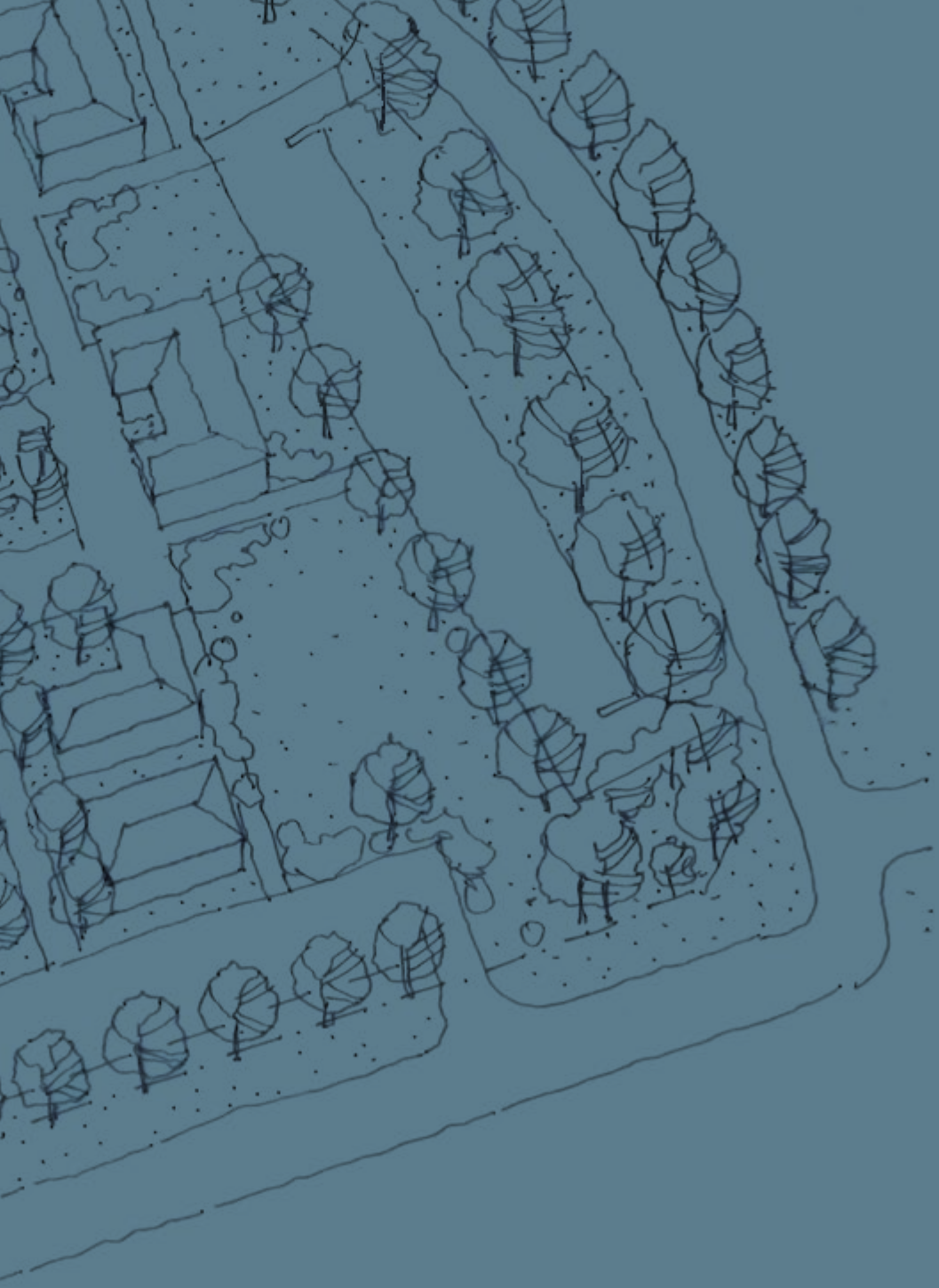

APPENDIX 4A

REVISED TRAFFIC IMPACT ASSESSMENT

Engineering a better future for over 20 years!

North Stoneville Local Structure Plan

Lot 48 Stoneville Road, Stoneville

Revised Transport Impact Assessment

PREPARED FOR:
Satterley Property Group

June 2024

Document history and status

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1 Introduction

This 2024 Revised Transport Impact Assessment (2024 RTIA) has been prepared by Transcore on behalf of Satterley Property Group with regard to the proposed North Stoneville revised Local Structure Plan (LSP). Refer **Appendix A** for more details. The LSP extends over Lot 48 Stoneville Road with an area of approximately 533ha (refer **Figure 1**).

As part of the latest LSP revision, a suite of road infrastructure upgrades is proposed to accommodate the development-generated traffic but also provide additional road capacity to mitigate potential bushfire evacuation operation. Accordingly, this 2024 RTIA has been prepared to address the relevant modifications of the LSP plan as well as address comments received by relevant state agencies on the 2023 TIA.

Figure 1: Local Structure Plan location and area

The LSP area is broadly situated between Toodyay Road and Great Eastern Highway, approximately 4.5km north of Mundaring town site and 12.5km northeast of Midland. More specifically, the LSP occupies an area located immediately south of Hawkstone Road (formerly Cameron Road), east of Roland Road and west of Stoneville Road in Stoneville, as shown in **Figure 1**.

The proposed LSP is anticipated to yield approximately 1,000 residential lots including a public primary school, Anglican K-12 school and a small-scale commercial precinct with a local neighbourhood centre to support this community.

This 2024 RTIA estimates the traffic volumes that will be generated by the LSP area and assesses the impact of the proposed scheme on surrounding road network. Further, the 2024 RTIA assesses the proposed internal LSP road network, identifies the hierarchy of these roads, recommends intersection treatments, proposes network of shared paths and footpaths and investigates the potential for future public transport services. As outlined earlier, this 2024 TIA also aims to address the comments received by relevant state agencies on the 2023 TIA.

2 Proposed Local Structure Plan

The location of the LSP area in its regional context within the Metropolitan Region Scheme (MRS) is illustrated in **Figure 2**.

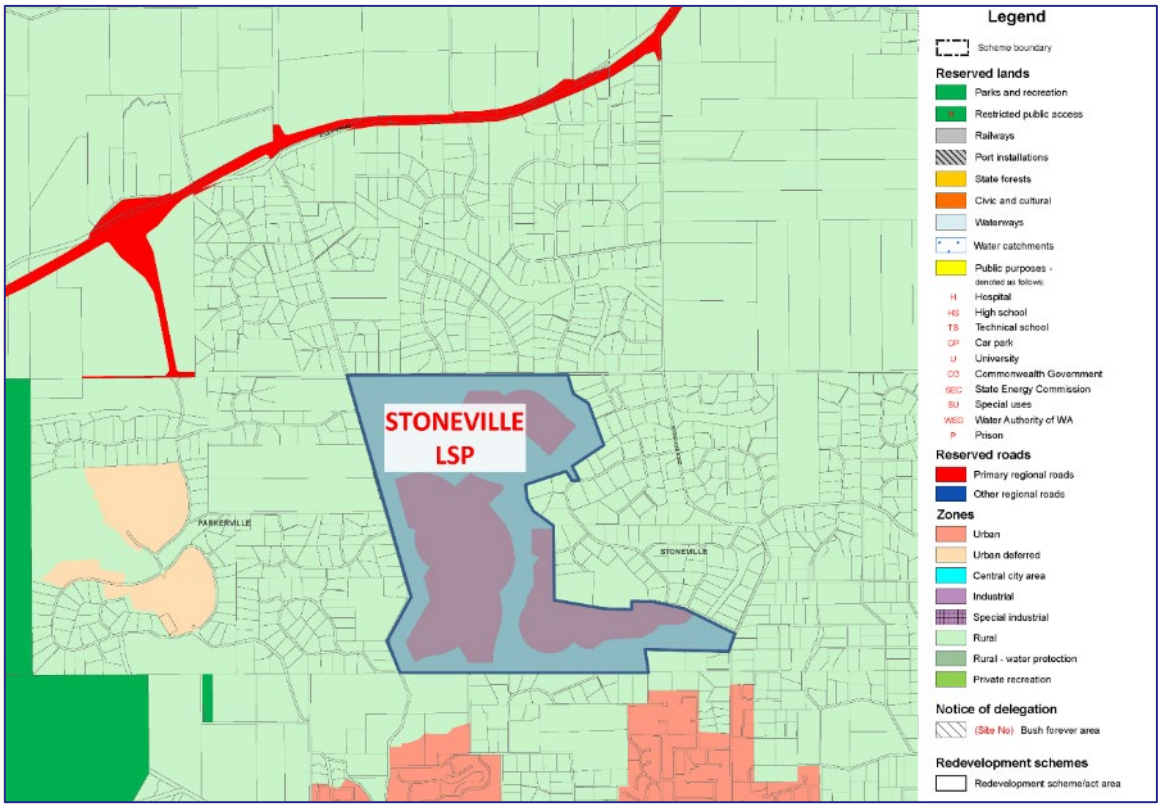

Figure 2: Local Structure Plan location within MRS context

The MRS plan shows subject site comprising "Rural" and "Urban" zones.

The MRS plan identifies Toodyay Road and Great Eastern Highway as Primary Regional Roads (i.e. Red Roads) which are both under care and control of Main Roads WA.

The LSP provides for a total of approximately 1,000 residential lots supporting a range of densities including a public primary school, private Anglican K-12 school and a retail/commercial node of approximately 1,500m^2 GFA. Refer North Stoneville Structure Plan (revised design) provided in **Figure 3** and **Appendix A** for more details.

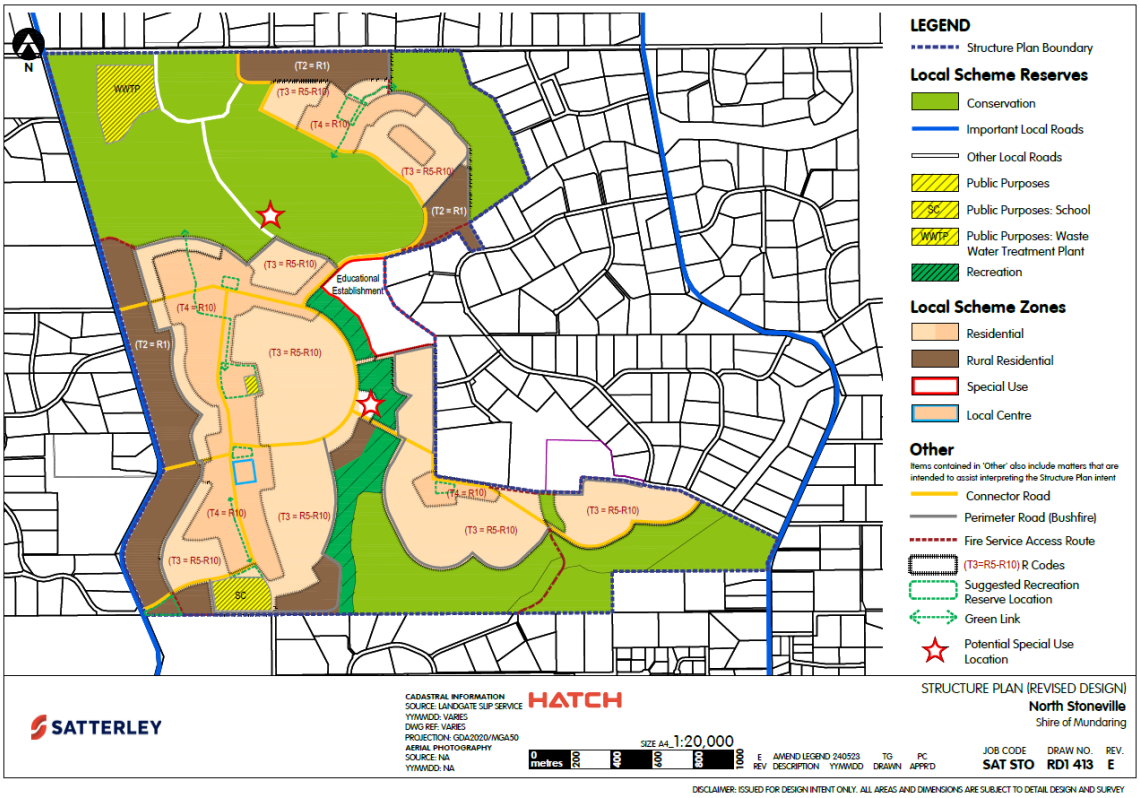

Figure 3: Proposed Structure Plan (Revised Design)

As part of the LSP a private Anglican K-12 school site of approximately 12ha is proposed at the central-east location with estimated capacity of about 500 students. Additionally, a public primary school site of approximately 4.3ha is also proposed at the southwest corner of the LSP area with a total capacity of about 300 students.

An approximate of 1,500m^2 GFA of retail/commercial floorspace for a local centre, is proposed centrally within the LSP area. This small-scale retail/commercial node is intended to predominantly serve the local LSP residents and is not expected to attract many patrons/visitors/customers outside the LSP area.

The LSP integrates with the surrounding road network via a system of eleven access intersections on all four frontages as described below:

- **Western Hawkstone Street Access Intersection** is proposed as a new T-intersection with Hawkstone Street (formerly Cameron Road) at the northern end of LSP;
- **Central Hawkstone Street Access Intersection** is proposed as a new T-intersection with Hawkstone Street (formerly Cameron Road) approximately 35m west of Braidwood Pass and approximately 130m east of Centenary Drive, at the northern end of LSP;
- **Eastern Hawkstone Street Access Intersection** is proposed as a new T-intersection with Hawkstone Street (formerly Cameron Road) at the northern end of LSP;
- **NE La Grange Road Access Intersection** is proposed as a new T-intersection with La Grange Road at the eastern side of LSP;

- **Central Woodlands Road Access** is proposed as a westbound branch off existing Woodland Road into the LSP site to connect to the internal LSP road system from the eastern side of LSP;
- **SE Woodlands Road Access Intersection** is proposed as a new T-intersection with Woodlands Road approximately 70m east of Wildberry Drive;
- **Brindle Road Extension** is proposed to be a northbound extension of Brindle Road into the LSP site adjacent to the public primary school site at the southwest corner of the LSP;
- **Northern Roland Road Access Intersection** is proposed to connect to Roland Road at the location where the future Fringeleaf Drive eastbound extension would connect to Roland Road to form a four-way intersection a short distance north of the existing Boyamyne Road intersection;
- **Central Roland Road Access Intersection** is proposed as a new T-intersection with Roland Road approximately 700m north of McDowell Loop intersection; and,
- **Southern Roland Road Intersection** is proposed at the existing McDowell Loop/Roland Road intersection as a new eastbound extension of McDowell Loop into the LSP area.

All intersections are proposed in the form of full-movement intersections.

The proposed LSP access strategy was developed to achieve the following key outcomes:

- Provide balanced internal traffic distribution within the LSP area;
- Distribute the traffic from the LSP area onto Roland Road and Stoneville Road through several connection points thus dispersing the traffic load on surrounding road network;
- Integrate with the existing road network within the locality; and,
- Provide multiple alternative access/egress and escape/evacuation options to achieve permeability, efficiency and maximise safety.

The traffic modelling and analysis undertaken for the purpose of this report allows for a staged development of the LSP. However, for simplicity of the analysis, traffic modelling and analysis is undertaken for two discrete scenarios: pre-construction stage of the Perth to Adelaide National Highway or "EastLink" (refer to **Section 5**) with only 400 lots developed and full development of the LSP with Perth to Adelaide National Highway (i.e., "EastLink") project in place.

The road network for the modelling task has been established following extensive discussions with the Shire of Mundaring providing advice relating to future road network modifications/upgrades planned by the Shire, including Brooking Road extension/realignment and Fringeleaf Drive eastbound extension. More details on these new road links and modifications are provided in **Section 5** of this report.

2.1 Proposed Local Infrastructure Upgrade Works

The proponent has agreed to fund a host of local road network upgrades prior to commencing development of LSP, in order to secure additional capacity in the local road network and facilitate potential need for efficient bushfire evacuation, address current capacity issues at Great Eastern Highway/Seabourne Street intersection, allow for regional background traffic growth along Great Eastern Highway and to ultimately accommodate the anticipated development-generated traffic.

Accordingly, the following road and intersection upgrades are proposed to be implemented at the outset of the project:

- Addition of a dedicated left-turn (continuous) lane on Stoneville Road at Toodyay Road/ Stoneville Road intersection (refer **Appendix E**);
- Addition of a dedicated left-turn (continuous) lane on Roland Road at Toodyay Road/ Roland Road intersection (Refer **Appendix F**);
- Construction of future Northern and Southern LSP Access intersections on Roland Road to ultimate roundabout format;
- Construction of the missing portion of Hawkstone Street along the northern boundary of the LSP; and,
- Upgrade of the existing Great Eastern Highway/Seaborne Street intersection to include separate left- and right-hand lanes on Seaborne Street approach.

3 Existing Situation

The North Stoneville LSP area is located approximately 4.5km north of Mundaring town site and 12.5km northeast of Midland.

3.1 Existing Land Use

The subject site is rural in nature and generally undeveloped. The areas surrounding the subject site are also predominantly of rural character with rural residential estates, small scale farms, market gardens and limited horticulture operations. The small-scale retail developments (general stores, restaurants/taverns and markets) are located within the Parkerville and Stoneville village centres to the south of LSP area off Roland Road and Stoneville Road, respectively.

The major district retail node is situated in Mundaring town centre (Mundaring Mall) which is located next to the existing Great Eastern Highway/Stoneville Road intersection some 4.2km southeast of the LSP.

3.2 Existing Road Network

The existing road network in this area is expectedly rural in nature. The existing road network and its classification in the *Metropolitan Functional Road Hierarchy* is illustrated in **Figure 4**. The LSP area is located between two major state roads: Toodyay Road to the north and Great Eastern Highway to the south.

Great Eastern Highway at this locality is a four-lane divided road with a wide median. It generally operates under an 80km/h speed limit regime; however, through Mundaring town site the speed limit is reduced to 60km/h as shown in **Figure 5**.

Wide pedestrian footpaths are in place intermittently on either side of Great Eastern Highway only through the Mundaring town site. There are several formal pedestrian crossing points at the intersections and mid-block; however, these are generally found only within Mundaring town site.

Great Eastern Highway is classified as *Primary Distributor* road in Main Roads WA *Metropolitan Functional Road Hierarchy*. It is covered by a *Primary Regional Roads* reservation (i.e. *Red Roads*) in the Metropolitan Region Scheme (MRS). Great Eastern Highway is a State Road under the care and control of Main Road WA.

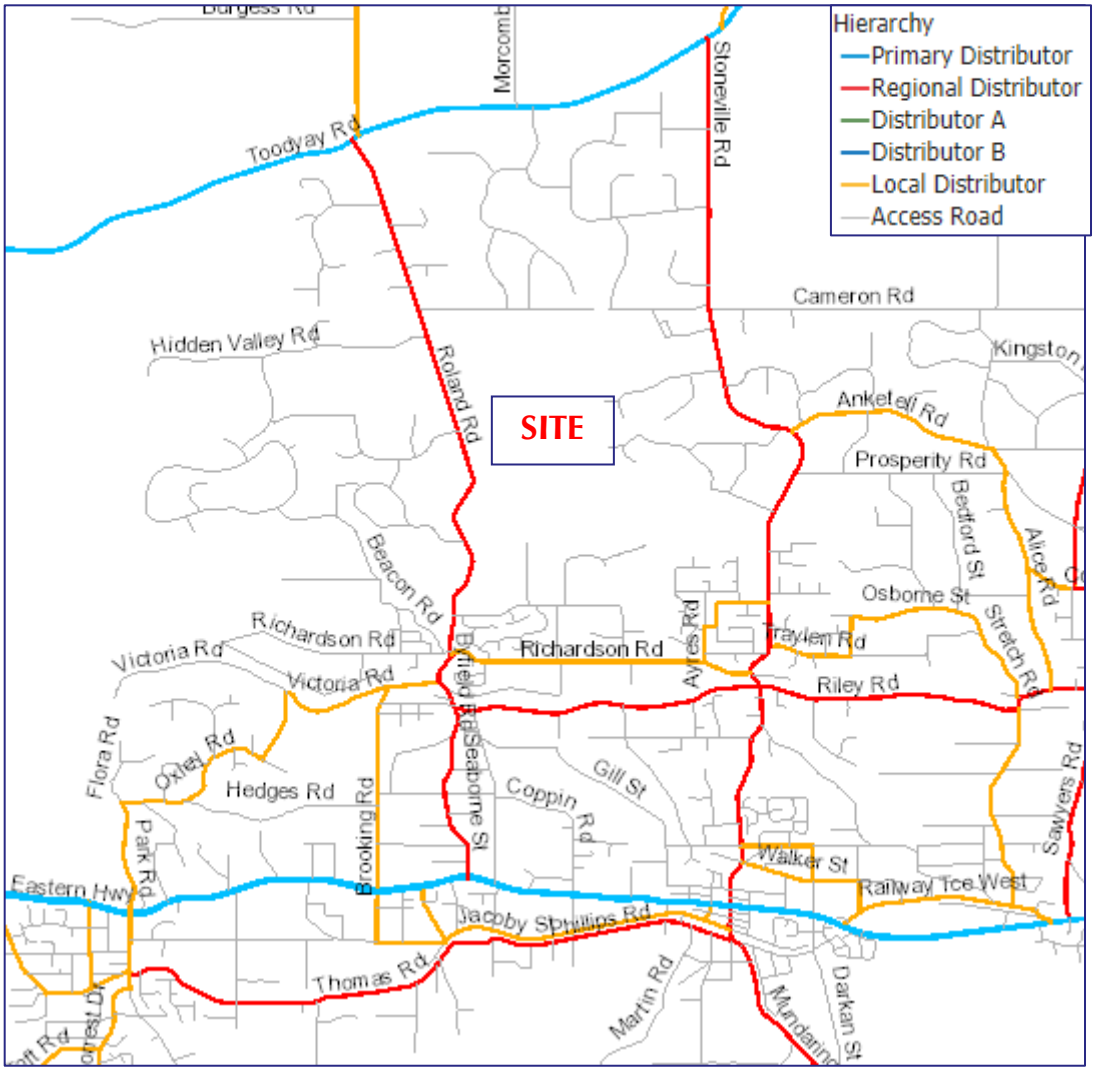

Figure 4: Existing Road Hierarchy

Toodyay Road is currently constructed as a single carriageway (one lane in each direction) with occasional passing lanes. At this locality it generally operates under a 100km/h speed limit regime; however, approaching the Gidgegannup townsite the speed is reduced to 80km/h and through the town site the speed is reduced 60km/h (40km/h adjacent to school).

Toodyay Road is classified as a *Primary Distributor* road in the Main Roads *Metropolitan Functional Road Hierarchy*. It is covered by a *Primary Regional Roads* reservation (i.e. *Red Road*) in the Metropolitan Region Scheme (MRS) and is a declared State Road under the care and control of Main Roads WA.

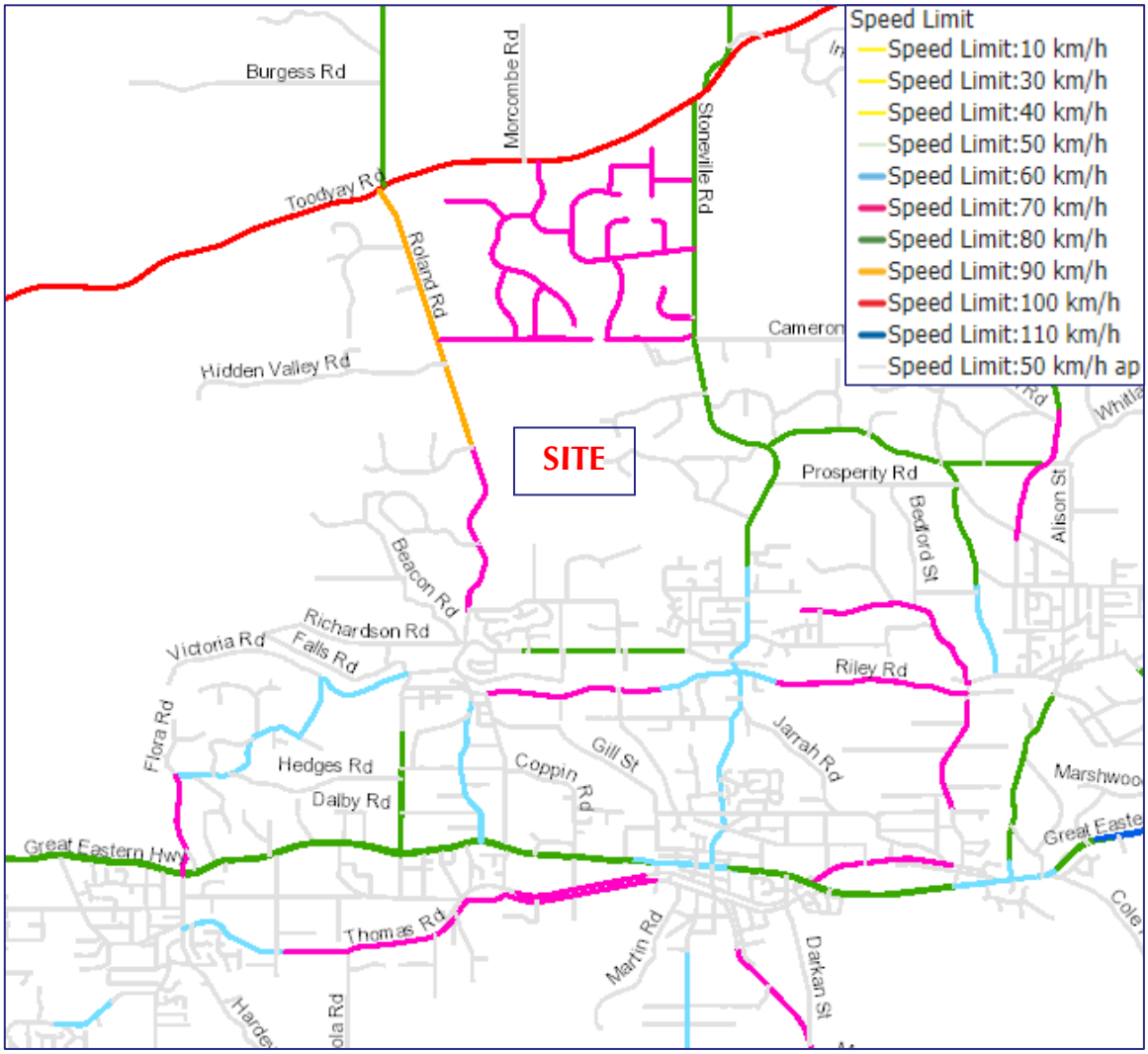

Figure 5: Existing Speed Limits

Roland Road, a north-south road link between the Toodyay Road and Parkerville town site, is a recently upgraded 7.2m wide, mostly unkerbed, single-carriageway rural road with wide gravel shoulders.

Roland Road is classified as a *Regional Distributor* in the Main Roads *Metropolitan Functional Road Hierarchy* and is under the care and control of the relevant local authorities (City of Swan and Shire of Mundaring). The posted speed limit on Roland Road in the vicinity of the LSP area is 70km/h on the section south of Boyamyne Road and 90km/h on the section between Boyamyne Road and Toodyay Road as shown in **Figure 5**.

Stoneville Road, a north-south road link between Toodyay Road and Great Eastern Highway passing through Stoneville town site, is about 7m wide, mostly unkerbed, single-carriageway rural road with wide gravel shoulders.

