



| ARCHITECTURAL TOWN PLANNING DOCUMENTATION |                                |
|-------------------------------------------|--------------------------------|
| Sheet Number                              | Sheet Name                     |
| DA00-00                                   | COVER SHEET & DRAWING LIST     |
| DA00-01                                   | SITE CONTEXT PLAN              |
| DA00-10                                   | DEMOLITION PLAN                |
| DA01-00                                   | OVERALL SITE PLAN              |
| DA02-01                                   | GROUND FLOOR & MEZZANINE PLANS |
| DA02-02                                   | ROOF PLAN                      |
| DA04-01                                   | ELEVATIONS                     |
| DA05-01                                   | OVERALL SECTIONS               |
| DA09-01                                   | 3D AXONMETRIC VIEWS            |
| DA09-10                                   | ARTIST IMPRESSIONS 1           |
| DA09-11                                   | ARTIST IMPRESSIONS 2           |
| DA09-12                                   | ARTIST IMPRESSIONS 3           |
| DA10-02                                   | PEDESTRIAN CIRCULATION DIAGRAM |

**ROCKHAMPTON REGIONAL COUNCIL**

**APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.:** D/175-2025

**Dated:** 25 May 2026





NORMAN GARDENS SHOPPING VILLAGE

GLENMORE SHOPPING VILLAGE

GLENMORE STATE HIGH SCHOOL

REDHILL OVER 50'S RESORT

CREMATORIUM

LARGE FORMAT SHOPPING CENTRE

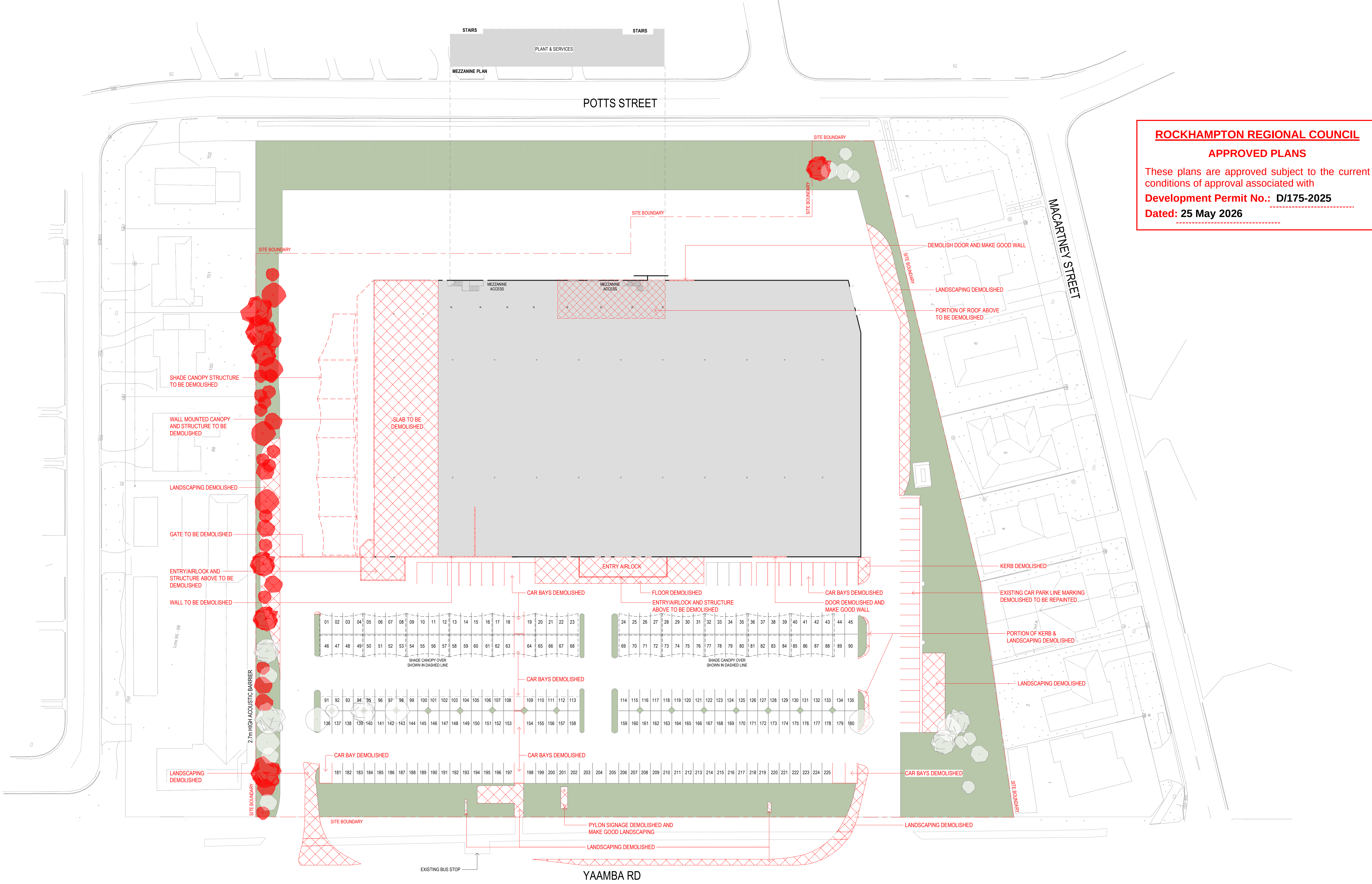
AUSPOST STAR TRACK

HOME WARE & ELECTRICAL APPLIANCES

CAR DEALERS RETAIL

SMALL LOCAL RETAIL





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GFA SCHEDULE

|                      |         |
|----------------------|---------|
| COLES SUPERMARKET    | 4113    |
| SHOWROOM             | 3541    |
| LIQUORLAND           | 150     |
| AMENITIES            | 17      |
| TOTAL PROPOSED GFA : | 7821 m2 |
| TOTAL EXISTING GFA : | 7923 m2 |

CAR PARK SCHEDULE

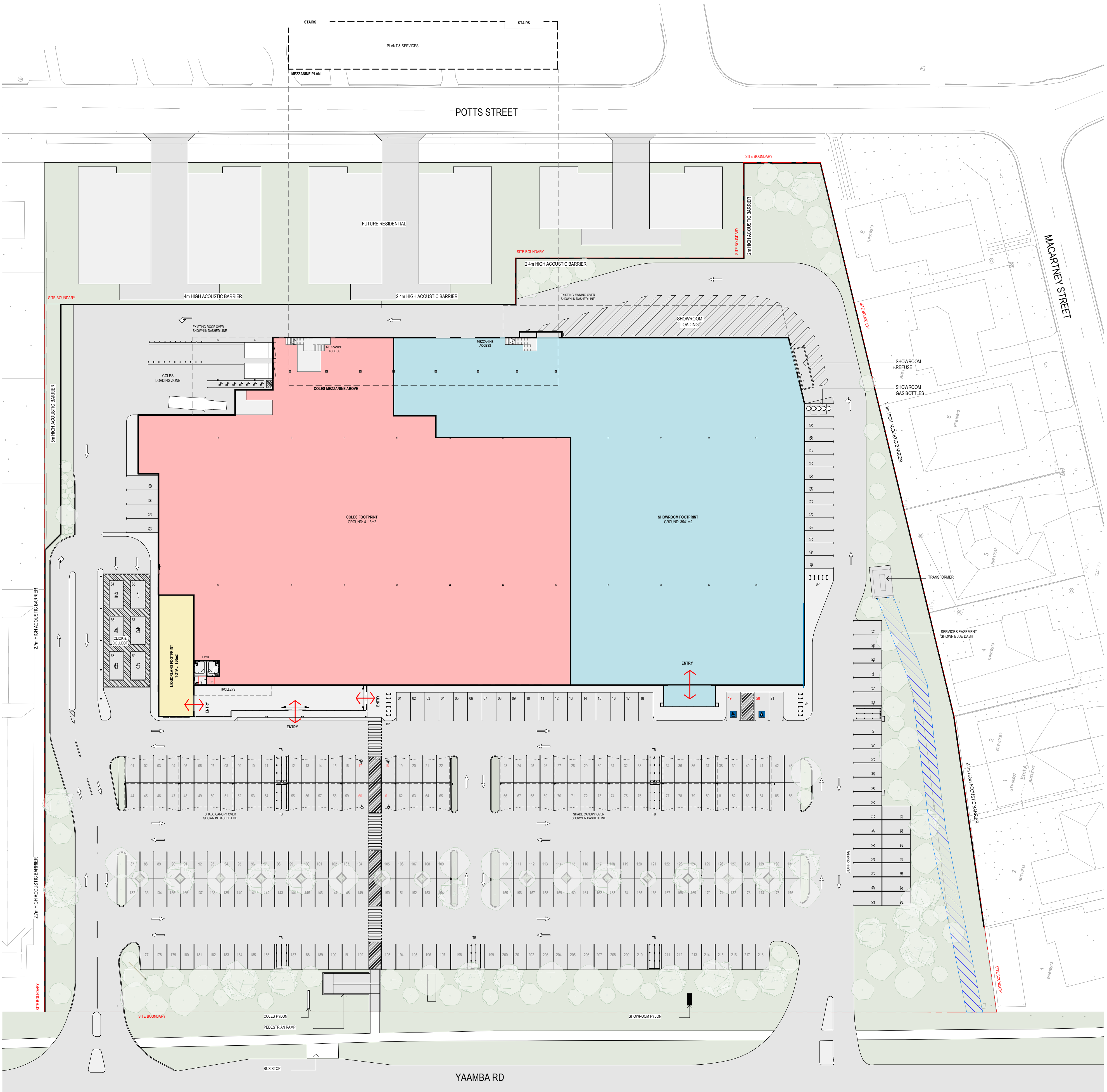
|                           |     |
|---------------------------|-----|
| EXISTING STANDARD CARPARK | 214 |
| EXISTING DISABLED CARPARK | 4   |
| TOTAL EXISTING CARPARKS : | 218 |
| NEW STANDARD CARPARK      | 57  |
| NEW DISABLED CARPARK      | 2   |
| NEW CLICK & COLLECT       | 6   |
| NEW HD VAN CARPARKS       | 4   |
| TOTAL PROPOSED CARPARKS : | 69  |
| TOTAL CARPARKS :          | 287 |

