



APPENDIX 2

TRANSCORE - TRAFFIC ASSESSMENT REPORT



ROWE GROUP



Proposed Local Structure Plan

Lots 15 & 17 Brand Highway, Rudds Gully

Traffic Assessment Report - Update

PREPARED FOR:
Australian Minerals Investors
Pty Ltd

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1.0 Background

Transcore prepared a Traffic Assessment Report for the proposed Local Structure Plan (hereafter LSP) over Lots 15 & 17 in Rudds Gully, CoGG in February 2012. The City has provided comments on the submitted structure plan documents including the original TAR. As part of the response to City's list of modifications issued on 26 May 2014 the proponent has decided to introduce changes in the original LSP plan to address City's requirements and bring a structure plan closely in line with the adopted strategic Rudds Gully Local Structure Plan document.

Accordingly, this TAR represents an update of the original 2012 TAR prepared for the revised development proposal over Lots 15 & 17 Rudds Gully.

2.0 Introduction

This updated Traffic Assessment Report has been prepared by Transcore, on behalf of Australian Mineral Investors Pty Ltd with regard to the proposed structure plan for Lots 15 & 17 Brand Highway in Rudds Gully, City of Greater Geraldton.

The subject Lots 15 & 17, along with the adjoining Lots 116 and 117 located between the two subject lots, form part of the Rudds Gully Local Structure Plan area. The City of Greater Geraldton adopted a Structure Plan for this area in August 2010 (refer **Appendix A**); however, it has not been endorsed by Western Australian Planning Commission. The unendorsed RGLSP identifies the land for “future residential”.

In the RGLSP external connectivity of the future residential area comprising Lots 15, 17, 116 and 117 is proposed through a consolidated access intersection system onto Brand Highway off Lot 116 and the area to the north of Lot 15. However, according to the advice provided to Transcore at the time of preparation of original TAR, the owner of Lot 116 and the area to the north of Lot 15 (same ownership) has no intention of developing these areas in the near future and no structure plan has been proposed or is being prepared for Lot 116.

Hence, there is a need to revisit the access options for Lots 15 and 17 proposed in the RGLSP so that Lots 15 and 17 can be developed independent of Lot 116.

This report aims to develop alternative access option where Lots 15 and 17 will have separate access intersections on Brand Highway, independent of the adjacent development areas. The report will also investigate any improvements or traffic management measures that may be required to the immediately adjacent road network as a result of the development of Lots 15 and 17.

Relevant information with respect to the planning and the future status of Brand Highway Bypass (Geraldton North South Highway) sourced from Main Roads WA is relevant to the investigations and is also included in this report.

Transcore’s traffic assessment report has been prepared in consultation with the City of Greater Geraldton and Main Roads WA.

3.0 Existing Situation

Lots 15 and 17 Brand Highway are situated in Rudds Gully, approximately 8.5km southeast of the Geraldton town centre. The LSP is located on the eastern side of Brand Highway approximately 780m (Lot 17) and 1.2km (Lot 15) north of the existing Brand Highway/Rudds Gully Road intersection. Lots 116 and 117 are located between the two subject lots.

The subject sites are presently vacant. Refer **Figure 1** for more details.



Figure 1: Locality map

Brand Highway is categorised as a State Highway and classified as *Primary Distributor* road (Functional Road Hierarchy, Main Roads WA). As such it is under care and control of Main Roads WA. Brand Highway connects Perth and Geraldton with a total length of approximately 350 km and together with North West Coastal Highway forms part of the WA's Coastal Route (total length approximately 510km).

Brand Highway is a sealed approximately 8m wide, single carriageway rural road with partially sealed shoulders on each side. It is constructed to two-lane undivided standard. Passing lanes in both directions exist along its length at regular intervals. A passing lane is in place at the eastern side (southbound direction) in the immediate vicinity of the LSP area.

According to the Main Roads WA traffic count information, Brand Highway (north of Rudds Gully Road) carried approximately 4,060 vehicles per day during typical weekday in August 2011. The vehicle class report for this road (at the same locality) suggests that approximately 13.1% of total traffic is the heavy vehicle component.

The sign-posted speed limit in the vicinity of the site is 90km/h. No pedestrian facilities are presently in place on Brand Highway in the vicinity of subject sites. Refer **Figure 2**.



Figure 2: Northbound view along Brand Highway

4.0 Proposed Development

The proposed Lots 15 and 17 local Structure Plan (hereafter LSP) occupies a combined area of approximately 67.07ha with Lot 15 covering 31.52ha and Lot 17 covering 35.57ha. The subject land is located on the east side of Brand Highway in Rudds Gully, approximately 8.5km southeast of Geraldton town centre. The subject lots are separated by Lots 116 and 117; however, both subject lots entail direct frontage on Brand Highway.

According to the advice provided by Urban Plan, the combined lot yield of Lots 15 and 17 is estimated at approximately 627 residential lots. The proposed development also entails a public primary school which is to be located at the southeast end of Lot 17 (approximately 4ha site).

The proposed structure plan internal road system provides maximum possible functionality and connectivity given that direct integration of Lots 15 and 17 is impossible as they are separated by Lot 116 and Lot 117. Lot 15 road system was designed to enable direct and seamless integration with residential developments proposed directly to the north whilst providing road link provisions to the future Lot 116 and 117 area. Similarly, road system proposed for Lot 17 allows for the future interface with Lot 116 and Lot 117 and future residential areas to the immediate south.

The proposed Lot 15 and 17 local structure plan is shown in **Appendix B**.

According to the structure plan, the development is proposed to entail two vehicular accesses onto Brand Highway, one for each Lot 15 and Lot 17. Lot 15 access is proposed approximately 135m to the north of existing Morwong Road intersection. The Lot 17 access point onto Brand Highway is proposed to be located approximately halfway between northern and southern end of Lot 17 as this location provide best sightlines on Brand Highway along Lot 17 frontage.

The proposed location of external access points onto Brand Highway also provides for balanced distribution of traffic from the future Lots 116 and 117 residential development onto Brand Highway via Lot 15 and Lot 17 accesses points.

It is anticipated that ultimately Morwong Road, which is currently only an informal gravel track in the vicinity of the southern end of Lot 15, will be closed and its intersection with Brand Highway will be removed as part of the overall LSP proposal.

Due to the proposed future urbanisation of land on the eastern side of Brand Highway within the Rudds Gully locality, it is recommended that liaison be undertaken with Main Roads WA to investigate the feasibility of extension of the existing 70km/h speed limit zone on Brand Highway further south to Rudds Gully Road. The 70km/h speed zone currently terminates just south of Dermott Drive.

5.0 Traffic Assessment

This section of the report provides an estimate of traffic that would be generated by the proposed Lot 15 and 17 LSP and assigns this traffic on the internal structure plan road network. An assessment of the internal structure plan road hierarchy and the road reservation requirements will also form part of this assessment.

In order to investigate the feasibility and long-term functionality of the proposed access system comprising two external access intersections on Brand Highway two scenarios will be considered: interim and ultimate.

- ✚ **Interim scenario** entails full development of Lots 15 and 17 with their respective accesses onto Brand Highway and interface of Lot 15 with residential developments to the immediate north (RGLSP area) with no direct internal road links between Lots 15 and 17.
- ✚ **Ultimate scenario** involves full development of Lot 116 and its integration into Lot 15 and 17 road network. Two external intersection accesses on Brand Highway from Lot 15 and Lot 17 are maintained in this scenario.

5.1 Trip Generation and Distribution

The traffic generation rates for the LSP were primarily sourced from the Roads and Traffic Authority NSW, “*Guide to Traffic Generating Developments*” document. The residential traffic generation rates used range from 9 vehicles per day (vpd) per dwelling for the lower residential densities, 7 vpd for medium density dwellings and 5 vpd for high-density units close to transit. However, in order to provide for a robust assessment and be consistent with other traffic reports prepared for nearby developments an average rate of 8 trips per day is adopted for this structure plan.

Accordingly, the structure plan area (Lots 15 and 17 combined) is estimated to generate approximately **4,800** daily vehicular trips (total of ins and outs) for a typical weekday.

Similarly, the traffic impact from the future residential development on Lot 116 was estimated using the same trip rate applied in case of Lot 15 and 17 developments. Accordingly, traffic generation estimate for Lots 116 and 117 was based on the estimation of approximately 600 residential lots adopted for this purpose in order to provide for a more robust scenario. Consequently, it is estimated that Lots 116 and 117 would generate additional 4,800 vehicles per day.

For the purpose of this assessment, it is assumed that a portion of traffic generated by Lots 15, 116 and 17 will be internal trips to primary school and to the future retail uses within the RGLSP area. Similarly, it is assumed that there will be some school traffic originating from RGLSP which would, in interim scenario, access Lot 17 via Brand Highway access or filter through Lot 116 in the ultimate scenario. It is also assumed that a portion of school traffic would originate from external areas to the

structure plan, which would access the school via Lot 17 access intersection on Brand Highway.