Stoneville Road is classified as a *Regional Distributor* in the Main Roads *Metropolitan Functional Road Hierarchy* and is under the care and control of the relevant local authorities (City of Swan and Shire of Mundaring). The posted speed limit on

Stoneville Road is generally 80km/h but reduces to 60km/h for the section between northern approach to Stoneville town site and Great Eastern Highway as shown in **Figure 5**.

Hawkstone Street (formerly Cameron Road) currently borders the LSP area on the along the northern side. It is connected to Roland Road with approximate 200m of unsealed section as it approaches Stoneville Road. Adjacent to Hawkstone Street, located in the west of Stoneville Road is Cameron Road.

Hawkstone Street is classified as an *Access Road* in the Main Roads *Metropolitan Functional Road Hierarchy* and is under the care and control of City of Swan. Hawkstone Street operates under a 70km/h speed limit regime between Roland Road and Stoneville Road.

There are no traffic counts available for this road; however, based on the number of properties it serves, it is anticipated that Hawkstone Street carries a very low level of traffic.

Roland Road forms a priority-controlled, T-intersection with Toodyay Road at its northern end. This intersection has been upgraded in late 2018 to include a left-turn slip lane and a right-turn pocket on Toodyay Road and a separate left and right-turn lanes on Roland Road approach.

Seaborne Street, southbound extension of Roland Road, forms a priority-controlled, T-intersection with Great Eastern Highway as shown in **Figure 6**. A left-turn slip lane and a right-turn pocket are in place on Great Eastern Highway. Wide median on Great Eastern Highway facilitates staged right-turn movements in and out of Seaborne Street. The intersection has been upgraded in 2020 with extended slip lane and turn pocket on Great Eastern Highway and a widened lane with a new splitter island on Seaborne Street approach. Street lighting has also been installed at the intersection. These works formed part of the Great Eastern Highway intersections upgrade programme by Main Roads WA.

At its northern end Stoneville Road also forms a priority-controlled, T-intersection with Toodyay Road as shown in **Figure 8**. Similarly, this intersection has also been upgraded in late 2018 to incorporate a left-turn slip lane and a right-turn pocket on Toodyay Road and a separate left and right-turn lanes on Stoneville Road approach.

At the southern end, adjacent to Mundaring town site, Stoneville Road forms a four-way signal-controlled intersection with Great Eastern Highway and Mundaring Weir Road, as shown in **Figure 7**.

Hawkstone Street forms a simple T-intersection with Roland Road.

Figure 6: Great Eastern Highway/Seaborne Street Intersection

Figure 7: Great Eastern Highway/Stoneville Road/Mundaring Weir Road Intersection

Figure 8: Toodyay Road/Stoneville Road Intersection

3.3 Existing Traffic Volumes

Existing average weekday traffic (AWT) volumes on the study area road network have been obtained from Main Roads WA and Shire of Mundaring (indicated by *) and are summarised in Table 1.

Table 1: Existing Traffic Volumes

Road Name	Location	AWT (HV)	AM Peak	PM Peak	Date
Great Eastern Hwy	E of Seaborne St	26,332vpd (13.2%)	1,949vph 0800-0900	2,170vph 1600-1700	2021/22
Great Eastern Hwy	W of Mundaring Weir Rd	18,723vpd (19.2%)	1,411vph 0800-0900	1,489vph 1600-1700	2021/22
Toodyay Rd	W of Roland Rd	9,190vpd (16.0%)	740vph 0700-0800	821vph 1600-1700	2023/24
Toodyay Rd	E of Stoneville Rd	6,334vpd (15.3%)	491vph 0700-0800	552vph 1600-1700	2021/22
Toodyay Rd	W of Stoneville Rd	6,760vpd (14.5%)	558vph 0700-0800	615vph 1600-1700	2021/22
Roland Rd	S of Toodyay Rd	1,812vpd (15.7%)	187vph 0800-0900	187vph 1500-1600	2021/22
Stoneville Rd	S of Toodyay Rd	1,740vpd (14.2%)	157vph 0800-0900	175vph 1500-1600	2021/22

3.4 Crash History

Crash histories have been obtained from the Main Roads WA website for the relevant intersections where any road crashes were recorded during the five-year period from 2019 – 2023 (refer Table 2 for more details).

Table 2: Crash Statistics – Intersections

Intersection	Fatal	Hospital	Medical	PDO	Critical	Total
Great Eastern Hwy/Seaborne St	1	1	4	9	Right Angle	15
Great Eastern Hwy/Stoneville Rd/Mundaring Weir Rd	0	1	7	16	Rear End	24
Toodyay Rd/Roland Rd	0	0	1	3	Unknown	4
Toodyay Rd/Stoneville Rd	0	0	1	4	Rear End	5
Roland Rd/Richardson Rd/ Byfield Rd	0	2	0	0	Unknown	2

The crash statistics for the relevant roads (mid-block crashes) during the five-year period between 2019–2023 were also obtained from Main Roads WA and presented in Table 3 for more details.

Table 3: Crash Statistics – Midblock

Road	Hospital	Medical	PDO	Critical	Total
Roland Rd	1	1	9	Hit Object	11
Stoneville Rd	0	3	9	Rear End	12
Byfield Rd	0	0	3	Unknown	3
Seaborne St	0	1	3	Unknown	4

3.5 Heavy Vehicle Routes

Restricted Access Vehicle (RAV) Network routes are designated for access by large heavy vehicle combinations that require special permits for each trip. Main Roads WA manages the RAV Networks and the permits for trucks to use them.

Figure 9 shows that Toodyay Road and Great Eastern Highway are permitted for use by RAV Network 4 (shown in dark blue) vehicles. RAV Networks 2, 3, and 4 permit access by a number of heavy vehicle combinations up to 27.5m long.

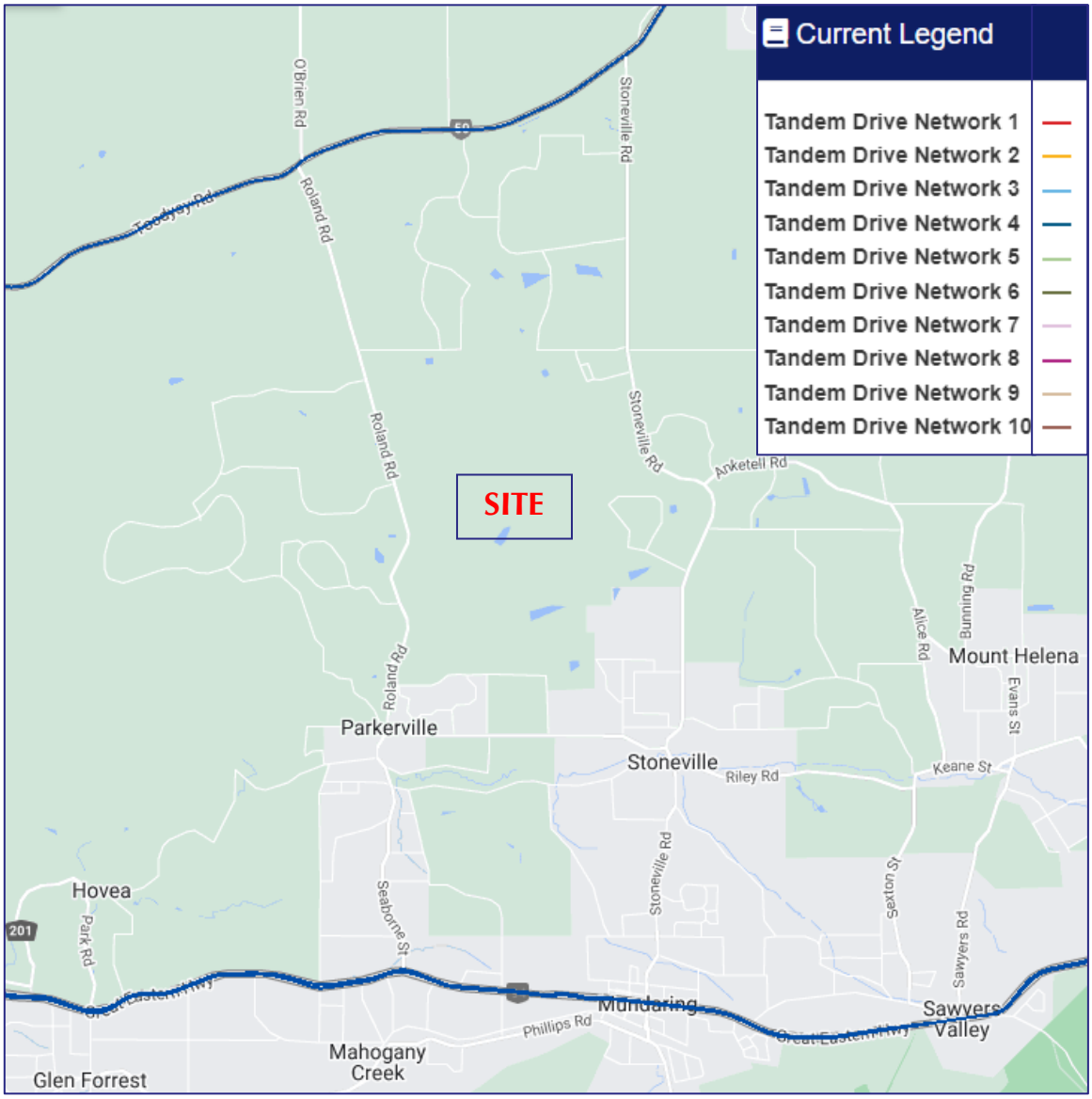

Figure 9: Restricted Access Vehicles Network Map

3.6 Public Transport

The Parkerville and Stoneville localities are presently served by bus services No. 328 and 331 which operate along Seaborne Street/Byfield Road/Richardson Road and Stoneville Road/Richardson Road routes providing connections to a bus/rail transfer facility at Midland Station and to Mundaring, Chidlow, and Wundowie town sites.

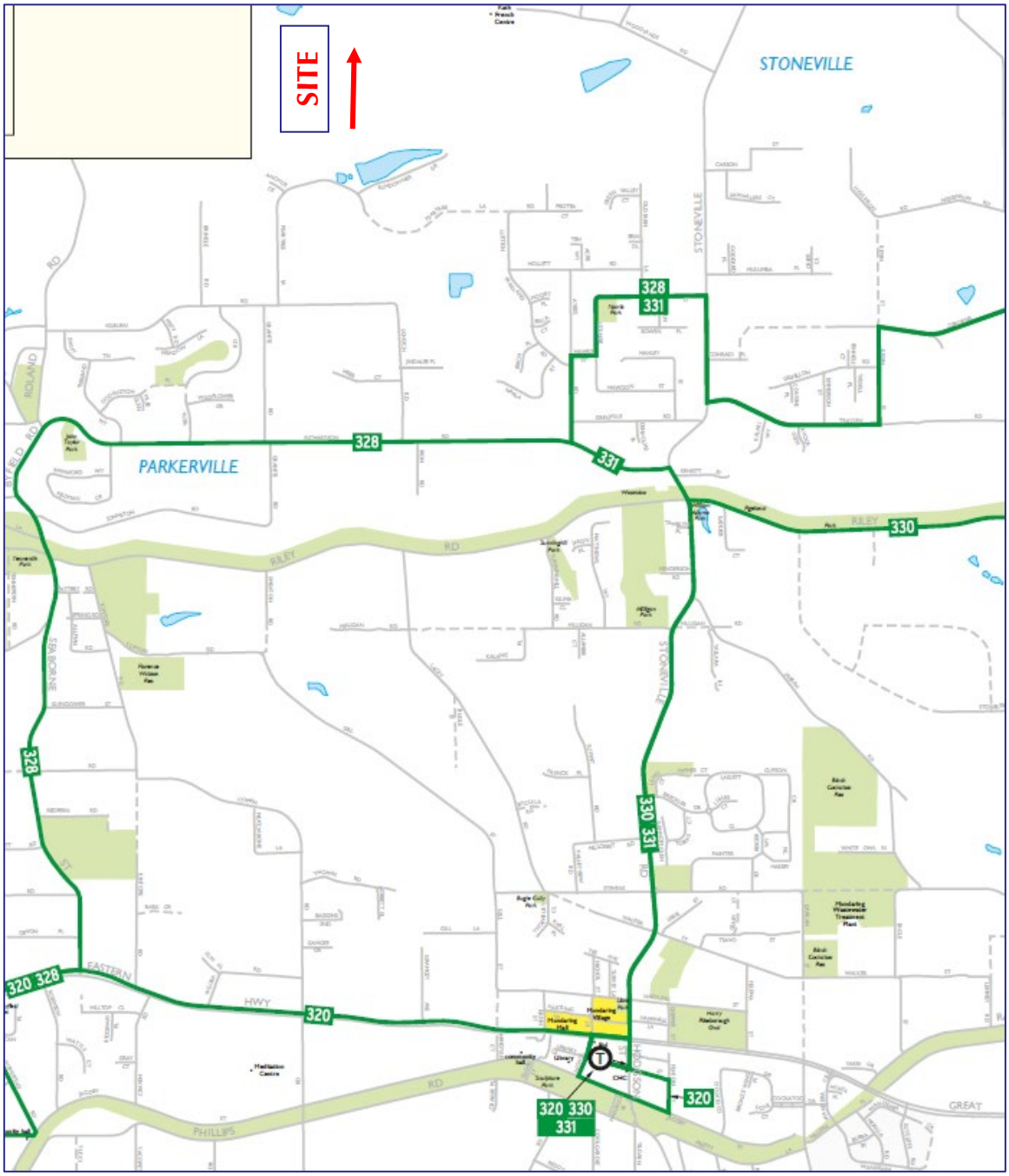

Figure 10: Existing Bus Routes

3.7 Pedestrian and Cyclist Facilities

The subject locality (area surrounding LSP) does not have a network of footpaths or shared paths with the only limited and isolated path network being located adjacent to Parkerville and Stoneville town sites.

4 Proposed Transport Network

4.1 Road Hierarchy

The North Stoneville LSP is based on the principles contained within the WAPC *Liveable Neighbourhoods* publication (2009) including the stated principles for road hierarchy. All internal LSP roads can be classified as *Neighbourhood Connectors B, Access Streets A and Access Streets D.*

The application of this road hierarchy to the proposed road network in the LSP is shown in **Figure 11.**

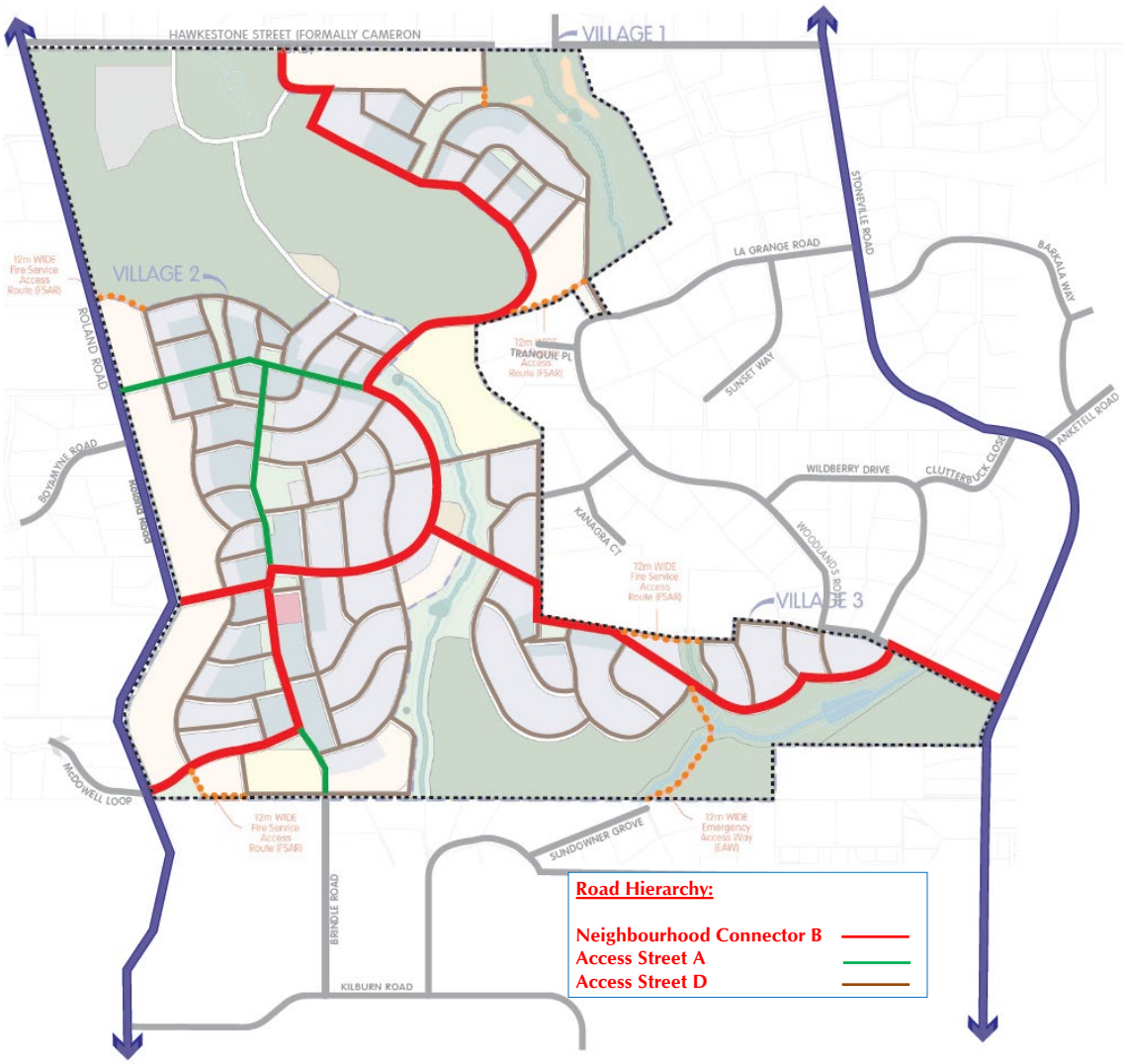

Figure 11: Proposed Road Hierarchy – North Stoneville LSP

4.2 Public Transport

The Public Transport Authority (PTA) supports the proposed structure plan. Whilst it is reasonable to assume there will be limited potential for a public transport service to directly serve the proposed townsite in the near future, it is expected that, once the population has reached an appropriate level the PTA may be receptive to the idea of introducing a bus service (most likely in the form of a spur form one of the existing bus services) from Parkerville town centre pass through the LSP area and continue towards Stoneville town centre.

In the interim, the proponent could engage with the community and relevant agencies to provide a privately sponsored community service (e.g. a private shuttle bus) that could provide access to existing PTA services at Mundaring. The details of this service could be worked out as the LSP is progressed through the consultation and approvals process.

4.3 Pedestrian and Cyclist Facilities

The proposed principles for provision of pedestrian and cyclist facilities in the North Stoneville LSP are based on the guidance provided in WAPC *Liveable Neighbourhood* publication.

All Neighbourhood Connector roads and Access Street A, including sections of Roland Road and Hawkstone Street fronting the LSP, will have a 2.0-2.5m shared path on one side and a 1.5m footpath on the other side. This defines the network of shared paths shown in **Figure 12**.

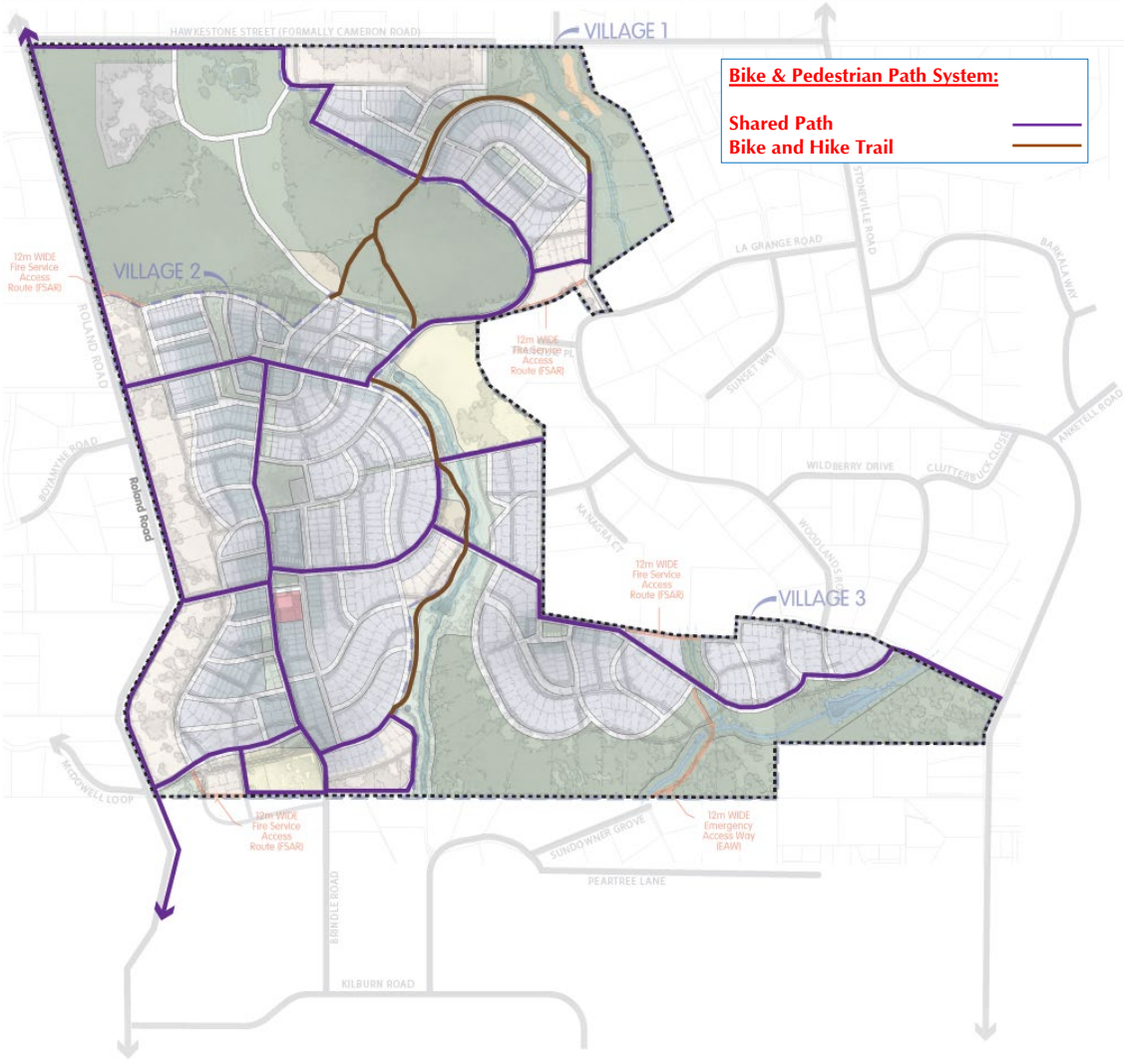

Figure 12: Proposed Shared Path Network – North Stoneville LSP

Most lower order access streets will have a 1.5m footpath on one side. However, footpaths will be provided on both sides or paired with shared paths on access streets abutting schools and retail/commercial nodes.

The proposed network of shared paths bisects the LSP area in both north-south and east-west directions allowing for connections to the recreational paths[1] which generally follow the existing terrain at this location, and which will also form part of the overall LSP area path network.

[1] *The network of recreational paths is not shown in Figure 5*

5 Changes to External Transport Network

5.1 Perth – Adelaide National Highway

The future Perth to Adelaide National Highway ("Orange Route" or "EastLink") will improve safety and amenity on the Northam to Perth section of the Great Eastern Highway and improve interstate access to metropolitan Perth. This longer-term planning concept, protected in the *Metropolitan Region Scheme*, will reduce gradients and provide significant productivity and safety benefits for freight vehicles[2].

The alignment is to the north of the existing route and generally follows the Toodyay Road corridor, deviating through the Red Hill section and connecting with the former rail reserve at Bakers Hill on Great Eastern Highway. The realigned route will also address safety and amenity issues at the Greenmount Hill entrance to Perth on the Great Eastern Highway, which has steep grades and is in close proximity to residential areas. Refer **Figure 13** for more details on route alignment of Eastlink (section between Red Hill and Wundowie).

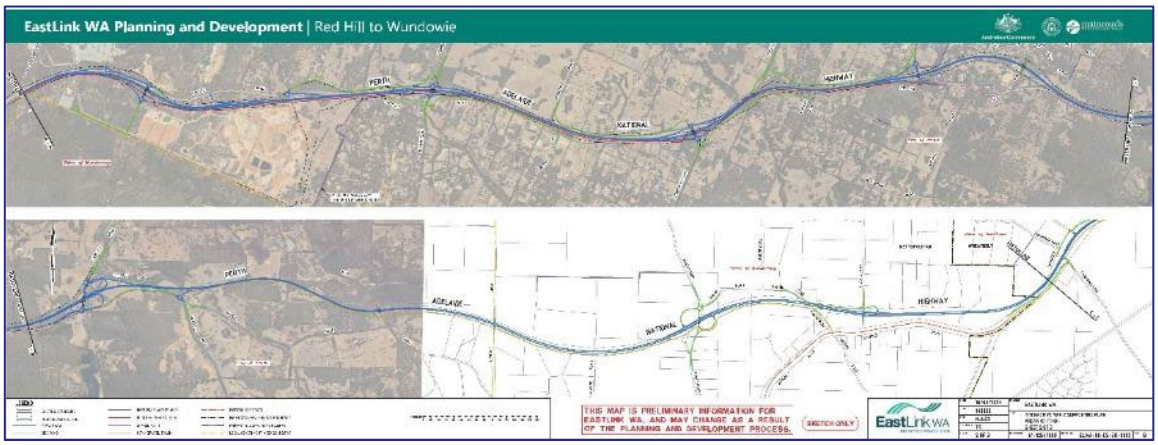

Figure 13: Perth – Adelaide National Highway – indicative alignment[3]

The EastLink is ultimately planned as a dual carriageway with interchanges and overpasses to freeway standard, enabling access for RAV 7 heavy vehicles (36.5m combinations) between Perth and Northam.

Ultimately, the intersection of Roland Road linking the area and the LSP to Toodyay Road is planned to be upgraded into an interchange format with the construction of EastLink as shown in **Figure 14**. This planned interchange with Roland Road secures very good level of operation and ample capacity for these this connection to district-level roads. The intersections of Stoneville Road and Roland Road with Toodyay Road

[2] *Perth Freight Transport Network Plan – Department of Transport*
[3] *Eastlink WA Planning and Development*

(prior to EastLink implementation) will continue to operate satisfactorily because of the recent intersection upgrades and the upgrades proposed as part of the LSP project.