CARPARK RATIO

|                         |      |
|-------------------------|------|
| NUM. OF CARS PER 100 m2 | 3.66 |
|-------------------------|------|

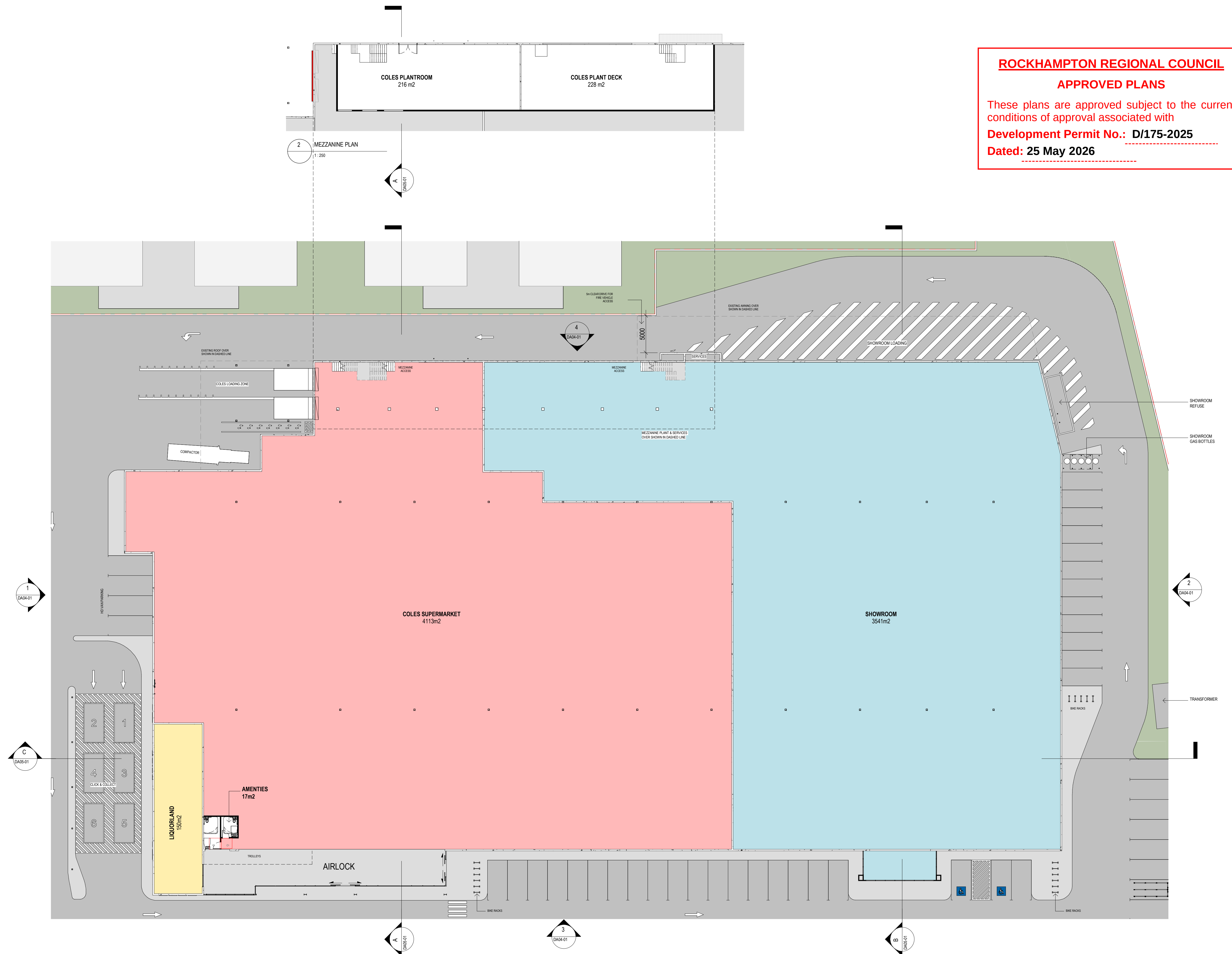
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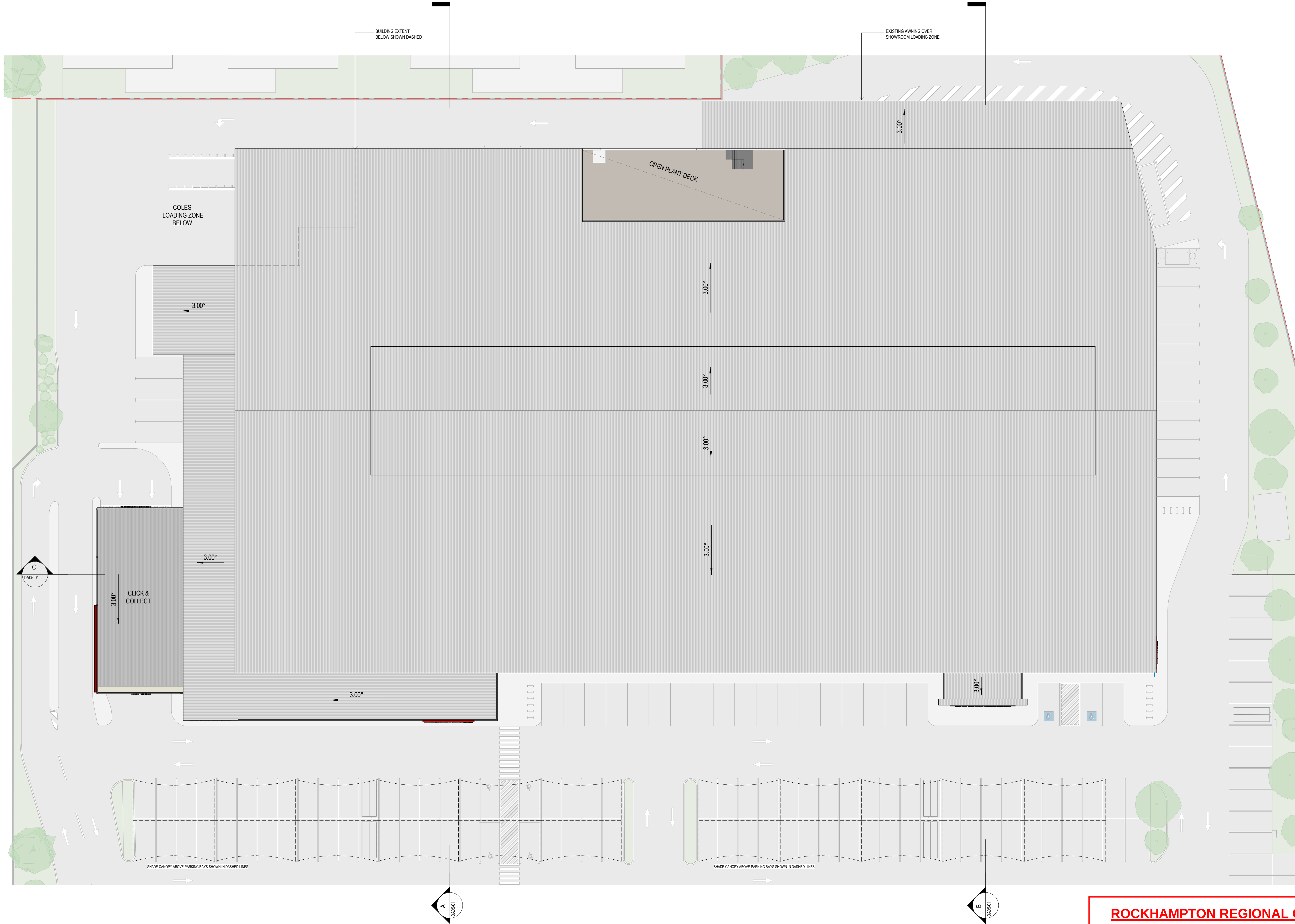




