# Attachment Five

Transport Impact Assessment

# Proposed ALDI Store, Yanchep
# 2 Kakadu Road

## Transport Impact Assessment

**PREPARED FOR:**
**ALDI Stores**

**February 2020**

# Document history and status

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**Client:** ALDI Stores

**Project:** 2 Kakadu Road

**Document revision:** r01a

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# REPORT TABLES

# 1.0 Summary

This Transport Impact Assessment (TIA) has been prepared with respect to the proposed ALDI store to be located at 2 Kakadu Road in Yanchep, City of Wanneroo.

The subject site is proposed to be developed in two parts with the southern portion being the proposed ALDI store and the northern portion being a future (yet to be determined) development. A single crossover on Kakadu Road will serve both developments. However, the focus of this Development Application is the ALDI store only.

The subject site is presently vacant. The proposed development will be served by a single full-movement crossover on Kakadu Road. The site has no direct accessibility by pedestrian path network at the moment; however, this situation will change with the full build-out of the locality. The site also enjoys access to local public transport services which operate along Yanchep Beach Rod and Marmion Avenue.

The aim of this TIA is to assess the traffic impact of the proposed development by estimating the traffic that will be generated by the proposal and evaluating the resultant traffic pattern on the surrounding road network. This evaluation includes capacity assessment of the intersections of Yanchep Beach Road with Kakadu Road, assessment of the operation of the site's crossover, review of the proposed parking supply and review of access to the site by all modes of transport.

Transcore has undertaken traffic count surveys of Yanchep Beach Road and Kakadu Road during February 2020 to gain better understanding of existing traffic patterns.

The capacity assessment of the nearby intersection of Yanchep Beach Rod/Kakadu Road has confirmed that this intersection can accommodate the development-generated traffic and would continue to enjoy similar operating conditions in the post-development and 10-year post-development scenarios with moderate increases in delays and queues.

# 2.0 Introduction

This Transport Impact Assessment has been prepared by Transcore on behalf of ALDI Stores. The subject of this report is an ALDI store proposed to be located at 2 Kakadu Road in Yanchep. The subject site is located a short distance to the southwest of existing Yanchep Road/Kakadu Road intersection as shown in **Figure 1**.


**Figure 1: Location of the subject site**

Key issues that will be addressed in this report include capacity assessment of the surrounding road network including local intersection of Yanchep Beach Road/Kakadu Road and review of the proposed site's access system. The parking demand for the store and access to the site by all modes of transport will also be considered.

The location of the site within the Metropolitan Region Scheme is illustrated in **Figure 2**. The Metropolitan Regional Scheme also confirms that the subject site is fronting Yanchep Beach Road which is classified as *Other Regional Road (Blue Road)*. The site is zoned "Urban" in the MRS.

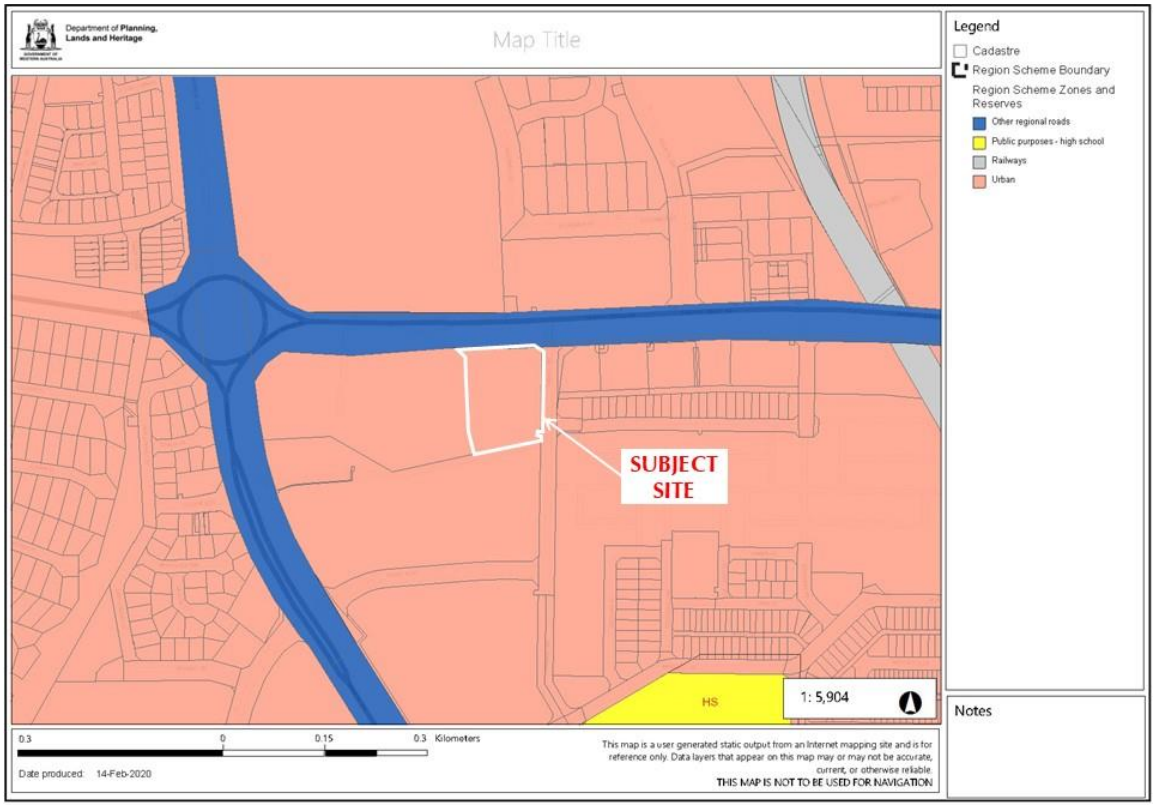


**Figure 2. Site location within the Metropolitan Region Scheme**

# 3.0 Development Proposal

The development proposal entails construction of a new ALDI store at 2 Kakadu Road in Yanchep. The subject site (approximately 1.16ha in size) occupies an area at the southwest corner of the existing Yanchep Beach Road/Kakadu Road intersection and a short distance east of Marmion Avenue.

The subject site is proposed to be bisected by the proposed crossover and associated main east-west driveway in two sections with southern part proposed to accommodate a new ALDI store development and the northern part to be developed at a later stage. Both ALDI store and the future development are proposed to be served by a joint crossover onto Kakadu Road. At this stage it is not known what type of development will occupy the northern portion of the subject site. It should be noted that the focus of this assessment is solely on the southern portion of the site and the proposed ALDI store.

The ALDI store is proposed to occupy space at the southern end of the site with the balance (of the southern portion of the site) being the open-air car park. The crossover proposed to service the site is to be located on Kakadu Road, approximately 40m to the south of the existing Yanchep Beach Road/Kakadu Road intersection.

The ALDI store is proposed to comprise the following elements:

- ALDI retail outlet at ground level of approximately 1,747m$^2$ (GLA);
- Supporting amenities inclusive of produce storage areas, freezers, chillers and staff rooms;
- Loading dock for the 19m semi-trailer at the western side of the store; and,
- Open-air, ground level car park with access off Kakadu Road totalling 111 parking bays including three ACROD bays.

A full-movement crossover on Kakadu Road is proposed to be located approximately 40m south of Yanchep Beach Road also staggered approximately 20m to the existing service station crossover on eastern side of Kakadu Road.