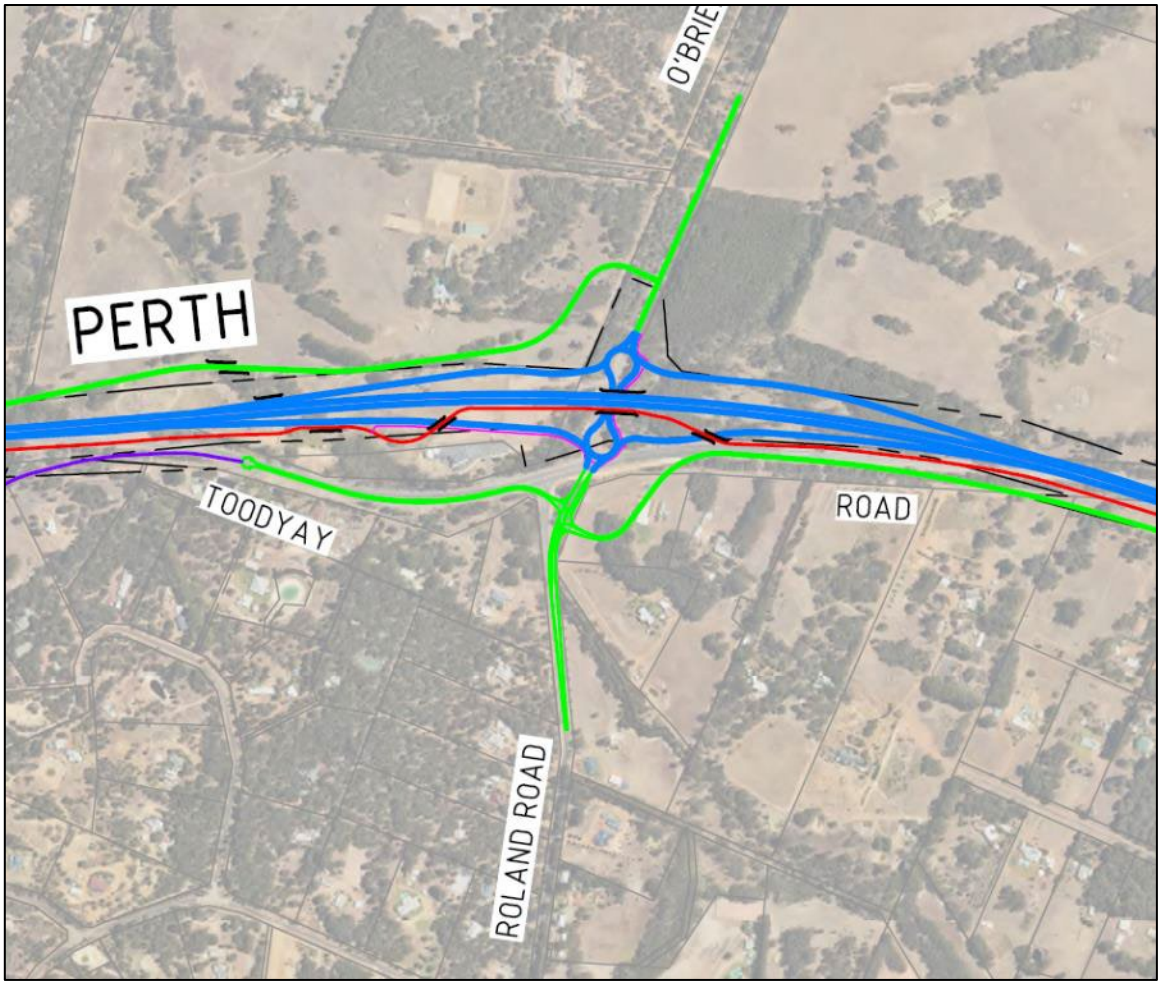

Figure 14: EastLink Map 2 – Interchange of Roland Road/Toodyay Road - Proposed Perth – Adelaide National Highway[4]

Based on the information on Main Roads website, this project is currently in a three-year planning and development phase until 2024, however, construction of grade-separated interchanges along Reid Highway planned to start in 2024.[5] The ultimate design concept for the Highway is expected to be finalised soon completing the end the planning and development phase of this project.

Also, from Main Roads WA website, it should be noted that, funding for the construction of the grade-separated interchanges along Reid Highway at Altone Road, and at Daviot Road/Drumpellier Drive has been committed. This project has been jointly funded by the Federal and State governments with $225 million commitment

[4] *EastLink Map 2 - Proposed Perth-Adelaide National Highway*
[5] *EastLink WA – Main Roads WA*

to the construction stage. $175 million is also committed for the construction stage for a grade separated interchange on Reid Highway at Henley Brook Avenue (currently West Swan Road) by the State and Australian governments. There is still no funding for the construction of the highway between Middle Swan and Northam.

Main Roads WA completed a series of intersection upgrades along Toodyay Road, between Red Hill and Noble Falls in the City of Swan. Among other intersections, the intersections of Toodyay Road/Roland Road and Toodyay Road/Stoneville Road have been upgraded to improve the existing traffic operations and safety. These two intersections are also proposed to be upgraded as part of the LSP project.

5.2 Roland Road/Richardson Road/Byfield Road Roundabout Concept

The Shire has provided a concept plan for the Roland Road/Richardson Road/Byfield Road roundabout intersection upgrade which shows modifications on the existing Richardson Road alignment to create a four-way roundabout intersection with Roland Road and Byfield Road. The concept plan for the roundabout is shown in **Appendix C**.

5.3 Brooking Road Realignment

Further, the Shire has provided early-stage concept plans for the Brooking Road/Beacon Road realignment which shows modifications of existing Beacon Road and Roland Road alignments to form a new intersection immediately north of Parkerville town centre with northbound extension of existing Brooking Road.

5.4 Proposed Great Eastern Highway/Seaborne Street Intersection Upgrade Concept

The existing intersection of Great Eastern Highway/Seaborne Street would require upgrades before 2031 assuming EastLink has not been constructed by this point., This intersection upgrade forms part of the suite of local road upgrades commitment by the developer as part of the LSP project.

The upgrade is required to improve the current capacity and operation of this intersection under normal traffic activities and in particular in case of bushfire emergencies and comprise the following elements:

- Conversion of existing free-flow left-turn slip lane on Great Eastern Highway to a give-way format (installation of a separation island);
- Upgrade of the existing single-lane Seaborne Street approach to include a separate left- and right-turn facility with approximately 50m-long right-turn pocket;
- Adjustment of the existing Great Eastern Highway median kerbing;

- Formalisation of the U-turn facility through signage and pavement marking at the existing Great Eastern Highway/Craven Road intersection (not shown on plan).

The formalisation of the U-turn facility is to cater for existing as well as potential future LSP-related traffic who may perform the U-turns at this intersection. These upgrades will ensure satisfactory operation of this intersection with or without the Brooking Road realignment by the time EastLink project is completed.

The proposed concept plan for the intersection upgrade is shown in **Appendix D**.

5.5 Proposed Hawkstone Road and Cameron Road Connection

It is understood that the current disconnection between Hawkstone Road and Cameron Road will be addressed prior to commencement of LSP construction works as part of developer's commitment so that two roads form a continuous east-west link providing convenient and legible connection between Roland Road and Stoneville Road along the northern LSP boundary.

5.6 Proposed upgrade to Toodyay Road/Stoneville Road intersection

This proposal entails construction of a dedicated free-flow left-turn lane from Stoneville Road onto Toodyay Road. This upgrade is proposed to improve evacuation times during a potential bushfire and provide a better and more convenient alternative for the existing and LSP traffic who wish to travel towards City.

5.7 Proposed upgrade to Toodyay Road/Roland Road intersection

This proposal entails construction of a dedicated free-flow left-turn lane from Roland Road onto Toodyay Road. This upgrade is proposed to improve evacuation times during a potential bushfire and provide a better and more convenient alternative for the existing and LSP traffic who wish to travel towards City.

6 Integration with Surrounding Area

The proposed North Stoneville LSP is consistent with the long-term planning for the subject locality.

The proposed LSP integrates with the existing local road network proposing three connections to Roland Road and four (indirect) connection to Stoneville Road as two key regional roads. Three links to Hawkstone Road provide for even distribution of the LSP traffic on surrounding road network.

On district-level, access to the subject site is available via two state roads: Toodyay Road (ultimately becoming EastLink) and Great Eastern Highway.

The proposed LSP road system is designed to accommodate the anticipated future traffic from within the locality associated with the proposed two new LSP schools (public primary and private K-12 school).

The LSP also proposes a small-scale retail/commercial node which will serve to reduce the demand for external trips and to a certain degree to regional retail/commercial nodes for LSP residents.

7 Analysis of the Transport Network

7.1 Assessment Period

Transcore has developed two distinct models for the purpose of North Stoneville LSP project:

Model 1: Transport modelling assumes release of 400 individual residential lots of the North Stoneville LSP by 2028 based on Satterley's indicative Projected Lot Delivery Programme. The model also assumes continued background traffic growth on local and district roads and pre-construction of EastLink including a suite of developer committed local road and intersection upgrades as discussed in detail in **Section 2.1** of this report (and in other related chapters).

The purpose of the modelling was to establish traffic impact on internal North Stoneville LSP road network, external LSP access intersection format and operation, local road network impacts and suitability of key district intersections to accommodate traffic load from the LSP and support fire evacuation prior to EastLink construction. It is anticipated that the proposed local infrastructure upgrade works will provide for additional capacity thus directly improving the efficiency of traffic operations in this locality.

Model 2: Transport modelling assumes ultimate development of the North Stoneville LSP and continued traffic growth on local and district roads and post-construction of EastLink in 2037.

The purpose of the modelling was to establish traffic projections and road hierarchy on internal North Stoneville LSP road network, external LSP access intersections form and standard, local road network impacts, traffic impact assessment on key district intersections with the assumed implementation of EastLink with background volumes and traffic re-distribution between Great Eastern Highway and Toodyay Road in accordance with ROM24 projections previously provided by Main Roads WA (refer **Table 4**). As 2037 horizon sits outside of Great Eastern Highway and EastLink traffic projections the 2036 projections have been used for 2037 time horizon.

Table 4: ROM24 outputs provided by Main Roads WA

Traffic projections	From	To	2016 (ROM)	2019 (observed)	2026 (ROM)	2031(ROM)	2036 (ROM)	
Great Eastern Hwy	Stoneville	Sawyers	23700	16135	29000	21000	23000	
Toodyay Rd (PANH)	Stoneville	Reserve	12500	5329	14000	23000	24000	
Total			36200	21464	43000	44000	47000	
Distribution between GEH and PANH	From	To	2016 (ROM)	2019 (observed)	2026 (ROM)	2031(ROM)	2036 (ROM)	
Great Eastern Hwy	Stoneville	Sawyers	65%	75%	67%	48%	49%	
Toodyay Rd (PANH)	Stoneville	Reserve	35%	25%	33%	52%	51%	
Total			1	1	1	1	1	
Traffic growth rate per annum	From	To	2016 (ROM)	2019 (observed)	2026 (ROM)	2031(ROM)	2036 (ROM)	
Great Eastern Hwy	Stoneville	Sawyers			2.0%	-1%	-0.1%	
Toodyay Rd (PANH)	Stoneville	Reserve			1.1%	4%	3.3%	avg
Total			0	0	1.7%	1%	1.3%	1.5%

The ROM24 outputs previously provided by Main Roads WA indicate that:

- The average annual traffic growth on Great Eastern Highway and Toodyay is about 1.5%; and,
- Once EastLink is implemented, the directional split of traffic between Great Eastern Highway and EastLink (Toodyay Road) would be about 49/51.

Accordingly, the above assumptions were used to establish the projected traffic volumes for future scenarios.

7.2 Traffic Generation

Transcore undertook modelling to establish the typical weekday traffic flows for the full North Stoneville LSP build-out scenario. As previously discussed, the modelling also made allowance for the traffic impact of the surrounding road network but also the future road network modifications and development in accordance with the Shire of Mundaring strategic road network planning initiatives and Main Roads WA strategic road network planning.

For the purpose of full build-out North Stoneville LSP modelling the following land use assumptions have been adopted:

- A total of approximately 1,000 dwellings will be assumed for the whole of the LSP area;
- One public primary school (assumed enrolment of 300 students);
- One private K-12 school (assumed enrolment of 500 students);
- Local retail/commercial centre located centrally within the Village 2 area totalling about 1,500m^2 GFA (50/50 split between retail and commercial floorspace); and,
- No public transport was modelled resulting in a more robust vehicular-based transport model.

The daily traffic generation rate used in traffic model was 8.0 vehicle trips per day (vpd) per dwelling, which corresponds to trip generation rates recommended in the WAPC *Transport Impact Assessment Guidelines*. This residential trip generation rate was assumed regardless of the specific type of dwellings (i.e., density), which results in a more robust modelling outcome.

Based on a guidance in the WAPC *Transport Impact Assessment Guidelines*, a school trip generation rate of 2.0 vpd per student was adopted for this assessment. It was also assumed that the public primary school would primarily cater for the students residing within the area; however, some school trips originating from external sources have also been modelled.

The traffic generation for the retail/commercial zone was based on relevant traffic generation rates derived from the *Roads and Traffic Authority NSW, "Guide to Traffic Generating Developments" (2002)* document.

Accordingly, once fully developed, the LSP area is estimated to generate approximately **8,000** total daily vehicular trips for a typical weekday (both inbound and outbound). The total daily vehicular traffic includes both internal LSP trips and external trips distributed across local and district road network.

For the purpose of this project, the typical weekday morning and afternoon peak hour flows were determined using the typical 10% daily traffic principle. Although the school-related traffic will be missing from the afternoon peak hour traffic as school activity terminates prior to the afternoon commuter peak hour, for the purpose of robust assessment the 10% afternoon peak hour traffic volume is still applied in this case.

The directional LSP traffic flows were established by using the general (approximately) 25%/75% and 65%/35% inbound/outbound morning and afternoon peak hour traffic split principle, respectively. This directional split is deemed appropriate considering that the bulk of the LSP land uses is residential. The traffic split on major roads (Roland Road and Stoneville Road) was assumed as 40/60 inbound/outbound for the morning and reverse for the afternoon peak traffic flows.

This traffic split is reflective only of the external LSP traffic component (i.e., traffic leaving from and arriving to the LSP area to and from external sources). The adopted traffic split also enables investigation of impacts of extreme/unbalanced traffic flow scenarios at intersections ensuring the proposed intersection standard and geometry is able to comfortably accommodate more balanced flows.

7.3 Trip Distribution

The distribution of LSP internal trips was determined by the model in proportion to the location of trip producers and trip attractors for work, education and other relevant types of trips between all the land uses within the transport model (i.e., shopping, social, recreational, etc.). The external distribution of trips to and from the LSP is summarised in **Table 5**.

It should be noted that, due to capacity constraints on Great Eastern Highway during peak periods and major proposed upgrades by developer at the relevant Toodyay Road intersections, including dedicated free flow left turns onto Toodyay Road, the peak hour trip distribution was adjusted for the purpose of SIDRA modelling.

Table 5: Trip distribution – North Stoneville LSP

Approach Road	Proportion of LSP Traffic (%)
Toodyay Road (west)	43.96%
Areas to north of Toodyay Road	2.03%
Toodyay Road (east)	2.57%
Great Eastern Highway (west)	43.96%
Great Eastern Highway (east)	5.11%
Areas to the east of Stoneville Road	0.34%
Mundaring Weir Road	2.03%
Total	**100%**

7.4 Daily and Peak Hour Traffic Flow Forecasts

The forecast daily traffic volumes for the key internal LSP road network have been derived from the transport model developed and are illustrated in **Figure 15**. It should be noted however that the forecast daily traffic volumes shown in this figure represent only the traffic generated by the North Stoneville LSP development.

The forecast traffic volumes on the internal North Stoneville LSP roads and roads surrounding the LSP area are shown in **Figure 15**.

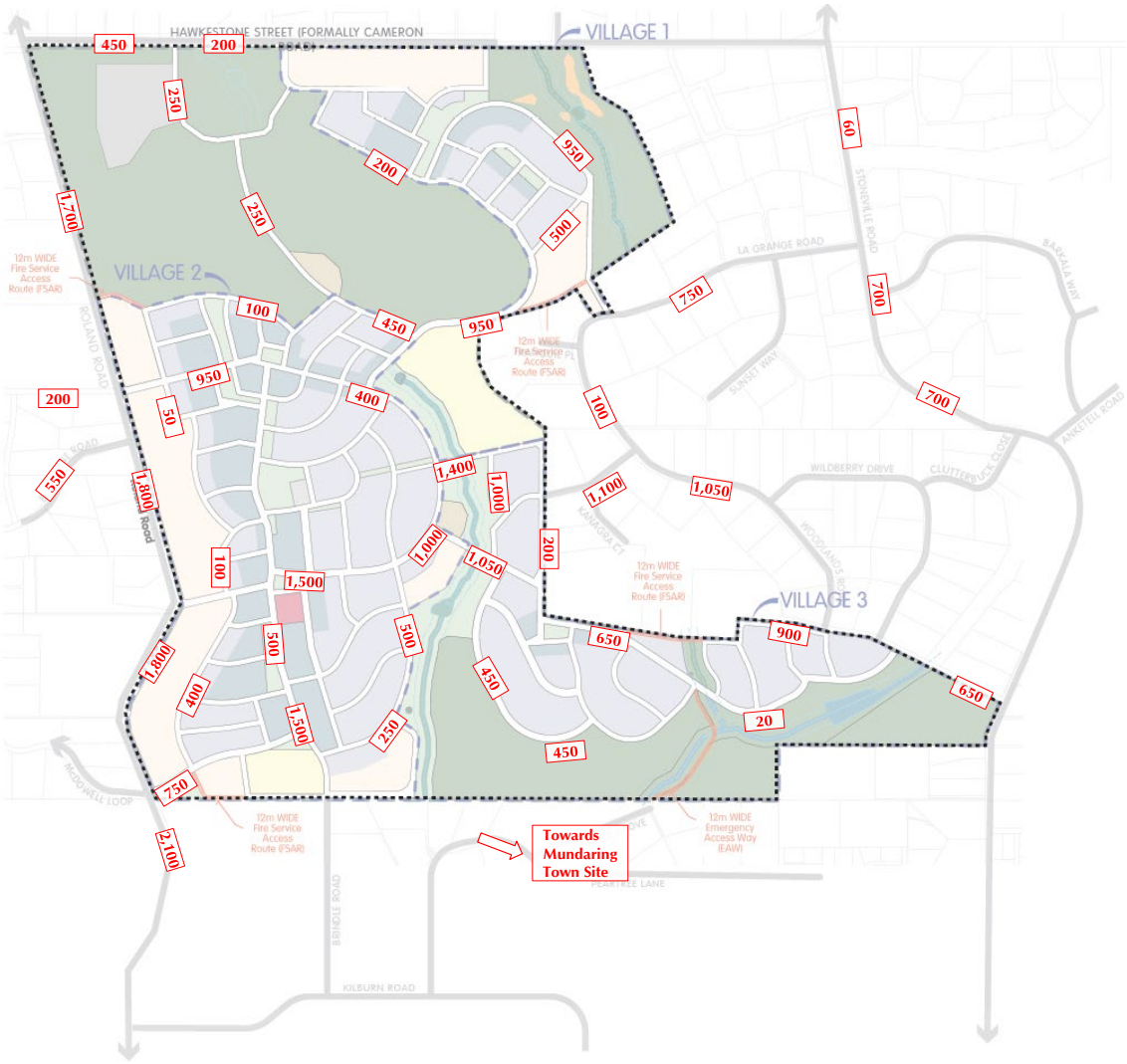

Figure 15: Daily Traffic Flow Forecast for North Stoneville LSP

The estimated morning and afternoon peak hour traffic flows through the main LSP access intersections and key local intersections in Stage 1 (400 lots) and Stage 2 (full LSP build-out) are shown in the following figures (refer **Figure 16** to **Figure 28**).

Figure 16: Estimated traffic flows at Toodyay Rd/Roland Rd Intersection – AM/PM Peak (Stage 1)

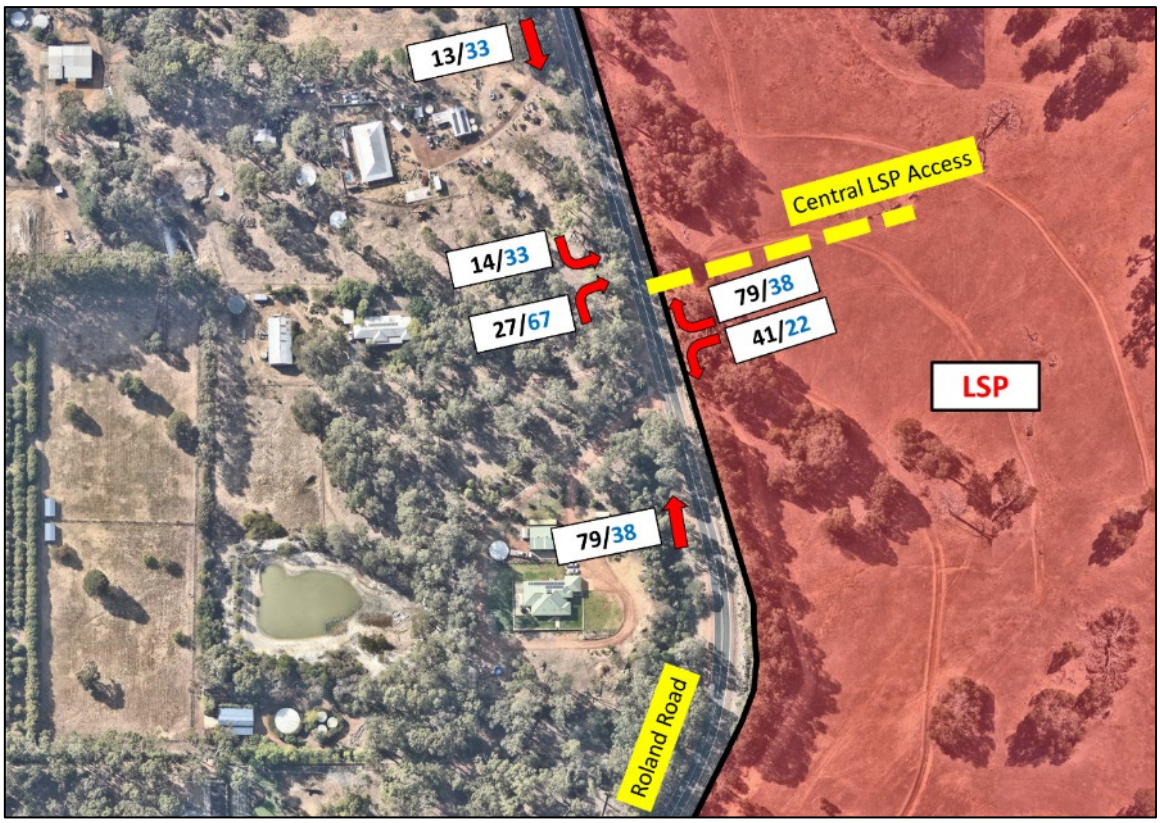

Figure 17: Estimated traffic flows at Roland Rd/Central LSP Access Intersection – AM/PM Peak (Stage 1)

Figure 18: Estimated traffic flows at Roland Rd/McDowell Loop/South LSP Access Intersection – AM/PM Peak (Stage 1)

Figure 19: Estimated traffic flows at Roland Rd/Richardson Rd/Byfield Rd Intersection – AM/PM Peak (Stage 1)

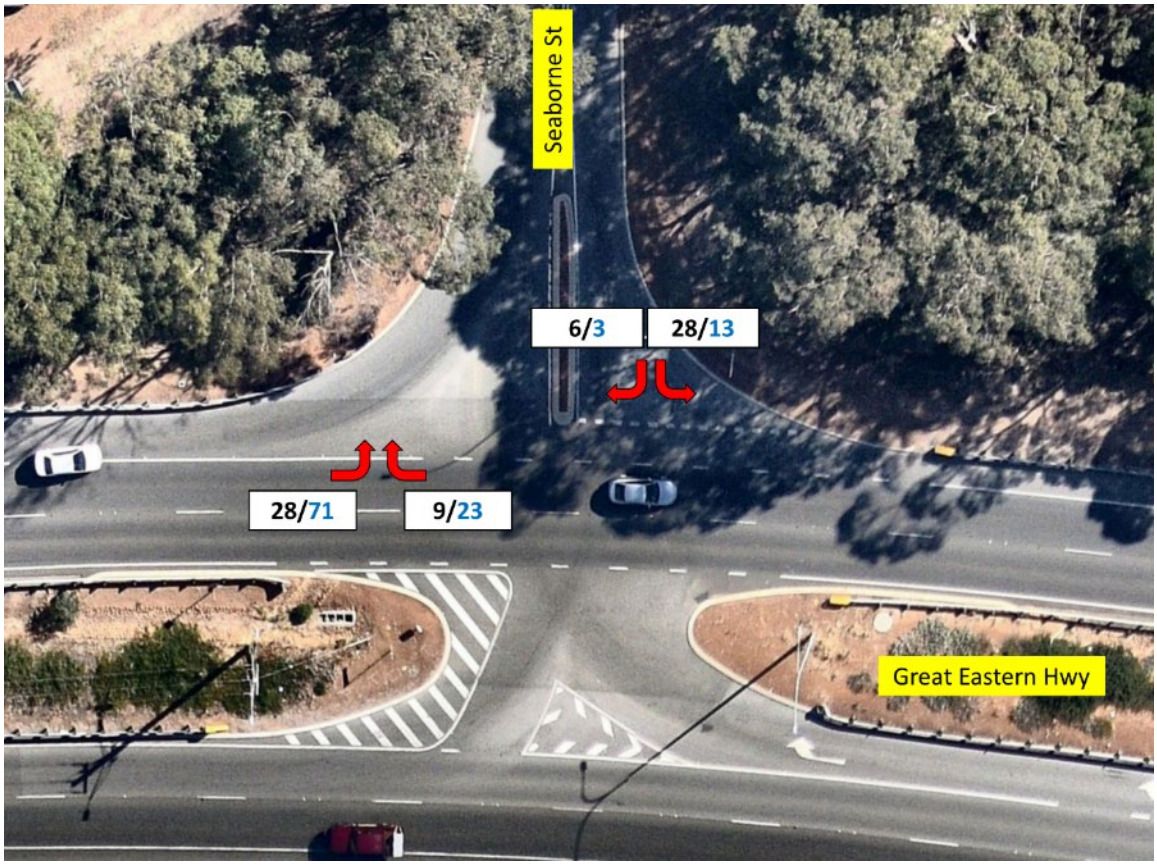

Figure 20: Estimated traffic flows at Great Eastern Hwy/Seaborne St Intersection – AM/PM Peak (Stage 1)

Figure 21: Estimated traffic flows at Toodyay Rd/Roland Rd Intersection – AM/PM Peak (Stage 2)