**Dated:** 25 May 2026







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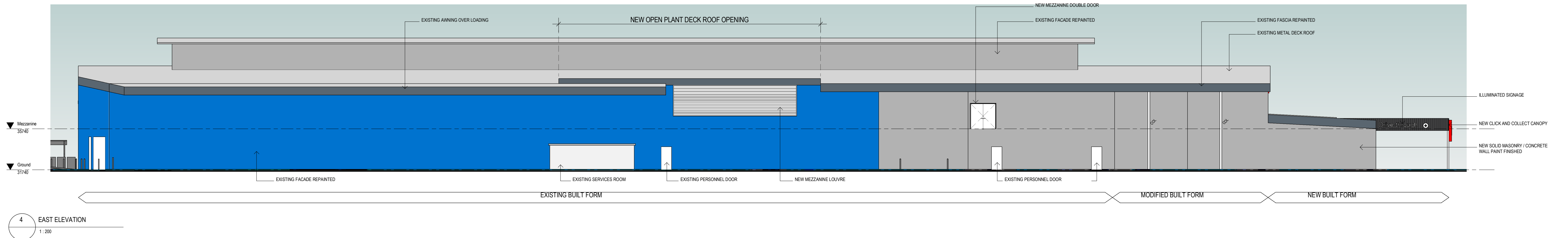
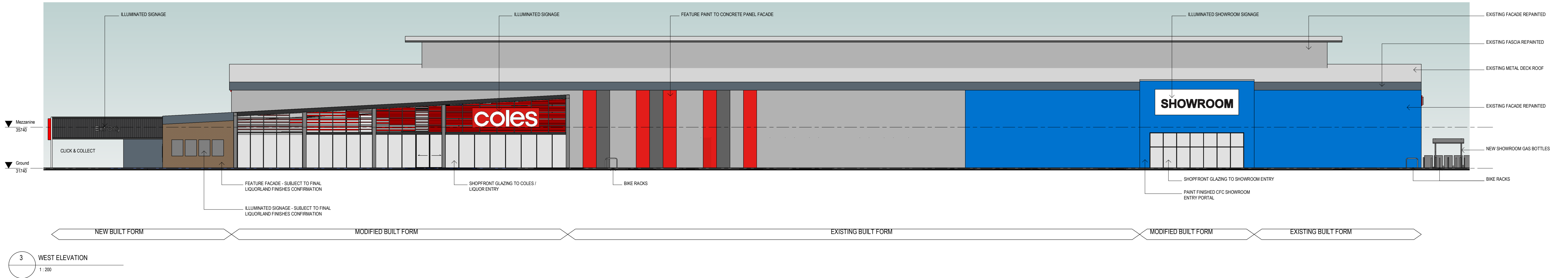
