and regional areas (based on a trip generation study prepared by Hyder for Roads and Maritime in 2009), with a summary presented in Table 6.1.

Table 6.1: Trip rate summary (Hyder, 2009)

Peak hour	SH1	SH2	SH3	SH4	SH5	SH6	SH7	SH8	SH9	SH10	Average
Weekday site peak	0.42	0.26	0.23	0.32	0.25	0.44	0.39	0.39	0.55	0.46	0.4
Network PM peak	0.36	0.06	0.05	0.24	0.17	0.23	0.31	0.23	0.03	0.33	0.2
Daily total vehicle trips	2.89	1.35	1.44	1.79	1.55	3.1	2.14	2.17	1.97	2.58	2.1

The Hyder survey results indicate that survey site SH6, located at Bonnells Bay near Newcastle, had a parking to dwelling ratio of around 2.0, similar to the proposed development and has been used as the basis for this assessment. Survey results indicated this site generated 0.23 trips per dwelling in the PM peak hour. It is noted that the PM road network peak hour around this site occurred between 3pm and 4pm. As a conservative assessment, a PM road network peak hour rate of 0.3 trips per dwelling has been assumed. The surveys revealed that the AM peak trip generation rate is around 33 to 43 per cent of the site peak hour rate. As such, a traffic generation rate of 0.2 trips per dwelling has conservatively been assumed in the AM peak hour.

The directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) is assumed to be 20:80 in the AM peak. The reverse directional split is assumed in the PM peak.

RACE

The *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002) recommends a rate of between 0.1 and 0.2 trips per dwelling for housing for aged and disabled persons. Considering the level of public transport near the site, the higher rate of 0.2 trips per dwelling has been adopted.

The directional split of traffic is assumed to be 80 per cent inbound/ 20 per cent outbound in the AM peak period associated with the arrival of staff. In the PM peak, a split of 50 per cent inbound/ 50 per cent outbound has been assumed corresponding with the arrival of visitors after work and staff shift changeover.

Traffic generation estimates of the peak hour traffic volumes resulting from the proposed development are set out in Table 6.2.

Table 6.2: Traffic generation estimates

Use	Size	Traffic generation rate		Traffic generation estimate (trips/ hour)			
		AM peak	PM peak	AM peak		PM peak	
				In	Out	In	Out
ILU	91 dwellings	0.2 trips / dwelling	0.3 trips / dwelling	3	14	22	5
RACF	74 beds	0.2 trips / dwelling	0.2 trips / dwelling	12	3	8	7
Total				15	17	30	12
				32		42	

Table 6.2 indicates that the site could potentially generate up to 42 vehicle movements in a peak hour.

The internal restaurant, library, cinema and garden uses would be ancillary to the proposed retirement living. As such, no additional trips are expected to be generated from these uses.

6.2 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- Configuration of the arterial road network in the immediate vicinity of the site
- Existing operation of intersections providing access between the local and arterial road network
- Distribution of households near the site
- Surrounding employment centres, retail centres and schools in relation to the site
- Likely distribution of staff's residences in relation to the site
- Configuration of access points to the site.

Considering these factors and for the purpose of estimating vehicle movements, the directional distributions shown in Figure 6.1 and Figure 6.2 have been assumed.

Figure 6.1: ILU distribution

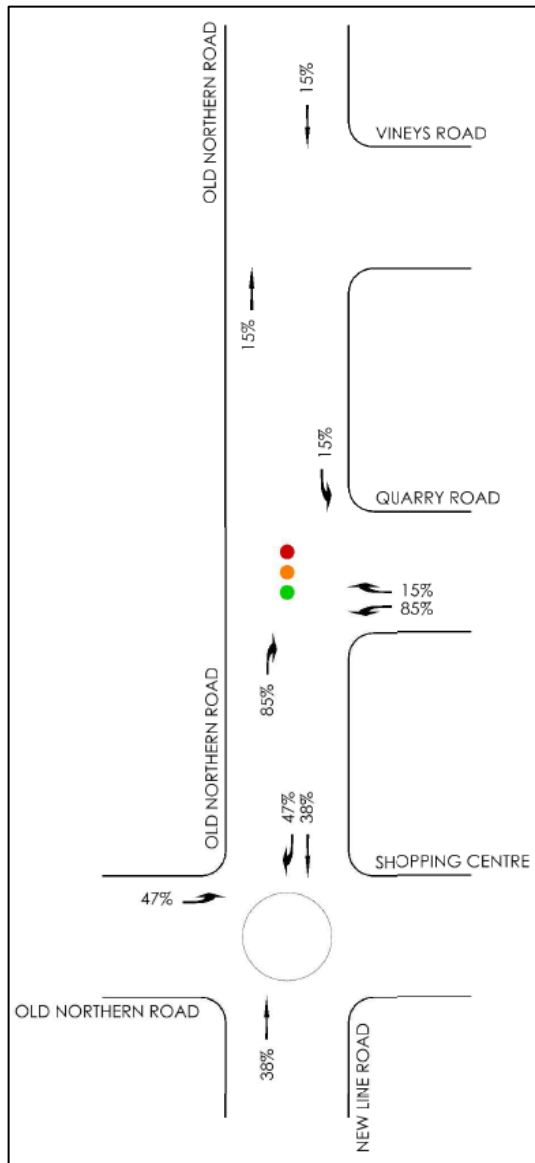
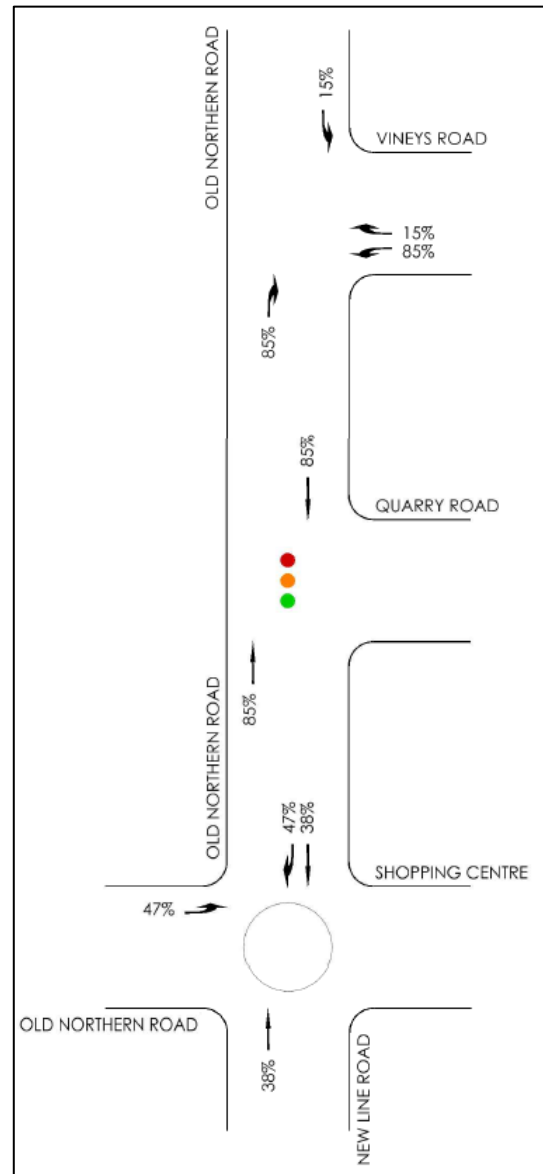


Figure 6.2: RACF distribution



A 2021 opening year and 2031 future year modelling scenario have been completed to assess the operation of key intersections surrounding the site. Annual compound growth rates consistent with the South Dural TMAP (WSP, 2016) report have been adopted for the study:

- Year 2016 to 2021:
 - AM peak: 1.4 per cent per annum
 - PM peak: 1.8 per cent per annum.
- Year 2021 to 2031:
 - AM peak: 1.3 per cent per annum
 - PM peak: 1.4 per cent per annum.

This considers the forecast increase in traffic movements due to local future development. Future 2021 and 2031 traffic volumes are shown in Figure 6.3 and Figure 6.4 respectively.

Figure 6.3: 2021 traffic volumes (no development)

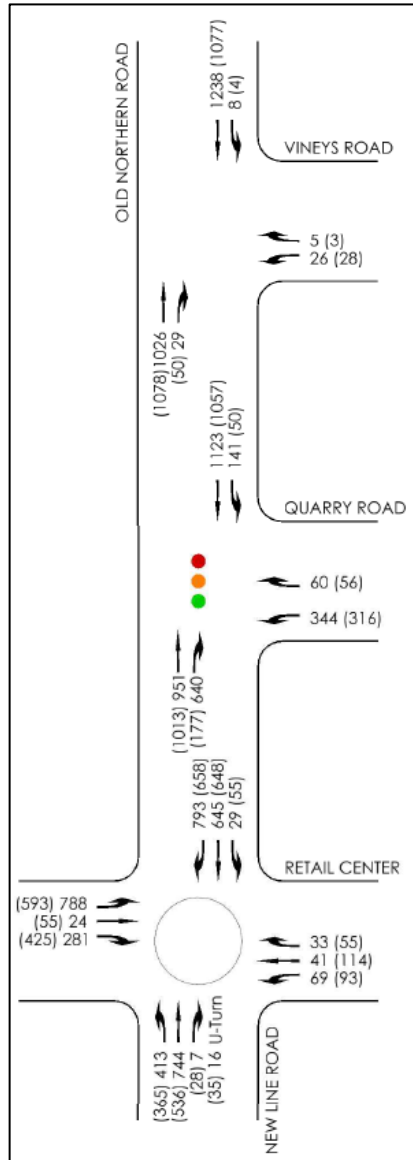
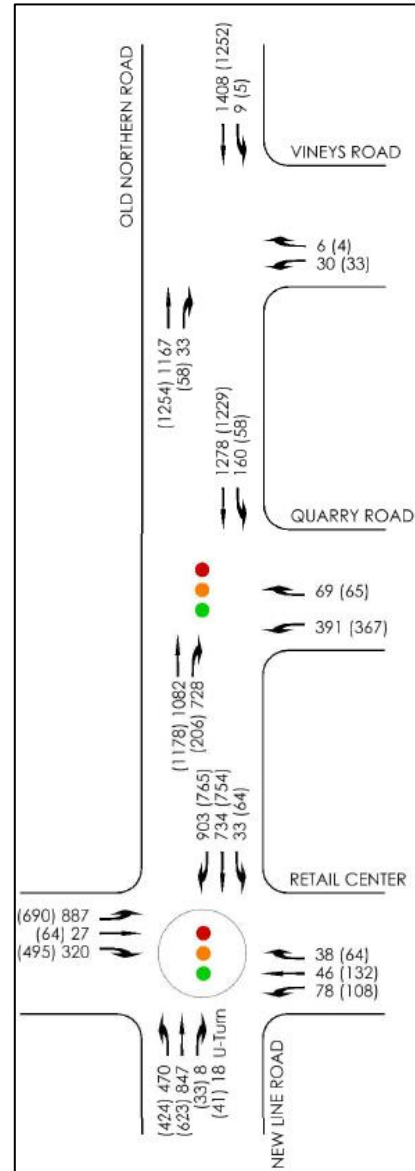


Figure 6.4: 2031 traffic volumes (no development)



6.3 Traffic Impact

6.3.1 2021 No Development

The key intersections identified near the site were modelled to assess the 2021 operation without the proposed development. The corresponding intersection operation results are summarised in Table 6.3.

Table 6.3: Future 2021 operating conditions (no development)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	1.00	85	249	F
		East	0.19	15	11	B
		North	0.56	18	95	B
		West	1.03	58	282	E
	PM	South	0.78	30	64	C
		East	0.43	20	21	B
		North	0.98	41	218	C
		West	0.68	18	42	B
Old Northern Road/ Quarry Road	AM	South	0.95	29	218	C
		East	0.39	32	100	C
		North	0.91	54	341	D
		Overall	0.95	39	341	C
	PM	South	0.37	13	79	A
		East	0.58	45	119	D
		North	0.57	20	175	B
		Overall	0.58	20	175	B
Old Northern Road/ Vineys Road	AM	South	0.18	29	4	C
		Southeast	0.15	92	2	F
		North	0.70	5	0	A
	PM	South	0.34	36	12	C
		Southeast	0.06	56	1	D
		North	0.60	5	0	A

As shown above, the Old Northern Road/ New Line Road intersection is expected to be at capacity in 2021 without the proposed development. In addition, unsatisfactory delays are expected at the Old Northern Road/ Vineys Road intersection for vehicle movements turning right out of Vineys Road.

As such, additional mitigation measures are required. Figure 6.5 and Figure 6.6 show potential upgrade options to address background traffic, noting the Old Northern Road/ New Line Road intersection upgrades are in-line with the upgrades recommended in the South Dural TMAP (WSP–PB, 2016). The proposed Old Northern Road/ Vineys Road upgrades are considered a do minimum option, noting that the addition of a short departure lane for right turning vehicles (effectively creating a staged right turn is not ideal given the limited sight distance for drivers. Site observations indicate that during peak periods, some drivers currently turn left from Vineys Road and use the Old Northern Road/ New Line Road roundabout to complete a U-turn.

Figure 6.5: 2021 Old Northern Road/ New Line Road mitigated layout

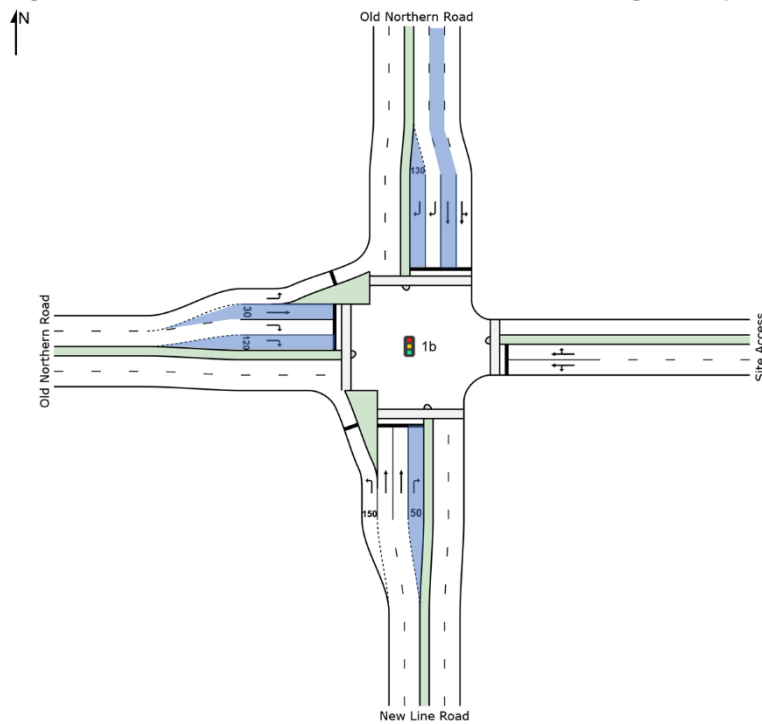


Figure 6.6: 2021 Old Northern Road/ Vineys Road mitigated layout

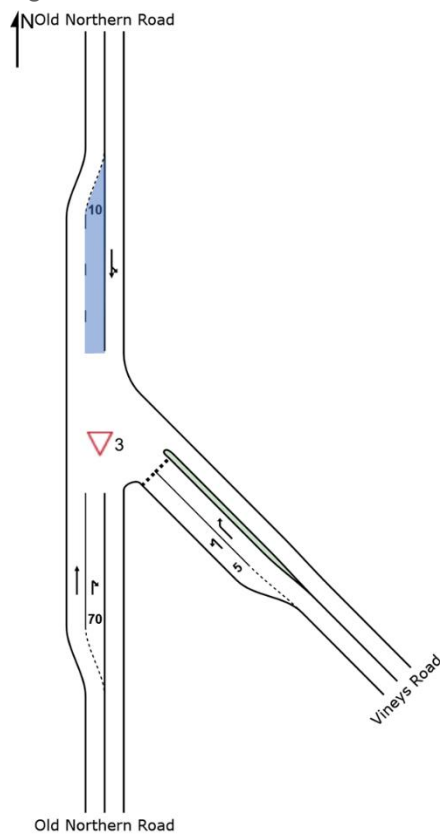


Table 6.4: Future 2021 operating conditions (no development with mitigation measures)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	0.92	54	216	D
		East	0.26	52	35	D
		North	0.75	50	190	D
		West	0.95	64	464	E
		Overall	0.95	55	464	D
	PM	South	0.71	41	130	C
		East	0.32	44	55	D
		North	0.85	53	167	D
		West	0.90	63	304	E
		Overall	0.90	52	304	D
Old Northern Road/ Quarry Road	AM	South	0.78	23	173	B
		East	0.33	25	81	B
		North	0.78	46	195	D
		Overall	0.78	32	195	C
	PM	South	0.38	15	126	A
		East	0.55	43	116	D
		North	0.37	18	100	B
		Overall	0.55	20	126	B
Old Northern Road/ Vineys Road	AM	South	0.18	29	4	C
		Southeast	0.17	27	4	B
		North	0.70	5	0	A
	PM	South	0.34	36	11	C
		Southeast	0.10	17	2	B
		North	0.60	5	0	A

As shown in Table 6.4, all intersections are expected to operate within acceptable levels of service (Level of Service D or better overall) in 2021 without the proposed development. It is noted that the Old Northern Road/ New Line Road intersection is still close to capacity in both weekday peak periods, with significant queuing on the west approach, particularly in the AM peak hour. The recommended mitigation measures at the Old Northern Road/ Vineys Road intersection is expected to improve the right turn out of Vineys Road. Intersection upgrades will improve queue lengths at the Old Northern Road/ Quarry Road intersection.

6.3.2 2021 With Development

The key intersections with the above required 2021 upgrades to accommodate background traffic growth were modelled with the additional traffic from the proposed development. The SIDRA Intersection results are summarised in Table 6.5.

Table 6.5: Future 2021 operating conditions (with development)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	0.89	50	209	D
		East	0.26	52	35	D
		North	0.77	51	194	D
		West	0.96	66	482	E
		Overall	0.96	55	482	D
	PM	South	0.72	41	134	C
		East	0.33	45	56	D
		North	0.83	52	166	D
		West	0.90	63	311	E
		Overall	0.90	52	311	D
Old Northern Road/ Quarry Road	AM	South	0.79	23	175	B
		East	0.34	25	85	B
		North	0.79	47	198	D
		Overall	0.79	32	198	C
	PM	South	0.39	15	127	B
		East	0.55	42	117	C
		North	0.38	19	103	B
		Overall	0.55	20	127	B
Old Northern Road/ Vineys Road	AM	South	0.25	30	6	C
		Southeast	0.19	28	4	B
		North	0.70	5	0	A
	PM	South	0.38	38	13	C
		Southeast	0.12	17	3	B
		North	0.60	5	0	A

As shown in Table 6.5, all intersections are expected to continue operating satisfactorily in both weekday peak hours in 2021 following full development of the site, with minor increases in delay and queues to intersections. 95th percentile queues are expected to increase by up to around one to two vehicles post development (key turning movements, lower on major approaches), while delays are expected to be similar to the above 2021 no development scenario.

This provides clear indication that the additional traffic from the proposed development (and associated impact) is negligible compared to existing volumes at key intersections near the site. At the Old Northern Road/ Quarry Road intersection, development traffic represents less than 1.5 percent of total traffic volumes during any 2021 road network peak period.

6.3.3 2031 No Development

The key intersections identified near the site were modelled to assess the 2031 operation without the proposed development. The previously identified intersection upgrades were included in this assessment, given they were required to maintain appropriate 2021 intersection operation. The corresponding results are summarised in Table 6.6.

Table 6.6: Future 2031 operating conditions (no development)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	0.89	48	235	D
		East	0.29	52	41	D
		North	0.97	68	266	E
		West	1.17	177	966	F
		Overall	1.17	92	966	F
	PM	South	0.82	45	165	D
		East	0.52	54	73	D
		North	0.80	48	188	D
		West	0.91	62	339	E
		Overall	0.91	52	339	D
Old Northern Road/ Quarry Road	AM	South	0.90	27	212	B
		East	0.39	27	101	B
		North	0.97	84	363	F
		Overall	0.97	50	363	D
	PM	South	0.44	15	139	A
		East	0.65	44	140	D
		North	0.44	19	123	B
		Overall	0.65	20	140	B
Old Northern Road/ Vineys Road	AM	South	0.44	72	10	F
		Southeast	0.43	67	10	E
		North	0.79	5	0	A
	PM	South	0.86	140	36	F
		Southeast	0.21	28	5	B
		North	0.69	5	0	A

As shown in Table 6.6, the Old Northern Road/ New Line Road intersection is expected again exceed its capacity in 2031 as a result of background traffic growth, while the Old Northern Road/ Quarry Road intersection will experience unsatisfactory delays on the north approach during the AM peak hour. Further to this, the right turn into Vineys Road will experience unsatisfactory delays in both peak hours.

As such, additional mitigation measures beyond those identified 2021 without development scenario are required to address continued background traffic growth. The 2031 potential mitigation measures investigated are shown in Figure 6.7 and Figure 6.8, and include Old Northern

Road widening to the north of Quarry Road, as well as an additional left turn lane on Old Northern Road west.

Figure 6.7: 2031 Old Northern Road/ New Line Road mitigated layout

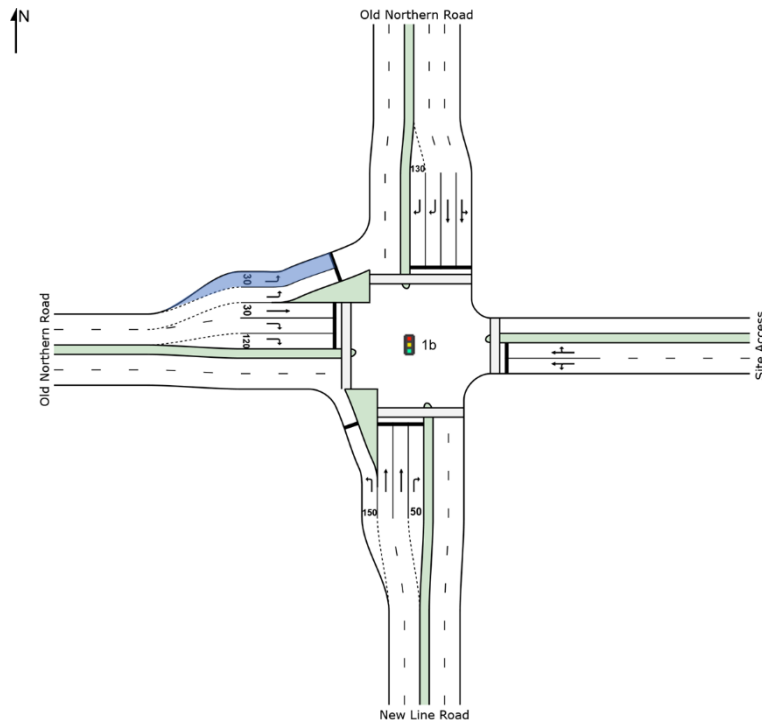


Figure 6.8: 2031 Old Northern Road/ Vineys Road mitigated layout

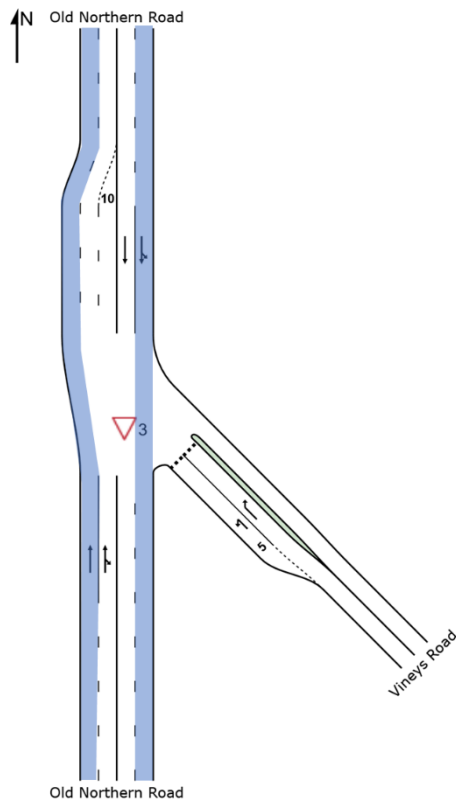


Table 6.7: Future 2031 operating conditions (no development with mitigation measures)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	0.89	48	235	D
		East	0.29	52	41	D
		North	0.97	68	266	E
		West	1.00	97	345	F
		Overall	1.00	70	345	E
	PM	South	0.82	45	165	D
		East	0.55	55	74	D
		North	0.78	47	186	D
		West	0.91	50	144	D
		Overall	0.91	48	186	D
Old Northern Road/ Quarry Road	AM	South	0.91	24	234	B
		East	0.37	25	94	B
		North	1.01	109	398	F
		Overall	1.01	57	398	E
	PM	South	0.44	13	92	A
		East	0.58	44	140	D
		North	0.44	19	123	B
		Overall	0.58	20	140	B
Old Northern Road/ Vineys Road	AM	South	0.44	39	73	C
		Southeast	0.04	20	1	B
		North	0.40	5	0	A
	PM	South	0.60	54	68	D
		Southeast	0.02	16	0	B
		North	0.35	5	0	A

As shown in Table 6.7, the Old Northern Road/ New Line Road and Old Northern Road/ Quarry Road intersections are expected to remain at capacity with the further road upgrades tested. Unsatisfactory delays are still present on the west approach of the Old Northern Road/ New Line Road intersection in the AM peak and on the north approach of the Old Northern Road/ Quarry Road intersection. The tested mitigation measures will improve the right turn into Vineys Road to within satisfactory operating conditions, however the unsignalised layout may not be desirable from a road safety perspective, requiring consideration of left-out only operation (and associated alternative departure routes).

6.3.4 2031 With Development

The key surveyed intersections with tested 2031 upgrades were modelled with the additional traffic from the proposed development. This was done to quantify the impact of the proposed development compared to the 2031 modelling results without development. The SIDRA Intersection results are summarised in Table 6.5.

Table 6.8: Future 2031 operating conditions (with development)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95th percentile queue (m)	Level of service
Old Northern Road/ New Line Road	AM	South	0.90	49	240	D
		East	0.29	52	41	D
		North	0.98	69	270	E
		West	1.01	100	354	F
		Overall	1.01	71	354	F
	PM	South	0.84	46	172	D
		East	0.55	55	74	D
		North	0.78	47	187	D
		West	0.91	50	144	D
		Overall	0.91	48	187	D
Old Northern Road/ Quarry Road	AM	South	0.91	24	234	B
		East	0.39	25	98	B
		North	1.02	113	409	F
		Overall	1.02	59	409	E
	PM	South	0.45	14	96	A
		East	0.58	43	141	D
		North	0.45	20	127	B
		Overall	0.58	20	141	B
Old Northern Road/ Vineys Road	AM	South	0.47	39	68	C
		Southeast	0.04	20	1	B
		North	0.40	5	0	A
	PM	South	0.63	56	59	D
		Southeast	0.02	16	1	B
		North	0.35	5	0	A

As shown in Table 6.8, the additional traffic from the proposed development is expected to result in an increase of up to two seconds average delay overall. 95th percentile queues are also expected to increase by between one to two cars, with results exacerbated at intersections already at capacity.

This provides clear indication that the additional traffic from the proposed development (and associated impact) is negligible compared to existing volumes at key intersections near the site. At the Old Northern Road/ Quarry Road intersection, development traffic represents less than 1.3 percent of total traffic volumes during any 2031 road network peak period.

6.4 Afternoon School Peak and Saturday Midday Peak

It is noted that the traffic surveys were completed after the afternoon school peak period finished. School peak periods are generally characterised with a large volume of traffic in a short

period of time (i.e. 15 minutes). While it is noted that there are existing constraints with the surrounding road network during school pick-up times in the afternoon, the purpose of this assessment was not to solve existing issues associated with such a short period of time. Notwithstanding, it is expected that existing total traffic volumes through key intersections near the site are lower during the school peak, with queues and delays observed particularly at Quarry Road during the afternoon school peak periods related to the sudden increase in turning movements and the ability of the traffic signal control system to respond immediately to these.

It is noted that the similar retirement living site used to estimate appropriate traffic generation rates for the proposed development (see Section 6.1.1) recorded a PM road network peak hour between 3pm and 4pm, which is also typically considered as the school peak hour. Therefore, the PM road network peak hour traffic generation rate is also applicable for the afternoon school peak and it is estimated that the proposed development would generate around the same amount of traffic in the afternoon school peak hour as estimated for the PM road network peak hour (i.e. 42 trips).

With the minor increase in traffic from the development, only a minor increase in delay and queues could be expected on existing operation during the afternoon school peak. Further, it is expected that staff shift changeover times would be scheduled outside of the school peaks (as documented in the Plan of Management) and resident/ visitors that are familiar with local traffic conditions would avoid travelling during the short afternoon school peak. In reality, it is therefore likely that traffic generated by the proposed development during the afternoon school peak hour will be lower than the above 42 trips.

It is not common traffic engineering practice for Saturday midday traffic analysis to be required for residential developments unless they interface with a significant retail or recreational precinct. Although local sporting events occur on the weekends near the site, traffic volumes during the Saturday midday peak hour are expected to be lower than the weekday AM and PM peak hours. Weekend sporting events are also seasonal and usually staggered throughout the day. As such, traffic volumes associated with local sporting events would typically be distributed throughout the day, without a significant peak.

6.5 Probability of Conflict Assessment

The width of Vineys Road south of Vineys Lane is currently constrained in that vehicles are required to slow and move close to the edge of the carriageway (or partially onto the verge) to allow opposing vehicles to pass. There is currently adequate space for vehicles to pull over slightly on the southern side for the majority of the length of road between the site and Vineys Lane, with the exception of near the culvert located underneath the road as shown in Figure 6.9.

Figure 6.9: Culvert located on Vineys Road



A probability of conflict assessment has been completed for this section of Vineys Road. This assessment assumes that current dwellings south of Vineys Lane currently generate one trip per dwelling in the peak hours and have a 20:80 direction split between inbound and outbound trips in the AM peak hour and the opposite in the PM peak hour. Assessing the anticipated RACF trips for both the AM and PM peak hours results in a probability of 0.023 conflicts in a peak hour at this point, or one conflict in the peak hours every 44 days.

The straight road alignment facilitates good sight lines in each direction, allowing for drivers to see oncoming vehicles, adjust travel speed and/or pull over to the side of the road until the opposing vehicle passes. On this basis, the existing Vineys Road layout can satisfactorily accommodate the anticipated additional traffic movements from the development without modification or any material change to existing traffic conditions.

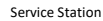
7. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- i The development proposal involves construction of 91 independent Living Units (ILUs), a 74-room residential aged care facility (RACF) and ancillary facilities.
- ii With the proposed new pedestrian refuge on Quarry Road, pedestrian access to the site is within 400 metres walk (along footpaths with minor gradients) to/from the Old Northern Road bus stops, which provide public transport access to primary facilities and services at Castle Hill and secondary facilities and services at Glenorie (and other locations) to comply with the relevant SEPP Seniors requirements.
- iii The proposal generates a SEPP Seniors and Roads and Maritime parking requirement of 155 spaces, with 134 car parking spaces for the ILUs and 22 spaces (including one ambulance space) for the RACF.
- iv The proposal generates a Hornsby DCP 2013 car parking requirement of 200 spaces for the ILU use and therefore a total of 222 spaces when combined with the above RACF requirement (for which no rate is specified in the DCP).
- v The proposed parking supply of 225 spaces (177 spaces for ILU use and 48 spaces for RACF use) exceeds the SEPP Seniors and Roads and Maritime requirements, but is consistent in terms of overall total with the Hornsby DCP 2013 parking requirements and is therefore acceptable.
- vi Although there are no Hornsby DCP requirements, it is recommended that the development provide a minimum of nine bicycle spaces for staff and visitors as part of the detailed design process.
- vii Two loading areas (one for ILU and one for RACF) are proposed within the respective basement areas.
- viii The ILU loading area accommodates vehicles up to 12.5 metre HRVs, although Hornsby Council's 10.24 metre garbage trucks would typically be the largest vehicles on-site.
- ix Given that the RACF is commercial (non-residential) use and the RACF operator would appoint their own private service provider, the loading and waste collection area for the RACF has been designed to accommodate up to 6.4-metre SRVs.
- x Access-controlled internal roads are provided along the eastern and western site boundaries, which accommodate removalist vehicles up to 8.8 metre MRVs and 10.1 metre fire appliances.
- xi The site is expected to generate up to 42 vehicle movements in any road network peak hour. Traffic generation during the afternoon school peak hour would be similar or lower, when considering proposed staff shift change times and resident travel behaviour.
- xii Background traffic growth in the coming years will necessitate upgrades at the Old Northern Road intersections with New Line Road, Quarry Road and Vineys Road to maintain acceptable intersection operation and safety.
- xiii Analysis of 2021 and 2031 design year scenarios indicates that additional traffic from the proposed development is expected to have a negligible impact on these intersections.
- xiv At the Old Northern Road/ Quarry Road intersection, development traffic represents less than 1.5 percent of total traffic volumes during any future road network peak period and reinforces the above negligible impact.
- xv Conflict analysis confirms that there is a low likelihood of two opposing vehicles meeting on Vineys Road immediately northwest of the site and therefore no road upgrades to Vineys Road are required.