Based on the actual location of the subject site, existing road network at the locality, and major local attractors the following assumptions were made for the distribution and assignment of the external traffic component of the LSP-generated traffic:

- ✚ Approximately 90% of the traffic generated from the subject site would travel to/from the north along Brand Highway;
- ✚ Approximately 10% of the traffic generated from the subject site would travel to/from the south along Brand Highway;

Accordingly, **Figure 3** and **Figure 4** illustrate the anticipated total daily traffic movements within the LSP area and through the proposed Brand Highway individual access intersections for Lot 15 and Lot 17 for the interim and ultimate scenarios, respectively.

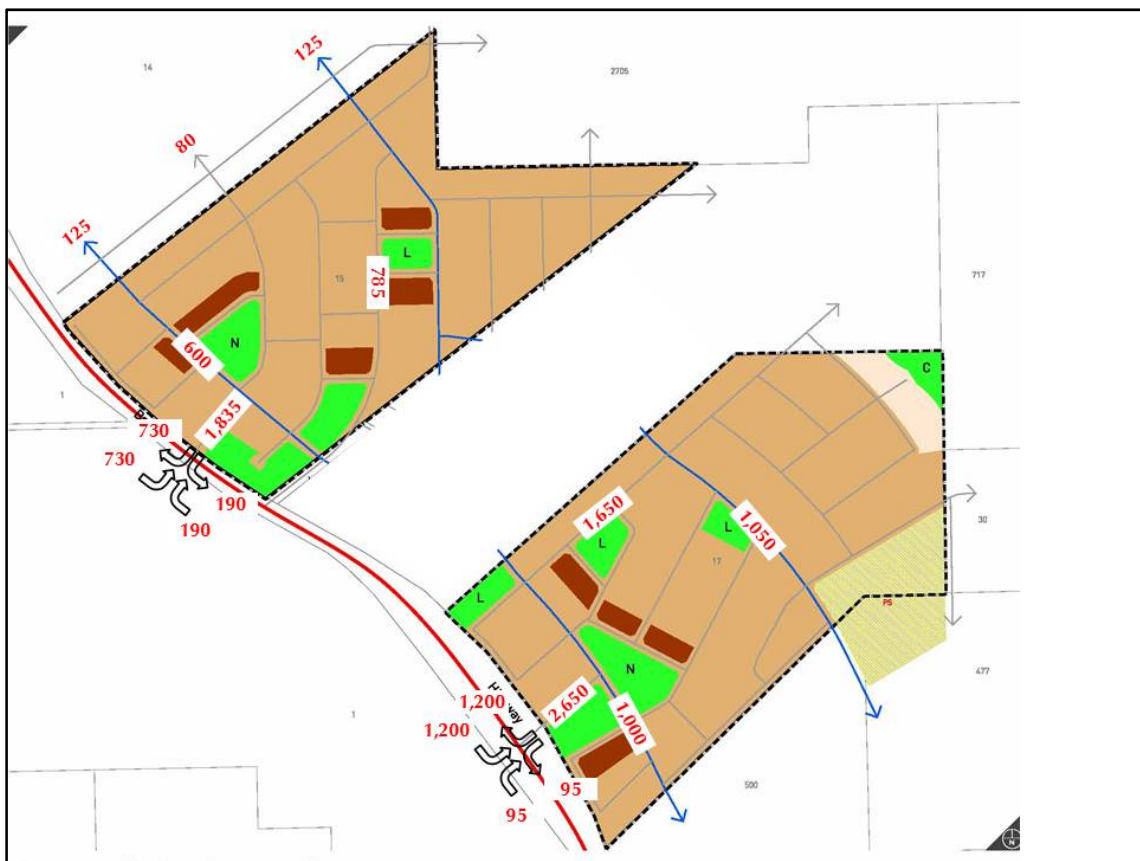


Figure 3. Anticipated total daily traffic for the proposed LSP – Interim Scenario

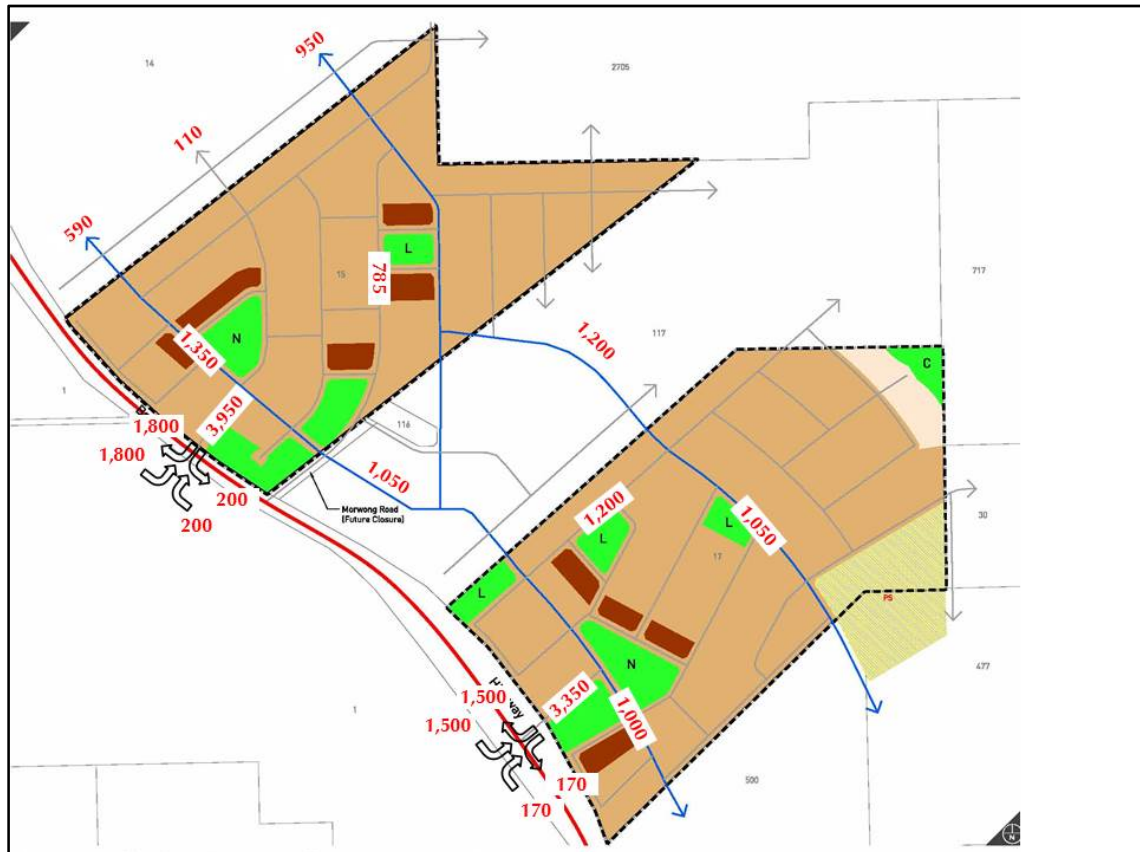


Figure 4. Anticipated total daily traffic for the proposed LSP – Ultimate Scenario

5.2 Internal LSP Intersection Capacity Analysis

At-grade, unsignalised intersections rely on gap selection for the entry of minor road traffic into or across the major road and for right-turn movements from the major road. As such, conflicting movements directly impact on the overall performance of the intersection, resulting in increased delays, queuing and risk of crashes. It is therefore critical to assess the capacity of intersections to ensure the anticipated traffic volumes can be accommodated.

Table 2.4 from AUSTROADS *“Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings”* document illustrates the traffic volume thresholds above which a detailed intersection capacity assessment is required to confirm that adequate capacity is in fact available. However, it is considered that sufficient capacity is available if the anticipated traffic volumes through intersections are below the indicative thresholds and therefore detailed capacity assessment is not required. Refer **Table 1** for more details.

Assuming that typical peak hour traffic represents approximately 10% of the total daily traffic volume, it is confirmed that uninterrupted traffic flow conditions can be expected at all key internal subdivision intersections as hourly traffic volumes through intersections are significantly below the indicative thresholds indicated in **Table 1**. Hence it is concluded that detailed assessment or capacity analysis is not

warranted for any of the internal LSP intersection (refer **Figure 3** and **Figure 4** for structure plan daily traffic projections).

Table 1. Traffic volume threshold for detailed intersection analysis

Major Road Type	Major Road Flow (vph ¹)	Minor Road Flow (vph)
Two-lane	400	250
	500	200
	600	100
Four-lane	1,000	100
	1,500	50
	2,000	25

It is further confirmed that the internal structure plan road network layout ensures efficient traffic distribution throughout the development with no bottlenecks or traffic congestion with balanced traffic loading of external access intersections on Brand Highway.