Pedestrians will access the store via the future footpath to be constructed along the western side of Kakadu Road.

A total of three bike racks are proposed to be located next to trolley bays and in the proximity of the main entry into the store. This will ensure passive surveillance is provided for the bike racks.

The proposed concept site plan for the proposed development is included in **Appendix A**.

A turn path assessment was undertaken to ensure the suitability of the geometry of the Kakadu Road crossover and the internal site's driveways including the loading

area to accommodate a standard 19m semi-trailer delivering goods to the site, which is the type of vehicle typically used by ALDI stores. The relevant turn path plans are shown in **Appendix B**.

# 4.0 Existing Situation

The subject site (2 Kakadu Road) is located at the southwest corner of the existing Yanchep Beach Road/Kakadu Road intersection and comprises an area of approximately 1.16ha. The site is bound by Kakadu Road to the east, existing private service road associated with the existing Woolworths store to the south, Yanchep Beach Road to the north and the Yanchep Sports Club complex to the immediate west. The site is also located approximately 250m east of Marmion Avenue.

The subject site is situated within a predominantly commercial zone which occupies land at the southeast corner of Yanchep Beach Road/Marmion Avenue intersection (Yanchep Central). A residential zone is also being developed to the southeast of the site.

## *4.1 Existing Road Network*

**Yanchep Beach Road** is constructed as a 9.6m wide two-lane, single-carriageway road with on-road cycle lanes. Yanchep Beach Road is approximately 6km long and connects Wanneroo Road at the east end with the Yanchep town centre at the western end. It operates under a 60km/h speed limit in the vicinity of the subject site. A 2.4m wide shared path is in place along the southern side of the road providing connection to the bus stop located immediately adjacent to the subject site. Two pedestrian crossing facilities are provided at the intersection with Kakadu Road and immediately to the west, adjacent to the subject site. Refer **Figure 3** and **Figure 4** for more details.

**Figure 3: Westbound view along Yanchep Beach Road from Kakadu Road intersection**

Adjacent to the site, Yanchep Beach Road is classified as a *Distributor B* road in the Main Roads WA *Metropolitan Functional Road Hierarchy*.

Based on the most recent traffic count data sourced from Main Roads WA, Yanchep Beach Road (west of Wanneroo Road) carried approximately 5,460 vehicles per day (vpd) with approximately 8% heavy vehicle component.

However, based on Transcore's own traffic count survey conducted in February 2020 Yanchep Beach Road, immediately west of Kakadu Road, carried approximately 9,800vpd during a typical weekday with approximately 8.8% heavy vehicle component.

**Figure 4: Easttbound view along Yanchep Beach Road from Kakadu Road intersection**

**Kakadu Road**, is constructed as a 7.6m wide two-lane, single-carriageway road with parking embayments on the east side of the road. At present, there are no pedestrian paths on either side of the road in the vicinity of the site; however, this will change with the ongoing development of the area. Refer **Figure 5** and **Figure 6** for more details.

Kakadu Road is classified as an *Access Street* in the Main Roads WA *Metropolitan Functional Road Hierarchy*. It operates under the default built-up area speed limit of 50km/h. Based on the traffic counts undertaken by Transcore (February 2020) Kakadu Road, immediately south of Yanchep Beach Road, carried about 4,520vpd during a regular weekday.

**Figure 5: Northbound view along Kakadu Road in the vicinity of future site's crossover**


**Figure 6: Southbound view along Kakadu Road in the vicinity of future site's crossover**

Kakadu Road forms a left-in/left-out only intersection with a solid median on Yanchep Beach Road terminating on its southern approach. Kakadu Road also forms priority-controlled T-intersections with the private service road (Woolworths access road) and Avon Road in the immediate vicinity of subject site.

The Main Roads WA Intersection *Crash Ranking Report* provides detailed crash data for intersections over the 5-year period ending 31 December 2018. Based on the latest information no crashes were recorded during this period at either of the three intersections.

## *4.2 Public Transport Access*

The subject site is served by two bus services that operate along Marmion Avenue and Yanchep Beach Road (bus routes 490 and 491). The closest pair of bus stops to the site are located on Marmion Avenue some 280m west of the site and on Yanchep Beach Road immediately to the north of the site.

The available of bus services provide connectivity to Butler Train Station, which provides access to the greater rail network. Other key regional nodes such as Two Rocks, Eglinton, Alkimos and Butler are also made accessible by existing bus services.

The map of existing public transport services available in the vicinity of the subject site is provided in **Figure 7**.

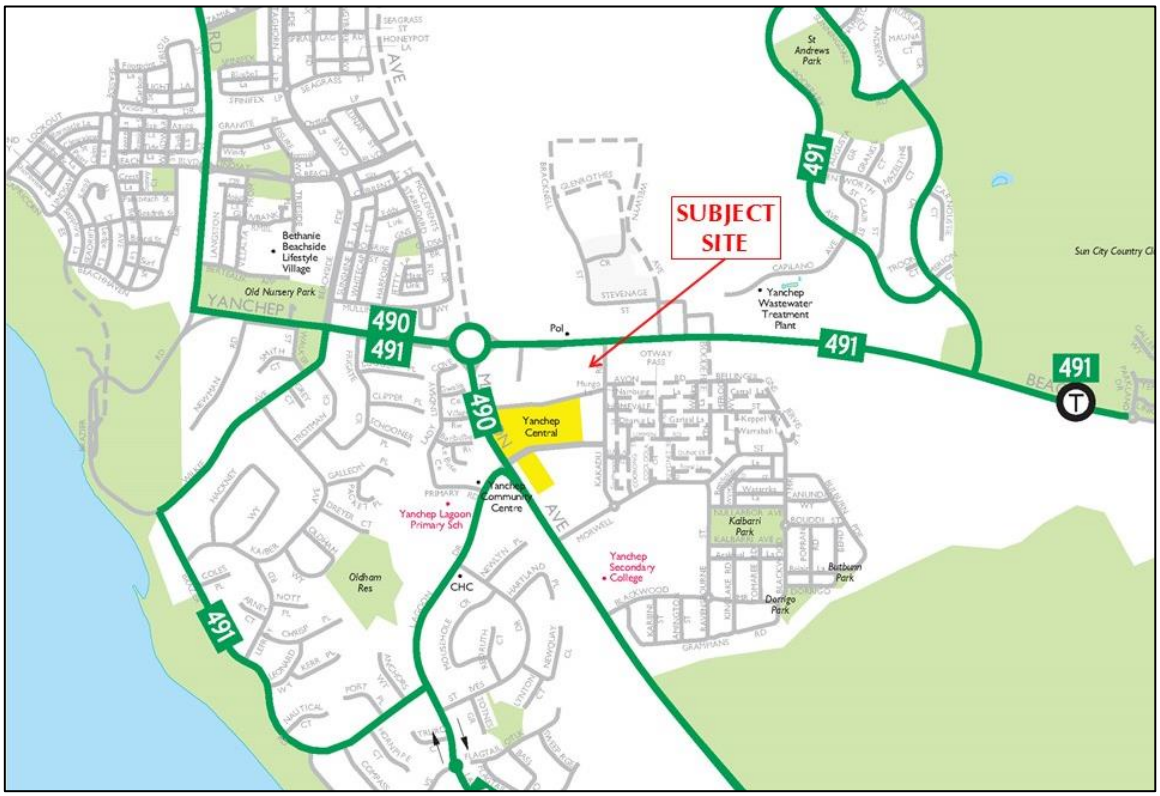


**Figure 7: Existing bus routes (source: Transperth)**

## *4.3 Pedestrian and Cyclist Facilities*

The cycling and pedestrian facilities are presently limited within this locality as it is currently still being developed. This situation is expected to change significantly once the locality is fully developed. At present, a pedestrian path is in place on Kakadu Road only at the southern section up to Peoni Road some 150m to the south of the subject site.