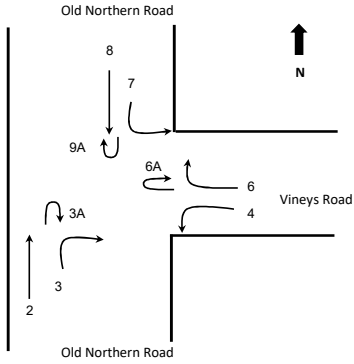
Appendix A

Survey Results

[illegible]

Location: Old Northern Road/ Quarry Road
Weather: Fine
Date: Tuesday, 20 February 2018
Survey Period : 7 am to 9 am
4 pm to 6 pm

AM Peak: 7:45am-8:45am
PM Peak: 4:00pm-5:00pm

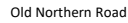


TIME	2				3				3A				4				6				6A				7				8				9A				AM PEAK	
	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Hour	Total				
07:15	172	12	0	184	3	1	0	4	0	0	0	0	8	1	0	9	0	0	0	0	0	0	0	0	242	14	0	256	0	0	0	0	7:00	-	8:00	2022		
07:30	205	8	0	213	1	0	0	1	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	261	10	2	273	0	0	0	0	7:15	-	8:15	2189		
07:45	211	14	0	225	7	1	0	8	0	0	0	0	5	1	0	6	0	0	0	0	0	0	0	1	264	8	1	273	0	0	0	0	7:30	-	8:30	2229		
08:00	237	25	0	262	7	0	0	7	0	0	0	0	4	0	0	4	2	0	0	0	2	0	0	2	276	13	0	289	0	0	0	0	7:45	-	8:45	2237		
08:15	254	20	0	274	10	0	0	10	0	0	0	0	9	0	0	9	1	0	0	1	0	0	0	0	308	18	0	326	0	0	0	0	8:00	-	9:00	2106		
08:30	194	17	0	211	4	1	0	5	0	0	0	0	6	1	0	7	1	0	0	0	1	0	0	0	4	285	17	0	302	0	0	0	0					
08:45	220	17	0	237	6	0	0	6	0	0	0	0	5	0	0	5	1	0	0	1	0	0	0	2	258	12	0	270	0	0	0	0						
09:00	214	16	0	230	4	0	0	4	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	187	7	1	195	0	0	0	0		
Total	1707	129	0	1836	42	3	0	45	0	0	0	0	46	3	0	49	5	0	0	5	0	0	0	9	0	0	0	2081	99	4	2184	0	0	0	0			
AM Peak	905	79	0	984	27	1	0	28	0	0	0	0	24	1	0	25	5	0	0	5	0	0	0	8	0	0	0	1127	60	0	1187	0	0	0	0			

Pedestrian			
South	East	North	Total
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	1
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	1

TIME	2				3				3A				4				6				6A				7				8				9A				PM PEAK	
	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Hour	Total				
16:15	253	14	1	268	5	5	0	10	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	282	6	1	289	0	0	0	0	16:00	-	17:00	2150		
16:30	247	19	0	266	5	5	0	10	1	0	0	1	4	1	0	5	0	0	0	0	0	0	0	0	262	14	0	276	0	0	0	0	16:15	-	17:15	2113		
16:45	246	10	0	256	4	4	0	8	0	0	0	0	9	0	0	9	1	0	0	1	0	0	0	4	216	8	1	225	0	0	0	0	16:30	-	17:30	2010		
17:00	237	7	0	244	10	10	0	20	0	0	0	0	8	0	0	8	2	0	0	2	0	0	0	0	236	7	0	243	0	0	0	0	16:45	-	17:45	2003		
17:15	254	3	0	257	8	8	0	16	0	0	0	0	6	0	0	6	1	0	0	1	0	0	0	0	240	5	0	245	0	0	0	0	17:00	-	18:00	1918		
17:30	232	3	0	235	4	4	0	8	0	0	0	0	4	0	0	4	1	0	0	1	0	0	0	0	202	4	0	206	0	0	0	0						
17:45	265	4	0	269	2	2	0	4	0	0	0	0	4	0	0	4	1	0	0	1	0	0	0	0	212	5	0	217	0	0	0	0						
18:00	230	2	0	232	7	7	0	14	0	0	0	0	1	0	0	1	2	0	0	2	0	0	0	0	178	3	0	181	0	0	0	0						
Total	1964	62	1	2027	45	45	0	90	1	0	0	1	41	1	0	42	8	0	0	8	0	0	0	0	18	1828	52	2	1882	0	0	0	0					
PM Peak	983	50	1	1034	24	24	0	48	1	0	0	1	26	1	0	27	3	0	0	3	0	0	0	0	4	996	35	2	1033	0	0	0	0					

Pedestrian			
South	East	North	Total
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	1	0	1
0	1	0	1



	1				2				3				3A				4				5				6				6A				7				8				9				9A				10				11				12				12A			
TIME	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total																
07:15	67	4	0	71	69	3	0	72	1	1	0	2	5	12	0	17	7	12	0	19	7	1	0	8	0	0	0	0	5	0	0	5	144	9	0	153	112	8	0	120	0	0	0	0	129	8	0	137	8	0	0	106	0	0	0	0								
07:30	63	2	0	65	90	5	0	95	4	1	0	5	8	12	7	0	19	6	7	0	13	4	2	0	6	0	0	0	0	10	0	0	10	168	7	1	176	109	8	0	117	0	0	0	0	119	7	0	126	12	0	0	12	90	10	0	100	0	0	0	0			
07:45	85	4	0	89	86	6	0	99	0	5	1	0	7	14	3	0	17	15	7	0	22	14	3	0	18	0	0	0	0	8	5	1	10	153	10	0	163	6	0	116	0	0	0	0	166	8	1	175	0	0	0	10	74	0	0	0	0							
08:00	92	3	0	95	120	15	0	135	2	0	0	2	2	2	1	0	3	12	2	0	14	19	1	0	11	0	0	0	0	5	0	0	5	139	8	1	148	160	8	0	168	0	0	0	0	216	13	0	229	10	0	0	10	93	4	0	97	0	0	0	0			
08:15	95	3	0	98	150	11	0	161	5	0	0	5	14	1	0	15	6	1	0	7	6	0	0	6	0	0	0	0	5	0	0	6	147	5	0	152	189	7	0	196	0	0	0	0	201	13	0	214	1	0	0	1	72	6	0	78	0	0	0	0				
08:30	101	4	0	105	190	17	0	197	0	0	0	1	15	2	0	17	5	0	0	5	9	0	0	9	0	0	0	0	6	0	0	6	151	12	0	163	206	3	0	209	0	0	0	0	161	7	0	168	6	0	0	5	46	5	0	51	0	0	0	0				
08:45	93	5	0	98	204	17	0	221	0	0	0	0	2	4	0	0	6	1	0	7	6	0	0	6	0	0	0	0	11	0	0	11	148	8	0	156	182	6	0	188	0	0	0	0	141	4	0	145	4	2	0	6	41	3	0	44	0	0	0	0				
09:00	72	3	0	75	120	9	0	129	7	8	0	15	20	9	1	0	21	18	7	0	25	11	0	0	15	1	0	0	0	8	1	0	8	129	5	0	137	150	10	0	167	0	0	0	0	155	10	0	165	15	0	0	10	88	0	0	0	0	0	0	0			
Total	668	28	0	696	1012	73	0	1085	16	4	0	20	32	15	0	47	108	32	15	0	140	71	25	0	96	66	6	0	0	60	0	0	60	1189	65	2	1256	1216	50	1	1267	0	0	0	0	1291	69	1	1361	65	3	0	68	589	49	0	638	0	0	0	0			
AM Peak	381	15	0	396	664	50	0	714	7	0	0	0	7	10	5	0	15	38	5	0	66	36	3	0	39	32	0	0	0	28	0	0	28	585	33	1	619	737	24	0	761	0	0	0	0	719	37	0	756	21	2	0	23	252	18	0	270	0	0	0	0			

	1				2				3				3A				4				5				6				6A				7				8				9				9A				10				11				12				12A			
TIME	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total	Light	Heavy	Cyc	Total																
16:15	84	2	0	86	120	12	0	132	6	4	0	6	3	6	0	9	10	14	3	0	16	17	8	0	12	0	0	0	16	0	0	16	147	8	0	155	188	1	0	189	0	0	0	0	143	9	1	153	9	0	0	9	90	12	0	102	0	0	0	0				
16:30	78	8	0	86	101	17	0	161	7	4	2	2	14	5	5	0	14	14	7	0	22	14	4	0	11	0	0	0	4	5	1	14	118	14	0	139	111	1	0	139	0	0	0	0	119	11	0	131	9	0	0	18	44	0	0	0	0							
16:45	99	5	0	104	116	8	0	124	10	0	0	10	4	2	0	6	19	2	0	21	26	0	0	26	19	1	0	20	0	0	0	9	127	8	0	135	160	4	0	164	0	0	0	0	133	6	0	139	11	0	0	11	111	8	0	119	0	0	0	0				
17:00	64	10	0	74	130	10	0	140	7	0	0	7	6	3	0	9	24	1	0	25	22	0	0	22	9	0	0	0	9	0	0	19	152	6	0	158	120	7	0	127	0	0	0	0	132	6	0	138	20	0	2	22	85	5	0	92	0	0	0	0				
17:15	77	3	0	80	140	9	0	149	9	0	0	9	5	3	0	8	20	1	0	21	23	2	0	25	10	0	0	10	0	0	14	129	5	0	134	154	2	0	156	0	0	0	0	109	2	0	111	22	0	0	22	132	2	0	134	0	0	0	0					
17:30	75	5	0	80	150	5	0	125	7	7	0	15	6	15	0	20	25	1	0	26	15	0	0	26	10	0	0	0	21	110	2	0	116	132	13	1	133	7	0	0	0	106	2	0	108	9	0	0	13	92	6	0	95	1	0	0	0							
17:45	69	4	0	73	124	3	0	127	9	1	0	10	4	2	0	10	4	2	0	18	11	3	0	16	0	0	0	38	5	0	38	120	3	0	128	104	36	2	106	0	0	0	0	120	36	0	109	10	0	0	10	109	1	0	104	0	0	0	0					
18:00	87	5	0	92	120	5	0	125	15	1	0	16	8	3	0	11	11	1	0	12	32	1	0	33	9	0	0	0	11	0	0	11	97	1	0	98	89	27	0	92	0	0	0	0	120	38	0	122	17	0	0	17	92	5	0	97	2	0	0	2				
Total	633	42	0	675	971	69	0	1040	67	2	0	69	39	26	0	65	145	17	0	162	222	9	0	231	98	2	0	100	0	0	0	108	1052	44	0	1096	1091	27	0	1118	0	0	0	0	1005	38	1	1044	119	0	2	121	799	44	0	843	4	0	0	0				

Appendix B

SIDRA INTERSECTION Results

MOVEMENT SUMMARY

 Site: 1 [1 Old North Road/ New Line Road AM]

 Network: N101 [AM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New Line Road													
1	L2	417	3.8	417	3.8	0.896	33.9	LOS C	22.5	164.4	1.00	1.53	38.6
2	T1	752	7.0	752	7.0	0.896	35.6	LOS C	22.5	164.4	1.00	1.55	28.5
3	R2	7	0.0	7	0.0	0.896	50.1	LOS D	19.4	144.6	1.00	1.55	27.4
3u	U	39	13.5	39	13.5	0.896	44.9	LOS D	19.4	144.6	1.00	1.55	39.2
Approach		1215	6.1	1215	6.1	0.896	35.4	LOS C	22.5	164.4	1.00	1.54	33.1
East: Site Access													
4	L2	69	7.6	69	7.6	0.163	11.9	LOS A	1.5	11.5	1.00	0.82	35.6
5	T1	41	7.7	41	7.7	0.163	13.2	LOS A	1.5	11.5	1.00	0.86	33.7
6	R2	34	0.0	34	0.0	0.163	13.5	LOS A	1.3	9.4	1.00	0.88	8.9
6u	U	1	0.0	1	0.0	0.163	13.5	LOS A	1.3	9.4	1.00	0.88	10.1
Approach		145	5.8	145	5.8	0.163	12.7	LOS A	1.5	11.5	1.00	0.84	30.8
North: Old Northern Road													
7	L2	29	0.0	29	0.0	0.579	10.5	LOS A	4.1	29.8	0.52	0.64	35.3
8	T1	651	5.3	651	5.3	0.813	7.1	LOS A	10.7	77.4	0.55	0.69	52.2
9	R2	801	3.2	801	3.2	0.813	14.1	LOS A	10.7	77.4	0.68	0.84	48.4
9u	U	1	0.0	1	0.0	0.813	16.4	LOS B	10.7	77.4	0.68	0.84	32.5
Approach		1482	4.0	1482	4.0	0.813	11.0	LOS A	10.7	77.4	0.62	0.77	49.9
West: Old Northern Road													
10	L2	796	4.9	796	4.9	0.964	27.8	LOS B	21.2	154.9	1.00	1.66	31.7
11	T1	24	8.7	24	8.7	0.536	18.5	LOS B	3.4	25.3	0.82	1.00	39.2
12	R2	284	6.7	284	6.7	0.536	15.0	LOS B	3.4	25.3	0.82	1.00	49.9
12u	U	1	0.0	1	0.0	0.536	17.1	LOS B	3.4	25.3	0.82	1.00	51.2
Approach		1105	5.4	1105	5.4	0.964	24.3	LOS B	21.2	154.9	0.95	1.47	37.6
All Vehicles		3947	5.1	3947	5.1	0.964	22.3	LOS B	22.5	164.4	0.84	1.21	39.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 2 [2 Old Northern Road/ Quarry Road AM]

 Network: N101 [AM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Old Northern Road													
2	T1	960	7.9	960	7.9	0.336	4.9	LOS A	9.2	69.0	0.34	0.30	43.0
3	R2	646	2.6	646	2.6	0.913	57.7	LOS E	26.7	191.4	0.89	0.90	24.9
Approach		1606	5.8	1606	5.8	0.913	26.1	LOS B	26.7	191.4	0.56	0.54	28.6
East: Quarry Road													
4	L2	346	3.3	346	3.3	0.376	26.2	LOS B	13.1	94.7	0.65	0.77	32.5
6	R2	61	10.3	61	10.3	0.255	60.5	LOS E	3.5	26.9	0.93	0.76	20.3
Approach		407	4.4	407	4.4	0.376	31.3	LOS C	13.1	94.7	0.69	0.77	29.8
North: Old Northern Road													
7	L2	142	6.7	142	6.7	0.847	47.5	LOS D	38.1	277.4	0.96	0.92	34.5
8	T1	1134	4.3	1134	4.3	0.847	42.3	LOS C	39.3	285.4	0.97	0.93	25.2
Approach		1276	4.5	1276	4.5	0.847	42.8	LOS D	39.3	285.4	0.97	0.93	26.6
All Vehicles		3289	5.1	3289	5.1	0.913	33.3	LOS C	39.3	285.4	0.73	0.72	27.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	29.9	LOS C	0.1	0.1	0.68	0.68	
All Pedestrians		105	44.6	LOS E			0.82	0.82	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: \\gta.com.au\projectfiles\ProjectFiles\Syd\N14200-14299\N142020 3 Quarry Road, Dural\Modelling\180222sid-N142020 3 Quarry Road, Dural.sip7

MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road AM]

Network: N101 [AM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Old Northern Road													
2	T1	1036	8.0	1036	8.0	0.559	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	29	3.6	29	3.6	0.144	23.9	LOS B	0.4	3.2	0.90	0.96	39.7
Approach		1065	7.9	1065	7.9	0.559	0.8	NA	0.4	3.2	0.02	0.03	59.0
SouthEast: Vineys Road													
21b	L3	26	4.0	26	4.0	0.132	22.7	LOS B	0.4	2.8	0.89	0.95	31.2
23a	R1	5	0.0	5	0.0	0.120	70.2	LOS E	0.3	1.9	0.97	0.98	26.2
Approach		32	3.3	32	3.3	0.132	30.6	LOS C	0.4	2.8	0.90	0.96	29.6
North: Old Northern Road													
7a	L1	8	0.0	8	0.0	0.666	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1249	5.1	1249	5.1	0.666	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
Approach		1258	5.0	1258	5.0	0.666	0.2	NA	0.0	0.0	0.00	0.00	59.6
All Vehicles		2355	6.3	2355	6.3	0.666	0.9	NA	0.4	3.2	0.02	0.03	58.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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Project: \\gta.com.au\projectfiles\ProjectFilesSyd\N14200-14299\N142020 3 Quarry Road, Dural\Modelling\180222sid-N142020 3 Quarry Road, Dural.sip7

MOVEMENT SUMMARY

 Site: 2 [2 Old Northern Road/ Quarry Road PM]

 Network: N101 [PM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Old Northern Road													
2	T1	1023	7.3	1023	7.3	0.357	5.0	LOS A	10.1	74.8	0.34	0.31	42.7
3	R2	179	1.8	179	1.8	0.324	55.9	LOS D	5.9	41.9	0.91	0.77	25.4
Approach		1202	6.5	1202	6.5	0.357	12.6	LOS A	10.1	74.8	0.43	0.38	34.0
East: Quarry Road													
4	L2	319	2.0	319	2.0	0.530	39.9	LOS C	15.5	110.6	0.83	0.81	26.2
6	R2	57	1.9	57	1.9	0.224	60.0	LOS E	3.3	23.2	0.93	0.75	20.4
Approach		376	2.0	376	2.0	0.530	42.9	LOS D	15.5	110.6	0.84	0.80	25.1
North: Old Northern Road													
7	L2	49	4.3	49	4.3	0.538	25.4	LOS B	22.0	159.2	0.69	0.63	44.0
8	T1	1067	3.6	1067	3.6	0.538	19.9	LOS B	22.4	161.9	0.69	0.63	36.3
Approach		1117	3.7	1117	3.7	0.538	20.2	LOS B	22.4	161.9	0.69	0.63	36.9
All Vehicles		2695	4.7	2695	4.7	0.538	20.0	LOS B	22.4	161.9	0.59	0.54	33.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53	
All Pedestrians		105	38.8	LOS D			0.74	0.74	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: \\gta.com.au\projectfiles\ProjectFilesSyd\N14200-14299\N142020 3 Quarry Road, Dural\Modelling\180222sid-N142020 3 Quarry Road, Dural.sip7

MOVEMENT SUMMARY

 Site: 1 [1 Old North Road/ New Line Road PM]

 Network: N101 [PM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New Line Road													
1	L2	368	7.1	368	7.1	0.700	11.9	LOS A	7.4	55.6	0.96	1.12	50.0
2	T1	541	9.1	541	9.1	0.700	13.0	LOS A	7.4	55.6	0.95	1.12	42.0
3	R2	28	0.0	28	0.0	0.700	27.0	LOS B	6.7	51.5	0.94	1.12	39.0
3u	U	36	47.1	36	47.1	0.700	23.4	LOS B	6.7	51.5	0.94	1.12	49.9
Approach		974	9.5	974	9.5	0.700	13.4	LOS A	7.4	55.6	0.95	1.12	46.2
East: Site Access													
4	L2	94	9.0	94	9.0	0.357	11.6	LOS A	2.7	20.0	1.00	1.03	35.2
5	T1	115	2.8	115	2.8	0.357	13.1	LOS A	2.7	20.0	0.98	1.04	34.2
6	R2	56	1.9	56	1.9	0.357	14.8	LOS B	2.4	16.8	0.96	1.05	8.5
6u	U	1	0.0	1	0.0	0.357	14.7	LOS B	2.4	16.8	0.96	1.05	9.7
Approach		265	4.8	265	4.8	0.357	12.9	LOS A	2.7	20.0	0.98	1.04	31.0
North: Old Northern Road													
7	L2	56	0.0	56	0.0	0.650	13.6	LOS A	5.3	38.6	0.70	0.87	31.5
8	T1	655	4.7	655	4.7	0.913	12.5	LOS A	17.8	128.3	0.76	0.99	47.1
9	R2	664	3.0	664	3.0	0.913	23.6	LOS B	17.8	128.3	0.89	1.24	41.8
9u	U	1	0.0	1	0.0	0.913	25.8	LOS B	17.8	128.3	0.89	1.24	24.7
Approach		1376	3.7	1376	3.7	0.913	17.9	LOS B	17.8	128.3	0.82	1.11	44.0
West: Old Northern Road													
10	L2	598	4.8	598	4.8	0.640	7.9	LOS A	5.4	39.4	0.83	0.96	47.9
11	T1	54	0.0	54	0.0	0.626	17.5	LOS B	4.9	36.0	0.82	1.02	39.6
12	R2	429	7.1	429	7.1	0.626	14.4	LOS A	4.9	36.0	0.82	1.02	50.2
12u	U	1	0.0	1	0.0	0.626	16.5	LOS B	4.9	36.0	0.82	1.02	51.6
Approach		1082	5.4	1082	5.4	0.640	11.0	LOS A	5.4	39.4	0.82	0.99	48.7
All Vehicles		3697	5.8	3697	5.8	0.913	14.3	LOS A	17.8	128.3	0.87	1.07	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road PM]

Network: N101 [PM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Old Northern Road													
2	T1	1087	4.8	1087	4.8	0.575	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	51	50.0	51	50.0	0.273	29.8	LOS C	0.9	9.5	0.90	0.99	37.1
Approach		1138	6.8	1138	6.8	0.575	1.4	NA	0.9	9.5	0.04	0.04	58.2
SouthEast: Vineys Road													
21b	L3	28	3.7	28	3.7	0.085	15.3	LOS B	0.3	1.9	0.81	0.92	35.6
23a	R1	3	0.0	3	0.0	0.046	46.2	LOS D	0.1	0.7	0.95	0.97	31.6
Approach		32	3.3	32	3.3	0.085	18.4	LOS B	0.3	1.9	0.82	0.92	34.8
North: Old Northern Road													
7a	L1	4	0.0	4	0.0	0.571	5.1	LOS A	0.0	0.0	0.00	0.00	57.8
8	T1	1085	3.4	1085	3.4	0.571	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1089	3.4	1089	3.4	0.571	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2259	5.1	2259	5.1	0.575	1.0	NA	0.9	9.5	0.03	0.04	58.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY



Site: 1 [1 Old North Road/ New Line Road AM 2021 wo dev]

Network: N101 [2021 AM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	435	3.8	435	3.8	1.000	67.9	LOS E	39.9	291.4	1.00	2.19	28.5
2	T1	783	7.0	783	7.0	1.000	70.1	LOS E	39.9	291.4	1.00	2.14	19.0
3	R2	7	0.0	7	0.0	1.000	84.8	LOS F	33.5	249.1	1.00	2.12	18.7
3u	U	39	13.5	39	13.5	1.000	79.6	LOS F	33.5	249.1	1.00	2.12	28.8
Approach		1264	6.1	1264	6.1	1.000	69.7	LOS E	39.9	291.4	1.00	2.16	23.1
East: Site Access													
4	L2	73	7.6	73	7.6	0.189	13.2	LOS A	1.8	13.4	1.00	0.84	34.7
5	T1	43	7.7	43	7.7	0.189	14.7	LOS B	1.8	13.4	1.00	0.89	32.9
6	R2	35	0.0	35	0.0	0.189	15.0	LOS B	1.5	10.8	1.00	0.91	8.5
6u	U	1	0.0	1	0.0	0.189	15.0	LOS B	1.5	10.8	1.00	0.91	9.7
Approach		152	5.8	152	5.8	0.189	14.1	LOS A	1.8	13.4	1.00	0.87	30.0
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.611	10.9	LOS A	4.6	33.7	0.55	0.68	35.0
8	T1	679	5.3	679	5.3	0.859	7.7	LOS A	13.2	94.8	0.59	0.73	51.7
9	R2	835	3.2	835	3.2	0.859	15.5	LOS B	13.2	94.8	0.74	0.90	47.3
9u	U	1	0.0	1	0.0	0.859	17.7	LOS B	13.2	94.8	0.74	0.90	31.0
Approach		1545	4.0	1545	4.0	0.859	12.0	LOS A	13.2	94.8	0.67	0.82	49.0
West: Old Northern Road													
10	L2	829	4.9	829	4.9	1.030	57.7	LOS E	38.6	281.5	1.00	2.41	21.0
11	T1	25	8.7	25	8.7	0.572	19.1	LOS B	3.8	28.0	0.84	1.02	38.8
12	R2	296	6.7	296	6.7	0.572	15.7	LOS B	3.8	28.0	0.84	1.02	49.5
12u	U	1	0.0	1	0.0	0.572	17.7	LOS B	3.8	28.0	0.84	1.02	50.8
Approach		1152	5.4	1152	5.4	1.030	46.0	LOS D	38.6	281.5	0.95	2.02	28.0
All Vehicles		4113	5.1	4113	5.1	1.030	39.3	LOS C	39.9	291.4	0.86	1.57	31.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

MOVEMENT SUMMARY



Site: 2 [2 Old Northern Road/ Quarry Road AM 2021 wo dev]



Network: N101 [2021 AM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1001	7.9	987	7.9	0.346	4.9	LOS A	9.6	71.7	0.34	0.31	42.9
3	R2	674	2.6	664	2.6	0.950	65.2	LOS E	30.4	217.5	0.89	0.93	23.2
Approach		1675	5.8	1651 ^{N1}	5.8	0.950	29.2	LOS C	30.4	217.5	0.56	0.56	27.0
East: Quarry Road													
4	L2	362	3.3	362	3.3	0.393	26.4	LOS B	13.9	100.1	0.66	0.77	32.4
6	R2	63	10.3	63	10.3	0.264	60.6	LOS E	3.7	27.8	0.93	0.76	20.3
Approach		425	4.4	425	4.4	0.393	31.5	LOS C	13.9	100.1	0.70	0.77	29.8
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.909	58.3	LOS E	46.8	341.0	0.99	1.02	31.3
8	T1	1182	4.3	1182	4.3	0.909	52.9	LOS D	46.8	341.0	0.99	1.03	22.0
Approach		1331	4.5	1331	4.5	0.909	53.5	LOS D	46.8	341.0	0.99	1.03	23.4
All Vehicles		3431	5.1	3407 ^{N1}	5.2	0.950	39.0	LOS C	46.8	341.0	0.75	0.77	25.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	29.9	LOS C	0.1	0.1	0.68	0.68
All Pedestrians		105	44.6	LOS E			0.82	0.82

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road AM 2021 wo dev] Network: N101 [2021 AM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1080	8.0	1066	8.0	0.575	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	31	3.6	30	3.6	0.179	28.5	LOS C	0.5	3.9	0.92	0.98	37.8
Approach		1111	7.9	1096 ^{N1}	7.9	0.575	0.9	NA	0.5	3.9	0.03	0.03	58.8
SouthEast: Vineys Road													
21b	L3	27	4.0	27	4.0	0.167	27.0	LOS B	0.5	3.5	0.91	0.97	29.2
23a	R1	5	0.0	5	0.0	0.154	91.8	LOS F	0.3	2.4	0.98	0.99	22.6
Approach		33	3.4	33	3.4	0.167	37.4	LOS C	0.5	3.5	0.92	0.97	27.0
North: Old Northern Road													
7a	L1	8	0.0	8	0.0	0.695	5.1	LOS A	0.0	0.0	0.00	0.00	57.6
8	T1	1303	5.1	1303	5.1	0.695	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
Approach		1312	5.0	1312	5.0	0.695	0.2	NA	0.0	0.0	0.00	0.00	59.5
All Vehicles		2455	6.3	2441 ^{N1}	6.3	0.695	1.0	NA	0.5	3.9	0.02	0.03	58.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY



Site: 2 [2 Old Northern Road/ Quarry Road PM 2021 wo dev]



Network: N101 [2021 PM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1066	7.3	1066	7.3	0.372	5.1	LOS A	10.7	79.3	0.35	0.32	42.5
3	R2	186	1.8	186	1.8	0.370	58.2	LOS E	6.3	44.7	0.93	0.77	24.8
Approach		1253	6.5	1253	6.5	0.372	13.0	LOS A	10.7	79.3	0.44	0.38	33.6
East: Quarry Road													
4	L2	333	2.0	333	2.0	0.579	41.9	LOS C	16.8	119.4	0.85	0.82	25.5
6	R2	59	1.9	59	1.9	0.232	60.1	LOS E	3.4	24.1	0.93	0.75	20.4
Approach		392	2.0	392	2.0	0.579	44.6	LOS D	16.8	119.4	0.86	0.81	24.6
North: Old Northern Road													
7	L2	53	4.3	53	4.3	0.572	24.8	LOS B	24.2	174.8	0.69	0.64	44.3
8	T1	1113	3.6	1113	3.6	0.572	19.4	LOS B	24.2	174.8	0.69	0.63	36.8
Approach		1165	3.7	1165	3.7	0.572	19.6	LOS B	24.2	174.8	0.69	0.63	37.3
All Vehicles		2809	4.7	2809	4.7	0.579	20.1	LOS B	24.2	174.8	0.60	0.55	33.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.7 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		ped	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	17.3	LOS B	0.1	0.1	0.52	0.52	
All Pedestrians		105	38.3	LOS D			0.74	0.74	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 1 [1 Old North Road/ New Line Road PM 2021 wo dev]



Network: N101 [2021 PM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	384	7.1	384	7.1	0.780	14.7	LOS B	9.3	69.7	1.00	1.21	48.2
2	T1	564	9.1	564	9.1	0.780	16.1	LOS B	9.3	69.7	0.99	1.20	39.4
3	R2	29	0.0	29	0.0	0.780	30.2	LOS C	8.3	63.8	0.99	1.20	36.7
3u	U	37	47.1	37	47.1	0.780	26.8	LOS B	8.3	63.8	0.99	1.20	47.8
Approach		1015	9.5	1015	9.5	0.780	16.4	LOS B	9.3	69.7	0.99	1.21	43.9
East: Site Access													
4	L2	98	9.0	98	9.0	0.427	15.8	LOS B	3.4	24.9	1.00	1.18	32.8
5	T1	120	2.8	120	2.8	0.427	17.4	LOS B	3.4	24.9	0.99	1.18	31.9
6	R2	58	1.9	58	1.9	0.427	19.5	LOS B	2.9	20.5	0.97	1.18	7.5
6u	U	1	0.0	1	0.0	0.427	19.4	LOS B	2.9	20.5	0.97	1.18	8.6
Approach		277	4.8	277	4.8	0.427	17.3	LOS B	3.4	24.9	0.99	1.18	28.7
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.699	14.8	LOS B	6.3	45.5	0.74	0.93	30.2
8	T1	682	4.7	682	4.7	0.982	18.3	LOS B	30.3	218.0	0.82	1.18	42.7
9	R2	693	3.0	693	3.0	0.982	38.9	LOS C	30.3	218.0	0.98	1.69	33.8
9u	U	1	0.0	1	0.0	0.982	41.2	LOS C	30.3	218.0	0.98	1.69	17.5
Approach		1434	3.7	1434	3.7	0.982	28.1	LOS B	30.3	218.0	0.89	1.42	37.5
West: Old Northern Road													
10	L2	624	4.8	624	4.8	0.686	8.7	LOS A	6.3	45.6	0.87	1.01	47.0
11	T1	58	0.0	58	0.0	0.675	18.3	LOS B	5.7	41.7	0.86	1.05	38.9
12	R2	447	7.1	447	7.1	0.675	15.3	LOS B	5.7	41.7	0.86	1.05	49.6
12u	U	1	0.0	1	0.0	0.675	17.4	LOS B	5.7	41.7	0.86	1.05	51.0
Approach		1131	5.4	1131	5.4	0.686	11.8	LOS A	6.3	45.6	0.86	1.03	48.0
All Vehicles		3856	5.8	3856	5.8	0.982	19.5	LOS B	30.3	218.0	0.92	1.23	41.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.7 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road PM 2021 wo dev] Network: N101 [2021 PM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1135	4.8	1135	4.8	0.600	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	53	50.0	53	50.0	0.337	35.8	LOS C	1.2	11.6	0.93	1.01	34.9
Approach		1187	6.8	1187	6.8	0.600	1.7	NA	1.2	11.6	0.04	0.04	57.9
SouthEast: Vineys Road													
21b	L3	29	3.7	29	3.7	0.100	16.9	LOS B	0.3	2.2	0.83	0.93	34.6
23a	R1	3	0.0	3	0.0	0.057	56.1	LOS D	0.1	0.9	0.96	0.98	29.1
Approach		33	3.3	33	3.3	0.100	20.7	LOS B	0.3	2.2	0.84	0.93	33.5
North: Old Northern Road													
7a	L1	4	0.0	4	0.0	0.596	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1134	3.4	1134	3.4	0.596	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1138	3.4	1138	3.4	0.596	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2358	5.1	2358	5.1	0.600	1.2	NA	1.2	11.6	0.03	0.04	58.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.7 %
 Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2021 wo dev mit]