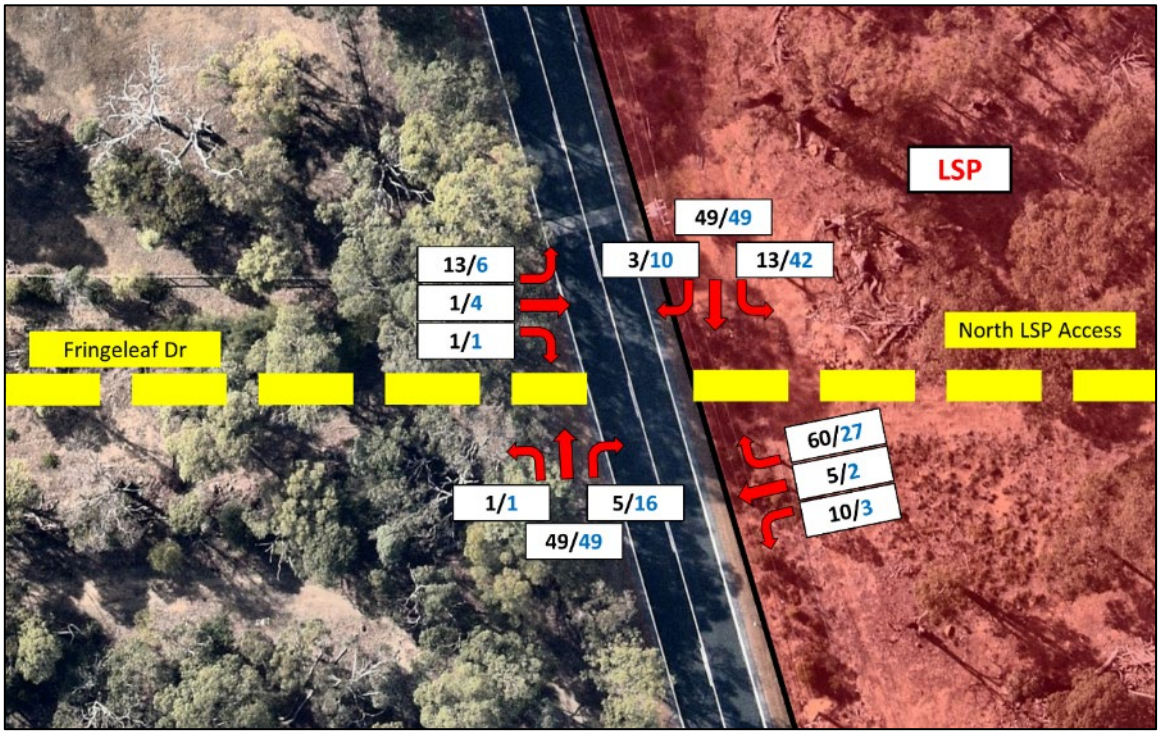

Figure 22: Estimated traffic flows at Roland Rd/Fringeleaf Dr/North LSP Access Intersection – AM/PM Peak (Stage 2)

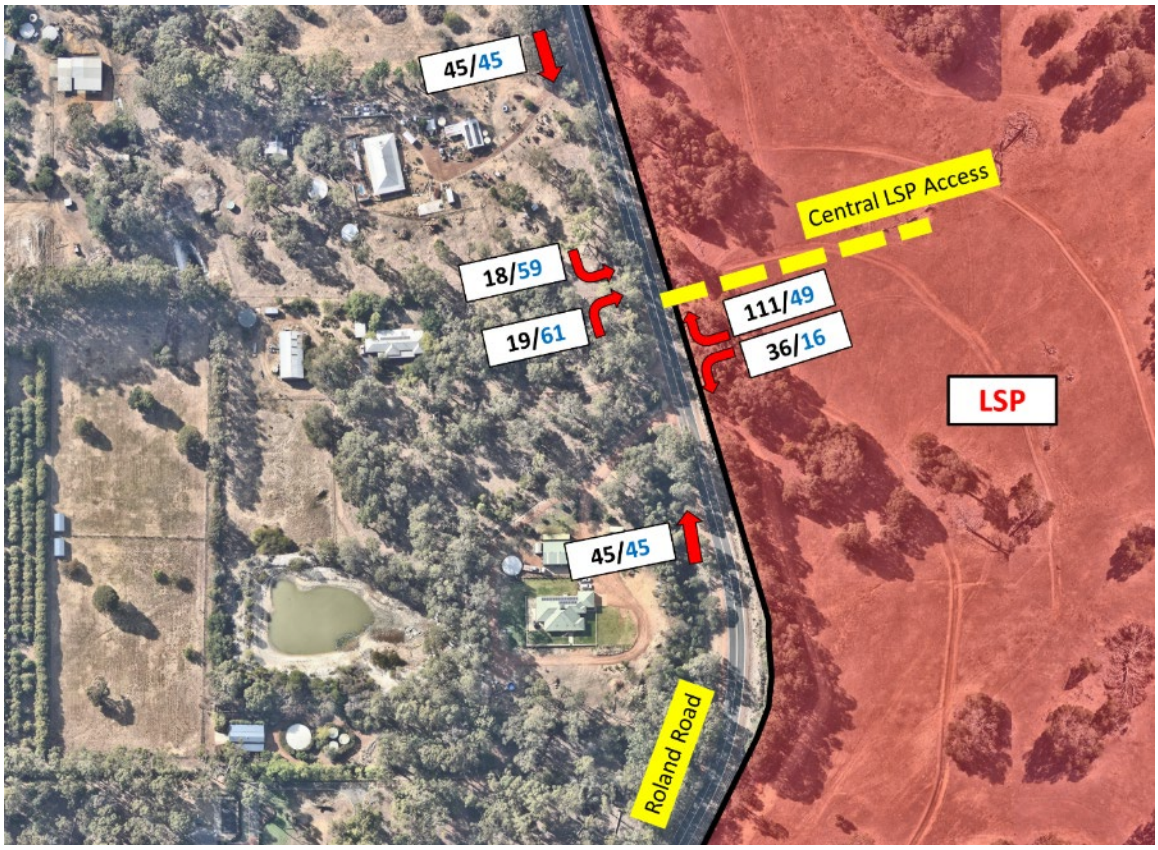

Figure 23: Estimated traffic flows at Roland Rd/Central LSP Access Intersection – AM/PM Peak (Stage 2)

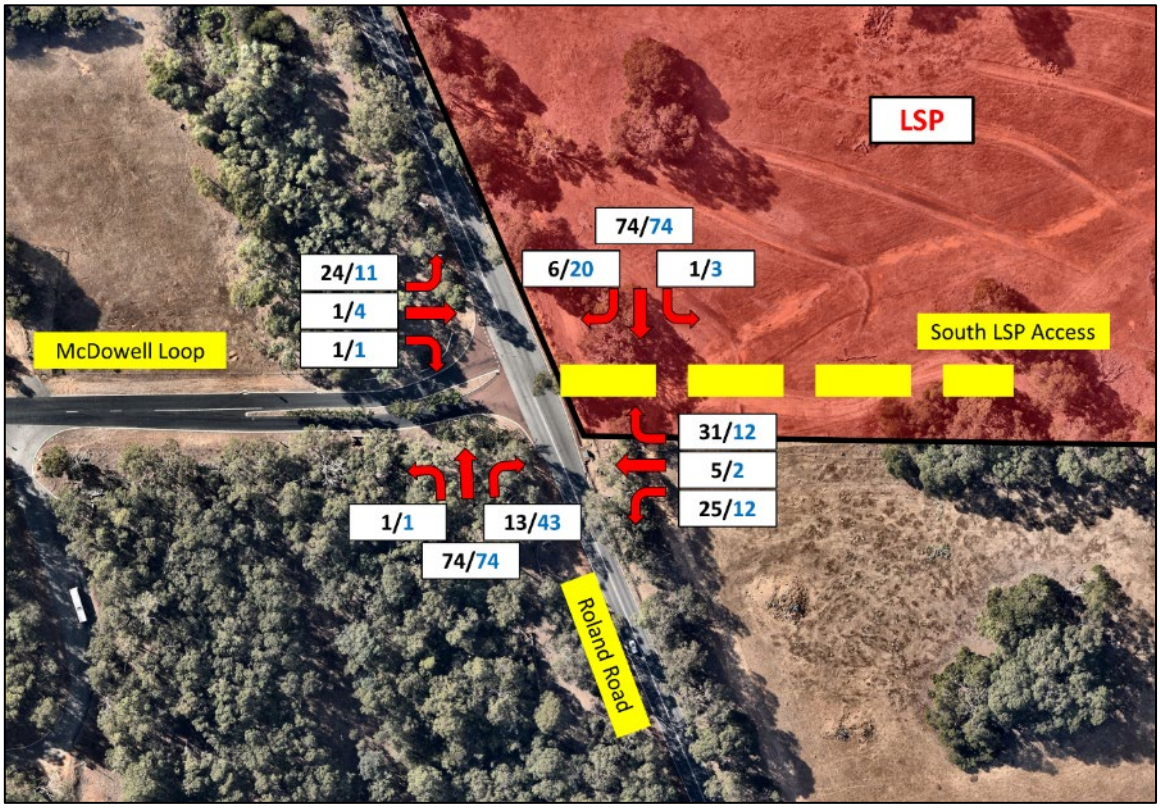

Figure 24: Estimated traffic flows at Roland Rd/McDowell Loop/South LSP Access Intersection – AM/PM Peak (Stage 2)

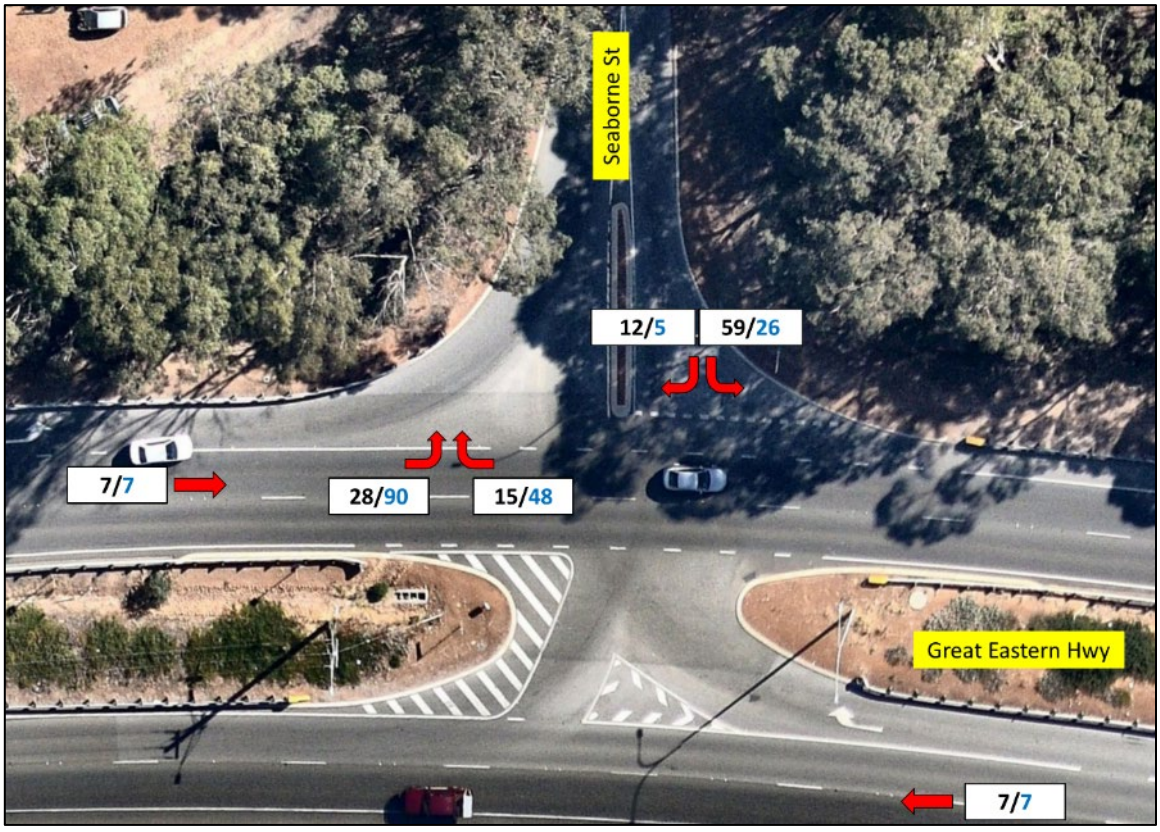

Figure 25: Estimated traffic flows at Great Eastern Hwy/Seaborne St Intersection – AM/PM Peak (Stage 2)

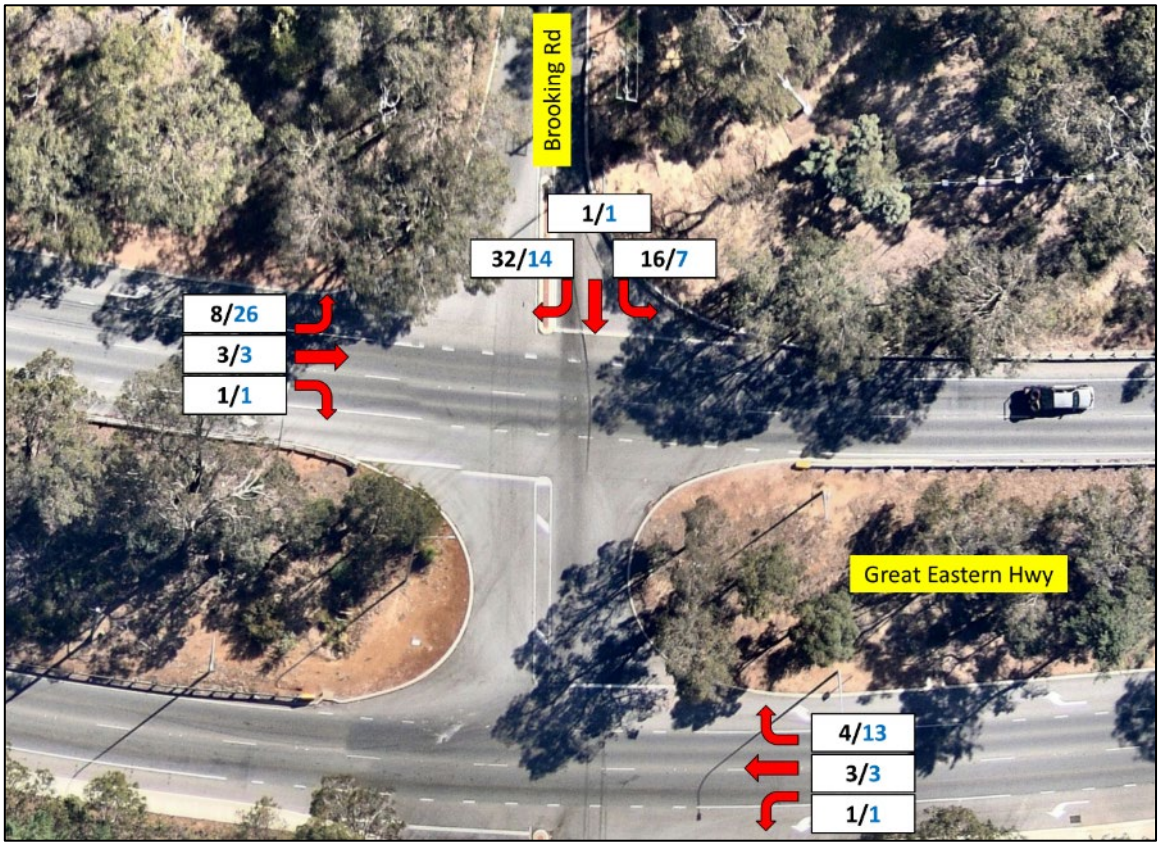

Figure 26: Estimated traffic flows at Great Eastern Hwy/Brooking Rd Intersection – AM/PM Peak (Stage 2)

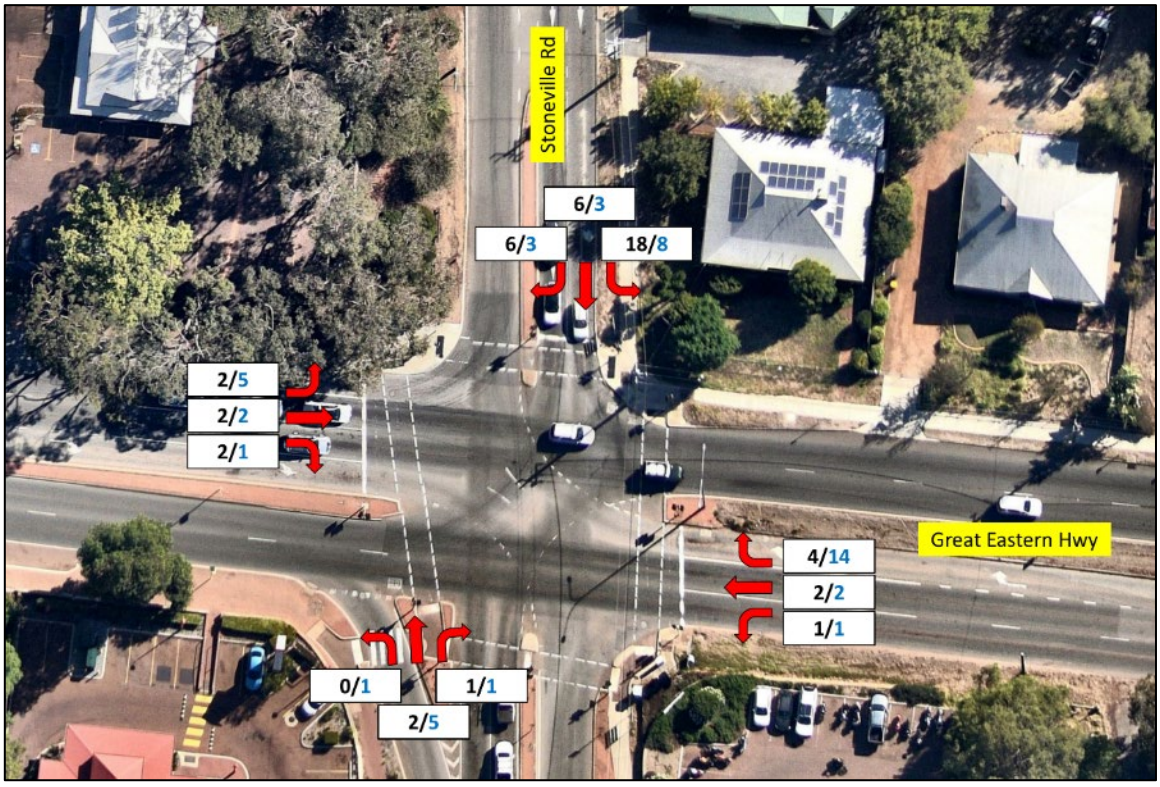

Figure 27: Estimated traffic flows at Great Eastern Hwy/Stoneville Rd Intersection – AM/PM Peak (Stage 2)

Figure 28: Estimated traffic flows at Stoneville Rd/Woodlands Rd Intersection – AM/PM Peak (Stage 2)

7.5 Roads and Intersections

7.5.1 Roads Assessment

The North Stoneville LSP road network proposed to accommodate the projected traffic volumes is detailed in **Section 7.4** of this Revised Transport Impact Assessment, while the details of the proposed road hierarchy are discussed in **Section 4.1**.

The projected traffic volumes for LSP road network were established using the transport model for North Stoneville LSP developed for this project. The outputs were also used to establish the road hierarchy with typical road reservations and cross-sections for the internal LSP road network.

A review of North Stoneville LSP traffic projections shows that, in accordance with the WAPC *"Liveable Neighbourhoods"* document, all internal LSP roads can be classified as *Neighbourhood Connector B, Access Street A, and Access Street D* roads.

Some key characteristics of the relevant road classifications have been summarised in **Table 6** and discussed in the following paragraphs.

Table 6: Proposed LSP internal road hierarchy – Indicative cross-sections

Road Classification	Indicative upper volume (vpd)	Indicative road reserve width (m)	Indicative road pavement width (m)
Neighbourhood Connector B	3,000	19.4m	2 x 3.5m lanes with 2.1m embayed parking
Access Street A	3,000	24.0m	2 x 3.5m lanes with 2.1m embayed parking
Access Street D	1,000	14.2m	6.0m

The north-south internal LSP spine road is proposed to be classified as a *Neighbourhood Connector B* road based on its function, location and projected traffic volumes of up to 1,500vpd. This road passes the internal LSP retail/commercial node, public primary school, K-12 private school, and connecting to regional distributor roads such as Roland Road to the west and (indirectly via Hawkstone Road) at the north of the LSP. Certain sections of these roads may potentially become part of a future bus route through the LSP subject to positive feasibility assessment outcome and PTA's approval.

The typical *Neighbourhood Connector B* road reserve of 19.4m includes 3.5m wide traffic lanes and indented 2.1m wide parking lanes (where required) one both sides. This road is a potential bus route. A shared path is proposed on one side of the road with a footpath on the other. Refer **Figure 29** for indicative cross section.

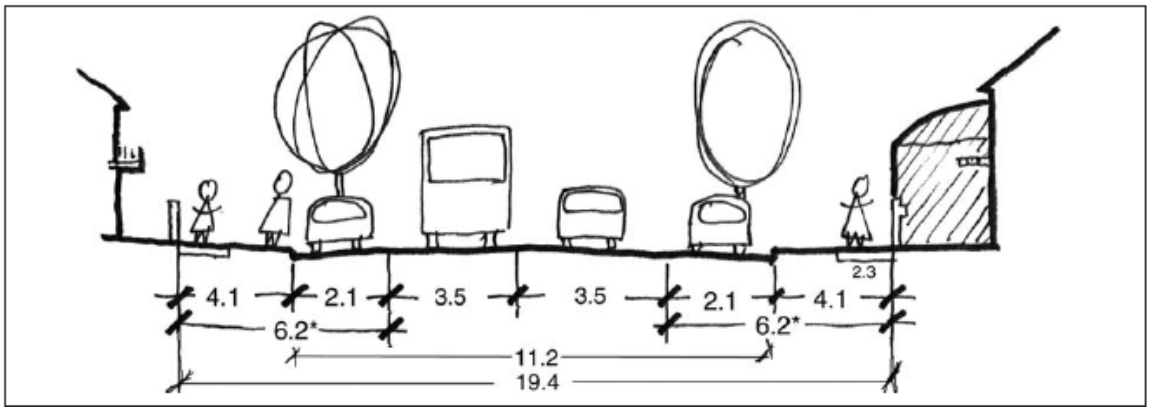

Figure 29: Neighborhood Connector B – with target speed of 50 km/h (<3,000vpd)

A total of four internal LSP roads (two east-west and two north-south roads) are classified as *Access Street A* roads. These roads, along with Neighbourhood Connectors, form the skeleton of the internal LSP road system. One of these roads passes the public primary school site at the southwest corner of the LSP area as such are anticipated to carry a significant proportion of school-related traffic.

These roads are to connect to the regional distributor roads such as Roland Road to the west and Stoneville Road to the east. Extensive school-related parking activity is also expected on these roads especially adjacent to the school site and during drop-off/pick-up hours.

The typical *Access Street A* road reserve of 24.0m includes 3.5m wide traffic lanes and indented 2.1m wide parking lanes (where required) one both sides. Shared paths are proposed on one side of these roads coupled with footpaths on the other. Refer **Figure 30** for indicative cross section.

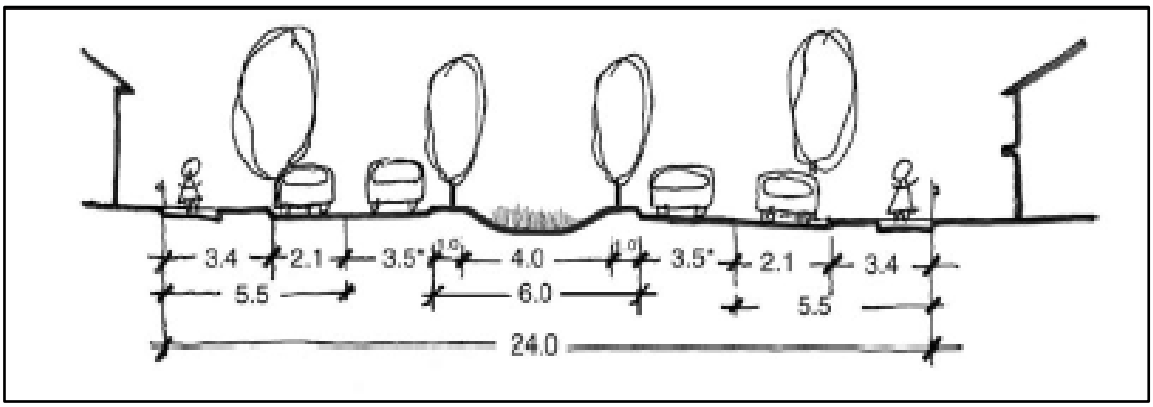

Figure 30: Access Street A - Avenue – with target speed of 40 km/h (<3,000vpd)

The balance of internal LSP roads is proposed as *Access Street D* roads. The typical road reserve for *Access Street D* entails a 6m wide trafficable carriageway pavement with 4.1m wide verges on both sides. If fronting P.O.S., access street verge adjacent

to P.O.S. may be reduced to 1.0m. Maximum desirable traffic volume for this type of road is 1,000vpd. The indicative cross-section of the *Access Street D* is illustrated in **Figure 31**.

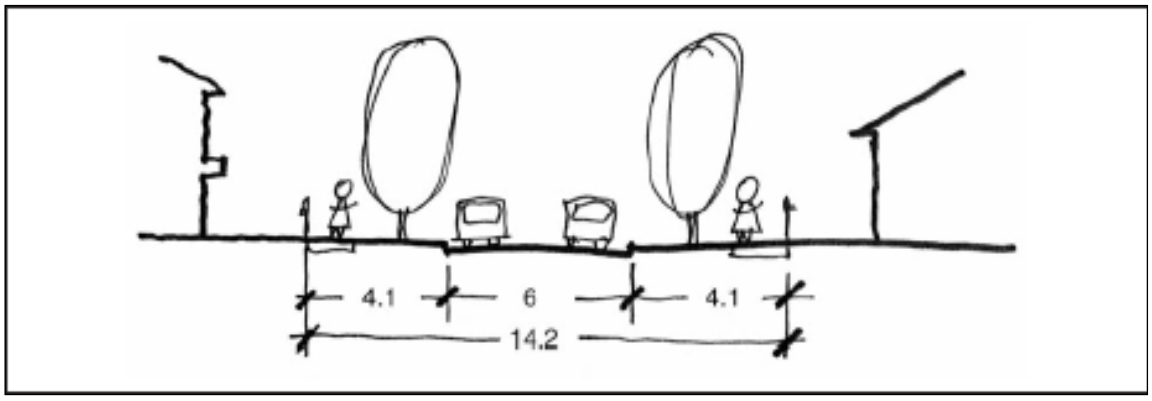

Figure 31: Access Street D – narrow yield (give way) street with target speed of 30 km/h (<1,000vpd)

The projected additional daily traffic volumes for full LSP build-out, which include the natural growth of regional traffic and traffic generated by the North Stoneville LSP area is shown in **Figure 32**.

As a result of the full buildout of LSP area, Toodyay Road west of Roland Road, is estimated to accommodate about 2,000vpd of LSP-generated traffic, post-construction of EastLink. The section of Toodyay Road east of Stoneville Road is anticipated accommodate about 120vpd of the LSP traffic at the same time. These levels of additional traffic can be accommodated on a single carriageway road with characteristics similar to the current Toodyay Road without the need for major upgrade.

Based on Main Roads WA advice, passing lanes may be contemplated to increase capacity of Toodyay Road west of Stoneville in the interim stage before Perth to Adelaide National Highway is implemented (i.e., EastLink).

Great Eastern Highway west of Seaborne Street, under this conservative scenario, is estimated to accommodate additional 2,050vpd of LSP-generated traffic with sections west and east of Mundaring town centre carrying about 750vpd and 250vpd of the LSP traffic, respectively. The current dual carriageway standard of Great Eastern Highway is sufficient to accommodate the project daily traffic volumes with no need for upgrade.

The construction of EastLink is expected to have significant and beneficial impact on existing traffic patterns within the locality as it is anticipated to attract a significant portion of traffic presently carried by Great Eastern Highway.

Hence, the construction of EastLink will also serve to alleviate the traffic load on Great Eastern Highway and consequently improve its operation.

