TRAFFIC AND PARKING IMPACT ASSESSMENT

OF THE PROPOSED RESIDENTIAL SUBDIVISION

AT 107 HAUSSMAN DRIVE, THORNTON

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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

200695.01FA - 8th October 2020

Development Type: **Residential Subdivision**

Site Address: **107 Haussman Drive, Thornton**

Prepared for: **McCloy Group**

Document reference: **200695.01FA**

Status	Issue	Prepared By	Checked By	Date
Draft	A	AT	TS	8th October 2020
Final	A	AT		8th October 2020

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1 INTRODUCTION

M^CLaren Traffic Engineering (MTE) was commissioned by *McCloy Group* to provide a Traffic and Parking Impact Assessment of the proposed Residential Subdivision of Lot 2 DP 1145348 with address 107 Haussman Drive, Thornton.

1.1 Description and Scale of Development

The proposed development, as depicted in the plans in **Annexure A**, includes the construction of the infrastructure and other works required to facilitate a future residential subdivision consisting of approximately **160 dwellings**. The proposed development has a total area of 18.96ha and will have the following features:

- Development of the majority of Lot 2 DP 1145348 into approximately 160 residential lots;
- The construction of new internal roads to facilitate access to the residential lots;
- Construction of a new primary access road from a new intersection with Haussman Drive, with access two options considered within this report:
    - **Scenario A:** Right-turn IN permitted
    - **Scenario B**: Right-turn IN prohibited.

The preliminary design of the Haussman Drive upgrade with respect to the location of the proposed primary access road for the subdivision is provided in **Annexure B**.

This proposed subdivision is part of the Thornton North Urban Release Area (Maitland Council DCP Part F7). The Maitland Development Control Plan outlines an indicative design for the general structure of Thornton North but does not specify specific road layouts for individual land releases and includes only a general collector road layout.

1.2 State Environmental Planning Policy (Infrastructure) 2007

The proposed development is on land that has a frontage to a classified road (Raymond Terrace Road) and does qualify under Clause 101 of the *SEPP (Infrastructure) 2007*. Accordingly, safe and practical vehicular access is provided by a road other than the Raymond Terrace Road and the safety, efficiency and ongoing operation of the Raymond Terrace Road will not be adversely affected by the development.

The proposed development does not qualify as a traffic generating development with relevant size and/or capacity under Clause 104 of the *SEPP (Infrastructure) 2007*. Accordingly, formal referral to the Roads and Maritime Services (RMS) is not required and Maitland City Council officers can determine this proposal accordingly.

1.3 Site Description

1.3.1 Existing Conditions

The subject site is situated at 107 Haussman Drive, Thornton NSW 2322 and is legally identified as Lot 2 in DP 1145348. The site can be classified as an existing rural residential property which housed a clay quarry, which is no longer in use. Vehicular access to the site is currently made from Haussman Drive via gravel driveway which measures 6m wide within the property with a 14m wide crossing at Haussman Drive.

The site is adjacent to current residential dwellings to the south and a rural property to the east. The site is also bordered by Huassman Drive to the west and Raymond Terrace Road to the north. In between the site and Haussman Drive is a High Voltage Transformer Station. More residential subdivisions are proposed to the east and north of the site in line with the *Maitland Council DCP*. Major arterial and sub-arterial roads surrounding the site include Raymond Terrace Road to the north and the New England Highway to the South.

1.3.2 Zoning

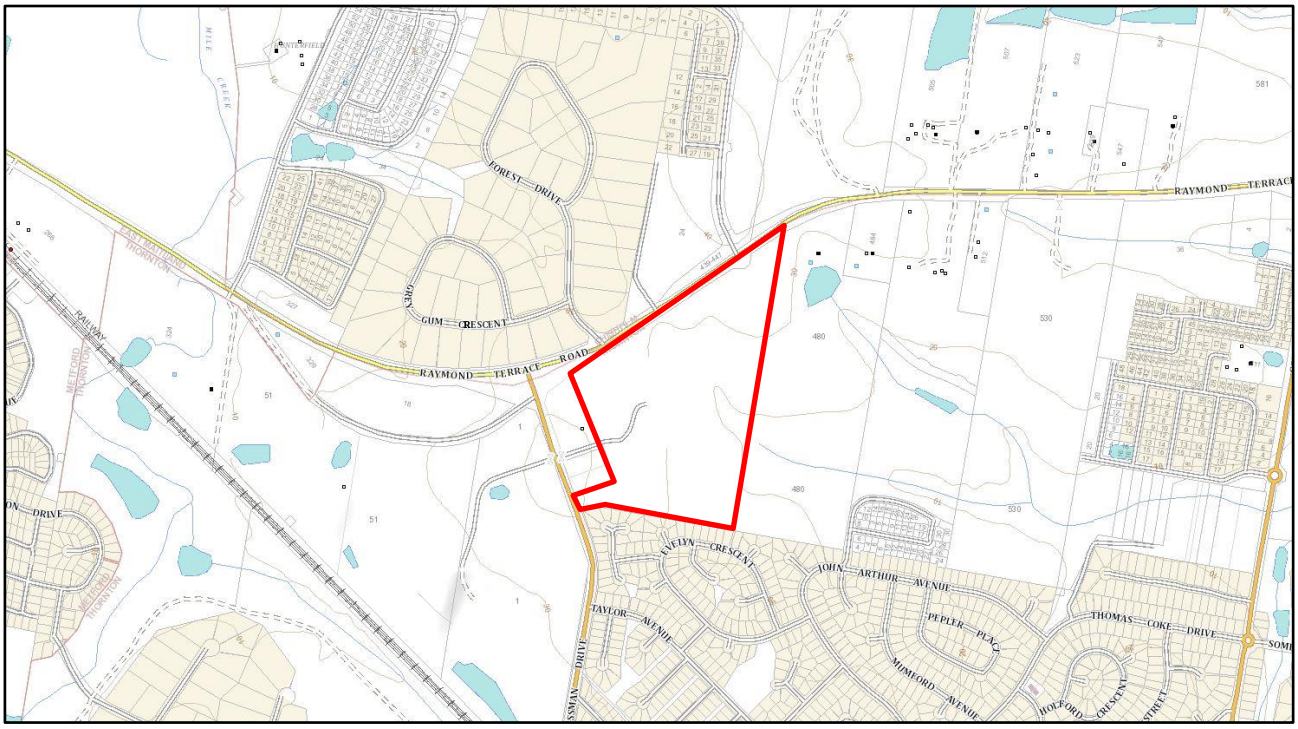
The subject site is currently zoned RU2 – Rural Landscape under the *Maitland City Council Local Environment Plan 2011*.