 Network: N101 [2021 AM Peak Mitigated]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	435	3.8	435	3.8	0.638	25.3	LOS B	14.7	106.2	0.88	0.83	42.0
2	T1	783	7.0	783	7.0	0.915	69.3	LOS E	29.1	215.7	1.00	1.08	18.7
3	R2	7	0.0	7	0.0	0.074	72.3	LOS F	0.5	3.2	0.97	0.66	17.8
Approach		1225	5.8	1225	5.8	0.915	53.7	LOS D	29.1	215.7	0.96	0.99	26.2
East: Site Access													
4	L2	73	7.6	73	7.6	0.263	48.5	LOS D	4.7	35.2	0.89	0.71	21.4
5	T1	43	7.7	43	7.7	0.263	53.4	LOS D	4.7	35.2	0.92	0.72	20.4
6	R2	35	0.0	35	0.0	0.263	55.8	LOS D	3.7	26.8	0.94	0.72	2.3
Approach		151	5.9	151	5.9	0.263	51.6	LOS D	4.7	35.2	0.91	0.71	17.7
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.388	36.5	LOS C	17.4	127.1	0.85	0.77	17.5
8	T1	679	5.3	679	5.3	0.388	29.6	LOS C	18.0	131.7	0.86	0.76	35.3
9	R2	835	3.2	835	3.2	0.747	67.6	LOS E	26.5	190.2	1.00	0.88	23.0
Approach		1544	4.1	1544	4.1	0.747	50.3	LOS D	26.5	190.2	0.94	0.83	27.2
West: Old Northern Road													
10	L2	829	4.9	829	4.9	0.948	64.3	LOS E	63.6	463.7	1.00	1.03	19.7
11	T1	25	8.7	25	8.7	0.094	60.3	LOS E	1.4	10.5	0.90	0.73	20.3
12	R2	296	6.7	296	6.7	0.571	62.6	LOS E	8.9	66.2	0.98	0.81	29.4
Approach		1151	5.4	1151	5.4	0.948	63.8	LOS E	63.6	463.7	0.99	0.97	22.7
All Vehicles		4071	5.0	4071	5.0	0.948	55.2	LOS D	63.6	463.7	0.96	0.91	25.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.4 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.8	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2021 wo dev mit]

Network: N101 [2021 AM Peak Mitigated]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1080	8.0	1080	8.0	0.583	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	31	3.6	31	3.6	0.181	28.6	LOS C	0.5	4.0	0.92	0.98	37.8
Approach		1111	7.9	1111	7.9	0.583	0.9	NA	0.5	4.0	0.03	0.03	58.8
SouthEast: Vineys Road													
21b	L3	27	4.0	27	4.0	0.167	27.0	LOS B	0.5	3.5	0.91	0.97	29.2
23a	R1	5	0.0	5	0.0	0.027	17.9	LOS B	0.1	0.5	0.84	0.92	42.0
Approach		33	3.4	33	3.4	0.167	25.5	LOS B	0.5	3.5	0.90	0.96	31.8
North: Old Northern Road													
7a	L1	8	0.0	8	0.0	0.695	5.1	LOS A	0.0	0.0	0.00	0.00	57.6
8	T1	1303	5.1	1303	5.1	0.695	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
Approach		1312	5.0	1312	5.0	0.695	0.2	NA	0.0	0.0	0.00	0.00	59.5
All Vehicles		2455	6.3	2455	6.3	0.695	0.9	NA	0.5	4.0	0.02	0.03	58.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.4 %

Number of Iterations: 6 (maximum specified: 10)

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road AM 2021 wo dev mit]

 Network: N101 [2021 AM Peak Mitigated]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1001	7.9	1001	7.9	0.358	5.9	LOS A	12.7	94.8	0.37	0.33	40.7
3	R2	674	2.6	674	2.6	0.784	48.2	LOS D	24.1	172.7	0.95	0.86	27.7
Approach		1675	5.8	1675	5.8	0.784	22.9	LOS B	24.1	172.7	0.60	0.54	30.6
East: Quarry Road													
4	L2	362	3.3	362	3.3	0.333	19.3	LOS B	11.2	81.0	0.54	0.74	37.0
6	R2	63	10.3	63	10.3	0.237	58.5	LOS E	3.6	27.2	0.92	0.75	20.9
Approach		425	4.4	425	4.4	0.333	25.1	LOS B	11.2	81.0	0.59	0.74	33.2
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.779	50.6	LOS D	25.9	189.1	0.96	0.87	33.3
8	T1	1182	4.3	1182	4.3	0.779	45.6	LOS D	26.9	195.1	0.97	0.88	24.1
Approach		1331	4.5	1331	4.5	0.779	46.2	LOS D	26.9	195.1	0.97	0.88	25.5
All Vehicles		3431	5.1	3431	5.1	0.784	32.2	LOS C	26.9	195.1	0.74	0.70	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.4 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	38.5	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		105	48.9	LOS E			0.86	0.86

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2021 wo dev mit]

 Network: N101 [2021 PM Peak Mitigated]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	384	7.1	384	7.1	0.589	23.9	LOS B	10.2	75.4	0.86	0.82	42.6
2	T1	564	9.1	564	9.1	0.706	50.8	LOS D	17.2	130.0	0.98	0.84	22.9
3	R2	29	0.0	29	0.0	0.344	75.9	LOS F	1.9	13.6	1.00	0.72	17.3
Approach		978	8.1	978	8.1	0.706	41.0	LOS C	17.2	130.0	0.93	0.83	30.6
East: Site Access													
4	L2	98	9.0	98	9.0	0.316	42.4	LOS C	7.4	54.8	0.86	0.70	22.9
5	T1	120	2.8	120	2.8	0.316	44.3	LOS D	7.4	54.8	0.87	0.71	22.6
6	R2	58	1.9	58	1.9	0.316	45.5	LOS D	7.0	50.3	0.88	0.71	2.7
Approach		276	4.8	276	4.8	0.316	43.9	LOS D	7.4	54.8	0.87	0.71	19.8
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.488	37.8	LOS C	15.6	112.6	0.73	0.68	16.8
8	T1	682	4.7	682	4.7	0.488	30.5	LOS C	17.0	123.6	0.76	0.68	34.8
9	R2	693	3.0	693	3.0	0.854	76.1	LOS F	23.2	166.7	1.00	0.90	21.3
Approach		1433	3.7	1433	3.7	0.854	52.8	LOS D	23.2	166.7	0.87	0.79	26.2
West: Old Northern Road													
10	L2	624	4.8	624	4.8	0.896	55.5	LOS D	41.7	303.8	0.97	0.96	21.7
11	T1	58	0.0	58	0.0	0.203	61.3	LOS E	3.3	22.9	0.92	0.76	20.1
12	R2	447	7.1	447	7.1	0.866	74.4	LOS F	15.6	116.2	1.00	0.95	26.8
Approach		1129	5.4	1129	5.4	0.896	63.3	LOS E	41.7	303.8	0.98	0.95	24.2
All Vehicles		3816	5.4	3816	5.4	0.896	52.2	LOS D	41.7	303.8	0.92	0.84	26.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	51.9	LOS E	0.2	0.2	0.89	0.89
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	56.9	LOS E			0.94	0.94

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road PM 2021 wo dev mit]

 Network: N101 [2021 PM Peak Mitigated]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1066	7.3	1066	7.3	0.380	6.8	LOS A	17.0	126.3	0.44	0.40	38.6
3	R2	186	1.8	186	1.8	0.370	58.2	LOS E	6.6	46.7	0.97	0.78	25.0
Approach		1253	6.5	1253	6.5	0.380	14.5	LOS A	17.0	126.3	0.52	0.46	32.1
East: Quarry Road													
4	L2	333	2.0	333	2.0	0.552	40.2	LOS C	16.3	116.4	0.83	0.82	26.1
6	R2	59	1.9	59	1.9	0.209	58.0	LOS E	3.3	23.5	0.91	0.75	21.0
Approach		392	2.0	392	2.0	0.552	42.9	LOS D	16.3	116.4	0.85	0.81	25.2
North: Old Northern Road													
7	L2	53	4.3	53	4.3	0.374	23.2	LOS B	13.6	98.2	0.61	0.57	45.0
8	T1	1113	3.6	1113	3.6	0.374	17.7	LOS B	13.8	99.8	0.61	0.55	38.0
Approach		1165	3.7	1165	3.7	0.374	18.0	LOS B	13.8	99.8	0.61	0.55	38.5
All Vehicles		2809	4.7	2809	4.7	0.552	19.9	LOS B	17.0	126.3	0.60	0.54	33.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2021 wo dev mit]

Network: N101 [2021 PM Peak Mitigated]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1135	4.8	1135	4.8	0.600	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	53	50.0	53	50.0	0.337	35.7	LOS C	1.1	11.4	0.93	1.01	34.9
Approach		1187	6.8	1187	6.8	0.600	1.7	NA	1.1	11.4	0.04	0.04	57.9
SouthEast: Vineys Road													
21b	L3	29	3.7	29	3.7	0.100	16.9	LOS B	0.3	2.2	0.83	0.93	34.6
23a	R1	3	0.0	3	0.0	0.011	12.5	LOS A	0.0	0.2	0.76	0.88	44.8
Approach		33	3.3	33	3.3	0.100	16.5	LOS B	0.3	2.2	0.83	0.92	36.0
North: Old Northern Road													
7a	L1	4	0.0	4	0.0	0.596	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1134	3.4	1134	3.4	0.596	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1138	3.4	1138	3.4	0.596	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2358	5.1	2358	5.1	0.600	1.2	NA	1.1	11.4	0.03	0.04	58.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 5 (maximum specified: 10)

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2021 w dev]

 Network: N101 [2021 AM Peak w Dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	435	3.8	435	3.8	0.601	23.8	LOS B	14.1	102.0	0.84	0.82	42.7
2	T1	791	7.0	791	7.0	0.894	64.4	LOS E	28.2	209.4	1.00	1.04	19.7
3	R2	7	0.0	7	0.0	0.064	70.8	LOS F	0.5	3.2	0.97	0.66	18.1
Approach		1233	5.8	1233	5.8	0.894	50.1	LOS D	28.2	209.4	0.94	0.96	27.2
East: Site Access													
4	L2	73	7.6	73	7.6	0.262	48.5	LOS D	4.7	35.3	0.89	0.71	21.4
5	T1	43	7.7	43	7.7	0.262	53.3	LOS D	4.7	35.3	0.92	0.72	20.4
6	R2	35	0.0	35	0.0	0.262	55.8	LOS D	3.7	26.7	0.94	0.72	2.3
Approach		151	5.9	151	5.9	0.262	51.6	LOS D	4.7	35.3	0.91	0.71	17.7
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.399	37.5	LOS C	17.8	129.9	0.86	0.77	17.2
8	T1	687	5.3	687	5.3	0.399	30.4	LOS C	18.3	133.9	0.87	0.77	34.9
9	R2	843	3.2	843	3.2	0.774	69.1	LOS E	27.0	193.9	1.00	0.88	22.7
Approach		1561	4.1	1561	4.1	0.774	51.4	LOS D	27.0	193.9	0.94	0.83	26.8
West: Old Northern Road													
10	L2	837	4.9	837	4.9	0.956	67.9	LOS E	66.0	481.5	1.00	1.05	19.0
11	T1	25	8.7	25	8.7	0.085	58.3	LOS E	1.4	10.3	0.88	0.73	20.7
12	R2	296	6.7	296	6.7	0.516	60.4	LOS E	8.7	64.7	0.96	0.80	29.9
Approach		1158	5.4	1158	5.4	0.956	65.8	LOS E	66.0	481.5	0.99	0.98	22.3
All Vehicles		4102	5.0	4102	5.0	0.956	55.1	LOS D	66.0	481.5	0.95	0.91	25.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.6 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.6	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road AM 2021 w dev]



Network: N101 [2021 AM Peak w Dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Arrival Flows HV Total	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Average Speed			
		veh/h	%	veh/h	%	v/c	sec		veh	m	per veh	km/h	
South: Old Northern Road													
2	T1	1012	7.9	1012	7.9	0.362	5.8	LOS A	12.7	95.0	0.37	0.33	40.8
3	R2	677	2.6	677	2.6	0.789	48.5	LOS D	24.4	174.6	0.95	0.86	27.6
Approach		1688	5.8	1688	5.8	0.789	22.9	LOS B	24.4	174.6	0.60	0.54	30.6
East: Quarry Road													
4	L2	375	3.3	375	3.3	0.344	19.4	LOS B	11.7	84.5	0.54	0.74	36.9
6	R2	66	10.3	66	10.3	0.249	58.6	LOS E	3.8	28.6	0.92	0.76	20.8
Approach		441	4.4	441	4.4	0.344	25.3	LOS B	11.7	84.5	0.60	0.74	33.1
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.785	51.0	LOS D	26.3	191.8	0.96	0.88	33.2
8	T1	1184	4.3	1184	4.3	0.785	46.0	LOS D	27.3	197.8	0.97	0.89	24.0
Approach		1333	4.5	1333	4.5	0.785	46.6	LOS D	27.3	197.8	0.97	0.89	25.4
All Vehicles		3462	5.1	3462	5.1	0.789	32.3	LOS C	27.3	197.8	0.74	0.70	28.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.6 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian	Distance	per ped	per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	38.5	LOS D	0.1	0.1	0.77	0.77	
All Pedestrians		105	48.9	LOS E			0.86	0.86	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2021 w dev]

Network: N101 [2021 AM Peak w Dev]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1082	8.0	1082	8.0	0.584	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	41	3.6	41	3.6	0.246	30.4	LOS C	0.8	5.5	0.93	0.99	37.1
Approach		1123	7.9	1123	7.9	0.584	1.2	NA	0.8	5.5	0.03	0.04	58.5
SouthEast: Vineys Road													
21b	L3	31	4.0	31	4.0	0.186	27.5	LOS B	0.5	4.0	0.92	0.97	28.9
23a	R1	6	0.0	6	0.0	0.033	18.2	LOS B	0.1	0.6	0.84	0.92	41.9
Approach		37	3.3	37	3.3	0.186	25.9	LOS B	0.5	4.0	0.90	0.96	31.7
North: Old Northern Road													
7a	L1	11	0.0	11	0.0	0.696	5.1	LOS A	0.0	0.0	0.00	0.00	57.6
8	T1	1303	5.1	1303	5.1	0.696	0.2	LOS A	0.0	0.0	0.00	0.00	59.5
Approach		1314	5.0	1314	5.0	0.696	0.2	NA	0.0	0.0	0.00	0.00	59.5
All Vehicles		2474	6.3	2474	6.3	0.696	1.1	NA	0.8	5.5	0.03	0.03	58.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.6 %

Number of Iterations: 6 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2021 w dev]

 Network: N101 [2021 PM Peak w Dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	384	7.1	384	7.1	0.589	23.9	LOS B	10.2	75.8	0.86	0.82	42.6
2	T1	577	9.1	577	9.1	0.721	51.4	LOS D	17.8	134.1	0.98	0.85	22.8
3	R2	29	0.0	29	0.0	0.344	75.9	LOS F	1.9	13.6	1.00	0.72	17.3
Approach		991	8.1	991	8.1	0.721	41.4	LOS C	17.8	134.1	0.93	0.83	30.4
East: Site Access													
4	L2	98	9.0	98	9.0	0.327	43.3	LOS D	7.5	55.5	0.87	0.71	22.7
5	T1	120	2.8	120	2.8	0.327	45.3	LOS D	7.5	55.5	0.88	0.72	22.4
6	R2	58	1.9	58	1.9	0.327	46.5	LOS D	7.1	50.7	0.89	0.72	2.7
Approach		276	4.8	276	4.8	0.327	44.8	LOS D	7.5	55.5	0.88	0.71	19.6
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.483	37.1	LOS C	15.6	112.6	0.72	0.68	17.1
8	T1	688	4.7	688	4.7	0.483	29.9	LOS C	17.0	123.9	0.75	0.68	35.1
9	R2	698	3.0	698	3.0	0.832	74.4	LOS F	23.1	165.9	1.00	0.89	21.6
Approach		1444	3.7	1444	3.7	0.832	51.7	LOS D	23.1	165.9	0.87	0.78	26.5
West: Old Northern Road													
10	L2	638	4.8	638	4.8	0.898	55.2	LOS D	42.7	310.9	0.97	0.97	21.8
11	T1	58	0.0	58	0.0	0.203	61.3	LOS E	3.3	22.9	0.92	0.76	20.1
12	R2	447	7.1	447	7.1	0.866	74.4	LOS F	15.6	116.2	1.00	0.95	26.8
Approach		1143	5.4	1143	5.4	0.898	63.0	LOS E	42.7	310.9	0.98	0.95	24.2
All Vehicles		3854	5.4	3854	5.4	0.898	51.9	LOS D	42.7	310.9	0.92	0.84	26.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	52.8	LOS E	0.2	0.2	0.90	0.90	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	57.2	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road PM 2021 w dev]



Network: N101 [2021 PM Peak w Dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1074	7.3	1074	7.3	0.383	6.8	LOS A	17.0	126.6	0.44	0.40	38.7
3	R2	206	1.8	206	1.8	0.391	57.5	LOS E	7.3	51.5	0.97	0.79	25.1
Approach		1280	6.4	1280	6.4	0.391	15.0	LOS B	17.0	126.6	0.53	0.46	31.8
East: Quarry Road													
4	L2	337	2.0	337	2.0	0.548	39.4	LOS C	16.4	116.7	0.83	0.81	26.4
6	R2	60	1.9	60	1.9	0.213	58.0	LOS E	3.4	24.0	0.91	0.75	20.9
Approach		397	2.0	397	2.0	0.548	42.2	LOS C	16.4	116.7	0.84	0.80	25.4
North: Old Northern Road													
7	L2	56	4.3	56	4.3	0.383	23.8	LOS B	14.0	100.9	0.62	0.58	44.6
8	T1	1119	3.6	1119	3.6	0.383	18.4	LOS B	14.2	102.6	0.62	0.56	37.5
Approach		1175	3.7	1175	3.7	0.383	18.6	LOS B	14.2	102.6	0.62	0.56	38.0
All Vehicles		2852	4.7	2852	4.7	0.548	20.3	LOS B	17.0	126.6	0.61	0.55	33.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.9	LOS B	0.1	0.1	0.54	0.54
All Pedestrians		105	39.1	LOS D			0.75	0.75

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2031 wo dev]  Network: N101 [2031 AM Peak]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	495	3.8	495	3.8	0.659	23.3	LOS B	15.7	113.7	0.86	0.83	43.0
2	T1	892	7.0	892	7.0	0.893	61.7	LOS E	31.6	234.6	1.00	1.04	20.2
3	R2	8	0.0	8	0.0	0.054	66.9	LOS E	0.5	3.5	0.95	0.67	18.8
Approach		1395	5.8	1395	5.8	0.893	48.1	LOS D	31.6	234.6	0.95	0.97	27.9
East: Site Access													
4	L2	82	7.6	82	7.6	0.294	48.8	LOS D	5.4	40.5	0.90	0.72	21.4
5	T1	48	7.7	48	7.7	0.294	53.5	LOS D	5.4	40.5	0.93	0.73	20.4
6	R2	40	0.0	40	0.0	0.294	56.1	LOS D	4.2	30.0	0.94	0.73	2.2
Approach		171	5.8	171	5.8	0.294	51.8	LOS D	5.4	40.5	0.92	0.72	17.6
North: Old Northern Road													
7	L2	35	0.0	35	0.0	0.472	41.7	LOS C	21.1	154.2	0.91	0.82	15.8
8	T1	773	5.3	773	5.3	0.472	33.9	LOS C	21.3	156.1	0.91	0.81	33.3
9	R2	951	3.2	951	3.2	0.972	96.4	LOS F	37.0	265.7	1.00	1.01	18.3
Approach		1758	4.1	1758	4.1	0.972	67.9	LOS E	37.0	265.7	0.96	0.92	22.8
West: Old Northern Road													
10	L2	944	4.9	944	4.9	1.169	220.7	LOS F	132.4	966.0	1.00	1.49	7.3
11	T1	28	8.7	28	8.7	0.105	60.5	LOS E	1.6	11.8	0.90	0.73	20.2
12	R2	337	6.7	337	6.7	0.650	63.7	LOS E	10.4	76.8	1.00	0.82	29.1
Approach		1309	5.4	1309	5.4	1.169	176.8	LOS F	132.4	966.0	1.00	1.30	10.7
All Vehicles		4633	5.0	4633	5.0	1.169	92.1	LOS F	132.4	966.0	0.96	1.03	18.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.7 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.6	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road AM 2031 wo dev]

 Network: N101 [2031 AM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1139	7.9	1058	8.0	0.378	5.5	LOS A	12.9	96.6	0.35	0.32	41.5
3	R2	766	2.6	711	2.6	0.899	57.8	LOS E	29.6	212.1	0.98	0.90	25.0
Approach		1905	5.8	1769 ^{N1}	5.8	0.899	26.5	LOS B	29.6	212.1	0.60	0.55	28.5
East: Quarry Road													
4	L2	412	3.3	412	3.3	0.393	21.5	LOS B	14.0	100.9	0.59	0.76	35.4
6	R2	73	10.3	73	10.3	0.273	58.8	LOS E	4.1	31.5	0.92	0.76	20.8
Approach		484	4.4	484	4.4	0.393	27.1	LOS B	14.0	100.9	0.64	0.76	32.0
North: Old Northern Road													
7	L2	168	6.7	168	6.7	0.972	86.3	LOS F	49.7	362.8	1.00	1.16	25.2
8	T1	1345	4.3	1345	4.3	0.972	83.9	LOS F	49.7	362.8	1.00	1.21	16.1
Approach		1514	4.5	1514	4.5	0.972	84.2	LOS F	49.7	362.8	1.00	1.20	17.3
All Vehicles		3903	5.1	3767 ^{N1}	5.3	0.972	49.8	LOS D	49.7	362.8	0.77	0.84	22.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.7 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	36.3	LOS D	0.1	0.1	0.75	0.75
All Pedestrians		105	47.8	LOS E			0.85	0.85

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2031 wo dev]

Network: N101 [2031 AM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1228	8.0	1149	8.1	0.621	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
3b	R3	35	3.6	32	3.6	0.443	72.0	LOS F	1.3	9.4	0.98	1.03	26.1
Approach		1263	7.9	1182 ^{N1}	8.0	0.621	2.1	NA	1.3	9.4	0.03	0.03	57.7
SouthEast: Vineys Road													
21b	L3	32	4.0	32	4.0	0.432	67.1	LOS E	1.2	8.9	0.97	1.03	18.0
23a	R1	6	0.0	6	0.0	0.059	30.4	LOS C	0.1	1.0	0.92	0.96	36.7
Approach		38	3.3	38	3.3	0.432	61.0	LOS E	1.2	8.9	0.96	1.02	21.0
North: Old Northern Road													
7a	L1	9	0.0	9	0.0	0.790	5.2	LOS A	0.0	0.0	0.00	0.00	57.4
8	T1	1482	5.1	1482	5.1	0.790	0.3	LOS A	0.0	0.0	0.00	0.00	59.3
Approach		1492	5.0	1492	5.0	0.790	0.4	NA	0.0	0.0	0.00	0.00	59.3
All Vehicles		2793	6.3	2711 ^{N1}	6.5	0.790	2.0	NA	1.3	9.4	0.03	0.03	57.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.7 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road PM 2031 wo dev]

 Network: N101 [2031 PM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1240	7.3	1240	7.3	0.442	6.7	LOS A	18.7	138.9	0.42	0.38	38.8
3	R2	217	1.8	217	1.8	0.431	58.8	LOS E	7.6	54.0	0.96	0.79	24.8
Approach		1457	6.5	1457	6.5	0.442	14.5	LOS A	18.7	138.9	0.50	0.44	32.1
East: Quarry Road													
4	L2	386	2.0	386	2.0	0.652	41.5	LOS C	19.7	140.3	0.87	0.83	25.6
6	R2	68	1.9	68	1.9	0.243	58.3	LOS E	3.9	27.5	0.92	0.76	20.9
Approach		455	2.0	455	2.0	0.652	44.0	LOS D	19.7	140.3	0.87	0.82	24.8
North: Old Northern Road													
7	L2	61	4.3	61	4.3	0.441	24.0	LOS B	16.8	121.1	0.64	0.59	44.6
8	T1	1294	3.6	1294	3.6	0.441	18.6	LOS B	17.1	123.2	0.64	0.58	37.3
Approach		1355	3.7	1355	3.7	0.441	18.8	LOS B	17.1	123.2	0.64	0.58	37.9
All Vehicles		3266	4.7	3266	4.7	0.652	20.4	LOS B	19.7	140.3	0.61	0.55	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2031 wo dev]

Network: N101 [2031 PM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1320	4.8	1320	4.8	0.698	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
3b	R3	61	50.0	61	50.0	0.858	140.2	LOS F	3.6	35.8	0.99	1.23	17.5
Approach		1381	6.8	1381	6.8	0.858	6.4	NA	3.6	35.8	0.04	0.05	53.9
SouthEast: Vineys Road													
21b	L3	35	3.7	35	3.7	0.214	28.3	LOS B	0.6	4.6	0.92	0.98	28.6
23a	R1	4	0.0	4	0.0	0.023	18.7	LOS B	0.1	0.4	0.85	0.93	41.6
Approach		39	3.3	39	3.3	0.214	27.3	LOS B	0.6	4.6	0.91	0.97	30.4
North: Old Northern Road													
7a	L1	5	0.0	5	0.0	0.694	5.1	LOS A	0.0	0.0	0.00	0.00	57.6
8	T1	1318	3.4	1318	3.4	0.694	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
Approach		1323	3.4	1323	3.4	0.694	0.2	NA	0.0	0.0	0.00	0.00	59.6
All Vehicles		2743	5.1	2743	5.1	0.858	3.7	NA	3.6	35.8	0.04	0.04	55.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 5 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2031 wo dev]  Network: N101 [2031 PM Peak]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	446	7.1	446	7.1	0.657	24.5	LOS B	14.2	105.4	0.88	0.83	42.3
2	T1	656	9.1	656	9.1	0.821	57.0	LOS E	21.9	165.2	1.00	0.95	21.3
3	R2	35	0.0	35	0.0	0.405	76.3	LOS F	2.3	16.1	1.00	0.73	17.2
Approach		1137	8.1	1137	8.1	0.821	44.8	LOS D	21.9	165.2	0.95	0.90	29.3
East: Site Access													
4	L2	114	9.0	114	9.0	0.519	52.2	LOS D	9.9	73.2	0.95	0.78	20.6
5	T1	139	2.8	139	2.8	0.519	54.1	LOS D	9.9	73.2	0.96	0.78	20.3
6	R2	67	1.9	67	1.9	0.519	55.4	LOS D	8.9	63.7	0.97	0.79	2.3
Approach		320	4.8	320	4.8	0.519	53.7	LOS D	9.9	73.2	0.96	0.78	17.6
North: Old Northern Road													
7	L2	67	0.0	67	0.0	0.500	31.7	LOS C	16.1	116.8	0.65	0.63	19.2
8	T1	794	4.7	794	4.7	0.500	25.8	LOS B	18.4	133.9	0.70	0.64	37.1
9	R2	805	3.0	805	3.0	0.800	71.2	LOS F	26.1	187.5	1.00	0.89	22.3
Approach		1666	3.7	1666	3.7	0.800	48.0	LOS D	26.1	187.5	0.84	0.76	27.6
West: Old Northern Road													
10	L2	726	4.8	726	4.8	0.896	48.9	LOS D	46.5	339.1	0.94	0.95	23.5
11	T1	67	0.0	67	0.0	0.214	59.5	LOS E	3.7	26.2	0.91	0.77	20.4
12	R2	521	7.1	521	7.1	0.912	80.2	LOS F	19.3	143.6	1.00	1.00	25.7
Approach		1315	5.4	1315	5.4	0.912	61.9	LOS E	46.5	339.1	0.96	0.96	24.5
All Vehicles		4438	5.4	4438	5.4	0.912	51.7	LOS D	46.5	339.1	0.91	0.86	26.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.8	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2031 wo dev mit]  Network: N101 [2031 AM Peak mit]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	495	3.8	495	3.8	0.659	23.3	LOS B	15.7	113.7	0.86	0.83	43.0
2	T1	892	7.0	892	7.0	0.893	61.7	LOS E	31.6	234.6	1.00	1.04	20.3
3	R2	8	0.0	8	0.0	0.054	66.9	LOS E	0.5	3.5	0.95	0.67	18.8
Approach		1395	5.8	1395	5.8	0.893	48.1	LOS D	31.6	234.6	0.95	0.97	27.9
East: Site Access													
4	L2	82	7.6	82	7.6	0.294	48.8	LOS D	5.4	40.5	0.90	0.72	21.4
5	T1	48	7.7	48	7.7	0.294	53.5	LOS D	5.4	40.5	0.93	0.73	20.4
6	R2	40	0.0	40	0.0	0.294	56.1	LOS D	4.2	30.0	0.94	0.73	2.2
Approach		171	5.8	171	5.8	0.294	51.8	LOS D	5.4	40.5	0.92	0.72	17.6
North: Old Northern Road													
7	L2	35	0.0	35	0.0	0.472	41.7	LOS C	21.1	154.2	0.91	0.82	15.9
8	T1	773	5.3	773	5.3	0.472	34.0	LOS C	21.4	156.4	0.91	0.81	33.4
9	R2	951	3.2	951	3.2	0.972	96.4	LOS F	37.0	265.7	1.00	1.01	18.4
Approach		1758	4.1	1758	4.1	0.972	67.9	LOS E	37.0	265.7	0.96	0.92	22.9
West: Old Northern Road													
10	L2	944	4.9	944	4.9	1.002	109.8	LOS F	47.2	344.6	1.00	1.15	13.3
11	T1	28	8.7	28	8.7	0.105	60.5	LOS E	1.6	11.8	0.90	0.73	20.2
12	R2	337	6.7	337	6.7	0.650	63.7	LOS E	10.4	76.8	1.00	0.82	29.1
Approach		1309	5.4	1309	5.4	1.002	96.9	LOS F	47.2	344.6	1.00	1.06	17.2
All Vehicles		4633	5.0	4633	5.0	1.002	69.6	LOS E	47.2	344.6	0.96	0.97	22.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.4 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.6	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road AM 2031 wo dev mit]

 Network: N101 [2031 AM Peak mit]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h		veh/h		v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1139	7.9	1138	7.9	0.407	5.5	LOS A	11.8	88.2	0.36	0.33	41.5
3	R2	766	2.6	765	2.6	0.905	52.6	LOS D	32.6	233.5	0.94	0.90	26.4
Approach		1905	5.8	1903 ^{N1}	5.8	0.905	24.4	LOS B	32.6	233.5	0.59	0.56	29.7
East: Quarry Road													
4	L2	412	3.3	412	3.3	0.373	19.2	LOS B	13.0	93.5	0.55	0.75	37.0
6	R2	73	10.3	73	10.3	0.273	58.8	LOS E	4.1	31.5	0.92	0.76	20.8
Approach		484	4.4	484	4.4	0.373	25.2	LOS B	13.0	93.5	0.60	0.75	33.1
North: Old Northern Road													
7	L2	168	6.7	168	6.7	1.014	111.7	LOS F	53.7	392.1	1.00	1.28	21.3
8	T1	1345	4.3	1345	4.3	1.014	108.4	LOS F	54.8	397.5	1.00	1.32	13.2
Approach		1514	4.5	1514	4.5	1.014	108.8	LOS F	54.8	397.5	1.00	1.32	14.3
All Vehicles		3903	5.1	3901 ^{N1}	5.1	1.014	57.3	LOS E	54.8	397.5	0.75	0.88	20.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	39.3	LOS D	0.2	0.2	0.78	0.78	
All Pedestrians		105	49.3	LOS E			0.87	0.87	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2031 wo dev mit]

Network: N101 [2031 AM Peak mit]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1228	8.0	1227	8.0	0.438	4.7	LOS A	9.7	72.7	0.34	0.03	55.2
3b	R3	35	3.6	35	3.6	0.438	39.0	LOS C	9.7	72.7	1.00	0.09	43.8
Approach		1263	7.9	1262 ^{N1}	7.9	0.438	5.6	NA	9.7	72.7	0.36	0.03	54.8
SouthEast: Vineys Road													
21b	L3	32	4.0	32	4.0	0.062	10.7	LOS A	0.2	1.5	0.62	0.83	39.0
23a	R1	6	0.0	6	0.0	0.035	19.7	LOS B	0.1	0.6	0.84	0.92	41.4
Approach		38	3.3	38	3.3	0.062	12.2	LOS A	0.2	1.5	0.66	0.85	39.6
North: Old Northern Road													
7a	L1	9	0.0	9	0.0	0.395	5.0	LOS A	0.0	0.0	0.00	0.01	57.8
8	T1	1482	5.1	1482	5.1	0.395	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1492	5.0	1492	5.0	0.395	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2793	6.3	2791 ^{N1}	6.3	0.438	2.7	NA	9.7	72.7	0.17	0.03	56.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Organisation: GTA CONSULTANTS | Processed: Tuesday, 26 February 2019 2:40:34 PM

Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road PM 2031 wo dev mit]

