Engineering a better future for over 20 years!

Lot 395 Marmion Ave, Yanchep

Proposed Service Station and Car Wash

Transport Impact Assessment

PREPARED FOR:
FRP Capital

April 2024

Document history and status

Author	Revision	Approved by	Date approved	Revision type
M Rasouli	2	B Bordbar	28/08/2023	Draft
M Rasouli	2a	B Bordbar	05/02/2024	Final
M Rasouli	2b	B Bordbar	28/02/2024	Revised Final
M Rasouli	2c	B Bordbar	04/04/2024	Minor modifications

File name: t23094-mr-r02b.docx

Author: Mohammad Rasouli

Project manager: Behnam Bordbar

Client: FRP Capital

Project: Yanchep Central Stage 3

Document revision: r02c

Project number: t23.094

TABLE OF CONTENTS

1 INTRODUCTION 1

2 DEVELOPMENT PROPOSAL 1

3 EXISTING SITUATION 3

3.1 Existing Land Use 3
3.2 Existing Road Network 4
3.3 Existing Traffic Volume on Roads 5
3.4 Crash Records 6
3.5 Public Transport Access 6
3.6 Pedestrian and Cyclist Facilities 7

4 CHANGES TO SURROUNDING TRANSPORT NETWORKS 8

5 INTEGRATION WITH SURROUNDING AREA 9

6 TRAFFIC ASSESSMENT 10

6.1 Assessment Period 10
6.2 Trip Generation 10
6.2.1 Service Station with Convenience Store – Regular Fuelling Points 10
6.2.2 Proposed car wash traffic generation 12
6.2.3 Proposed dog wash traffic generation 13
6.3 Trip Distribution 15
6.4 Traffic Flow 16
6.5 Analysis of Local Intersections & Crossovers 16
6.6 Impact on Surrounding Roads and Neighbouring Areas 19
6.7 Traffic Noise and Vibration 19
6.8 Road Safety 19

7 PARKING ASSESSMENT 20

8 PUBLIC TRANSPORT ACCESS 21

9 PEDESTRIAN AND CYCLIST ACCESS 22

10 CONCLUSIONS 23

APPENDIX A: PROPOSED DEVELOPMENT PLANS

APPENDIX B: TURN PATH ANALYSIS

APPENDIX C: FUTURE TRAFFIC FLOWS

APPENDIX D: INTERSECTION ANALYSIS (EXISTING CALIBRATED SCENARIO)

APPENDIX E: INTERSECTION ANALYSIS (2024, POST-DEVELOPMENT SCENARIO)

APPENDIX F: INTERSECTION ANALYSIS (2034, 10 YEARS POST-DEVELOPMENT SCENARIO)

REPORT FIGURES

Figure 1: Site location 2
Figure 2: Proposed site plan 2
Figure 3: Existing land uses (July 2023) 3
Figure 4: Existing driveway forming southern boundary of the subject site 5
Figure 5: Existing peak hour traffic flows (2023) 5
Figure 6: Existing public transport 7
Figure 7: Local Planning Policy 3.8: Marmion Avenue Arterial Road Access 8
Figure 8: Existing and future primary catchment areas 15
Figure 9: Intersection network and layouts modelled in SIDRA 18

REPORT TABLES

Table 1. Morning peak hour surveyed results at the Halls Head service station with a drive-through facility 11
Table 2. Traffic survey results at the service stations with drive-through facilities in South Australia 12
Table 3: Trip generation of the proposed land uses 14
Table 4: Passing trade and non-passing trade component of the trip generation 14
Table 5: Traffic distribution 16

1 Introduction

This Transport Impact Assessment (TIA) has been prepared by Transcore in relation to the proposed Service Station and Car Wash located at north-west portion of Lot 395, Yanchep in City of Wanneroo.

Lot 395 (Yanchep Central Shopping Centre) is located on the north east side of the intersection of Marmion Avenue and Peony Boulevard, as shown in **Figure 1**. The proposed development forms the north-west portion of Lot 395 on the northern side of the existing one-way driveway off Marmion Avenue (fronting the subject site).

Transcore recently prepared a TIA for the proposed Tavern and Dan Murphy's Liquor Store which is proposed to be developed within Lot 395 as shown in **Figure 1**. The traffic generation of the proposed Tavern and Dan Murphy's Liquor Store is considered for the purpose of this development application.

Lot 50 (Yanchep Central Stage 1) is located opposite the existing Woolworths anchored shopping centre and was subject of a separate application which was approved by Metro Outer JDAP on 17 November 2021. This development is currently under construction.

Figure 1 depicts the zones and reservations of the Metropolitan Region Scheme (MRS) overlaid on a current aerial photograph and shows the Other Regional Roads Reservations (Blue Road) for Marmion Avenue and Yanchep Beach Road.

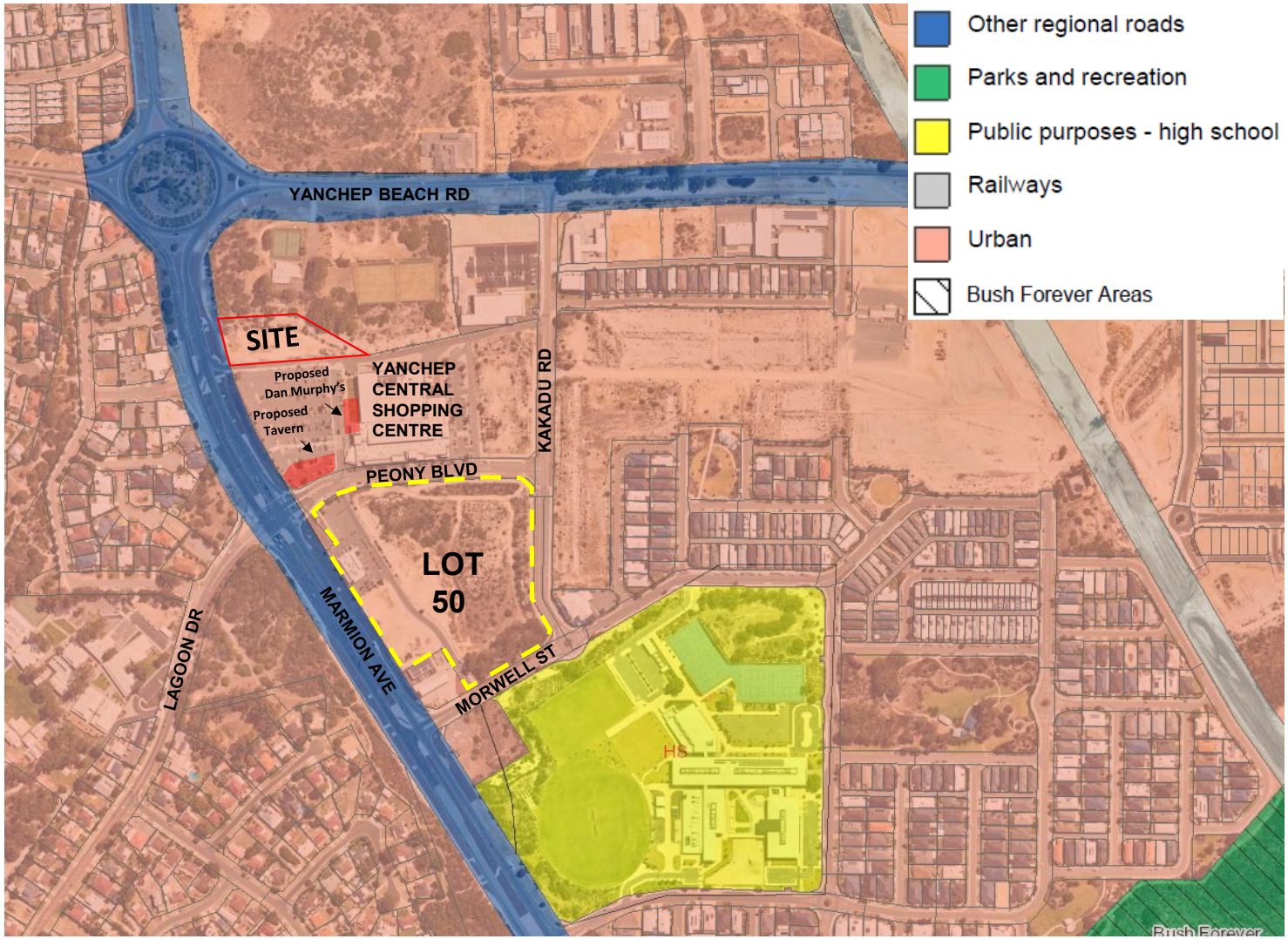


Figure 1: Site location

2 Development Proposal

The overall layout of the proposed development is shown on the proposed site plan in **Figure 2**Error! Reference source not found. and **Appendix A**.

The development proposal comprises the following elements:

- A control building (convenience retail store);
- An order-taking drive-through facility for the control building;
- A single-bay auto car wash & a four-bay manual car wash and four vacuum bays;
- A dog wash;
- Fuel canopy with 8 light vehicle fuelling positions; and,
- A total of 12 car parking bays inclusive of one ACROD bay.

It is anticipated that the proposed Tavern and Dan Murphy's Liquor Store within Lot 395 will be developed as part of the stage 3 development of the Yanchep Central.

Lot 50 which is the stage 1 development of the Yanchep Central is located to the south of Lot 395 which is recently constructed and entails:

- New supermarket and specialty stores (total 4,885m^2 NLA);
- Medical / health (680m^2 NLA);
- Child care centre (565m^2 NLA);
- Two fast food restaurants (285m^2 and 265m^2 NLA); and,
- Fuel outlet (217m^2 NLA).

Therefore, the traffic generation of both Lot 50 and Lot 395 has been considered for the assessment of the future scenarios for the proposed development.

As part of the proposed development, it is assumed that the existing one-way driveway fronting the subject site would be converted to a two-way driveway with additional left out exit to Marmion Avenue in line with City of Wanneroo *Local Planning Policy 3.8: Marmion Avenue Arterial Road Access*. Transcore has prepared a concept sketch for the proposed additional left out exit to Marmion Avenue (refer **Appendix B**).

Deliveries and waste collections will be accommodated within the development site. Pedestrians will access the development via the existing principal shared path along Marmion Avenue and the existing path on the other side of the driveway off Marmion Avenue.

Turn path analysis are undertaken which demonstrates satisfactory traffic movement of fuel tanker and service vehicles. The turn path analysis is provided in **Appendix C**.

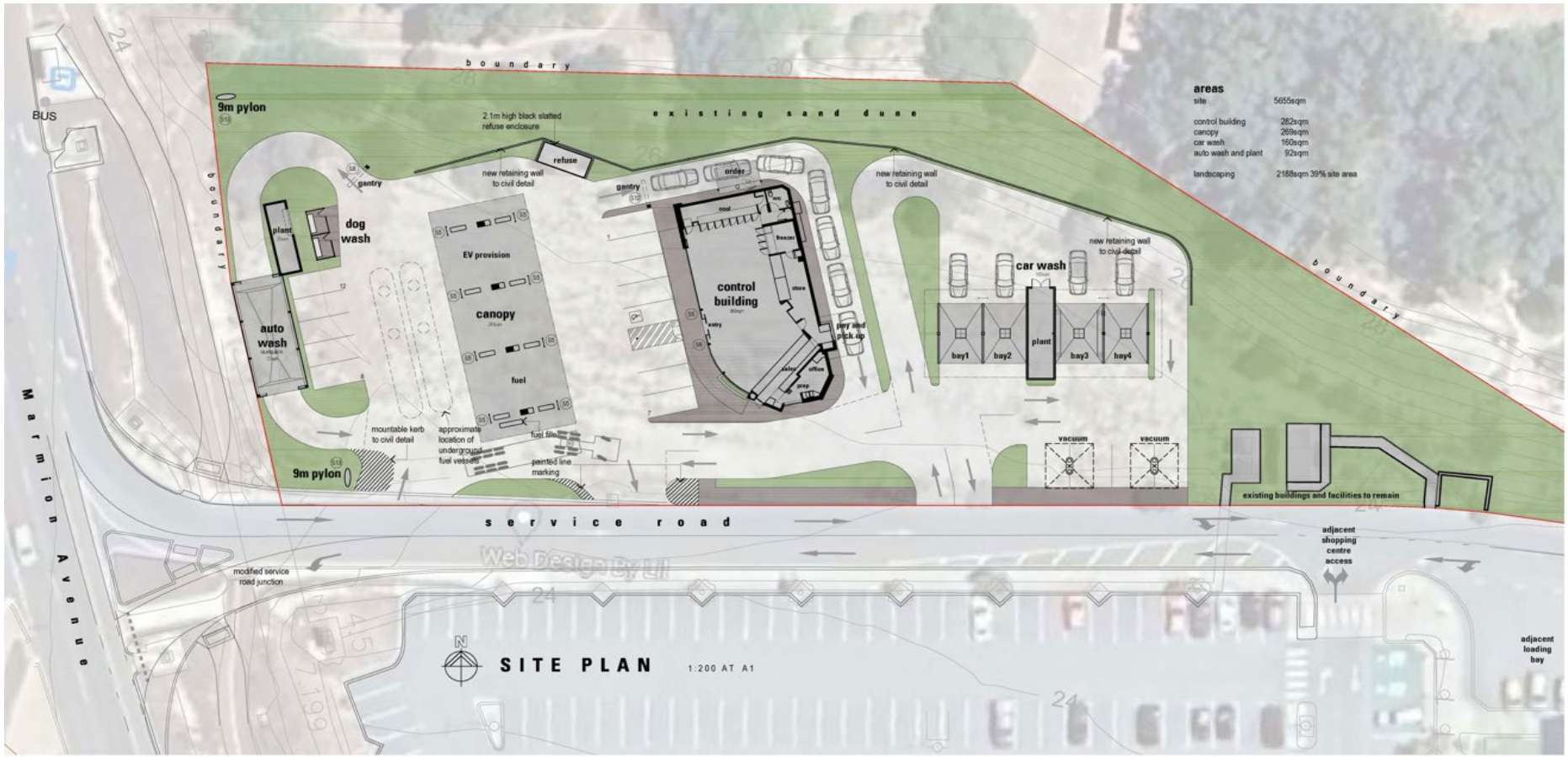


Figure 2: Proposed site plan

3 Existing Situation

3.1 Existing Land Use

As shown in **Figure 3**, Lot 395 (north of Peony Boulevard) is occupied by the existing shopping centre and Lot 50 (south of Peony Boulevard) has recently completed construction as part of Stage 1 Yanchep Central development. At present there is a Coles super market and a McDonalds restaurant on Lot 50.