A shared path is presently in place along the southern side of Yanchep Beach Road and adjacent to the site.

# 5.0 Changes to Surrounding Transport Networks

No specific changes to the surrounding transport networks are proposed as part of the development proposal.

Yanchep Beach Road is planned to be duplicated at some point in the future with a second carriageway to be constructed to the south of the existing one.

Marmion Avenue is currently undergoing duplication works.

# 6.0 Integration with Surrounding Area

The proposed development is of retail character and as such is in accordance with the planning for the locality.

The site has reasonably good road accessibility which in turn minimises any potential impact on traffic and/or delivery and service vehicles accessing the proposed development.

The existing bus routes are operating in the immediate vicinity of the site and will service the proposed development well providing suitable travel alternatives, particularly for employees.

# 7.0 Traffic Assessment

## *7.1 Assessment Period*

The proposed development is a retail outlet and will generate highest traffic movements during the weekday afternoon and Saturday midday periods, although ALDI stores generally trade seven days a week.

Review of the latest available traffic count data on abutting roads and the traffic counts undertaken by Transcore, it is anticipated that the highest demand on the local road network would occur during weekday afternoon commuter peak hour.

Therefore, the analysis in this report focuses on the Friday afternoon peak hour (3:00-4:00PM). As ALDI stores generate little or no traffic during the typical weekday morning peak hour, the traffic assessment for this period is not warranted.

It is anticipated that the proposed ALDI store will be fully developed and operating by the end of 2022. As such, the post-development scenario assumes the assessment year to be that of 2022.

Similarly, the 10-year time horizon assessment for this type of transport assessment is generally taken as 10 years after full development which in this case would be around 2032.

## *7.2 Trip Generation and Distribution*

The traffic volume that will be generated by the proposed development has been estimated using trip generation rates derived from the Roads and Traffic Authority of New South Wales *Guide to Traffic Generating Developments (2002).*

Accordingly, it is estimated that the proposed development would generate approximately 2,212 total Friday trips with approximately 232 trips during the 4:00-5:00PM peak hour period.

The directional split of inbound and outbound trips for the proposed development is estimated to be about 50/50 for inbound/outbound trips during the weekday PM peak period.

Trips associated with the proposed retail development also comprise passing-trade trips (i.e. trips already on the road network and not new traffic generated by the proposed development). However, in order to provide for a robust assessment a minimal passing trade discount of about 10% for the proposed development has been assumed for the Yanchep Beach Road and Marmion Avenue traffic.

The distribution of traffic to and from the proposed development for the post-development scenario has been evaluated by considering the catchment areas that are likely to be served by the proposed ALDI store as well as the available access and egress routes to and from the site. Consequently, the directional split of traffic to and from the site is assumed as follows:

- 30% of all traffic to/from east of the site;
- 30% of all traffic to/from west and northwest of the site; and
- 60% of all traffic to/from south and southwest of the site direction.

## *7.3 Nearby Developments and Transport Proposals*

The subject locality is currently undergoing rapid development in terms of land use and road network. The area at the southeast corner of Yanchep Beach Road/Marmion Avenue roundabout has been planned as a district centre with commercial/retail and recreational uses.

Yanchep Beach Road is planned to be duplicated with a new carriageway built south of the existing one; however, the Kakadu Road intersection will maintain its left-in/left-out only form, at least in the initial post-upgrade stage. There is a potential that this intersection may be converted to a four-way signalised intersection with a new northern leg as Kakadu Road extension if planning investigation provide sufficient justification.

## *7.4 Traffic Flows*

The traffic movements generated by the proposed development have been manually assigned on the adjacent road network in line with the available access and egress routes. Accordingly, the resulting traffic movements generated by ALDI store during typical Friday afternoon peak hour are shown in **Figure 8.**

In order to establish existing traffic flows and patterns on the adjacent road network Transcore has undertaken a traffic count survey for Yanchep Beach Road and Kakadu Road over a five-day period (12$^{th}$ – 17$^{th}$) in February 2020. The typical weekday afternoon peak hour traffic flows are shown in **Figure 9**.

The construction and completion of the proposed ALDI store is expected to occur by the end of 2022. In order to approximate the year 2022 traffic volumes on relevant roads a typical annual traffic growth of 2.0% p.a. (cumulative growth of 4%) was assumed and has been applied for background traffic. These traffic volumes have been used in intersection and crossover capacity analysis for the post-development stage.

The same principle was applied for the 2032 scenario with traffic flows on adjacent roads increased by 24% over the 2020-2032 period. It should be noted however, that according to the *St Andrews District Structure Plan – Transport Study (SKM 2007)* modelling Kakadu Road, with full structure plan build out, is forecast to carry around

5,000vpd. This daily traffic volume is lower than what is modelled by Transcore and as such the 2032 capacity analysis of Yanchep Beach Road/Kakadu Road intersection and development's crossover on Kakadu Road can be considered robust and conservative.