The external intersection capacity assessment of the Lot 15 and Lot 17 access intersections on Brand Highway is discussed and presented in **Section 5.7** of this report.

5.3 Internal LSP Road Network Assessment

Preliminary assessment of the internal Lot 15 and Lot 17 structure plan road network was undertaken with consideration of the projected traffic volumes, the length of the roads and the intersection treatments.

The internal structure plan road network provides for satisfactory permeability and efficient distribution of traffic within the structure plan area and provides good interface for ultimate integration of Lot 116. However, the following modifications/improvements to the internal structure plan road network are proposed to further improve traffic operations and safety:

- ✚ It is suggested that consideration be given to suitable intersection treatment for all the proposed four-way intersections to delineate priority and improve safety. Such treatments include intersection thresholds and roundabouts;
- ✚ The Y-shaped intersections in the LSP represent a potential safety concern due to angle of traffic approach and potential sightline limitations. These intersections should ideally be redesigned to entail a 90 degree approach, or as a minimum, entail additional treatments such as splitter islands and pavement markings to provide better guidance for drivers.

¹ vph – vehicles per hour

- ✚ Delineation through the 90-degree bends should be considered so to provide guidance and avoid undesirable and hazardous corner-cutting movements. Ideally, the delineation through the bends should be reinforced with the adequately designed median islands and localised road widening;
- ✚ Provision of speed-controlled features should be considered for the long, straight sections of internal roads of the LSP area and in particular in the vicinity of the proposed school site; and,
- ✚ Ensure safe movement of the service and emergency vehicles throughout the structure plan area is tested by application of appropriate design vehicle movement assessment.

5.4 Internal LSP Road Network Hierarchy

The projected traffic volumes on the internal LSP road network were used to determine the road hierarchy and the required road reservations within the structure plan area. The hierarchy was based on the forecast traffic volumes for the “ultimate scenario”.

Consideration was also given to the proposed road hierarchy for RGLSP in order to maintain road consistency throughout the development areas. Refer **Figure 5** for more details.

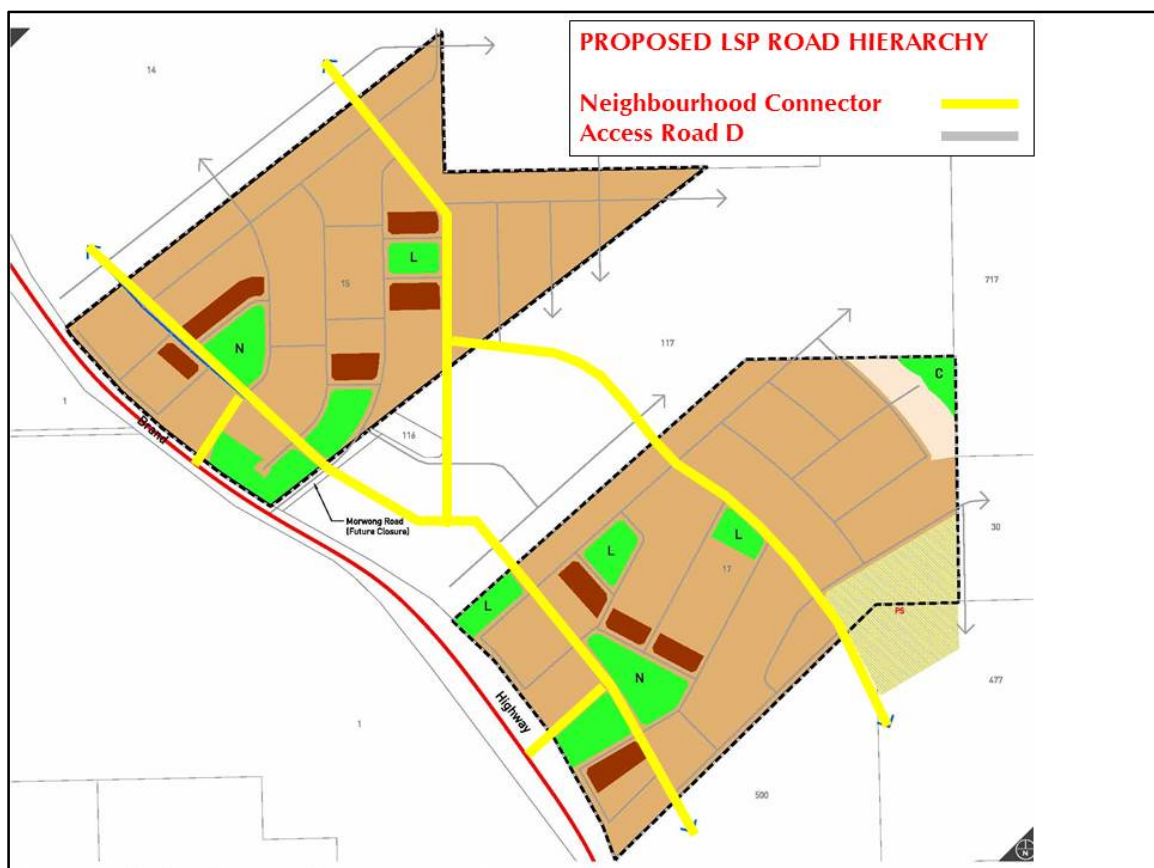


Figure 5. Proposed internal LSP road hierarchy

A review of LSP traffic projections shows that, in accordance with the WAPC “Liveable Neighbourhoods” document, and with respect to forecast daily traffic volumes, all internal LSP roads can be classified as *Neighbourhood Connector* and *Access Streets D* (refer **Figure 5** for more details). Some key characteristics of typical cross-sections, defined in WAPC *Liveable Neighbourhoods* (2009) publication are discussed further in this section.

The typical road reserve for the proposed *Neighbourhood Connector* entails a 9.4m wide road pavement, 1.5m on-street cycling lanes and 5.0m wide verges on both sides. These streets are designed to carry up to 3,000vpd. The concept cross-section of the *Neighbourhood Connector* is illustrated in **Figure 6**.

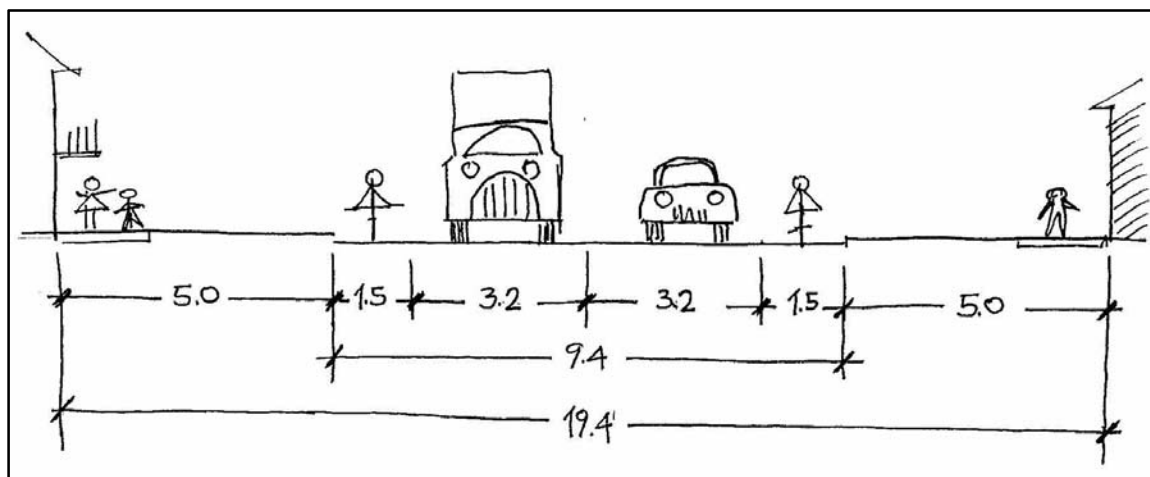


Figure 6. Neighbourhood Connector – with target speed of 50 km/hr (<3,000vpd)

The typical road reserve for *Access Street D* entails a road reserve of 14.2m with 6m wide trafficable carriageway pavement and 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. Refer **Figure 7** for more details.