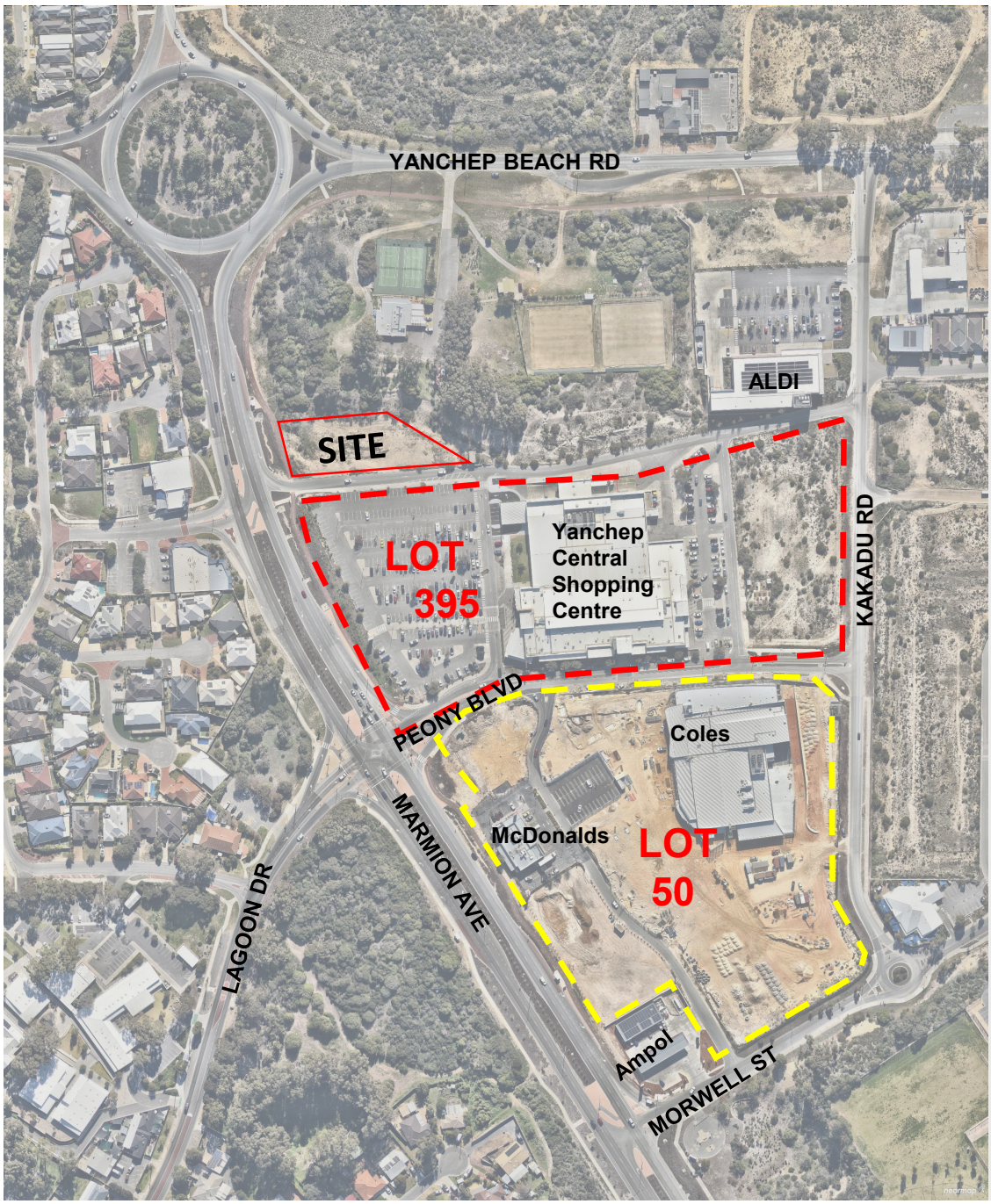


Figure 3: Existing land uses (July 2023)

At present there is a Coles super market and a McDonalds restaurant as well on Lot 50. Other land uses in the vicinity include an Aldi supermarket and Yanchep Sports Club north of the existing shopping centre and Yanchep Secondary College south of Morwell Street.

Substantial residential development has already occurred on the western side of Marmion Avenue and east of the subject site around Yanchep Secondary College.

3.2 Existing Road Network

Marmion Avenue is covered by an Other Regional Roads reservation in the MRS as shown in **Figure 1**. It is understood that Marmion Avenue is now classified as a Primary Distributor under the care and control of Main Roads WA, however this change is yet to be incorporated in the MRS.

Marmion Avenue is constructed as a dual divided carriageway road with two lanes in each direction. This section of Marmion Avenue has a posted speed limit of 60km/h and no direct driveway access from abutting residential or commercial properties, apart from a left in only driveway connection (constructed to intersection standard with left turn deceleration lane on Marmion Avenue) at the north-western corner of the existing Woolworths shopping centre.

Peony Boulevard runs eastwards from Marmion Avenue to Kakadu Road. It is classified as an Access Road in the Main Roads WA functional road hierarchy and is covered by the default built up area speed limit of 50km/h. Most of Peony Boulevard is constructed as one lane each way (3.5m traffic lanes) separated by a 2m-wide raised median, with indented parking bays on both sides. There is no parking on the western 60m section of Peony Boulevard, but it entails left and right turn lanes on its approach to the signalised intersection at Marmion Avenue. The Marmion Ave / Peony Blvd / Lagoon Dr intersection is constructed as a signalised 4-way intersection with left and right turn lanes provided on each approach.

Morwell Street is classified as an Access Road in the Main Roads WA functional road hierarchy and the default built up area speed limit of 50km/h applies to this street. It is constructed as a two-lane, single-carriageway urban road with a full-movement T-intersection on Marmion Avenue at its western end and a single-lane roundabout at its intersection with Kakadu Road.

Kakadu Road is classified as an Access road in the Main Roads WA functional road hierarchy and is covered by the default built up area speed limit of 50km/h. It is constructed as a two-lane, single-carriageway urban road with a left in / left out T-intersection on Yanchep Beach Road at its northern end and a single-lane roundabout with Morwell Street at its southern end.

Existing driveway, forming southern boundary of the subject site, connects Marmion Avenue and Kakadu Road as shown in **Figure 4**. The western part of this driveway fronting the subject site is currently one-way eastbound which changes to to-way immediately east of the subject site and connects to Kakadu Road.

Figure 4: Existing driveway forming southern boundary of the subject site

3.3 Existing Traffic Volume on Roads

Traffic volume data from the Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection were sourced from the latest available SCATS data for June 2023.

Manual turn traffic counts were also undertaken by Transcore on Thursday 03 August 2023 (8-9AM and 3-4PM) and Saturday 05 August 2023 (11AM-12PM) at the left in driveway intersection on Marmion Avenue north of Peony Boulevard and the shopping centre driveway on Peony Boulevard. The results of those peak hour traffic counts and corresponding Thursday and Saturday peak hour flows from the June 2023 SCATS data at the signalised intersection are shown in Figure 5.

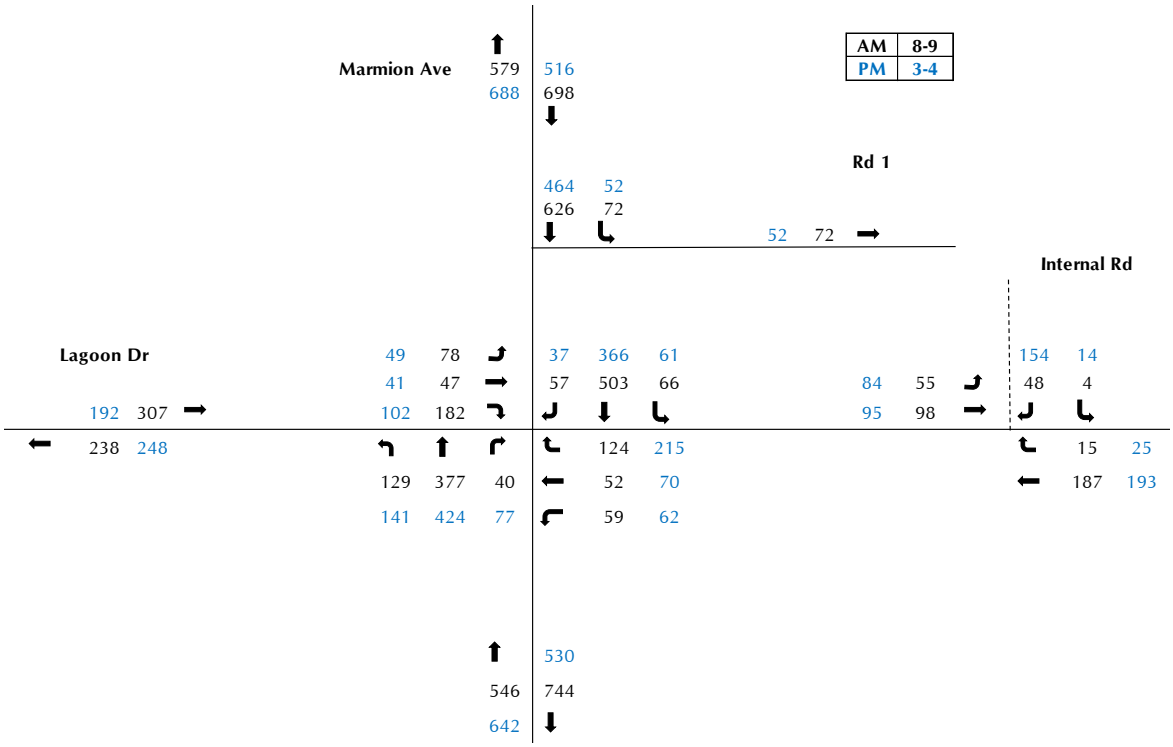


Figure 5: Existing peak hour traffic flows (2023)

3.4 Crash Records

Information available on the Main Roads WA website indicates the following crashes were recorded at the four intersections in the vicinity of the subject site during the five-year period ending December 2022.

- Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection:
  - 6 crashes total
  - 2 injury requiring medical treatment, 3 PDO major and 1 hospital
  - 3 right turn / through and 2 rear end crashes
- Marmion Ave / Morwell St T-intersection:
  - 1 crash total
  - 1 PDO minor
  - 1 rear end crash
- Peony Blvd / Kakadu Rd T-intersection:
  - 1 crash total
  - 1 PDO major
  - 1 rear end crash
- Morwell St / Kakadu Rd roundabout:
  - 1 crash total
  - 1 medical
  - 1 hit object

3.5 Public Transport Access

The closest existing Transperth bus routes to the subject site are route 490 (Butler Train Station – Two Rocks) and route 491 (Butler Station – Yanchep), which both traverse along Marmion Avenue adjacent to the subject site, as shown in **Figure 6**.

Route 490 currently provides hourly service on all days and more frequent services during weekday AM and PM peak periods.

Route 491 currently provides hourly service on weekdays (two-hourly on Saturdays, Sundays and public holidays) and more frequent services during weekday AM and PM peak periods.

The closest bus stops are located on Marmion Avenue between Peony Boulevard and Morwell Avenue.

Figure 6: Existing public transport

3.6 Pedestrian and Cyclist Facilities

There is an existing 3m wide path on the eastern verge of Marmion Avenue south of Yanchep Beach Road to Morwell Street, then 2.5m wide path south of Morwell Street. The western verge of Marmion Avenue has 2.0m to 2.5m wide path from 90m south of the Yanchep Beach Road roundabout to about 170m south of Morwell Street. Marmion Avenue has 2m-wide on-road cycle lanes and 1.2 to 1.5m wide cycle lanes on Peony Blvd and Lagoon Drive approaches to the signalised intersection. There is also a path on the northern side of the existing Woolworths shopping centre car park connecting from Marmion Avenue to the shopping centre and other paths connecting to that existing shopping centre and the McDonald's restaurant.

4 Changes to Surrounding Transport Networks

City of Wanneroo *Local Planning Policy 3.8: Marmion Avenue Arterial Road Access* includes information on the type and location of vehicular access points on Marmion Avenue and other roads including Yanchep Beach Road. The relevant section of the spatial plan from LPP3.8 is shown in **Figure 7**.

Future intersection treatments shown on this plan at key intersections relevant to Yanchep Central are as follows:

- Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection (existing);
- Marmion Ave / Morwell St full movement T-intersection (existing);
- Marmion Ave left in / left out access at the northern side of the existing shopping centre (currently left in only);
- Marmion Ave / Yanchep Beach Rd roundabout (existing); and
- Yanchep Beach Rd / Kakadu Rd full movement T-intersection (currently left in / left out only).

Figure 7: Local Planning Policy 3.8: Marmion Avenue Arterial Road Access

Figure 7 also shows the future railway alignment crossing Yanchep Beach Road further east from the subject site. It shows future train stations at Yanchep (north of Yanchep Beach Road) and Yanchep South (south of Yanchep Beach Road).

5 Integration with Surrounding Area

The proposed development is in line with the existing and future land uses within Yanchep Central and in accordance with Yanchep Town Centre zone, as shown in **Figure 7**. Accordingly, the proposed development is consistent with the general planning intent.

6 Traffic Assessment

6.1 Assessment Period

Due to the nature of the proposed development, it is expected that distinct peak activity periods will be experienced during weekday morning and afternoon peak road network periods.

It is therefore anticipated that the combination of the traffic to be generated by the proposed development and the peak road network traffic periods is likely to result in the greatest demand on the road network during the typical weekday morning and afternoon peak hours between 08:00AM-09:00AM and 03:00PM-04:00PM. As such, trip generation is estimated and traffic analysis is undertaken for these periods.

For the purpose of this TIA, the traffic generation of Stage 1 and 3 has been considered in the traffic analysis. It is also assumed that the proposed development would be completed by in 2025. In accordance with WAPC Transport Impact Assessment Guidelines the traffic assessment is to be undertaken for the year of opening and 10 years after the opening, so assessment years of 2025 and 2035 has been adopted for this transport impact assessment.

6.2 Trip Generation

6.2.1 Service Station with Convenience Store – Regular Fuelling Points

Based on the feedback received from a number of Western Australia service station operators that the trip rates published in the Institute of Transportation Engineers 11th Edition Trip Generation Guidelines (a US trip generation source) significantly overestimate the actual patronage numbers, Transcore undertook extensive traffic surveys during 2022. As part of this survey, a total of 15 service stations were surveyed, in order to establish more accurate local traffic generation rates for this type of land use in Western Australia. All of the sites selected entailed different operators in order to ensure robust data with a high level of confidence. The surveys were undertaken on Mondays, Tuesdays and Wednesdays in order to include trade activity during the discounted fuel days as well and to ensure a conservative approach.

The following sites were surveyed for the purpose of the study:

- 7-Eleven, 194 Great Eastern Hwy, Ascot WA
- Ampol, 204 Great Eastern Hwy, Ascot WA
- BP, 1 Canham Way, Greenwood WA
- BP, 88 Gilbertson Road, Kardinya WA
- BP, 848 Canning Hwy, Applecross WA
- Coles Express, 73A Frobisher Street, Osborne Park WA
- Puma, 58 Montana Crescent, Alkimos WA

- Ampol 3, Morwell Street, Yanchep WA
- Liberty, 2341 Albany Highway, Gosnells WA
- 7-Eleven, 931 Wanneroo Road, Wanneroo WA
- 7-Eleven, 13 Lakes Road, Greenfield WA
- Shell, 582 Stirling Highway, Mosman WA
- Puma, Cnr Johnson Street & Helena Street, Guildford WA
- United, 2 Feilman Drive, Leda WA
- United, 101 Terrier Place, Southern River WA

Accordingly, the trip rates which were used to estimate traffic generation for the service station components of the proposed development are as follows:

- Weekday daily: 162.20vpd per filling point;
- Weekday AM peak hour: 9.49vph per filling point; and,
- Weekday PM peak hour: 11.27vph per filling point.

Drive Through Facility

This service station entails a drive-through facility for the convenience store/control building. This drive-through facility is proposed to provide additional convenience to customers of the convenience store. No traffic generation rates are available for such drive-through facility.

For the purpose of this project, Transcore has identified and undertaken a manual traffic survey at a similar service station with a drive-through facility in Halls Head on Thursday 2nd September 2021 between 8:00AM to 9:00AM. The surveyed drive-through facility closes at 2pm every day. This is because the drive-through sales do not have enough demand during the afternoon. The surveyed results are shown in **Table 1**.

Table 1. Morning peak hour surveyed results at the Halls Head service station with a drive-through facility

Time	Movement	Drive-Thru	Service Station	Total
8:00AM – 9:00AM	Entry	31	22	53
	Exit	55		55
Total (inbound and outbound)				108

It should be noted that this service station in Halls Head is the only available existing service station currently operating with a drive-through facility in the Perth metropolitan area and Mandurah Peel region.