1.4 Site Context

The site location is depicted in **Figure 1 & Figure 2** below.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The existing road network surrounding the site has the following characteristics:

Haussman Drive

- Unclassified LOCAL Road;
- Approximately 8.0 m wide sealed carriageway facilitating two lanes (one in each direction) and unsealed shoulders on both sides of the road (i.e. no formal kerb);
- Signposted 60km/h carriageway;
- No kerbside parking permitted;
- Haussmann Drive meets Raymond Terrace Road with a T-Intersection 300m to the north of the proposed site access road;
- Brickworks Road also meets Haussmann Road with a T-Intersection 70m to the south of Raymond Terrace Road, and 230m to the north of the proposed site access road.

Raymond Terrace Road

- Classified STATE Road (Road No. 104);
- Approximately 16.0m wide sealed carriageway facilitating two lanes of traffic (one in each direction) as well as turning lanes;
- Unsealed shoulders are present on both sides of the road (i.e. no formal kerb), except on approach to the Settlers Boulevard Intersection;
- Signposted 80km/h carriageway;
- No kerbside parking permitted.

Settlers Boulevard

- Unclassified LOCAL Road;
- Approximately 23.0m wide sealed carriageway facilitating four lanes of traffic (two in each direction) in the proximity to the junction with Raymond Terrace Road. 8m median separates the two directions. Becomes one lane each way 200m away from intersection;
- Signposted 50km/h carriageway;
- No kerbside parking permitted.

2.2 Existing Traffic and Parking Environment

Traffic counts were completed at the intersection of Haussman Drive / Raymond Terrace Road on three consecutive days on Thursday 11th, Friday 12th and Saturday 13th of May 2017, representing a typical weekday and weekend conditions and are reproduced in **Annexure C** for reference.

To account for expected increase in traffic volumes between 2017 and 2020, a linear growth factor of 2% p.a. over 3 years has been applied to all approaches of the May 2017 traffic volumes. The application of a 2% growth factor is a standard approach for adapting historical count data in the absence of more localised traffic growth rates and is considered a conservative approach for these specific intersections.

2.2.1 Intersection Performance

Existing intersection performances have been assessed using SIDRA INTERSECTION 8. The results of the analysis are summarised in **Table 1** below with detailed SIDRA outputs shown in **Annexure D**. It should be noted that as three consecutive survey days were undertaken, the worst-case day will be assessed, that is Friday the 12th of May, with a 2% p.a. growth rate over 3-years applied to all movements.

TABLE 1: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8)

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/vehicle)	Level of Service(3)	Control Type	Worst Movement
EXISTING PERFORMANCE						
Haussman Drive / Raymond Terrace Road	AM	0.95	13.1 (Worst: 41.8)	**N/A** (Worst: C)	Priority	RT from Haussman Drive
	PM	1.01	25.2 (Worst: >70)	**N/A** (Worst: F)		RT from Haussman Drive

SIDRA INTERSECTION modelling provides an overall Level of Service (LoS) of N/A, as SIDRA does not provide a good representation of the operation of the intersection of Haussman Drive / Raymond Terrace due to free flow assumptions along major road movements, that is the near zero delays associated with major road through movements. A more appropriate indication for the overall operation of the intersection is the LoS and average delays associated with the minor road movements.

The worst turn movements of Haussman Drive (RT from Haussman Drive) are operating at LoS “C” during the peak AM period and LoS “F” during the peak PM period. While the LoS of “C” indicates the movement is operating satisfactorily during the AM, during the PM the right turn movement from Haussman Drive is operating at capacity and intersection upgrades are required. These upgrades are already planned and discussed in **Section 2.3** below.

2.3 Future Road and Infrastructure Upgrades

From *Maitland City Councils Development Application Tracker* and website, it appears that there are future planned road changes which will affect existing traffic conditions within the vicinity of the subject site.

Roadworks include upgrades and new intersections along Raymond Terrace Road in line with the planned layout of the Thornton North Urban Release Area. In addition, new public residential roads will be built to facilitate the residential development of the area, also changing the traffic conditions experienced.

As part of those works, upgrades to Haussman Drive are currently underway with the design of Stage 2 of this project currently being completed for the section from Raymond Terrace Road to Taylor Avenue. According to the *Maitland City Council* website the following is stated with regard to the Stage 2 upgrades.

> *Haussman Drive uprade from Raymond Terrace Road to Taylor Avenue including both intersections:*
>
> - *Relocation of power poles and other utility services*
> - *Upgrade to a signalised intersection at Raymond Terrace Road and Haussman Drive*
> - *Construction of a roundabout at Haussman Drive and Taylor Avenue intersection*
> - *Reconstruction and widening of the road pavement in both Railway Avenue and Haussman Drive.*
> - *Construction of a shared path along Haussman Drive.*

The proposed upgrade of the Raymond Terrace Road / Haussman Drive intersection to a signalised intersection will greatly increase the intersections capacity beyond the existing priority channelised right turn arrangement. The existing worst movement as identified above in **Section 2.2.1**, being the right hand turn movement from Haussman Drive, is expected to be provided with additional capacity increasing the operating performance of this movement at this intersection.

The exact details of these proposed upgrades have not yet been released by Council or the TfNSW and cannot be assessed in detail within this report. Considering the upgrades are in-line with several locally planned residential subdivisions throughout the Thornton North Urban Release area, it is expected that the intersection design will have already accounted for the traffic generation from this proposed subdivision amongst others.

Preliminary plans for the duplication of Haussman Drive at the site location are provided in **Annexure B**.

2.4 Public Transport

The subject site has access to existing bus route 182 provided by Hunter Buses Network which the 182 from Haussman Drive onto Taylor Avenue. The nearest bus stop on Haussman Drive (Stop ID. 2322136) is located approximately 500m from the majority of the site. These bus routes provide access to Thornton Train Station Stockland Green Hills Shopping Centre and Maitland. Thornton Station is 2kms from the Subdivision and provides access to Maitland and Newcastle, as well as the extended NSW TrainLink Network.