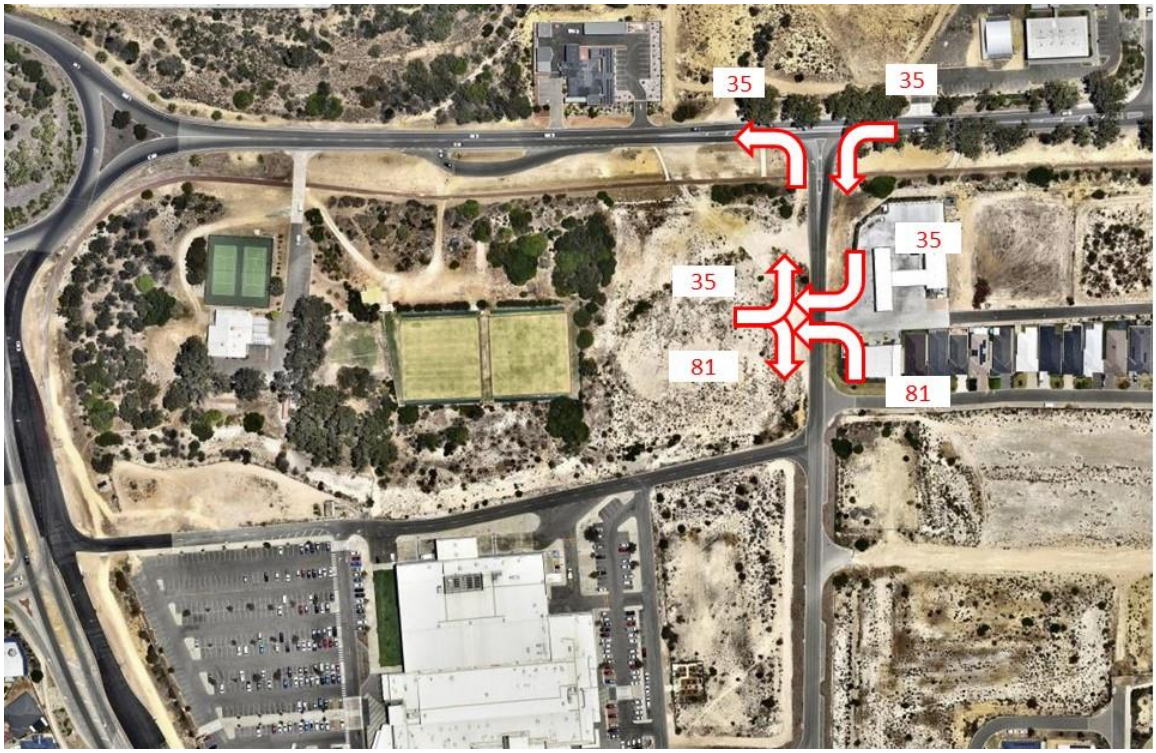


**Figure 8: Estimated traffic flows from the proposed ALDI store – Friday afternoon peak hour**


**Figure 9: Existing traffic flows in the vicinity of subject site (survey results) – weekday afternoon peak hour**

## *7.5 Analysis of Intersections*

The operation of the adjacent intersection of Yanchep Beach Road/Kakadu Road was analysed for the existing situation and the post-development (year 2022) scenario during the critical weekday afternoon peak hour.

The capacity assessment of the Yanchep Beach Road/Kakadu Road intersection was also undertaken for the +10 year time horizon scenario (year 2032). At this stage Yanchep Beach Road is expected to be duplicated but the Kakadu Road intersection will likely continue to operate in its left-in/left-out format.

The capacity analysis 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 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 Yanchep Beach Road/Kakadu Road for existing, post-development and 2032 scenarios are shown in tabular form in **Table 2** and **Table 3** in **Appendix C** and discussed in the following paragraphs.

**Yanchep Beach Road/Kakadu Road intersection**

The result of the capacity analysis for the Yanchep Beach Road/Kakadu Road intersection for existing situation shows very good overall operating conditions with moderate queues (seldom reaching two vehicles) on Kakadu Road approach and ample spare capacity (approximately 75%). Ample spare capacity (about 71%) remains available in the post-development stage with Kakadu Road queues increasing marginally. Refer **Table 2** and **Table 3** in **Appendix C** for more details.

The operation of this intersection in 2032 assessment year indicates that this intersection will continue to operate satisfactorily. The most pronounced delays and queues associated with the left-turn movement from Kakadu Road into Yanchep Beach Road of 4sec and up to two vehicles are recorded. The intersection would continue to enjoy approximately 65% of spare capacity in this period. Refer **Table 4** in **Appendix C** for more details.

Accordingly, it can be concluded that the Yanchep Beach Road/Kakadu Road intersection has more than sufficient capacity to accommodate the proposed development's traffic in the post-development and 2032 stages.

## *7.6 Analysis of Development Accesses*

The ALDI store is proposed to take access via a full-movement crossover on Kakadu Road to be located approximately 40m south of Yanchep Beach Road intersection.

The results of the SIDRA analysis for the post-development scenario indicates that the proposed development's crossover on Kakadu Road will operate at a very good overall level of service A (LoS A). No significant delays or queuing are expected at the crossover or for through traffic on Kakadu Road. The crossover operates with ample spare capacity in the post-development stage (year 2022). Refer **Table 5** in **Appendix C** for more details.

Similarly, the 2032 assessment confirms that the Kakadu Road crossover would continue to operate with a very good overall LoS A and marginal delays and queues and with ample spare capacity. Refer **Table 6** in **Appendix C** for more details.

Accordingly, it is confirmed that the proposal access system will serve the proposed development satisfactorily and will provide sufficient capacity.

## *7.7 Impact on Surrounding Roads*

The access and egress routes to and from the site are generally via district distributor roads such as Yanchep Beach Road and Marmion Avenue.

Considering existing traffic volumes on these roads, their standard, classification and capacity thresholds, it is concluded that the impact from the proposed development on these roads would be insignificant. The estimated cumulative impact on relevant roads is presented in **Table 1**.

Kakadu Road is classified as an *Access Street* in the Main Roads WA *Metropolitan Functional Road Hierarchy*. It is however planned to be classified as a Neighbourhood Connector as identified in ASP 40 Structure Plan (Plan No. 1 – Local Structure Plan) map.

Based on the traffic counts conducted in February 2020 Kakadu Road immediately south of Yanchep Beach Road carries about 4,500vpd. However, site observations confirm that a significant portion of traffic travel only between Yanchep Beach Road and the local petrol station and back (or to/from Woolworth's service road) so the section of this road south of service road does not experience this level of daily traffic.

The proposed development is anticipated to increase daily traffic volume on Kakadu Road north and south of the site by approximately 664vpd and 1,550vpd,

respectively. The post-development daily volumes on Kakadu Road to the north of site's crossover are moderate and will not have a practical impact on traffic operation or road capacity. The addition of development-generated traffic on the section of road between the subject site and service road would result in total post-development traffic volumes in order of about 5,400vpd, and although noticeable, would be only over a short section of Kakadu Road and within practical capacity of this type of road.

**Table 1. Level of traffic impact on adjacent roads**

| Road | Section | Existing traffic (vpd) | Additional traffic (vpd) | Increase (%) |
|---|---|---|---|---|
| Yanchep Beach Road | W of Kakadu Rd | 9,800 | 330 | ~3.4% |
| | E of Kakadu Rd | 9,800 | 330 | ~3.4% |
| Kakadu Road | N of crossover | 4,520 | 660 | 14.7% |
| | Between crossover & service road | 3,850[1] | 1,550 | 40.3% |
| | S of service road | 3,150[2] | 1,550 | 49.2% |

## *7.8 Impact on Neighbouring Areas*

The traffic generated by the proposed ALDI store would have a negligible impact on nearby residential areas, with development traffic using mostly district-level roads or roads within the commercial/retail zone.

## *7.9 Traffic Noise and Vibration*

It generally requires a doubling of traffic volumes on a road to produce a perceptible 3dB(A) increase in road noise. The proposed development will not increase traffic volumes or noise on Yanchep Beach Road or Kakadu Road anywhere near this level.

The nature of the development is essentially retail and as such it will not generate significant traffic volumes late at night, so night time traffic noise and vibration are not anticipated to be an issue for this development either.

## *7.10 Road Safety*

No particular road safety issues have been identified for the proposed ALDI development.

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[1] *Estimation*
[2] *Estimation*

# 8.0 Parking

The total on-site car parking provision for the proposed ALDI store comprises 111 parking bays. A total of three ACROD bays are proposed in the vicinity of the main entry into the ALDI store to ensure easy access.

Three bike racks are also proposed at the northern side of the store, immediately next to the trolley bay, to facilitate bicycle parking and ensure passive surveillance.

A separate service bay (i.e. loading area) is provided and clearly marked for loading/unloading and waste collection operations at the western side of the ALDI building and is proposed to be accessed from the internal car park driveways.

According to the advice provided to Transcore, the on-site parking provision meets the parking requirement for the proposed type of development as set out in the relevant parking policies.