For the purpose of this project, Transcore also sourced additional information for OTR service stations with drive-through facilities in South Australia. The surveyed results with respective locations are provided in **Table 2.**

Table 2. Traffic survey results at the service stations with drive-through facilities in South Australia

Location	Daily	Peak Periods	
		AM peak	PM peak
OTR Croydon Park	NA	4	NA
OTR Para Hills	170	17	NA
OTR Trinity Gardens	126	NA	8
OTR Marion South	80	6	NA
Average	**125 vehicles/ 250vpd (inbound + outbound)**	**9 vehicles/ 18vph (inbound + outbound)**	**8 vehicles/ 16vph (inbound + outbound)**

Review of the Halls Head and South Australian surveys, results in the following daily and peak hour trip rates:

- Weekday AM peak hour: 30 vehicles equivalent to 15 in and 15 out trips;
- Weekday PM peak hour: 16 vehicles equivalent to 8 in and 8 out trips; and,
- Weekday: 250 vehicles equivalent to 125 in and 125 out trips.

Review of ITE 11 trip rates for similar land uses (stand-alone Coffee shop with drive through (#938)) would provide almost similar results for the AM and PM peak hours. However, the above trip rates are more conservative and accurate and therefore were used for the purpose of this study.

6.2.2 Proposed car wash traffic generation

The traffic volume likely to be generated by the proposed car wash has been estimated based on projected customer numbers and number of staff and the information available in Transcore's database for similar land use.

Accordingly, the trip generation of the proposed manual and auto car wash are estimated as below:

Manual Car Wash

- Weekday AM peak hour: 24 trips per hour;
- Weekday PM peak hour: 24 trips per hour; and,
- Weekday: 256 trips per day.

Auto Car Wash

- Weekday AM peak hour: 6 trips per hour;
- Weekday PM peak hour: 6 trips per hour; and,
- Weekday: 68 trips per day.

6.2.3 Proposed dog wash traffic generation

It is conservatively assumed than one customer would use the dog wash every 20 minutes and therefore three customers would utilise the proposed dog wash. This translated to the below trip generation during the road network peak hour:

- Weekday AM peak hour: 6 trips per hour;
- Weekday PM peak hour: 6 trips per hour; and;
- Weekday: 64 trips per day;

Data source and other assumptions are as follows:

- Directional splits of 50% in / 50% out assumed for all land uses as they are all dominated by customer arrival / departure.
- Pass-by rates was sourced from ITE Trip Generation Handbook 3rd Ed: Service Station with Convenience Market (#945): 62% for AM and 56% for PM (average of 60% for both peak hours were used). Coffee shop with drive through (#938): 89% for weekday (90% was used for the peak hours).
- Conservatively, 0% pass-by rate was assumed for the other land uses (Dog Wash, Auto Car Wash and Manual Car Wash).

Table 3 summarises the daily and peak hour trip generation of the proposed development. **Table 4** shows the passing and non-passing trade of the trip generation.

Accordingly, it is estimated that the proposed development would generate approximately 1,626 trips per regular weekday with approximately 121 trips (both inbound and outbound) during the weekday AM and PM peak hours.

The primary trips associated with the proposed development during the AM and PM peak hours are estimated to be about 56vph and 58vph respectively which will be distributed to the surrounding roads and intersections.

Table 3: Trip generation of the proposed land uses

Land use	Quantity	Daily Rate	Weekd-AM Peak	Weekd-PM Peak	Cross Trade	Daily Trips	Weekd-AM trips	Weekd-PM trips	AM		PM	
									IN	OUT	IN	OUT
Service Station	8	162.20	9.49	11.27	0.2	1038	61	72	30	30	36	36
Control building drive through facility	1	250	30	16	0.2	200	24	13	12	12	6	6
Dog Wash	1				0.2	64	6	6	2	2	2	2
Auto Car Wash	1				0.2	68	6	6	2	2	2	2
Manual Car wash	4				0.2	256	24	24	10	10	10	10
Total traffic						**1626**	**121**	**121**	**57**	**57**	**57**	**57**

Table 4: Passing trade and non-passing trade component of the trip generation

Passing Trade	Passing Trade Component				Primary Trips Component			
	AM		PM		AM		PM	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
60%	18	18	22	22	12	12	14	14
90%	11	11	6	6	1	1	1	1
0%	0	0	0	0	2	2	2	2
0%	0	0	0	0	2	2	2	2
0%	0	0	0	0	10	10	10	10
	29	**29**	**27**	**27**	**28**	**28**	**29**	**29**

6.3 Trip Distribution

The distribution of trips that will be attracted to the subject site has been estimated based on the distribution of surrounding residential areas and the catchment area of other competing shopping centres that are planned in this area.

The diagram at **Figure 8** shows MRS zones overlaid on a current aerial photo. As evident, the primary catchment area will mainly be south of Yanchep Beach Rd, so the future distribution used for the TIA has less traffic from the north and more from the south.

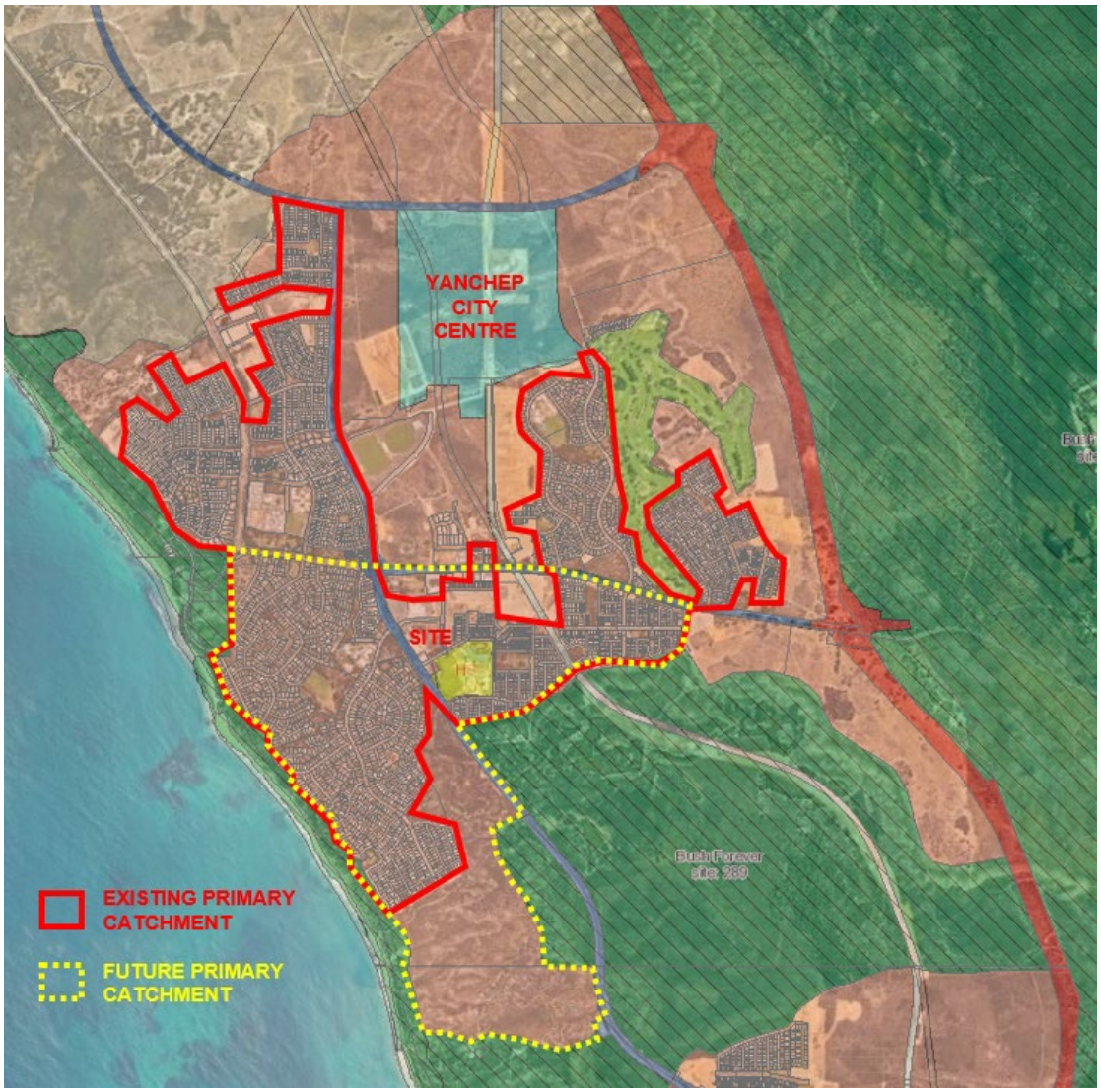


Figure 8: Existing and future primary catchment areas

Pass-by trips will be more strongly related to southbound traffic flows on Marmion Avenue because of convenience factor. The resulting modelled traffic distribution of the proposed development is summarised in **Table 5**.

Table 5: Traffic distribution

Approach / departure route	Primary Trips	Pass-by Trips
Marmion Ave north	20%	80%
Marmion Ave south	30%	10%
Lagoon Dr west	30%	-
Kakadu Rd north	20%	10%

The traffic movements generated by the proposed development have been manually assigned on the adjacent road network and the resulting traffic movements generated by this development are shown in **Appendix D**.

Figure D1 shows the additional traffic flows generated by the proposed development.

6.4 Traffic Flow

Main Roads WA has advised that future traffic volumes on this section of Marmion Avenue are projected to increase at a compound growth rate of 7.82% per year. It should be noted that the 7.82% annual growth projected by Main Roads WA is considered to be a very conservative assumption.

Accordingly, future year base traffic flows (without the proposed development) have been estimated by factoring up the current through traffic flows on Marmion Avenue by applying a compound growth rate of 7.82% per year and adding the approved Stage 1 and 3 developments traffic. The future total traffic flows during peak hours with the proposed development are shown in **Appendix D**.

Figure D2 shows the additional traffic flows generated by the Stage 1 and 3 developments as per the previously approved development application for Stage 1 and the August 2023 TIA for Stage 3. This traffic is used as the background traffic for 2025 and the development traffic has been added to the 2025 background traffic.

Figure D3 illustrates 2025 with development traffic and **Figure D4** reflects the 2035 with development traffic (plus 7.82% annual growth).

6.5 Analysis of Local Intersections & Crossovers

Key intersections and driveways shown in **Figure 9** have been analysed as a network of intersections using Network analysis in the SIDRA computer software package, for 2025 and 2035 AM and PM peak hours based on traffic flows as shown in Figures C3 (2025) and C4 (2035).

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 SIDRA analysis has been undertaken in accordance with current MRWA operational modelling guidelines including separate input of different classes of heavy vehicles and the parameters specified by MRWA for those vehicle classes.

The results of the SIDRA analysis are summarised in **Appendix E** (existing calibrated scenario), **Appendix F** (2024, post development scenario) and **Appendix G** (2035, 10 years post development scenario).

The SIDRA results in Appendix D indicate that the existing Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection is currently operating satisfactory with overall LoS C and minimum queues and delays for all approaches of the intersection.

The SIDRA results in Appendix E indicate that the existing Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection will operate at a degree of saturation ranging from 0.667 to 0.88 in the two 2025 peak periods analysed. Overall intersection level of service would be C in modelled peak periods with no movements at level of service E or F.

The SIDRA results in Appendix F indicate that the existing Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection would operate at a degree of saturation ranging from 0.776 to 0.9 in the two 2035 peak periods analysed. Overall intersection level of service would be C in modelled peak periods with no movements at level of service F. This is considered to represent a satisfactory level of service for this existing signalised intersection in 2035.

The SIDRA results indicate that the existing T-intersection of the north south driveways on Peony Boulevard is operating satisfactorily with LoS A. This intersection would continue to operate satisfactorily with LoS C or better for all approaches of the intersection in 2024 and 2034 future scenarios.

The proposed left in/ left out driveway from Marmion Avenue (currently is left in only) north of Peony Boulevard (labelled as "Rd 1" in the SIDRA analysis) is assessed in

Appendix E and F (2024 and 2034 respectively). All movements will continue to operate at level of service A indicating very good operation in future.

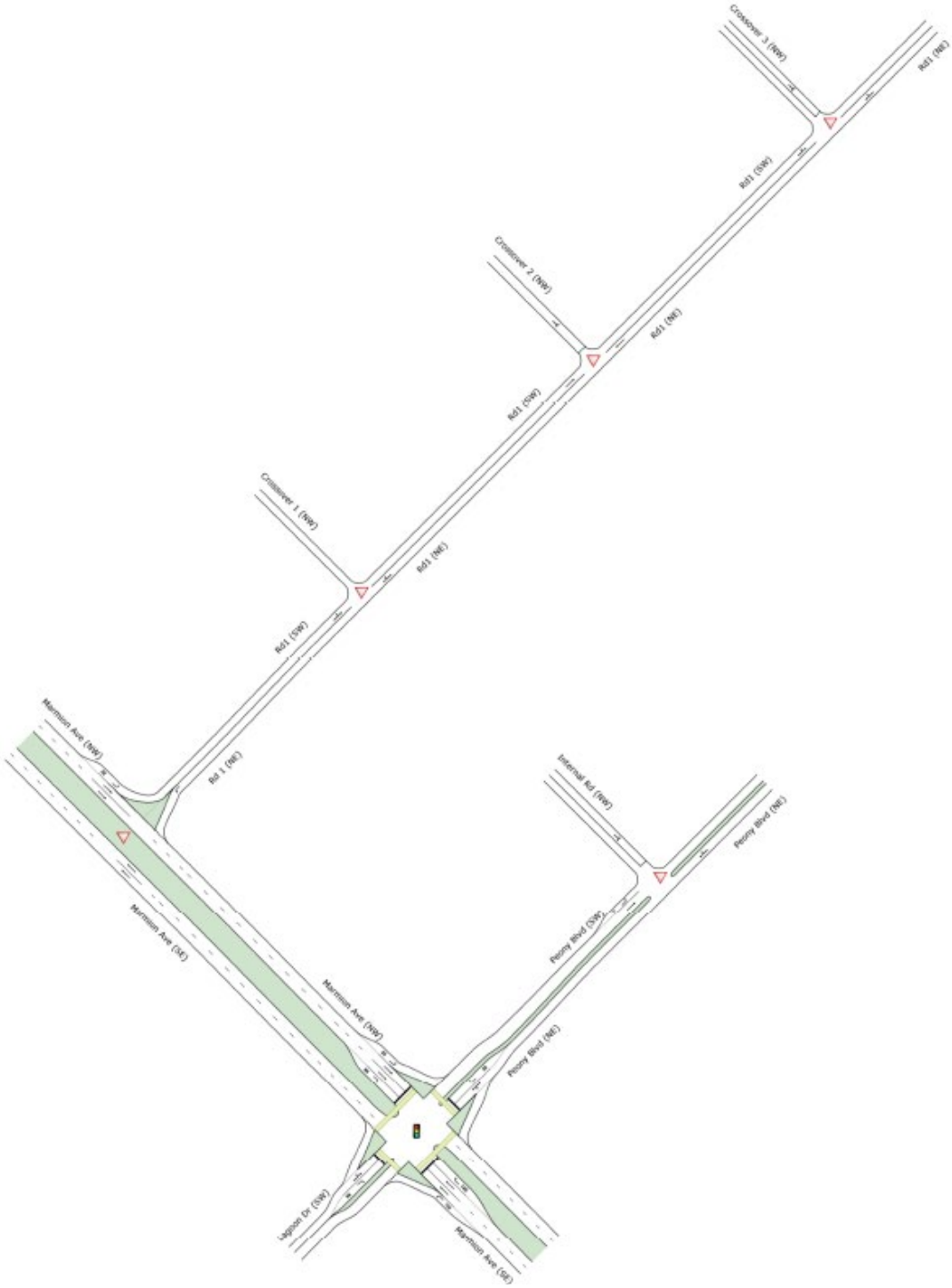


Figure 9: Intersection network and layouts modelled in SIDRA

6.6 Impact on Surrounding Roads and Neighbouring Areas

The WAPC Transport Impact Assessment Guidelines (2016) provides the following guidance on the assessment of traffic impacts:

"As a general guide, an increase in traffic of less than 10 percent of capacity would not normally be likely to have a material impact on any particular section of road, but increases over 10 percent may. All sections of road with an increase greater than 10 percent of capacity should therefore be included in the analysis. For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10 percent of capacity. Therefore, any section of road where development traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis."