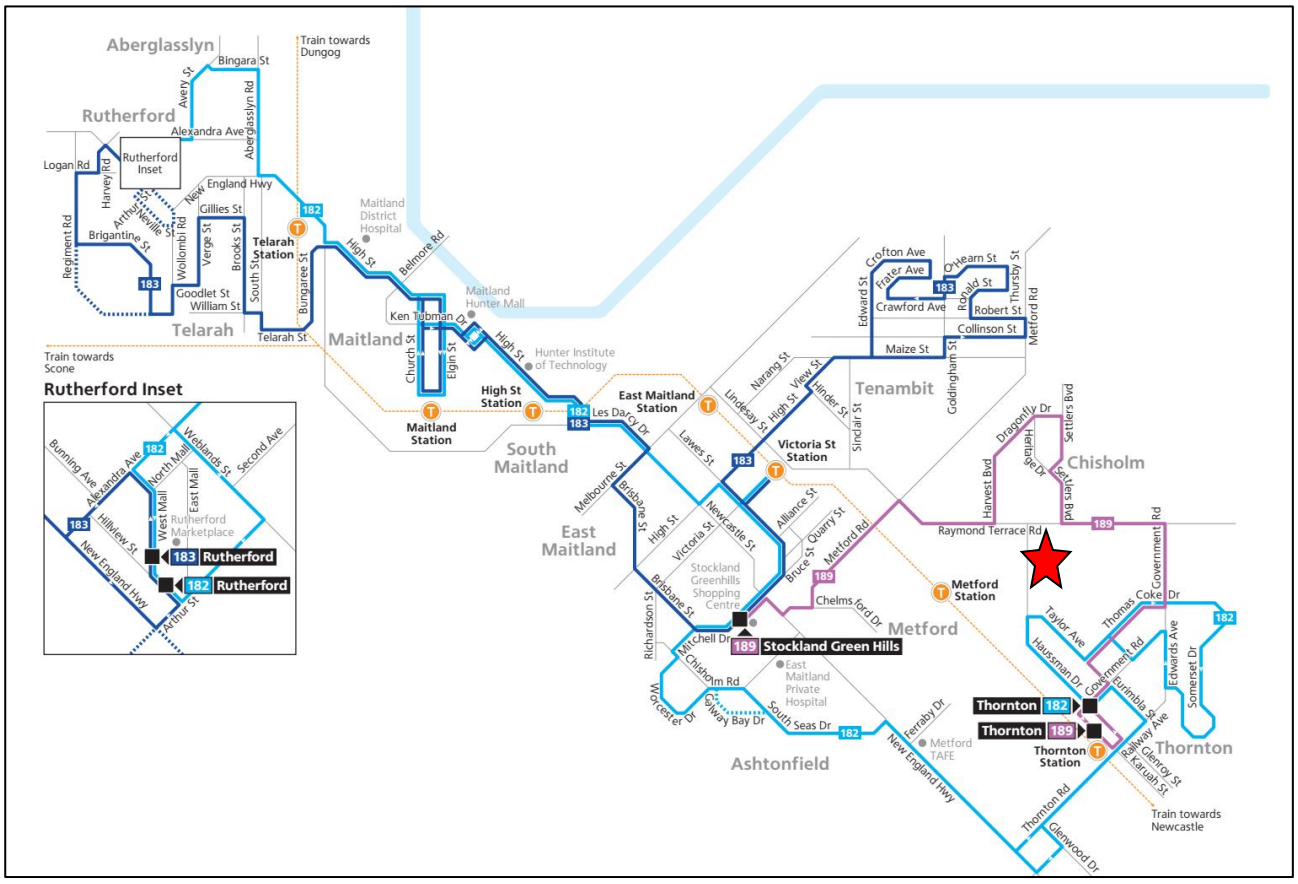


FIGURE 3: BUS ROUTES

3 PARKING ASSESSMENT

3.1 Council Parking Requirement

Reference is made to the *Maitland Development Control Plan 2011 – Part C – Design Guidelines – Appendix A* which designates the following in regard to parking:

> *Dwelling Houses*
> *Minimum of 1 space*
> *This space is to be located behind the building line as set by Council.*

The residential lots will have sufficient space for a minimum of 1 car parking space per dwelling. Further assessment of this provision will be conducted during the individual development applications for each residential dwelling within the subdivision.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

The estimated traffic generation level for the residential subdivision for 160 proposed lots is based upon the RMS *Guide to Traffic Generating Developments October 2002* and more recent supplements. The RMS publicised updated low density residential dwellings traffic generation rates within the *Technical Direction TDT 2013/04a,* and these rates will be applied to this subdivision development. The expected traffic generation is summarised in **Table 2** below.

TABLE 2: PEAK HOUR TRAFFIC GENERATION

Development Type	Scale	Peak Period	Rate	Peak Traffic Generation	Trip Assignment(1)
Dwelling Houses	160	AM	0.71 trips per dwelling	114	23 IN; 91 OUT
		PM	0.78 trips per dwelling	125	100 IN; 25 OUT

Note (1): Assumes 20% inbound & 80% outbound during AM peak (shown above). Vice versa for PM.

As shown above, the traffic generated by the site equates to **114** and **125** vehicle trips in both the AM (23 IN; 91 OUT) and PM (100 IN; 25 OUT) peak periods, respectively.

The traffic assignment and likely impact of these additional vehicle trips on the existing road network are analysed in the following sub-sections.

4.2 Traffic Assignment

Given the surrounding road network and the available routes to / from the site the following two traffic assignments have been considered, based weather or not right-turns into the subdivision access road are permitted. Both traffic assignment scenarios assume that the proposed subdivision is only accessible via one future intersection with Haussman Drive, where right-turn movements from the access road into Haussman Drive will be prohibited.

Right-Turn IN Permitted (Scenario A)

During the AM and PM period, the following traffic distribution is adopted:

- **Inbound:**
    - 50% from the north along Haussman Drive:
        - 40% along Raymond Terrace Road from the Maitland area;
        - 10% along Raymond Terrace Road from the Raymond Terrace area;

- 50% from the south along Haussman Drive.

- **Outbound:**
  - 50% to the north along Haussman Drive, after completing a U-turn at the future Haussman Drive / Taylor Avenue roundabout:
    - 40% along Raymond Terrace Road towards Maitland;
    - 10% along Raymond Terrace Road towards Raymond Terrace;
  - 50% to the south along Haussman Drive.

Right-Turn IN Prohibited (Scenario B)

During the AM and PM period, the following traffic distribution is adopted:

- **Inbound:**
  - 50% from the north along Haussman Drive:
    - 40% along Raymond Terrace Road from the Maitland area;
    - 10% along Raymond Terrace Road from the Raymond Terrace area;
  - 50% from the south;
    - 30% along Haussman Drive, turning right onto Raymond Terrace Road before completing at U-Turn at the signalised intersection of Raymond Terrace Road / Settlers Boulevard and turning left into Haussman Drive;
    - 20% along Government Road and Raymond Terrace Road turning left into Haussman Drive.