 Network: N101 [2031 PM Peak mit]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1240	7.3	1240	7.3	0.442	5.5	LOS A	12.4	92.2	0.34	0.31	41.5
3	R2	217	1.8	217	1.8	0.431	58.8	LOS E	7.1	50.4	0.90	0.77	24.8
Approach		1457	6.5	1457	6.5	0.442	13.4	LOS A	12.4	92.2	0.42	0.38	33.2
East: Quarry Road													
4	L2	386	2.0	386	2.0	0.583	41.5	LOS C	19.7	140.3	0.87	0.83	25.6
6	R2	68	1.9	68	1.9	0.243	58.3	LOS E	3.9	27.5	0.92	0.76	20.9
Approach		455	2.0	455	2.0	0.583	44.0	LOS D	19.7	140.3	0.87	0.82	24.8
North: Old Northern Road													
7	L2	61	4.3	61	4.3	0.440	24.0	LOS B	16.7	120.6	0.64	0.59	44.6
8	T1	1294	3.6	1294	3.6	0.440	18.6	LOS B	17.0	122.7	0.64	0.58	37.4
Approach		1355	3.7	1355	3.7	0.440	18.8	LOS B	17.0	122.7	0.64	0.58	37.9
All Vehicles		3266	4.7	3266	4.7	0.583	19.9	LOS B	19.7	140.3	0.58	0.52	33.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Organisation: GTA CONSULTANTS | Processed: Tuesday, 26 February 2019 2:41:04 PM

Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2031 wo dev mit]  Network: N101 [2031 PM Peak mit]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	446	7.1	446	7.1	0.657	24.7	LOS B	14.5	107.6	0.88	0.83	42.3
2	T1	656	9.1	656	9.1	0.821	57.0	LOS E	21.9	165.2	1.00	0.95	21.4
3	R2	35	0.0	35	0.0	0.405	76.3	LOS F	2.3	16.1	1.00	0.73	17.2
Approach		1137	8.1	1137	8.1	0.821	44.9	LOS D	21.9	165.2	0.95	0.90	29.3
East: Site Access													
4	L2	114	9.0	114	9.0	0.545	53.3	LOS D	10.0	74.3	0.96	0.79	20.3
5	T1	139	2.8	139	2.8	0.545	55.2	LOS D	10.0	74.3	0.97	0.79	20.1
6	R2	67	1.9	67	1.9	0.545	56.6	LOS E	9.0	64.1	0.98	0.79	2.2
Approach		320	4.8	320	4.8	0.545	54.8	LOS D	10.0	74.3	0.97	0.79	17.4
North: Old Northern Road													
7	L2	67	0.0	67	0.0	0.492	31.4	LOS C	16.0	115.9	0.65	0.63	19.5
8	T1	794	4.7	794	4.7	0.492	24.8	LOS B	18.3	133.2	0.69	0.64	37.8
9	R2	805	3.0	805	3.0	0.778	69.9	LOS E	25.9	185.8	1.00	0.88	22.6
Approach		1666	3.7	1666	3.7	0.778	46.8	LOS D	25.9	185.8	0.84	0.76	28.1
West: Old Northern Road													
10	L2	726	4.8	726	4.8	0.648	27.9	LOS B	14.4	105.2	0.68	0.77	31.8
11	T1	67	0.0	67	0.0	0.214	59.5	LOS E	3.7	26.2	0.91	0.77	20.4
12	R2	521	7.1	521	7.1	0.912	80.2	LOS F	19.3	143.6	1.00	1.00	25.7
Approach		1315	5.4	1315	5.4	0.912	50.3	LOS D	19.3	143.6	0.82	0.86	27.6
All Vehicles		4438	5.4	4438	5.4	0.912	47.9	LOS D	25.9	185.8	0.87	0.83	27.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.8	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2031 wo dev mit]

Network: N101 [2031 PM Peak mit]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1320	4.8	1320	4.8	0.598	6.0	LOS A	8.5	67.7	0.14	0.02	54.3
3b	R3	61	50.0	61	50.0	0.598	53.6	LOS D	8.5	67.7	1.00	0.17	32.4
Approach		1381	6.8	1381	6.8	0.598	8.1	NA	8.5	67.7	0.18	0.03	52.7
SouthEast: Vineys Road													
21b	L3	35	3.7	35	3.7	0.059	9.6	LOS A	0.2	1.4	0.56	0.78	39.9
23a	R1	4	0.0	4	0.0	0.018	15.6	LOS B	0.0	0.3	0.79	0.89	43.4
Approach		39	3.3	39	3.3	0.059	10.3	LOS A	0.2	1.4	0.59	0.79	40.5
North: Old Northern Road													
7a	L1	5	0.0	5	0.0	0.347	5.0	LOS A	0.0	0.0	0.00	0.00	57.9
8	T1	1318	3.4	1318	3.4	0.347	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1323	3.4	1323	3.4	0.347	0.1	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		2743	5.1	2743	5.1	0.598	4.3	NA	8.5	67.7	0.10	0.03	54.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %

Number of Iterations: 5 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2031 w dev]

 Network: N101 [2031 AM Peak w dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	495	3.8	495	3.8	0.659	23.3	LOS B	15.7	113.7	0.86	0.83	43.0
2	T1	899	7.0	899	7.0	0.900	63.2	LOS E	32.3	239.8	1.00	1.06	20.0
3	R2	8	0.0	8	0.0	0.054	66.9	LOS E	0.5	3.5	0.95	0.67	18.8
Approach		1402	5.8	1402	5.8	0.900	49.1	LOS D	32.3	239.8	0.95	0.97	27.6
East: Site Access													
4	L2	82	7.6	82	7.6	0.294	48.8	LOS D	5.4	40.5	0.90	0.72	21.4
5	T1	48	7.7	48	7.7	0.294	53.5	LOS D	5.4	40.5	0.93	0.73	20.4
6	R2	40	0.0	40	0.0	0.294	56.1	LOS D	4.2	30.0	0.94	0.73	2.2
Approach		171	5.8	171	5.8	0.294	51.8	LOS D	5.4	40.5	0.92	0.72	17.6
North: Old Northern Road													
7	L2	35	0.0	35	0.0	0.475	41.7	LOS C	21.3	155.4	0.91	0.82	15.9
8	T1	781	5.3	779	5.3	0.475	33.9	LOS C	21.5	157.1	0.91	0.81	33.4
9	R2	958	3.2	955	3.2	0.976	98.2	LOS F	37.5	269.8	1.00	1.02	18.1
Approach		1774	4.1	1768 ^{N1}	4.1	0.976	68.8	LOS E	37.5	269.8	0.96	0.92	22.7
West: Old Northern Road													
10	L2	952	4.9	952	4.9	1.010	114.3	LOS F	48.5	354.1	1.00	1.17	12.9
11	T1	28	8.7	28	8.7	0.105	60.5	LOS E	1.6	11.8	0.90	0.73	20.2
12	R2	337	6.7	337	6.7	0.650	63.7	LOS E	10.4	76.8	1.00	0.82	29.1
Approach		1317	5.4	1317	5.4	1.010	100.2	LOS F	48.5	354.1	1.00	1.07	16.8
All Vehicles		4663	5.0	4658 ^{N1}	5.0	1.010	71.1	LOS F	48.5	354.1	0.96	0.97	21.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.6	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road AM 2031 w dev]



Network: N101 [2031 AM Peak w dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1149	7.9	1144	7.9	0.409	5.5	LOS A	11.9	88.6	0.36	0.33	41.6
3	R2	769	2.6	766	2.6	0.905	52.7	LOS D	32.7	233.8	0.94	0.90	26.4
Approach		1919	5.8	1910 ^{N1}	5.8	0.905	24.4	LOS B	32.7	233.8	0.59	0.56	29.7
East: Quarry Road													
4	L2	425	3.3	425	3.3	0.386	19.4	LOS B	13.5	97.5	0.55	0.75	36.9
6	R2	75	10.3	75	10.3	0.281	58.9	LOS E	4.3	32.5	0.93	0.76	20.8
Approach		500	4.4	500	4.4	0.386	25.3	LOS B	13.5	97.5	0.61	0.75	33.1
North: Old Northern Road													
7	L2	169	6.7	169	6.7	1.021	116.2	LOS F	55.2	403.2	1.00	1.30	20.8
8	T1	1347	4.3	1347	4.3	1.021	112.9	LOS F	56.3	408.8	1.00	1.35	12.8
Approach		1517	4.5	1517	4.5	1.021	113.3	LOS F	56.3	408.8	1.00	1.34	13.8
All Vehicles		3936	5.1	3926 ^{N1}	5.1	1.021	58.9	LOS E	56.3	408.8	0.75	0.89	19.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	39.3	LOS D	0.2	0.2	0.78	0.78
All Pedestrians		105	49.3	LOS E			0.87	0.87

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2031 w dev]

Network: N101 [2031 AM Peak w dev]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1232	8.0	1226	8.0	0.470	5.3	LOS A	9.1	67.7	0.29	0.04	54.6
3b	R3	45	3.6	45	3.6	0.470	39.0	LOS C	9.1	67.7	1.00	0.13	41.3
Approach		1277	7.9	1271 ^{N1}	7.9	0.470	6.5	NA	9.1	67.7	0.32	0.04	54.0
SouthEast: Vineys Road													
21b	L3	34	4.0	34	4.0	0.066	10.7	LOS A	0.2	1.6	0.62	0.84	38.9
23a	R1	6	0.0	6	0.0	0.036	20.0	LOS B	0.1	0.6	0.84	0.92	41.2
Approach		40	3.4	40	3.4	0.066	12.2	LOS A	0.2	1.6	0.66	0.85	39.5
North: Old Northern Road													
7a	L1	12	0.0	12	0.0	0.396	5.0	LOS A	0.0	0.0	0.00	0.01	57.8
8	T1	1483	5.1	1483	5.1	0.396	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1495	5.0	1495	5.0	0.396	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2812	6.3	2806 ^{N1}	6.3	0.470	3.2	NA	9.1	67.7	0.15	0.03	55.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2031 w dev]

 Network: N101 [2031 PM Peak w dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	446	7.1	446	7.1	0.657	24.7	LOS B	14.5	107.6	0.88	0.83	42.3
2	T1	669	9.1	669	9.1	0.837	58.4	LOS E	22.7	171.5	1.00	0.97	21.1
3	R2	35	0.0	35	0.0	0.405	76.3	LOS F	2.3	16.1	1.00	0.73	17.2
Approach		1151	8.1	1151	8.1	0.837	45.9	LOS D	22.7	171.5	0.95	0.91	28.9
East: Site Access													
4	L2	114	9.0	114	9.0	0.545	53.3	LOS D	10.0	74.3	0.96	0.79	20.3
5	T1	139	2.8	139	2.8	0.545	55.2	LOS D	10.0	74.3	0.97	0.79	20.1
6	R2	67	1.9	67	1.9	0.545	56.6	LOS E	9.0	64.1	0.98	0.79	2.2
Approach		320	4.8	320	4.8	0.545	54.8	LOS D	10.0	74.3	0.97	0.79	17.4
North: Old Northern Road													
7	L2	67	0.0	67	0.0	0.495	31.2	LOS C	16.1	116.4	0.65	0.63	19.6
8	T1	799	4.7	799	4.7	0.495	24.7	LOS B	18.4	133.8	0.69	0.64	37.8
9	R2	811	3.0	811	3.0	0.783	70.1	LOS E	26.1	187.3	1.00	0.88	22.6
Approach		1677	3.7	1677	3.7	0.783	46.9	LOS D	26.1	187.3	0.84	0.76	28.1
West: Old Northern Road													
10	L2	739	4.8	739	4.8	0.665	28.0	LOS B	14.8	107.5	0.69	0.77	31.7
11	T1	67	0.0	67	0.0	0.214	59.5	LOS E	3.7	26.2	0.91	0.77	20.4
12	R2	521	7.1	521	7.1	0.912	80.2	LOS F	19.3	143.6	1.00	1.00	25.7
Approach		1327	5.4	1327	5.4	0.912	50.1	LOS D	19.3	143.6	0.82	0.86	27.6
All Vehicles		4475	5.4	4475	5.4	0.912	48.1	LOS D	26.1	187.3	0.87	0.83	27.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		ped	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.8	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road PM 2031 w dev]



Network: N101 [2031 PM Peak w dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1247	7.3	1247	7.3	0.444	5.8	LOS A	12.9	96.3	0.35	0.32	41.0
3	R2	236	1.8	236	1.8	0.447	58.0	LOS E	7.7	54.8	0.90	0.78	25.0
Approach		1483	6.4	1483	6.4	0.447	14.1	LOS A	12.9	96.3	0.44	0.40	32.7
East: Quarry Road													
4	L2	392	2.0	392	2.0	0.579	40.7	LOS C	19.8	140.9	0.86	0.83	25.9
6	R2	69	1.9	69	1.9	0.246	58.3	LOS E	3.9	27.9	0.92	0.76	20.9
Approach		461	2.0	461	2.0	0.579	43.4	LOS D	19.8	140.9	0.87	0.82	25.0
North: Old Northern Road													
7	L2	64	4.3	64	4.3	0.450	24.7	LOS B	17.2	124.2	0.65	0.61	44.2
8	T1	1300	3.6	1300	3.6	0.450	19.3	LOS B	17.5	126.5	0.65	0.59	36.8
Approach		1364	3.7	1364	3.7	0.450	19.5	LOS B	17.5	126.5	0.65	0.59	37.4
All Vehicles		3308	4.7	3308	4.7	0.579	20.4	LOS B	19.8	140.9	0.59	0.53	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.9	LOS B	0.1	0.1	0.54	0.54
All Pedestrians		105	39.1	LOS D			0.75	0.75

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190226sid-N142020 3 Quarry Road, Dural 2031.sip7

MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2031 w dev]

Network: N101 [2031 PM Peak w dev]

Old Northern Road/ Vineys Road
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1320	4.8	1320	4.8	0.625	4.9	LOS A	7.2	59.1	0.10	0.03	55.3
3b	R3	68	50.0	68	50.0	0.625	55.8	LOS D	7.2	59.1	1.00	0.24	31.1
Approach		1388	7.1	1388	7.1	0.625	7.4	NA	7.2	59.1	0.15	0.04	53.3
SouthEast: Vineys Road													
21b	L3	41	3.7	41	3.7	0.069	9.7	LOS A	0.2	1.7	0.57	0.79	39.8
23a	R1	5	0.0	5	0.0	0.023	16.0	LOS B	0.1	0.4	0.80	0.89	43.2
Approach		46	3.3	46	3.3	0.069	10.4	LOS A	0.2	1.7	0.59	0.80	40.4
North: Old Northern Road													
7a	L1	6	0.0	6	0.0	0.348	5.0	LOS A	0.0	0.0	0.00	0.01	57.9
8	T1	1322	3.4	1322	3.4	0.348	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1328	3.4	1328	3.4	0.348	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2763	5.2	2763	5.2	0.625	3.9	NA	7.2	59.1	0.08	0.03	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 6 (maximum specified: 10)

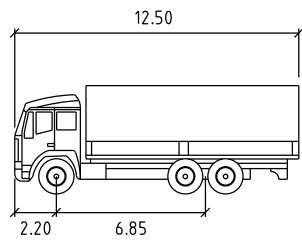
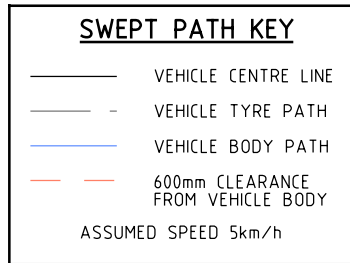
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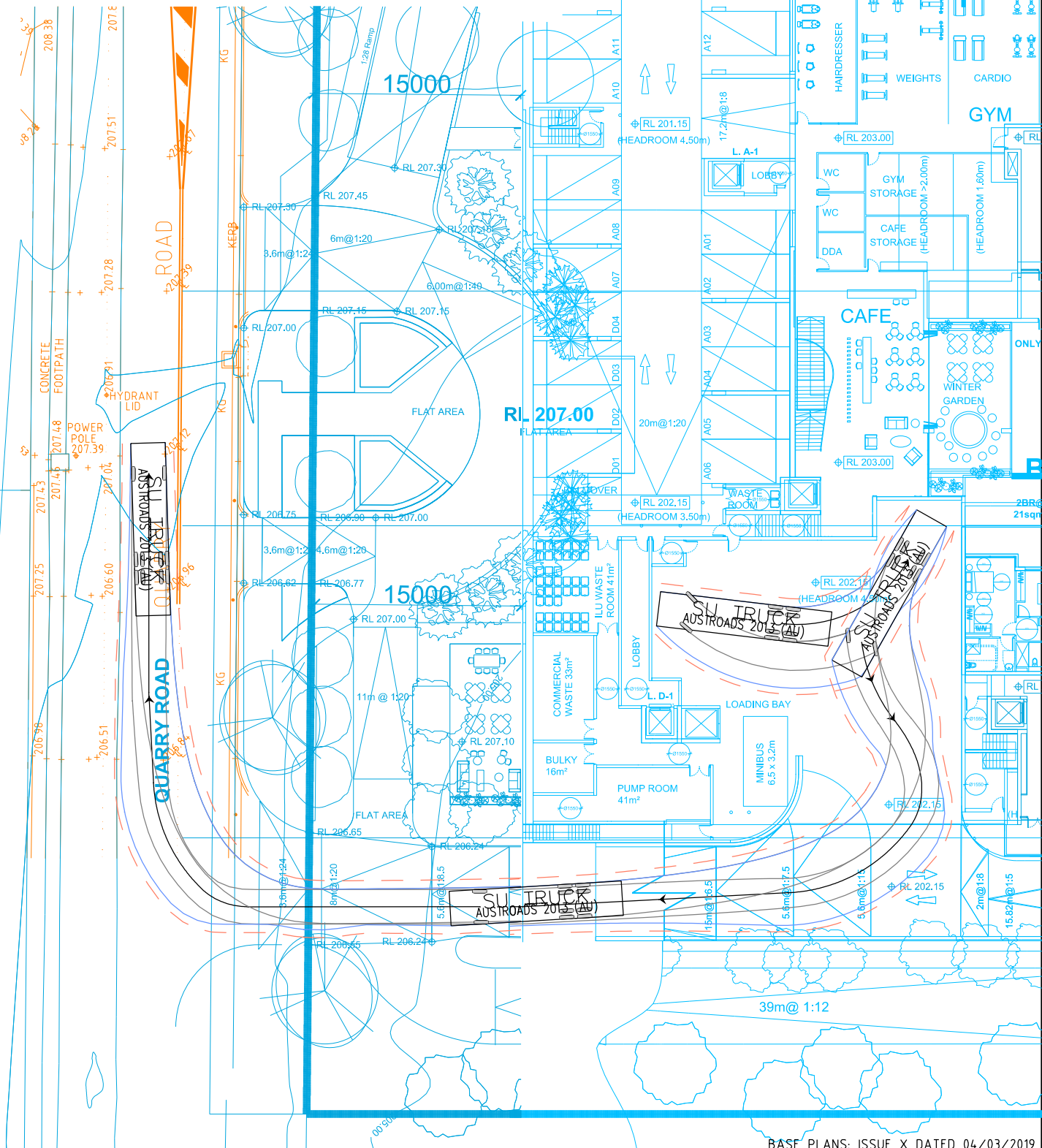
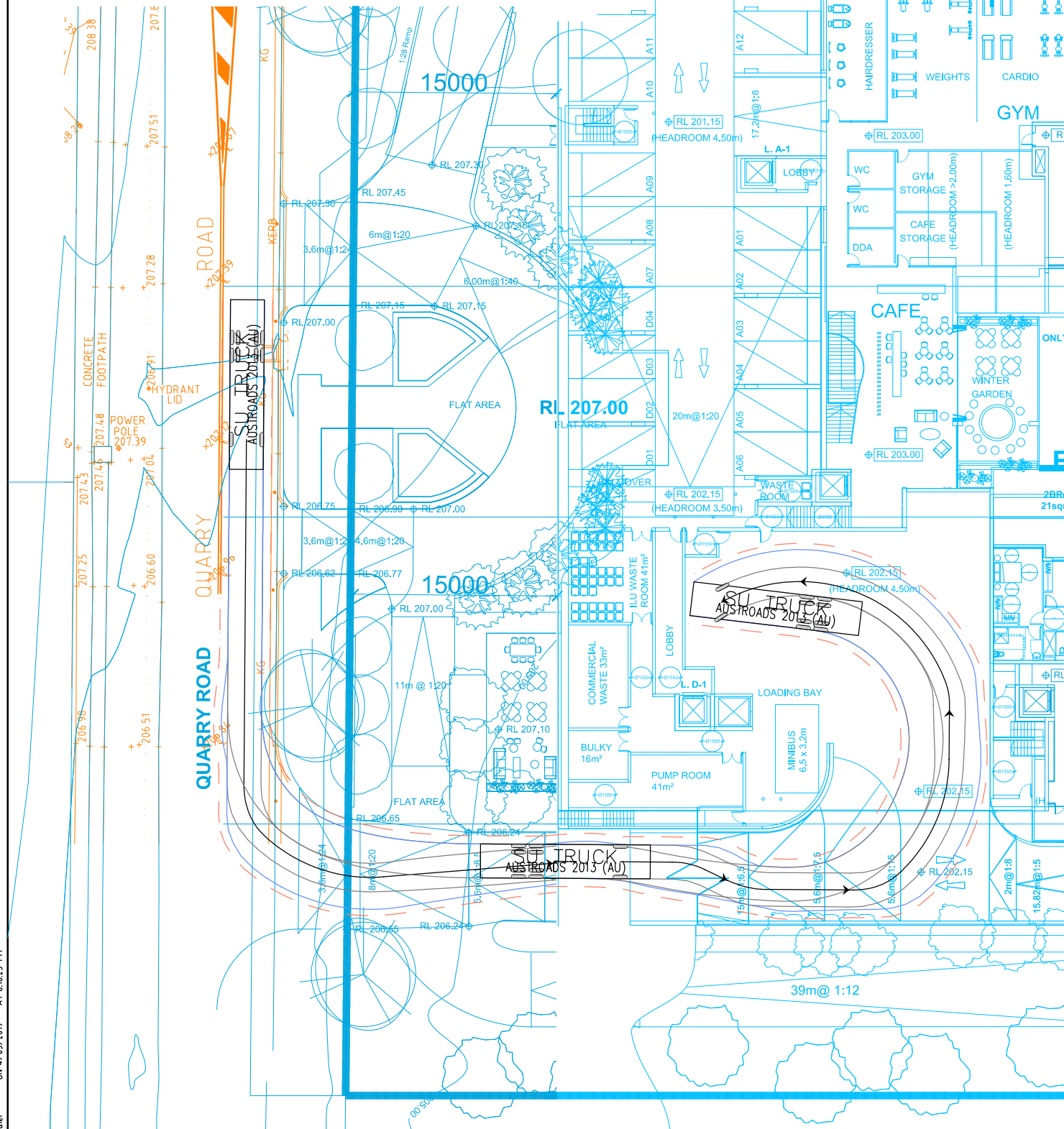
Appendix C

Swept Path Assessment



SU TRUCK metres

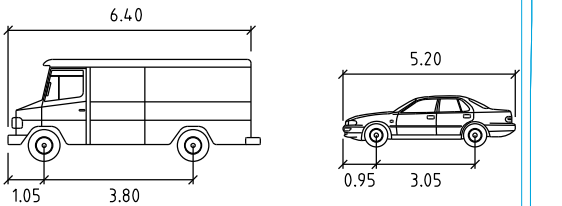
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Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6



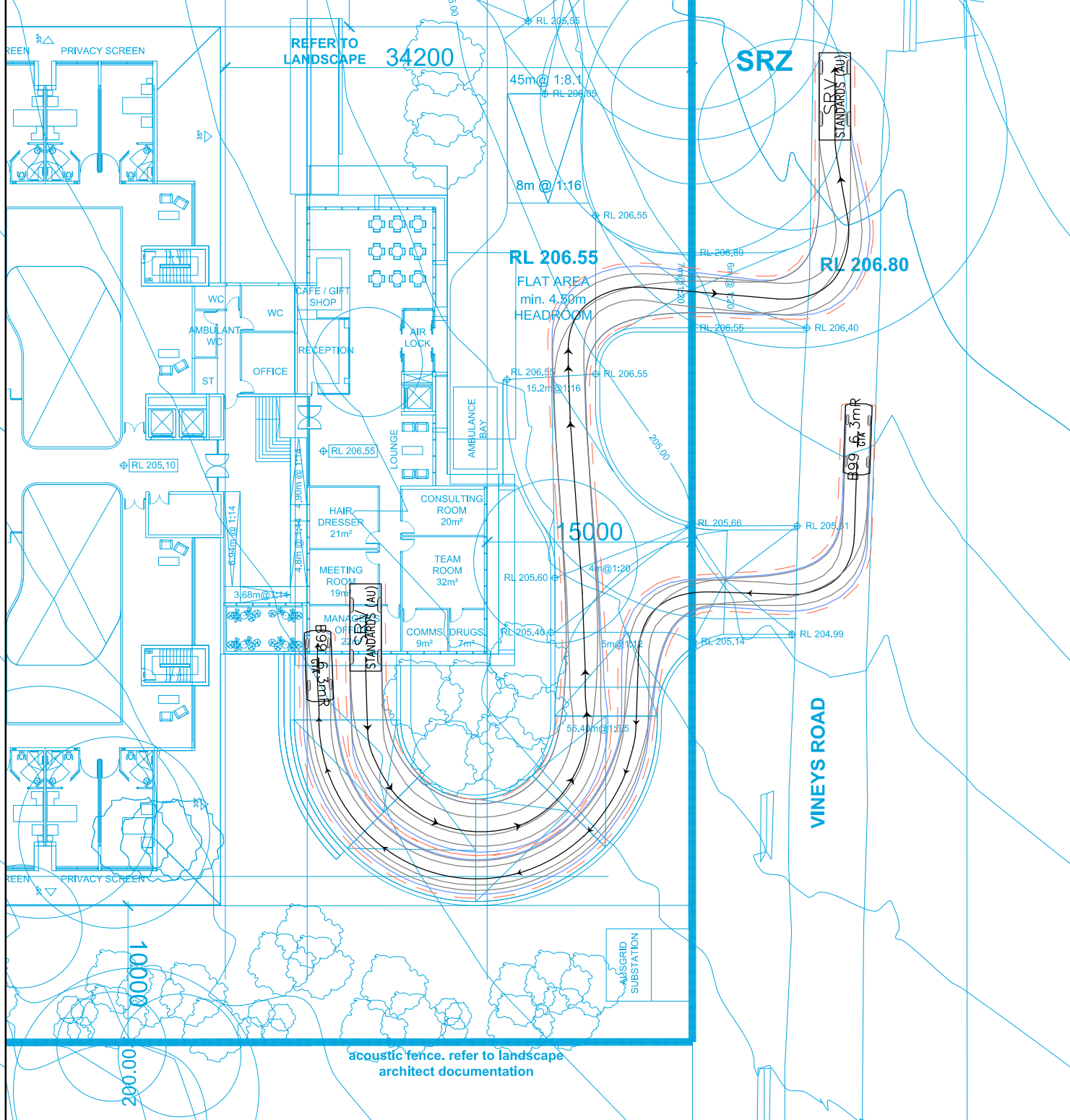
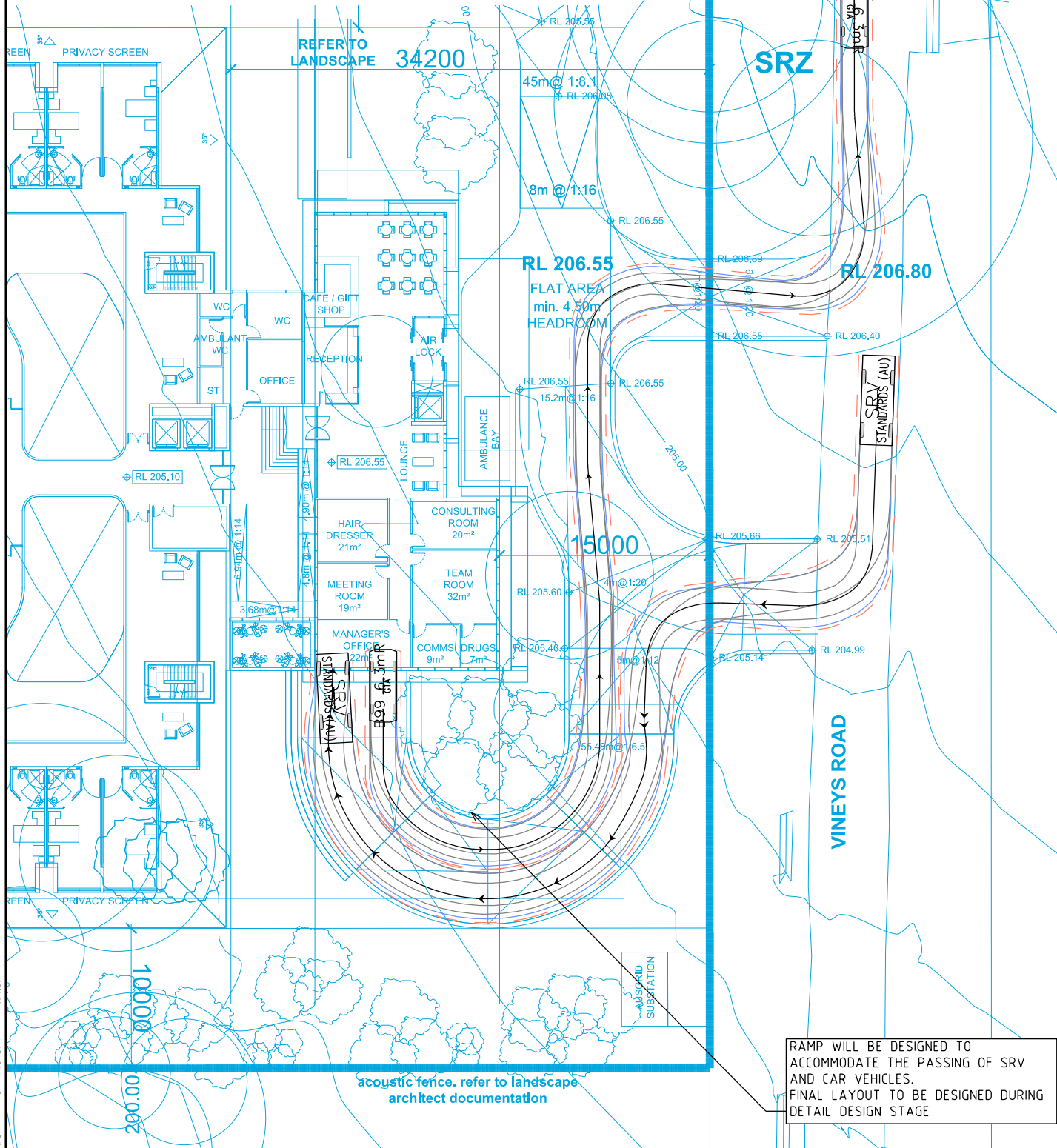
BASE PLANS: ISSUE X DATED 04/03/2019

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



SRV	metres	B99 6.3mR	metres
Width	: 2.30	Width	: 1.94
Track	: 2.30	Track	: 1.77
Lock to Lock Time	: 6.0	Lock to Lock Time	: 6.0
Steering Angle	: 38.0	Steering Angle	: 34.0



RAMP WILL BE DESIGNED TO ACCOMMODATE THE PASSING OF SRV AND CAR VEHICLES. FINAL LAYOUT TO BE DESIGNED DURING DETAIL DESIGN STAGE

ON 17/03/2019 AT 6:16:26 PM
PLOTTED BY : Heiko Obermaier



Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES
ONLY SUBJECT TO CHANGE
WITHOUT NOTIFICATION

DESIGNED
H.OBERMAIER

APPROVED BY
B.MAYNARD

DESIGN CHECK
-

DATE ISSUED
4 MARCH 2019

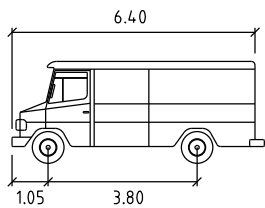
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CAD FILE NO.
N142021-01-P3.dgn