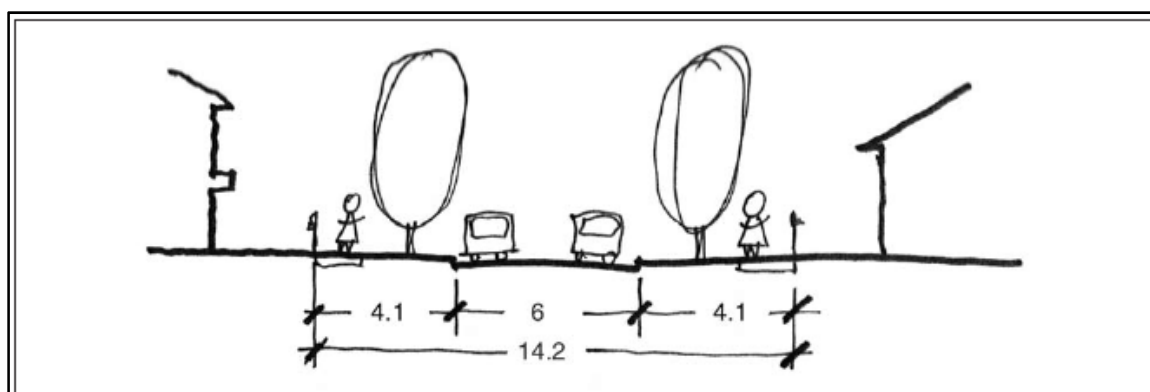


Figure 7. Access Street D – narrow yield (give way) street with target speed of 30 km/h (<1,000vpd)

The low speed environment of Access Streets D enables on-street cycling. Staggered parking on both sides of these streets can be used as part of the speed-control measure.

However, the final cross section details are to be determined during the subdivision design stage. The cross section of the two Neighbourhood Connector roads on the approach to respective Lot 15 and Lot 17 Brand Highway access intersections will be dictated by the requirements of these intersections.

In order to facilitate visitor parking demand occasional public parking in form of embayed parking bays are also recommended on either or both sides of Access Streets.

5.5 Public Transport

There are no public transport services presently operating in the immediate vicinity of the LSP area. The nearest presently available TransGeraldton bus routes service Wandina residential area located approximately 1.5km to the north of LSP area.

The two bus routes (No. 854 and No. 855) connect Wandina to Geraldton town centre. Refer **Figure 8** for more details.



Figure 8. Existing bus routes within the locality (source: BusWest)

The proposed LSP can be serviced by re-routing the existing public transport services available in the relative vicinity which would then continue to travel further south along Brand Highway to access the LSP area via southern LSP access intersection and then continue north on a loop route through Lot 17 with a potential bus stop in the vicinity of the proposed school site. The bus service would then access Brand Highway via the same southern LSP access intersection to travel back towards Geraldton town site. Alternatively, bus could continue to travel northwest to access Lot 15, loop through Lot 15 and exit the LSP at the northern LSP access intersection to travel back to Geraldton. An indicative route map showing two potential route options is shown in **Figure 9**.

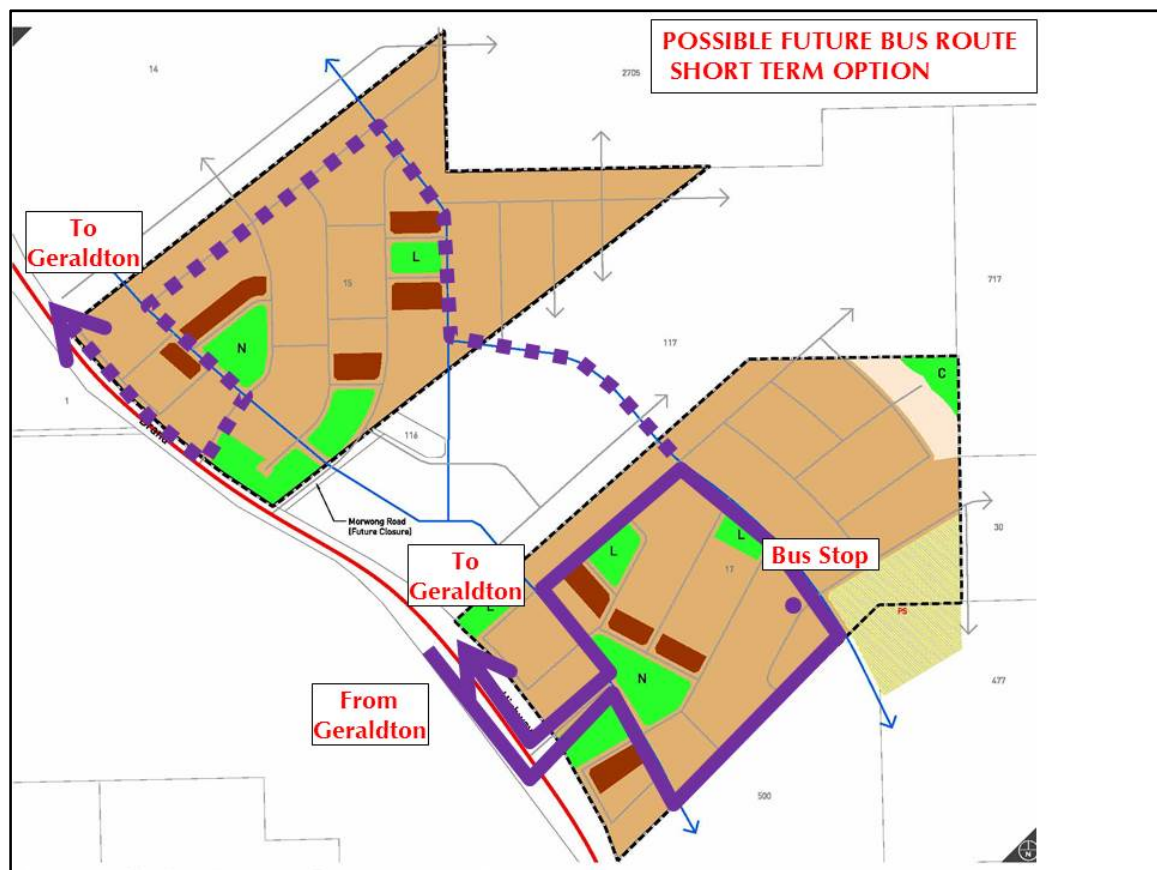


Figure 9. Possible new bus route servicing the proposed development – short term option

However, servicing the proposed LSP in the short term by a public transport option is not considered to be feasible due to the relatively moderate patronage potential and the relatively isolated position of the LSP in relation to remainder of Geraldton town site. The proposed primary school would likely service only the local LSP residents most of which would drive to school (primary school students are mostly dropped off to school unless they reside in immediate vicinity of the school). As such, the benefit of a bus line servicing the school is considered to be relatively small.

The opportunity to service the proposed LSP would increase significantly once the immediate area is fully developed and the Lot 15 & 17 LSP is integrated. This would in return provide necessary conditions to provide a feasible public transport option in form of a bus service which would be travelling through the structure plan rather

than along Brand Highway. A possible bus route for the long term option is presented in **Figure 10**.

The bus service could be routed to travel through the Lot 15 & 17 LSP along the Neighbourhood Connectors and pass the school site as shown in the following figure.