The proposed development will not increase traffic on any lanes on the surrounding road network by more than 100vph. Therefore, the proposed development will not increase traffic flows at or above the quoted WAPC threshold on most of the surrounding roads to warrant further detailed analysis.

6.7 Traffic Noise and Vibration

The WAPC's *State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning* requires assessment of noise impact on noise-sensitive developments when a road carries more than 20,000vpd in an urban area or 5,000vpd in a rural area.

The traffic generation of the proposed development will only be just below 1,600vpd and will not increase the traffic flows on any surrounding roads to anywhere near the abovementioned traffic thresholds, so no noise impacts on surrounding areas are anticipated.

6.8 Road Safety

No particular road safety issues have been identified in relation to the proposed development.

7 Parking Assessment

A total of 12 car parking bays inclusive of one ACROD bay are planned for the proposed development.

It is Transcore's understanding that sufficient parking supply is provided to address the parking requirements of the proposed development, particularly considering the available bays for the drive-through facility for the control building/shop, the car wash and the fuel bowsers.

8 Public Transport Access

The existing bus services in this area have been noted in Section 3.5 of this report and will provide a satisfactory level of public transport accessibility to the site.

9 Pedestrian and Cyclist Access

The existing pedestrian and cyclist facilities in this area have been noted in Section 3.6 of this report.

10 Conclusions

This Transport Impact Assessment (TIA) has been prepared by Transcore in relation to the proposed Service Station and Car Wash located at north-west portion of Lot 395, Yanchep in City of Wanneroo.

It is expected that Yanchep Central Stage 1 (Lot 50) and 3 (proposed Dan Murphy's and Tavern in Lot 395) would be completed before the construction of the proposed development. Therefore, the traffic generation of both Lot 50 and Lot 395 has been considered for the assessment of the future scenarios.

As part of the proposed development, it is expected that the existing one-way driveway fronting the subject site would be converted to a two-way driveway with additional left out exit to Marmion Avenue in line with City of Wanneroo Local Planning Policy 3.8: Marmion Avenue Arterial Road Access.

It is estimated that the proposed development would generate approximately 1,626 trips per regular weekday with approximately 121 trips (both inbound and outbound) during the weekday AM and PM peak hours.

The majority of the development generated trips would be distributed to the proposed left in/ left out driveway off Marmion Avenue. Minimal traffic would be distributed to the existing Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection.

SIDRA analysis undertaken indicates satisfactory traffic operation for the proposed left in/ left out intersection on Marmion Avenue. All movements will continue to operate at level of service A in 2035 indicating very good operation.

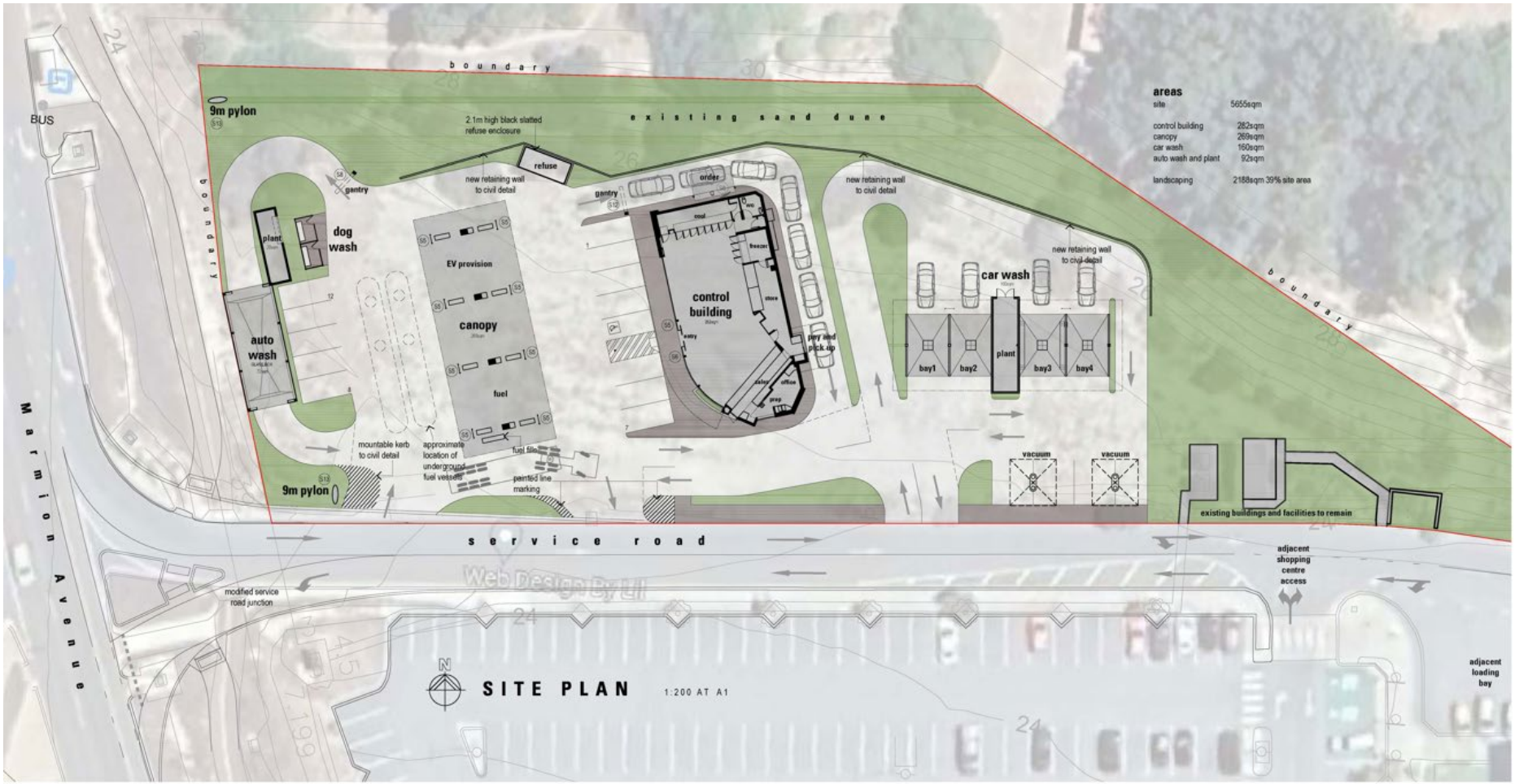
The traffic analysis undertaken for 2035 confirms that the existing Marmion Ave / Peony Blvd / Lagoon Dr signalised intersection will operate satisfactorily with the traffic from the proposed Stage 1, Stage 3 and the proposed development.

In conclusion, the findings of this Transport Impact Assessment are supportive of the proposed developments.

Appendix A

PROPOSED SITE PLAN

Engineering a better future for over 20 years!



NEW SERVICE STATION COMPLEX

1 PEONY BOULEVARD YANCHEP SHOPPING CENTER WA 6035

04.04.24
JN1534.SK01b

PLANNING APPLICATION

ADS Architects
93 Gilles Street Adelaide 5000 T:82232244

Appendix B

PROPOSED CONCEPT SKETCH

transcore

Engineering a better future for over 20 years!

Lot 395 Marmion Avenue Yanchep, Proposed Service Station and Car Wash
Proposed Left out onto Marmion Avenue

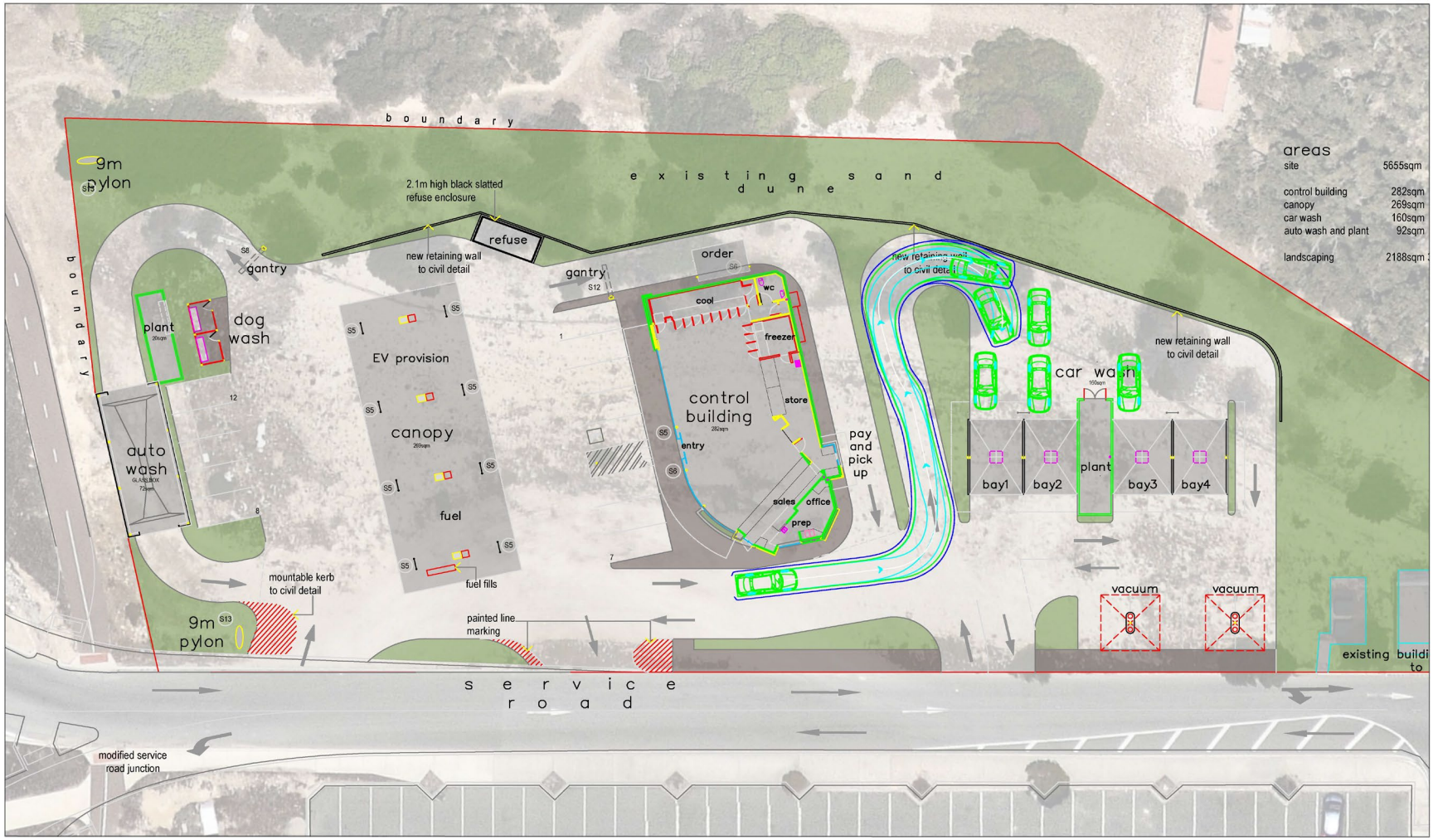
t23.094.sk10a
9/02/2024
Scale: 1:500 @ A3

Appendix C

TURN PATH ANALYSIS

transcore

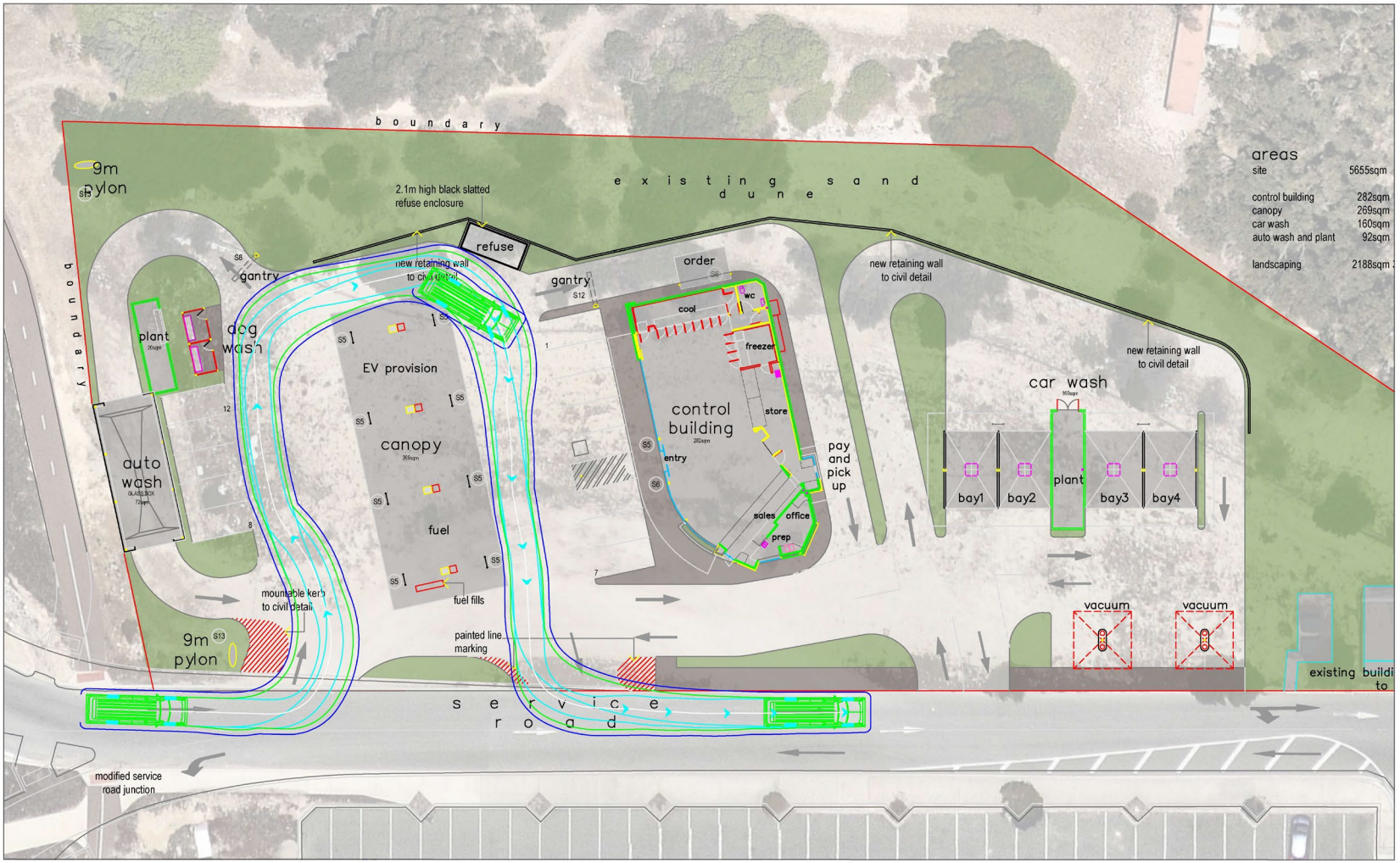
Engineering a better future for over 20 years!