3 QUARRY ROAD, DURAL

RACF LOADING DOCK ACCESS
VEHICLE SWEEP PATH ASSESSMENT
DRAWING NO. N142021-01-02 SHEET 02 OF 13 ISSUE P3

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



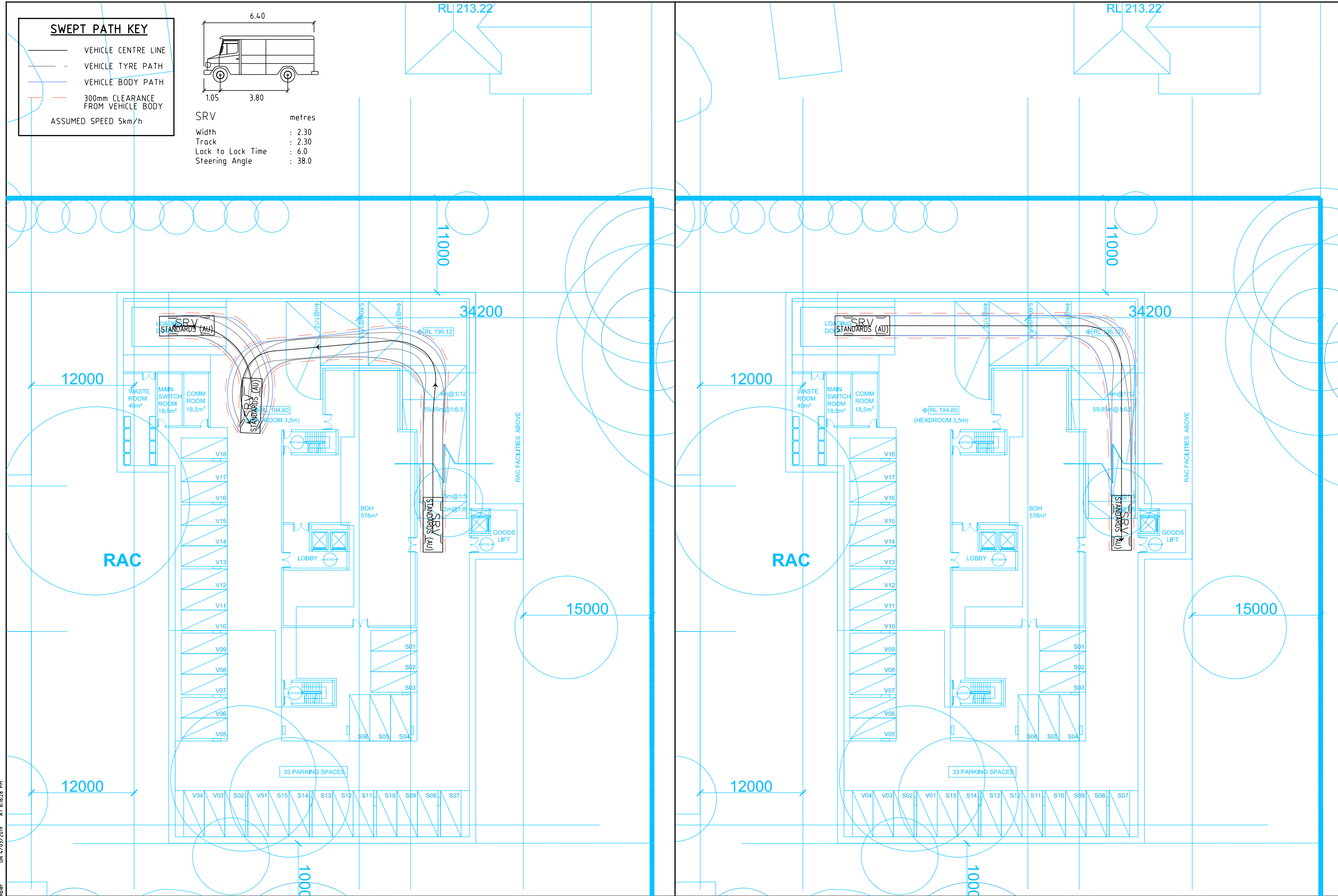
SRV metres

Width : 2.30

Track : 2.30

Lock to Lock Time : 6.0

Steering Angle : 38.0



ON 17/03/2019 AT 6:16:28 PM
PLOTTED BY : Heiko Obermaier



Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

PRELIMINARY PLAN

FOR DISCUSSION PURPOSES
ONLY SUBJECT TO CHANGE
WITHOUT NOTIFICATION

DESIGNED
H.OBERMAIER

DESIGN CHECK
-

APPROVED BY
B.MAYNARD

DATE ISSUED
4 MARCH 2019

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CAD FILE NO.
N142021-01-P3.dgn

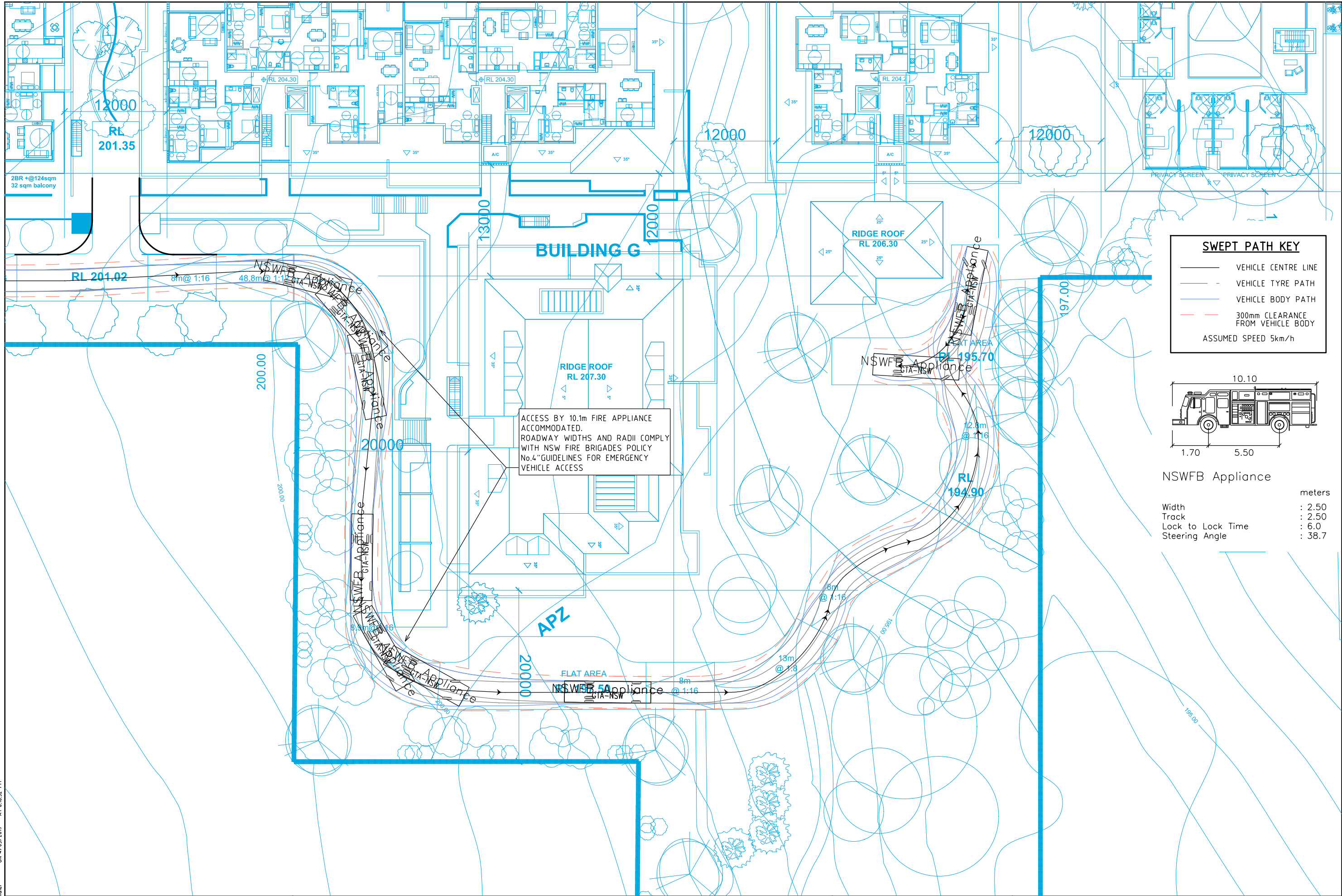
3 QUARRY ROAD, DURAL

**RACF LOADING DOCK ACCESS
VEHICLE SWEEP PATH ASSESSMENT**

DRAWING NO. N142021-01-03

SHEET 03 OF 13

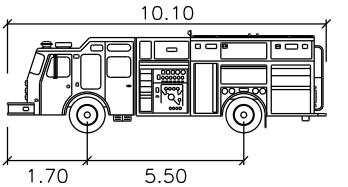
ISSUE P3



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



NSWFB Appliance

	Width	10.10
	Track	1.70
	Lock to Lock Time	5.50
	Steering Angle	

NSWFB Appliance

	Width	: 2.50
	Track	: 2.50
	Lock to Lock Time	: 6.0
	Steering Angle	: 38.7

ON 4/03/2019 AT 6:16:32 PM
PLOTTED BY : Heiko Obermaier



Melbourne 03 9851 9600
Sydney 02 8448 1800
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Adelaide 08 8334 3600
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PRELIMINARY PLAN
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B.MAYNARD

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4 MARCH 2019

SCALE
A3

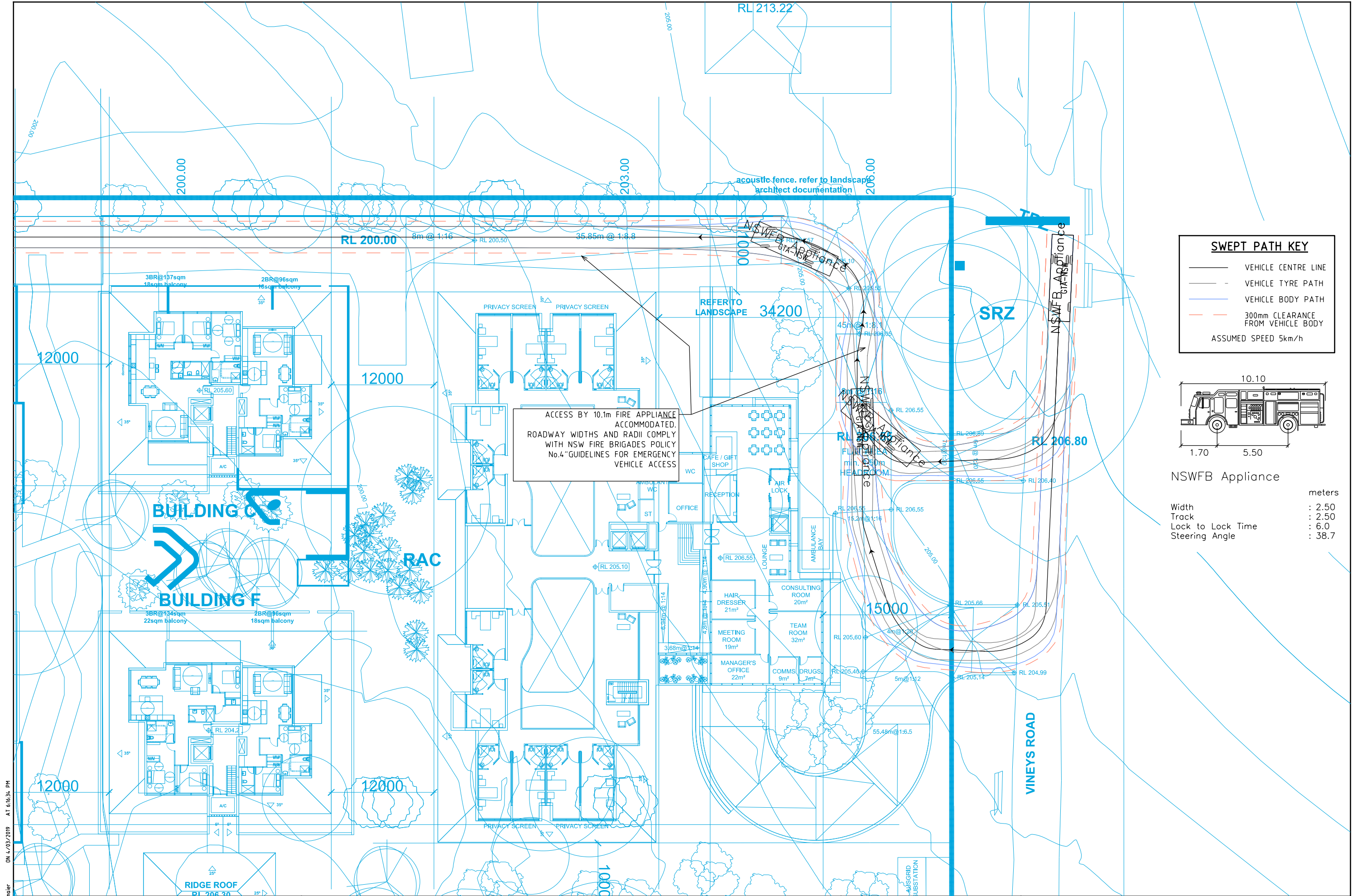


CAD FILE NO.
N142021-01-P3.dgn

3 QUARRY ROAD, DURAL

**NSW FIRE BRIGADE ACCESS - ENTRY FROM QUARRY RD
VEHICLE SWEEP PATH ASSESSMENT**

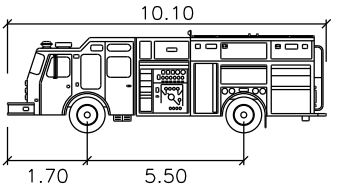
DRAWING NO. N142021-01-05 SHEET 05 OF 13 ISSUE P3



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



NSWFB Appliance

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

ON 17/03/2019 AT 6:16:34 PM
PLOTTED BY : Heiko Obermaier



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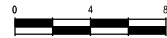
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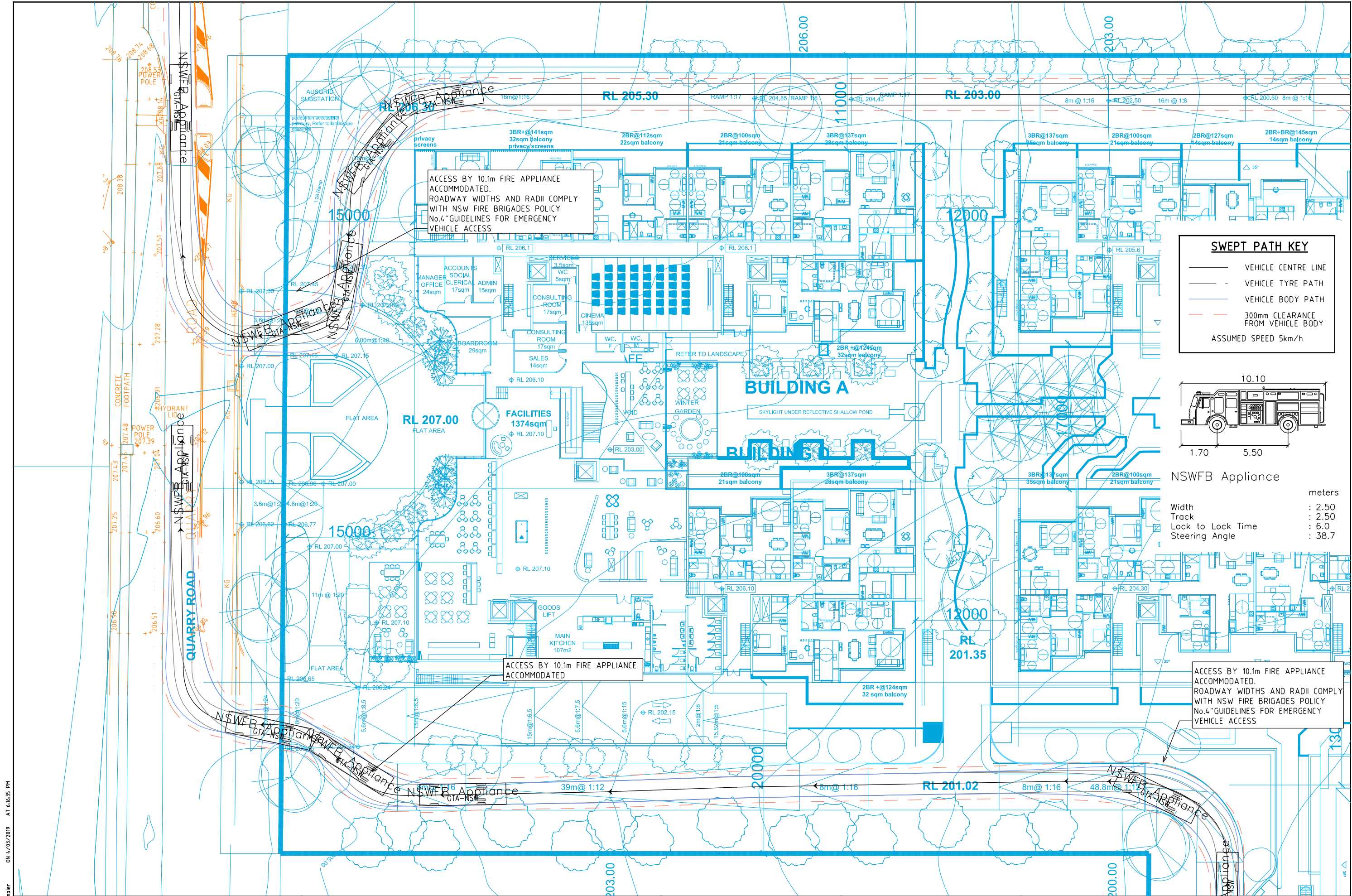
3 QUARRY ROAD, DURAL

**NSW FIRE BRIGADE ACCESS - ENTRY FROM VINEYS RD
VEHICLE SWEEP PATH ASSESSMENT**

DRAWING NO. N142021-01-06

SHEET 06 OF 13

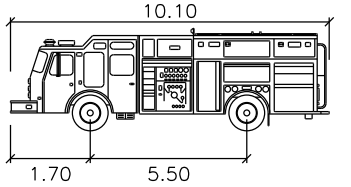
ISSUE P3



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



NSWFB Appliance

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

PLOTTED BY : Heiko Obermaier ON 17/03/2019 AT 6:16:35 PM

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PRELIMINARY PLAN
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DESIGN CHECK
-

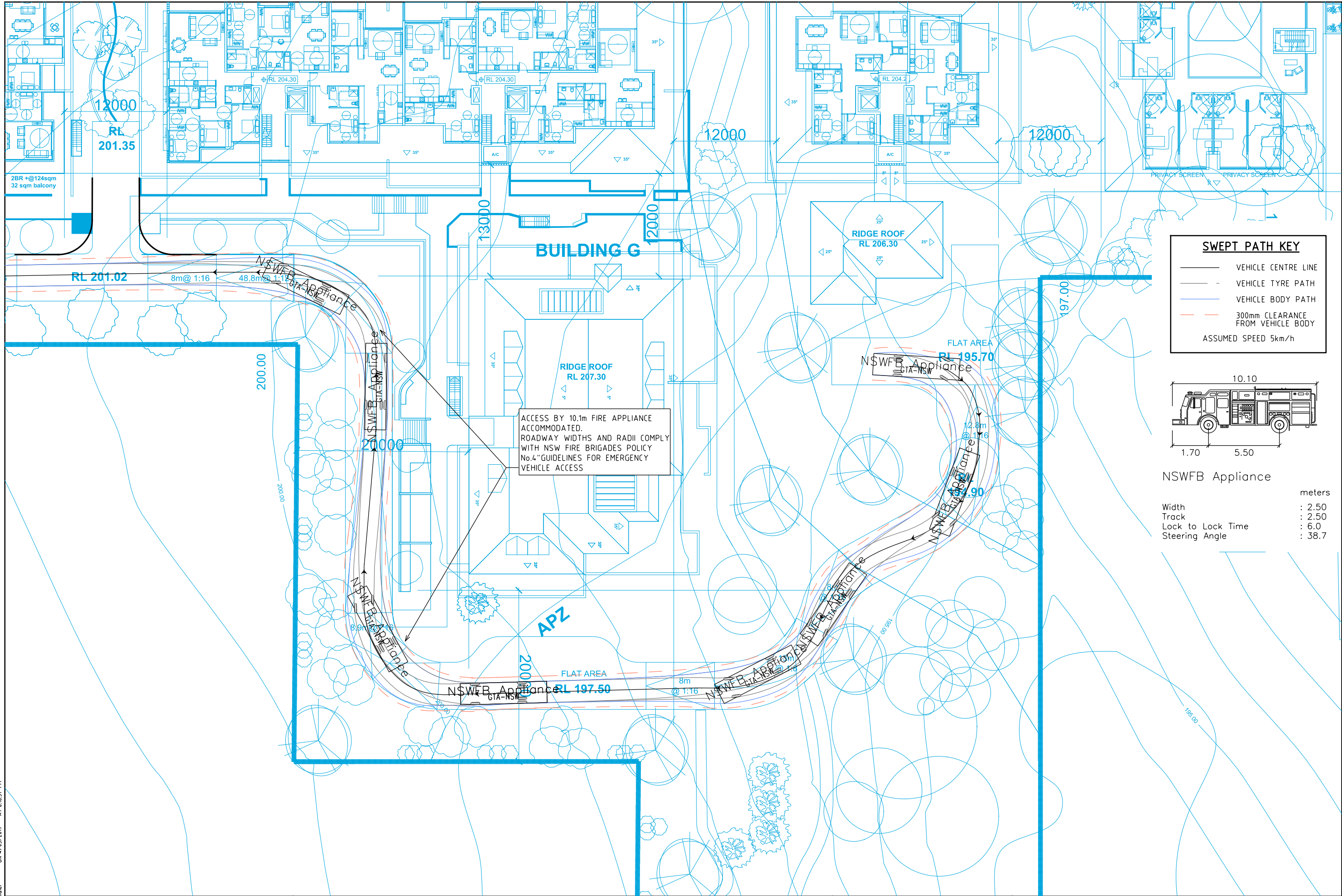
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4 MARCH 2019

SCALE
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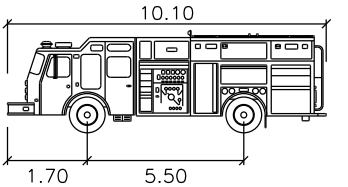
CAD FILE NO.
N142021-01-P3.dgn



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



NSWFB Appliance

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

ON 4/03/2019 AT 6:16:37 PM
PLOTTED BY : Heiko Obermaier



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SCALE
A3
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1:400

CAD FILE NO.
N142021-01-P3.dgn

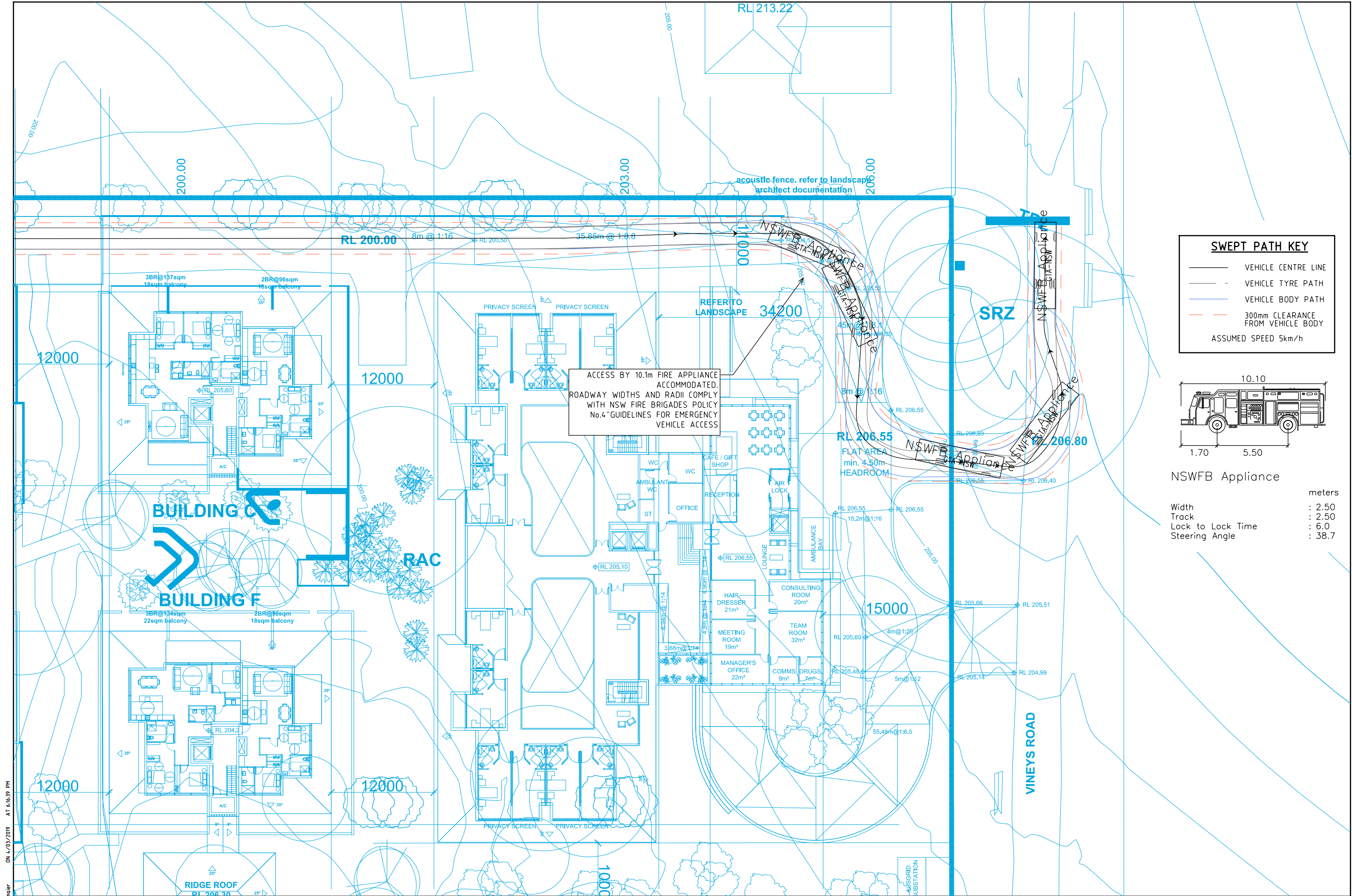
3 QUARRY ROAD, DURAL

**NSW FIRE BRIGADE ACCESS - EXIT TO QUARRY RD
VEHICLE SWEEP PATH ASSESSMENT**

DRAWING NO. N142021-01-08

SHEET 08 OF 13

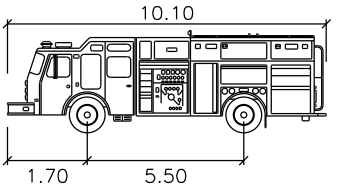
ISSUE P3



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



NSWFB Appliance

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

ACCESS BY 10.1m FIRE APPLIANCE ACCOMMODATED. ROADWAY WIDTHS AND RADII COMPLY WITH NSW FIRE BRIGADES POLICY No.4 "GUIDELINES FOR EMERGENCY VEHICLE ACCESS"

ON 17/03/2019 AT 6:16:39 PM
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SCALE
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CAD FILE NO.
N142021-01-P3.dgn

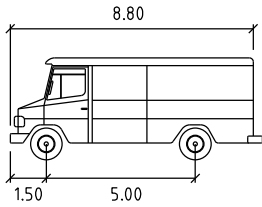
3 QUARRY ROAD, DURAL

**NSW FIRE BRIGADE ACCESS - EXIT TO VINEYS RD
VEHICLE SWEPT PATH ASSESSMENT**

DRAWING NO. N142021-01-09 SHEET 09 OF 13 ISSUE P3

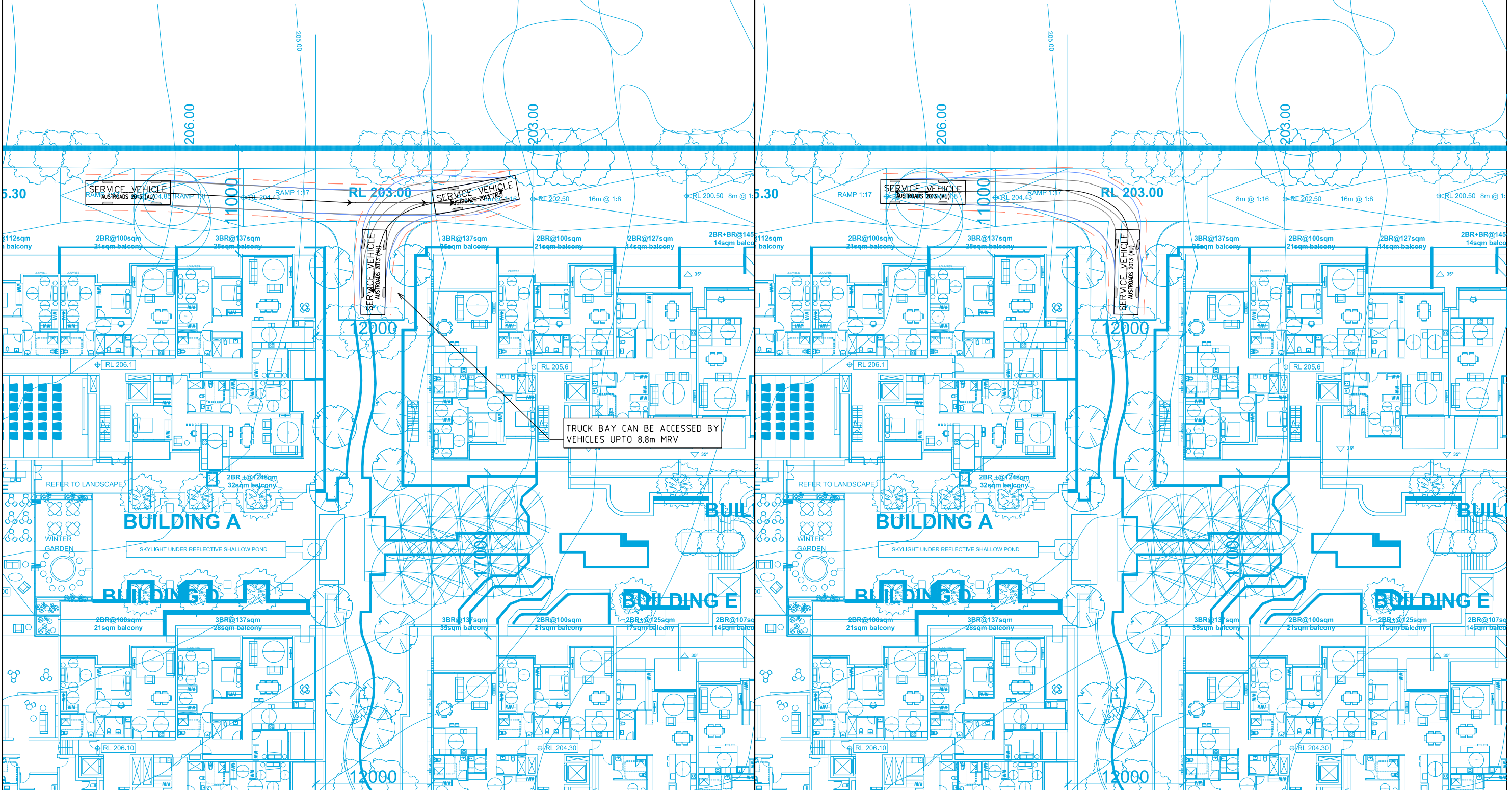
SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



SERVICE VEHICLE metres

Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 38.7



ON 17/03/2019 AT 6:16:41 PM
PLOTTED BY : Heiko Obermaier



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B.MAYNARD

DATE ISSUED
4 MARCH 2019

SCALE
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1:400

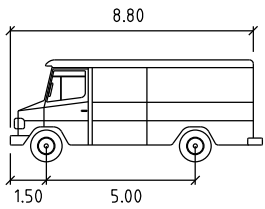
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3 QUARRY ROAD, DURAL

RACF LOADING DOCK ACCESS
VEHICLE SWEEP PATH ASSESSMENT

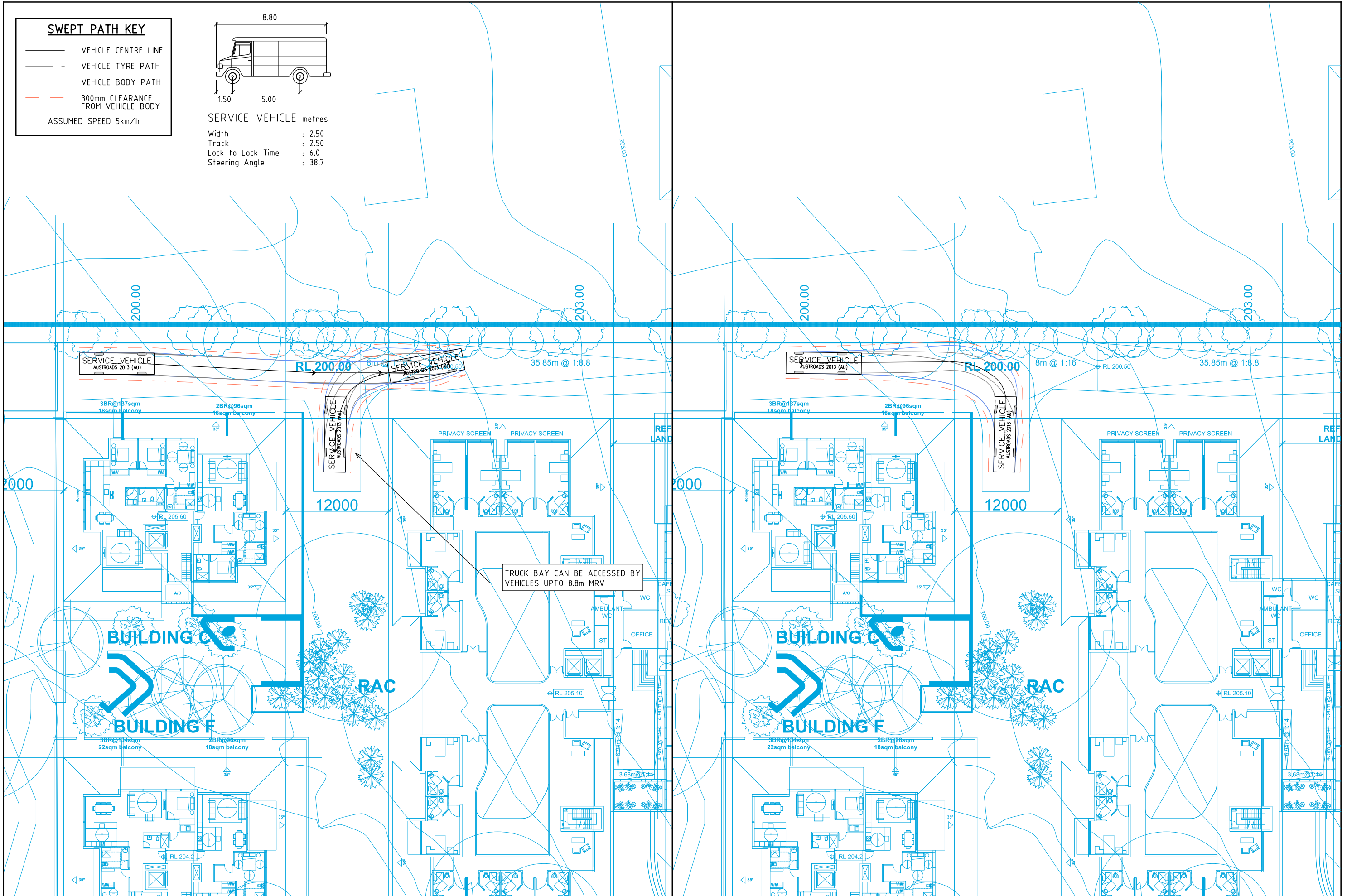
SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