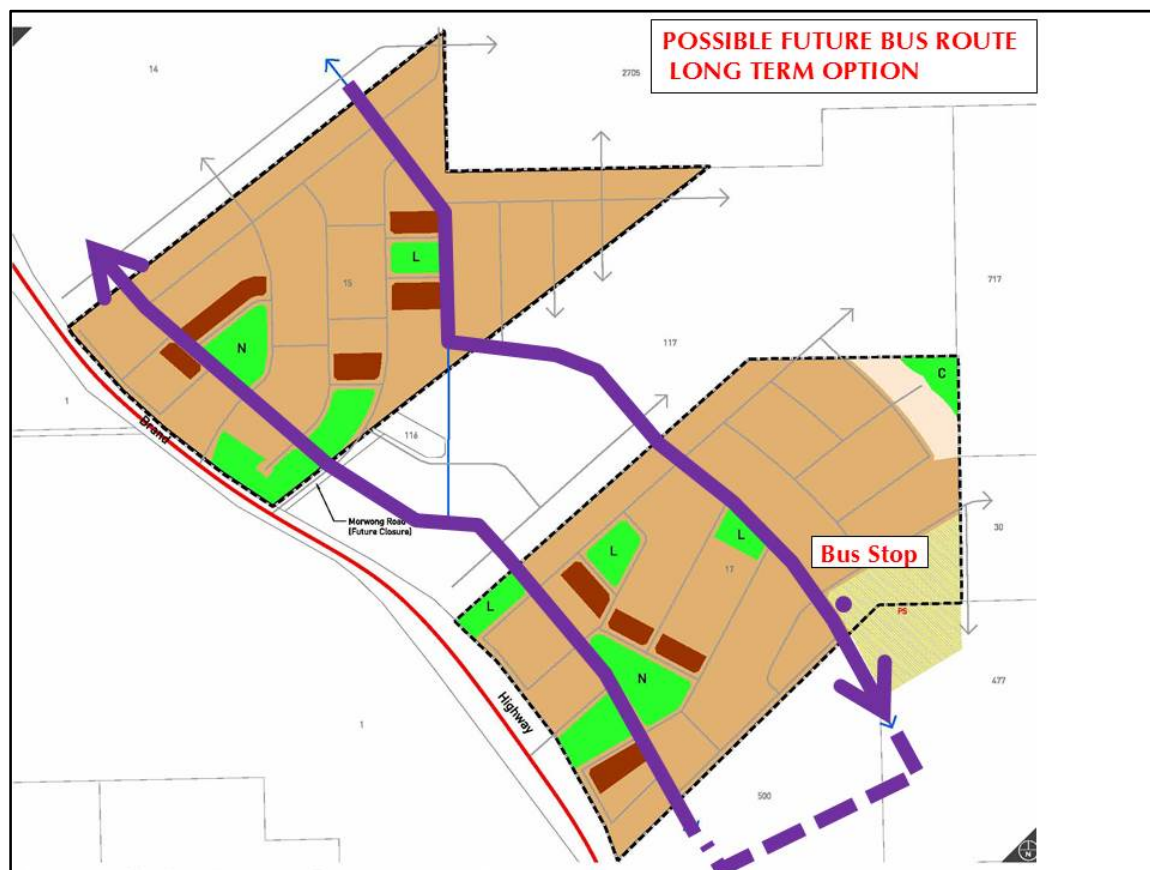


Figure 10. Possible new bus route servicing the proposed development – long term option

Within the LSP area the bus service would assume the route along Neighbourhood Connector roads. The WAPC *Transport Assessment Guidelines for Developments Volume 2 – Structure Plans* (2006) suggest that it is desirable for at least 90% of dwellings to be within 400m straight line distance of a bus route.

Providing that the future bus route travels along Neighbourhood Connector roads the 400m catchment radius would likely cover most of the LSP area and as such would meet the WAPC's recommendation.

5.6 Pedestrian and Cyclist Facilities

The proposed internal pedestrian and cyclist path system for the LSP is designed so to seamlessly integrate with the future external LSP path network. Considering the level of forecast daily traffic volumes on internal LSP roads provision of separate

cyclist facilities in form of shared paths is considered only for the *Neighbourhood Connector* roads.

Apart from the *Neighbourhood Connectors*, the maximum traffic volumes on internal LSP roads seldom exceed 1,000vpd and are typically well below this threshold. As such, it is reasonable to assume that cyclists and vehicles can safely share the road environment.

Accordingly, it is proposed that shared paths be provided along the *Neighbourhood Connector* roads extending N-S through the structure plan area and the three E-W connections within Lot 15 and 17. Shared paths around the school perimeter are also proposed and should be provided either on both sides or in combination with footpath on other side. All other *Access Streets* within the LSP do not warrant any specific on-road cycling facilities.

Considering ongoing expansion of Gerladton residential areas to the south and the planned urbanisation of Rudds Gully locality a provision of a principal shared path (PSP) along LSP side of Brand Highway is considered warranted. Hence, considering the future needs of the community and in line with the CoGG requirements, construction of a 2.5m wide PSP along eastern side of Brand Highway fronting subject LSP area is proposed.

Similarly, provision of shared path connections between the LSP's shared path system and the future Brand Highway PSP is also proposed to allow for future interface of the internal LSP system and the PSP. It should be noted however that the future Brand Highway PSP does not form part of this project but is rather part of the Brand Highway upgrade project.

Refer **Figure 11** for pedestrian and cyclist path network proposal.

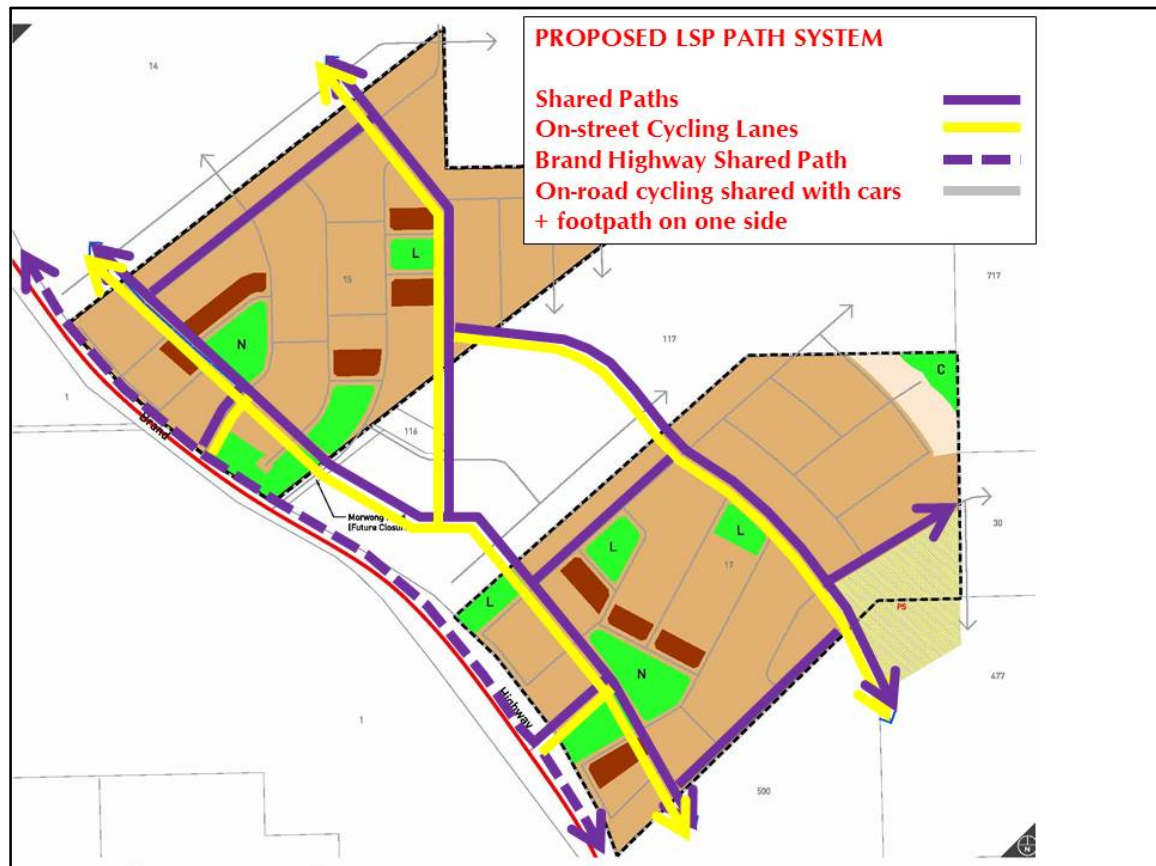


Figure 11. Proposed LSP pedestrian and cyclist facilities

The WAPC *Transport Assessment Guidelines for Developments Volume 2 – Structure Plans* (2006) provides guidance on the levels of traffic volumes that are likely to affect the ability for pedestrians to cross various types of road. Based on that guidance an undivided two-lane road should be acceptable for pedestrians crossing traffic volumes of up to approximately 11,000vpd and this threshold can be increased to around 28,000vpd by adding a central median or pedestrian refuge islands. On a four-lane road, because of its greater carriageway width, this threshold is lower; even with a median island the threshold is only around 16,000vpd.

Since the forecast traffic volumes on internal LSP roads as well as external roads abutting the LSP area are nowhere near these levels, the ability of pedestrians and cyclists to cross these roads is not a concern.

5.7 LSP Access Intersection Assessment

The recommendation for the required intersection standards are based on the forecasted traffic volumes through the proposed access intersections on Brand Highway for Lot 15 and Lot 17, the composition of the Brand Highway traffic (approximately 13% of heavy vehicle traffic component), and with respect to the relevant intersection treatment warrants recommended by the AUSTROADS *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections* (2009) document.

Accordingly, the Auxiliary Left Turn/Channelised Right Turn (AUL/CHR) intersection treatment is recommended for both Lot 15 and Lot 17 access intersections on Brand Highway. This type of treatment involves provision of a combination of left-turn facility in the southbound and a protected (line marked) right-turn facility in the northbound direction of Brand Highway. **Figure 12** and **Figure 13** and illustrate concept AUL/CHR intersection treatment.

Brand Highway entails a passing lane in the southbound direction in the immediate vicinity of the LSP area and as such any intersection design should consider existing situation.