Yanchep Central Stage 3
B99 Passenger Car
Manual Carwash Entry

LEGEND
Vehicle Body
Wheel Path
300mm Clearance

t23.094.sk18b
04/04/2024
Scale: 1:300 @ A3



Yanchep Central Stage 3
8.8 m Service Truck
Refuse Entry and Exit

LEGEND
Vehicle Body
Wheel Path
500mm Clearance

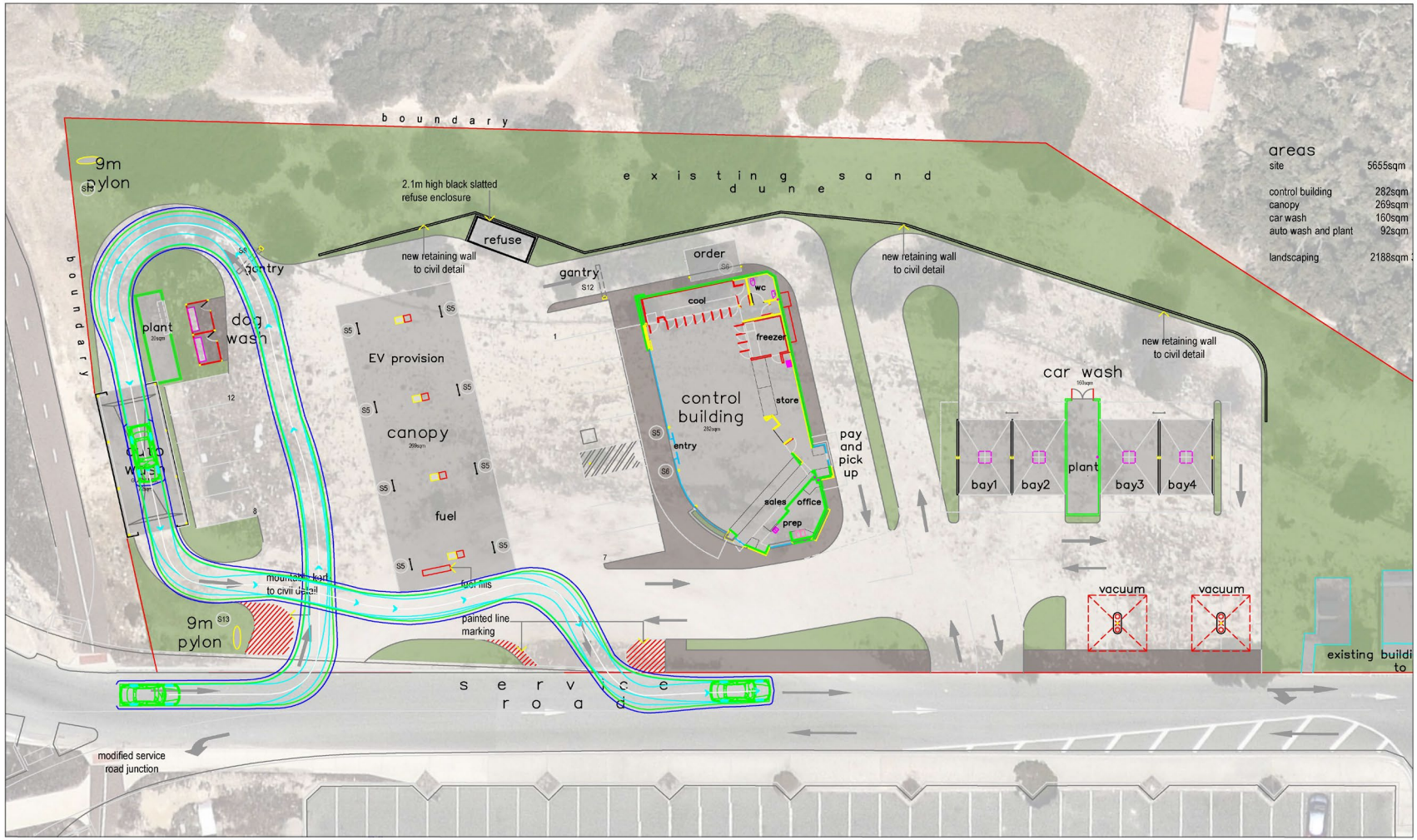
t23.094.sk19b
04/04/2024
Scale: 1:300 @ A3

Yanchep Central Stage 3
19.0 m Fuel Tanker
Tanker Entry and Exit

LEGEND
Vehicle Body
Wheel Path
500mm Clearance

t23.094.sk20b
04/04/2024
Scale: 1:500 @ A3

transcore



Yanchep Central Stage 3
B99 Passenger Car
Auto Carwash Entry and Exit

LEGEND
Vehicle Body
Wheel Path
300mm Clearance

t23.094.sk21b
04/04/2024
Scale: 1:300 @ A3

Appendix D

FUTURE TRAFFIC FLOWS

Engineering a better future for over 20 years!

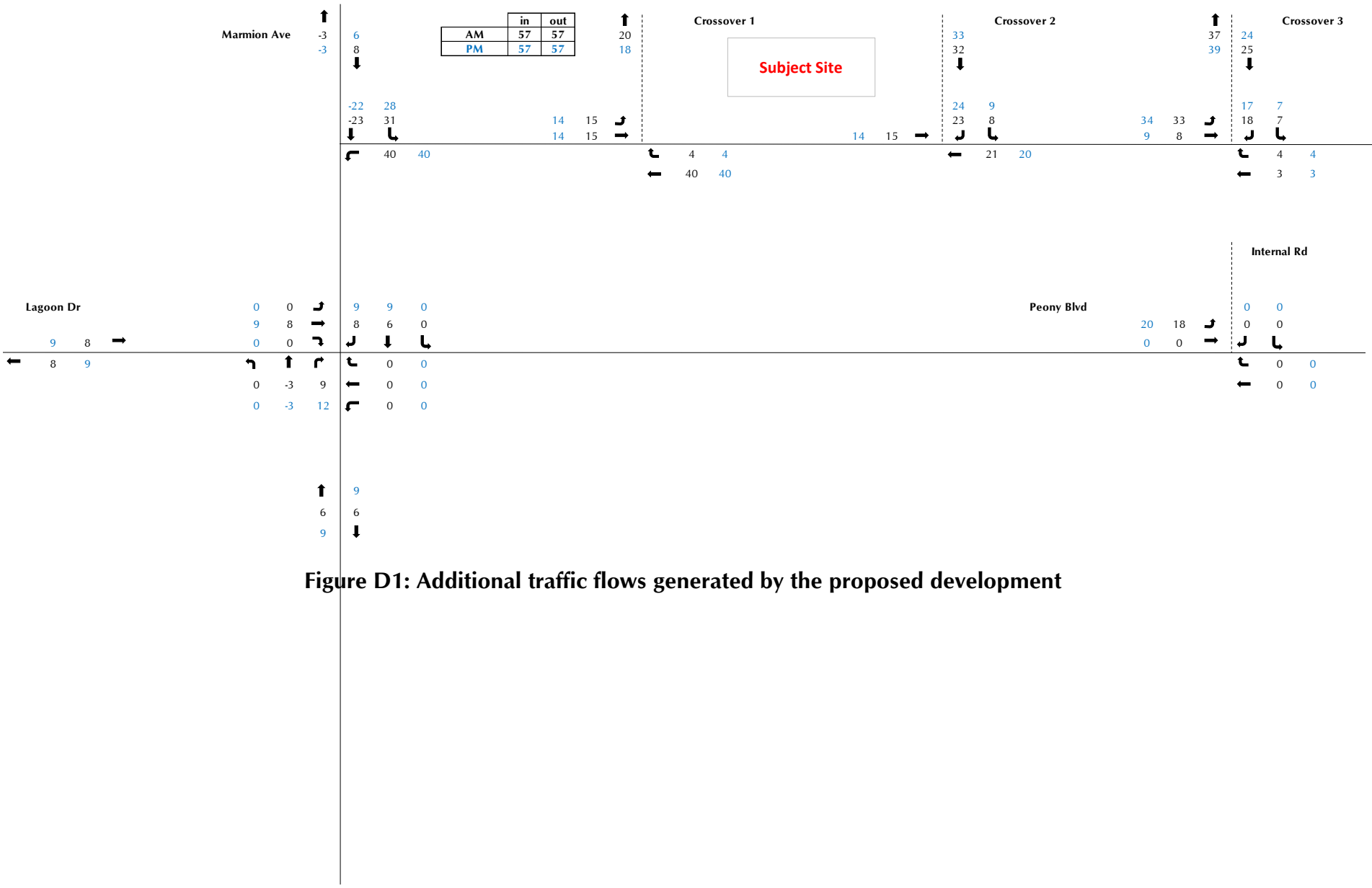


Figure D1: Additional traffic flows generated by the proposed development

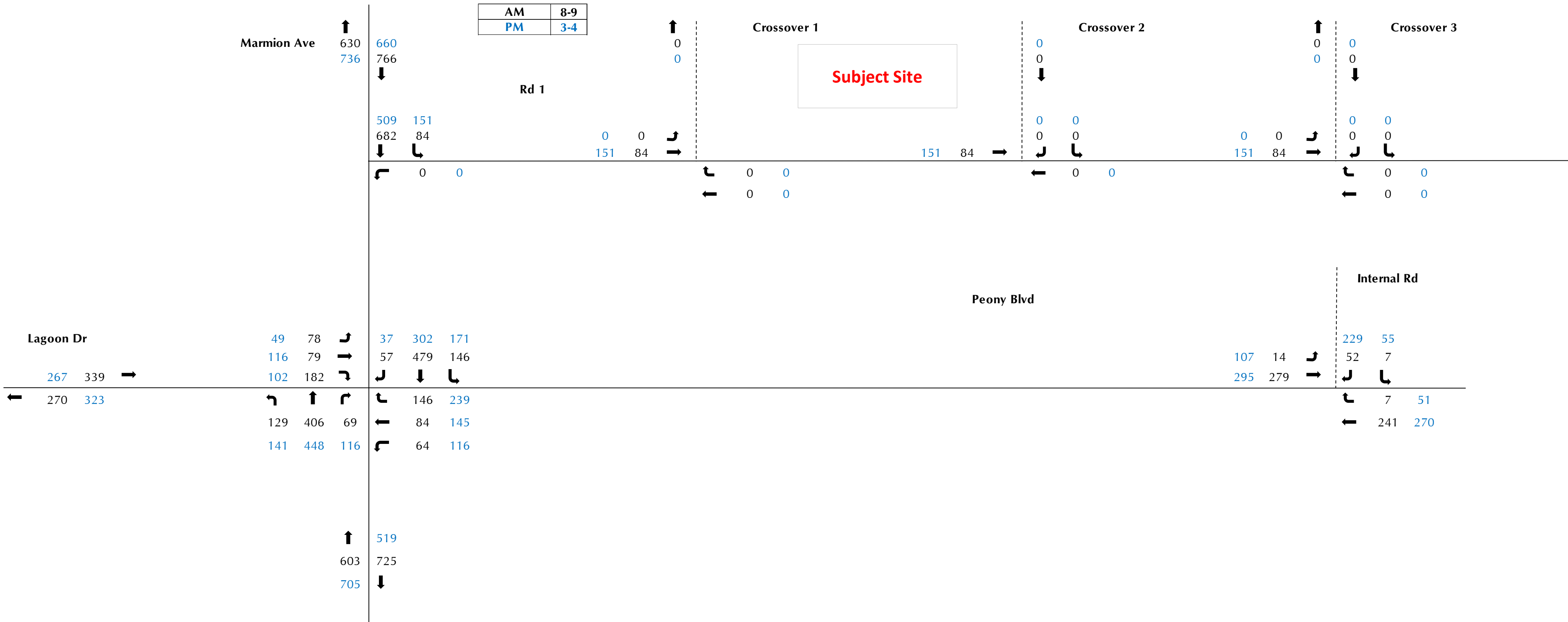


Figure D2: 2023/2024 peak hours base traffic flows with Stage 1 and 3.

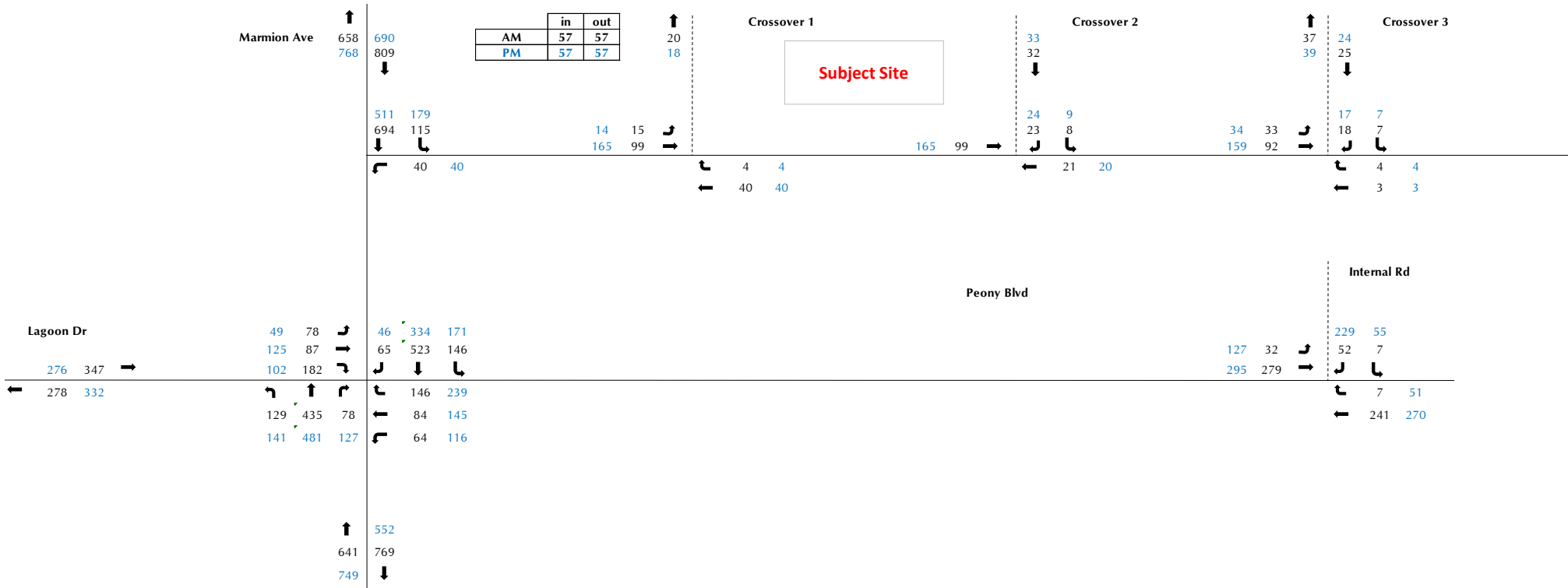


Figure D3: 2025 peak hours total traffic flows with stage 1 and 3 and the proposed development