SERVICE VEHICLE metres

Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 38.7



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DATE ISSUED
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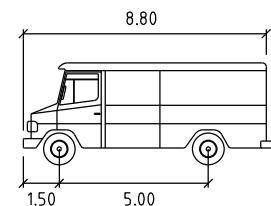
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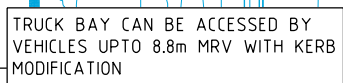
3 QUARRY ROAD, DURAL

RACF LOADING DOCK ACCESS
VEHICLE SWEEP PATH ASSESSMENT

DRAWING NO. N142021-01-11 SHEET 11 OF 13 ISSUE P3



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Width           : 2.50
Track           : 2.50
Lock to Lock Time : 6.0
Steering Angle  : 38.7
```



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WITHOUT NOTIFICATION

DESIGN CHECK

DATE ISSUED
4 MARCH 2019

CAD FILE NO.
N142021-01-P3.dgn

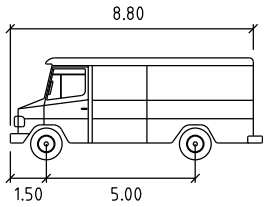
RACF LOADING DOCK ACCESS VEHICLE SWEEP PATH ASSESSMENT

DRAWING NO. N142021-01-12 SHEET 12 OF 13 ISSUE P3

SWEPT PATH KEY

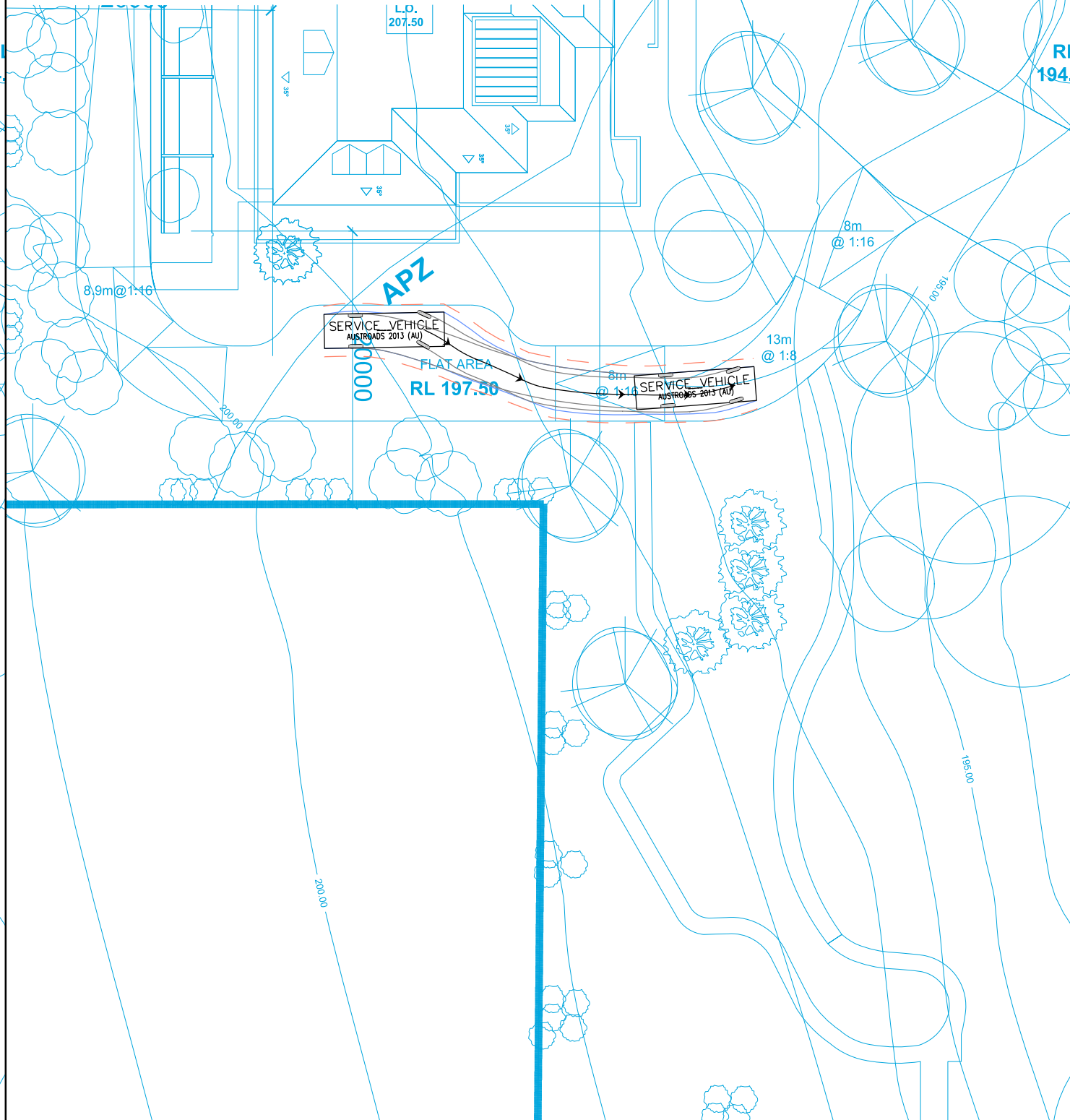
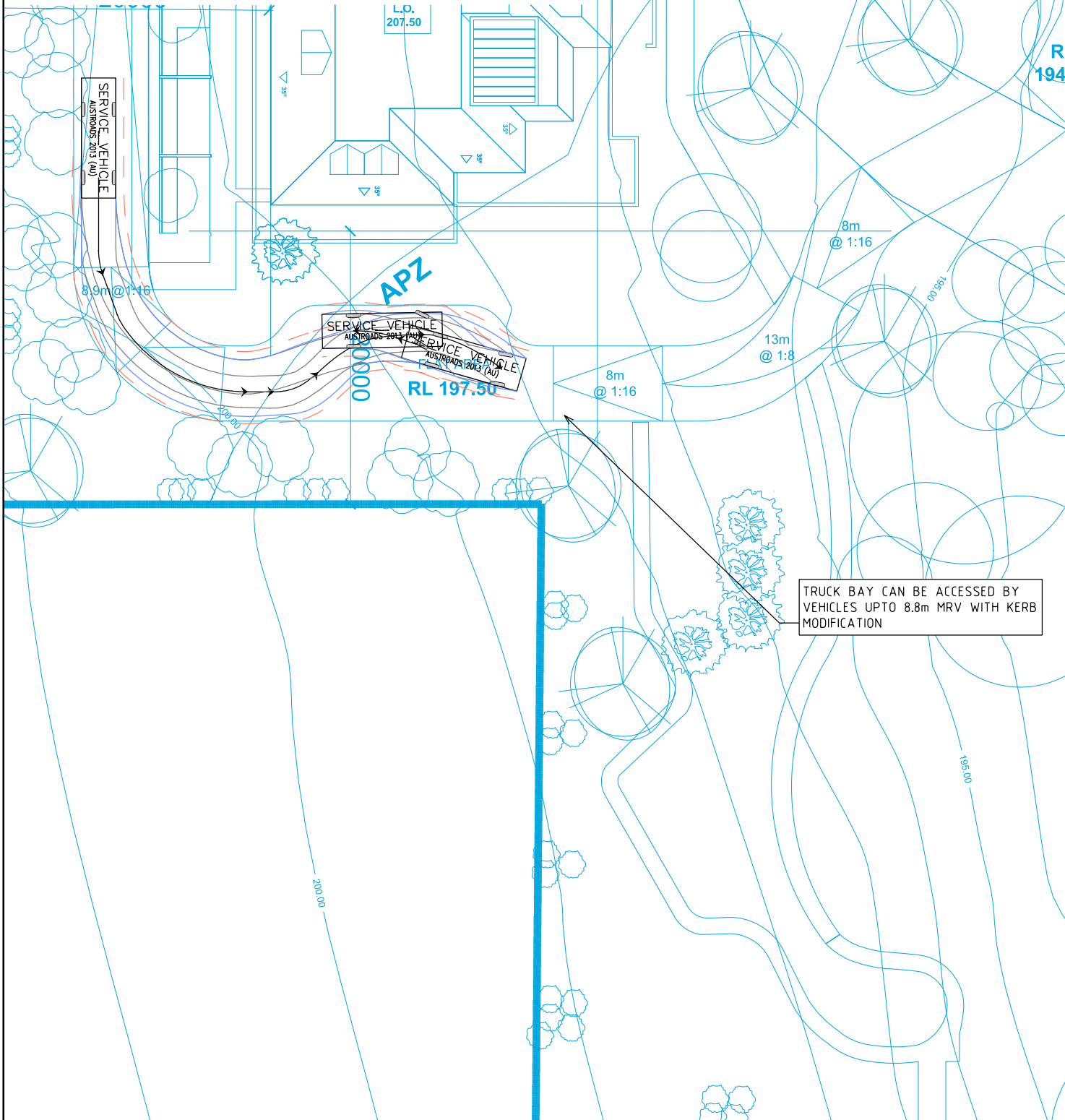
- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



SERVICE VEHICLE metres

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7



PLOTTED BY : Heiko Obermaier ON 17/03/2019 AT 6:16:48 PM



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WITHOUT NOTIFICATION

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B.MAYNARD

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4 MARCH 2019

SCALE
A3 0 4 8 1:400

CAD FILE NO.
N142021-01-P3.dgn

3 QUARRY ROAD, DURAL

**RACF LOADING DOCK ACCESS
VEHICLE SWEPT PATH ASSESSMENT**

DRAWING NO. N142021-01-13

SHEET 13 OF 13

ISSUE P3

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PO Box 7025, Cloisters Square
PERTH WA 6850
P +618 6169 1000
E perth@gta.com.au

ATTACHMENT 2

Updated SIDRA Intersection Modelling results

MOVEMENT SUMMARY

 Site: 1 [1 Old North Road/ New Line Road AM]

 Network: N101 [AM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	417	3.8	417	3.8	0.869	30.3	LOS C	20.3	148.4	1.00	1.43	40.1
2	T1	752	7.0	752	7.0	0.869	32.0	LOS C	20.3	148.4	1.00	1.46	30.1
3	R2	7	0.0	7	0.0	0.869	46.4	LOS D	17.6	131.2	1.00	1.47	28.9
3u	U	16	33.3	16	33.3	0.869	42.2	LOS C	17.6	131.2	1.00	1.47	40.5
Approach		1192	6.2	1192	6.2	0.869	31.6	LOS C	20.3	148.4	1.00	1.45	34.6
East: Site Access													
4	L2	69	7.6	69	7.6	0.156	11.6	LOS A	1.5	11.2	1.00	0.80	35.8
5	T1	41	7.7	41	7.7	0.156	12.8	LOS A	1.5	11.2	1.00	0.85	33.9
6	R2	34	0.0	34	0.0	0.156	13.0	LOS A	1.3	9.2	1.00	0.87	9.0
6u	U	1	0.0	1	0.0	0.156	13.0	LOS A	1.3	9.2	1.00	0.87	10.2
Approach		145	5.8	145	5.8	0.156	12.3	LOS A	1.5	11.2	1.00	0.83	31.0
North: Old Northern Road													
7	L2	29	0.0	29	0.0	0.569	10.2	LOS A	4.0	28.9	0.50	0.62	35.4
8	T1	651	5.3	651	5.3	0.800	6.7	LOS A	10.2	73.5	0.53	0.66	52.5
9	R2	801	3.2	801	3.2	0.800	13.5	LOS A	10.2	73.5	0.65	0.81	48.9
9u	U	1	0.0	1	0.0	0.800	15.8	LOS B	10.2	73.5	0.65	0.81	33.2
Approach		1482	4.0	1482	4.0	0.800	10.5	LOS A	10.2	73.5	0.59	0.74	50.3
West: Old Northern Road													
10	L2	796	4.9	796	4.9	0.950	24.0	LOS B	19.0	138.9	1.00	1.56	33.9
11	T1	24	8.7	24	8.7	0.527	18.3	LOS B	3.3	24.7	0.81	0.99	39.4
12	R2	284	6.7	284	6.7	0.527	14.8	LOS B	3.3	24.7	0.81	0.99	50.0
12u	U	1	0.0	1	0.0	0.527	16.9	LOS B	3.3	24.7	0.81	0.99	51.4
Approach		1105	5.4	1105	5.4	0.950	21.5	LOS B	19.0	138.9	0.95	1.40	39.3
All Vehicles		3924	5.2	3924	5.2	0.950	20.1	LOS B	20.3	148.4	0.83	1.15	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.8 %

Number of Iterations: 5 (maximum specified: 10)

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural.sip7

MOVEMENT SUMMARY



Site: 2 [2 Old Northern Road/ Quarry Road AM]



Network: N101 [AM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	960	7.9	960	7.9	0.336	4.9	LOS A	9.2	69.0	0.34	0.30	43.0
3	R2	646	2.6	646	2.6	0.913	57.7	LOS E	26.7	191.4	0.89	0.90	24.9
Approach		1606	5.8	1606	5.8	0.913	26.1	LOS B	26.7	191.4	0.56	0.54	28.6
East: Quarry Road													
4	L2	346	3.3	346	3.3	0.376	26.2	LOS B	13.1	94.7	0.65	0.77	32.5
6	R2	61	10.3	61	10.3	0.255	60.5	LOS E	3.5	26.9	0.93	0.76	20.3
Approach		407	4.4	407	4.4	0.376	31.3	LOS C	13.1	94.7	0.69	0.77	29.8
North: Old Northern Road													
7	L2	142	6.7	142	6.7	0.847	47.5	LOS D	38.1	277.4	0.96	0.92	30.9
8	T1	1134	4.3	1134	4.3	0.847	42.3	LOS C	39.3	285.4	0.97	0.93	17.8
Approach		1276	4.5	1276	4.5	0.847	42.8	LOS D	39.3	285.4	0.97	0.93	19.9
All Vehicles		3289	5.1	3289	5.1	0.913	33.3	LOS C	39.3	285.4	0.73	0.72	25.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.8 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	29.9	LOS C	0.1	0.1	0.68	0.68
All Pedestrians		105	44.6	LOS E			0.82	0.82

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural.sip7

MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road AM]

Network: N101 [AM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1036	8.0	1036	8.0	0.559	2.3	LOS A	0.0	0.0	0.00	0.36	56.8
3b	R3	29	3.6	29	3.6	0.144	23.9	LOS B	0.4	3.1	0.90	0.96	36.4
Approach		1065	7.9	1065	7.9	0.559	2.9	NA	0.4	3.1	0.02	0.37	55.9
SouthEast: Vineys Road													
21b	L3	26	4.0	26	4.0	0.140	22.7	LOS B	0.4	2.8	0.89	0.95	31.2
23a	R1	5	0.0	5	0.0	0.109	64.7	LOS E	0.2	1.7	0.96	0.98	24.8
Approach		32	3.3	32	3.3	0.140	29.7	LOS C	0.4	2.8	0.90	0.96	29.1
North: Old Northern Road													
7a	L1	8	0.0	8	0.0	0.702	3.2	LOS A	0.0	0.0	0.00	0.00	39.7
8	T1	1249	5.1	1249	5.1	0.702	0.2	LOS A	0.0	0.0	0.00	0.00	39.8
Approach		1258	5.0	1258	5.0	0.702	0.2	NA	0.0	0.0	0.00	0.00	39.8
All Vehicles		2355	6.3	2355	6.3	0.702	1.8	NA	0.4	3.1	0.02	0.18	47.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.8 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY



Site: 2 [2 Old Northern Road/ Quarry Road PM]



Network: N101 [PM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1023	7.3	1023	7.3	0.357	5.0	LOS A	10.1	74.8	0.34	0.31	42.7
3	R2	179	1.8	179	1.8	0.324	55.9	LOS D	5.9	41.9	0.91	0.77	25.4
Approach		1202	6.5	1202	6.5	0.357	12.6	LOS A	10.1	74.8	0.43	0.38	34.0
East: Quarry Road													
4	L2	319	2.0	319	2.0	0.530	39.9	LOS C	15.5	110.6	0.83	0.81	26.2
6	R2	57	1.9	57	1.9	0.224	60.0	LOS E	3.3	23.2	0.93	0.75	20.4
Approach		376	2.0	376	2.0	0.530	42.9	LOS D	15.5	110.6	0.84	0.80	25.1
North: Old Northern Road													
7	L2	49	4.3	49	4.3	0.538	25.4	LOS B	22.0	159.2	0.69	0.63	41.0
8	T1	1067	3.6	1067	3.6	0.538	19.9	LOS B	22.4	161.9	0.69	0.63	28.4
Approach		1117	3.7	1117	3.7	0.538	20.2	LOS B	22.4	161.9	0.69	0.63	29.4
All Vehicles		2695	4.7	2695	4.7	0.538	20.0	LOS B	22.4	161.9	0.59	0.54	29.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 1 [1 Old North Road/ New Line Road PM]

 Network: N101 [PM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	368	7.1	368	7.1	0.700	11.9	LOS A	7.4	55.6	0.96	1.12	50.0
2	T1	541	9.1	541	9.1	0.700	13.0	LOS A	7.4	55.6	0.95	1.12	42.0
3	R2	28	0.0	28	0.0	0.700	27.0	LOS B	6.7	51.5	0.94	1.12	39.0
3u	U	36	47.1	36	47.1	0.700	23.4	LOS B	6.7	51.5	0.94	1.12	49.9
Approach		974	9.5	974	9.5	0.700	13.4	LOS A	7.4	55.6	0.95	1.12	46.2
East: Site Access													
4	L2	94	9.0	94	9.0	0.357	11.6	LOS A	2.7	20.0	1.00	1.03	35.2
5	T1	115	2.8	115	2.8	0.357	13.1	LOS A	2.7	20.0	0.98	1.04	34.2
6	R2	56	1.9	56	1.9	0.357	14.8	LOS B	2.4	16.8	0.96	1.05	8.5
6u	U	1	0.0	1	0.0	0.357	14.7	LOS B	2.4	16.8	0.96	1.05	9.7
Approach		265	4.8	265	4.8	0.357	12.9	LOS A	2.7	20.0	0.98	1.04	31.0
North: Old Northern Road													
7	L2	56	0.0	56	0.0	0.650	13.6	LOS A	5.3	38.6	0.70	0.87	31.5
8	T1	655	4.7	655	4.7	0.913	12.5	LOS A	17.8	128.3	0.76	0.99	47.1
9	R2	664	3.0	664	3.0	0.913	23.6	LOS B	17.8	128.3	0.89	1.24	41.8
9u	U	1	0.0	1	0.0	0.913	25.8	LOS B	17.8	128.3	0.89	1.24	24.7
Approach		1376	3.7	1376	3.7	0.913	17.9	LOS B	17.8	128.3	0.82	1.11	44.0
West: Old Northern Road													
10	L2	598	4.8	598	4.8	0.640	7.9	LOS A	5.4	39.4	0.83	0.96	47.9
11	T1	54	0.0	54	0.0	0.626	17.5	LOS B	4.9	36.0	0.82	1.02	39.6
12	R2	429	7.1	429	7.1	0.626	14.4	LOS A	4.9	36.0	0.82	1.02	50.2
12u	U	1	0.0	1	0.0	0.626	16.5	LOS B	4.9	36.0	0.82	1.02	51.6
Approach		1082	5.4	1082	5.4	0.640	11.0	LOS A	5.4	39.4	0.82	0.99	48.7
All Vehicles		3697	5.8	3697	5.8	0.913	14.3	LOS A	17.8	128.3	0.87	1.07	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road PM]

Network: N101 [PM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1087	4.8	1087	4.8	0.575	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	51	50.0	51	50.0	0.273	29.7	LOS C	0.9	9.1	0.90	0.99	33.6
Approach		1138	6.8	1138	6.8	0.575	1.4	NA	0.9	9.1	0.04	0.04	57.8
SouthEast: Vineys Road													
21b	L3	28	3.7	28	3.7	0.085	15.3	LOS B	0.3	1.9	0.81	0.92	35.6
23a	R1	3	0.0	3	0.0	0.042	43.0	LOS D	0.1	0.7	0.94	0.97	32.5
Approach		32	3.3	32	3.3	0.085	18.1	LOS B	0.3	1.9	0.82	0.92	35.0
North: Old Northern Road													
7a	L1	4	0.0	4	0.0	0.571	5.1	LOS A	0.0	0.0	0.00	0.00	57.8
8	T1	1085	3.4	1085	3.4	0.571	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1089	3.4	1089	3.4	0.571	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2259	5.1	2259	5.1	0.575	1.0	NA	0.9	9.1	0.03	0.04	58.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 1 [1 Old North Road/ New Line Road AM 2021 ex w dev]

 Network: N101 [2021 AM Peak w Dev]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	435	3.8	435	3.8	0.992	65.8	LOS E	38.6	281.8	1.00	2.13	29.0
2	T1	791	7.0	791	7.0	0.992	68.0	LOS E	38.6	281.8	1.00	2.09	19.4
3	R2	7	0.0	7	0.0	0.992	82.6	LOS F	32.3	241.1	1.00	2.07	19.1
3u	U	17	33.3	17	33.3	0.992	78.6	LOS F	32.3	241.1	1.00	2.07	29.1
Approach		1249	6.2	1249	6.2	0.992	67.4	LOS E	38.6	281.8	1.00	2.10	23.4
East: Site Access													
4	L2	73	7.6	73	7.6	0.185	13.1	LOS A	1.8	13.2	1.00	0.84	34.8
5	T1	43	7.7	43	7.7	0.185	14.5	LOS B	1.8	13.2	1.00	0.88	33.0
6	R2	35	0.0	35	0.0	0.185	14.8	LOS B	1.5	10.7	1.00	0.90	8.6
6u	U	1	0.0	1	0.0	0.185	14.8	LOS B	1.5	10.7	1.00	0.90	9.8
Approach		152	5.8	152	5.8	0.185	13.9	LOS A	1.8	13.2	1.00	0.86	30.1
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.608	10.7	LOS A	4.6	33.4	0.53	0.66	35.1
8	T1	687	5.3	687	5.3	0.854	7.4	LOS A	13.0	93.4	0.58	0.71	51.9
9	R2	843	3.2	843	3.2	0.854	14.9	LOS B	13.0	93.4	0.73	0.88	47.7
9u	U	1	0.0	1	0.0	0.854	17.2	LOS B	13.0	93.4	0.73	0.88	31.6
Approach		1562	4.1	1562	4.1	0.854	11.5	LOS A	13.0	93.4	0.66	0.80	49.4
West: Old Northern Road													
10	L2	837	4.9	837	4.9	1.029	56.9	LOS E	38.6	281.4	1.00	2.39	21.2
11	T1	25	8.7	25	8.7	0.568	19.0	LOS B	3.7	27.7	0.83	1.01	38.8
12	R2	296	6.7	296	6.7	0.568	15.6	LOS B	3.7	27.7	0.83	1.01	49.5
12u	U	1	0.0	1	0.0	0.568	17.6	LOS B	3.7	27.7	0.83	1.01	50.9
Approach		1159	5.4	1159	5.4	1.029	45.5	LOS D	38.6	281.4	0.95	2.01	28.1
All Vehicles		4122	5.2	4122	5.2	1.029	38.1	LOS C	38.6	281.8	0.86	1.54	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.4 %

Number of Iterations: 10 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 2 [2 Old Northern Road/ Quarry Road AM 2021 ex w dev]

 Network: N101 [2021 AM Peak w Dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1012	7.9	998	7.9	0.350	5.0	LOS A	9.7	72.8	0.34	0.31	42.8
3	R2	677	2.6	667	2.6	0.957	66.9	LOS E	31.2	223.2	0.90	0.94	22.9
Approach		1688	5.8	1665 ^{N1}	5.8	0.957	29.8	LOS C	31.2	223.2	0.56	0.56	26.6
East: Quarry Road													
4	L2	375	3.3	375	3.3	0.407	26.6	LOS B	14.5	104.5	0.67	0.78	32.3
6	R2	66	10.3	66	10.3	0.277	60.8	LOS E	3.8	29.3	0.94	0.76	20.3
Approach		441	4.4	441	4.4	0.407	31.7	LOS C	14.5	104.5	0.71	0.77	29.6
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.912	59.2	LOS E	47.4	345.5	1.00	1.03	27.5
8	T1	1184	4.3	1184	4.3	0.912	53.8	LOS D	47.4	345.5	0.99	1.03	15.0
Approach		1333	4.5	1333	4.5	0.912	54.4	LOS D	47.4	345.5	0.99	1.03	16.9
All Vehicles		3462	5.1	3439 ^{N1}	5.2	0.957	39.6	LOS C	47.4	345.5	0.75	0.77	22.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	29.9	LOS C	0.1	0.1	0.68	0.68	
All Pedestrians		105	44.6	LOS E			0.82	0.82	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road AM 2021 ex w dev]

Network: N101 [2021 AM Peak w Dev]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1082	8.0	1069	8.0	0.577	2.3	LOS A	0.0	0.0	0.00	0.36	56.8
3b	R3	41	3.6	41	3.6	0.243	30.2	LOS C	0.7	5.3	0.93	0.99	33.7
Approach		1123	7.9	1109 ^{N1}	7.9	0.577	3.3	NA	0.7	5.3	0.03	0.38	55.4
SouthEast: Vineys Road													
21b	L3	31	4.0	31	4.0	0.240	28.7	LOS C	0.6	4.0	0.92	0.98	28.4
23a	R1	6	0.0	6	0.0	0.170	86.4	LOS F	0.4	2.7	0.97	0.99	21.6
Approach		37	3.3	37	3.3	0.240	38.6	LOS C	0.6	4.0	0.93	0.98	26.1
North: Old Northern Road													
7a	L1	11	0.0	11	0.0	0.896	3.9	LOS A	0.0	0.0	0.00	0.00	39.1
8	T1	1303	5.1	1303	5.1	0.896	0.9	LOS A	0.0	0.0	0.00	0.00	39.2
Approach		1314	5.0	1314	5.0	0.896	0.9	NA	0.0	0.0	0.00	0.00	39.2
All Vehicles		2474	6.3	2460 ^{N1}	6.3	0.896	2.6	NA	0.7	5.3	0.03	0.19	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.4 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

 Site: 1 [1 Old North Road/ New Line Road PM 2021 ex w dev]

 Network: N101 [2021 PM Peak w Dev]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	384	7.1	384	7.1	0.798	15.6	LOS B	9.9	73.9	1.00	1.23	47.7
2	T1	577	9.1	577	9.1	0.798	17.0	LOS B	9.9	73.9	1.00	1.23	38.7
3	R2	29	0.0	29	0.0	0.798	31.2	LOS C	8.8	67.4	1.00	1.23	36.1
3u	U	37	47.1	37	47.1	0.798	27.8	LOS B	8.8	67.4	1.00	1.23	47.2
Approach		1027	9.5	1027	9.5	0.798	17.3	LOS B	9.9	73.9	1.00	1.23	43.2
East: Site Access													
4	L2	98	9.0	98	9.0	0.436	16.4	LOS B	3.5	25.5	1.00	1.19	32.4
5	T1	120	2.8	120	2.8	0.436	18.1	LOS B	3.5	25.5	0.99	1.20	31.6
6	R2	58	1.9	58	1.9	0.436	20.3	LOS B	2.9	21.0	0.98	1.20	7.4
6u	U	1	0.0	1	0.0	0.436	20.1	LOS B	2.9	21.0	0.98	1.20	8.5
Approach		277	4.8	277	4.8	0.436	17.9	LOS B	3.5	25.5	0.99	1.20	28.4
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.706	14.9	LOS B	6.4	46.5	0.75	0.94	30.1
8	T1	688	4.7	688	4.7	0.991	19.6	LOS B	32.9	237.1	0.83	1.21	41.8
9	R2	698	3.0	698	3.0	0.991	42.5	LOS C	32.9	237.1	0.99	1.78	32.4
9u	U	1	0.0	1	0.0	0.991	44.7	LOS D	32.9	237.1	0.99	1.78	16.4
Approach		1445	3.7	1445	3.7	0.991	30.5	LOS C	32.9	237.1	0.90	1.48	36.3
West: Old Northern Road													
10	L2	638	4.8	638	4.8	0.708	9.1	LOS A	6.7	48.7	0.88	1.04	46.5
11	T1	58	0.0	58	0.0	0.685	18.6	LOS B	5.8	42.8	0.87	1.06	38.7
12	R2	447	7.1	447	7.1	0.685	15.6	LOS B	5.8	42.8	0.87	1.06	49.4
12u	U	1	0.0	1	0.0	0.685	17.6	LOS B	5.8	42.8	0.87	1.06	50.8
Approach		1144	5.4	1144	5.4	0.708	12.1	LOS A	6.7	48.7	0.88	1.05	47.7
All Vehicles		3894	5.8	3894	5.8	0.991	20.7	LOS B	32.9	237.1	0.93	1.27	40.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.6 %

Number of Iterations: 10 (maximum specified: 10)

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Organisation: GTA CONSULTANTS | Processed: Tuesday, 9 April 2019 9:25:31 AM

Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

 Site: 2 [2 Old Northern Road/ Quarry Road PM 2021 ex w dev]

 Network: N101 [2021 PM Peak w Dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1074	7.3	1074	7.3	0.375	5.1	LOS A	10.8	80.1	0.35	0.32	42.5
3	R2	206	1.8	206	1.8	0.410	58.5	LOS E	7.0	49.9	0.93	0.78	24.7
Approach		1280	6.4	1280	6.4	0.410	13.7	LOS A	10.8	80.1	0.44	0.39	33.1
East: Quarry Road													
4	L2	337	2.0	337	2.0	0.588	42.0	LOS C	17.0	121.2	0.86	0.82	25.5
6	R2	60	1.9	60	1.9	0.236	60.1	LOS E	3.4	24.5	0.93	0.75	20.4
Approach		397	2.0	397	2.0	0.588	44.8	LOS D	17.0	121.2	0.87	0.81	24.5
North: Old Northern Road													
7	L2	56	4.3	56	4.3	0.586	25.0	LOS B	25.0	180.6	0.70	0.65	41.3
8	T1	1119	3.6	1119	3.6	0.586	19.6	LOS B	25.0	180.6	0.70	0.64	28.6
Approach		1175	3.7	1175	3.7	0.586	19.8	LOS B	25.0	180.6	0.70	0.64	29.7
All Vehicles		2852	4.7	2852	4.7	0.588	20.6	LOS B	25.0	180.6	0.61	0.55	29.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.6 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	17.3	LOS B	0.1	0.1	0.52	0.52
All Pedestrians		105	38.3	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road PM 2021 ex w dev]

Network: N101 [2021 PM Peak w Dev]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1136	4.8	1136	4.8	0.601	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	59	50.0	59	50.0	0.383	37.5	LOS C	1.3	13.0	0.93	1.03	30.8
Approach		1195	7.1	1195	7.1	0.601	1.9	NA	1.3	13.0	0.05	0.05	57.1
SouthEast: Vineys Road													
21b	L3	36	3.7	36	3.7	0.123	17.1	LOS B	0.4	2.8	0.84	0.93	34.4
23a	R1	4	0.0	4	0.0	0.071	53.5	LOS D	0.2	1.2	0.95	0.98	29.7
Approach		40	3.3	40	3.3	0.123	20.9	LOS B	0.4	2.8	0.85	0.93	33.4
North: Old Northern Road													
7a	L1	5	0.0	5	0.0	0.599	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1137	3.4	1137	3.4	0.599	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1142	3.4	1142	3.4	0.599	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2377	5.2	2377	5.2	0.601	1.4	NA	1.3	13.0	0.04	0.04	57.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 5.6 %

Number of Iterations: 10 (maximum specified: 10)

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY



Site: 1 [1 Old North Road/ New Line Road AM 2021 wo dev]



Network: N101 [2021 AM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	435	3.8	435	3.8	0.971	56.5	LOS D	34.2	249.5	1.00	1.96	31.3
2	T1	783	7.0	783	7.0	0.971	58.6	LOS E	34.2	249.5	1.00	1.94	21.4
3	R2	7	0.0	7	0.0	0.971	73.2	LOS F	28.8	214.7	1.00	1.93	20.9
3u	U	17	33.3	17	33.3	0.971	69.2	LOS E	28.8	214.7	1.00	1.93	31.4
Approach		1242	6.2	1242	6.2	0.971	58.1	LOS E	34.2	249.5	1.00	1.95	25.6
East: Site Access													
4	L2	73	7.6	73	7.6	0.181	12.9	LOS A	1.8	13.1	1.00	0.83	34.9
5	T1	43	7.7	43	7.7	0.181	14.4	LOS A	1.8	13.1	1.00	0.87	33.1
6	R2	35	0.0	35	0.0	0.181	14.6	LOS B	1.5	10.6	1.00	0.89	8.6
6u	U	1	0.0	1	0.0	0.181	14.6	LOS B	1.5	10.6	1.00	0.89	9.8
Approach		152	5.8	152	5.8	0.181	13.7	LOS A	1.8	13.1	1.00	0.85	30.2
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.601	10.6	LOS A	4.5	32.6	0.53	0.65	35.2
8	T1	679	5.3	679	5.3	0.845	7.3	LOS A	12.4	89.5	0.57	0.70	52.0
9	R2	835	3.2	835	3.2	0.845	14.7	LOS B	12.4	89.5	0.71	0.87	47.9
9u	U	1	0.0	1	0.0	0.845	17.0	LOS B	12.4	89.5	0.71	0.87	31.8
Approach		1545	4.0	1545	4.0	0.845	11.4	LOS A	12.4	89.5	0.65	0.79	49.5
West: Old Northern Road													
10	L2	829	4.9	829	4.9	1.015	48.5	LOS D	33.9	247.2	1.00	2.19	23.5
11	T1	25	8.7	25	8.7	0.563	18.9	LOS B	3.7	27.4	0.83	1.01	38.9
12	R2	296	6.7	296	6.7	0.563	15.5	LOS B	3.7	27.4	0.83	1.01	49.6
12u	U	1	0.0	1	0.0	0.563	17.5	LOS B	3.7	27.4	0.83	1.01	51.0
Approach		1152	5.4	1152	5.4	1.015	39.3	LOS C	33.9	247.2	0.95	1.86	30.4
All Vehicles		4091	5.2	4091	5.2	1.015	33.5	LOS C	34.2	249.5	0.85	1.45	33.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.3 %

Number of Iterations: 10 (maximum specified: 10)

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY



Site: 2 [2 Old Northern Road/ Quarry Road AM 2021 wo dev]



Network: N101 [2021 AM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1001	7.9	994	7.9	0.348	5.0	LOS A	9.7	72.4	0.34	0.31	42.8
3	R2	674	2.6	669	2.6	0.960	67.7	LOS E	31.5	225.6	0.90	0.94	22.7
Approach		1675	5.8	1663 ^{N1}	5.8	0.960	30.2	LOS C	31.5	225.6	0.56	0.56	26.5
East: Quarry Road													
4	L2	362	3.3	362	3.3	0.393	26.4	LOS B	13.9	100.1	0.66	0.77	32.4
6	R2	63	10.3	63	10.3	0.264	60.6	LOS E	3.7	27.8	0.93	0.76	20.3
Approach		425	4.4	425	4.4	0.393	31.5	LOS C	13.9	100.1	0.70	0.77	29.8
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.909	58.3	LOS E	46.8	341.0	0.99	1.02	27.7
8	T1	1182	4.3	1182	4.3	0.909	52.9	LOS D	46.8	341.0	0.99	1.03	15.2
Approach		1331	4.5	1331	4.5	0.909	53.5	LOS D	46.8	341.0	0.99	1.03	17.1
All Vehicles		3431	5.1	3419 ^{N1}	5.1	0.960	39.5	LOS C	46.8	341.0	0.75	0.77	22.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.3 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	29.9	LOS C	0.1	0.1	0.68	0.68
All Pedestrians		105	44.6	LOS E			0.82	0.82

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road AM 2021 wo dev] Network: N101 [2021 AM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1080	8.0	1073	8.0	0.579	2.3	LOS A	0.0	0.0	0.00	0.36	56.8
3b	R3	31	3.6	30	3.6	0.180	28.5	LOS C	0.5	3.8	0.92	0.98	34.4
Approach		1111	7.9	1103 ^{N1}	7.9	0.579	3.0	NA	0.5	3.8	0.03	0.37	55.8
SouthEast: Vineys Road													
21b	L3	27	4.0	27	4.0	0.212	28.0	LOS B	0.5	3.6	0.91	0.98	28.7
23a	R1	5	0.0	5	0.0	0.141	83.5	LOS F	0.3	2.2	0.97	0.99	22.0
Approach		33	3.4	33	3.4	0.212	36.9	LOS C	0.5	3.6	0.92	0.98	26.5
North: Old Northern Road													
7a	L1	8	0.0	8	0.0	0.881	3.7	LOS A	0.0	0.0	0.00	0.00	39.2
8	T1	1303	5.1	1303	5.1	0.881	0.8	LOS A	0.0	0.0	0.00	0.00	39.3