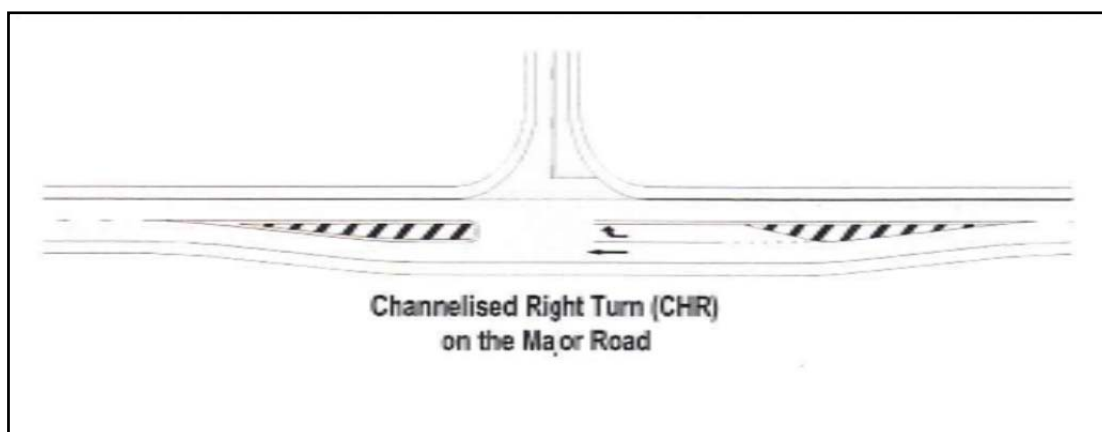


Figure 12. Channelised right-turn treatment on Major Road (CHR)

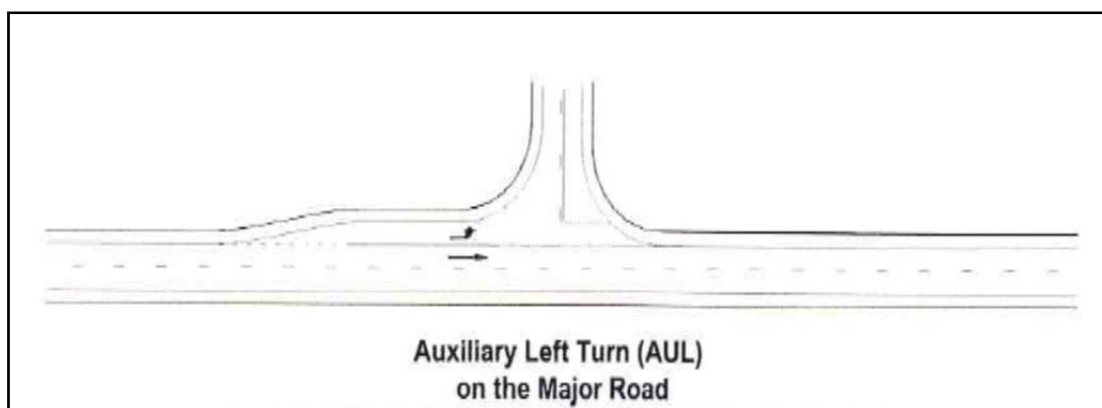


Figure 13. Auxiliary left-turn treatment on Major Road (AUL)

The proposed intersection treatment provides for safe ingress/egress operations at both proposed Brand Highway access intersections for the LSP, including provision for uninterrupted traffic flows along Brand Highway. This is particularly important due to the heavy vehicle component of Brand Highway traffic.

In order to establish the suitability of the proposed intersection standard and to assess the future traffic operations of the proposed access intersections on Brand Highway, a capacity analysis using SIDRA computer package was undertaken. For this purpose the recommended AUL/CHR layout for these intersections were modelled in the capacity analysis.

According to the advice provided to Transcore, concept plans for the two LSP intersections on Brand Highway have been prepared by the Client's civil engineering consultant based on recommended layout and in line with CoGG requirements.

In order to estimate the typical peak hour traffic which, based on the latest available Main Roads WA traffic data for Brand Highway, represents an overall peak hour period, a typical assumption of 10% of the total daily traffic for the afternoon peak hour periods was assumed. Assuming a period of 4 years for full development and occupation of the LSP area, year 2018 is assumed to be representative of post-development scenario.

Figure 14 depicts the estimated peak hour traffic movements through the two proposed Brand Highway access intersections (Lot 15 and Lot 17 Brand Highway access intersections) based on the "Ultimate Scenario" traffic forecast.

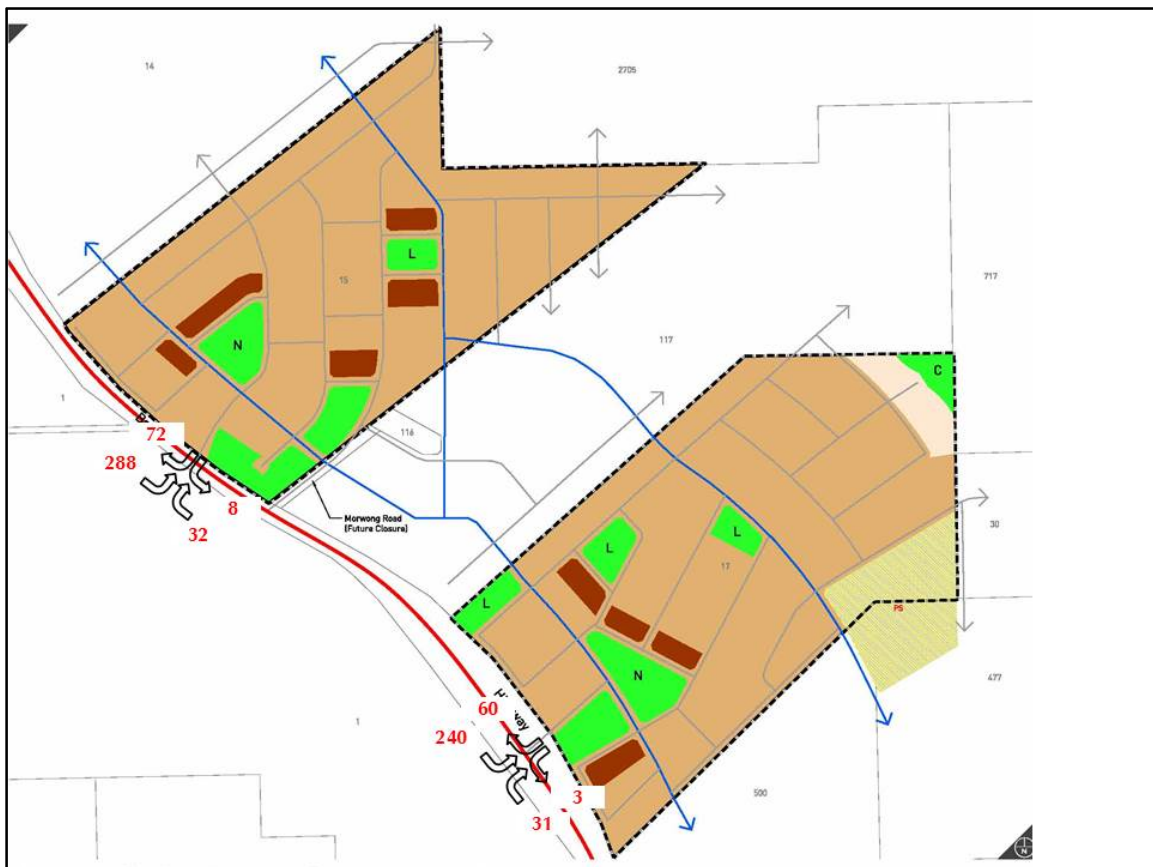


Figure 14. Anticipated PM peak hour traffic volumes at Lot 15 and Lot 17 Brand Highway access intersections

Capacity analysis of the two external LSP intersection on Brand Highway for the post-development (year 2018) scenario has been 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 varied 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 services, 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 SIDRA analysis for the proposed access intersections are detailed in **Table 2** and **Table 3** (overleaf).

Table 2. SIDRA results for the Lot 15 access intersection on Brand Highway – PM peak period (post-development scenario, year 2018)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brand Hwy South											
11	T	252	13.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.00	70.0
12	R	32	2.0	0.036	11.9	LOS B	0.1	1.1	0.57	0.76	49.2
Approach		284	11.8	0.140	1.3	NA	0.1	1.1	0.06	0.09	67.1
East: Lot 15 Access East											
1	L	8	2.0	0.144	12.8	LOS B	0.5	3.6	0.62	0.79	30.8
3	R	72	2.0	0.144	12.8	LOS B	0.5	3.6	0.62	0.87	30.8
Approach		80	2.0	0.144	12.8	LOS B	0.5	3.6	0.62	0.86	30.8
North: Brand Hwy North											
4	L	288	2.0	0.157	8.8	LOS A	0.0	0.0	0.00	0.68	53.1
5	T	412	13.0	0.229	0.0	LOS A	0.0	0.0	0.00	0.00	70.0
Approach		700	8.5	0.229	3.6	NA	0.0	0.0	0.00	0.28	62.4
All Vehicles		1064	8.9	0.229	3.7	NA	0.5	3.6	0.06	0.27	61.7

The result of the intersection capacity assessment indicates that very good operation conditions (overall LoS A/B) can be expected at both Lot 15 and 17 Brand Highway access intersections with no impediment on the through traffic flows along Brand Highway. Any occasional queuing is well within the capacity of the right-turn pockets at both intersections.