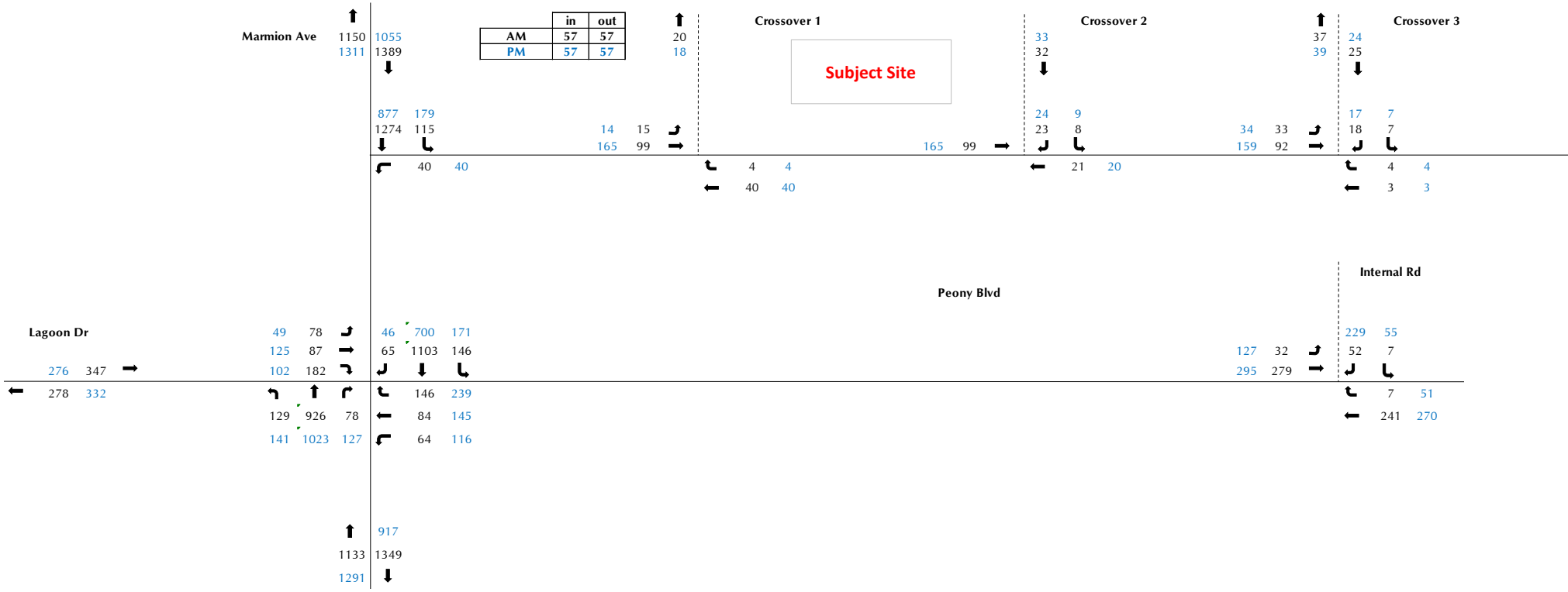


Figure D4: 2035 peak hours total traffic flows with stage 1 and 3 and the proposed development

Appendix E

INTERSECTION ANALYSIS

(EXISTING CALIBRATED SCENARIO)

transcore

Engineering a better future for over 20 years!

MOVEMENT SUMMARY

Site: [Marmion Ave & Peony Blvd & Lagoon Dr - 2024 - Existing - AM (Site Folder: Existing (2024))]

Network: N101 [AM (Network Folder: Existing (2024))]

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
10	L2	136	2.0	136	2.0	0.163	16.7	LOS B	2.9	21.6	0.61	0.69	0.61	37.0
11	T1	397	10.0	397	10.0	0.595	33.2	LOS C	7.4	60.1	0.96	0.79	0.96	19.7
12	R2	42	2.0	42	2.0	0.307	46.1	LOS D	1.7	12.6	0.98	0.73	0.98	15.7
Approach		575	7.5	575	7.5	0.595	30.3	LOS C	7.4	60.1	0.88	0.76	0.88	23.5
NorthEast: Peony Blvd (NE)														
1	L2	62	2.0	62	2.0	0.136	12.4	LOS B	2.1	15.5	0.58	0.57	0.58	36.9
2	T1	55	2.0	55	2.0	*0.136	8.2	LOS A	2.1	15.5	0.58	0.57	0.58	35.2
3	R2	131	2.0	131	2.0	0.635	43.6	LOS D	5.2	39.5	1.00	0.83	1.08	6.0
Approach		247	2.0	247	2.0	0.635	27.9	LOS C	5.2	39.5	0.80	0.71	0.84	17.5
NorthWest: Marmion Ave (NW)														
4	L2	69	2.0	69	2.0	0.083	16.3	LOS B	1.4	10.6	0.59	0.67	0.59	24.5
5	T1	529	16.9	529	16.9	*0.848	42.4	LOS D	11.8	103.0	1.00	1.03	1.33	22.9
6	R2	60	2.0	60	2.0	*0.442	46.8	LOS D	2.4	18.3	0.99	0.75	0.99	20.5
Approach		659	14.0	659	14.0	0.848	40.0	LOS D	11.8	103.0	0.96	0.96	1.22	22.7
SouthWest: Lagoon Dr (SW)														
7	L2	82	2.0	82	2.0	0.129	9.1	LOS A	1.6	12.2	0.47	0.55	0.47	36.7
8	T1	49	2.0	49	2.0	0.129	4.6	LOS A	1.6	12.2	0.47	0.55	0.47	36.7
9	R2	192	2.0	192	2.0	*0.847	49.5	LOS D	8.5	64.2	1.00	1.01	1.38	22.3
Approach		323	2.0	323	2.0	0.847	32.3	LOS C	8.5	64.2	0.78	0.82	1.01	24.9
All Vehicles		1804	8.1	1804	8.1	0.848	33.9	LOS C	11.8	103.0	0.88	0.84	1.02	22.9

MOVEMENT SUMMARY

Site: [Marmion Ave & Rd 1 - 2024 - Existing - AM (Site Folder: Existing (2024))]

Network: N101 [AM (Network Folder: Existing (2024))]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
2	T1	609	10.0	609	10.0	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		609	10.0	609	10.0	0.171	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
NorthWest: Marmion Ave (NW)														
7	L2	76	2.0	76	2.0	0.041	7.5	LOS A	0.0	0.0	0.00	0.64	0.00	40.9
8	T1	659	16.9	659	16.9	0.198	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		735	15.4	735	15.4	0.198	0.8	NA	0.0	0.0	0.00	0.07	0.00	55.1
All Vehicles		1344	12.9	1344	12.9	0.198	0.4	NA	0.0	0.0	0.00	0.04	0.00	57.9

MOVEMENT SUMMARY

Site: [Peony Blvd & Internal Rd - 2024 - Existing - AM (Site Folder: Existing (2024))]

Network: N101 [AM (Network Folder: Existing (2024))]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Peony Blvd (NE)														
2	T1	197	2.0	197	2.0	0.114	0.1	LOS A	0.1	1.1	0.05	0.04	0.05	45.0
3	R2	16	2.0	16	2.0	0.114	3.8	LOS A	0.1	1.1	0.05	0.04	0.05	25.6
Approach		213	2.0	213	2.0	0.114	0.3	NA	0.1	1.1	0.05	0.04	0.05	38.4
NorthWest: Internal Rd (NW)														
4	L2	4	2.0	4	2.0	0.064	0.3	LOS A	0.3	1.9	0.37	0.28	0.37	20.1
6	R2	51	2.0	51	2.0	0.064	2.1	LOS A	0.3	1.9	0.37	0.28	0.37	18.5
Approach		55	2.0	55	2.0	0.064	1.9	LOS A	0.3	1.9	0.37	0.28	0.37	18.7
SouthWest: Peony Blvd (SW)														
7	L2	58	2.0	58	2.0	0.033	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	36.4
8	T1	103	2.0	103	2.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		161	2.0	161	2.0	0.051	1.6	NA	0.0	0.0	0.00	0.19	0.00	42.0
All Vehicles		428	2.0	428	2.0	0.114	1.0	NA	0.3	1.9	0.07	0.13	0.07	33.5

MOVEMENT SUMMARY

Site: [Marmion Ave & Peony Blvd & Lagoon Dr - 2024 - Existing - PM (Site Folder: Existing (2024))]

Network: N101 [PM (Network Folder: Existing (2024))]

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
10	L2	148	2.0	148	2.0	0.107	6.5	LOS A	0.7	5.5	0.21	0.61	0.21	45.9
11	T1	446	10.0	446	10.0	*0.664	38.2	LOS D	9.5	77.6	0.98	0.84	1.02	17.9
12	R2	81	2.0	81	2.0	*0.665	54.3	LOS D	3.8	28.8	1.00	0.82	1.15	13.9
Approach		676	7.3	676	7.3	0.665	33.2	LOS C	9.5	77.6	0.81	0.78	0.86	22.1
NorthEast: Peony Blvd (NE)														
1	L2	65	2.0	65	2.0	0.186	13.5	LOS B	2.2	16.5	0.66	0.62	0.66	36.1
2	T1	74	2.0	74	2.0	*0.186	9.3	LOS A	2.2	16.5	0.66	0.62	0.66	34.4
3	R2	226	2.0	226	2.0	*0.656	42.2	LOS D	9.6	72.3	0.98	0.84	1.01	6.2
Approach		365	2.0	365	2.0	0.656	30.4	LOS C	9.6	72.3	0.86	0.75	0.88	15.1
NorthWest: Marmion Ave (NW)														
4	L2	64	2.0	64	2.0	0.047	6.3	LOS A	0.3	2.0	0.18	0.59	0.18	38.2
5	T1	385	16.9	385	16.9	0.613	37.4	LOS D	8.1	70.5	0.97	0.80	0.97	24.7
6	R2	39	2.0	39	2.0	0.323	51.9	LOS D	1.8	13.2	0.99	0.73	0.99	19.3
Approach		488	13.8	488	13.8	0.613	34.5	LOS C	8.1	70.5	0.87	0.77	0.87	24.6
SouthWest: Lagoon Dr (SW)														
7	L2	52	2.0	52	2.0	0.114	12.5	LOS B	1.6	12.3	0.57	0.57	0.57	33.2
8	T1	43	2.0	43	2.0	0.114	7.9	LOS A	1.6	12.3	0.57	0.57	0.57	33.2
9	R2	107	2.0	107	2.0	0.314	39.3	LOS D	4.2	31.4	0.90	0.77	0.90	25.3
Approach		202	2.0	202	2.0	0.314	25.7	LOS C	4.2	31.4	0.75	0.67	0.75	27.4
All Vehicles		1732	7.4	1732	7.4	0.665	32.1	LOS C	9.6	77.6	0.83	0.76	0.85	22.3

MOVEMENT SUMMARY

Site: [Marmion Ave & Rd 1 - 2024 - Existing - PM (Site Folder: Existing (2024))]

Network: N101 [PM (Network Folder: Existing (2024))]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
2	T1	724	10.0	724	10.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		724	10.0	724	10.0	0.203	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
NorthWest: Marmion Ave (NW)														
7	L2	55	2.0	55	2.0	0.030	7.5	LOS A	0.0	0.0	0.00	0.64	0.00	40.9
8	T1	488	16.9	488	16.9	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		543	15.4	543	15.4	0.147	0.8	NA	0.0	0.0	0.00	0.06	0.00	55.2
All Vehicles		1267	12.3	1267	12.3	0.203	0.3	NA	0.0	0.0	0.00	0.03	0.00	58.5

MOVEMENT SUMMARY

Site: [Peony Blvd & Internal Rd - 2024 - Existing - PM (Site Folder: Existing (2024))] **Network: N101 [PM (Network Folder: Existing (2024))]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Peony Blvd (NE)														
2	T1	203	2.0	203	2.0	0.158	0.1	LOS A	0.2	1.8	0.08	0.06	0.08	42.5
3	R2	26	2.0	26	2.0	0.158	3.9	LOS A	0.2	1.8	0.08	0.06	0.08	25.4
Approach		229	2.0	229	2.0	0.158	0.6	NA	0.2	1.8	0.08	0.06	0.08	34.9
NorthWest: Internal Rd (NW)														
4	L2	15	2.0	15	2.0	0.263	0.4	LOS A	0.9	6.9	0.41	0.35	0.41	19.8
6	R2	162	2.0	162	2.0	0.263	2.5	LOS A	0.9	6.9	0.41	0.35	0.41	18.2
Approach		177	2.0	177	2.0	0.263	2.3	LOS A	0.9	6.9	0.41	0.35	0.41	18.4
SouthWest: Peony Blvd (SW)														
7	L2	88	2.0	88	2.0	0.051	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	36.4
8	T1	100	2.0	100	2.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		188	2.0	188	2.0	0.051	2.0	NA	0.0	0.0	0.00	0.25	0.00	40.6
All Vehicles		595	2.0	595	2.0	0.263	1.6	NA	0.9	6.9	0.15	0.21	0.15	27.4

Appendix F

2025 INTERSECTION ANALYSIS

(POST DEVELOPMENT SCENARIO)

transcore

Engineering a better future for over 20 years!

MOVEMENT SUMMARY

Site: [Marmion Ave & Peony Blvd & Lagoon Dr - 2025 - AM (Site Folder: 2025 + Development)]

Network: N101 [AM (Network Folder: 2025)]

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
10	L2	136	2.0	136	2.0	0.101	6.6	LOS A	0.7	5.0	0.23	0.61	0.23	45.8
11	T1	458	10.0	458	10.0	0.686	34.9	LOS C	8.9	72.4	0.99	0.86	1.06	19.1
12	R2	82	2.0	82	2.0	*0.599	47.8	LOS D	3.4	25.6	1.00	0.80	1.08	15.3
Approach		676	7.4	676	7.4	0.686	30.8	LOS C	8.9	72.4	0.84	0.80	0.89	23.0
NorthEast: Peony Blvd (NE)														
1	L2	67	2.0	67	2.0	0.202	14.6	LOS B	3.2	23.8	0.65	0.60	0.65	35.1
2	T1	88	2.0	88	2.0	*0.202	10.4	LOS B	3.2	23.8	0.65	0.60	0.65	33.5
3	R2	154	2.0	154	2.0	0.747	45.7	LOS D	6.4	48.5	1.00	0.91	1.21	5.8
Approach		309	2.0	309	2.0	0.747	28.8	LOS C	6.4	48.5	0.83	0.75	0.93	17.5
NorthWest: Marmion Ave (NW)														
4	L2	154	2.0	154	2.0	0.119	6.6	LOS A	0.8	5.8	0.23	0.61	0.23	37.7
5	T1	551	16.9	551	16.9	*0.882	45.8	LOS D	12.8	112.3	1.00	1.08	1.42	21.8
6	R2	68	2.0	68	2.0	0.504	47.1	LOS D	2.8	21.0	1.00	0.76	1.00	20.5
Approach		773	12.6	773	12.6	0.882	38.1	LOS D	12.8	112.3	0.85	0.96	1.15	22.6
SouthWest: Lagoon Dr (SW)														
7	L2	82	2.0	82	2.0	0.206	12.2	LOS B	2.9	21.9	0.61	0.59	0.61	33.7
8	T1	92	2.0	92	2.0	0.206	7.7	LOS A	2.9	21.9	0.61	0.59	0.61	33.7
9	R2	192	2.0	192	2.0	*0.847	49.5	LOS D	8.5	64.2	1.00	1.01	1.38	22.3
Approach		365	2.0	365	2.0	0.847	30.6	LOS C	8.5	64.2	0.81	0.81	1.01	25.1
All Vehicles		2123	7.6	2123	7.6	0.882	33.1	LOS C	12.8	112.3	0.83	0.85	1.01	22.6

MOVEMENT SUMMARY

Site: [Marmion Ave & Rd 1 - 2025 - AM (Site Folder: 2025 + Development)]