- **Outbound:**
  - 50% northbound along Haussman Drive, after completing a U-turn at the future Haussman Drive / Taylor Avenue intersection:
    - 40% along Raymond Terrace Road towards Maitland;
    - 10% along Raymond Terrace Road towards Raymond Terrace;
  - 50% southbound along Haussman Drive.

4.3 Traffic Impact

The additional traffic specified in **Section 4.1** and **4.2** above has been added to the existing intersections. The following sub-sections outline the results of the future performance under each scenario explored within this report.

4.3.1 Haussman Drive / Raymond Terrace Road

The future SIDRA INTERSECTION performance of the Haussman Drive / Raymond Terrace Road intersection under Scenarios A and B are summarised in **Table 3** below, with detailed SIDRA outputs reproduced in **Annexure D** for reference.

TABLE 3: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3]	Control Type	Worst Movement
EXISTING PERFORMANCE						
Haussman Drive / Raymond Terrace Road	AM	0.95	13.1 (Worst: 41.8)	**N/A** (Worst: C)	Priority	RT from Haussman Drive
	PM	1.01	25.2 (Worst: >70)	**NA** (Worst: F)		RT from Haussman Drive
FUTURE PERFORMANCE – Scenario A – RHT IN Permitted						
Haussman Drive / Raymond Terrace Road	AM	0.96	15.2 (Worst: 47.4)	**N/A** (Worst: D)	Priority	RT from Haussman Drive
	PM	1.11	34.4 (Worst: >70)	**N/A** (Worst: F)		RT from Haussman Drive
FUTURE PERFORMANCE – Scenario B – RHT IN Prohibited						
Haussman Drive / Raymond Terrace Road	AM	0.99	17.2 (Worst: 54.6)	**N/A** (Worst: D)	Priority	RT from Haussman Drive
	PM	1.38	61.5 (Worst: >70)	**N/A** (Worst: F)		RT from Haussman Drive

As shown above the worst turn movement (RT from Haussman Drive) of the intersection of Haussman Drive / Raymond Terrace Road remains unchanged in the future scenario for the PM peak period and reduces from a LoS “C” to a LoS “D” in the future scenarios for the AM peak period. This result indicates that the right turn movement from Haussman Drive is essentially at capacity within this intersection under its existing arrangements, especially in the PM peak period.

The proposed signalised upgrade of the Haussman Drive / Raymond Terrace Road intersection, which is currently undergoing design by Council and TfNSW will result in a significant increase in the intersections capacity, especially the capacity of the heavily utilised right turn movements both from Raymond Terrace Road and Haussman Drive. Detailed concept designs of the proposed intersection upgrade have not been provided for this analysis, but considering the existing performance of the intersection, it is expected there will be a significant increase in the intersections overall capacity which will cater for both this proposed subdivision development and the other residential subdivisions currently planned within the Thornton North Urban Release Area.

4.3.2 Haussman Drive / Subdivision Access Road

A number of options have been considered for the design of the Haussman Drive / Subdivision Access Road intersection, with consideration made to the upgrades to Haussman Drive to a dual carriageway in both directions as outlined in **Annexure B**. Two scenarios have been considered, with both scenarios assuming that right-turn movements from the Access Road into Haussman Drive will be prohibited. The two scenarios assessed below are:

- **Scenario A** – Right-Turn IN Permitted
- **Scenario B** – Right Turn IN Prohibited

The future SIDRA INTERSECTION performance of the Haussman Drive / Subdivision Access Road intersection under Scenarios A and B are summarised in **Table 3** below, with detailed SIDRA outputs reproduced in **Annexure D** for reference.

TABLE 4: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3]	Control Type	Worst Movement	95th Percentile Queue
FUTURE PERFORMANCE – Scenario A – RHT IN Permitted							
Haussman Drive / Access Road	AM	0.22	0.6 (Worst: 11.5)	**N/A** (Worst: A)	Priority	RT from Haussman Drive	0.3 veh (2.1m) Haussman Drive
	PM	0.24	1 (Worst: 11.5)	**NA** (Worst: A)		RT from Haussman Drive	1.2 veh (8.2m) Haussman Drive
FUTURE PERFORMANCE – Scenario B – RHT IN Prohibited							
Haussman Drive / Access Road	AM	0.18	0.7 (Worst: 7)	**N/A** (Worst: A)	Priority	LT from Access Road	0.4 veh (2.5m) Access Road
	PM	0.18	0.6 (Worst: 6.5)	**N/A** (Worst: A)		LT from Access Road	0.3 veh (2.1m) Access Road

As shown above the worst turning movements operate at LoS “A” during both the AM and PM peak periods. This represents acceptable delays and additional spare capacity maintained under both scenarios.

SIDRA outputs provide an indication of the average queue length associated with individual turning movements. When right turns are permitted from Haussman Drive into the Access Road, a 95th percentile queue length of 8.2m (1.2 veh) in the PM peak period will be present along Haussman Drive. As a dual carriageway, the intersection will effectively operate as a basic right-turn (BAR) treatment, facilitating following vehicles to negotiate around a right turning vehicle in an instance when they would be queued at the intersection. This outcome is considered acceptable from a traffic flow perspective, through an additional sightline assessment would be required to ensure the minimum sightline requirements are met under this scenario.

The alternative option considered, which is prohibiting a right-turn movement into the access road from Haussman Drive (Scenario B), will have a marginal reduction on the average intersection delay, due to removal of the right-turn. Comparatively, for this proposed intersection there is no significant benefit gained from prohibiting right-turn movements which can easily be accommodated within the dual carriageway. It should be noted that limited data is available on the expected increase to the Haussman Drive two-way traffic flows with respect to the completion of the entire Thornton North urban release area.

The provision of an additional eastern access point to the subdivision, potentially to Honeymyrtle Street, will likely change the traffic flow dynamics of this intersection. While further traffic modelling would be required to quantify the impact, it is expected that both the number of right and left turn movements into the Access Road would increase. Residents in the existing residential streets within the northern side of Thornton such as John Arthur Avenue and Mahogany Crescent would be expected to utilise the new intersection for access, as an alternative to Taylor Avenue. This has the potential to create residential amenity impacts within these local streets due to an increase in through traffic. The Haussman Drive / Access Road intersection is expected to have sufficient capacity to accommodate this additional traffic flow, subject to further intersection modelling of this specific scenario.

Based on the analysis above, the provision of a right-turn from Haussman Drive into the subdivision access road will not have a detrimental impact on the performance of Haussman Drive.