Figure 32: Projected additional daily traffic volumes from the LSP on regional roads with full North Stoneville LSP build-out

According to the *Austroads' Guide to Road Design Part 3: Geometric Design* document rural roads carrying daily traffic volumes in excess of 3,000vpd would warrant total carriageway width of 12.0m comprising of 2 x 3.5m wide trafficable lanes and 2.5m wide shoulders with sealed width of 1.5m.

Based on latest Transcore's traffic surveys Roland Road presently carries about 1,800vpd just south of Toodyay Road. Similarly, based on latest Transcore's traffic surveys Seaborne Street is estimated to carry just over 3,000vpd north of Great Eastern Highway

Roland Road under full traffic load from the LSP is estimated to attract additional 2,200vpd of the LSP traffic at the northern end and up to about 1,800vpd of the LSP traffic adjacent to the Parkerville town centre. Accordingly, a cross-section comprising 2 x 3.5m wide trafficable lanes and 2.5m wide shoulders with sealed width of 1.5m would be sufficient for Roland Road to accommodate this level of traffic.

Seaborne Road, benefitting from new Brooking Road realignment route, is estimated to attract a maximum of 1,980vpd of additional LSP traffic at the southernmost end. Similarly, to Roland Road, a road profile comprising 2 x 3.5m wide trafficable lanes

and 2.5m wide shoulders with sealed width of 1.5m would also be sufficient for Seaborne Street to accommodate this level of traffic.

Additionally, appropriate intersection treatments would be required to control traffic flows at major new and existing intersections once this level of daily traffic is experienced. More details on intersection treatments will be provided in the following paragraphs.

Based on latest Transcore's traffic surveys Stoneville Road presently carries about 2,450vpd just south of Woodlands Road.

With full development of North Stoneville LSP area, Stoneville Road could be expected to experience an increase in traffic activity with total daily traffic volumes increasing by 2,600vpd from the LSP traffic along the section adjacent to the LSP area and about 3,500vpd of the LSP traffic in the vicinity of Mundaring town centre.

As such, single carriageway road with a total width of 12.0m comprising of 2 x 3.5m wide trafficable lanes and 2.5m wide shoulders with sealed width of 1.5m standard would provide sufficient capacity for the anticipated traffic volumes on Stoneville Road. However, the section of Stoneville Road adjacent to Mundaring town centre may require localised widening to provide for sheltered turning facilities at key intersections.

The internal north-south LSP Access Street abutting the public primary school site which further south connects to Brindle Road forming a LSP road/Brindle Road/Kilburn Road/Granite Road/Richardson Road corridor to Stoneville Road could be expected to attract about 1,000vpd additional traffic from the LSP as an attractive proposition to access the eastern part of Mundaring town centre zone. All roads forming this corridor are classified as Access Streets. Brindle Road is presently only partially sealed and as such this missing link would need to be constructed to facilitate this corridor.

Hawkstone Street could ultimately carry about 450vpd of the LSP traffic. With its current standard Hawkstone Street should be able to accommodate this level of daily traffic without the need for upgrade.

The ultimate road standards and cross-sections to be implemented will be determined during the detail design stages of the project through liaison with the local government technical departments and/or relevant state agencies. The contribution towards road network upgrades should be made on fair and equitable basis through appropriate development contribution schemes where funding its typically determined on impact basis.

7.5.2 Internal LSP Intersection Analysis

The LSP road network proposed to accommodate the projected traffic volumes is detailed in **Section 7.2** of this transport assessment, including the details of the proposed road hierarchy in **Section 4.1**.

Table 3.6 of *"Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management"* recommends suitable traffic controls (i.e., intersections) for different types of roads based on operational and Safe System objectives. Accordingly, assuming that typical peak hour traffic represents approximately 10% of the daily traffic volume, including Collector Road/Local Road or Local Road/Local Road intersection type, it is confirmed that uninterrupted traffic flow conditions can be expected at all key internal subdivision intersections designed in form of priority or stop-controlled format.

Accordingly, it is confirmed that the proposed internal LSP road network layout provides for satisfactory permeability and efficient traffic distribution throughout the LSP area with no bottlenecks or traffic congestion anticipated during typical operating conditions.

However, in order to ensure efficient and safe traffic movements within and adjacent to the LSP area a number of intersection treatments are proposed, as detailed in **Figure 33.** The design details of the intersection treatments and other speed-control measures are typically determined at the subdivision design stage.

There are a number of four-way intersections within the LSP that will require special consideration. Most of these are located along proposed *Neighbourhood Connector B* and *Access Street A* roads, including two along Roland Road, being Northern and Southern Access intersections. It is suggested that these be constructed as roundabouts to improve the safety of these crossroads as well as help control traffic speeds on these relatively long roads.

A number of other four-way intersections are indicated in **Figure 33**. Each of these may require appropriate traffic management treatments to ensure low traffic speeds on the side road approaches, clearly indicating priority at the intersection and alerting drivers to the presence of the crossroads (i.e. threshold treatments, raised plateaus, etc.). However, it is not appropriate to prescribe specific intersection treatments or traffic calming measures at all these locations at the structure planning stage. This level of detail can more appropriately be addressed as part of the subsequent subdivision design and approval processes.

A number of staggers are also shown in the proposed LSP. Each of these staggered intersections need to be addressed at the detailed subdivision design stage in accordance with *Liveable Neighbourhoods (2009) Table 5 Junction Spacing*.

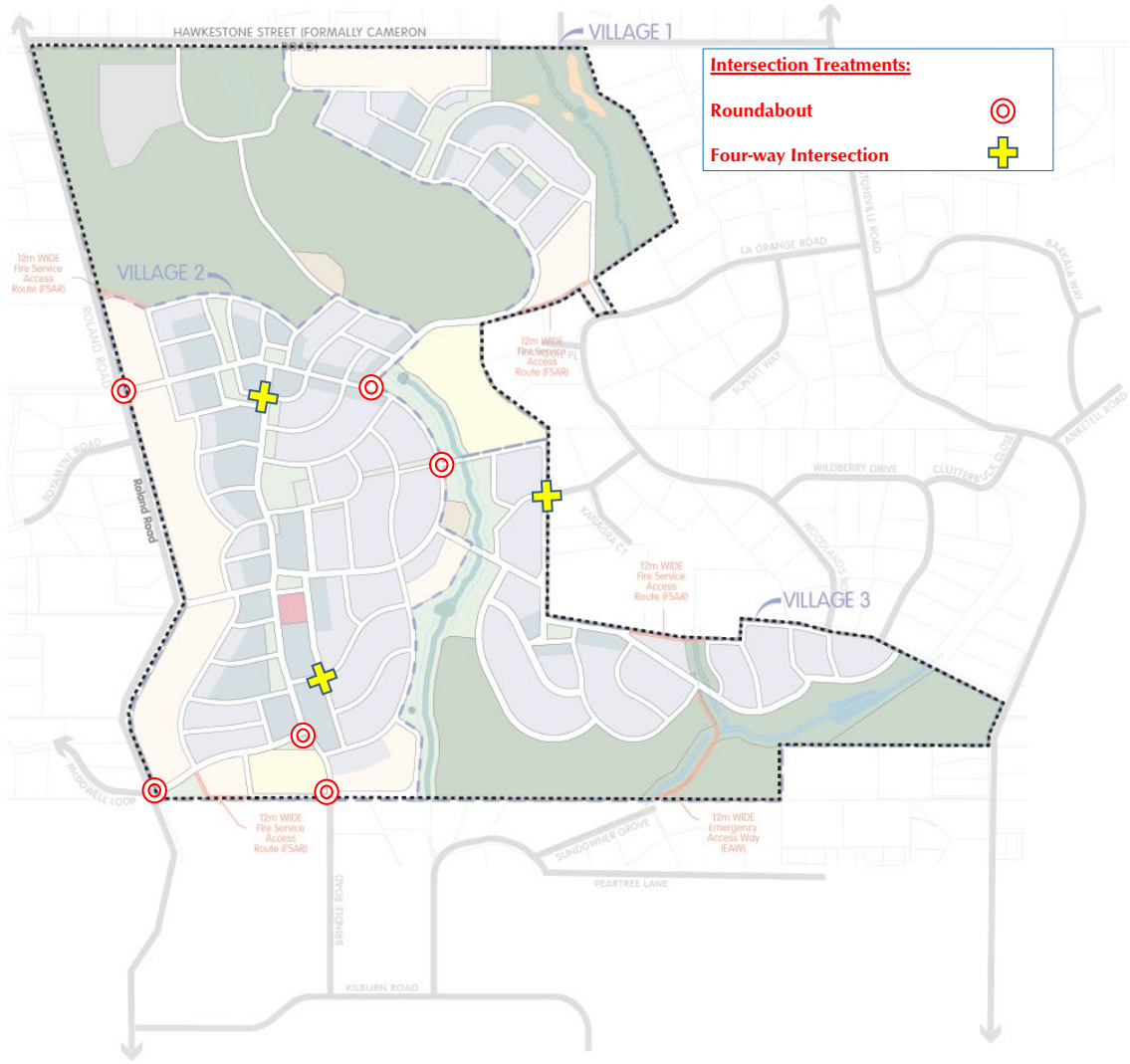

Figure 33: Proposed Intersection Treatments

There is a total of three access intersections on Roland Road, three on Hawkstone Street, one on La Grange Road, two on Woodlands Road and one on Brindle Road northbound extension into the LSP is proposed to serve the North Stoneville LSP area.

All but four access intersections are proposed in the form of T-intersection. The two Roland Road access intersections (Northern and Southern Access intersection) are proposed to form 4-way roundabout intersections with Fringeleaf Drive (eastbound extension) and McDowell Loop, respectively.

Due to the anticipated low level of traffic flows the future four-way access intersection on Woodlands Road is proposed to be designed as priority-controlled four-way intersection with priority on Woodlands Road.

7.5.3 External Intersection Analysis

The capacity assessment of key district intersections on Toodyay Road, Great Eastern Highway, Roland Road and Stoneville Road during typical weekday morning and

afternoon peak hour was undertaken using the SIDRA intersection-modelling software to determine the expected operational characteristics of these intersections.

Transcore organised traffic turn counts at these intersections to establish the existing traffic patterns. Also, as requested by Main Roads WA, Transcore organised up-to-date video survey of the intersection of Great Eastern Highway/Seabourne Street, which was undertaken on Wednesday 17 April 2024.

The capacity analysis was undertaken for the following two discrete scenarios:

Scenario 1: Partial development of LSP area (400 residential lots are released) at the western end of the LSP area with two access intersections on Roland Road. The previously indicated local road and intersection upgrades are carried out as discussed in **Section 2.1** the report. These upgrades are expected to result in a portion of existing background and new LSP traffic choosing Toodyay Road over Great Eastern Highway for trips heading west towards Perth due to capacity constraints on Great Eastern Highway and additional capacity secured by the proposed pre-LSP intersection upgrade works at Toodyay Road/Roland Road intersection.

It was further assumed that EastLink is not yet developed by this stage thereby providing no attractive alternative to Great Eastern Highway. An indicative scenario timeframe of 2028 is assumed for the purpose of this assessment.

Scenario 2: Full LSP build-out scenario with all external access intersections completed. The Roland Road and Stoneville Road intersections on Toodyay Road are now upgraded to a grade-separated, free-flow standard in line with the planning for the EastLink project. As previously discussed, the EastLink project will result in re-balancing of traffic between Toodyay Road and Great Eastern Highway which is at this stage estimated to be at approximately 51/49 split. The proposed Brooking Road realignment provides additional connection between the LSP and Great Eastern Highway.

Intersections where increase in traffic flows for any intersection approach is under the 100vph threshold or intersections with minor roads are not considered in this instance.

Capacity analysis of these intersections was undertaken using the SIDRA computer software package. SIDRA is an intersection modelling tool commonly used by traffic engineers for all types of intersections. SIDRA outputs are presented in the form of Degree of Saturation, Level of Service, Average Delay and 95% Queue. These characteristics are defined as follows:

- Degree of Saturation is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The Degree of Saturation ranges from close to zero for infrequent traffic flow up to one for saturated flow or capacity.
- Level of Service is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. In general, there are 6 levels of service, designated from A to F, with Level of Service A representing the best operating condition (i.e. free flow) and Level of Service F the worst (i.e. forced or breakdown flow).

- Average Delay is the average of all travel time delays for vehicles through the intersection.
- 95% Queue is the queue length below which 95% of all observed queue lengths fall.

The results of the relevant intersection SIDRA analysis are summarised in **Appendix B** and discussed in greater detail the following paragraphs.

Toodyay Road/Roland Road Intersection

This intersection was modelled in its current form for the existing situation scenario. A continuous left-turn lane on Roland Road approach to the intersection is proposed for this intersection as a next incremental upgrade in order to secure free-flow conditions during the bushfire evacuation events. This upgrade is in line with the outcome of the bushfire evacuation modelling and assessment undertaken for this project. Accordingly, this intersection was modelled to allow for the proposed subsequent pre-LSP upgrade for the Scenario 1 stage.

The results of the SIDRA analysis demonstrate very good overall intersection LoS during both peak periods and in both existing and Scenario 1 models. The analysis for infers that the intersection will operate with significant spare capacity (approximately 76% and 68% for AM and PM peaks), in the Scenario 1.

Ultimately, this intersection is planned to be upgraded to an interchange format (free flow) with the construction of EastLink. Clearly at this stage (i.e., Scenario 2) no capacity issues would be expected.

Great Eastern Highway/Seaborne Street Intersection

This intersection is modelled as is for the existing situation scenario and with the allowance for proposed intersection upgrades in the Stage 1 and Stage 2 scenarios, as discussed previously in Section **5.4** of the report.

The assessment of the intersection for existing situation indicates capacity constraints would be experienced in AM peak particularly for the right-turn out movements from Seaborne Street. The PM peak operation of this intersection is markedly better though.

The SIDRA analysis of Stage 1 shows that the proposed upgrades will provide some benefits by securing additional capacity at this intersection in the short term; however, the anticipated growth in background traffic primarily on Great Eastern Highway is expected to erase this benefit by 2028. At this stage, and with the benefit of anticipated re-routing of LSP-generated trips to Toodyay Road (due to proposed intersection upgrades), this intersection is expected to experience capacity constraints in the AM peak only. The capacity levels are estimated to be at 107% and 41% levels in the AM and PM peaks, respectively.

The right-turn out movement from Seaborne Street records LoS F in the morning peak with extended queues. Interestingly, the sensitivity analysis of this intersection without the LSP-generated traffic also shows similar levels of capacity constraints for the morning peak at 104%, with LoS F with extended queues for the right-out movements.

The intersection was modelled using default traffic flow gaps; however, in reality, it is expected that drivers would probably choose smaller gaps to enter Great Eastern Highway westbound flow with a few of these vehicles making left-turns from Seaborne Street first and then performing a U-turn at Craven Road intersection to continue travelling westbound towards Perth. It is however, expected that this situation would be experienced only in the morning peak hour period with traffic reverting to regular operation throughout the rest of the day.

Accordingly, the proposed U-turn facility at the Great Eastern Highway/Craven Road intersection plays a role in alleviating the right-turn traffic load from Great Eastern Highway and improving the overall Great Eastern Highway/Seaborne Street intersection operation.

It is clear that construction of EastLink would address capacity issues for intersections along Great Eastern Highway through alleviating traffic loads on this road by anticipated re-balancing of traffic between Toodyay Road and Great Eastern Highway.

Expectedly, in the longer term, the Stage 2 intersection analysis renders improved operational characteristics at Great Eastern Highway/Seaborne Street intersection due to the anticipated re-assignment of regional traffic onto EastLink. The Great Eastern Highway/Seaborne Street intersection at this stage is anticipated to experience capacity levels of 97% and 33% in the AM and PM peak hour, respectively and LoS D and C for the contentious right-turn out movement from Seaborne Street in morning and afternoon peaks, respectively.

Great Eastern Highway/Stoneville Road/Mundaring Weir Road Intersection

The SIDRA analysis indicates that the combination of North Stoneville LSP traffic and the cumulative growth in background traffic along the highway and side roads will result in no overall change in intersection LoS which remains at level C in both morning and afternoon weekday peak periods (Scenario 1). The analysis indicates that the existing intersection capacity of 77% and 90% will remain acceptable at 84% and 82% during the AM and PM peak hour periods, respectively.

With the implementation of EastLink and anticipated re-distribution of district-level traffic this signalised intersection is expected to maintain spare capacity going into the future with estimated capacity levels of 89% and 87% (AM and PM peak) and overall LoS D (Stage 2).

Roland Road/Richardson Road Intersection

This intersection was modelled in its current format and without any additional turning facilities to provide for a conservative assessment. The result of SIDRA analysis confirms that an overall LoS A/B with minor queues and delays can be expected at this intersection for both peak weekday periods in Stage 1 scenario.

With the future creation of Roland Road/Richardson Road/Byfield Road roundabout intersection the new intersection format will secure significant additional capacity and improvement in operational characteristics that no detailed analysis of this intersection for Stage 2 was deemed necessary.

Roland Road/Fringeleaf Drive/Northern LSP Access Road Intersection

This future 4-way intersection was modelled as a 4-way roundabout intersection in order to secure seamless discharge of LSP traffic onto Roland Road in bushfire emergency situations. For this purpose, an additional priority lane was included in the roundabout design to secure free-flow right-turns out of LSP area.

As expected, the result of SIDRA analysis for Stage 2 confirms that an overall LoS A/B with minor queues and delays and no practical impact on Roland Road operation can be expected at this intersection for both peak weekday periods under this format.

Roland Road/Central LSP Access Road Intersection

The SIDRA assessment of this future T-intersection renders overall intersection LoS A for both weekday peak periods with moderate queues and delays. The intersection operates with significant level of spare capacity, but it is anticipated that left- and right-turn lanes on Roland Road may be warranted on safety grounds due to the volume of through traffic along Roland Road.

Roland Road/McDowell Loop/Southern LSP Access Road Intersection

Similar operating conditions as with Northern LSP Access Road intersection are expected at this future 4-way intersection which was initially modelled as a simple four-way stop-controlled intersection for Scenario 1 and single-lane roundabout for Scenario 2.

Stoneville Road/Woodlands Road Intersection

The capacity assessment of the existing T-intersection on Stoneville Road confirms that excellent overall intersection LoS A can be expected during both weekday peak periods under full North Stoneville LSP build-out scenario (Stage 2).

Localised road widening on Stoneville Road should be considered at this intersection to mitigate any potential impact on operation of through traffic along Stoneville Road. Any intersection treatment at this intersection should also consider the proximity of existing local road intersection located some 80m to the north, including the proximity of the horizontal curve on Stoneville Road to the south.

7.6 Access to Frontage Properties

The WAPC Liveable Neighbourhoods policy requires that *"Development along Integrator B and Neighbourhood Connector streets with ultimate vehicle volumes over 5,000 vehicles per day should be designed either so vehicles entering the street can do so travelling forward or are provided with alternative forms of vehicle access. Wider lots with paired driveways and protected reversing areas in the parking lane may be used on streets with up to 7,000 vehicles per day."*

No internal LSP roads are expected to experience these levels of daily traffic and as such this is not an issue.

7.7 Pedestrian and Cycle Networks

The proposed network of shared paths for pedestrians and cyclists in the LSP area is described in **Section 4.3** of this Revised Transport Impact Assessment. This network of paths will provide for a very good level of accessibility and permeability for pedestrians and cyclists within the LSP area, and connections to key internal retail/commercial and education nodes.

The subject site is relatively isolated and removed from the nearest developed areas. As such, the proposed network of LSP cycle and pedestrian paths is generally restricted to internal routes with limited potential for external connectivity; however, in addition to the internal path system a shared path link along the eastern (LSP) side of Roland Road and southern side of Hawkstone Street (west of LSP access intersection) is proposed to form a comprehensive system of paths.

The main locations where there may be increased demand for pedestrian and cyclist movements crossing the road network are likely to be adjacent to the retail/commercial node and schools. The anticipated traffic volumes adjacent to these nodes is relatively low so pedestrian movements across these streets will be generally safe. Appropriate pedestrian crossing facilities with refuge island and drop ramps should be incorporated in the road design at subdivision stages of the development.

The WAPC *Transport Impact Assessment Guidelines Vol 2* (2016) provides guidance on the levels of traffic volumes that are likely to affect the ability for pedestrians to cross various types of roads. Based on that guidance an undivided two-lane road should be acceptable for pedestrians crossing traffic volumes of up to approximately 1,100vph and this threshold can be increased to around 2,800vph by adding a central median or pedestrian refuge islands.

None of the roads within the LSP area are expected to carry traffic flows anywhere near these levels.

7.8 Access to Schools

The proposed LSP will be the primary catchment area for the future primary and K-12 schools. Hence all primary and high school students residing in the proximity would need to cross either the *Neighbourhood Connector B* or *Access Street A* or *D* roads separating the schools from the immediately adjacent residential areas on their way to and from school.

Pedestrian paths on one side and shared paths on the other are proposed on the perimeter roads. It is recommended that pedestrian crossing facilities in the vicinity of schools be further investigated during the subdivision design stage of the project.

Information from the 2002 – 2006 *Perth & Regions Travel Survey* (PARTS) indicated that 25.4% of primary school students and 17.1% of high school students walk or cycle home from school while 26.7% of primary and 21.9% of high school students walk or cycle home from school. Therefore, a 300-student primary school would typically have about 80-students walking or cycling, and a 500-student high school would typically have about 85-105 students walking or cycling.

Warrant criteria provided on the WA Police website indicate that a *Type A Children's Crossing* may be provided where a minimum of 20 students and 200 vehicle movements occur within the hour immediately before and immediately after school for a primary school, or 20 students and 700vph for high schools.

The warrants are lower for a *Type B Children's Crossing* at 10 students and 100vph for a primary school or 10 students and 350vph for a high school. Such facilities can only be applied for by a School Principal or the President/Secretary of the relevant school/parent organisation (e.g., P&C, or P&F).

The anticipated numbers of students crossing roads around school perimeters around the school sites may potentially meet these warrants in future so it would be expected that the schools would apply for this facility if/when future student numbers and movements meet those warrants.

7.9 Access to Public Transport

The WAPC *Transport Impact Assessment Guidelines Vol 2* (2016) suggests that it is desirable that at least 90 per cent of dwellings within the structure plan area should be within 500m straight line distance of a bus route.

Current planning by the Public Transport Authority (PTA) does not propose any future bus routes adjacent to or through the LSP area. However, a route combining sections of *Neighbourhood Connector B* and *Access A* roads lends itself to a potential future bus route through the LSP area. With this proposed bus route, it is estimated that some 75-80% of the LSP area would be covered with the suggested 500m distance. Importantly, the proposed route would pass both school sites including the LSP town centre. If this route is selected, the constituent roads and intersections would need to be designed in accordance with PTA requirements.

The indicative bus route through the LSP areas is at best envisaged as a deviation of the existing bus route number 328 that currently operates along Richardson Road. Refer **Figure 34** for more details.

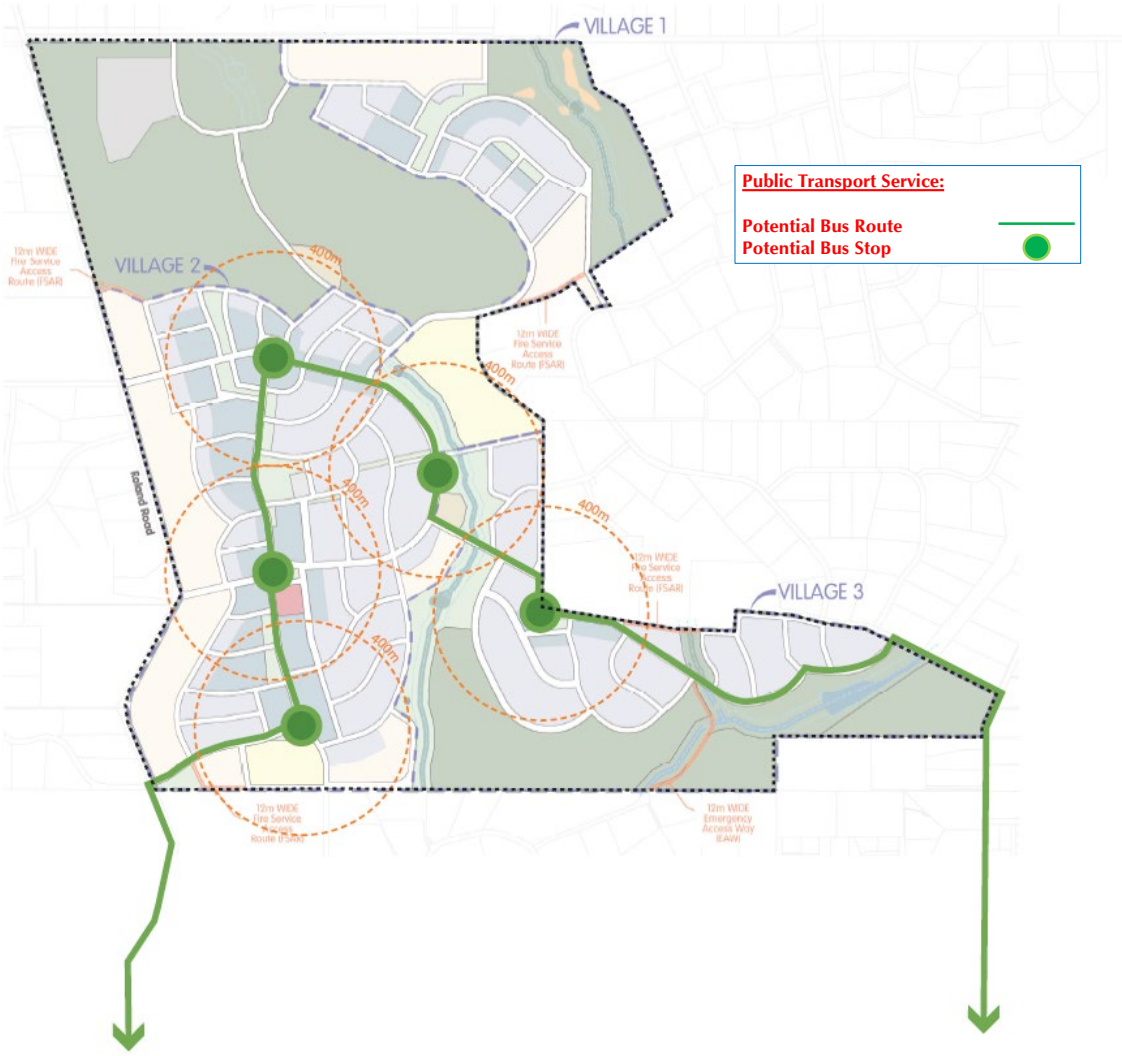

Figure 34: Potential Bus Route through the LSP area.

8 Conclusions

This Revised Transport Impact Assessment was necessitated to address the most recent modifications of the LSP as well as address the comments received by relevant state agencies on the 2023 TIA.

The main findings of the Revised Transport Impact Assessment prepared for the proposed North Stoneville LSP are outlined below.

The LSP area is anticipated to accommodate approximately 1,000 dwellings including a public primary school, private K-12 school and a retail/commercial node of approximately 1,500m^2 GFA.

This structure plan area is anticipated to generate traffic volume of approximately 8,000 vehicles per day (both inbound and outbound trips).

The internal road network of the LSP area has been designed in accordance with WAPC *Liveable Neighbourhoods* principles. The cross-sections and reservations for these roads will be finalised during the detailed subdivision design stage.