Network: N101 [AM (Network Folder: 2025)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
2	T1	693	10.0	693	10.0	0.195	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		693	10.0	693	10.0	0.195	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
NorthEast: Rd 1 (NE)														
4	L2	42	2.0	42	2.0	0.048	1.9	LOS A	0.2	1.3	0.42	0.32	0.42	16.7
Approach		42	2.0	42	2.0	0.048	1.9	LOS A	0.2	1.3	0.42	0.32	0.42	16.7
NorthWest: Marmion Ave (NW)														
7	L2	121	2.0	121	2.0	0.066	7.5	LOS A	0.0	0.0	0.00	0.64	0.00	34.8
8	T1	731	16.9	731	16.9	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		852	14.8	852	14.8	0.219	1.1	NA	0.0	0.0	0.00	0.09	0.00	53.7
All Vehicles		1586	12.4	1586	12.4	0.219	0.6	NA	0.2	1.3	0.01	0.06	0.01	56.5

MOVEMENT SUMMARY

Site: [Peony Blvd & Internal Rd - 2025 - AM (Site Folder: 2025 + Development)]

Network: N101 [AM (Network Folder: 2025)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Peony Blvd (NE)														
2	T1	254	2.0	254	2.0	0.138	0.1	LOS A	0.1	0.7	0.03	0.02	0.03	47.0
3	R2	7	2.0	7	2.0	0.138	4.7	LOS A	0.1	0.7	0.03	0.02	0.03	25.8
Approach		261	2.0	261	2.0	0.138	0.2	NA	0.1	0.7	0.03	0.02	0.03	43.5
NorthWest: Internal Rd (NW)														
4	L2	7	2.0	7	2.0	0.094	1.0	LOS A	0.4	2.7	0.52	0.47	0.52	19.0
6	R2	55	2.0	55	2.0	0.094	4.1	LOS A	0.4	2.7	0.52	0.47	0.52	17.3
Approach		62	2.0	62	2.0	0.094	3.7	LOS A	0.4	2.7	0.52	0.47	0.52	17.5
SouthWest: Peony Blvd (SW)														
7	L2	34	2.0	34	2.0	0.019	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	36.4
8	T1	294	2.0	294	2.0	0.146	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		327	2.0	327	2.0	0.146	0.5	NA	0.0	0.0	0.00	0.05	0.00	46.9
All Vehicles		651	2.0	651	2.0	0.146	0.7	NA	0.4	2.7	0.06	0.08	0.06	37.2

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 1 - 2025 - AM (Site Folder: 2025 + Development)]

Network: N101 [AM (Network Folder: 2025)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	42	2.0	42	2.0	0.025	0.0	LOS A	0.0	0.2	0.05	0.05	0.05	43.7
3	R2	4	2.0	4	2.0	0.025	2.9	LOS A	0.0	0.2	0.05	0.05	0.05	40.7
Approach		46	2.0	46	2.0	0.025	0.3	NA	0.0	0.2	0.05	0.05	0.05	43.2
SouthWest: Rd1 (SW)														
7	L2	16	2.0	16	2.0	0.063	3.0	LOS A	0.0	0.0	0.00	0.07	0.00	29.2
8	T1	104	2.0	104	2.0	0.063	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	44.0
Approach		120	2.0	120	2.0	0.063	0.4	NA	0.0	0.0	0.00	0.07	0.00	40.2
All Vehicles		166	2.0	166	2.0	0.063	0.4	NA	0.0	0.2	0.01	0.06	0.01	40.9

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 2 - 2025 - AM (Site Folder: 2025 + Development)]

Network: N101 [AM (Network Folder: 2025)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	22	2.0	22	2.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		22	2.0	22	2.0	0.011	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
NorthWest: Crossover 2 (NW)														
4	L2	8	2.0	8	2.0	0.027	0.3	LOS A	0.1	0.7	0.20	0.22	0.20	16.0
6	R2	24	2.0	24	2.0	0.027	1.4	LOS A	0.1	0.7	0.20	0.22	0.20	16.0
Approach		33	2.0	33	2.0	0.027	1.1	LOS A	0.1	0.7	0.20	0.22	0.20	16.0
SouthWest: Rd1 (SW)														
8	T1	104	2.0	104	2.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		104	2.0	104	2.0	0.054	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		159	2.0	159	2.0	0.054	0.2	NA	0.1	0.7	0.04	0.04	0.04	37.1

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 3 - 2025 - AM (Site Folder: 2025 + Development)]

Network: N101 [AM (Network Folder: 2025)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	3	2.0	3	2.0	0.004	0.3	LOS A	0.0	0.1	0.22	0.30	0.22	40.8
3	R2	4	2.0	4	2.0	0.004	5.0	LOS A	0.0	0.1	0.22	0.30	0.22	40.7
Approach		7	2.0	7	2.0	0.004	3.0	NA	0.0	0.1	0.22	0.30	0.22	40.7
NorthWest: Crossover 3 (NW)														
4	L2	7	2.0	7	2.0	0.021	0.3	LOS A	0.1	0.5	0.18	0.16	0.18	37.4
6	R2	19	2.0	19	2.0	0.021	1.0	LOS A	0.1	0.5	0.18	0.16	0.18	16.7
Approach		26	2.0	26	2.0	0.021	0.8	LOS A	0.1	0.5	0.18	0.16	0.18	28.3
SouthWest: Rd1 (SW)														
7	L2	35	2.0	35	2.0	0.069	4.6	LOS A	0.0	0.0	0.00	0.14	0.00	16.6
8	T1	97	2.0	97	2.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	47.3
Approach		132	2.0	132	2.0	0.069	1.2	NA	0.0	0.0	0.00	0.14	0.00	38.5
All Vehicles		165	2.0	165	2.0	0.069	1.2	NA	0.1	0.5	0.04	0.15	0.04	37.7

MOVEMENT SUMMARY

Site: [Marmion Ave & Peony Blvd & Lagoon Dr - 2025 - PM (Site Folder: 2025 + Development)] **Network: N101 [PM (Network Folder: 2025)]**

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
10	L2	148	2.0	148	2.0	0.109	6.8	LOS A	0.9	6.7	0.23	0.61	0.23	45.7
11	T1	506	10.0	506	10.0	0.753	40.8	LOS D	11.4	92.8	1.00	0.91	1.13	17.1
12	R2	134	2.0	134	2.0	*0.731	52.3	LOS D	6.2	47.0	1.00	0.87	1.18	14.3
Approach		788	7.1	788	7.1	0.753	36.3	LOS D	11.4	92.8	0.86	0.85	0.97	20.6
NorthEast: Peony Blvd (NE)														
1	L2	122	2.0	122	2.0	0.379	15.1	LOS B	5.3	39.7	0.75	0.69	0.75	34.5
2	T1	153	2.0	153	2.0	*0.379	10.9	LOS B	5.3	39.7	0.75	0.69	0.75	33.0
3	R2	252	2.0	252	2.0	*0.729	44.0	LOS D	11.1	83.6	1.00	0.88	1.09	6.0
Approach		526	2.0	526	2.0	0.729	27.7	LOS C	11.1	83.6	0.87	0.78	0.91	18.3
NorthWest: Marmion Ave (NW)														
4	L2	180	2.0	180	2.0	0.146	7.5	LOS A	1.5	11.6	0.29	0.63	0.29	35.9
5	T1	352	16.9	352	16.9	*0.679	41.4	LOS D	7.8	68.1	1.00	0.86	1.08	23.2
6	R2	48	2.0	48	2.0	0.402	52.3	LOS D	2.2	16.6	1.00	0.74	1.00	19.2
Approach		580	11.0	580	11.0	0.679	31.8	LOS C	7.8	68.1	0.78	0.78	0.83	24.1
SouthWest: Lagoon Dr (SW)														
7	L2	52	2.0	52	2.0	0.312	23.1	LOS C	4.6	34.8	0.79	0.73	0.79	25.4
8	T1	132	2.0	132	2.0	0.312	18.5	LOS B	4.6	34.8	0.79	0.73	0.79	25.4
9	R2	107	2.0	107	2.0	0.314	39.3	LOS D	4.2	31.4	0.90	0.77	0.90	25.3
Approach		291	2.0	291	2.0	0.314	27.0	LOS C	4.6	34.8	0.83	0.74	0.83	25.3
All Vehicles		2185	6.3	2185	6.3	0.753	31.8	LOS C	11.4	92.8	0.83	0.80	0.90	21.7

MOVEMENT SUMMARY

Site: [Marmion Ave & Rd 1 - 2025 - PM (Site Folder: 2025 + Development)] **Network: N101 [PM (Network Folder: 2025)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
2	T1	808	10.0	808	10.0	0.227	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		808	10.0	808	10.0	0.227	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
NorthEast: Rd 1 (NE)														
4	L2	42	2.0	42	2.0	0.043	1.3	LOS A	0.2	1.1	0.36	0.24	0.36	17.4
Approach		42	2.0	42	2.0	0.043	1.3	LOS A	0.2	1.1	0.36	0.24	0.36	17.4
NorthWest: Marmion Ave (NW)														
7	L2	188	2.0	188	2.0	0.103	7.5	LOS A	0.0	0.0	0.00	0.64	0.00	34.8
8	T1	538	16.9	538	16.9	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		726	13.0	726	13.0	0.162	2.0	NA	0.0	0.0	0.00	0.17	0.00	49.7
All Vehicles		1577	11.2	1577	11.2	0.227	0.9	NA	0.2	1.1	0.01	0.08	0.01	55.6

MOVEMENT SUMMARY

Site: [Peony Blvd & Internal Rd - 2025 - PM (Site Folder: 2025 + Development)] **Network: N101 [PM (Network Folder: 2025)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Peony Blvd (NE)														
2	T1	284	2.0	284	2.0	0.297	0.7	LOS A	0.7	5.3	0.21	0.10	0.21	34.6
3	R2	54	2.0	54	2.0	0.297	5.5	LOS A	0.7	5.3	0.21	0.10	0.21	24.4
Approach		338	2.0	338	2.0	0.297	1.5	NA	0.7	5.3	0.21	0.10	0.21	29.6
NorthWest: Internal Rd (NW)														
4	L2	58	2.0	58	2.0	0.700	7.1	LOS A	4.1	31.2	0.65	1.23	1.35	15.4
6	R2	241	2.0	241	2.0	0.700	12.3	LOS B	4.1	31.2	0.65	1.23	1.35	13.6
Approach		299	2.0	299	2.0	0.700	11.3	LOS B	4.1	31.2	0.65	1.23	1.35	14.0
SouthWest: Peony Blvd (SW)														
7	L2	134	2.0	134	2.0	0.077	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	36.4
8	T1	311	2.0	311	2.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		444	2.0	444	2.0	0.154	1.3	NA	0.0	0.0	0.00	0.16	0.00	42.8
All Vehicles		1081	2.0	1081	2.0	0.700	4.1	NA	4.1	31.2	0.25	0.43	0.44	24.0

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 1 - 2025 - PM (Site Folder: 2025 + Development)] **Network: N101 [PM (Network Folder: 2025)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	42	2.0	42	2.0	0.025	0.1	LOS A	0.0	0.2	0.06	0.05	0.06	43.0
3	R2	4	2.0	4	2.0	0.025	3.1	LOS A	0.0	0.2	0.06	0.05	0.06	40.3
Approach		46	2.0	46	2.0	0.025	0.4	NA	0.0	0.2	0.06	0.05	0.06	42.6
SouthWest: Rd1 (SW)														
7	L2	15	2.0	15	2.0	0.098	3.0	LOS A	0.0	0.0	0.00	0.04	0.00	29.7
8	T1	174	2.0	174	2.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	46.2
Approach		188	2.0	188	2.0	0.098	0.2	NA	0.0	0.0	0.00	0.04	0.00	43.5
All Vehicles		235	2.0	235	2.0	0.098	0.3	NA	0.0	0.2	0.01	0.04	0.01	43.4

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 2 - 2025 - PM (Site Folder: 2025 + Development)] **Network: N101 [PM (Network Folder: 2025)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	21	2.0	21	2.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		21	2.0	21	2.0	0.011	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
NorthWest: Crossover 2 (NW)														
4	L2	9	2.0	9	2.0	0.030	0.5	LOS A	0.1	0.8	0.26	0.26	0.26	15.6
6	R2	25	2.0	25	2.0	0.030	1.7	LOS A	0.1	0.8	0.26	0.26	0.26	15.6
Approach		35	2.0	35	2.0	0.030	1.3	LOS A	0.1	0.8	0.26	0.26	0.26	15.6
SouthWest: Rd1 (SW)														
8	T1	174	2.0	174	2.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		174	2.0	174	2.0	0.090	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		229	2.0	229	2.0	0.090	0.2	NA	0.1	0.8	0.04	0.04	0.04	38.7

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 3 - 2025 - PM (Site Folder: 2025 + Development)] **Network: N101 [PM (Network Folder: 2025)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	3	2.0	3	2.0	0.005	0.5	LOS A	0.0	0.2	0.28	0.30	0.28	40.2
3	R2	4	2.0	4	2.0	0.005	5.2	LOS A	0.0	0.2	0.28	0.30	0.28	40.2
Approach		7	2.0	7	2.0	0.005	3.2	NA	0.0	0.2	0.28	0.30	0.28	40.2
NorthWest: Crossover 3 (NW)														
4	L2	7	2.0	7	2.0	0.022	0.5	LOS A	0.1	0.5	0.24	0.20	0.24	37.0
6	R2	18	2.0	18	2.0	0.022	1.2	LOS A	0.1	0.5	0.24	0.20	0.24	16.2
Approach		25	2.0	25	2.0	0.022	1.0	LOS A	0.1	0.5	0.24	0.20	0.24	28.0
SouthWest: Rd1 (SW)														
7	L2	36	2.0	36	2.0	0.107	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	16.8
8	T1	167	2.0	167	2.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	48.1
Approach		203	2.0	203	2.0	0.107	0.8	NA	0.0	0.0	0.00	0.10	0.00	42.1
All Vehicles		236	2.0	236	2.0	0.107	0.9	NA	0.1	0.5	0.03	0.11	0.03	41.2

Appendix G

2035 INTERSECTION ANALYSIS

(10 YEARS POST DEVELOPMENT SCENARIO)

transcore

Engineering a better future for over 20 years!