5 CONCLUSION

In view of the foregoing, the proposed residential subdivision (as depicted in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- The subdivision lot layout does not provide concept plans for the dwellings set out of each lot, however there is ample site area in each lot to provide the required number of car parking spaces.

- Detailed compliance of the internal road design within the proposed subdivision in accordance with AMCORD and the Council requirements will be required at a later stage of this proposal. A road safety evaluation will also follow at the detailed design stage to ensure that lots can be adequately served in terms of potential individual driveway locations and service vehicle circulation.

- The traffic generated by the site equates to **114** and **125** vehicles trips in the AM (23 IN; 91 OUT) and PM (100 IN; 25 OUT) peak periods, respectively. The traffic generated by the proposed development will be of a low order and will not detrimentally impact the ongoing operation of the existing road network.

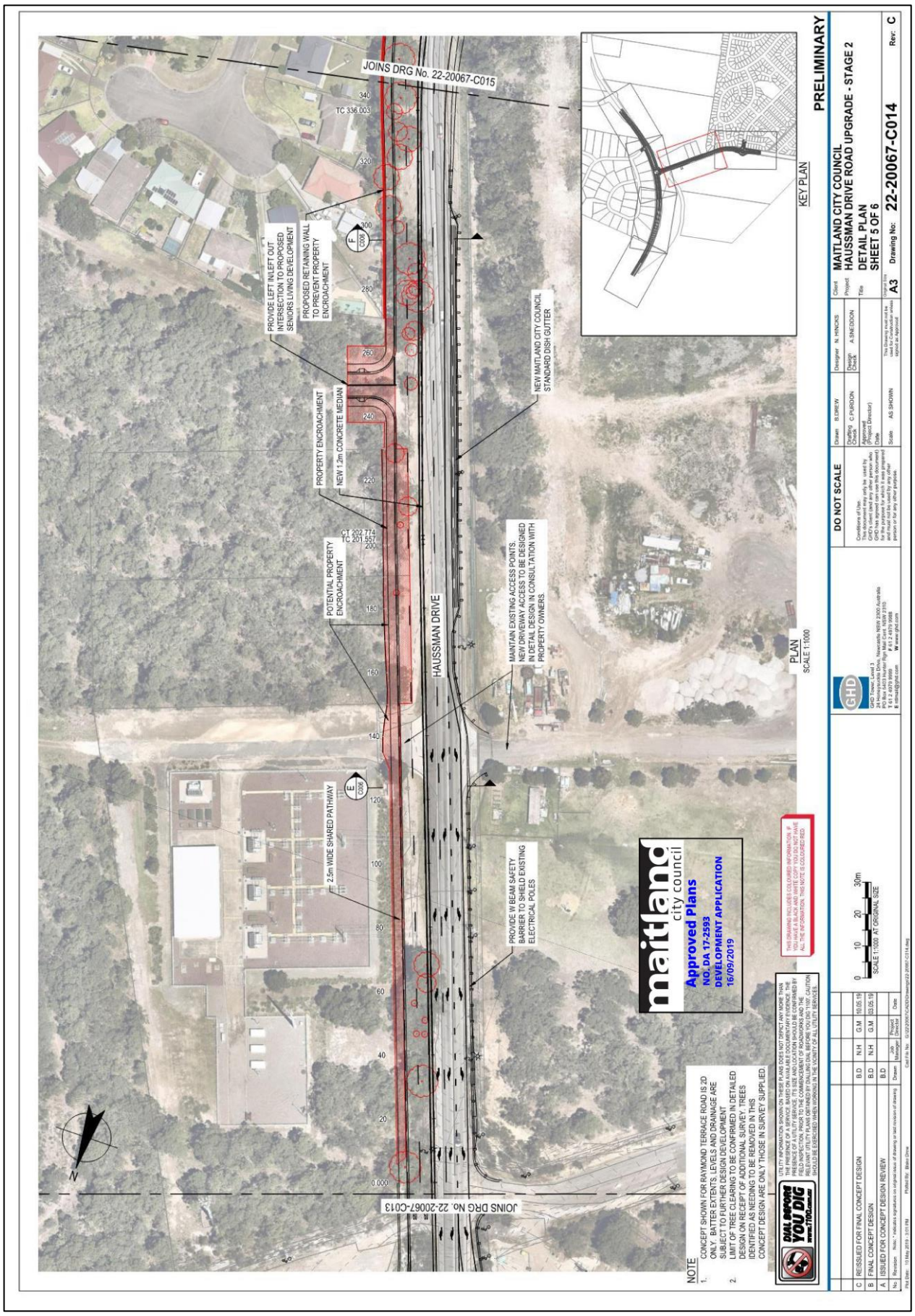
- The provision of a right-turn movement from Haussman Drive into the subdivision access road is supportable and can currently be provided without the provision of a channelised right-turn. The 95th percentile queue of 8.2m (1.2 vehicles) is minimal with an average delay of 11.5 seconds.

- The impact of providing an additional eastern access road to Honeymyrtle Street has not been assessed, but this option is expected to increase the through traffic using the subdivision to access Haussman Drive, potentially creating residential amenity issues within the proposed subdivision. Further detailed analysis of this scenario would be required including its impact on the Haussman Drive / Access Road intersection.

- The intersection of Haussman Drive / Raymond Terrace Road intersection is already operating at capacity, though it is expected that the proposed upgrades to this intersection by Council will provide significant additional capacity to the intersection to support both existing traffic flows and future traffic flows generated by the completion of the Thornton North Urban Release area. A concept design of this intersection upgrade has not been provided and hence could not be assessed in detail.

ANNEXURE A: CONCEPT SITE PLANS

ANNEXURE B: HAUSSMAN DRIVE / SUBDIVISION ACCESS ROAD CONCEPT



ANNEXURE C: TRAFFIC SURVEY RESULTS

(Sheet 1 of 3)

BVY TRAFFIC SURVEY — Quality data services proven since 2000

QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY
Intersection of Hausmann Dr and Raymond Tarrace Rd, Thornton

Date:	Thu 11/05/17
Weather:	Overcast
Suburban	Thornton
Custome	BTF

North:	N/A
East:	Raymond Tarrace Rd
South:	Hausmann Dr
West:	Raymond Tarrace Rd

Survey Start	AM:	7:00	PM:	15:00
Vehicular Peakhour		Pedestrians Peakhour		
AM:	7:45 AM-8:45 AM	AM:	N/A	
PM:	4:15 PM-5:15 PM	PM:	N/A	