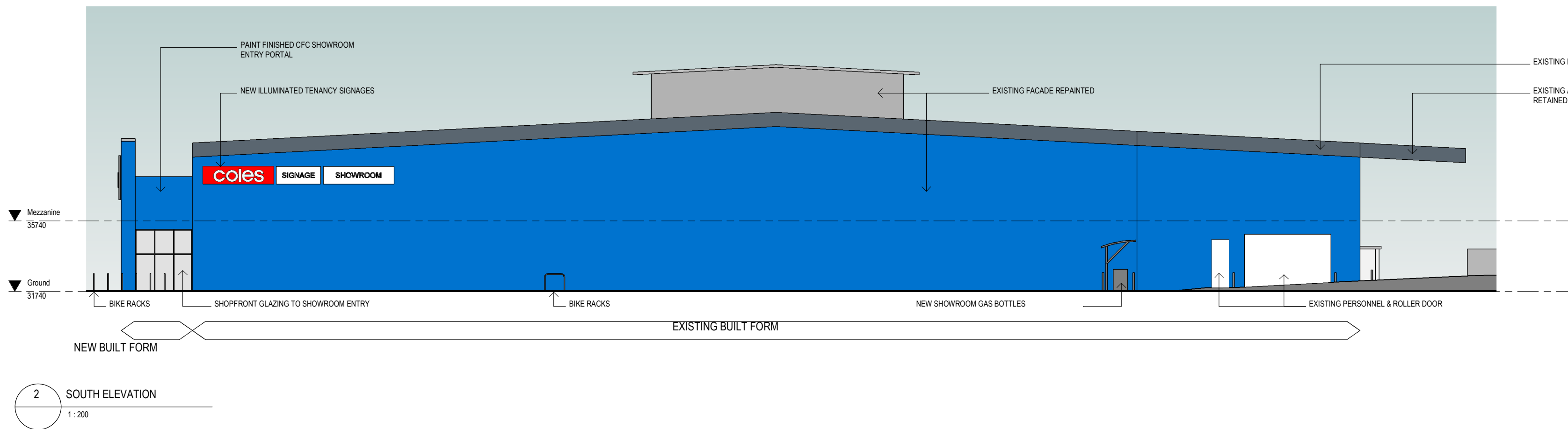
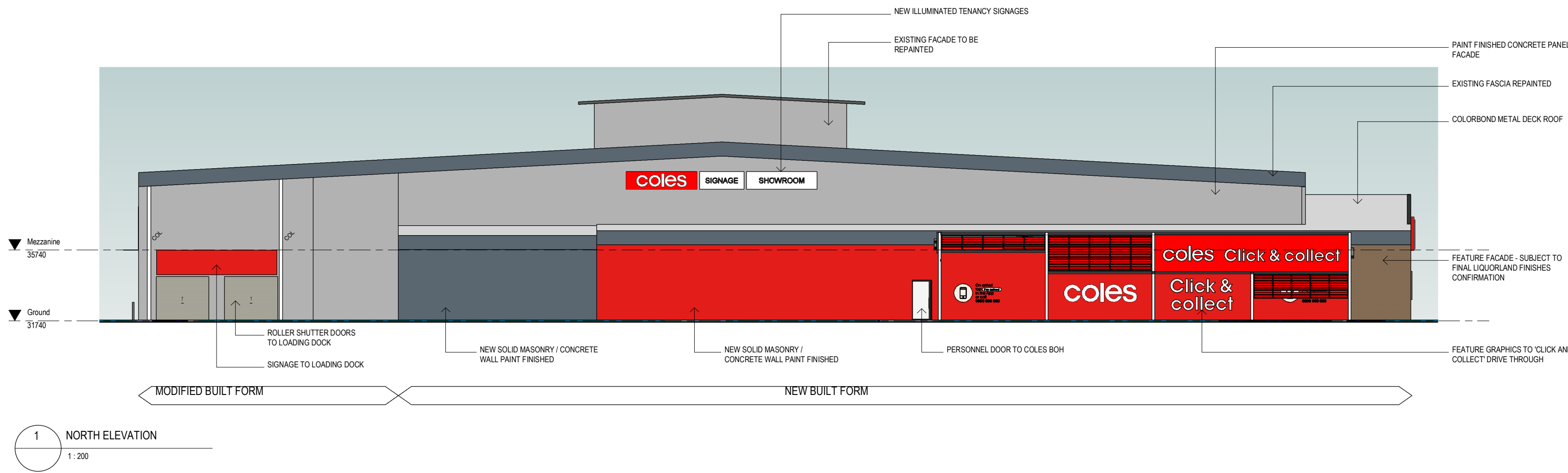
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## ROCKHAMPTON REGIONAL COUNCIL