Table 3. SIDRA results for the Lot 17 access intersection on Brand Highway – PM peak period (post-development scenario, year 2018)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brand Hwy South											
11	T	192	13.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	70.0
12	R	31	2.0	0.026	10.3	LOS B	0.1	0.8	0.45	0.67	50.7
Approach		223	11.5	0.107	1.4	NA	0.1	0.8	0.06	0.09	66.8
East: Lot 17 Access East											
1	L	3	2.0	0.079	10.2	LOS B	0.3	2.0	0.48	0.65	34.0
3	R	60	2.0	0.079	10.2	LOS B	0.3	2.0	0.48	0.75	34.0
Approach		63	2.0	0.079	10.2	LOS B	0.3	2.0	0.48	0.74	34.0
North: Brand Hwy North											
4	L	240	2.0	0.131	8.8	LOS A	0.0	0.0	0.00	0.68	53.1
5	T	180	13.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.00	70.0
Approach		420	6.7	0.131	5.0	NA	0.0	0.0	0.00	0.39	59.7
All Vehicles		706	7.8	0.131	4.4	NA	0.3	2.0	0.06	0.33	60.2

6.0 Geraldton North South Highway

Main Roads WA is presently managing and planning Geraldton North South Highway Project (also known as Brand Highway Bypass Project), which will provide an alternative, future north south regional route for Geraldton area. The intention of this bypass is to remove regional through traffic, particularly heavy vehicles, from the existing North West Coastal Highway and Brand Highway within Geraldton city area. The preferred alignment was endorsed by the WAPC in 2003 and has been included in the Geraldton Region Plan. Main Roads WA intends to continue liaison with DoP and CoGG to include the endorsed GNSH concept and reservation into local planning strategies and statutory plans. Refer **Appendix C**.

The concept provides for a four-lane divided highway with pedestrian and cyclist facilities and grade separated interchanges at junctions with Geraldton Southern Transport Corridor and the future Narngulu Access Road.

There is no clear timeframe or funding allocation for this project at this stage; however, it is assumed that it is likely to commence in mid-term period.

The impact of the proposed GNSH on the proposed Lot 15 and 17 residential development is expected to be favourable as it is expected that, due to removal of heavy vehicle and through traffic from Brand Highway in the vicinity of the subject locality, traffic composition and volumes at the two access intersections will change and reduce. This scenario would provide additional capacity at the two intersections to accommodate further traffic growth from future developments. It should be noted however that this situation have not been modelled in this assessment so to provide for the most robust scenario.

7.0 Conclusions

This Traffic Assessment Report Update is set out to investigate the impact of the traffic from the proposed residential developments on Lots 15 & 17 Brand Highway in Rudds Gully, City of Greater Geraldton. The subject LSP area is located at the east side of Brand Highway approximately 8.5km southeast of the Geraldton town centre.

The proposed LSP (Lot 15 and 17 combined) yields a total of approximately 627 residential lots through a mix of low and median density (R10 to R30).

This report also investigates the suitability and operation of the proposed external access system, including any improvements or traffic management measures that may be required to the immediately adjacent road network as a result of the proposed development on Lots 15 and 17. For the purpose of robustness of the assessment traffic impact from the adjoining Lot 116 was also included in the assessment.

Accordingly, based on the concept Lots 15 & 17 structure plan it was established that the structure plan area would ultimately generate approximately 4,800 daily vehicular trips with potential additional 4,800 daily vehicular trips from Lots 116 and 117 area.

Internal LSP road system consists of *Neighbourhood Connector* and *Access Streets D* roads designed to facilitate inter-LSP vehicular, cyclist and pedestrian movements and seamlessly integrate with Lots 116 and 117 including the future residential developments to the immediate north and south.

In order to provide for a practical, safe and efficient external access system and to ensure minimal impact on the traffic flow on Brand Highway, the following access system is proposed for the Lot 15 & 17 area:

-  Access point off Lot 15 in form of a full-movement, T-intersection (AUL/CHR rural treatment type); and,
-  Access point off Lot 17 in form of a full-movement, T-intersection (AUL/CHR rural treatment type).

Consideration was also given to constraints imposed by the local topography and existing and future developments and their access arrangements at this locality when recommending the location of the proposed Lot 15 and 17 access system.

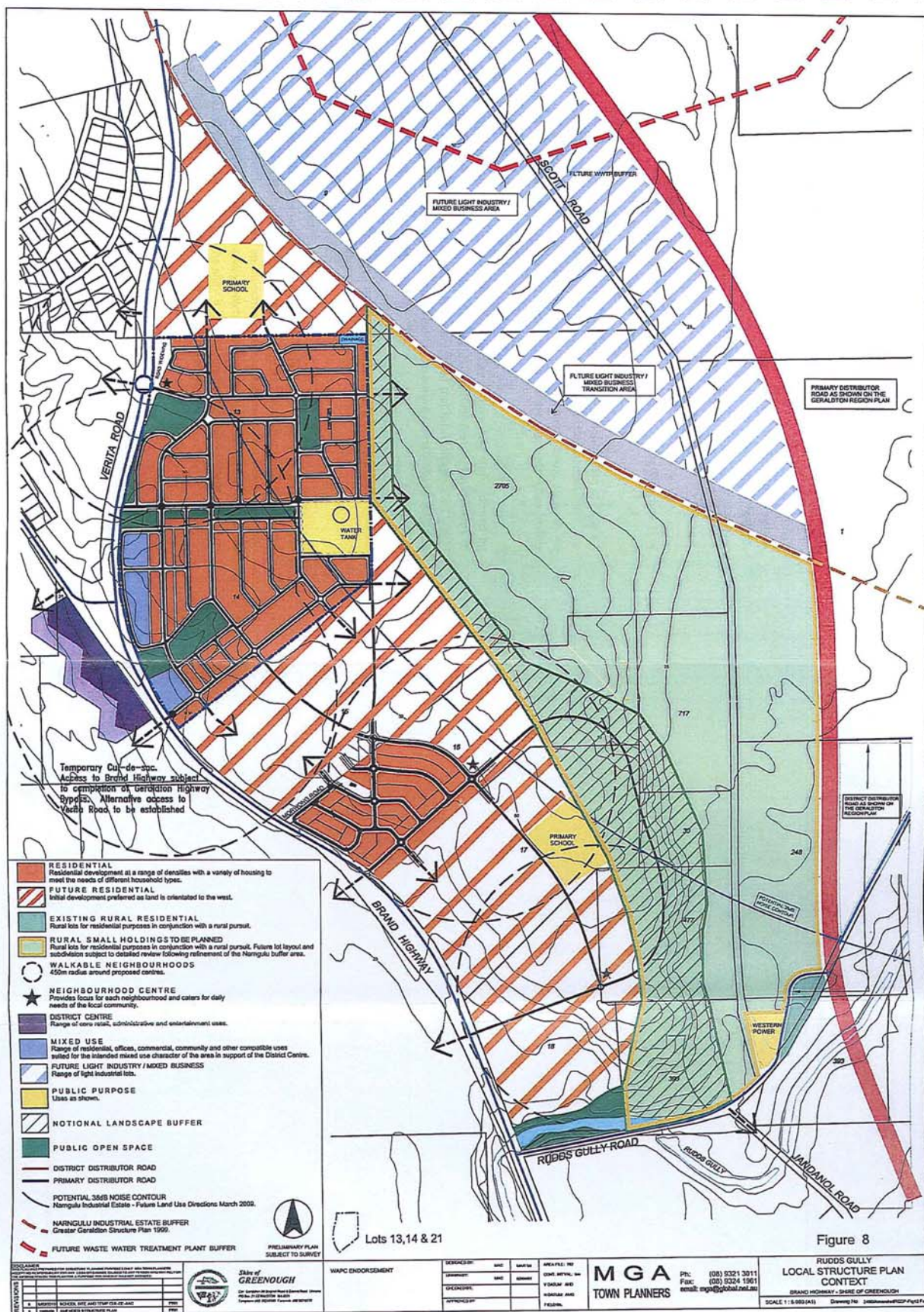
Accordingly, the proposed external intersection system provides optimal functionality of the access/egress operations for the proposed development and conforms to the relevant technical standards and safety requirements.