All Vehicles

Time		pproach Raymond Tarr			th Approach Hausman			pproach Raymond Tarr			Hourly Total	
eriod Star	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	48	25	0	12	38	0	44	53	1205	
7:15	7:30	0	69	34	0	10	39	0	52	60	1385	
7:30	7:45	0	120	51	0	12	46	0	50	62	1530	
7:45	8:00	0	143	34	0	17	55	0	60	71	1632	Peak
8:00	8:15	0	151	31	0	20	57	0	61	80	1613	
8:15	8:30	0	147	39	0	25	56	0	61	81	1545	
8:30	8:45	0	164	40	0	23	65	0	57	94	1441	
8:45	9:00	0	108	20	0	19	68	0	63	83	1293	
9:00	9:15	0	74	21	0	17	67	0	71	82	1201	
9:15	9:30	0	68	17	0	11	72	0	61	76		
9:30	9:45	0	74	17	0	13	72	0	54	65		
9:45	10:00	0	76	11	0	14	53	0	52	63		
15:00	15:15	0	110	34	0	23	91	0	62	79	1722	
15:15	15:30	0	95	16	0	26	87	0	69	111	1765	
15:30	15:45	0	110	24	0	22	98	0	94	128	1796	
15:45	16:00	0	108	19	0	23	79	0	85	129	1776	
16:00	16:15	0	97	21	0	19	81	0	91	133	1776	
16:15	16:30	0	102	21	0	23	83	0	72	134	1801	Peak
16:30	16:45	0	115	21	0	37	83	1	66	133	1775	
16:45	17:00	0	120	18	0	29	98	0	59	119	1711	
17:00	17:15	0	125	20	0	32	105	0	72	113	1613	
17:15	17:30	0	96	19	0	39	102	0	61	92	1451	
17:30	17:45	0	86	23	0	40	96	0	63	84	1270	
17:45	18:00	0	80	16	0	29	89	0	52	79	1059	
18:00	18:15	0	86	11	0	20	73	0	42	73	908	
18:15	18:30	0	58	10	0	18	50	0	37	55		
18:30	18:45	0	41	15	0	12	37	0	25	51		
18:45	19:00	0	50	7	0	19	38	0	32	48		

Peak Time		pproach Raymond Tarr			th Approach Hausman			pproach Raymond Tarr			Peak
eriod Star	Period End	U	WB	L	U	R	L	U	R	EB	total
7:45	8:45	0	605	144	0	85	233	0	239	326	1632
16:15	17:15	0	462	80	0	121	369	1	269	499	1801

ANNEXURE C: TRAFFIC SURVEY RESULTS

(Sheet 2 of 3)

BVY TRAFFIC SURVEY
Quality data services proven since 2000

QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY

Intersection of Hausmann Dr and Raymond Tarrace Rd, Thornton

Date:	Fri 12/05/17	*North:*	N/A	Survey Start	AM:	7:00	PM: 15:00
Weather:	Overcast	*East:*	Raymond Tarrace Rd	Vehicular Peakhour		Pedestrians Peakhour	
Suburban	Thornton	*South:*	Hausmann Dr	AM:	8:00 AM-9:00 AM	AM:	N/A
Custome	BTF	*West:*	Raymond Tarrace Rd	PM:	4:30 PM-5:30 PM	PM:	N/A

All Vehicles

Time		pproach Raymond Tarr			th Approach Hausman			pproach Raymond Tarr			Hourly Total	
eriod Star	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	65	19	0	11	36	0	46	43	1198	
7:15	7:30	0	66	40	0	12	43	0	55	59	1396	
7:30	7:45	0	131	39	0	17	46	0	83	44	1578	
7:45	8:00	0	133	23	0	10	53	0	83	41	1722	
8:00	8:15	0	161	27	0	18	56	0	91	65	1771	Peak
8:15	8:30	0	147	36	0	9	75	0	117	73	1667	
8:30	8:45	0	150	47	0	7	84	0	137	79	1485	
8:45	9:00	0	108	33	0	17	69	0	107	58	1241	
9:00	9:15	1	85	16	0	16	63	0	82	51	1106	
9:15	9:30	0	82	14	0	9	60	0	68	42		
9:30	9:45	0	78	6	0	9	63	0	59	45		
9:45	10:00	0	66	13	0	8	57	0	65	48		
15:00	15:15	0	108	27	0	22	75	0	92	66	1685	
15:15	15:30	0	109	20	0	24	99	0	103	64	1729	
15:30	15:45	0	97	22	0	26	96	0	114	84	1750	
15:45	16:00	0	107	13	0	24	107	0	104	82	1770	
16:00	16:15	0	110	17	0	17	109	0	103	78	1823	
16:15	16:30	0	111	22	0	27	101	0	110	69	1884	
16:30	16:45	0	105	18	0	31	105	0	123	77	1888	Peak
16:45	17:00	0	124	21	0	41	110	0	111	83	1862	
17:00	17:15	0	135	18	0	38	104	0	121	79	1727	
17:15	17:30	0	116	14	0	40	98	0	104	72	1529	
17:30	17:45	0	117	19	0	38	96	0	101	62	1325	
17:45	18:00	0	98	20	0	25	79	0	74	59	1094	
18:00	18:15	0	86	13	0	19	73	0	61	45	914	
18:15	18:30	0	61	11	0	9	55	0	61	43		
18:30	18:45	0	50	9	0	11	52	0	53	27		
18:45	19:00	0	51	11	0	19	37	0	34	23		

Peak Time		pproach Raymond Tarr			th Approach Hausman			pproach Raymond Tarr			Peak
eriod Star	Period End	U	WB	L	U	R	L	U	R	EB	total
8:00	9:00	0	566	143	0	51	284	0	452	275	1771
16:30	17:30	0	480	71	0	150	417	0	459	311	1888

ANNEXURE C: TRAFFIC SURVEY RESULTS

(Sheet 3 of 3)

BVY TRAFFIC SURVEY
Quality data services proven since 2000
ABN 18 434 865 435
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QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY
Intersection of Hausmann Dr and Raymond Tarrace Rd, Thornton

Date:	Sat 13/05/17
Weather:	Overcast
Suburban.	Thornton
Customer:	BTF

North:	N/A
East:	Raymond Tarrace Rd
South:	Hausmann Dr
West:	Raymond Tarrace Rd

Survey Start	AM:	9:00	PM:	12:00
Vehicular Peakhour		Pedestrians Peakhour		
AM:	11:00 AM-12:00 P	AM:	N/A	
PM:	12:45 PM-1:45 PM	PM:	N/A	