Toodyay Road would retain its two-lane standard albeit some upgrades are proposed for its intersection with Roland Road.

As part of the road network upgrades proposed by the proponent at the outset of the project, several existing intersections within the locality will be upgraded prior to commencement of Stage 1 of the LSP development. This is particularly important in case of Great Eastern Highway/Seaborne Street intersection and the two relevant intersections on Toodyay Road.

The Toodyay Road intersection upgrades are proposed to improve potential bushfire evacuation process the and to address existing capacity constraints along Great Eastern Highway.

The intersection of Great Eastern Highway/Seabourne Street will experience capacity issues even without the LSP traffic. These capacity issue will be addressed in the short term by the proponent's proposed intersection upgrades on Toodyay Road and by East Link, in the longer term.

The existing road network at the subject locality is generally of good standard and would not require extensive upgrades to support the anticipated increase in traffic activity as a result of the proposed North Stoneville LSP.

Access to the LSP area is proposed to be facilitated through a system of access intersections along Roland Road, Hawkstone Road and (indirectly) Stoneville Road, including few lower order local roads comprising either roundabouts or T-intersections with appropriate treatments.

The proposed North Stoneville LSP provides for a comprehensive network of shared paths and footpaths to encourage and facilitate non-motorised modes of traffic throughout the LSP area.

At present, there are no plans to provide a public transport service for the proposed LSP; however, if such service becomes feasible in the future the proposed LSP road network allows for such service.

Appendix A

NORTH STONEVILLE LOCAL STRUCTURE PLAN – CONCEPT

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SATTERLEY

CADASTRAL INFORMATION
SOURCE: LANDGATE SLIP SERVICE
YYMMDD: VARIES
DWG REF: VARIES
PROJECTION: GDA2020/MGA50
AERIAL PHOTOGRAPHY
SOURCE: NA
YYMMDD: NA

HATCH

SIZE A4_1:20,000

0 metres 200 400 600 800 1000

REV	AMEND LEGEND 240523 DESCRIPTION	YYMMDD	TG DRAWN	PC APPR'D
E				

STRUCTURE PLAN (REVISED DESIGN)
North Stoneville
Shire of Mundaring

JOB CODE	DRAW NO.	REV.
SAT STO	RD1 413	E

DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

Appendix B

SIDRA INTERSECTION ASSESSMENT RESULTS

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Table 7: SIDRA Results: Roland Road/Toodyay Road intersection – AM Peak (Existing)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	99	5.3	99	5.3	0.060	9.7	LOS A	0.4	3.2	0.43	0.71	0.43	87.3
6	R2	All MCs	19	5.6	19	5.6	0.026	15.9	LOS C	0.2	1.4	0.65	0.82	0.65	59.3
Approach			118	5.4	118	5.4	0.060	10.7	LOS B	0.4	3.2	0.47	0.72	0.47	85.3
East: Toodyay Rd (E)															
7	L2	All MCs	35	12.1	35	12.1	0.021	8.2	LOS A	0.0	0.0	0.00	0.66	0.00	67.1
2	T1	All MCs	375	10.1	375	10.1	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			409	10.3	409	10.3	0.219	0.7	NA	0.0	0.0	0.00	0.06	0.00	98.7
West: Toodyay Rd (W)															
8	T1	All MCs	203	19.2	203	19.2	0.128	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
9	R2	All MCs	69	15.2	69	15.2	0.090	11.1	LOS B	0.3	2.9	0.49	0.74	0.49	85.5
Approach			273	18.1	273	18.1	0.128	2.9	NA	0.3	2.9	0.13	0.19	0.13	95.8
All Vehicles			800	12.2	800	12.2	0.219	2.9	NA	0.4	3.2	0.11	0.20	0.11	95.6

Table 8: SIDRA Results: Roland Road/Toodyay Road intersection – PM Peak (Existing)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	47	13.3	47	13.3	0.026	9.3	LOS A	0.2	1.5	0.36	0.65	0.36	85.1
6	R2	All MCs	13	16.7	13	16.7	0.036	27.4	LOS D	0.2	1.7	0.77	0.92	0.77	47.6
Approach			60	14.0	60	14.0	0.036	13.1	LOS B	0.2	1.7	0.45	0.70	0.45	80.8
East: Toodyay Rd (E)															
7	L2	All MCs	12	0.0	12	0.0	0.006	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
2	T1	All MCs	268	14.5	268	14.5	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			280	13.9	280	13.9	0.162	0.3	NA	0.0	0.0	0.00	0.03	0.00	99.5
West: Toodyay Rd (W)															
8	T1	All MCs	465	5.0	465	5.0	0.253	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
9	R2	All MCs	98	4.3	98	4.3	0.096	9.5	LOS A	0.4	2.9	0.40	0.68	0.40	88.6
Approach			563	4.9	563	4.9	0.253	1.8	NA	0.4	2.9	0.07	0.12	0.07	97.7
All Vehicles			903	8.3	903	8.3	0.253	2.1	NA	0.4	2.9	0.07	0.13	0.07	97.1

Table 9: SIDRA Results: Roland Road/Toodyay Road intersection – AM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	271	5.3	271	5.3	0.077	8.3	LOS A	0.0	0.0	0.00	0.62	0.00	82.2
6	R2	All MCs	25	5.6	25	5.6	0.041	18.1	LOS C	0.3	2.1	0.71	0.89	0.71	57.3
Approach			296	5.3	296	5.3	0.077	9.2	LOS A	0.3	2.1	0.06	0.64	0.06	81.4
East: Toodyay Rd (E)															
7	L2	All MCs	40	12.1	40	12.1	0.024	8.2	LOS A	0.0	0.0	0.00	0.66	0.00	67.1
2	T1	All MCs	409	10.1	409	10.1	0.240	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			449	10.3	449	10.3	0.240	0.8	NA	0.0	0.0	0.00	0.06	0.00	98.6
West: Toodyay Rd (W)															
8	T1	All MCs	222	19.2	222	19.2	0.140	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
9	R2	All MCs	102	15.2	102	15.2	0.140	11.8	LOS B	0.5	4.6	0.53	0.78	0.53	85.3
Approach			324	17.9	324	17.9	0.140	3.8	NA	0.5	4.6	0.17	0.25	0.17	94.8
All Vehicles			1069	11.2	1069	11.2	0.240	4.0	NA	0.5	4.6	0.07	0.28	0.07	92.1

Table 10: SIDRA Results: Roland Road/Toodyay Road intersection – PM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	131	5.3	131	5.3	0.037	8.3	LOS A	0.0	0.0	0.00	0.62	0.00	82.2
6	R2	All MCs	17	5.6	17	5.6	0.045	26.2	LOS D	0.3	2.1	0.82	0.94	0.82	50.8
Approach			147	5.3	147	5.3	0.045	10.4	LOS B	0.3	2.1	0.09	0.66	0.09	80.6
East: Toodyay Rd (E)															
7	L2	All MCs	17	12.1	17	12.1	0.010	8.2	LOS A	0.0	0.0	0.00	0.66	0.00	67.1
2	T1	All MCs	293	10.1	293	10.1	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			309	10.2	309	10.2	0.171	0.5	NA	0.0	0.0	0.00	0.04	0.00	99.2
West: Toodyay Rd (W)															
8	T1	All MCs	507	19.2	507	19.2	0.321	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
9	R2	All MCs	173	15.2	173	15.2	0.192	10.6	LOS B	0.8	6.9	0.46	0.71	0.46	85.9
Approach			680	18.2	680	18.2	0.321	2.9	NA	0.8	6.9	0.12	0.18	0.12	95.8
All Vehicles			1137	14.3	1137	14.3	0.321	3.2	NA	0.8	6.9	0.08	0.20	0.08	94.5

Table 11: SIDRA Results: Great Eastern Highway/Seaborne Street intersection – AM Peak (Existing)

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Median (S)																
5	T1	All MCs	44	3.0	44	3.0	0.077	4.8	LOS A	0.2	1.9	0.60	0.60	0.60	43.9
Approach			44	3.0	44	3.0	0.077	4.8	LOS A	0.2	1.9	0.60	0.60	0.60	43.9
North: Seaborne St (N)																
1	L2	All MCs	53	4.0	53	4.0	0.685	9.5	LOS A	2.2	17.0	0.78	1.07	1.28	46.0
2	T1	All MCs	194	6.0	194	6.0	0.685	14.0	LOS B	2.2	17.0	0.78	1.07	1.28	42.2
Approach			246	5.6	246	5.6	0.685	13.1	LOS B	2.2	17.0	0.78	1.07	1.28	43.3
West: GEH (W)																
3	L2	All MCs	104	10.5	104	10.5	0.070	7.5	LOS A	0.3	2.4	0.13	0.57	0.13	53.5
4	T1	All MCs	768	15.0	768	15.0	0.254	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach			873	14.5	873	14.5	0.254	0.9	LOS A	0.3	2.4	0.01	0.07	0.01	74.1
All Vehicles			1163	12.1	1163	12.1	0.685	3.7	NA	2.2	17.0	0.20	0.30	0.30	64.9
East: GEH (E)																
2	T1	All MCs	1065	12.9	1065	12.9	0.333	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
3	R2	All MCs	44	7.1	44	7.1	0.026	6.9	LOS A	0.0	0.0	0.00	0.64	0.00	51.0
Approach			1109	12.7	1109	12.7	0.333	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.0
North: Median (N)																
1	R2	All MCs	194	6.0	194	6.0	0.806	35.6	LOS E	3.8	29.8	0.95	1.83	2.26	25.6
Approach			194	6.0	194	6.0	0.806	35.6	LOS E	3.8	29.8	0.95	1.83	2.26	25.6
All Vehicles			1303	11.7	1303	11.7	0.806	5.6	NA	3.8	29.8	0.14	0.29	0.34	64.7

Table 12: SIDRA Results: Great Eastern Highway/Seaborne Street intersection – PM Peak (Existing)

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Median (S)																
5	T1	All MCs	29	9.1	29	9.1	0.095	10.4	LOS B	0.3	2.1	0.76	0.76	0.76	36.9
Approach			29	9.1	29	9.1	0.095	10.4	LOS B	0.3	2.1	0.76	0.76	0.76	36.9
North: Seaborne St (N)																
1	L2	All MCs	35	0.0	35	0.0	0.183	7.9	LOS A	0.6	4.5	0.68	0.86	0.68	47.7
2	T1	All MCs	56	3.9	56	3.9	0.183	14.0	LOS B	0.6	4.5	0.68	0.86	0.68	43.6
Approach			91	2.4	91	2.4	0.183	11.7	LOS B	0.6	4.5	0.68	0.86	0.68	45.5
West: GEH (W)																
3	L2	All MCs	189	3.2	189	3.2	0.121	7.4	LOS A	0.5	4.0	0.10	0.58	0.10	56.0
4	T1	All MCs	1128	6.3	1128	6.3	0.330	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
Approach			1318	5.9	1318	5.9	0.330	1.1	LOS A	0.5	4.0	0.01	0.08	0.01	73.9
All Vehicles			1438	5.7	1438	5.7	0.330	2.0	NA	0.6	4.5	0.07	0.15	0.07	70.6
East: GEH (E)																
2	T1	All MCs	823	11.6	823	11.6	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	All MCs	29	10.7	29	10.7	0.018	7.1	LOS A	0.0	0.0	0.00	0.65	0.00	51.0
Approach			853	11.6	853	11.6	0.255	0.3	NA	0.0	0.0	0.00	0.02	0.00	79.2
North: Median (N)																
1	R2	All MCs	56	5.7	56	5.7	0.140	8.6	LOS A	0.5	3.7	0.71	0.74	0.71	43.2
Approach			56	5.7	56	5.7	0.140	8.6	LOS A	0.5	3.7	0.71	0.74	0.71	43.2
All Vehicles			908	11.2	908	11.2	0.255	0.8	NA	0.5	3.7	0.04	0.07	0.04	76.5

Table 13: SIDRA Results: Great Eastern Highway/Seaborne Street intersection – AM Peak (Stage 1)

Vehicle Movement Performance																	
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Median (S)																	
5	T1	All MCs	58	3.0	58	3.0	0.113	5.8	LOS A	0.4	2.8	0.65	0.65	0.65	42.9
Approach			58	3.0	58	3.0	0.113	5.8	LOS A	0.4	2.8	0.65	0.65	0.65	42.9
North: Seaborne St (N)																	
1	L2	All MCs	87	3.8	87	3.8	0.084	7.4	LOS A	0.3	2.4	0.45	0.67	0.45	50.8
2	T1	All MCs	218	6.0	218	6.0	0.863	18.4	LOS C	13.0	101.9	0.93	1.29	2.03	37.7
Approach			305	5.4	305	5.4	0.863	15.2	LOS C	13.0	101.9	0.79	1.12	1.58	41.7
West: GEH (W)																	
3	L2	All MCs	143	10.5	143	10.5	0.097	7.6	LOS A	0.4	3.4	0.15	0.57	0.15	53.4
4	T1	All MCs	838	15.0	838	15.0	0.277	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach			981	14.3	981	14.3	0.277	1.2	LOS A	0.4	3.4	0.02	0.08	0.02	73.0
All Vehicles			1344	11.8	1344	11.8	0.863	4.5	NA	13.0	101.9	0.22	0.34	0.40	62.7
East: GEH (E)																	
2	T1	All MCs	1162	13.0	1162	13.0	0.364	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
3	R2	All MCs	58	9.1	58	9.1	0.035	7.0	LOS A	0.0	0.0	0.00	0.65	0.00	51.0
Approach			1220	12.8	1220	12.8	0.364	0.4	NA	0.0	0.0	0.00	0.03	0.00	78.9
North: Median (N)																	
1	R2	All MCs	218	3.8	218	3.8	1.069	127.4	LOS F	3.9	29.8	1.00	4.24	6.04	10.8
Approach			218	3.8	218	3.8	1.069	127.4	LOS F	3.9	29.8	1.00	4.24	6.04	10.8
All Vehicles			1438	11.4	1438	11.4	1.069	19.6	NA	3.9	29.8	0.15	0.67	0.92	46.8

Table 14: SIDRA Results: Great Eastern Highway/Seaborne Street intersection – PM Peak (Stage 1)

Vehicle Movement Performance																	
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Median (S)																	
5	T1	All MCs	57	3.0	57	3.0	0.246	16.1	LOS C	0.7	5.2	0.85	0.92	0.95	34.7
Approach			57	3.0	57	3.0	0.246	16.1	LOS C	0.7	5.2	0.85	0.92	0.95	34.7
North: Seaborne St (N)																	
1	L2	All MCs	52	3.8	52	3.8	0.066	8.7	LOS A	0.2	1.7	0.54	0.75	0.54	49.6
2	T1	All MCs	64	6.0	64	6.0	0.264	20.8	LOS C	0.8	6.2	0.86	0.97	0.97	35.9
Approach			116	5.0	116	5.0	0.264	15.4	LOS C	0.8	6.2	0.72	0.87	0.78	42.3
West: GEH (W)																	
3	L2	All MCs	282	10.5	282	10.5	0.191	7.6	LOS A	0.9	7.2	0.16	0.57	0.16	53.4
4	T1	All MCs	1231	15.0	1231	15.0	0.407	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.6
Approach			1513	14.2	1513	14.2	0.407	1.5	LOS A	0.9	7.2	0.03	0.11	0.03	71.2
All Vehicles			1685	13.2	1685	13.2	0.407	3.0	NA	0.9	7.2	0.11	0.19	0.11	66.9
East: GEH (E)																	
2	T1	All MCs	898	13.0	898	13.0	0.281	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	All MCs	57	9.1	57	9.1	0.035	7.0	LOS A	0.0	0.0	0.00	0.65	0.00	51.0
Approach			955	12.7	955	12.7	0.281	0.4	NA	0.0	0.0	0.00	0.04	0.00	78.8
North: Median (N)																	
1	R2	All MCs	64	3.8	64	3.8	0.181	10.1	LOS B	0.6	4.7	0.76	0.79	0.77	42.4
Approach			64	3.8	64	3.8	0.181	10.1	LOS B	0.6	4.7	0.76	0.79	0.77	42.4
All Vehicles			1019	12.2	1019	12.2	0.281	1.1	NA	0.6	4.7	0.05	0.09	0.05	75.9

Table 15: SIDRA Results: Great Eastern Highway/Seaborne Street intersection – AM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Median (S)															
5	T1	All MCs	69	3.0	69	3.0	0.106	4.0	LOS A	0.4	2.7	0.56	0.54	0.56	44.7
Approach			69	3.0	69	3.0	0.106	4.0	LOS A	0.4	2.7	0.56	0.54	0.56	44.7
North: Seaborne St (N)															
1	L2	All MCs	125	3.8	125	3.8	0.110	7.0	LOS A	0.4	3.2	0.41	0.65	0.41	50.9
2	T1	All MCs	300	6.0	300	6.0	0.973	26.9	LOS D	6.1	47.7	0.98	1.89	3.85	32.1
Approach			425	5.4	425	5.4	0.973	21.0	LOS C	6.1	47.7	0.81	1.52	2.83	37.4
West: GEH (W)															
3	L2	All MCs	154	10.5	154	10.5	0.105	7.6	LOS A	0.4	3.7	0.17	0.57	0.17	53.4
4	T1	All MCs	679	15.0	679	15.0	0.225	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach			833	14.2	833	14.2	0.225	1.4	LOS A	0.4	3.7	0.03	0.11	0.03	71.5
All Vehicles			1327	10.8	1327	10.8	0.973	7.9	NA	6.1	47.7	0.31	0.58	0.96	56.2
East: GEH (E)															
2	T1	All MCs	938	13.0	938	13.0	0.294	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	All MCs	69	9.1	69	9.1	0.042	7.0	LOS A	0.0	0.0	0.00	0.65	0.00	51.0
Approach			1007	12.7	1007	12.7	0.294	0.5	NA	0.0	0.0	0.00	0.04	0.00	78.6
North: Median (N)															
1	R2	All MCs	300	3.8	300	3.8	0.914	40.6	LOS E	3.9	29.8	0.97	2.74	3.52	24.1
Approach			300	3.8	300	3.8	0.914	40.6	LOS E	3.9	29.8	0.97	2.74	3.52	24.1
All Vehicles			1307	10.6	1307	10.6	0.914	9.7	NA	3.9	29.8	0.22	0.66	0.81	56.7

Table 16: SIDRA Results: Great Eastern Highway/Seaborne Street intersection – PM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Median (S)															
5	T1	All MCs	86	3.0	86	3.0	0.223	9.0	LOS A	0.7	5.5	0.75	0.80	0.82	39.9
Approach			86	3.0	86	3.0	0.223	9.0	LOS A	0.7	5.5	0.75	0.80	0.82	39.9
North: Seaborne St (N)															
1	L2	All MCs	69	3.8	69	3.8	0.074	7.8	LOS A	0.3	2.0	0.49	0.70	0.49	50.4
2	T1	All MCs	73	6.0	73	6.0	0.234	18.2	LOS C	0.8	6.4	0.83	0.95	0.91	37.8
Approach			142	4.9	142	4.9	0.234	13.1	LOS B	0.8	6.4	0.66	0.83	0.70	44.3
West: GEH (W)															
3	L2	All MCs	321	10.5	321	10.5	0.224	7.7	LOS A	1.1	8.7	0.21	0.57	0.21	53.2
4	T1	All MCs	993	15.0	993	15.0	0.329	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
Approach			1314	13.9	1314	13.9	0.329	2.0	LOS A	1.1	8.7	0.05	0.14	0.05	69.1
All Vehicles			1542	12.5	1542	12.5	0.329	3.4	NA	1.1	8.7	0.15	0.24	0.16	64.5
East: GEH (E)															
2	T1	All MCs	726	13.0	726	13.0	0.227	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	All MCs	86	9.1	86	9.1	0.052	7.0	LOS A	0.0	0.0	0.00	0.65	0.00	51.0
Approach			813	12.5	813	12.5	0.227	0.8	NA	0.0	0.0	0.00	0.07	0.00	78.0
North: Median (N)															
1	R2	All MCs	73	3.8	73	3.8	0.106	4.6	LOS A	0.4	3.1	0.60	0.63	0.60	49.0
Approach			73	3.8	73	3.8	0.106	4.6	LOS A	0.4	3.1	0.60	0.63	0.60	49.0
All Vehicles			885	11.8	885	11.8	0.227	1.1	NA	0.4	3.1	0.05	0.11	0.05	75.3

Table 17: SIDRA Results: Great Eastern Highway/Stoneville Road/Mundaring Weir Road intersection – AM Peak (Existing)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mundaring Weir Rd (S)															
1	L2	All MCs	48	10.9	48	10.9	0.114	23.0	LOS C	1.2	9.6	0.78	0.71	0.78	40.6
2	T1	All MCs	120	10.5	120	10.5	*0.605	34.5	LOS C	4.2	35.1	1.00	0.81	1.06	38.4
3	R2	All MCs	92	5.7	92	5.7	0.458	39.0	LOS D	3.1	24.4	0.98	0.77	0.98	35.1
Approach			260	8.9	260	8.9	0.605	34.0	LOS C	4.2	35.1	0.95	0.78	0.98	37.6
East: GEH (E)															
4	L2	All MCs	103	6.1	103	6.1	0.771	33.1	LOS C	12.8	124.7	0.96	0.93	1.10	38.5
5	T1	All MCs	621	18.7	621	18.7	*0.771	27.6	LOS C	12.8	128.8	0.96	0.93	1.11	41.0
6	R2	All MCs	25	5.3	25	5.3	0.126	37.2	LOS D	0.8	6.3	0.93	0.71	0.93	35.7
Approach			749	16.5	749	16.5	0.771	28.7	LOS C	12.8	128.8	0.96	0.93	1.10	40.5
North: Stoneville Rd (N)															
7	L2	All MCs	28	0.0	28	0.0	0.426	32.0	LOS C	5.3	39.6	0.91	0.75	0.91	40.3
8	T1	All MCs	144	2.6	144	2.6	0.426	26.4	LOS C	5.3	39.6	0.91	0.75	0.91	41.5
9	R2	All MCs	291	2.9	291	2.9	*0.758	37.0	LOS D	10.3	78.3	0.99	0.91	1.14	36.2
Approach			463	2.7	463	2.7	0.758	33.4	LOS C	10.3	78.3	0.96	0.85	1.06	38.0
West: GEH (W)															
10	L2	All MCs	52	8.2	52	8.2	0.144	30.4	LOS C	1.5	11.9	0.85	0.73	0.85	37.7
11	T1	All MCs	435	24.0	435	24.0	0.738	31.7	LOS C	7.8	85.7	0.99	0.92	1.15	39.5
12	R2	All MCs	16	13.3	16	13.3	*0.113	39.9	LOS D	0.5	4.5	0.95	0.69	0.95	33.9
Approach			502	22.0	502	22.0	0.738	31.9	LOS C	7.8	85.7	0.97	0.89	1.12	39.1
All Vehicles			1975	13.7	1975	13.7	0.771	31.3	LOS C	12.8	128.8	0.96	0.88	1.08	39.1

Table 18: SIDRA Results: Great Eastern Highway/Stoneville Road/Mundaring Weir Road intersection – PM Peak (Existing)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mundaring Weir Rd (S)															
1	L2	All MCs	75	4.2	75	4.2	0.177	22.9	LOS C	1.7	12.8	0.84	0.72	0.84	41.8
2	T1	All MCs	182	3.2	182	3.2	*0.723	30.4	LOS C	5.7	43.3	1.00	0.89	1.19	40.2
3	R2	All MCs	121	6.0	121	6.0	0.526	33.7	LOS C	3.5	28.0	0.98	0.78	0.98	36.9
Approach			378	4.3	378	4.3	0.723	30.0	LOS C	5.7	43.3	0.96	0.82	1.05	39.4
East: GEH (E)															
4	L2	All MCs	59	3.6	59	3.6	0.830	36.2	LOS D	10.2	96.5	1.00	1.03	1.32	37.9
5	T1	All MCs	545	14.2	545	14.2	0.830	30.6	LOS C	10.2	98.5	1.00	1.03	1.32	39.8
6	R2	All MCs	51	2.2	51	2.2	*0.285	34.7	LOS C	1.5	11.4	0.96	0.74	0.96	37.0
Approach			655	12.3	655	12.3	0.830	31.5	LOS C	10.2	98.5	1.00	1.01	1.29	39.4
North: Stoneville Rd (N)															
7	L2	All MCs	76	1.3	76	1.3	0.704	34.6	LOS C	6.1	45.5	1.00	0.88	1.15	38.5
8	T1	All MCs	124	0.8	124	0.8	0.704	29.0	LOS C	6.1	45.5	1.00	0.88	1.15	39.8
9	R2	All MCs	216	2.7	216	2.7	*0.801	37.5	LOS D	7.1	53.6	1.00	0.97	1.30	36.1
Approach			416	1.9	416	1.9	0.801	34.4	LOS C	7.1	53.6	1.00	0.92	1.23	37.6
West: GEH (W)															
10	L2	All MCs	80	1.3	80	1.3	0.202	27.1	LOS C	2.0	14.8	0.86	0.75	0.86	40.1
11	T1	All MCs	642	9.9	642	9.9	*0.896	37.0	LOS D	11.9	107.6	1.00	1.15	1.51	37.4
12	R2	All MCs	24	0.0	24	0.0	0.071	28.1	LOS C	0.6	4.4	0.86	0.69	0.86	40.1
Approach			746	8.7	746	8.7	0.896	35.7	LOS D	11.9	107.6	0.98	1.09	1.42	37.8
All Vehicles			2195	7.7	2195	7.7	0.896	33.2	LOS C	11.9	107.6	0.99	0.99	1.28	38.5

Table 19: SIDRA Results: Great Eastern Highway/Stoneville Road/Mundaring Weir Road intersection – AM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mundaring Weir Rd (S)															
1	L2	All MCs	54	10.9	54	10.9	0.142	25.6	LOS C	1.4	11.6	0.83	0.72	0.83	39.5
2	T1	All MCs	132	10.5	132	10.5	*0.663	35.3	LOS D	4.7	39.1	1.00	0.85	1.12	38.1
3	R2	All MCs	100	5.7	100	5.7	0.500	39.2	LOS D	3.4	26.8	0.98	0.77	0.98	35.0
Approach			285	8.9	285	8.9	0.663	34.8	LOS C	4.7	39.1	0.96	0.80	1.02	37.2
East: GEH (E)															
4	L2	All MCs	113	6.1	113	6.1	0.842	37.9	LOS D	15.5	150.6	1.00	1.04	1.25	36.7
5	T1	All MCs	678	18.7	678	18.7	*0.842	32.5	LOS C	15.5	155.6	0.99	1.04	1.26	38.9
6	R2	All MCs	28	5.3	28	5.3	0.141	37.3	LOS D	0.9	7.1	0.93	0.71	0.93	35.6
Approach			819	16.5	819	16.5	0.842	33.4	LOS C	15.5	155.6	0.99	1.03	1.24	38.5
North: Stoneville Rd (N)															
7	L2	All MCs	32	0.0	32	0.0	0.467	32.3	LOS C	5.8	43.9	0.92	0.76	0.92	40.2
8	T1	All MCs	158	2.6	158	2.6	0.467	26.7	LOS C	5.8	43.9	0.92	0.76	0.92	41.4
9	R2	All MCs	317	2.9	317	2.9	*0.827	40.3	LOS D	12.0	91.2	1.00	0.98	1.26	35.1
Approach			506	2.6	506	2.6	0.827	35.6	LOS D	12.0	91.2	0.97	0.90	1.13	37.2
West: GEH (W)															
10	L2	All MCs	57	8.2	57	8.2	0.158	30.5	LOS C	1.6	13.2	0.85	0.74	0.85	37.6
11	T1	All MCs	475	24.0	475	24.0	0.806	34.8	LOS C	9.0	99.5	1.00	1.00	1.27	38.3
12	R2	All MCs	18	13.3	18	13.3	*0.129	40.0	LOS D	0.6	5.1	0.95	0.69	0.95	33.9
Approach			549	22.0	549	22.0	0.806	34.5	LOS C	9.0	99.5	0.98	0.97	1.22	38.0
All Vehicles			2160	13.6	2160	13.6	0.842	34.4	LOS C	15.5	155.6	0.98	0.95	1.18	37.9