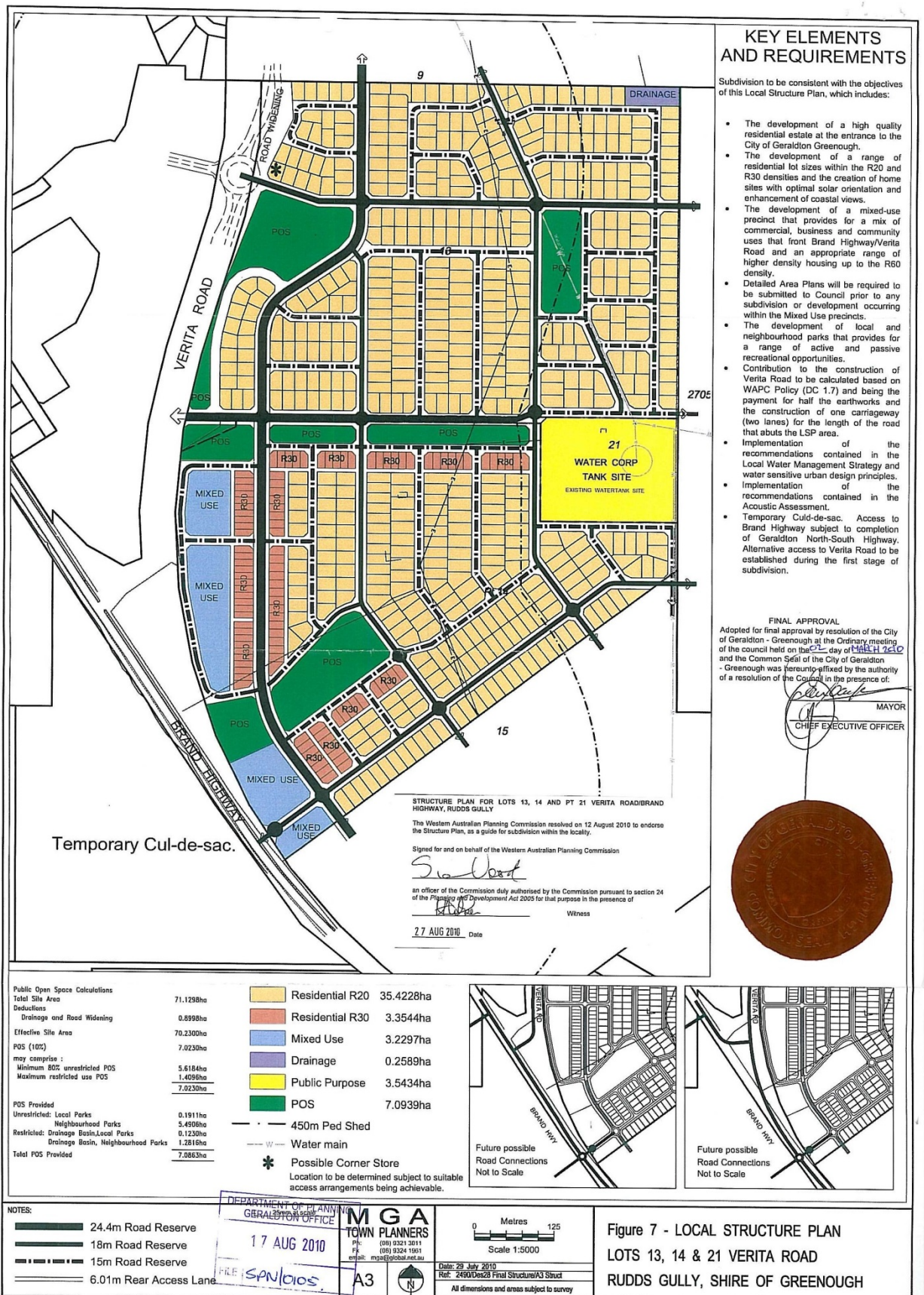
Relevant information with respect to the planning and the future status of Brand Highway Bypass (Geraldton North-South Highway) forms part of this report.

Accordingly, the proposed development is expected to integrate well with the surrounding areas with minimal impacts on the traffic operations along Brand Highway.

Appendix A

LOCAL STRUCTURE PLAN FOR LOTS 13, 14 & 15 VERITA ROAD RUDDS GULLY





Appendix B

LOTS 15 & 17 BRAND HIGHWAY, RUDDS GULLY LOCAL STRUCTURE PLAN



- RESIDENTIAL**
- Residential - Low Density (R10)
 - Residential - Low Density (R20)
 - Residential - Medium Density (R30)
- PUBLIC PURPOSE**
- PS Educational/Institutional
 - PS Primary School
- PARKS/RECREATION & CONSERVATION**
- Public Open Space
 - Neighbourhood Local
- TRANSPORT**
- Primary Distributor Road
 - Neighbourhood Connector
 - Access Street
- OTHER**
- Structure Plan Boundary
 - Local Development Plan Areas

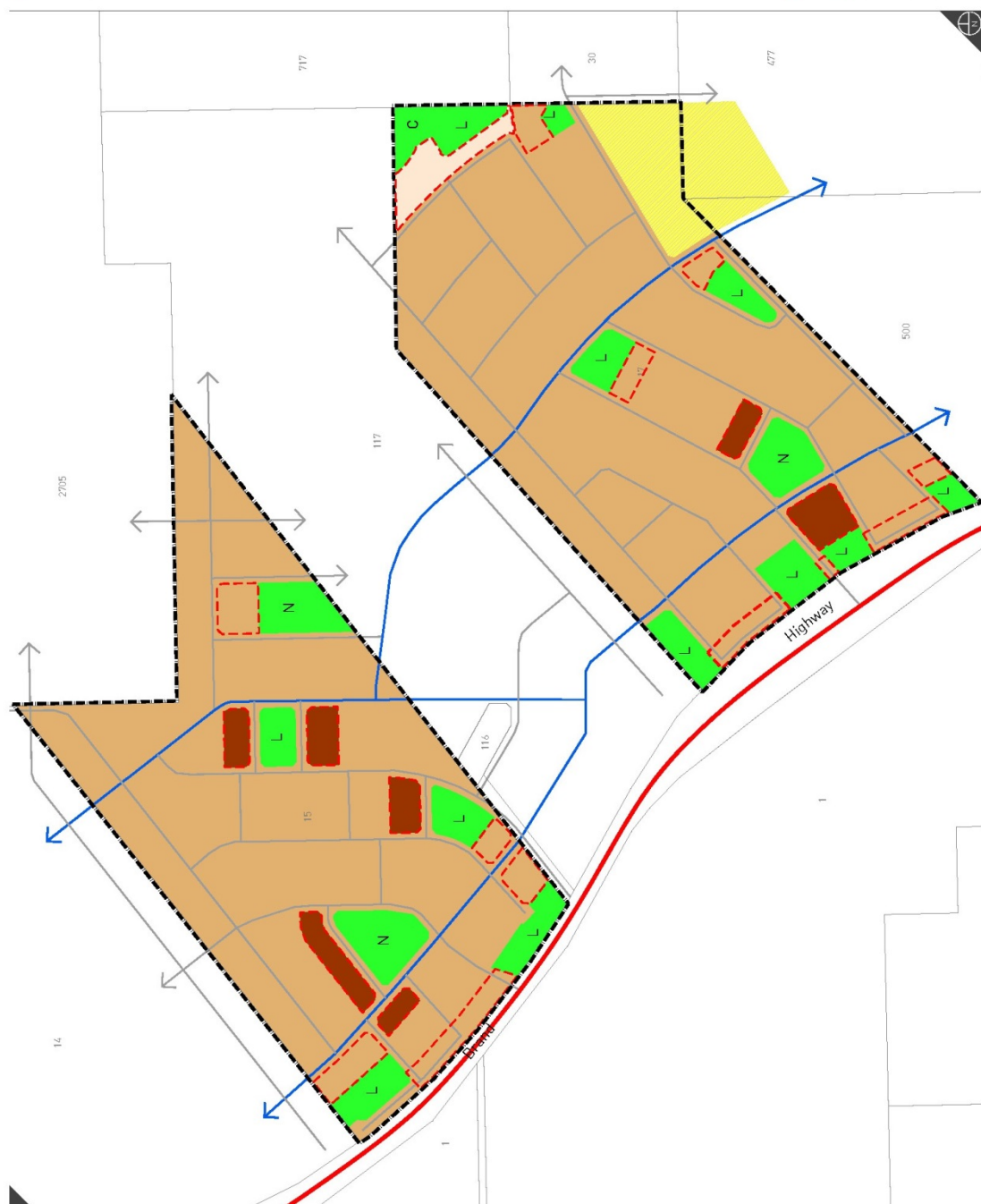
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I	2015/09/11	M. Sullivan
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Designer: R. Cumming
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Projection: MGA50
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Customer provided by: Lindgate



Rudds Gully Local Structure Plan

Plan 1

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Appendix C

GERALDTON NORTH-SOUTH HIGHWAY PROJECT

GERALDTON - LOCALITY PLAN