All Vehicles

Time		Approach Raymond Tarra			uth Approach Hausmann			Approach Raymond Tarra			Hourly Total	
Period Star	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
9:00	9:15	0	68	10	0	5	57	0	41	58	1167	
9:15	9:30	0	87	21	0	17	79	0	48	69	1249	
9:30	9:45	0	94	23	0	9	64	0	46	63	1274	
9:45	10:00	0	86	16	0	11	66	0	68	61	1337	
10:00	10:15	0	90	10	0	12	59	0	82	68	1372	
10:15	10:30	0	99	8	0	17	63	0	78	81	1438	
10:30	10:45	0	104	11	0	17	77	0	68	85	1474	
10:45	11:00	0	101	13	0	8	71	0	71	79	1509	
11:00	11:15	0	105	21	0	13	77	0	85	86	1558	Peak
11:15	11:30	0	101	17	0	17	71	0	93	83		
11:30	11:45	0	110	19	0	15	71	0	95	87		
11:45	12:00	0	98	16	0	19	91	0	79	89		
12:00	12:15	0	97	14	0	18	62	0	70	100	1397	
12:15	12:30	0	91	10	0	11	59	0	68	85	1406	
12:30	12:45	0	95	12	0	19	62	0	74	79	1433	
12:45	13:00	0	99	15	0	13	80	0	75	89	1434	Peak
13:00	13:15	0	95	14	0	10	90	0	62	99	1412	
13:15	13:30	0	103	10	0	13	75	0	60	90	1387	
13:30	13:45	0	95	16	0	21	69	0	56	85	1372	
13:45	14:00	0	91	12	0	16	74	0	63	93	1344	
14:00	14:15	0	81	16	0	21	72	0	61	94	1334	
14:15	14:30	0	98	7	0	19	62	0	67	83		
14:30	14:45	0	93	10	0	17	54	0	59	81		
14:45	15:00	0	85	10	0	19	65	0	71	89		

Peak Time		Approach Raymond Tarra			uth Approach Hausmann			Approach Raymond Tarra			Peak
Period Star	Period End	U	WB	L	U	R	L	U	R	EB	total
11:00	12:00	0	414	73	0	64	310	0	352	345	1558
12:45	13:45	0	392	55	0	57	314	0	253	363	1434

ANNEXURE D: SIDRA MODELLING RESULTS

(10 SHEETS)

MOVEMENT SUMMARY

Site: 01 [01EXAM - Raymond Terrace Drive / Haussman Drive]

Raymond Terrace Drive / Haussman Drive
Thornton, NSW (Job Ref: 200695)
EXISTING AM
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
1	L2	317	1.3	0.172	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
3	R2	57	5.6	0.440	41.8	LOS C	1.5	10.9	0.93	1.03	1.18	34.8
Approach		374	2.0	0.440	11.1	LOS A	1.5	10.9	0.14	0.60	0.18	50.5
East: Raymond Terrace Drive (E)												
4	L2	160	4.6	0.089	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	632	1.8	0.328	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		792	2.4	0.328	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.5
West: Raymond Terrace Drive (W)												
11	T1	307	2.1	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	504	4.6	0.953	41.2	LOS C	17.2	124.9	0.97	2.11	4.68	35.1
Approach		812	3.6	0.953	25.6	NA	17.2	124.9	0.60	1.31	2.91	41.7
All Vehicles		1977	2.8	0.953	13.1	NA	17.2	124.9	0.27	0.70	1.23	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 01 [01EXPM - Raymond Terrace Drive / Haussman Drive]

Raymond Terrace Drive / Haussman Drive
Thornton, NSW (Job Ref: 200695)
EXISTING PM
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
1	L2	465	1.6	0.720	55.7	LOS D	23.1	164.1	0.97	0.01	2.97	31.5
3	R2	167	3.8	1.006	111.6	LOS F	10.6	76.5	1.00	1.82	4.33	20.9
Approach		633	2.2	1.006	70.5	LOS F	23.1	164.1	0.98	0.49	3.33	27.8
East: Raymond Terrace Drive (E)												
4	L2	79	2.7	0.043	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
5	T1	536	2.2	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		615	2.2	0.279	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
West: Raymond Terrace Drive (W)												
11	T1	347	2.7	0.182	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	513	1.8	0.730	15.6	LOS B	7.0	49.6	0.79	1.23	1.75	46.7
Approach		860	2.2	0.730	9.3	NA	7.0	49.6	0.47	0.73	1.04	51.3
All Vehicles		2107	2.2	1.006	25.2	NA	23.1	164.1	0.49	0.47	1.43	42.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 01 [01(A)FUAM - Raymond Terrace Drive / Haussman Drive]

Raymond Terrace Drive / Haussman Drive
Thornton, NSW (Job Ref: 200695)
FUTURE AM - Scenario A
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
1	L2	355	1.2	0.193	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
3	R2	66	4.8	0.516	45.1	LOS D	1.8	13.3	0.94	1.05	1.27	33.7
Approach		421	1.8	0.516	11.9	LOS A	1.8	13.3	0.15	0.61	0.20	50.0
East: Raymond Terrace Drive (E)												
4	L2	162	4.5	0.090	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	632	1.8	0.328	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		794	2.4	0.328	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.5
West: Raymond Terrace Drive (W)												
11	T1	307	2.1	0.346	2.2	LOS A	2.0	14.3	0.64	0.00	0.65	57.2
12	R2	514	4.5	0.973	47.4	LOS D	19.8	144.1	0.98	2.28	5.24	33.2
Approach		821	3.6	0.973	30.5	NA	19.8	144.1	0.86	1.43	3.52	39.3
All Vehicles		2036	2.7	0.973	15.2	NA	19.8	144.1	0.38	0.75	1.46	47.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 01 [01(A)FUPM - Raymond Terrace Drive / Haussman Drive]

Raymond Terrace Drive / Haussman Drive
Thornton, NSW (Job Ref: 200695)
FUTURE PM - Scenario A
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
1	L2	476	1.5	0.782	71.4	LOS F	29.9	212.4	1.00	0.00	3.54	27.8
3	R2	171	3.7	1.110	177.8	LOS F	17.6	127.3	1.00	2.25	6.15	15.0
Approach		646	2.1	1.110	99.4	LOS F	29.9	212.4	1.00	0.59	4.23	22.8
East: Raymond Terrace Drive (E)												
4	L2	82	2.6	0.045	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
5	T1	536	2.2	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		618	2.2	0.279	0.8	NA	0.0	0.0	0.00	0.08	0.00	59.0
West: Raymond Terrace Drive (W)												
11	T1	347	2.7	0.182	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	555	1.7	0.792	17.6	LOS B	8.9	63.3	0.83	1.36	2.13	45.5
Approach		902	2.1	0.792	10.8	NA	8.9	63.3	0.51	0.84	1.31	50.2
All Vehicles		2166	2.1	1.110	34.4	NA	29.9	212.4	0.51	0.55	1.81	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 01 [01(B)FUAM - Raymond Terrace Drive / Haussman Drive]