Table 20: SIDRA Results: Great Eastern Highway/Stoneville Road/Mundaring Weir Road intersection – PM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mundaring Weir Rd (S)															
1	L2	All MCs	82	4.2	82	4.2	0.092	12.5	LOS B	1.2	9.3	0.53	0.67	0.53	47.3
2	T1	All MCs	199	3.2	199	3.2	*0.819	38.2	LOS D	7.6	57.8	1.00	0.98	1.32	37.1
3	R2	All MCs	133	6.0	133	6.0	0.597	39.1	LOS D	4.6	36.3	0.99	0.81	1.04	35.0
Approach			414	4.3	414	4.3	0.819	33.4	LOS C	7.6	57.8	0.90	0.86	1.07	38.0
East: GEH (E)															
4	L2	All MCs	65	3.6	65	3.6	0.779	35.5	LOS D	11.9	112.0	0.98	0.95	1.15	38.2
5	T1	All MCs	595	14.2	595	14.2	0.779	29.9	LOS C	11.9	114.4	0.98	0.95	1.15	40.1
6	R2	All MCs	56	2.2	56	2.2	*0.367	40.8	LOS D	1.9	14.9	0.98	0.74	0.98	34.9
Approach			716	12.3	716	12.3	0.779	31.3	LOS C	11.9	114.4	0.98	0.93	1.14	39.4
North: Stoneville Rd (N)															
7	L2	All MCs	83	1.3	83	1.3	0.674	37.0	LOS D	7.5	55.7	0.99	0.85	1.07	37.5
8	T1	All MCs	136	0.8	136	0.8	0.674	31.5	LOS C	7.5	55.7	0.99	0.85	1.07	38.8
9	R2	All MCs	236	2.7	236	2.7	*0.766	39.6	LOS D	8.6	64.9	1.00	0.92	1.19	35.4
Approach			455	1.9	455	1.9	0.766	36.7	LOS D	8.6	64.9	0.99	0.89	1.13	36.7
West: GEH (W)															
10	L2	All MCs	87	1.3	87	1.3	0.176	27.0	LOS C	2.3	17.3	0.80	0.74	0.80	40.2
11	T1	All MCs	700	9.9	700	9.9	*0.780	29.7	LOS C	12.4	111.8	0.98	0.94	1.14	40.4
12	R2	All MCs	27	0.0	27	0.0	0.172	39.7	LOS D	0.9	6.8	0.96	0.71	0.96	35.6
Approach			815	8.7	815	8.7	0.780	29.7	LOS C	12.4	111.8	0.96	0.91	1.10	40.2
All Vehicles			2399	7.7	2399	7.7	0.819	32.1	LOS C	12.4	114.4	0.96	0.91	1.11	38.9

Table 21: SIDRA Results: Great Eastern Highway/Stoneville Road/Mundaring Weir Road intersection – AM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mundaring weir Rd (S)															
10	L2	All MCs	59	9.6	59	9.6	0.040	18.5	LOS B	1.6	13.1	0.55	0.64	0.55	40.0
2	T1	All MCs	146	8.9	146	8.9	*0.273	48.3	LOS D	7.5	61.4	0.93	0.73	0.93	31.7
6	R2	All MCs	109	6.0	109	6.0	0.213	52.4	LOS D	5.6	43.6	0.92	0.75	0.92	29.6
Approach			315	8.0	315	8.0	0.273	44.2	LOS D	7.5	61.4	0.86	0.72	0.86	32.1
East: GEH (E)															
7	L2	All MCs	123	6.1	123	6.1	0.888	66.8	LOS E	23.9	228.6	1.00	1.04	1.24	28.5
2	T1	All MCs	575	18.7	575	18.7	*0.888	64.9	LOS E	23.9	234.3	1.00	1.07	1.24	30.4
6	R2	All MCs	36	5.3	36	5.3	0.406	78.1	LOS E	2.2	16.9	1.00	0.73	1.00	27.2
Approach			734	15.9	734	15.9	0.888	65.8	LOS E	23.9	234.3	1.00	1.05	1.23	28.9
North: Sroneville Rd (N)															
7	L2	All MCs	54	0.0	54	0.0	*0.185	17.7	LOS B	3.1	23.0	0.76	0.70	0.76	42.1
8	T1	All MCs	179	2.6	179	2.6	*0.861	44.3	LOS D	29.2	221.8	0.92	0.88	1.02	32.9
9	R2	All MCs	353	2.9	353	2.9	0.861	55.7	LOS E	29.2	221.8	1.00	0.97	1.14	30.9
Approach			585	2.6	585	2.6	0.861	48.7	LOS D	29.2	221.8	0.95	0.92	1.07	32.3
West: GEH (W)															
10	L2	All MCs	64	6.9	64	6.9	0.060	14.8	LOS B	1.4	11.4	0.41	0.66	0.41	45.1
8	T1	All MCs	389	23.8	389	23.8	0.547	42.1	LOS D	10.0	110.4	0.92	0.77	0.92	35.6
9	R2	All MCs	22	6.9	22	6.9	0.254	70.6	LOS E	1.3	10.5	0.99	0.71	0.99	27.9
Approach			476	20.7	476	20.7	0.547	39.8	LOS D	10.0	110.4	0.85	0.75	0.85	36.1
All Vehicles			2109	12.1	2109	12.1	0.888	52.0	LOS D	29.2	234.3	0.93	0.90	1.04	31.7

Table 22: SIDRA Results: Great Eastern Highway/Stoneville Road/Mundaring Weir Road intersection – PM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mundaring weir Rd (S)															
10	L2	All MCs	92	9.6	92	9.6	0.054	13.2	LOS B	1.8	14.6	0.50	0.63	0.50	42.5
2	T1	All MCs	223	8.9	223	8.9	*0.368	39.5	LOS D	9.6	78.3	0.93	0.75	0.93	34.3
6	R2	All MCs	145	6.0	145	6.0	0.249	43.1	LOS D	6.1	47.8	0.91	0.76	0.91	31.9
Approach			460	8.1	460	8.1	0.368	35.4	LOS D	9.6	78.3	0.84	0.73	0.84	34.8
East: GEH (E)															
7	L2	All MCs	72	6.1	72	6.1	0.854	56.7	LOS E	16.5	162.0	1.00	1.03	1.24	31.0
2	T1	All MCs	525	18.7	525	18.7	*0.854	49.4	LOS D	16.5	166.4	1.00	1.04	1.24	33.2
6	R2	All MCs	76	5.3	76	5.3	*0.716	61.1	LOS E	4.0	31.2	1.00	0.85	1.20	29.0
Approach			673	15.8	673	15.8	0.854	51.5	LOS D	16.5	166.4	1.00	1.02	1.24	32.5
North: Sroneville Rd (N)															
7	L2	All MCs	100	0.0	100	0.0	0.185	18.1	LOS B	2.1	15.4	0.76	0.73	0.76	44.2
8	T1	All MCs	152	2.6	152	2.6	*0.864	47.4	LOS D	21.7	164.6	0.99	0.99	1.18	31.6
9	R2	All MCs	261	2.9	261	2.9	0.864	52.7	LOS D	21.7	164.6	1.00	1.01	1.21	31.8
Approach			513	2.3	513	2.3	0.864	44.4	LOS D	21.7	164.6	0.95	0.95	1.11	33.6
West: GEH (W)															
10	L2	All MCs	101	6.9	101	6.9	0.106	18.5	LOS B	2.3	18.2	0.49	0.69	0.49	44.2
8	T1	All MCs	517	23.8	517	23.8	0.830	50.3	LOS D	13.9	153.2	1.00	1.01	1.22	33.7
9	R2	All MCs	32	6.9	32	6.9	0.303	62.3	LOS E	1.6	12.5	0.99	0.72	0.99	30.5
Approach			649	20.3	649	20.3	0.830	46.0	LOS D	13.9	153.2	0.92	0.95	1.10	34.0
All Vehicles			2295	12.5	2295	12.5	0.864	45.1	LOS D	21.7	166.4	0.93	0.92	1.09	33.6

Table 23: SIDRA Results: Roland Road/Richardson Road intersection – AM Peak (Existing)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Richardson Rd (E)															
8	T1	All MCs	122	3.4	122	3.4	0.133	0.6	LOS A	0.6	4.5	0.30	0.35	0.30	58.2
9	R2	All MCs	88	9.5	88	9.5	0.133	5.7	LOS A	0.6	4.5	0.30	0.35	0.30	53.1
Approach			211	6.0	211	6.0	0.133	2.7	NA	0.6	4.5	0.30	0.35	0.30	55.9
North: Roland Rd (N)															
10	L2	All MCs	56	9.4	56	9.4	0.146	7.9	LOS A	1.0	8.2	0.28	0.63	0.28	53.8
6	R2	All MCs	226	5.6	226	5.6	0.146	9.0	LOS A	1.0	8.2	0.28	0.63	0.28	65.0
Approach			282	6.3	282	6.3	0.146	8.8	LOS A	1.0	8.2	0.28	0.63	0.28	62.4
West: Byfield Rd (W)															
7	L2	All MCs	194	6.0	194	6.0	0.134	7.6	LOS A	0.0	0.0	0.00	0.62	0.00	67.4
2	T1	All MCs	44	0.0	44	0.0	0.134	4.0	LOS A	0.0	0.0	0.00	0.62	0.00	74.1
Approach			238	4.9	238	4.9	0.134	6.9	NA	0.0	0.0	0.00	0.62	0.00	68.5
All Vehicles			731	5.8	731	5.8	0.146	6.4	NA	1.0	8.2	0.19	0.55	0.19	62.2

Table 24: SIDRA Results: Roland Road/Richardson Road intersection – PM Peak (Existing)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Richardson Rd (E)															
8	T1	All MCs	47	4.4	47	4.4	0.050	0.4	LOS A	0.2	1.5	0.24	0.30	0.24	58.1
9	R2	All MCs	36	2.9	36	2.9	0.050	5.2	LOS A	0.2	1.5	0.24	0.30	0.24	55.5
Approach			83	3.8	83	3.8	0.050	2.5	NA	0.2	1.5	0.24	0.30	0.24	56.9
North: Roland Rd (N)															
10	L2	All MCs	28	0.0	28	0.0	0.061	7.8	LOS A	0.4	3.0	0.27	0.63	0.27	54.8
6	R2	All MCs	106	0.0	106	0.0	0.061	8.0	LOS A	0.4	3.0	0.27	0.63	0.27	68.5
Approach			135	0.0	135	0.0	0.061	7.9	LOS A	0.4	3.0	0.27	0.63	0.27	65.1
West: Byfield Rd (W)															
7	L2	All MCs	74	4.3	74	4.3	0.103	7.6	LOS A	0.0	0.0	0.00	0.55	0.00	70.1
2	T1	All MCs	116	3.6	116	3.6	0.103	4.0	LOS A	0.0	0.0	0.00	0.55	0.00	75.0
Approach			189	3.9	189	3.9	0.103	5.4	NA	0.0	0.0	0.00	0.55	0.00	73.1
All Vehicles			407	2.6	407	2.6	0.103	5.6	NA	0.4	3.0	0.14	0.53	0.14	66.5

Table 25: SIDRA Results: Roland Road/Richardson Road intersection – AM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Richardson Rd (E)															
8	T1	All MCs	134	3.4	134	3.4	0.165	1.0	LOS A	0.8	6.1	0.37	0.42	0.37	57.8
9	R2	All MCs	114	9.5	114	9.5	0.165	6.0	LOS A	0.8	6.1	0.37	0.42	0.37	52.8
Approach			247	6.2	247	6.2	0.165	3.3	NA	0.8	6.1	0.37	0.42	0.37	55.4
North: Roland Rd (N)															
10	L2	All MCs	112	9.4	112	9.4	0.209	7.9	LOS A	1.6	12.6	0.29	0.63	0.29	53.6
6	R2	All MCs	283	5.6	283	5.6	0.209	9.6	LOS A	1.6	12.6	0.29	0.63	0.29	64.6
Approach			395	6.7	395	6.7	0.209	9.2	LOS A	1.6	12.6	0.29	0.63	0.29	61.0
West: Byfield Rd (W)															
7	L2	All MCs	251	6.0	251	6.0	0.169	7.6	LOS A	0.0	0.0	0.00	0.62	0.00	67.2
2	T1	All MCs	48	0.0	48	0.0	0.169	4.0	LOS A	0.0	0.0	0.00	0.62	0.00	74.0
Approach			299	5.0	299	5.0	0.169	7.0	NA	0.0	0.0	0.00	0.62	0.00	68.2
All Vehicles			941	6.0	941	6.0	0.209	6.9	NA	1.6	12.6	0.22	0.57	0.22	61.4

Table 26: SIDRA Results: Roland Road/Richardson Road intersection – PM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Richardson Rd (E)															
8	T1	All MCs	53	3.4	53	3.4	0.095	1.1	LOS A	0.5	3.6	0.39	0.47	0.39	57.1
9	R2	All MCs	82	9.5	82	9.5	0.095	5.9	LOS A	0.5	3.6	0.39	0.47	0.39	52.2
Approach			135	7.2	135	7.2	0.095	4.0	NA	0.5	3.6	0.39	0.47	0.39	54.0
North: Roland Rd (N)															
10	L2	All MCs	61	9.4	61	9.4	0.097	8.2	LOS A	0.7	5.3	0.32	0.65	0.32	54.0
6	R2	All MCs	134	5.6	134	5.6	0.097	8.9	LOS A	0.7	5.3	0.32	0.65	0.32	65.1
Approach			195	6.8	195	6.8	0.097	8.7	LOS A	0.7	5.3	0.32	0.65	0.32	61.2
West: Byfield Rd (W)															
7	L2	All MCs	180	6.0	180	6.0	0.168	7.6	LOS A	0.0	0.0	0.00	0.59	0.00	68.3
2	T1	All MCs	126	0.0	126	0.0	0.168	4.0	LOS A	0.0	0.0	0.00	0.59	0.00	75.4
Approach			306	3.5	306	3.5	0.168	6.1	NA	0.0	0.0	0.00	0.59	0.00	71.1
All Vehicles			636	5.3	636	5.3	0.168	6.5	NA	0.7	5.3	0.18	0.58	0.18	63.7

Table 27: SIDRA Results: Roland Road/Fringeleaf Road/Northern LSP Access intersection – AM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	1	2.0	1	2.0	0.072	6.2	LOS A	0.0	0.0	0.00	0.56	0.00	69.8
2	T1	All MCs	264	7.0	264	7.0	0.072	7.5	LOS A	0.0	0.0	0.00	0.56	0.00	68.4
6	R2	All MCs	5	2.0	5	2.0	0.072	11.3	LOS B	0.0	0.0	0.00	0.56	0.00	69.2
Approach			271	6.9	271	6.9	0.072	7.5	LOS A	0.0	0.0	0.00	0.56	0.00	68.4
East: Access 3 (E)															
7	L2	All MCs	11	2.0	11	2.0	0.069	3.7	LOS A	0.4	2.8	0.38	0.57	0.38	52.6
2	T1	All MCs	5	2.0	5	2.0	0.069	3.6	LOS A	0.4	2.8	0.38	0.57	0.38	44.9
6	R2	All MCs	63	2.0	63	2.0	0.069	8.4	LOS A	0.4	2.8	0.38	0.57	0.38	52.1
Approach			79	2.0	79	2.0	0.069	7.4	LOS A	0.4	2.8	0.38	0.57	0.38	51.6
North: Roland Rd (N)															
7	L2	All MCs	14	2.0	14	2.0	0.125	6.2	LOS A	0.6	5.1	0.05	0.53	0.05	56.6
8	T1	All MCs	177	7.0	177	7.0	0.125	7.0	LOS A	0.6	5.1	0.05	0.53	0.05	68.9
9	R2	All MCs	3	2.0	3	2.0	0.125	11.5	LOS B	0.6	5.1	0.05	0.53	0.05	56.1
Approach			194	6.6	194	6.6	0.125	7.0	LOS A	0.6	5.1	0.05	0.53	0.05	67.6
West: New Road (W)															
10	L2	All MCs	14	2.0	14	2.0	0.018	5.0	LOS A	0.1	0.6	0.45	0.51	0.45	54.5
8	T1	All MCs	1	2.0	1	2.0	0.018	4.8	LOS A	0.1	0.6	0.45	0.51	0.45	46.2
9	R2	All MCs	1	2.0	1	2.0	0.018	9.1	LOS A	0.1	0.6	0.45	0.51	0.45	54.2
Approach			16	2.0	16	2.0	0.018	5.3	LOS A	0.1	0.6	0.45	0.51	0.45	53.9
All Vehicles			559	5.9	559	5.9	0.125	7.3	LOS A	0.6	5.1	0.09	0.55	0.09	64.7

Table 28: SIDRA Results: Roland Road/Fringeleaf Road/Northern LSP Access intersection – PM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	1	2.0	1	2.0	0.046	6.2	LOS A	0.0	0.0	0.00	0.58	0.00	69.4
2	T1	All MCs	156	7.0	156	7.0	0.046	7.4	LOS A	0.0	0.0	0.00	0.58	0.00	68.0
6	R2	All MCs	17	2.0	17	2.0	0.046	11.3	LOS B	0.0	0.0	0.00	0.58	0.00	68.8
Approach			174	6.5	174	6.5	0.046	7.8	LOS A	0.0	0.0	0.00	0.58	0.00	68.1
East: Access 3 (E)															
7	L2	All MCs	3	2.0	3	2.0	0.030	3.7	LOS A	0.2	1.2	0.39	0.56	0.39	52.4
2	T1	All MCs	2	2.0	2	2.0	0.030	3.6	LOS A	0.2	1.2	0.39	0.56	0.39	44.8
6	R2	All MCs	28	2.0	28	2.0	0.030	8.4	LOS A	0.2	1.2	0.39	0.56	0.39	51.9
Approach			34	2.0	34	2.0	0.030	7.7	LOS A	0.2	1.2	0.39	0.56	0.39	51.5
North: Roland Rd (N)															
7	L2	All MCs	44	2.0	44	2.0	0.164	6.3	LOS A	0.9	6.7	0.11	0.53	0.11	56.3
8	T1	All MCs	184	7.0	184	7.0	0.164	7.1	LOS A	0.9	6.7	0.11	0.53	0.11	68.5
9	R2	All MCs	11	2.0	11	2.0	0.164	11.6	LOS B	0.9	6.7	0.11	0.53	0.11	55.8
Approach			239	5.9	239	5.9	0.164	7.2	LOS A	0.9	6.7	0.11	0.53	0.11	65.2
West: Fingerleaf Dr (W)															
10	L2	All MCs	6	2.0	6	2.0	0.012	4.2	LOS A	0.1	0.4	0.35	0.44	0.35	54.7
8	T1	All MCs	4	2.0	4	2.0	0.012	4.0	LOS A	0.1	0.4	0.35	0.44	0.35	46.4
9	R2	All MCs	1	2.0	1	2.0	0.012	8.4	LOS A	0.1	0.4	0.35	0.44	0.35	54.4
Approach			12	2.0	12	2.0	0.012	4.5	LOS A	0.1	0.4	0.35	0.44	0.35	51.3
All Vehicles			458	5.7	458	5.7	0.164	7.4	LOS A	0.9	6.7	0.09	0.55	0.09	64.5

Table 29: SIDRA Results: Roland Road/Central LSP Access intersection – AM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
2	T1	All MCs	213	7.0	213	7.0	0.066	0.1	LOS A	0.2	1.5	0.07	0.10	0.07	87.4
6	R2	All MCs	28	2.0	28	2.0	0.066	7.7	LOS A	0.2	1.5	0.07	0.10	0.07	60.7
Approach			241	6.4	241	6.4	0.066	1.0	NA	0.2	1.5	0.07	0.10	0.07	83.1
East: Access 2 (E)															
7	L2	All MCs	43	2.0	43	2.0	0.125	5.0	LOS A	0.4	3.4	0.33	0.58	0.33	53.6
6	R2	All MCs	83	2.0	83	2.0	0.125	6.4	LOS A	0.4	3.4	0.33	0.58	0.33	53.5
Approach			126	2.0	126	2.0	0.125	5.9	LOS A	0.4	3.4	0.33	0.58	0.33	53.5
North: Roland Rd (N)															
7	L2	All MCs	15	2.0	15	2.0	0.076	7.5	LOS A	0.0	0.0	0.00	0.07	0.00	78.3
8	T1	All MCs	127	7.0	127	7.0	0.076	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	88.2
Approach			142	6.5	142	6.5	0.076	0.8	NA	0.0	0.0	0.00	0.07	0.00	87.1
All Vehicles			509	5.3	509	5.3	0.125	2.2	NA	0.4	3.4	0.12	0.21	0.12	73.9

Table 30: SIDRA Results: Roland Road/Central LSP Access intersection – PM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
2	T1	All MCs	107	7.0	107	7.0	0.053	0.4	LOS A	0.4	3.2	0.23	0.31	0.23	82.0
6	R2	All MCs	71	2.0	71	2.0	0.053	7.8	LOS A	0.4	3.2	0.23	0.31	0.23	58.1
Approach			178	5.0	178	5.0	0.053	3.3	NA	0.4	3.2	0.23	0.31	0.23	70.5
East: Access 2 (E)															
7	L2	All MCs	23	2.0	23	2.0	0.061	5.1	LOS A	0.2	1.6	0.32	0.57	0.32	53.7
6	R2	All MCs	40	2.0	40	2.0	0.061	6.1	LOS A	0.2	1.6	0.32	0.57	0.32	53.6
Approach			63	2.0	63	2.0	0.061	5.7	LOS A	0.2	1.6	0.32	0.57	0.32	53.6
North: Roland Rd (N)															
7	L2	All MCs	35	2.0	35	2.0	0.101	7.5	LOS A	0.0	0.0	0.00	0.12	0.00	77.3
8	T1	All MCs	155	7.0	155	7.0	0.101	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	86.9
Approach			189	6.1	189	6.1	0.101	1.4	NA	0.0	0.0	0.00	0.12	0.00	85.0
All Vehicles			431	5.0	431	5.0	0.101	2.8	NA	0.4	3.2	0.14	0.27	0.14	72.6

Table 31: SIDRA Results: Roland Road/Central LSP Access intersection – AM Peak (Stage 2)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
2	T1	All MCs	219	7.0	219	7.0	0.065	0.1	LOS A	0.1	1.1	0.06	0.08	0.06	88.0
6	R2	All MCs	20	2.0	20	2.0	0.065	7.9	LOS A	0.1	1.1	0.06	0.08	0.06	61.0
Approach			239	6.6	239	6.6	0.065	0.7	NA	0.1	1.1	0.06	0.08	0.06	84.8
East: Access 2 (E)															
7	L2	All MCs	38	2.0	38	2.0	0.167	5.2	LOS A	0.6	4.6	0.40	0.63	0.40	53.3
6	R2	All MCs	117	2.0	117	2.0	0.167	6.7	LOS A	0.6	4.6	0.40	0.63	0.40	53.1
Approach			155	2.0	155	2.0	0.167	6.4	LOS A	0.6	4.6	0.40	0.63	0.40	53.2
North: Roland Rd (N)															
7	L2	All MCs	19	2.0	19	2.0	0.102	7.5	LOS A	0.0	0.0	0.00	0.07	0.00	78.4
8	T1	All MCs	173	7.0	173	7.0	0.102	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	88.3
Approach			192	6.5	192	6.5	0.102	0.8	NA	0.0	0.0	0.00	0.07	0.00	87.2
All Vehicles			585	5.3	585	5.3	0.167	2.2	NA	0.6	4.6	0.13	0.22	0.13	73.8

Table 32: SIDRA Results: Roland Road/Central LSP Access intersection – PM Peak (Stage 2)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
2	T1	All MCs	134	7.0	134	7.0	0.059	0.4	LOS A	0.4	3.2	0.23	0.29	0.23	82.9
6	R2	All MCs	64	2.0	64	2.0	0.059	8.1	LOS A	0.4	3.2	0.23	0.29	0.23	58.5
Approach			198	5.4	198	5.4	0.059	2.9	NA	0.4	3.2	0.23	0.29	0.23	73.0
East: Access 2 (E)															
7	L2	All MCs	17	2.0	17	2.0	0.073	5.2	LOS A	0.2	1.9	0.37	0.61	0.37	53.4
6	R2	All MCs	52	2.0	52	2.0	0.073	6.4	LOS A	0.2	1.9	0.37	0.61	0.37	53.3
Approach			68	2.0	68	2.0	0.073	6.1	LOS A	0.2	1.9	0.37	0.61	0.37	53.3
North: Roland Rd (N)															
7	L2	All MCs	62	2.0	62	2.0	0.129	7.5	LOS A	0.0	0.0	0.00	0.17	0.00	76.4
8	T1	All MCs	180	7.0	180	7.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	85.7
Approach			242	5.7	242	5.7	0.129	1.9	NA	0.0	0.0	0.00	0.17	0.00	83.1
All Vehicles			508	5.1	508	5.1	0.129	2.9	NA	0.4	3.2	0.14	0.28	0.14	73.6

Table 33: SIDRA Results: Roland Road/McDowell Loop/Southern LSP Access intersection – AM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	1	2.0	1	2.0	0.064	6.6	LOS A	0.6	5.1	0.24	0.55	0.24	55.2
2	T1	All MCs	129	7.0	129	7.0	0.064	7.5	LOS A	0.6	5.1	0.24	0.55	0.24	66.6
6	R2	All MCs	27	2.0	27	2.0	0.064	11.7	LOS B	0.6	5.1	0.24	0.55	0.24	54.6
Approach			158	6.1	158	6.1	0.064	8.2	LOS A	0.6	5.1	0.24	0.55	0.24	64.1
East: Access 1 (E)															
7	L2	All MCs	43	2.0	43	2.0	0.112	3.8	LOS A	0.6	4.8	0.38	0.55	0.38	53.0
2	T1	All MCs	1	2.0	1	2.0	0.112	3.8	LOS A	0.6	4.8	0.38	0.55	0.38	45.3
6	R2	All MCs	83	2.0	83	2.0	0.112	8.3	LOS A	0.6	4.8	0.38	0.55	0.38	52.7
Approach			127	2.0	127	2.0	0.112	6.8	LOS A	0.6	4.8	0.38	0.55	0.38	52.7
North: Roland Rd (N)															
7	L2	All MCs	14	2.0	14	2.0	0.123	6.4	LOS A	0.6	5.1	0.13	0.52	0.13	56.2
8	T1	All MCs	157	7.0	157	7.0	0.123	7.2	LOS A	0.6	5.1	0.13	0.52	0.13	68.1
9	R2	All MCs	1	2.0	1	2.0	0.123	11.5	LOS B	0.6	5.1	0.13	0.52	0.13	55.6
Approach			172	6.6	172	6.6	0.123	7.2	LOS A	0.6	5.1	0.13	0.52	0.13	66.9
West: McDowell Loop (W)															
10	L2	All MCs	1	2.0	1	2.0	0.003	4.1	LOS A	0.0	0.1	0.42	0.46	0.42	53.8
8	T1	All MCs	1	2.0	1	2.0	0.003	4.0	LOS A	0.0	0.1	0.42	0.46	0.42	45.8
9	R2	All MCs	1	2.0	1	2.0	0.003	8.6	LOS A	0.0	0.1	0.42	0.46	0.42	53.5
Approach			3	2.0	3	2.0	0.003	5.6	LOS A	0.0	0.1	0.42	0.46	0.42	50.8
All Vehicles			460	5.1	460	5.1	0.123	7.4	LOS A	0.6	5.1	0.24	0.54	0.24	61.2