# 9.0 Public Transport Access

The existing public transport services in this area are covered in in section **4.2** of this report. Access to the nearby bus stops is either available via existing path system or will ultimately be available once the full build-out of the locality is completed.

# 10.0 Pedestrian and Cyclist Access

Due to the type of retail store (weekly shopping and bulk purchases) the proposed ALDI outlet is not expected to attract a significant number of walk-in customers or bicycle trips; however, the appropriate facilities will be provided for these modes of transport.

It is anticipated that once the locality is fully built-out with completion of, now absent, path network direct access to the site by pedestrians and cyclists will be facilitated.

# 11.0 Conclusions

This Transport Impact Assessment has been prepared for the proposed ALDI store to be located at 2 Kakadu Road in Yanchep, City of Wanneroo.

The subject site is proposed to be divided in two sections with the southern portion being the proposed ALDI store and the northern portion being a future (yet to be determined) development. A single crossover on Kakadu Road is proposed to serve both developments.

The proposed ALDI store is expected to generate approximately 2,212 total weekday trips (both inbound and outbound) with approximately 232 trips (both inbound and outbound) during the weekday afternoon peak period, which is anticipated to be the critical period for the surrounding road network.

The capacity assessment of the nearby intersection of Yanchep Beach Road/Kakadu Road has confirmed that the intersection has sufficient capacity to accommodate the development-generated traffic and would continue to enjoy similar operating conditions in the post-development and 10-year post-development scenarios with moderate increases in delays and queues. Capacity issues are not expected for the Kakadu Road crossover either.

The on-site parking provision of 111 bays meets the parking requirement for the proposed type of development.

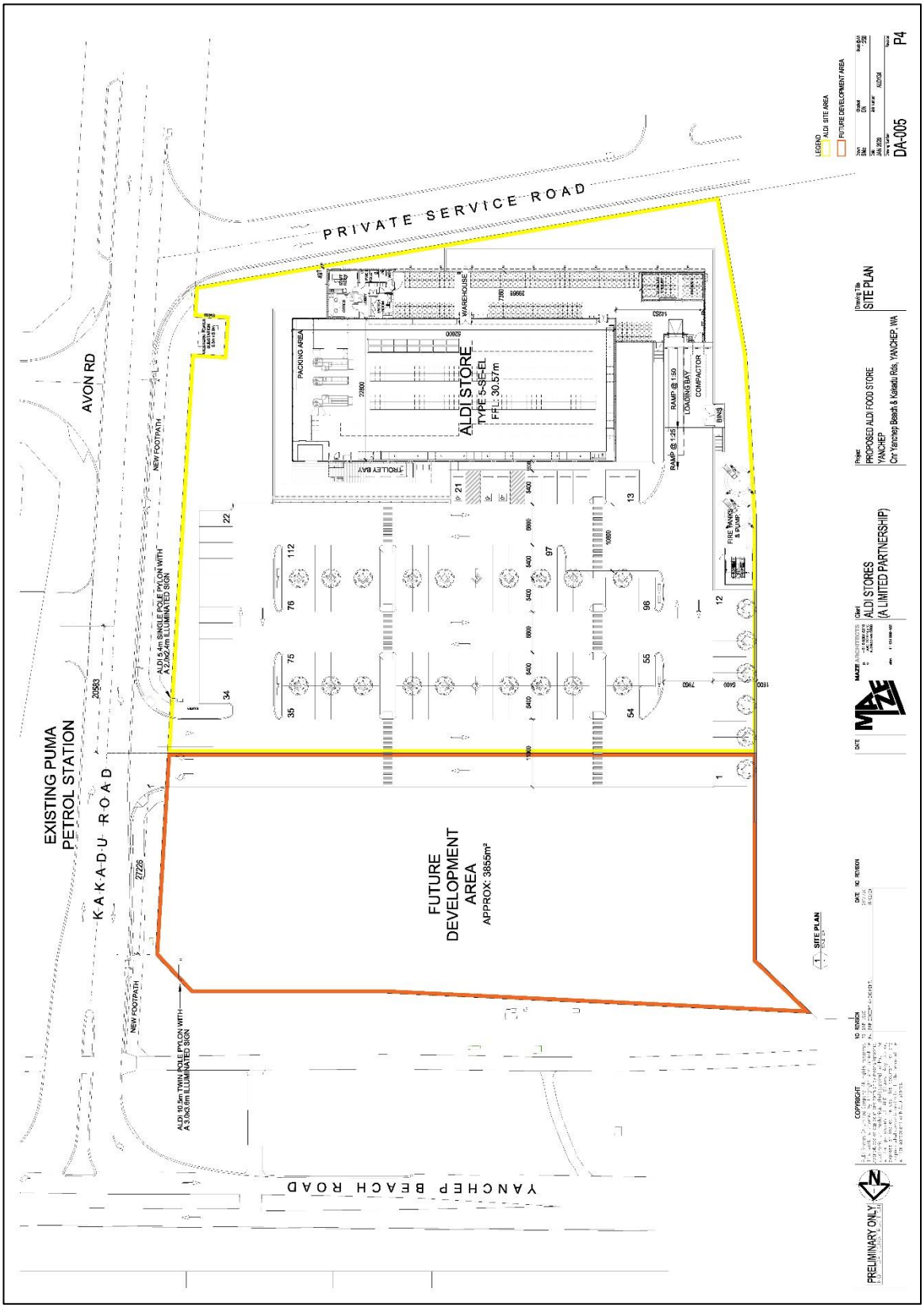
The site presently lacks direct access by pedestrians due to incomplete local path network; however, this situation is expected to change with full build-out of the locality.

The existing public transport services in this area also provide for alternative modes of transport to and from the site.

It is therefore concluded that the existing and future planned road network can accommodate the traffic from the proposed development without undermining traffic operations.