Raymond Terrace Drive / Haussman Drive
Thornton, NSW (Job Ref: 200695)
FUTURE AM - Scenario B
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
1	L2	355	1.2	0.193	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
3	R2	74	4.3	0.576	48.3	LOS D	2.1	15.3	0.95	1.07	1.35	32.8
Approach		428	1.7	0.576	13.0	LOS A	2.1	15.3	0.16	0.62	0.23	49.3
East: Raymond Terrace Drive (E)												
4	L2	175	4.2	0.097	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	632	1.8	0.328	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		806	2.3	0.328	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.4
West: Raymond Terrace Drive (W)												
11	T1	307	2.1	0.351	2.3	LOS A	2.1	14.7	0.65	0.00	0.66	57.2
12	R2	514	4.5	0.990	54.6	LOS D	22.2	161.7	0.99	2.44	5.78	31.1
Approach		821	3.6	0.990	35.0	NA	22.2	161.7	0.86	1.53	3.87	37.5
All Vehicles		2056	2.7	0.990	17.2	NA	22.2	161.7	0.38	0.79	1.59	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 01 [01(B)FUPM - Raymond Terrace Drive / Haussman Drive]

Raymond Terrace Drive / Haussman Drive
Thornton, NSW (Job Ref: 200695)
FUTURE PM - Scenario B
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
1	L2	476	1.5	0.892	99.1	LOS F	38.1	270.3	1.00	0.00	4.45	23.0
3	R2	202	3.1	1.377	389.2	LOS F	40.6	291.6	1.00	3.36	10.80	7.9
Approach		678	2.0	1.377	185.6	LOS F	40.6	291.6	1.00	1.00	6.34	14.8
East: Raymond Terrace Drive (E)												
4	L2	142	1.5	0.077	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
5	T1	536	2.2	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		678	2.0	0.279	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.5
West: Raymond Terrace Drive (W)												
11	T1	347	2.7	0.183	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	555	1.7	0.854	22.0	LOS B	11.1	79.0	0.89	1.56	2.77	43.2
Approach		902	2.1	0.854	13.5	NA	11.1	79.0	0.55	0.96	1.70	48.4
All Vehicles		2258	2.1	1.377	61.5	NA	40.6	291.6	0.52	0.72	2.59	29.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 02A [02(A)FUAM - Haussman Drive / Access Road - RHT IN]

Huassman Drive / Access Road - Scenario A
Thornton, NSW (Job Ref: 200695)
FUTURE AM - Scenario A
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
2	T1	459	1.6	0.130	0.4	LOS A	0.3	2.1	0.06	0.02	0.06	59.3
3	R2	13	0.0	0.130	11.5	LOS A	0.3	2.1	0.13	0.04	0.13	56.8
Approach		472	1.6	0.130	0.7	NA	0.3	2.1	0.06	0.02	0.06	59.3
East: Access Road (E)												
4	L2	48	0.0	0.055	7.4	LOS A	0.2	1.4	0.43	0.66	0.43	52.2
Approach		48	0.0	0.055	7.4	LOS A	0.2	1.4	0.43	0.66	0.43	52.2
North: Huassman Dirve (N)												
7	L2	13	0.0	0.217	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.2
8	T1	815	3.7	0.217	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		827	3.7	0.217	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1347	2.8	0.217	0.6	NA	0.3	2.1	0.04	0.04	0.04	59.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 02A [02(A)FUPM - Haussman Drive / Access Road - RHT IN]

Huassman Drive / Access Road - Scenario A
Thornton, NSW (Job Ref: 200695)
FUTURE PM - Scenario A
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
2	T1	776	1.8	0.243	0.8	LOS A	1.2	8.2	0.12	0.04	0.13	58.7
3	R2	53	0.0	0.243	11.5	LOS A	1.2	8.2	0.31	0.11	0.34	55.1
Approach		828	1.7	0.243	1.5	NA	1.2	8.2	0.14	0.05	0.15	58.4
East: Access Road (E)												
4	L2	14	0.0	0.014	6.9	LOS A	0.0	0.3	0.38	0.59	0.38	52.4
Approach		14	0.0	0.014	6.9	LOS A	0.0	0.3	0.38	0.59	0.38	52.4
North: Huassman Dirve (N)												
7	L2	53	0.0	0.202	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.6
8	T1	725	1.6	0.202	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		778	1.5	0.202	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
All Vehicles		1620	1.6	0.243	1.0	NA	1.2	8.2	0.07	0.05	0.08	58.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 02B [02(B)FUAM - Haussman Drive / Access Road - No RHT IN]

Huassman Drive / Access Road - Scenario B
Thornton, NSW (Job Ref: 200695)
FUTURE AM - Scenario B
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
2	T1	429	1.7	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		429	1.7	0.111	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Access Road (E)												
4	L2	96	0.0	0.100	7.0	LOS A	0.4	2.5	0.39	0.64	0.39	52.4
Approach		96	0.0	0.100	7.0	LOS A	0.4	2.5	0.39	0.64	0.39	52.4
North: Huassman Dirve (N)												
7	L2	24	0.0	0.182	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	58.0
8	T1	664	4.6	0.182	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		688	4.4	0.182	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		1214	3.1	0.182	0.7	NA	0.4	2.5	0.03	0.06	0.03	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

Site: 02B [02(B)FUPM - Haussman Drive / Access Road - No RHT IN]

Huassman Drive / Access Road - Scenario B
Thornton, NSW (Job Ref: 200695)
FUTURE PM - Scenario B
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Haussman Drive (S)												
2	T1	678	2.0	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		678	2.0	0.176	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Access Road (E)												
4	L2	26	0.0	0.025	6.5	LOS A	0.1	0.6	0.32	0.58	0.32	52.6
Approach		26	0.0	0.025	6.5	LOS A	0.1	0.6	0.32	0.58	0.32	52.6
North: Huassman Dirve (N)												
7	L2	105	0.0	0.182	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	56.8
8	T1	592	2.0	0.182	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.3
Approach		697	1.7	0.182	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.9
All Vehicles		1401	1.8	0.182	0.6	NA	0.1	0.6	0.01	0.06	0.01	59.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.