Table 34: SIDRA Results: Roland Road/McDowell Loop/Southern LSP Access intersection – PM Peak (Stage 1)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	1	2.0	1	2.0	0.052	6.4	LOS A	0.5	4.0	0.16	0.61	0.16	54.6
2	T1	All MCs	67	7.0	67	7.0	0.052	7.3	LOS A	0.5	4.0	0.16	0.61	0.16	65.6
6	R2	All MCs	71	2.0	71	2.0	0.052	11.5	LOS B	0.5	4.0	0.16	0.61	0.16	54.0
Approach			139	4.4	139	4.4	0.052	9.4	LOS A	0.5	4.0	0.16	0.61	0.16	59.1
East: Access 1 (E)															
7	L2	All MCs	23	2.0	23	2.0	0.056	3.7	LOS A	0.3	2.3	0.35	0.54	0.35	53.2
2	T1	All MCs	1	2.0	1	2.0	0.056	3.6	LOS A	0.3	2.3	0.35	0.54	0.35	45.4
6	R2	All MCs	40	2.0	40	2.0	0.056	8.1	LOS A	0.3	2.3	0.35	0.54	0.35	52.8
Approach			64	2.0	64	2.0	0.056	6.5	LOS A	0.3	2.3	0.35	0.54	0.35	52.8
North: Roland Rd (N)															
7	L2	All MCs	35	2.0	35	2.0	0.140	6.6	LOS A	0.7	5.7	0.22	0.52	0.22	55.8
8	T1	All MCs	143	7.0	143	7.0	0.140	7.5	LOS A	0.7	5.7	0.22	0.52	0.22	67.6
9	R2	All MCs	1	2.0	1	2.0	0.140	11.7	LOS B	0.7	5.7	0.22	0.52	0.22	55.3
Approach			179	6.0	179	6.0	0.140	7.3	LOS A	0.7	5.7	0.22	0.52	0.22	64.9
West: McDowell Loop (W)															
10	L2	All MCs	1	2.0	1	2.0	0.003	3.8	LOS A	0.0	0.1	0.36	0.45	0.36	54.1
8	T1	All MCs	1	2.0	1	2.0	0.003	3.7	LOS A	0.0	0.1	0.36	0.45	0.36	46.0
9	R2	All MCs	1	2.0	1	2.0	0.003	8.2	LOS A	0.0	0.1	0.36	0.45	0.36	53.7
Approach			3	2.0	3	2.0	0.003	5.2	LOS A	0.0	0.1	0.36	0.45	0.36	51.0
All Vehicles			385	4.7	385	4.7	0.140	7.9	LOS A	0.7	5.7	0.22	0.56	0.22	60.3

Table 35: SIDRA Results: Roland Road/McDowell Loop/Southern LSP Access intersection – AM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	1	2.0	1	2.0	0.086	6.4	LOS A	0.9	7.1	0.16	0.52	0.16	55.8
2	T1	All MCs	220	7.0	220	7.0	0.086	7.3	LOS A	0.9	7.1	0.16	0.52	0.16	67.5
6	R2	All MCs	14	2.0	14	2.0	0.086	11.5	LOS B	0.9	7.1	0.16	0.52	0.16	55.3
Approach			235	6.7	235	6.7	0.086	7.5	LOS A	0.9	7.1	0.16	0.52	0.16	66.6
East: Access 1 (E)															
7	L2	All MCs	26	2.0	26	2.0	0.059	4.1	LOS A	0.3	2.4	0.41	0.55	0.41	53.4
2	T1	All MCs	5	2.0	5	2.0	0.059	4.0	LOS A	0.3	2.4	0.41	0.55	0.41	45.5
6	R2	All MCs	33	2.0	33	2.0	0.059	8.6	LOS A	0.3	2.4	0.41	0.55	0.41	53.1
Approach			64	2.0	64	2.0	0.059	6.4	LOS A	0.3	2.4	0.41	0.55	0.41	52.5
North: Roland Rd (N)															
7	L2	All MCs	1	2.0	1	2.0	0.143	6.3	LOS A	0.7	5.9	0.09	0.53	0.09	56.3
8	T1	All MCs	203	7.0	203	7.0	0.143	7.1	LOS A	0.7	5.9	0.09	0.53	0.09	68.2
9	R2	All MCs	6	2.0	6	2.0	0.143	11.4	LOS B	0.7	5.9	0.09	0.53	0.09	55.7
Approach			211	6.8	211	6.8	0.143	7.3	LOS A	0.7	5.9	0.09	0.53	0.09	67.7
West: McDowell Loop (W)															
10	L2	All MCs	25	2.0	25	2.0	0.027	4.4	LOS A	0.1	1.1	0.45	0.49	0.45	54.9
8	T1	All MCs	1	2.0	1	2.0	0.027	4.3	LOS A	0.1	1.1	0.45	0.49	0.45	46.5
9	R2	All MCs	1	2.0	1	2.0	0.027	8.8	LOS A	0.1	1.1	0.45	0.49	0.45	54.6
Approach			27	2.0	27	2.0	0.027	4.5	LOS A	0.1	1.1	0.45	0.49	0.45	54.6
All Vehicles			537	5.9	537	5.9	0.143	7.1	LOS A	0.9	7.1	0.18	0.53	0.18	64.2

Table 36: SIDRA Results: Roland Road/McDowell Loop/Southern LSP Access intersection – PM Peak (Stage 2)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Roland Rd (S)															
10	L2	All MCs	1	2.0	1	2.0	0.072	6.4	LOS A	0.7	5.5	0.14	0.56	0.14	55.5
2	T1	All MCs	153	7.0	153	7.0	0.072	7.2	LOS A	0.7	5.5	0.14	0.56	0.14	66.9
6	R2	All MCs	45	2.0	45	2.0	0.072	11.5	LOS B	0.7	5.5	0.14	0.56	0.14	54.9
Approach			199	5.8	199	5.8	0.072	8.2	LOS A	0.7	5.5	0.14	0.56	0.14	63.7
East: Access 1 (E)															
7	L2	All MCs	13	2.0	13	2.0	0.026	4.2	LOS A	0.1	1.1	0.43	0.53	0.43	53.5
2	T1	All MCs	2	2.0	2	2.0	0.026	4.1	LOS A	0.1	1.1	0.43	0.53	0.43	45.6
6	R2	All MCs	13	2.0	13	2.0	0.026	8.6	LOS A	0.1	1.1	0.43	0.53	0.43	53.2
Approach			27	2.0	27	2.0	0.026	6.2	LOS A	0.1	1.1	0.43	0.53	0.43	52.6
North: Roland Rd (N)															
7	L2	All MCs	3	2.0	3	2.0	0.174	6.5	LOS A	0.9	7.3	0.18	0.53	0.18	55.7
8	T1	All MCs	211	7.0	211	7.0	0.174	7.3	LOS A	0.9	7.3	0.18	0.53	0.18	67.3
9	R2	All MCs	21	2.0	21	2.0	0.174	11.6	LOS B	0.9	7.3	0.18	0.53	0.18	55.1
Approach			235	6.5	235	6.5	0.174	7.7	LOS A	0.9	7.3	0.18	0.53	0.18	65.8
West: McDowell Loop (W)															
10	L2	All MCs	12	2.0	12	2.0	0.016	4.0	LOS A	0.1	0.6	0.40	0.44	0.40	54.9
8	T1	All MCs	4	2.0	4	2.0	0.016	3.9	LOS A	0.1	0.6	0.40	0.44	0.40	46.5
9	R2	All MCs	1	2.0	1	2.0	0.016	8.5	LOS A	0.1	0.6	0.40	0.44	0.40	54.6
Approach			17	2.0	17	2.0	0.016	4.3	LOS A	0.1	0.6	0.40	0.44	0.40	52.5
All Vehicles			478	5.8	478	5.8	0.174	7.7	LOS A	0.9	7.3	0.19	0.54	0.19	63.5

Table 37: SIDRA Results: Stoneville Road/Woodlands Road intersection – AM Peak (Stage 2)

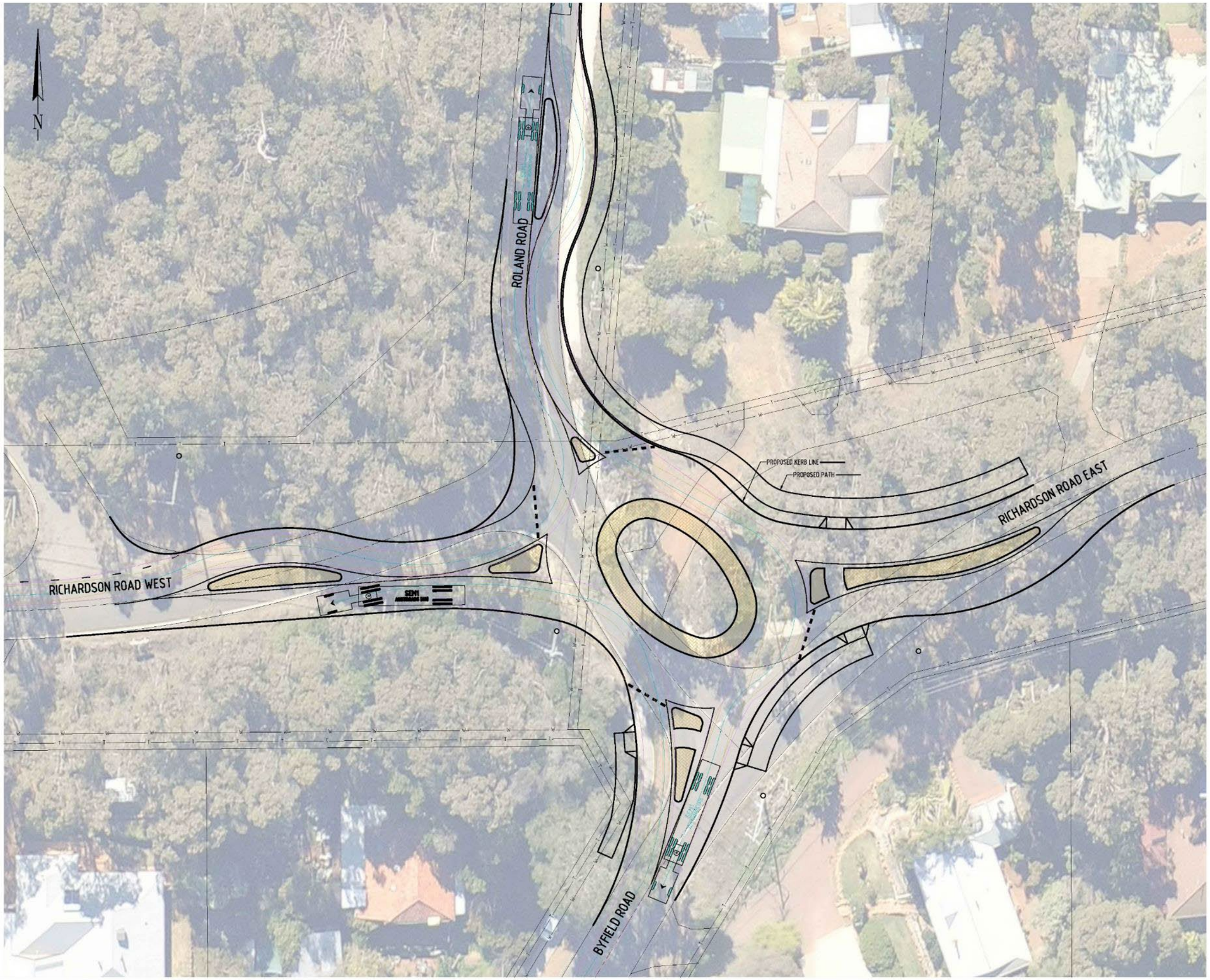
Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Stoneville Rd (S)															
7	L2	All MCs	53	12.5	53	12.5	0.111	7.8	LOS A	0.0	0.0	0.00	0.53	0.00	66.3
2	T1	All MCs	144	6.5	144	6.5	0.111	4.0	LOS A	0.0	0.0	0.00	0.53	0.00	74.7
Approach			197	8.1	197	8.1	0.111	5.0	NA	0.0	0.0	0.00	0.53	0.00	72.3
North: Stoneville Rd (N)															
8	T1	All MCs	263	1.7	263	1.7	0.142	0.0	LOS A	0.0	0.3	0.02	0.01	0.02	61.4
9	R2	All MCs	5	0.0	5	0.0	0.142	4.8	LOS A	0.0	0.3	0.02	0.01	0.02	59.2
Approach			268	1.7	268	1.7	0.142	0.1	NA	0.0	0.3	0.02	0.01	0.02	61.4
West: Woodlands Rd (W)															
10	L2	All MCs	6	0.0	6	0.0	0.121	7.9	LOS A	0.8	6.3	0.42	0.74	0.42	53.9
6	R2	All MCs	192	6.3	192	6.3	0.121	9.5	LOS A	0.8	6.3	0.42	0.74	0.42	63.9
Approach			198	6.1	198	6.1	0.121	9.4	LOS A	0.8	6.3	0.42	0.74	0.42	63.5
All Vehicles			663	4.9	663	4.9	0.142	4.3	NA	0.8	6.3	0.13	0.38	0.13	64.9

Table 38: SIDRA Results: Stoneville Road/Woodlands Road intersection – AM Peak (Stage 2)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Stoneville Rd (S)															
7	L2	All MCs	155	0.0	155	0.0	0.203	7.5	LOS A	0.0	0.0	0.00	0.55	0.00	72.5
2	T1	All MCs	231	1.4	231	1.4	0.203	4.0	LOS A	0.0	0.0	0.00	0.55	0.00	75.8
Approach			385	0.8	385	0.8	0.203	5.4	NA	0.0	0.0	0.00	0.55	0.00	74.4
North: Stoneville Rd (N)															
8	T1	All MCs	168	6.3	168	6.3	0.100	0.1	LOS A	0.1	0.6	0.05	0.06	0.05	60.2
9	R2	All MCs	6	33.3	6	33.3	0.100	7.2	LOS A	0.1	0.6	0.05	0.06	0.05	47.6
Approach			175	7.2	175	7.2	0.100	0.4	NA	0.1	0.6	0.05	0.06	0.05	59.6
West: Woodlands Rd (W)															
10	L2	All MCs	7	25.0	7	25.0	0.059	9.7	LOS A	0.4	2.9	0.42	0.72	0.42	52.7
6	R2	All MCs	89	0.0	89	0.0	0.059	9.2	LOS A	0.4	2.9	0.42	0.72	0.42	67.2
Approach			97	1.9	97	1.9	0.059	9.2	LOS A	0.4	2.9	0.42	0.72	0.42	65.8
All Vehicles			657	2.7	657	2.7	0.203	4.6	NA	0.4	2.9	0.08	0.45	0.08	68.6

Appendix C

ROLAND ROAD/RICHARDSON ROAD/BYFIELD ROAD ROUNDABOUT CONCEPT



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WARNING

SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE ONLY INDICATIVE AND MUST NOT BE USED FOR EXCAVATION.
THE "ONE CALL 1100" SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS.

No.	REVISION	ENGINEER	APPROVED	DATE

SHIRE OF MUNDARING

GREAT EASTERN HIGHWAY
MUNDARING

Stace Rogers Assoc Dip Civ Eng (AMIEAust)
SJR Civil Consulting Pty Ltd
30 North Road
BASSENDEAN WA 6054
Ph : (08) 9379 9481 or 0447 112 481

Drawn: SR		Design: SR	
Draft Check:		Engineer Check:	
Approved:			
Scale: 1:250		Datum: MGA 94, AHD	

In the absence of the APPROVED signature this drawing shall be treated as PRELIMINARY.

Project: BYFIELD, RICHARDSON & ROLAND ROADS
PROPOSED ROUNDABOUT

Title: INTERSECTION RECONFIGURATION CONCEPT PLAN

Size: A1 | Drg. No. | Rev

CadFile - Plot Design1.DWG

Appendix D

GREAT EASTERN HIGHWAY/SEABORNE STREET INTERSECTION UPGRADE – CONCEPT

Intersection Great Eastern Hwy and Seabourne St

Proposed Intersection Modification -Option 3

t16.318.sk03

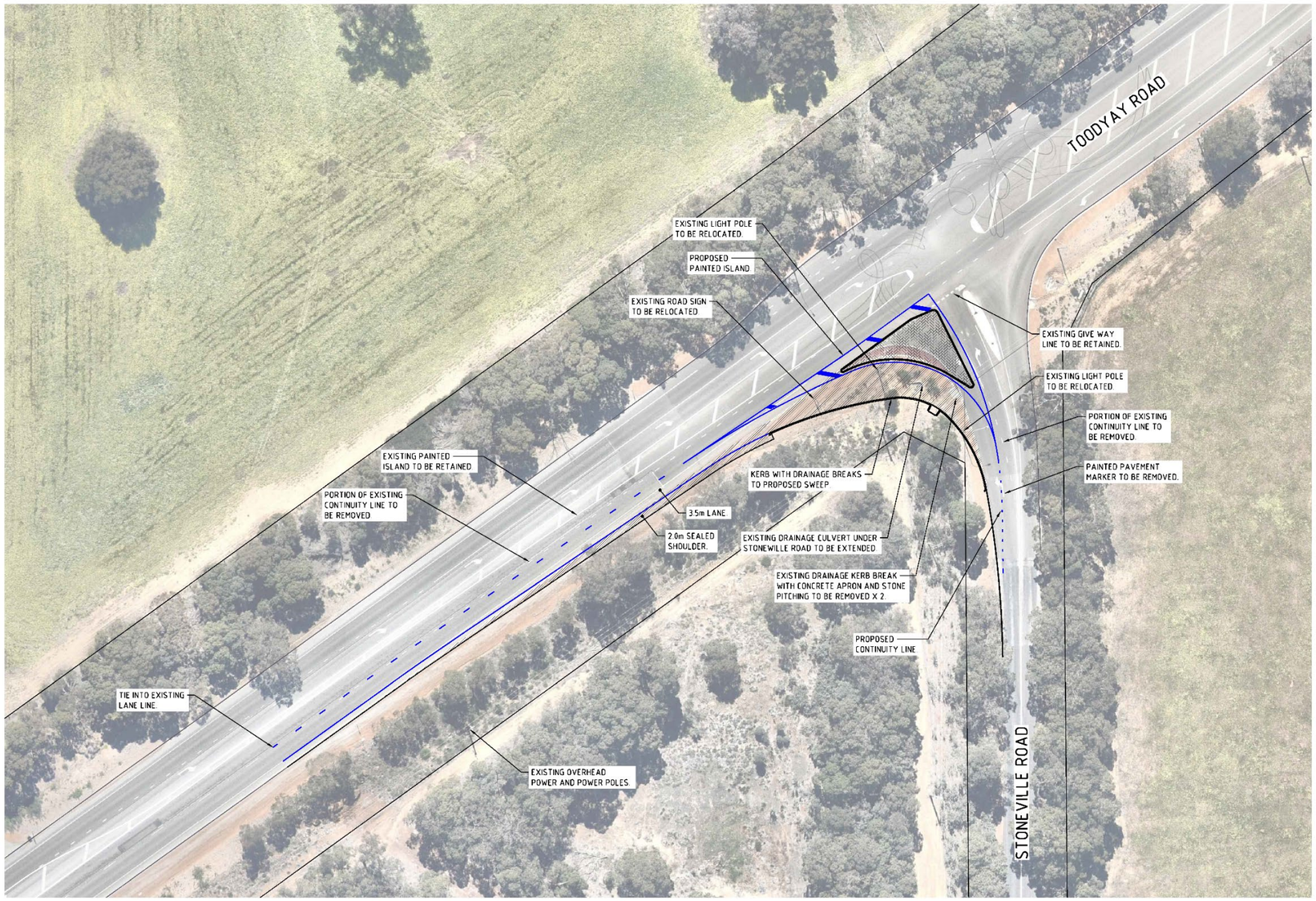
15/03/2020

Scale: 1:500 @ A3

transcore

Appendix E

PROPOSED TOODYAY ROAD/STONEVILLE ROAD INTERSECTION UPGRADE – CONCEPT



PRELIMINARY

REV	DATE	DRN	CKD	APP	AMENDMENT
A	19.08.21	AC	-	-	ISSUED FOR INFORMATION

N

1:500 0m 10 20 30

Cossill & Webley CONSULTING ENGINEERS

Mailing Address
PO Box 680
Subiaco WA 6904

Street Address
B12 (Level 2) 431 Roberts Road
Subiaco WA 6008

T (08) 9422 5800 F (08) 9422 5801 E admin@cosweb.com.au

CLIENT: SATTERLEY

APPROVED: CHECK PRINT

DESIGNED: AC

SCALE: 1:500

PROJECT: STONEVILLE

TITLE: STONEVILLE ROAD & TOODYAY TOAD INTERSECTION UPGRADE CONCEPT PLAN

WAPC No.: WAPC No.

DRAWING No.: 6198-00-SK16

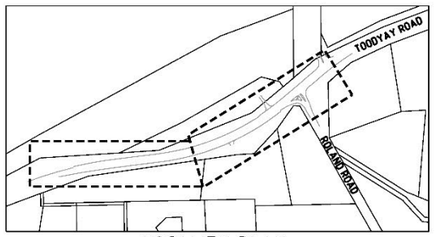
REVISION: A

ORIGINAL SIZE: A1

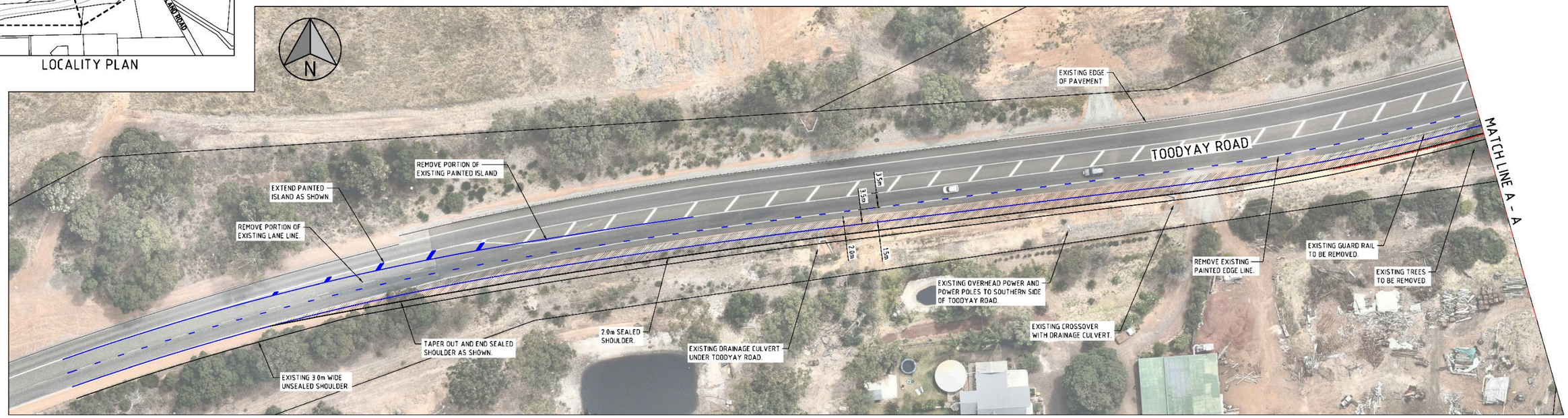
P:\6198 Stoneville\6198-00\Acad\6198-00-SK16.dwg, 19/08/2021 9:41:09 AM, anthonyc, Digital Signing PDF.pc3, 1:1, - CW Reference

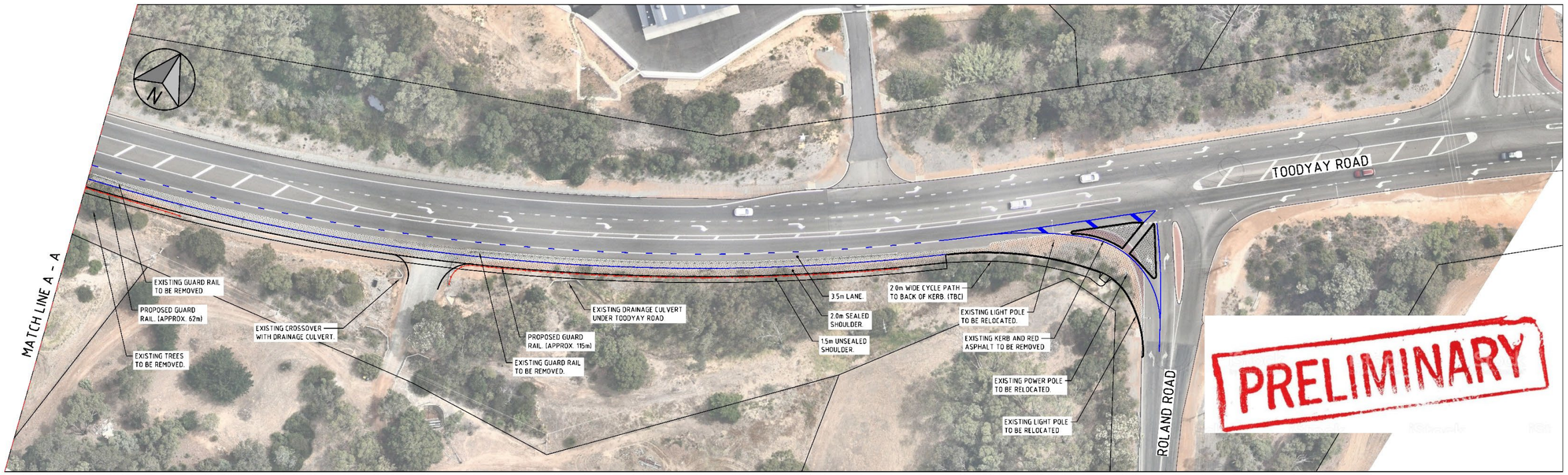
Appendix F

PROPOSED TOODYAY ROAD/ROLAND ROAD INTERSECTION UPGRADE – CONCEPT



LOCALITY PLAN





REV	DATE	DRN	CKD	APP	AMENDMENT
A	19.08.21	AC	-	-	ISSUED FOR INFORMATION

1:500 0m 10 20 30

Cossill & Webley CONSULTING ENGINEERS
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CLIENT: SATTERLEY

APPROVED: CHECK PRINT

DESIGNED: AC

SCALE: 1:500

PROJECT: STONEVILLE

TITLE: ROLAND ROAD & TOODYAY TOAD INTERSECTION UPGRADE CONCEPT PLAN

WAPC No.: WAPC No.

DRAWING No.: 6198-00-SK17

REVISION: A

ORIGINAL SIZE: A1