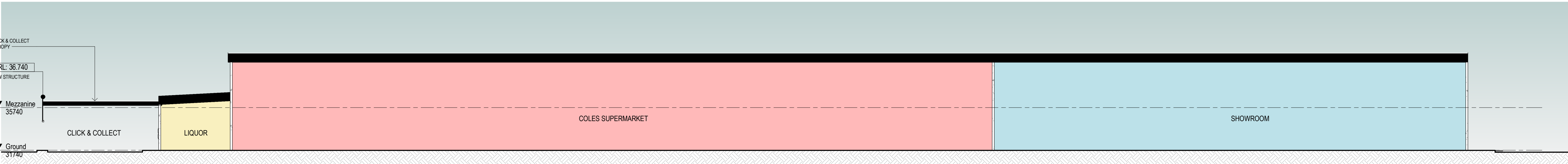
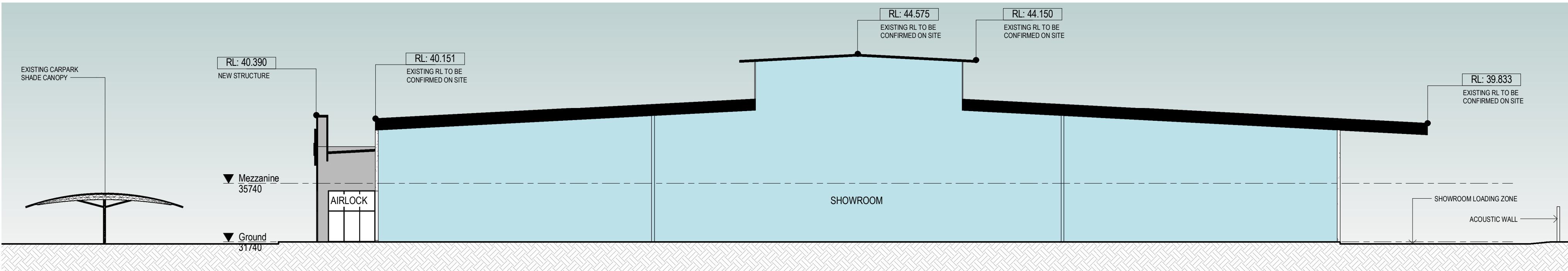
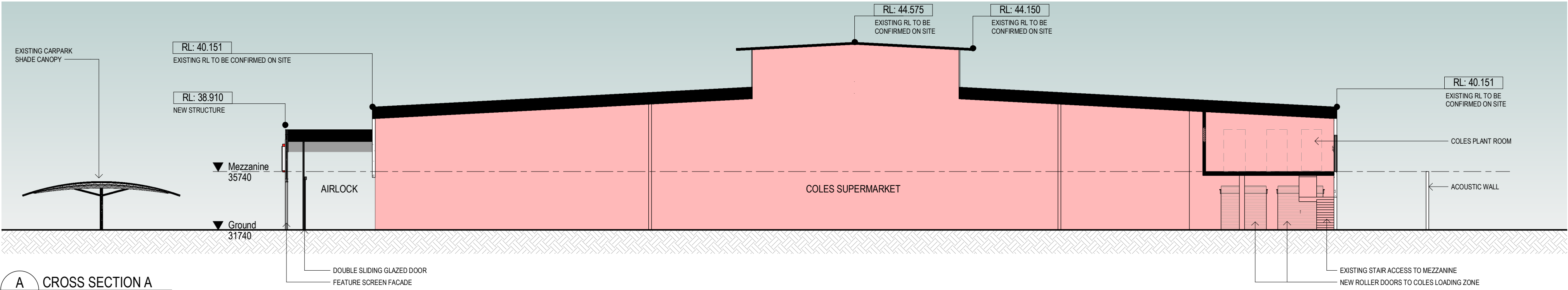
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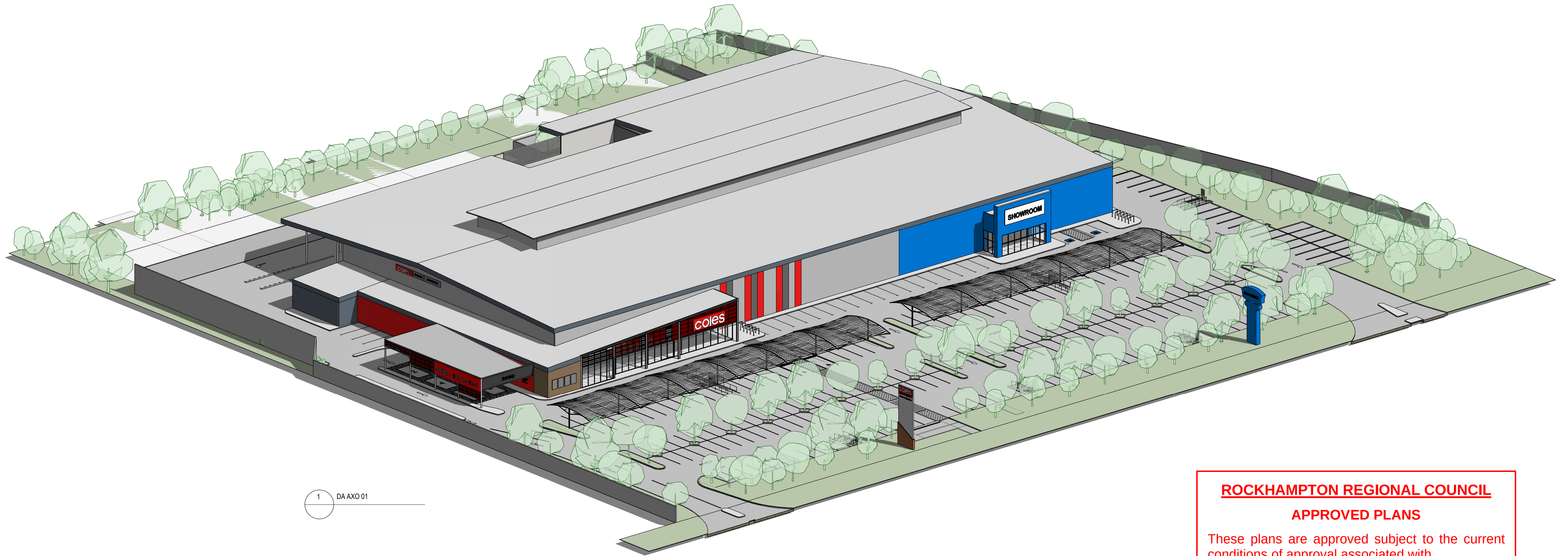
**Dated: 25 May 2026**