# Appendix A

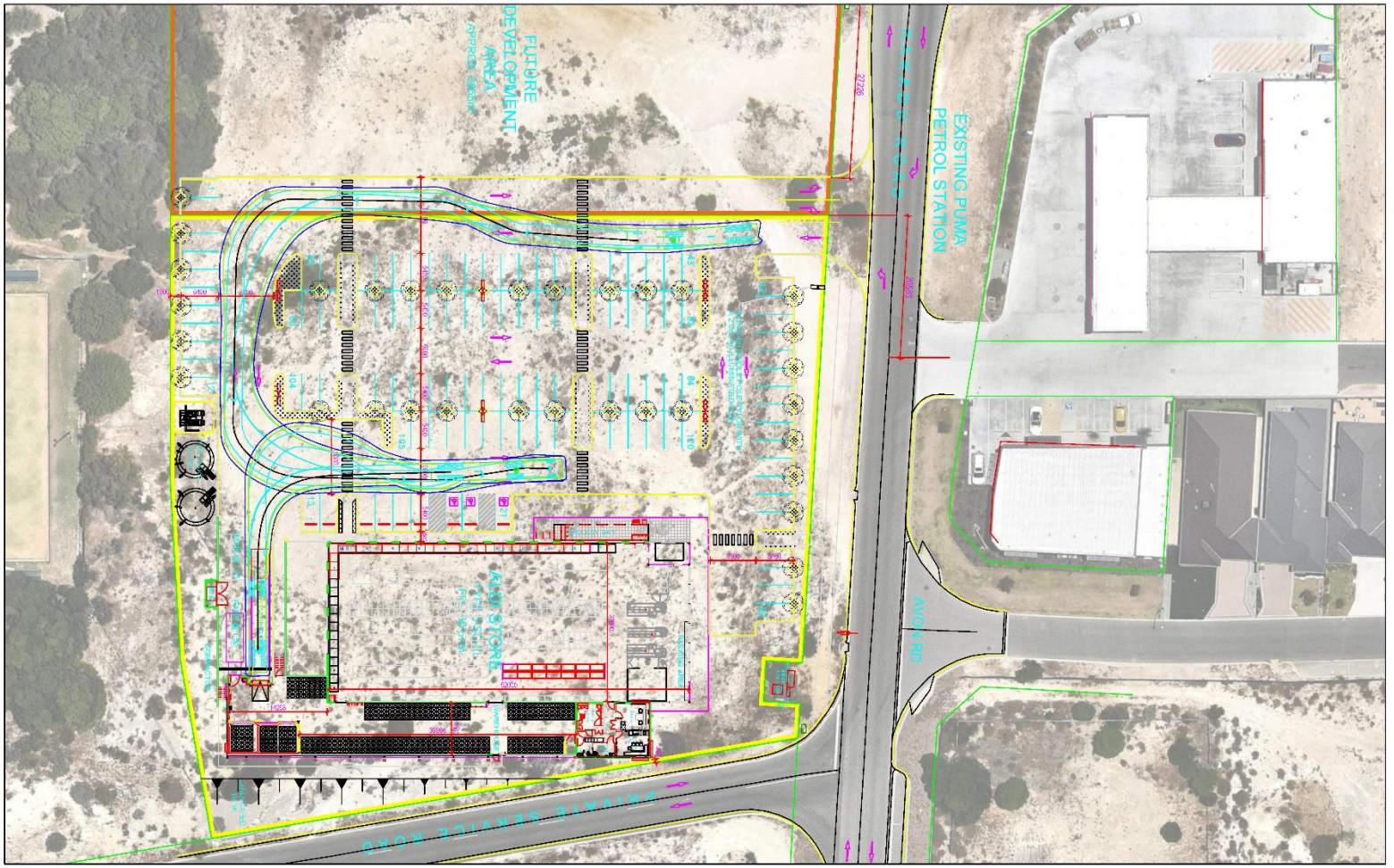
## SITE PLAN


PRIVATE SERVICE ROAD
AVON RD
KAKADU ROAD
YANCHEP BEACH ROAD
EXISTING PUMA PETROL STATION
ALDI STORE
TYPE 5-SEL
FFL 30.57m
WAREHOUSE
PACKING AREA
LOADING BAY
COMPACTOR
TROLLEY BAY
FUTURE DEVELOPMENT AREA
APPROX: 3855m²
NEW FOOTPATH
ALDI 15.4m SINGLE POLE PYLON WITH A 2.0x2.4m ILLUMINATED SIGN
ALDI 10.5m TWIN POLE PYLON WITH A 3.0x3.6m ILLUMINATED SIGN
LEGEND
ALDI SITE AREA
FUTURE DEVELOPMENT AREA
DA-005
P4
SITE PLAN
PROPOSED ALDI FOOD STORE
YANCHEP
Cnr Yanchep Beach & Kakadu Rds, YANCHEP, WA
ALDI STORES
(A LIMITED PARTNERSHIP)
MAZE ARCHITECTS
PRELIMINARY ONLY
COPYRIGHT

# Appendix B

## TURN PATH PLANS FOR 19m SEMI-TRAILER

No. OF 'D' PALLETS (Excl. CHILL/FRZ) 335 352 -17
EXISTING PUMA
PETROL STATION
YANCHEP BEACH ROAD
FUTURE
DEVELOPMENT
AREA
LEGEND
Vehicle Body
Wheel Path
500mm Clearance
t19.001.H.sk01
13/02/2020
Scale: 1:500 @ A3
ALDI Stores - Yanchep
Austroads 2013: 19.0m Semi-Trailer
Semi-Trailer Left In from Yanchep Beach Road