MOVEMENT SUMMARY

Site: [Marmion Ave & Peony Blvd & Lagoon Dr - 2035 - AM (Site Folder: 2035 + Development)]

Network: N101 [AM (Network Folder: 2035)]

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
10	L2	136	2.0	136	2.0	0.093	6.6	LOS A	0.9	6.6	0.18	0.60	0.18	45.9
11	T1	975	10.0	975	10.0	0.644	29.2	LOS C	22.5	183.5	0.85	0.76	0.85	21.4
12	R2	82	2.0	82	2.0	*0.898	79.9	LOS E	5.6	42.1	1.00	0.97	1.55	10.2
Approach		1193	8.5	1193	8.5	0.898	30.1	LOS C	22.5	183.5	0.79	0.75	0.82	22.3
NorthEast: Peony Blvd (NE)														
1	L2	67	2.0	67	2.0	0.303	29.4	LOS C	6.1	46.1	0.82	0.72	0.82	24.6
2	T1	88	2.0	88	2.0	*0.303	25.2	LOS C	6.1	46.1	0.82	0.72	0.82	23.9
3	R2	154	2.0	154	2.0	0.776	65.6	LOS E	9.5	71.5	1.00	0.90	1.18	4.2
Approach		309	2.0	309	2.0	0.776	46.2	LOS D	9.5	71.5	0.91	0.81	1.00	12.6
NorthWest: Marmion Ave (NW)														
4	L2	154	2.0	154	2.0	0.107	6.7	LOS A	1.1	8.4	0.20	0.60	0.20	37.5
5	T1	1161	16.9	1161	16.9	*0.890	46.5	LOS D	30.7	269.3	0.95	1.00	1.14	21.6
6	R2	68	2.0	68	2.0	0.757	73.2	LOS E	4.4	33.0	1.00	0.85	1.25	15.3
Approach		1383	14.5	1383	14.5	0.890	43.4	LOS D	30.7	269.3	0.87	0.95	1.04	21.6
SouthWest: Lagoon Dr (SW)														
7	L2	82	2.0	82	2.0	0.310	22.1	LOS C	5.1	38.8	0.79	0.70	0.79	25.5
8	T1	92	2.0	92	2.0	0.310	17.6	LOS B	5.1	38.8	0.79	0.70	0.79	25.5
9	R2	192	2.0	192	2.0	*0.908	76.0	LOS E	13.1	98.9	1.00	1.04	1.43	17.1
Approach		365	2.0	365	2.0	0.908	49.2	LOS D	13.1	98.9	0.90	0.88	1.12	19.1
All Vehicles		3251	9.7	3251	9.7	0.908	39.5	LOS D	30.7	269.3	0.85	0.86	0.96	20.6

MOVEMENT SUMMARY

Site: [Marmion Ave & Rd 1 - 2035 - AM (Site Folder: 2035 + Development)]

Network: N101 [AM (Network Folder: 2035)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
2	T1	1211	10.0	1211	10.0	0.340	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1211	10.0	1211	10.0	0.340	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
NorthEast: Rd 1 (NE)														
4	L2	42	2.0	42	2.0	0.156	5.0	LOS A	0.2	1.8	0.61	0.61	0.61	13.2
Approach		42	2.0	42	2.0	0.156	5.0	LOS A	0.2	1.8	0.61	0.61	0.61	13.2
NorthWest: Marmion Ave (NW)														
7	L2	121	2.0	121	2.0	0.066	7.5	LOS A	0.0	0.0	0.00	0.64	0.00	34.8
8	T1	1341	16.9	1341	16.9	0.403	0.0	LOS A	6.6	58.2	0.00	0.00	0.00	59.7
Approach		1462	15.7	1462	15.7	0.403	0.7	NA	6.6	58.2	0.00	0.05	0.00	55.9
All Vehicles		2715	12.9	2715	12.9	0.403	0.5	NA	6.6	58.2	0.01	0.04	0.01	57.6

MOVEMENT SUMMARY

Site: [Peony Blvd & Internal Rd - 2035 - AM (Site Folder: 2035 + Development)]

Network: N101 [AM (Network Folder: 2035)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Peony Blvd (NE)														
2	T1	254	2.0	254	2.0	0.173	0.1	LOS A	0.1	0.7	0.03	0.02	0.03	47.0
3	R2	7	2.0	7	2.0	0.173	4.7	LOS A	0.1	0.7	0.03	0.02	0.03	25.8
Approach		261	2.0	261	2.0	0.173	0.2	NA	0.1	0.7	0.03	0.02	0.03	43.5
NorthWest: Internal Rd (NW)														
4	L2	7	2.0	7	2.0	0.116	1.0	LOS A	0.4	2.7	0.52	0.47	0.52	19.0
6	R2	55	2.0	55	2.0	0.116	4.1	LOS A	0.4	2.7	0.52	0.47	0.52	17.3
Approach		62	2.0	62	2.0	0.116	3.7	LOS A	0.4	2.7	0.52	0.47	0.52	17.6
SouthWest: Peony Blvd (SW)														
7	L2	34	2.0	34	2.0	0.019	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	36.4
8	T1	294	2.0	294	2.0	0.146	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		327	2.0	327	2.0	0.146	0.5	NA	0.0	0.0	0.00	0.05	0.00	46.9
All Vehicles		651	2.0	651	2.0	0.173	0.7	NA	0.4	2.7	0.06	0.08	0.06	37.2

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 1 - 2035 - AM (Site Folder: 2035 + Development)]

Network: N101 [AM (Network Folder: 2035)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	42	2.0	42	2.0	0.035	0.0	LOS A	0.0	0.2	0.05	0.05	0.05	43.7
3	R2	4	2.0	4	2.0	0.035	2.9	LOS A	0.0	0.2	0.05	0.05	0.05	40.7
Approach		46	2.0	46	2.0	0.035	0.3	NA	0.0	0.2	0.05	0.05	0.05	43.2
SouthWest: Rd1 (SW)														
7	L2	16	2.0	16	2.0	0.063	3.0	LOS A	0.0	0.0	0.00	0.07	0.00	29.2
8	T1	104	2.0	104	2.0	0.063	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	44.0
Approach		120	2.0	120	2.0	0.063	0.4	NA	0.0	0.0	0.00	0.07	0.00	40.2
All Vehicles		166	2.0	166	2.0	0.063	0.4	NA	0.0	0.2	0.01	0.06	0.01	40.9

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 2 - 2035 - AM (Site Folder: 2035 + Development)]

Network: N101 [AM (Network Folder: 2035)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	22	2.0	22	2.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		22	2.0	22	2.0	0.011	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
NorthWest: Crossover 2 (NW)														
4	L2	8	2.0	8	2.0	0.027	0.3	LOS A	0.1	0.7	0.20	0.22	0.20	16.0
6	R2	24	2.0	24	2.0	0.027	1.4	LOS A	0.1	0.7	0.20	0.22	0.20	16.0
Approach		33	2.0	33	2.0	0.027	1.1	LOS A	0.1	0.7	0.20	0.22	0.20	16.0
SouthWest: Rd1 (SW)														
8	T1	104	2.0	104	2.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		104	2.0	104	2.0	0.054	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		159	2.0	159	2.0	0.054	0.2	NA	0.1	0.7	0.04	0.04	0.04	37.1

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 3 - 2035 - AM (Site Folder: 2035 + Development)]

Network: N101 [AM (Network Folder: 2035)]

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	3	2.0	3	2.0	0.004	0.3	LOS A	0.0	0.1	0.22	0.30	0.22	40.8
3	R2	4	2.0	4	2.0	0.004	5.0	LOS A	0.0	0.1	0.22	0.30	0.22	40.7
Approach		7	2.0	7	2.0	0.004	3.0	NA	0.0	0.1	0.22	0.30	0.22	40.7
NorthWest: Crossover 3 (NW)														
4	L2	7	2.0	7	2.0	0.021	0.3	LOS A	0.1	0.5	0.18	0.16	0.18	37.4
6	R2	19	2.0	19	2.0	0.021	1.0	LOS A	0.1	0.5	0.18	0.16	0.18	16.7
Approach		26	2.0	26	2.0	0.021	0.8	LOS A	0.1	0.5	0.18	0.16	0.18	28.3
SouthWest: Rd1 (SW)														
7	L2	35	2.0	35	2.0	0.069	4.6	LOS A	0.0	0.0	0.00	0.14	0.00	16.6
8	T1	97	2.0	97	2.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	47.3
Approach		132	2.0	132	2.0	0.069	1.2	NA	0.0	0.0	0.00	0.14	0.00	38.5
All Vehicles		165	2.0	165	2.0	0.069	1.2	NA	0.1	0.5	0.04	0.15	0.04	37.7

MOVEMENT SUMMARY

Site: [Marmion Ave & Peony Blvd & Lagoon Dr - 2035 - PM (Site Folder: 2035 + Development)] **Network: N101 [PM (Network Folder: 2035)]**

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
10	L2	148	2.0	148	2.0	0.103	6.9	LOS A	1.2	9.2	0.20	0.60	0.20	45.5
11	T1	1077	10.0	1077	10.0	*0.859	47.6	LOS D	34.6	282.5	0.97	0.96	1.09	15.3
12	R2	134	2.0	134	2.0	0.731	71.0	LOS E	8.8	66.1	1.00	0.85	1.12	11.3
Approach		1359	8.3	1359	8.3	0.859	45.4	LOS D	34.6	282.5	0.89	0.91	0.99	16.9
NorthEast: Peony Blvd (NE)														
1	L2	122	2.0	122	2.0	0.549	34.6	LOS C	9.2	69.6	0.91	0.85	0.91	22.2
2	T1	153	2.0	153	2.0	*0.549	30.4	LOS C	9.2	69.6	0.91	0.85	0.91	21.7
3	R2	252	2.0	252	2.0	*0.880	69.5	LOS E	13.0	97.9	0.98	0.99	1.28	4.0
Approach		526	2.0	526	2.0	0.880	50.1	LOS D	13.0	97.9	0.94	0.92	1.08	12.0
NorthWest: Marmion Ave (NW)														
4	L2	180	2.0	180	2.0	0.134	8.2	LOS A	2.2	17.0	0.27	0.63	0.27	34.7
5	T1	737	16.9	737	16.9	0.753	43.6	LOS D	21.7	190.0	0.94	0.84	0.97	22.5
6	R2	48	2.0	48	2.0	*0.580	76.4	LOS E	3.3	24.6	1.00	0.76	1.06	14.9
Approach		965	13.4	965	13.4	0.753	38.7	LOS D	21.7	190.0	0.82	0.80	0.85	22.5
SouthWest: Lagoon Dr (SW)														
7	L2	52	2.0	52	2.0	0.450	46.9	LOS D	7.7	57.7	0.91	0.87	0.91	16.0
8	T1	132	2.0	132	2.0	0.450	42.3	LOS D	7.7	57.7	0.91	0.87	0.91	16.0
9	R2	107	2.0	107	2.0	0.297	52.5	LOS D	5.8	44.0	0.89	0.77	0.89	21.6
Approach		291	2.0	291	2.0	0.450	46.9	LOS D	7.7	57.7	0.90	0.83	0.90	18.5
All Vehicles		3141	8.2	3141	8.2	0.880	44.3	LOS D	34.6	282.5	0.88	0.87	0.96	17.9

MOVEMENT SUMMARY

Site: [Marmion Ave & Rd 1 - 2035 - PM (Site Folder: 2035 + Development)] **Network: N101 [PM (Network Folder: 2035)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marmion Ave (SE)														
2	T1	1380	10.0	1380	10.0	0.388	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1380	10.0	1380	10.0	0.388	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.7
NorthEast: Rd 1 (NE)														
4	L2	42	2.0	42	2.0	0.065	2.8	LOS A	0.2	1.5	0.49	0.42	0.49	15.5
Approach		42	2.0	42	2.0	0.065	2.8	LOS A	0.2	1.5	0.49	0.42	0.49	15.5
NorthWest: Marmion Ave (NW)														
7	L2	188	2.0	188	2.0	0.103	7.5	LOS A	0.0	0.0	0.00	0.64	0.00	34.8
8	T1	923	16.9	923	16.9	0.327	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1112	14.4	1112	14.4	0.327	1.3	NA	0.0	0.0	0.00	0.11	0.00	52.6
All Vehicles		2534	11.8	2534	11.8	0.388	0.6	NA	0.2	1.5	0.01	0.05	0.01	57.0

MOVEMENT SUMMARY

Site: [Peony Blvd & Internal Rd - 2035 - PM (Site Folder: 2035 + Development)] **Network: N101 [PM (Network Folder: 2035)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Peony Blvd (NE)														
2	T1	284	2.0	284	2.0	0.204	0.7	LOS A	2.3	17.4	0.21	0.09	0.21	34.6
3	R2	54	2.0	54	2.0	0.204	5.4	LOS A	2.3	17.4	0.21	0.09	0.21	24.5
Approach		338	2.0	338	2.0	0.204	1.4	NA	2.3	17.4	0.21	0.09	0.21	29.6
NorthWest: Internal Rd (NW)														
4	L2	58	2.0	58	2.0	0.875	18.1	LOS C	6.6	49.9	0.65	1.99	2.24	12.0
6	R2	241	2.0	241	2.0	0.875	23.3	LOS C	6.6	49.9	0.65	1.99	2.24	10.4
Approach		299	2.0	299	2.0	0.875	22.3	LOS C	6.6	49.9	0.65	1.99	2.24	10.7
SouthWest: Peony Blvd (SW)														
7	L2	134	2.0	134	2.0	0.077	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	36.4
8	T1	311	2.0	311	2.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		444	2.0	444	2.0	0.154	1.3	NA	0.0	0.0	0.00	0.16	0.00	42.8
All Vehicles		1081	2.0	1081	2.0	0.875	7.2	NA	6.6	49.9	0.24	0.65	0.69	20.3

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 1 - 2035 - PM (Site Folder: 2035 + Development)] **Network: N101 [PM (Network Folder: 2035)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	42	2.0	42	2.0	0.025	0.1	LOS A	0.0	0.2	0.06	0.05	0.06	43.0
3	R2	4	2.0	4	2.0	0.025	3.1	LOS A	0.0	0.2	0.06	0.05	0.06	40.3
Approach		46	2.0	46	2.0	0.025	0.4	NA	0.0	0.2	0.06	0.05	0.06	42.6
SouthWest: Rd1 (SW)														
7	L2	15	2.0	15	2.0	0.098	3.0	LOS A	0.0	0.0	0.00	0.04	0.00	29.7
8	T1	174	2.0	174	2.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	46.2
Approach		188	2.0	188	2.0	0.098	0.2	NA	0.0	0.0	0.00	0.04	0.00	43.5
All Vehicles		235	2.0	235	2.0	0.098	0.3	NA	0.0	0.2	0.01	0.04	0.01	43.4

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 2 - 2035 - PM (Site Folder: 2035 + Development)] **Network: N101 [PM (Network Folder: 2035)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	21	2.0	21	2.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		21	2.0	21	2.0	0.011	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
NorthWest: Crossover 2 (NW)														
4	L2	9	2.0	9	2.0	0.030	0.5	LOS A	0.1	0.8	0.26	0.26	0.26	15.6
6	R2	25	2.0	25	2.0	0.030	1.7	LOS A	0.1	0.8	0.26	0.26	0.26	15.6
Approach		35	2.0	35	2.0	0.030	1.3	LOS A	0.1	0.8	0.26	0.26	0.26	15.6
SouthWest: Rd1 (SW)														
8	T1	174	2.0	174	2.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		174	2.0	174	2.0	0.090	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		229	2.0	229	2.0	0.090	0.2	NA	0.1	0.8	0.04	0.04	0.04	38.7

MOVEMENT SUMMARY

Site: [Rd 1 & Crossover 3 - 2035 - PM (Site Folder: 2035 + Development)] **Network: N101 [PM (Network Folder: 2035)]**

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Rd1 (NE)														
2	T1	3	2.0	3	2.0	0.005	0.5	LOS A	0.0	0.2	0.28	0.30	0.28	40.2
3	R2	4	2.0	4	2.0	0.005	5.2	LOS A	0.0	0.2	0.28	0.30	0.28	40.2
Approach		7	2.0	7	2.0	0.005	3.2	NA	0.0	0.2	0.28	0.30	0.28	40.2
NorthWest: Crossover 3 (NW)														
4	L2	7	2.0	7	2.0	0.022	0.5	LOS A	0.1	0.5	0.24	0.20	0.24	37.0
6	R2	18	2.0	18	2.0	0.022	1.2	LOS A	0.1	0.5	0.24	0.20	0.24	16.2
Approach		25	2.0	25	2.0	0.022	1.0	LOS A	0.1	0.5	0.24	0.20	0.24	28.0
SouthWest: Rd1 (SW)														
7	L2	36	2.0	36	2.0	0.107	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	16.8
8	T1	167	2.0	167	2.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	48.1
Approach		203	2.0	203	2.0	0.107	0.8	NA	0.0	0.0	0.00	0.10	0.00	42.1
All Vehicles		236	2.0	236	2.0	0.107	0.9	NA	0.1	0.5	0.03	0.11	0.03	41.2