Approach		1312	5.0	1312	5.0	0.881	0.8	NA	0.0	0.0	0.00	0.00	39.3
All Vehicles		2455	6.3	2448 ^{N1}	6.3	0.881	2.3	NA	0.5	3.8	0.02	0.18	46.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.3 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Organisation: GTA CONSULTANTS | Processed: Thursday, 4 April 2019 2:11:59 PM

Project: P:\N14200-14299\N142021 3 Quarry Road, Dural - Additional Works\Modelling\190404 Model (Addressing TTPP review)\190404sid-N142020 3 Quarry Road, Dural 2021.sip7

MOVEMENT SUMMARY



Site: 2 [2 Old Northern Road/ Quarry Road PM 2021 wo dev]



Network: N101 [2021 PM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1066	7.3	1066	7.3	0.372	5.1	LOS A	10.7	79.3	0.35	0.32	42.5
3	R2	186	1.8	186	1.8	0.370	58.2	LOS E	6.3	44.7	0.93	0.77	24.8
Approach		1253	6.5	1253	6.5	0.372	13.0	LOS A	10.7	79.3	0.44	0.38	33.6
East: Quarry Road													
4	L2	333	2.0	333	2.0	0.579	41.9	LOS C	16.8	119.4	0.85	0.82	25.5
6	R2	59	1.9	59	1.9	0.232	60.1	LOS E	3.4	24.1	0.93	0.75	20.4
Approach		392	2.0	392	2.0	0.579	44.6	LOS D	16.8	119.4	0.86	0.81	24.6
North: Old Northern Road													
7	L2	53	4.3	53	4.3	0.572	24.8	LOS B	24.2	174.8	0.69	0.64	41.4
8	T1	1113	3.6	1113	3.6	0.572	19.4	LOS B	24.2	174.8	0.69	0.63	28.8
Approach		1165	3.7	1165	3.7	0.572	19.6	LOS B	24.2	174.8	0.69	0.63	29.8
All Vehicles		2809	4.7	2809	4.7	0.579	20.1	LOS B	24.2	174.8	0.60	0.55	29.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.7 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	17.3	LOS B	0.1	0.1	0.52	0.52
All Pedestrians		105	38.3	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 1 [1 Old North Road/ New Line Road PM 2021 wo dev]



Network: N101 [2021 PM Peak]

Old North Road/ New Line Road
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h		veh/h		v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	384	7.1	384	7.1	0.780	14.7	LOS B	9.3	69.7	1.00	1.21	48.2
2	T1	564	9.1	564	9.1	0.780	16.1	LOS B	9.3	69.7	0.99	1.20	39.4
3	R2	29	0.0	29	0.0	0.780	30.2	LOS C	8.3	63.8	0.99	1.20	36.7
3u	U	37	47.1	37	47.1	0.780	26.8	LOS B	8.3	63.8	0.99	1.20	47.8
Approach		1015	9.5	1015	9.5	0.780	16.4	LOS B	9.3	69.7	0.99	1.21	43.9
East: Site Access													
4	L2	98	9.0	98	9.0	0.427	15.8	LOS B	3.4	24.9	1.00	1.18	32.8
5	T1	120	2.8	120	2.8	0.427	17.4	LOS B	3.4	24.9	0.99	1.18	31.9
6	R2	58	1.9	58	1.9	0.427	19.5	LOS B	2.9	20.5	0.97	1.18	7.5
6u	U	1	0.0	1	0.0	0.427	19.4	LOS B	2.9	20.5	0.97	1.18	8.6
Approach		277	4.8	277	4.8	0.427	17.3	LOS B	3.4	24.9	0.99	1.18	28.7
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.699	14.8	LOS B	6.3	45.5	0.74	0.93	30.2
8	T1	682	4.7	682	4.7	0.982	18.3	LOS B	30.3	218.0	0.82	1.18	42.7
9	R2	693	3.0	693	3.0	0.982	38.9	LOS C	30.3	218.0	0.98	1.69	33.8
9u	U	1	0.0	1	0.0	0.982	41.2	LOS C	30.3	218.0	0.98	1.69	17.5
Approach		1434	3.7	1434	3.7	0.982	28.1	LOS B	30.3	218.0	0.89	1.42	37.5
West: Old Northern Road													
10	L2	624	4.8	624	4.8	0.686	8.7	LOS A	6.3	45.6	0.87	1.01	47.0
11	T1	58	0.0	58	0.0	0.675	18.3	LOS B	5.7	41.7	0.86	1.05	38.9
12	R2	447	7.1	447	7.1	0.675	15.3	LOS B	5.7	41.7	0.86	1.05	49.6
12u	U	1	0.0	1	0.0	0.675	17.4	LOS B	5.7	41.7	0.86	1.05	51.0
Approach		1131	5.4	1131	5.4	0.686	11.8	LOS A	6.3	45.6	0.86	1.03	48.0
All Vehicles		3856	5.8	3856	5.8	0.982	19.5	LOS B	30.3	218.0	0.92	1.23	41.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.7 %

Number of Iterations: 10 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 3 [3 Old Northern Road/ Vineys Road PM 2021 wo dev] Network: N101 [2021 PM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1135	4.8	1135	4.8	0.600	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	53	50.0	53	50.0	0.337	35.6	LOS C	1.1	11.1	0.93	1.01	31.5
Approach		1187	6.8	1187	6.8	0.600	1.6	NA	1.1	11.1	0.04	0.04	57.4
SouthEast: Vineys Road													
21b	L3	29	3.7	29	3.7	0.100	16.9	LOS B	0.3	2.2	0.83	0.93	34.6
23a	R1	3	0.0	3	0.0	0.052	51.8	LOS D	0.1	0.8	0.95	0.98	30.1
Approach		33	3.3	33	3.3	0.100	20.3	LOS B	0.3	2.2	0.84	0.93	33.7
North: Old Northern Road													
7a	L1	4	0.0	4	0.0	0.596	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1134	3.4	1134	3.4	0.596	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1138	3.4	1138	3.4	0.596	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2358	5.1	2358	5.1	0.600	1.2	NA	1.1	11.1	0.03	0.04	57.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.7 %
 Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2021 wo dev mit]

 Network: N101 [2021 AM Peak Mitigated]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	435	3.8	435	3.8	0.638	25.3	LOS B	14.7	106.2	0.88	0.83	42.0
2	T1	783	7.0	783	7.0	0.915	69.3	LOS E	29.1	215.7	1.00	1.08	18.7
3	R2	7	0.0	7	0.0	0.074	72.3	LOS F	0.5	3.2	0.97	0.66	17.8
Approach		1225	5.8	1225	5.8	0.915	53.7	LOS D	29.1	215.7	0.96	0.99	26.2
East: Site Access													
4	L2	73	7.6	73	7.6	0.263	48.5	LOS D	4.7	35.2	0.89	0.71	21.4
5	T1	43	7.7	43	7.7	0.263	53.4	LOS D	4.7	35.2	0.92	0.72	20.4
6	R2	35	0.0	35	0.0	0.263	55.8	LOS D	3.7	26.8	0.94	0.72	2.3
Approach		151	5.9	151	5.9	0.263	51.6	LOS D	4.7	35.2	0.91	0.71	17.7
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.388	21.7	LOS B	8.6	62.9	0.42	0.42	25.3
8	T1	679	5.3	679	5.3	0.388	12.9	LOS A	8.6	62.9	0.40	0.37	45.9
9	R2	835	3.2	835	3.2	0.747	11.5	LOS A	7.6	54.3	0.30	0.65	46.3
Approach		1544	4.1	1544	4.1	0.747	12.3	LOS A	8.6	62.9	0.35	0.53	45.8
West: Old Northern Road													
10	L2	829	4.9	829	4.9	0.948	64.3	LOS E	63.6	463.7	1.00	1.03	19.7
11	T1	25	8.7	25	8.7	0.094	60.3	LOS E	1.4	10.5	0.90	0.73	20.3
12	R2	296	6.7	296	6.7	0.571	62.6	LOS E	8.9	66.2	0.98	0.81	29.4
Approach		1151	5.4	1151	5.4	0.948	63.8	LOS E	63.6	463.7	0.99	0.97	22.7
All Vehicles		4071	5.0	4071	5.0	0.948	40.8	LOS C	63.6	463.7	0.73	0.80	29.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.8	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2021 wo dev mit]

Network: N101 [2021 AM Peak Mitigated]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1080	8.0	1080	8.0	0.583	2.3	LOS A	0.0	0.0	0.00	0.36	56.8
3b	R3	31	3.6	31	3.6	0.181	28.6	LOS C	0.6	4.0	0.92	0.98	34.4
Approach		1111	7.9	1111	7.9	0.583	3.0	NA	0.6	4.0	0.03	0.37	55.8
SouthEast: Vineys Road													
21b	L3	27	4.0	27	4.0	0.167	27.0	LOS B	0.5	3.5	0.91	0.97	29.2
23a	R1	5	0.0	5	0.0	0.027	17.9	LOS B	0.1	0.5	0.84	0.92	36.5
Approach		33	3.4	33	3.4	0.167	25.5	LOS B	0.5	3.5	0.90	0.96	30.8
North: Old Northern Road													
7a	L1	8	0.0	8	0.0	0.695	3.2	LOS A	0.0	0.0	0.00	0.00	39.7
8	T1	1303	5.1	1303	5.1	0.695	0.2	LOS A	0.0	0.0	0.00	0.00	39.8
Approach		1312	5.0	1312	5.0	0.695	0.2	NA	0.0	0.0	0.00	0.00	39.8
All Vehicles		2455	6.3	2455	6.3	0.695	1.8	NA	0.6	4.0	0.02	0.18	47.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 6 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road AM 2021 wo dev mit]

 Network: N101 [2021 AM Peak Mitigated]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1001	7.9	1001	7.9	0.358	2.8	LOS A	6.3	46.7	0.17	0.15	48.9
3	R2	674	2.6	674	2.6	0.712	31.3	LOS C	14.3	102.5	0.63	0.75	33.9
Approach		1675	5.8	1675	5.8	0.712	14.3	LOS A	14.3	102.5	0.35	0.39	37.3
East: Quarry Road													
4	L2	362	3.3	362	3.3	0.341	20.4	LOS B	11.7	84.1	0.56	0.74	36.2
6	R2	63	10.3	63	10.3	0.237	58.5	LOS E	3.6	27.2	0.92	0.75	20.9
Approach		425	4.4	425	4.4	0.341	26.0	LOS B	11.7	84.1	0.61	0.75	32.6
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.729	46.8	LOS D	24.1	175.8	0.93	0.83	31.0
8	T1	1182	4.3	1182	4.3	0.729	41.7	LOS C	25.0	181.7	0.95	0.83	18.0
Approach		1331	4.5	1331	4.5	0.729	42.2	LOS C	25.0	181.7	0.94	0.83	20.1
All Vehicles		3431	5.1	3431	5.1	0.729	26.6	LOS B	25.0	181.7	0.61	0.61	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	37.0	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		105	48.1	LOS E			0.86	0.86

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2021 wo dev mit]

 Network: N101 [2021 PM Peak Mitigated]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	384	7.1	384	7.1	0.589	23.9	LOS B	10.2	75.4	0.86	0.82	42.6
2	T1	564	9.1	564	9.1	0.706	50.8	LOS D	17.2	130.0	0.98	0.84	22.9
3	R2	29	0.0	29	0.0	0.344	75.9	LOS F	1.9	13.6	1.00	0.72	17.3
Approach		978	8.1	978	8.1	0.706	41.0	LOS C	17.2	130.0	0.93	0.83	30.6
East: Site Access													
4	L2	98	9.0	98	9.0	0.316	42.4	LOS C	7.4	54.8	0.86	0.70	22.9
5	T1	120	2.8	120	2.8	0.316	44.3	LOS D	7.4	54.8	0.87	0.71	22.6
6	R2	58	1.9	58	1.9	0.316	45.5	LOS D	7.0	50.3	0.88	0.71	2.7
Approach		276	4.8	276	4.8	0.316	43.9	LOS D	7.4	54.8	0.87	0.71	19.8
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.488	37.3	LOS C	16.8	121.6	0.79	0.73	17.0
8	T1	682	4.7	682	4.7	0.488	30.0	LOS C	16.8	121.6	0.74	0.67	35.0
9	R2	693	3.0	693	3.0	0.854	31.2	LOS C	18.0	129.1	0.84	0.83	34.1
Approach		1433	3.7	1433	3.7	0.854	30.9	LOS C	18.0	129.1	0.79	0.75	34.1
West: Old Northern Road													
10	L2	624	4.8	624	4.8	0.896	55.5	LOS D	41.7	303.8	0.97	0.96	21.7
11	T1	58	0.0	58	0.0	0.203	61.3	LOS E	3.3	22.9	0.92	0.76	20.1
12	R2	447	7.1	447	7.1	0.866	74.4	LOS F	15.6	116.2	1.00	0.95	26.8
Approach		1129	5.4	1129	5.4	0.896	63.3	LOS E	41.7	303.8	0.98	0.95	24.2
All Vehicles		3816	5.4	3816	5.4	0.896	44.0	LOS D	41.7	303.8	0.89	0.83	28.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	51.9	LOS E	0.2	0.2	0.89	0.89
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	56.9	LOS E			0.94	0.94

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road PM 2021 wo dev mit]

 Network: N101 [2021 PM Peak Mitigated]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h		veh/h		v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1066	7.3	1066	7.3	0.380	1.1	LOS A	2.8	20.9	0.07	0.06	55.2
3	R2	186	1.8	186	1.8	0.370	58.2	LOS E	6.4	45.2	0.94	0.78	25.0
Approach		1253	6.5	1253	6.5	0.380	9.6	LOS A	6.4	45.2	0.20	0.17	37.9
East: Quarry Road													
4	L2	333	2.0	333	2.0	0.552	40.2	LOS C	16.3	116.4	0.83	0.82	26.1
6	R2	59	1.9	59	1.9	0.209	58.0	LOS E	3.3	23.5	0.91	0.75	21.0
Approach		392	2.0	392	2.0	0.552	42.9	LOS D	16.3	116.4	0.85	0.81	25.2
North: Old Northern Road													
7	L2	53	4.3	53	4.3	0.374	23.2	LOS B	13.6	98.2	0.61	0.57	42.2
8	T1	1113	3.6	1113	3.6	0.374	17.7	LOS B	13.8	99.8	0.61	0.55	30.1
Approach		1165	3.7	1165	3.7	0.374	18.0	LOS B	13.8	99.8	0.61	0.55	31.1
All Vehicles		2809	4.7	2809	4.7	0.552	17.7	LOS B	16.3	116.4	0.46	0.41	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2021 wo dev mit]

Network: N101 [2021 PM Peak Mitigated]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h		veh/h		v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1135	4.8	1135	4.8	0.600	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	53	50.0	53	50.0	0.337	35.9	LOS C	1.2	11.8	0.93	1.02	31.4
Approach		1187	6.8	1187	6.8	0.600	1.7	NA	1.2	11.8	0.04	0.05	57.4
SouthEast: Vineys Road													
21b	L3	29	3.7	29	3.7	0.100	16.9	LOS B	0.3	2.2	0.83	0.93	34.6
23a	R1	3	0.0	3	0.0	0.011	12.5	LOS A	0.0	0.2	0.76	0.88	44.8
Approach		33	3.3	33	3.3	0.100	16.5	LOS B	0.3	2.2	0.83	0.92	36.0
North: Old Northern Road													
7a	L1	4	0.0	4	0.0	0.596	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1134	3.4	1134	3.4	0.596	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1138	3.4	1138	3.4	0.596	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2358	5.1	2358	5.1	0.600	1.1	NA	1.2	11.8	0.03	0.04	57.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2021 w dev]

 Network: N101 [2021 AM Peak w Dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	435	3.8	435	3.8	0.601	23.8	LOS B	14.1	102.0	0.84	0.82	42.7
2	T1	791	7.0	791	7.0	0.894	64.4	LOS E	28.2	209.4	1.00	1.04	19.7
3	R2	7	0.0	7	0.0	0.064	70.8	LOS F	0.5	3.2	0.97	0.66	18.1
Approach		1233	5.8	1233	5.8	0.894	50.1	LOS D	28.2	209.4	0.94	0.96	27.2
East: Site Access													
4	L2	73	7.6	73	7.6	0.262	48.5	LOS D	4.7	35.3	0.89	0.71	21.4
5	T1	43	7.7	43	7.7	0.262	53.3	LOS D	4.7	35.3	0.92	0.72	20.4
6	R2	35	0.0	35	0.0	0.262	55.8	LOS D	3.7	26.7	0.94	0.72	2.3
Approach		151	5.9	151	5.9	0.262	51.6	LOS D	4.7	35.3	0.91	0.71	17.7
North: Old Northern Road													
7	L2	31	0.0	31	0.0	0.399	22.7	LOS B	9.2	66.9	0.44	0.44	24.6
8	T1	687	5.3	687	5.3	0.399	13.7	LOS A	9.2	66.9	0.42	0.39	45.2
9	R2	843	3.2	843	3.2	0.774	10.7	LOS A	7.0	50.5	0.27	0.65	47.0
Approach		1561	4.1	1561	4.1	0.774	12.2	LOS A	9.2	66.9	0.34	0.53	45.9
West: Old Northern Road													
10	L2	837	4.9	837	4.9	0.956	67.9	LOS E	66.0	481.5	1.00	1.05	19.0
11	T1	25	8.7	25	8.7	0.085	58.3	LOS E	1.4	10.3	0.88	0.73	20.7
12	R2	296	6.7	296	6.7	0.516	60.4	LOS E	8.7	64.7	0.96	0.80	29.9
Approach		1158	5.4	1158	5.4	0.956	65.8	LOS E	66.0	481.5	0.99	0.98	22.3
All Vehicles		4102	5.0	4102	5.0	0.956	40.2	LOS C	66.0	481.5	0.73	0.79	29.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.6	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road AM 2021 w dev]



Network: N101 [2021 AM Peak w Dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1012	7.9	1012	7.9	0.362	2.2	LOS A	5.1	37.8	0.13	0.12	51.0
3	R2	677	2.6	677	2.6	0.649	26.2	LOS B	12.5	89.4	0.60	0.74	36.3
Approach		1688	5.8	1688	5.8	0.649	11.8	LOS A	12.5	89.4	0.32	0.37	39.8
East: Quarry Road													
4	L2	375	3.3	375	3.3	0.349	19.9	LOS B	12.0	86.2	0.55	0.74	36.5
6	R2	66	10.3	66	10.3	0.249	58.6	LOS E	3.8	28.6	0.92	0.76	20.8
Approach		441	4.4	441	4.4	0.349	25.8	LOS B	12.0	86.2	0.61	0.75	32.8
North: Old Northern Road													
7	L2	148	6.7	148	6.7	0.748	48.1	LOS D	24.6	179.4	0.94	0.85	30.5
8	T1	1184	4.3	1184	4.3	0.748	43.0	LOS D	25.5	185.1	0.96	0.85	17.6
Approach		1333	4.5	1333	4.5	0.748	43.5	LOS D	25.5	185.1	0.96	0.85	19.7
All Vehicles		3462	5.1	3462	5.1	0.748	25.8	LOS B	25.5	185.1	0.60	0.60	28.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	37.8	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		105	48.5	LOS E			0.86	0.86

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2021 w dev]

Network: N101 [2021 AM Peak w Dev]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1082	8.0	1082	8.0	0.584	2.3	LOS A	0.0	0.0	0.00	0.36	56.8
3b	R3	41	3.6	41	3.6	0.246	30.4	LOS C	0.8	5.6	0.93	0.99	33.6
Approach		1123	7.9	1123	7.9	0.584	3.4	NA	0.8	5.6	0.03	0.38	55.4
SouthEast: Vineys Road													
21b	L3	31	4.0	31	4.0	0.186	27.5	LOS B	0.5	4.0	0.92	0.97	28.9
23a	R1	6	0.0	6	0.0	0.033	18.2	LOS B	0.1	0.6	0.85	0.92	36.4
Approach		37	3.3	37	3.3	0.186	25.9	LOS B	0.5	4.0	0.90	0.96	30.7
North: Old Northern Road													
7a	L1	11	0.0	11	0.0	0.696	3.2	LOS A	0.0	0.0	0.00	0.00	39.7
8	T1	1303	5.1	1303	5.1	0.696	0.2	LOS A	0.0	0.0	0.00	0.00	39.8
Approach		1314	5.0	1314	5.0	0.696	0.2	NA	0.0	0.0	0.00	0.00	39.8
All Vehicles		2474	6.3	2474	6.3	0.696	2.0	NA	0.8	5.6	0.03	0.19	47.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 10 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2021 w dev]

 Network: N101 [2021 PM Peak w Dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	384	7.1	384	7.1	0.589	23.9	LOS B	10.2	75.8	0.86	0.82	42.6
2	T1	577	9.1	577	9.1	0.721	51.4	LOS D	17.8	134.1	0.98	0.85	22.8
3	R2	29	0.0	29	0.0	0.344	75.9	LOS F	1.9	13.6	1.00	0.72	17.3
Approach		991	8.1	991	8.1	0.721	41.4	LOS C	17.8	134.1	0.93	0.83	30.4
East: Site Access													
4	L2	98	9.0	98	9.0	0.327	43.3	LOS D	7.5	55.5	0.87	0.71	22.7
5	T1	120	2.8	120	2.8	0.327	45.3	LOS D	7.5	55.5	0.88	0.72	22.4
6	R2	58	1.9	58	1.9	0.327	46.5	LOS D	7.1	50.7	0.89	0.72	2.7
Approach		276	4.8	276	4.8	0.327	44.8	LOS D	7.5	55.5	0.88	0.71	19.6
North: Old Northern Road													
7	L2	58	0.0	58	0.0	0.483	36.7	LOS C	16.8	121.6	0.78	0.72	17.2
8	T1	688	4.7	688	4.7	0.483	29.3	LOS C	16.8	121.6	0.74	0.66	35.3
9	R2	698	3.0	698	3.0	0.832	29.4	LOS C	17.1	122.9	0.80	0.81	34.9
Approach		1444	3.7	1444	3.7	0.832	29.7	LOS C	17.1	122.9	0.77	0.74	34.7
West: Old Northern Road													
10	L2	638	4.8	638	4.8	0.898	55.2	LOS D	42.7	310.9	0.97	0.97	21.8
11	T1	58	0.0	58	0.0	0.203	61.3	LOS E	3.3	22.9	0.92	0.76	20.1
12	R2	447	7.1	447	7.1	0.866	74.4	LOS F	15.6	116.2	1.00	0.95	26.8
Approach		1143	5.4	1143	5.4	0.898	63.0	LOS E	42.7	310.9	0.98	0.95	24.2
All Vehicles		3854	5.4	3854	5.4	0.898	43.7	LOS D	42.7	310.9	0.88	0.82	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian	m		per ped	
P1	South Full Crossing	53	52.8	LOS E	0.2	0.2	0.90	0.90	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	57.2	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road PM 2021 w dev]



Network: N101 [2021 PM Peak w Dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1074	7.3	1074	7.3	0.383	1.2	LOS A	3.1	23.1	0.07	0.07	54.9
3	R2	206	1.8	206	1.8	0.391	57.5	LOS E	6.8	48.2	0.90	0.77	25.1
Approach		1280	6.4	1280	6.4	0.391	10.2	LOS A	6.8	48.2	0.21	0.18	37.3
East: Quarry Road													
4	L2	337	2.0	337	2.0	0.548	39.4	LOS C	16.4	116.7	0.83	0.81	26.4
6	R2	60	1.9	60	1.9	0.213	58.0	LOS E	3.4	24.0	0.91	0.75	20.9
Approach		397	2.0	397	2.0	0.548	42.2	LOS C	16.4	116.7	0.84	0.80	25.4
North: Old Northern Road													
7	L2	56	4.3	56	4.3	0.383	23.8	LOS B	14.0	100.9	0.62	0.58	41.8
8	T1	1119	3.6	1119	3.6	0.383	18.4	LOS B	14.2	102.6	0.62	0.56	29.6
Approach		1175	3.7	1175	3.7	0.383	18.6	LOS B	14.2	102.6	0.62	0.56	30.6
All Vehicles		2852	4.7	2852	4.7	0.548	18.1	LOS B	16.4	116.7	0.47	0.42	31.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		ped	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	18.9	LOS B	0.1	0.1	0.54	0.54	
All Pedestrians		105	39.1	LOS D			0.75	0.75	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2021 w dev]

Network: N101 [2021 PM Peak w Dev]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1136	4.8	1136	4.8	0.601	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3b	R3	59	50.0	59	50.0	0.383	37.8	LOS C	1.4	13.7	0.93	1.03	30.7
Approach		1195	7.1	1195	7.1	0.601	1.9	NA	1.4	13.7	0.05	0.05	57.1
SouthEast: Vineys Road													
21b	L3	36	3.7	36	3.7	0.123	17.1	LOS B	0.4	2.8	0.84	0.93	34.4
23a	R1	4	0.0	4	0.0	0.015	12.8	LOS A	0.0	0.3	0.76	0.88	44.7
Approach		40	3.3	40	3.3	0.123	16.6	LOS B	0.4	2.8	0.83	0.92	35.9
North: Old Northern Road													
7a	L1	5	0.0	5	0.0	0.599	5.1	LOS A	0.0	0.0	0.00	0.00	57.7
8	T1	1137	3.4	1137	3.4	0.599	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1142	3.4	1142	3.4	0.599	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		2377	5.2	2377	5.2	0.601	1.3	NA	1.4	13.7	0.04	0.04	57.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2031 wo dev]  Network: N101 [2031 AM Peak]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	495	3.8	495	3.8	0.659	23.3	LOS B	15.7	113.7	0.86	0.83	43.0
2	T1	892	7.0	892	7.0	0.893	61.7	LOS E	31.6	234.6	1.00	1.04	20.2
3	R2	8	0.0	8	0.0	0.054	66.9	LOS E	0.5	3.5	0.95	0.67	18.8
Approach		1395	5.8	1395	5.8	0.893	48.1	LOS D	31.6	234.6	0.95	0.97	27.9
East: Site Access													
4	L2	82	7.6	82	7.6	0.294	48.8	LOS D	5.4	40.5	0.90	0.72	21.4
5	T1	48	7.7	48	7.7	0.294	53.5	LOS D	5.4	40.5	0.93	0.73	20.4
6	R2	40	0.0	40	0.0	0.294	56.1	LOS D	4.2	30.0	0.94	0.73	2.2
Approach		171	5.8	171	5.8	0.294	51.8	LOS D	5.4	40.5	0.92	0.72	17.6
North: Old Northern Road													
7	L2	35	0.0	35	0.0	0.472	28.9	LOS C	13.4	97.8	0.57	0.55	20.8
8	T1	773	5.3	773	5.3	0.472	21.1	LOS B	13.4	97.8	0.57	0.52	40.0
9	R2	951	3.2	951	3.2	0.972	34.5	LOS C	31.7	227.9	0.97	0.95	32.7
Approach		1758	4.1	1758	4.1	0.972	28.5	LOS C	31.7	227.9	0.79	0.75	35.4
West: Old Northern Road													
10	L2	944	4.9	944	4.9	1.169	220.7	LOS F	132.4	966.0	1.00	1.49	7.3
11	T1	28	8.7	28	8.7	0.105	60.5	LOS E	1.6	11.8	0.90	0.73	20.2
12	R2	337	6.7	337	6.7	0.650	63.7	LOS E	10.4	76.8	1.00	0.82	29.1
Approach		1309	5.4	1309	5.4	1.169	176.8	LOS F	132.4	966.0	1.00	1.30	10.7
All Vehicles		4633	5.0	4633	5.0	1.169	77.2	LOS F	132.4	966.0	0.90	0.97	20.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.6	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road AM 2031 wo dev]

 Network: N101 [2031 AM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1139	7.9	1058	8.0	0.378	2.8	LOS A	6.5	48.9	0.17	0.15	49.1
3	R2	766	2.6	711	2.6	0.859	31.4	LOS C	17.9	128.1	0.65	0.78	33.8
Approach		1905	5.8	1769 ^{N1}	5.8	0.859	14.3	LOS A	17.9	128.1	0.36	0.40	37.3
East: Quarry Road													
4	L2	412	3.3	412	3.3	0.404	22.7	LOS B	14.5	104.7	0.61	0.76	34.7
6	R2	73	10.3	73	10.3	0.273	58.8	LOS E	4.1	31.5	0.92	0.76	20.8
Approach		484	4.4	484	4.4	0.404	28.1	LOS B	14.5	104.7	0.66	0.76	31.5
North: Old Northern Road													
7	L2	168	6.7	168	6.7	0.834	51.3	LOS D	32.6	238.3	0.97	0.92	29.6
8	T1	1345	4.3	1345	4.3	0.834	46.9	LOS D	33.9	245.8	0.98	0.94	16.6
Approach		1514	4.5	1514	4.5	0.834	47.4	LOS D	33.9	245.8	0.98	0.94	18.6