ALDI Stores - Yanchep

Austroads 2013: 19.0m Semi-Trailer Semi Trailer Circulation

LEGEND

Vehicle Body

Wheel Path

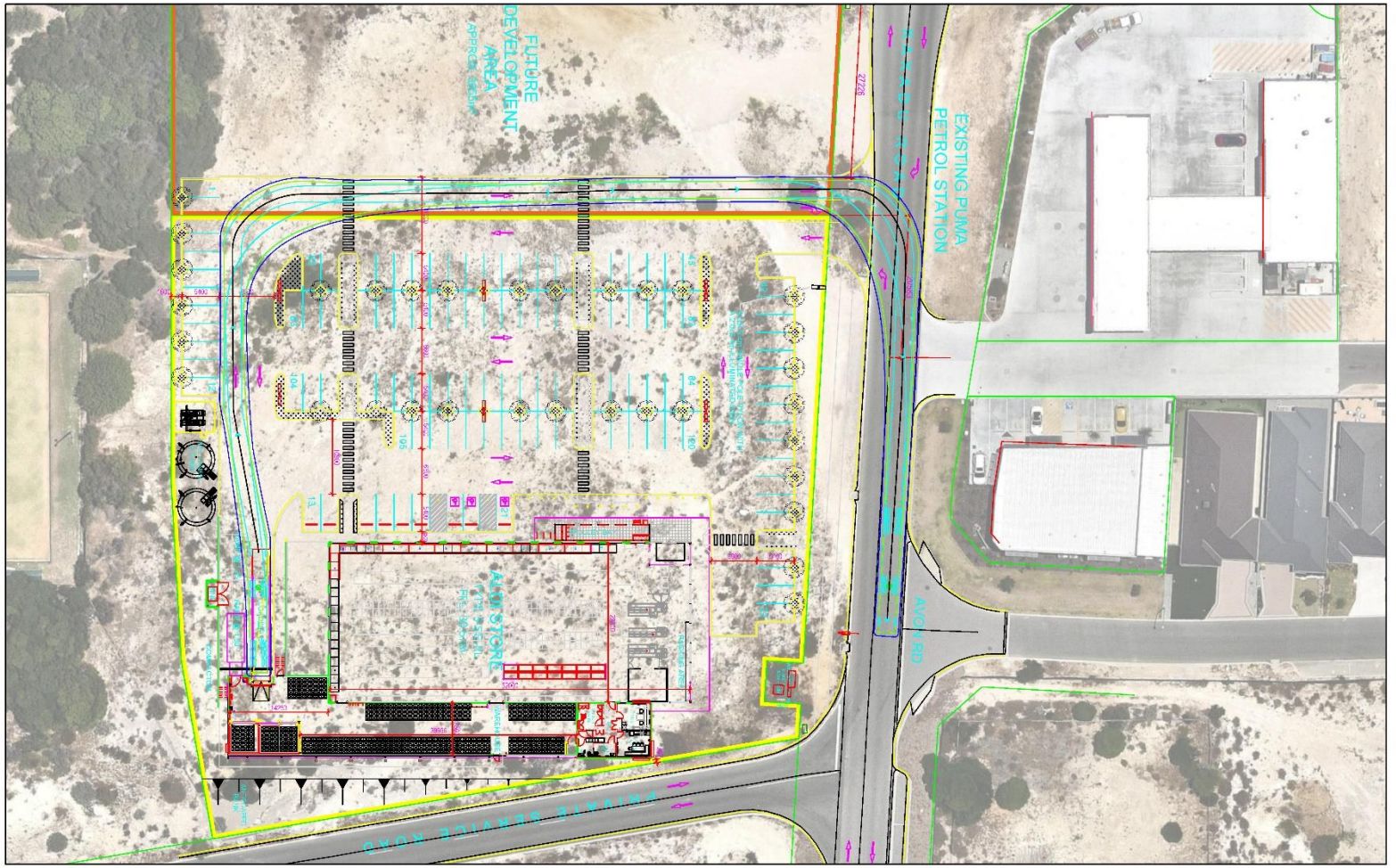
500mm Clearance

t19.001.H.sk05

13/02/2020

Scale: 1:500 @ A3

transcore




ALDI Stores - Yanchep

Austroads 2013: 19.0m Semi-Trailer

Semi Trailer Circulation and Right Out Onto Kakadu Rd

LEGEND

Vehicle Body

Wheel Path

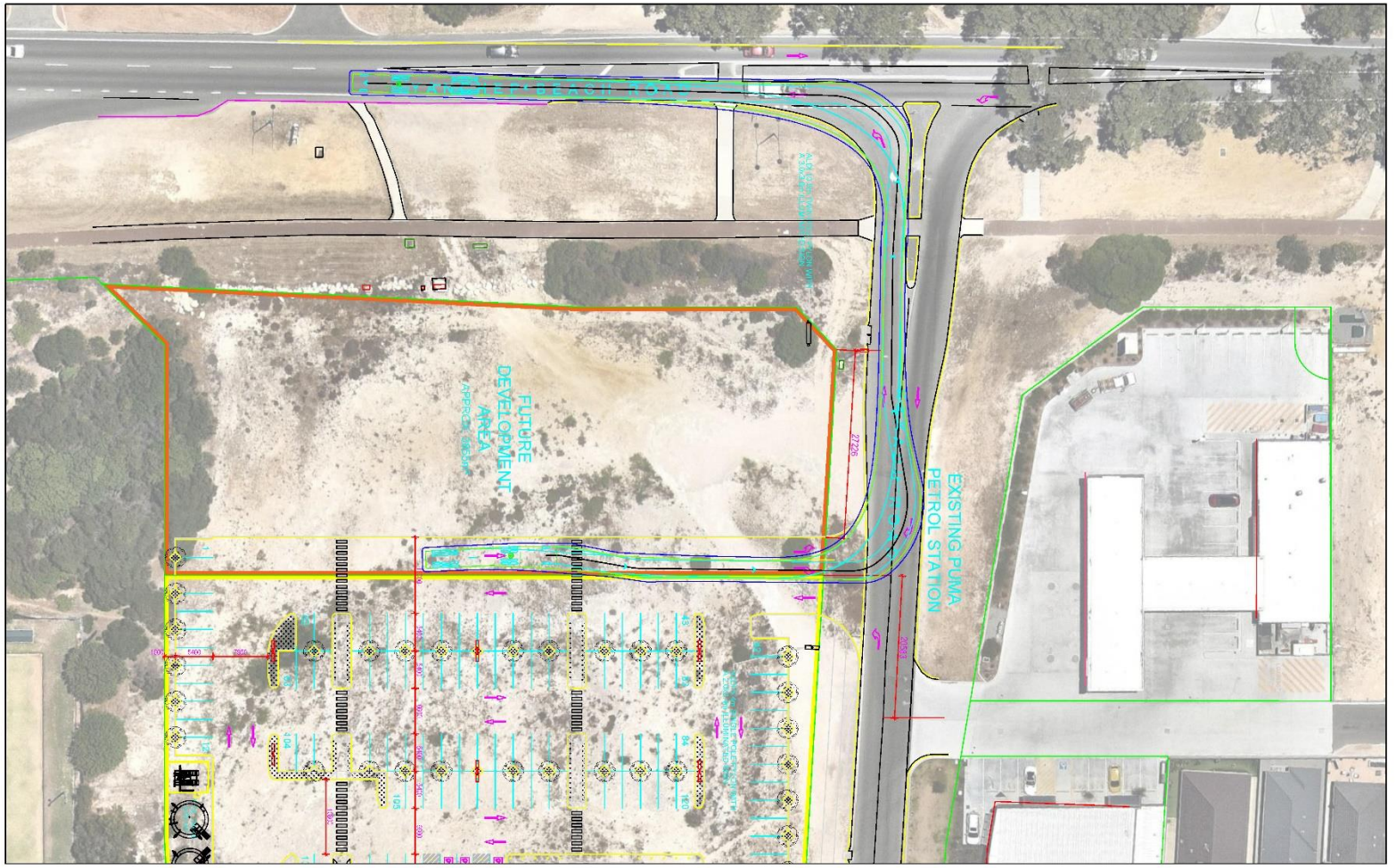
500mm Clearance

t19.001.H.sk06

13/02/2020

Scale: 1:500 @ A3

transcore




ALDI Stores - Yanchep
Austroads 2013: 19.0m Semi-Trailer
Semi Trailer Left Out Onto Kakadu Rd

LEGEND
Vehicle Body
Wheel Path
500mm Clearance

t19.001.H.sk07
13/02/2020
Scale: 1:500 @ A3

transcore

# Appendix C

## SIDRA INTERSECTION ANALYSIS

## Table 2. SIDRA results for the Yanchep Beach Road/Kakadu Road intersection – weekday PM peak (existing situation)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Kakadu Road | | | | | | | | | | | | |
| 1 | L2 | 335 | 4.9 | 0.253 | 4.4 | LOS A | 1.2 | 8.6 | 0.35 | 0.57 | 0.35 | 44.7 |
| Approach | | 335 | 4.9 | 0.253 | 4.4 | LOS A | 1.2 | 8.6 | 0.35 | 0.57 | 0.35 | 44.7 |
| East: Yanchep Beach Road | | | | | | | | | | | | |
| 4 | L2 | 149 | 4.9 | 0.189 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 0.00 | 52.6 |
| 5 | T1 | 200 | 8.8 | 0.189 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 0.00 | 57.7 |
| Approach | | 349 | 7.1 | 0.189 | 2.4 | NA | 0.0 | 0.0 | 0.00 | 0.25 | 0.00 | 56.1 |
| West: Yanchep Beach Road | | | | | | | | | | | | |
| 11 | T1 | 417 | 8.8 | 0.223 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 60.0 |
| Approach | | 417 | 8.8 | 0.223 | 0.0 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 60.0 |
| All Vehicles | | 1101 | 7.1 | 0.253 | 2.1 | NA | 1.2 | 8.6 | 0.11 | 0.25 | 0.11 | 54.9 |

## Table 3. SIDRA results for the Yanchep Beach Road/Kakadu Road intersection – weekday PM peak (post-development 2022)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | HV % | Arrival Flows Total 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 | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Kakadu Road | | | | | | | | | | | | | | |
| 1 | L2 | 385 | 4.9 | 385 | 4.9 | 0.293 | 4.4 | LOS A | 1.4 | 10.3 | 0.37 | 0.58 | 0.37 | 44.7 |
| Approach | | 385 | 4.9 | 385 | 4.9 | 0.293 | 4.4 | LOS A | 1.4 | 10.3 | 0.37 | 0.58 | 0.37 | 44.7 |
| East: Yanchep Beach Road | | | | | | | | | | | | | | |
| 4 | L2 | 193 | 4.9 | 193 | 4.9 | 0.216 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.28 | 0.00 | 55.1 |
| 5 | T1 | 207 | 8.8 | 207 | 8.8 | 0.216 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.28 | 0.00 | 57.4 |
| Approach | | 400 | 6.9 | 400 | 6.9 | 0.216 | 2.7 | NA | 0.0 | 0.0 | 0.00 | 0.28 | 0.00 | 56.6 |
| West: Yanchep Beach Road | | | | | | | | | | | | | | |
| 11 | T1 | 471 | 8.8 | 471 | 8.8 | 0.251 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 471 | 8.8 | 471 | 8.8 | 0.251 | 0.0 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| All Vehicles | | 1256 | 7.0 | 1256 | 7.0 | 0.293 | 2.2 | NA | 1.4 | 10.3 | 0.11 | 0.27 | 0.11 | 54.9 |

## Table 4. SIDRA results for the Yanchep Beach Road/Kakadu Road intersection – weekday PM peak (10-year post-development 2032)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | HV % | Arrival Flows Total 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 | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Kakadu Road | | | | | | | | | | | | | | |
| 1 | L2 | 452 | 4.9 | 452 | 4.9 | 0.349 | 3.5 | LOS A | 1.8 | 13.0 | 0.05 | 0.52 | 0.05 | 45.6 |
| Approach | | 452 | 4.9 | 452 | 4.9 | 0.349 | 3.5 | LOS A | 1.8 | 13.0 | 0.05 | 0.52 | 0.05 | 45.6 |
| East: Yanchep Beach Road | | | | | | | | | | | | | | |
| 4 | L2 | 229 | 4.9 | 229 | 4.9 | 0.129 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.56 | 0.00 | 51.1 |
| 5 | T1 | 248 | 8.8 | 248 | 8.8 | 0.129 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 0.00 | 59.8 |
| Approach | | 478 | 6.9 | 478 | 6.9 | 0.129 | 2.7 | NA | 0.0 | 0.0 | 0.00 | 0.28 | 0.00 | 56.7 |
| West: Yanchep Beach Road | | | | | | | | | | | | | | |
| 11 | T1 | 554 | 8.8 | 554 | 8.8 | 0.148 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 60.0 |
| Approach | | 554 | 8.8 | 554 | 8.8 | 0.148 | 0.0 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 60.0 |
| All Vehicles | | 1483 | 7.0 | 1483 | 7.0 | 0.349 | 2.0 | NA | 1.8 | 13.0 | 0.02 | 0.25 | 0.02 | 55.3 |

## Table 5. SIDRA results for the Kakadu Road crossover – weekday PM peak (post-development 2022)

| Movement Performance - Vehicles | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | Turn | Demand Flows Total veh/h | HV % | Arrival Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
| South: Kakadu Road | | | | | | | | | | | | | | |
| 4 | L2 | 85 | 0.0 | 85 | 0.0 | 0.225 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.11 | 0.00 | 44.1 |
| 5 | T1 | 354 | 1.5 | 354 | 1.5 | 0.225 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.11 | 0.00 | 48.8 |
| Approach | | 439 | 1.2 | 439 | 1.2 | 0.225 | 0.9 | NA | 0.0 | 0.0 | 0.00 | 0.11 | 0.00 | 47.7 |
| North: Kakadu Road | | | | | | | | | | | | | | |
| 11 | T1 | 161 | 3.2 | 161 | 3.2 | 0.115 | 0.6 | LOS A | 0.3 | 2.4 | 0.22 | 0.11 | 0.22 | 48.2 |
| 12 | R2 | 37 | 0.0 | 37 | 0.0 | 0.115 | 5.2 | LOS A | 0.3 | 2.4 | 0.22 | 0.11 | 0.22 | 29.0 |
| Approach | | 198 | 2.6 | 198 | 2.6 | 0.115 | 1.4 | NA | 0.3 | 2.4 | 0.22 | 0.11 | 0.22 | 46.7 |
| West: ALDI Crossover | | | | | | | | | | | | | | |
| 1 | L2 | 37 | 0.0 | 37 | 0.0 | 0.031 | 1.2 | LOS A | 0.1 | 0.8 | 0.39 | 0.25 | 0.39 | 18.1 |
| 3 | R2 | 85 | 0.0 | 85 | 0.0 | 0.119 | 3.4 | LOS A | 0.4 | 2.7 | 0.49 | 0.52 | 0.49 | 37.9 |
| Approach | | 122 | 0.0 | 122 | 0.0 | 0.119 | 2.7 | LOS A | 0.4 | 2.7 | 0.46 | 0.44 | 0.46 | 35.5 |
| All Vehicles | | 759 | 1.4 | 759 | 1.4 | 0.225 | 1.3 | NA | 0.4 | 2.7 | 0.13 | 0.16 | 0.13 | 45.3 |

## Table 6. SIDRA results for the Kakadu Road crossover – weekday PM peak (10-year post-development 2032)

| Movement Performance - Vehicles | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | Turn | Demand Flows Total veh/h | HV % | Arrival Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
| South: Kakadu Road | | | | | | | | | | | | | | |
| 4 | L2 | 85 | 0.0 | 85 | 0.0 | 0.259 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.09 | 0.00 | 44.2 |
| 5 | T1 | 420 | 1.2 | 420 | 1.2 | 0.259 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.09 | 0.00 | 48.9 |
| Approach | | 505 | 1.0 | 505 | 1.0 | 0.259 | 0.8 | NA | 0.0 | 0.0 | 0.00 | 0.09 | 0.00 | 48.0 |
| North: Kakadu Road | | | | | | | | | | | | | | |
| 11 | T1 | 198 | 2.6 | 198 | 2.6 | 0.136 | 0.6 | LOS A | 0.4 | 2.7 | 0.21 | 0.09 | 0.21 | 48.3 |
| 12 | R2 | 37 | 0.0 | 37 | 0.0 | 0.136 | 5.7 | LOS A | 0.4 | 2.7 | 0.21 | 0.09 | 0.21 | 29.1 |
| Approach | | 235 | 2.2 | 235 | 2.2 | 0.136 | 1.4 | NA | 0.4 | 2.7 | 0.21 | 0.09 | 0.21 | 47.0 |
| West: ALDI Crossover | | | | | | | | | | | | | | |
| 1 | L2 | 37 | 0.0 | 37 | 0.0 | 0.034 | 1.5 | LOS A | 0.1 | 0.9 | 0.43 | 0.30 | 0.43 | 18.0 |
| 3 | R2 | 85 | 0.0 | 85 | 0.0 | 0.135 | 4.2 | LOS A | 0.4 | 3.1 | 0.55 | 0.59 | 0.55 | 37.3 |
| Approach | | 122 | 0.0 | 122 | 0.0 | 0.135 | 3.4 | LOS A | 0.4 | 3.1 | 0.51 | 0.50 | 0.51 | 35.0 |
| All Vehicles | | 862 | 1.2 | 862 | 1.2 | 0.259 | 1.3 | NA | 0.4 | 3.1 | 0.13 | 0.15 | 0.13 | 45.7 |