All Vehicles		3903	5.1	3767 ^{N1}	5.3	0.859	29.4	LOS C	33.9	245.8	0.65	0.66	26.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	34.8	LOS D	0.1	0.1	0.73	0.73	
All Pedestrians		105	47.0	LOS E			0.84	0.84	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2031 wo dev]

Network: N101 [2031 AM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1228	8.0	1149	8.1	0.621	2.3	LOS A	0.0	0.0	0.00	0.36	56.8
3b	R3	35	3.6	32	3.6	0.443	72.2	LOS F	1.3	9.5	0.98	1.03	22.6
Approach		1263	7.9	1182 ^{N1}	8.0	0.621	4.3	NA	1.3	9.5	0.03	0.37	54.5
SouthEast: Vineys Road													
21b	L3	32	4.0	32	4.0	0.432	67.1	LOS E	1.2	8.9	0.97	1.03	18.0
23a	R1	6	0.0	6	0.0	0.059	30.4	LOS C	0.1	1.0	0.92	0.96	32.4
Approach		38	3.3	38	3.3	0.432	61.0	LOS E	1.2	8.9	0.96	1.02	20.5
North: Old Northern Road													
7a	L1	9	0.0	9	0.0	0.790	3.3	LOS A	0.0	0.0	0.00	0.00	39.6
8	T1	1482	5.1	1482	5.1	0.790	0.3	LOS A	0.0	0.0	0.00	0.00	39.7
Approach		1492	5.0	1492	5.0	0.790	0.3	NA	0.0	0.0	0.00	0.00	39.7
All Vehicles		2793	6.3	2711 ^{N1}	6.5	0.790	2.9	NA	1.3	9.5	0.03	0.18	45.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2031 wo dev]  Network: N101 [2031 PM Peak]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	446	7.1	446	7.1	0.657	24.5	LOS B	14.2	105.4	0.88	0.83	42.3
2	T1	656	9.1	656	9.1	0.821	57.0	LOS E	21.9	165.2	1.00	0.95	21.3
3	R2	35	0.0	35	0.0	0.405	76.3	LOS F	2.3	16.1	1.00	0.73	17.2
Approach		1137	8.1	1137	8.1	0.821	44.8	LOS D	21.9	165.2	0.95	0.90	29.3
East: Site Access													
4	L2	114	9.0	114	9.0	0.519	52.2	LOS D	9.9	73.2	0.95	0.78	20.6
5	T1	139	2.8	139	2.8	0.519	54.1	LOS D	9.9	73.2	0.96	0.78	20.3
6	R2	67	1.9	67	1.9	0.519	55.4	LOS D	8.9	63.7	0.97	0.79	2.3
Approach		320	4.8	320	4.8	0.519	53.7	LOS D	9.9	73.2	0.96	0.78	17.6
North: Old Northern Road													
7	L2	67	0.0	67	0.0	0.500	33.7	LOS C	18.7	135.1	0.76	0.71	18.4
8	T1	794	4.7	794	4.7	0.500	26.4	LOS B	18.7	135.1	0.71	0.65	36.8
9	R2	805	3.0	805	3.0	0.800	26.3	LOS B	17.9	128.5	0.73	0.80	36.5
Approach		1666	3.7	1666	3.7	0.800	26.6	LOS B	18.7	135.1	0.73	0.72	36.2
West: Old Northern Road													
10	L2	726	4.8	726	4.8	0.896	48.9	LOS D	46.5	339.1	0.94	0.95	23.5
11	T1	67	0.0	67	0.0	0.214	59.5	LOS E	3.7	26.2	0.91	0.77	20.4
12	R2	521	7.1	521	7.1	0.912	80.2	LOS F	19.3	143.6	1.00	1.00	25.7
Approach		1315	5.4	1315	5.4	0.912	61.9	LOS E	46.5	339.1	0.96	0.96	24.5
All Vehicles		4438	5.4	4438	5.4	0.912	43.7	LOS D	46.5	339.1	0.87	0.84	28.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.8	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road PM 2031 wo dev]

 Network: N101 [2031 PM Peak]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1240	7.3	1240	7.3	0.442	1.7	LOS A	6.0	44.3	0.11	0.10	52.9
3	R2	217	1.8	217	1.8	0.431	47.9	LOS D	6.4	45.5	0.80	0.75	27.8
Approach		1457	6.5	1457	6.5	0.442	8.6	LOS A	6.4	45.5	0.21	0.19	39.5
East: Quarry Road													
4	L2	386	2.0	386	2.0	0.652	41.5	LOS C	19.7	140.3	0.87	0.83	25.6
6	R2	68	1.9	68	1.9	0.243	58.3	LOS E	3.9	27.5	0.92	0.76	20.9
Approach		455	2.0	455	2.0	0.652	44.0	LOS D	19.7	140.3	0.87	0.82	24.8
North: Old Northern Road													
7	L2	61	4.3	61	4.3	0.435	24.0	LOS B	16.5	119.1	0.63	0.59	41.7
8	T1	1294	3.6	1294	3.6	0.435	18.5	LOS B	16.8	121.1	0.64	0.58	29.5
Approach		1355	3.7	1355	3.7	0.435	18.7	LOS B	16.8	121.1	0.64	0.58	30.5
All Vehicles		3266	4.7	3266	4.7	0.652	17.7	LOS B	19.7	140.3	0.48	0.44	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2031 wo dev]

Network: N101 [2031 PM Peak]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1320	4.8	1320	4.8	0.698	0.1	LOS A	0.0	0.0	0.00	0.00	59.6
3b	R3	61	50.0	61	50.0	0.858	142.3	LOS F	3.7	36.8	0.99	1.23	14.5
Approach		1381	6.8	1381	6.8	0.858	6.4	NA	3.7	36.8	0.04	0.05	52.4
SouthEast: Vineys Road													
21b	L3	35	3.7	35	3.7	0.214	28.3	LOS B	0.6	4.6	0.92	0.98	28.6
23a	R1	4	0.0	4	0.0	0.023	18.7	LOS B	0.1	0.4	0.85	0.93	41.6
Approach		39	3.3	39	3.3	0.214	27.3	LOS B	0.6	4.6	0.91	0.97	30.4
North: Old Northern Road													
7a	L1	5	0.0	5	0.0	0.694	5.1	LOS A	0.0	0.0	0.00	0.00	57.6
8	T1	1318	3.4	1318	3.4	0.694	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
Approach		1323	3.4	1323	3.4	0.694	0.2	NA	0.0	0.0	0.00	0.00	59.6
All Vehicles		2743	5.1	2743	5.1	0.858	3.7	NA	3.7	36.8	0.04	0.04	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2031 wo dev mit]  Network: N101 [2031 AM Peak mit]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	495	3.8	495	3.8	0.659	23.3	LOS B	15.7	113.7	0.86	0.83	43.0
2	T1	892	7.0	892	7.0	0.893	61.7	LOS E	31.6	234.6	1.00	1.04	20.3
3	R2	8	0.0	8	0.0	0.054	66.9	LOS E	0.5	3.5	0.95	0.67	18.8
Approach		1395	5.8	1395	5.8	0.893	48.1	LOS D	31.6	234.6	0.95	0.97	27.9
East: Site Access													
4	L2	82	7.6	82	7.6	0.294	48.8	LOS D	5.4	40.5	0.90	0.72	21.4
5	T1	48	7.7	48	7.7	0.294	53.5	LOS D	5.4	40.5	0.93	0.73	20.4
6	R2	40	0.0	40	0.0	0.294	56.1	LOS D	4.2	30.0	0.94	0.73	2.2
Approach		171	5.8	171	5.8	0.294	51.8	LOS D	5.4	40.5	0.92	0.72	17.6
North: Old Northern Road													
7	L2	35	0.0	35	0.0	0.472	27.4	LOS B	12.7	92.6	0.54	0.52	21.8
8	T1	773	5.3	773	5.3	0.472	19.2	LOS B	12.7	92.6	0.53	0.49	41.3
9	R2	951	3.2	951	3.2	0.972	32.4	LOS C	31.2	224.2	0.95	0.95	33.8
Approach		1758	4.1	1758	4.1	0.972	26.5	LOS B	31.2	224.2	0.76	0.74	36.6
West: Old Northern Road													
10	L2	944	4.9	944	4.9	1.002	109.8	LOS F	47.2	344.6	1.00	1.15	13.3
11	T1	28	8.7	28	8.7	0.105	60.5	LOS E	1.6	11.8	0.90	0.73	20.2
12	R2	337	6.7	337	6.7	0.650	63.7	LOS E	10.4	76.8	1.00	0.82	29.1
Approach		1309	5.4	1309	5.4	1.002	96.9	LOS F	47.2	344.6	1.00	1.06	17.2
All Vehicles		4633	5.0	4633	5.0	1.002	53.8	LOS D	47.2	344.6	0.89	0.90	25.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %

Number of Iterations: 7 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.6	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road AM 2031 wo dev mit]

 Network: N101 [2031 AM Peak mit]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1139	7.9	1138	7.9	0.407	3.0	LOS A	6.6	49.5	0.18	0.17	48.3
3	R2	766	2.6	765	2.6	0.893	40.7	LOS C	23.4	167.3	0.68	0.82	30.1
Approach		1905	5.8	1903 ^{N1}	5.8	0.893	18.2	LOS B	23.4	167.3	0.38	0.43	34.0
East: Quarry Road													
4	L2	412	3.3	412	3.3	0.383	20.3	LOS B	13.5	97.2	0.57	0.75	36.2
6	R2	73	10.3	73	10.3	0.273	58.8	LOS E	4.1	31.5	0.92	0.76	20.8
Approach		484	4.4	484	4.4	0.383	26.1	LOS B	13.5	97.2	0.62	0.75	32.6
North: Old Northern Road													
7	L2	168	6.7	168	6.7	0.910	66.3	LOS E	37.9	276.6	1.00	1.04	25.6
8	T1	1345	4.3	1345	4.3	0.910	62.3	LOS E	39.3	285.1	1.00	1.06	13.4
Approach		1514	4.5	1514	4.5	0.910	62.7	LOS E	39.3	285.1	1.00	1.06	15.2
All Vehicles		3903	5.1	3901 ^{N1}	5.1	0.910	36.4	LOS C	39.3	285.1	0.65	0.71	23.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %

Number of Iterations: 7 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	37.8	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		105	48.5	LOS E			0.86	0.86

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2031 wo dev mit]

Network: N101 [2031 AM Peak mit]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1228	8.0	1227	8.0	0.439	7.0	LOS A	9.8	73.3	0.34	0.27	40.8
3b	R3	35	3.6	35	3.6	0.439	39.2	LOS C	9.8	73.3	1.00	0.09	39.5
Approach		1263	7.9	1262 ^{N1}	7.9	0.439	7.8	NA	9.8	73.3	0.36	0.26	40.7
SouthEast: Vineys Road													
21b	L3	32	4.0	32	4.0	0.062	10.6	LOS A	0.2	1.5	0.62	0.83	39.0
23a	R1	6	0.0	6	0.0	0.036	19.8	LOS B	0.1	0.6	0.84	0.92	35.9
Approach		38	3.3	38	3.3	0.062	12.1	LOS A	0.2	1.5	0.66	0.84	38.1
North: Old Northern Road													
7a	L1	9	0.0	9	0.0	0.399	3.1	LOS A	0.0	0.0	0.00	0.01	39.8
8	T1	1482	5.1	1482	5.1	0.399	0.1	LOS A	0.0	0.0	0.00	0.00	39.9
Approach		1492	5.0	1492	5.0	0.399	0.1	NA	0.0	0.0	0.00	0.00	39.9
All Vehicles		2793	6.3	2791 ^{N1}	6.3	0.439	3.8	NA	9.8	73.3	0.17	0.13	40.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %

Number of Iterations: 7 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2031 wo dev mit]  Network: N101 [2031 PM Peak mit]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	446	7.1	446	7.1	0.657	24.7	LOS B	14.5	107.6	0.88	0.83	42.3
2	T1	656	9.1	656	9.1	0.821	57.0	LOS E	21.9	165.2	1.00	0.95	21.4
3	R2	35	0.0	35	0.0	0.405	76.3	LOS F	2.3	16.1	1.00	0.73	17.2
Approach		1137	8.1	1137	8.1	0.821	44.9	LOS D	21.9	165.2	0.95	0.90	29.3
East: Site Access													
4	L2	114	9.0	114	9.0	0.545	53.3	LOS D	10.0	74.3	0.96	0.79	20.3
5	T1	139	2.8	139	2.8	0.545	55.2	LOS D	10.0	74.3	0.97	0.79	20.1
6	R2	67	1.9	67	1.9	0.545	56.6	LOS E	9.0	64.1	0.98	0.79	2.2
Approach		320	4.8	320	4.8	0.545	54.8	LOS D	10.0	74.3	0.97	0.79	17.4
North: Old Northern Road													
7	L2	67	0.0	67	0.0	0.492	33.0	LOS C	18.4	133.2	0.75	0.70	18.8
8	T1	794	4.7	794	4.7	0.492	25.7	LOS B	18.4	133.2	0.70	0.64	37.3
9	R2	805	3.0	805	3.0	0.778	25.3	LOS B	17.0	122.0	0.70	0.78	37.3
Approach		1666	3.7	1666	3.7	0.778	25.8	LOS B	18.4	133.2	0.70	0.71	36.8
West: Old Northern Road													
10	L2	726	4.8	726	4.8	0.648	27.9	LOS B	14.4	105.2	0.68	0.77	31.8
11	T1	67	0.0	67	0.0	0.214	59.5	LOS E	3.7	26.2	0.91	0.77	20.4
12	R2	521	7.1	521	7.1	0.912	80.2	LOS F	19.3	143.6	1.00	1.00	25.7
Approach		1315	5.4	1315	5.4	0.912	50.3	LOS D	19.3	143.6	0.82	0.86	27.6
All Vehicles		4438	5.4	4438	5.4	0.912	40.0	LOS C	21.9	165.2	0.82	0.81	30.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.8	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: 2 [2b Old Northern Road/ Quarry Road PM 2031 wo dev mit]

 Network: N101 [2031 PM Peak mit]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1240	7.3	1240	7.3	0.442	1.9	LOS A	6.6	49.4	0.12	0.11	52.0
3	R2	217	1.8	217	1.8	0.431	51.1	LOS D	6.7	47.8	0.84	0.76	26.8
Approach		1457	6.5	1457	6.5	0.442	9.2	LOS A	6.7	49.4	0.23	0.21	38.5
East: Quarry Road													
4	L2	386	2.0	386	2.0	0.583	41.5	LOS C	19.7	140.3	0.87	0.83	25.6
6	R2	68	1.9	68	1.9	0.243	58.3	LOS E	3.9	27.5	0.92	0.76	20.9
Approach		455	2.0	455	2.0	0.583	44.0	LOS D	19.7	140.3	0.87	0.82	24.8
North: Old Northern Road													
7	L2	61	4.3	61	4.3	0.435	24.0	LOS B	16.5	119.1	0.63	0.59	41.7
8	T1	1294	3.6	1294	3.6	0.435	18.5	LOS B	16.8	121.1	0.64	0.58	29.5
Approach		1355	3.7	1355	3.7	0.435	18.7	LOS B	16.8	121.1	0.64	0.58	30.5
All Vehicles		3266	4.7	3266	4.7	0.583	18.0	LOS B	19.7	140.3	0.49	0.45	31.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		105	38.8	LOS D			0.74	0.74

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2031 wo dev mit]

Network: N101 [2031 PM Peak mit]

Old Northern Road/ Vineys Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1320	4.8	1320	4.8	0.598	6.0	LOS A	8.6	68.3	0.14	0.02	53.0
3b	R3	61	50.0	61	50.0	0.598	53.7	LOS D	8.6	68.3	1.00	0.17	28.8
Approach		1381	6.8	1381	6.8	0.598	8.1	NA	8.6	68.3	0.18	0.03	51.1
SouthEast: Vineys Road													
21b	L3	35	3.7	35	3.7	0.059	9.6	LOS A	0.2	1.4	0.56	0.78	39.9
23a	R1	4	0.0	4	0.0	0.018	15.6	LOS B	0.0	0.3	0.79	0.89	43.4
Approach		39	3.3	39	3.3	0.059	10.3	LOS A	0.2	1.4	0.59	0.79	40.5
North: Old Northern Road													
7a	L1	5	0.0	5	0.0	0.347	5.0	LOS A	0.0	0.0	0.00	0.00	57.9
8	T1	1318	3.4	1318	3.4	0.347	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1323	3.4	1323	3.4	0.347	0.1	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		2743	5.1	2743	5.1	0.598	4.3	NA	8.6	68.3	0.10	0.03	53.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %

Number of Iterations: 6 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road AM 2031 w dev]

 Network: N101 [2031 AM Peak w dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Line Road													
1	L2	495	3.8	495	3.8	0.659	23.3	LOS B	15.7	113.7	0.86	0.83	43.0
2	T1	899	7.0	899	7.0	0.900	63.2	LOS E	32.3	239.8	1.00	1.06	20.0
3	R2	8	0.0	8	0.0	0.054	66.9	LOS E	0.5	3.5	0.95	0.67	18.8
Approach		1402	5.8	1402	5.8	0.900	49.1	LOS D	32.3	239.8	0.95	0.97	27.6
East: Site Access													
4	L2	82	7.6	82	7.6	0.294	48.8	LOS D	5.4	40.5	0.90	0.72	21.4
5	T1	48	7.7	48	7.7	0.294	53.5	LOS D	5.4	40.5	0.93	0.73	20.4
6	R2	40	0.0	40	0.0	0.294	56.1	LOS D	4.2	30.0	0.94	0.73	2.2
Approach		171	5.8	171	5.8	0.294	51.8	LOS D	5.4	40.5	0.92	0.72	17.6
North: Old Northern Road													
7	L2	35	0.0	35	0.0	0.476	27.8	LOS B	13.1	95.4	0.55	0.53	21.5
8	T1	781	5.3	781	5.3	0.476	20.0	LOS B	13.1	95.4	0.55	0.50	40.7
9	R2	958	3.2	958	3.2	0.979	36.1	LOS C	33.1	237.7	0.99	0.97	32.2
Approach		1774	4.1	1774	4.1	0.979	28.8	LOS C	33.1	237.7	0.79	0.76	35.4
West: Old Northern Road													
10	L2	952	4.9	952	4.9	1.010	114.3	LOS F	48.5	354.1	1.00	1.17	12.9
11	T1	28	8.7	28	8.7	0.105	60.5	LOS E	1.6	11.8	0.90	0.73	20.2
12	R2	337	6.7	337	6.7	0.650	63.7	LOS E	10.4	76.8	1.00	0.82	29.1
Approach		1317	5.4	1317	5.4	1.010	100.2	LOS F	48.5	354.1	1.00	1.07	16.8
All Vehicles		4663	5.0	4663	5.0	1.010	55.9	LOS D	48.5	354.1	0.90	0.91	25.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %

Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		ped	m		per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	56.4	LOS E	0.2	0.2	0.93	0.93	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		211	58.6	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road AM 2031 w dev]



Network: N101 [2031 AM Peak w dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1149	7.9	1144	7.9	0.409	3.0	LOS A	6.7	50.0	0.18	0.17	48.2
3	R2	769	2.6	766	2.6	0.893	40.6	LOS C	23.4	167.1	0.68	0.82	30.1
Approach		1919	5.8	1910 ^{N1}	5.8	0.893	18.1	LOS B	23.4	167.1	0.38	0.43	34.0
East: Quarry Road													
4	L2	425	3.3	425	3.3	0.396	20.5	LOS B	14.1	101.4	0.57	0.75	36.1
6	R2	75	10.3	75	10.3	0.281	58.9	LOS E	4.3	32.5	0.93	0.76	20.8
Approach		500	4.4	500	4.4	0.396	26.2	LOS B	14.1	101.4	0.63	0.76	32.5
North: Old Northern Road													
7	L2	169	6.7	169	6.7	0.930	71.6	LOS F	40.6	296.1	1.00	1.07	24.5
8	T1	1347	4.3	1347	4.3	0.930	68.0	LOS E	42.0	305.0	1.00	1.10	12.5
Approach		1517	4.5	1517	4.5	0.930	68.4	LOS E	42.0	305.0	1.00	1.10	14.3
All Vehicles		3936	5.1	3926 ^{N1}	5.1	0.930	38.6	LOS C	42.0	305.0	0.65	0.73	23.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	37.8	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		105	48.5	LOS E			0.86	0.86

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road AM 2031 w dev]

Network: N101 [2031 AM Peak w dev]

Old Northern Road/ Vineys Road
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1232	8.0	1226	8.0	0.471	7.6	LOS A	9.2	68.2	0.29	0.29	40.4
3b	R3	45	3.6	45	3.6	0.471	39.3	LOS C	9.2	68.2	1.00	0.13	37.0
Approach		1277	7.9	1271 ^{N1}	7.9	0.471	8.7	NA	9.2	68.2	0.31	0.28	40.3
SouthEast: Vineys Road													
21b	L3	34	4.0	34	4.0	0.071	10.6	LOS A	0.2	1.5	0.62	0.83	39.1
23a	R1	6	0.0	6	0.0	0.036	20.2	LOS B	0.1	0.6	0.85	0.92	35.8
Approach		40	3.4	40	3.4	0.071	12.1	LOS A	0.2	1.5	0.65	0.85	38.1
North: Old Northern Road													
7a	L1	12	0.0	12	0.0	0.426	3.1	LOS A	0.0	0.0	0.00	0.01	39.8
8	T1	1483	5.1	1483	5.1	0.426	0.1	LOS A	0.0	0.0	0.00	0.00	39.9
Approach		1495	5.0	1495	5.0	0.426	0.1	NA	0.0	0.0	0.00	0.00	39.9
All Vehicles		2812	6.3	2806 ^{N1}	6.3	0.471	4.2	NA	9.2	68.2	0.15	0.14	40.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

 Site: 1b [1b Old Northern Road/ New Line Road PM 2031 w dev]

 Network: N101 [2031 PM Peak w dev]

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: New Line Road													
1	L2	446	7.1	446	7.1	0.657	24.7	LOS B	14.5	107.6	0.88	0.83	42.3
2	T1	669	9.1	669	9.1	0.837	58.4	LOS E	22.7	171.5	1.00	0.97	21.1
3	R2	35	0.0	35	0.0	0.405	76.3	LOS F	2.3	16.1	1.00	0.73	17.2
Approach		1151	8.1	1151	8.1	0.837	45.9	LOS D	22.7	171.5	0.95	0.91	28.9
East: Site Access													
4	L2	114	9.0	114	9.0	0.545	53.3	LOS D	10.0	74.3	0.96	0.79	20.3
5	T1	139	2.8	139	2.8	0.545	55.2	LOS D	10.0	74.3	0.97	0.79	20.1
6	R2	67	1.9	67	1.9	0.545	56.6	LOS E	9.0	64.1	0.98	0.79	2.2
Approach		320	4.8	320	4.8	0.545	54.8	LOS D	10.0	74.3	0.97	0.79	17.4
North: Old Northern Road													
7	L2	67	0.0	67	0.0	0.495	33.0	LOS C	18.6	134.3	0.75	0.70	18.8
8	T1	799	4.7	799	4.7	0.495	25.7	LOS B	18.6	134.3	0.71	0.64	37.3
9	R2	811	3.0	811	3.0	0.783	25.0	LOS B	17.1	122.5	0.70	0.78	37.5
Approach		1677	3.7	1677	3.7	0.783	25.6	LOS B	18.6	134.3	0.70	0.71	36.9
West: Old Northern Road													
10	L2	739	4.8	739	4.8	0.665	28.0	LOS B	14.8	107.5	0.69	0.77	31.7
11	T1	67	0.0	67	0.0	0.214	59.5	LOS E	3.7	26.2	0.91	0.77	20.4
12	R2	521	7.1	521	7.1	0.912	80.2	LOS F	19.3	143.6	1.00	1.00	25.7
Approach		1327	5.4	1327	5.4	0.912	50.1	LOS D	19.3	143.6	0.82	0.86	27.6
All Vehicles		4475	5.4	4475	5.4	0.912	40.2	LOS C	22.7	171.5	0.82	0.81	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	58.8	LOS E			0.95	0.95

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 2 [2b Old Northern Road/ Quarry Road PM 2031 w dev]



Network: N101 [2031 PM Peak w dev]

Old Northern Road/ Quarry Road

Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Old Northern Road													
2	T1	1247	7.3	1247	7.3	0.444	1.9	LOS A	6.6	48.8	0.12	0.11	52.2
3	R2	236	1.8	236	1.8	0.447	49.5	LOS D	7.2	51.1	0.83	0.76	27.3
Approach		1483	6.4	1483	6.4	0.447	9.4	LOS A	7.2	51.1	0.23	0.21	38.4
East: Quarry Road													
4	L2	392	2.0	392	2.0	0.579	40.7	LOS C	19.8	140.9	0.86	0.83	25.9
6	R2	69	1.9	69	1.9	0.246	58.3	LOS E	3.9	27.9	0.92	0.76	20.9
Approach		461	2.0	461	2.0	0.579	43.4	LOS D	19.8	140.9	0.87	0.82	25.0
North: Old Northern Road													
7	L2	64	4.3	64	4.3	0.445	24.6	LOS B	16.9	122.2	0.65	0.60	41.3
8	T1	1300	3.6	1300	3.6	0.445	19.2	LOS B	17.2	124.4	0.65	0.59	28.9
Approach		1364	3.7	1364	3.7	0.445	19.4	LOS B	17.2	124.4	0.65	0.59	30.0
All Vehicles		3308	4.7	3308	4.7	0.579	18.3	LOS B	19.8	140.9	0.49	0.45	31.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 6 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	18.9	LOS B	0.1	0.1	0.54	0.54
All Pedestrians		105	39.1	LOS D			0.75	0.75

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3b Old Northern Road/ Vineys Road PM 2031 w dev]

Network: N101 [2031 PM Peak w dev]

Old Northern Road/ Vineys Road
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Old Northern Road													
2	T1	1320	4.8	1320	4.8	0.625	4.9	LOS A	7.3	59.8	0.10	0.03	54.2
3b	R3	68	50.0	68	50.0	0.625	55.9	LOS D	7.3	59.8	1.00	0.24	27.5
Approach		1388	7.1	1388	7.1	0.625	7.4	NA	7.3	59.8	0.15	0.04	51.7
SouthEast: Vineys Road													
21b	L3	41	3.7	41	3.7	0.069	9.7	LOS A	0.2	1.7	0.57	0.79	39.8
23a	R1	5	0.0	5	0.0	0.023	16.0	LOS B	0.1	0.4	0.80	0.89	43.2
Approach		46	3.3	46	3.3	0.069	10.4	LOS A	0.2	1.7	0.59	0.80	40.4
North: Old Northern Road													
7a	L1	6	0.0	6	0.0	0.348	5.0	LOS A	0.0	0.0	0.00	0.01	57.9
8	T1	1322	3.4	1322	3.4	0.348	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1328	3.4	1328	3.4	0.348	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2763	5.2	2763	5.2	0.625	3.9	NA	7.3	59.8	0.08	0.03	54.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.2 %

Number of Iterations: 6 (maximum specified: 10)

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ATTACHMENT 3

Roads and Maritime correspondence (dated 18/03/19)



30 March 2019

Our Reference: SYD18/01487/02
Council Ref: DA/668/2018

General Manager
Hornsby Shire Council
PO Box 37
HORNSBY NSW 1630

Attention: Caroline Maeshian

Dear Sir/Madam,

**PROPOSED SENIORS LIVING DEVELOPMENT
3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL**

Reference is made to Council's email dated 12 March 2019, regarding the abovementioned application which was referred to Roads and Maritime Services (Roads and Maritime) for comments.

Roads and Maritime has reviewed the submitted application and notes that the proposal will not have significant traffic generation during the peak period. Hence, Roads and Maritime has no comments for Council's consideration in the determination of this development application.

Any inquiries in relation to this application can be directed to undersigned on 8849 2219 or by email at development.sydney@rms.nsw.gov.au

Yours sincerely

A handwritten signature in black ink, appearing to read 'Pahee Rathan'.

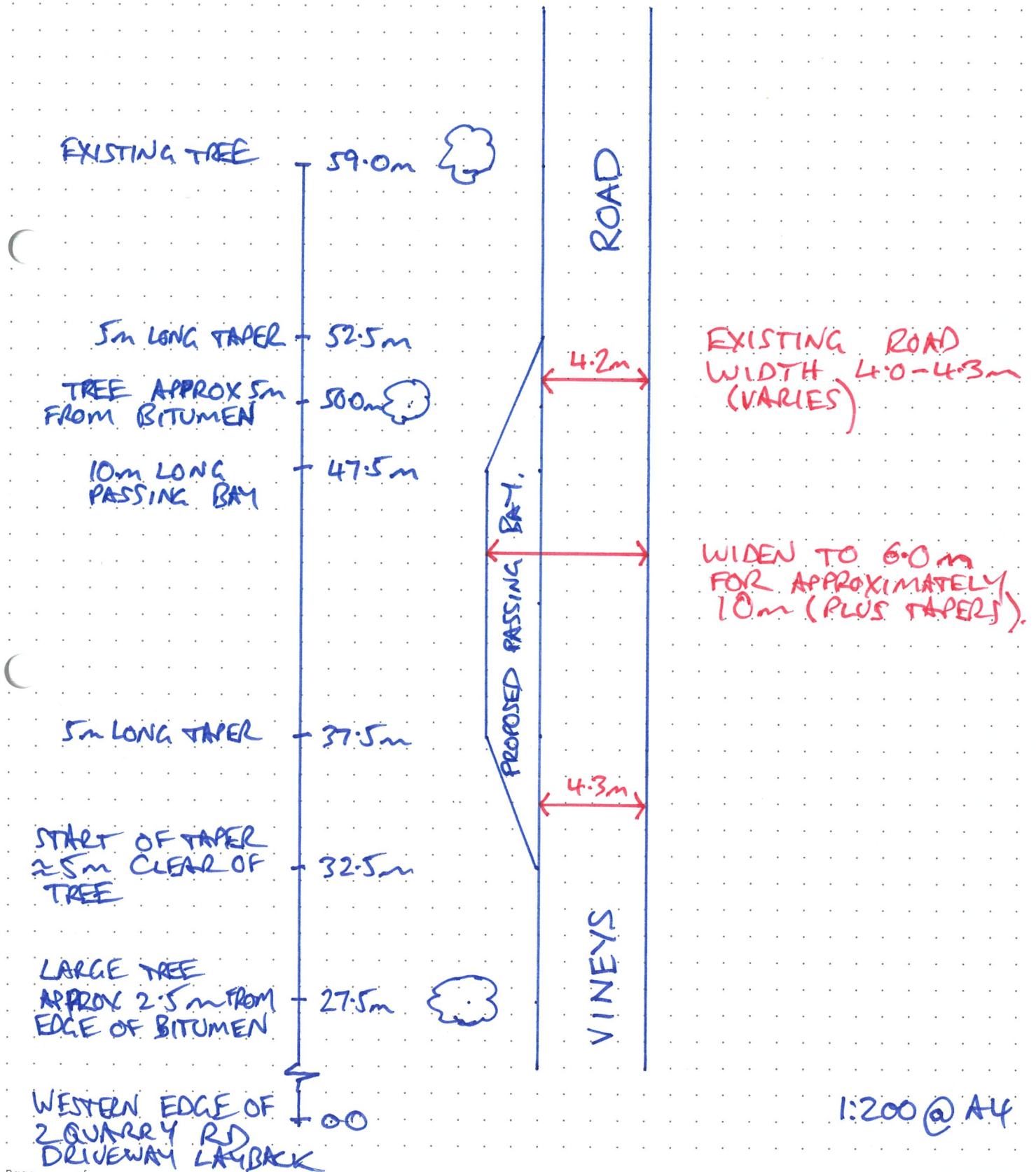
**Pahee Rathan
A/Senior Land Use Assessment Coordinator
North West Precinct**

ATTACHMENT 4

Indicative Vineys Road passing bay layout

- ☐ Confidential
- ☐ Meeting
- ☐ Phone Call
- ☐ Site Visit
- ☒ File Note

Date 7/5/19 GTA Rep. BM
 Assignment Name/No. 3 QUARRY RD DURAL
 Attendee Details _____
 Purpose/Subject PROPOSED VINEYS RD PASSING BAY



ATTACHMENT 5

Bus stop access assessment