**A** CROSS SECTION A  
1 : 200

**B** CROSS SECTION B  
1 : 200

**C** LONG SECTION C  
1 : 200





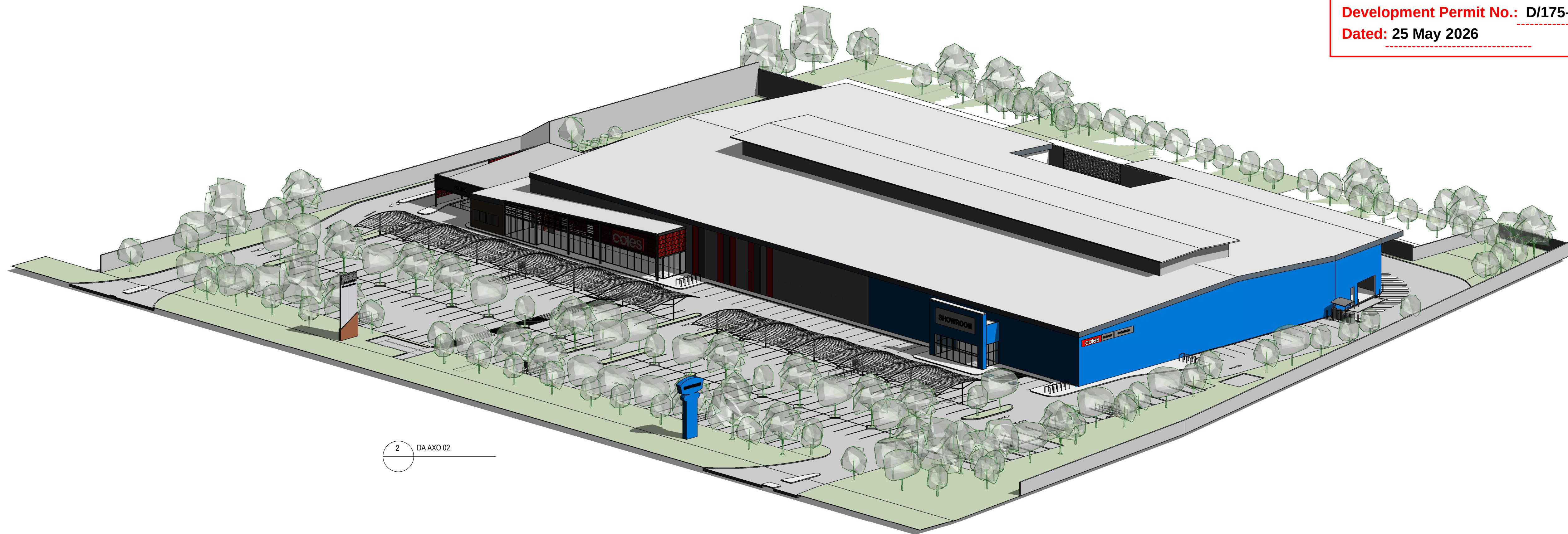
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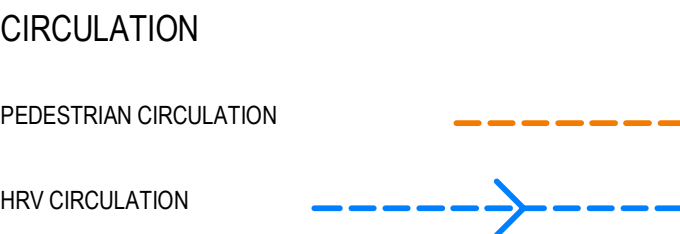
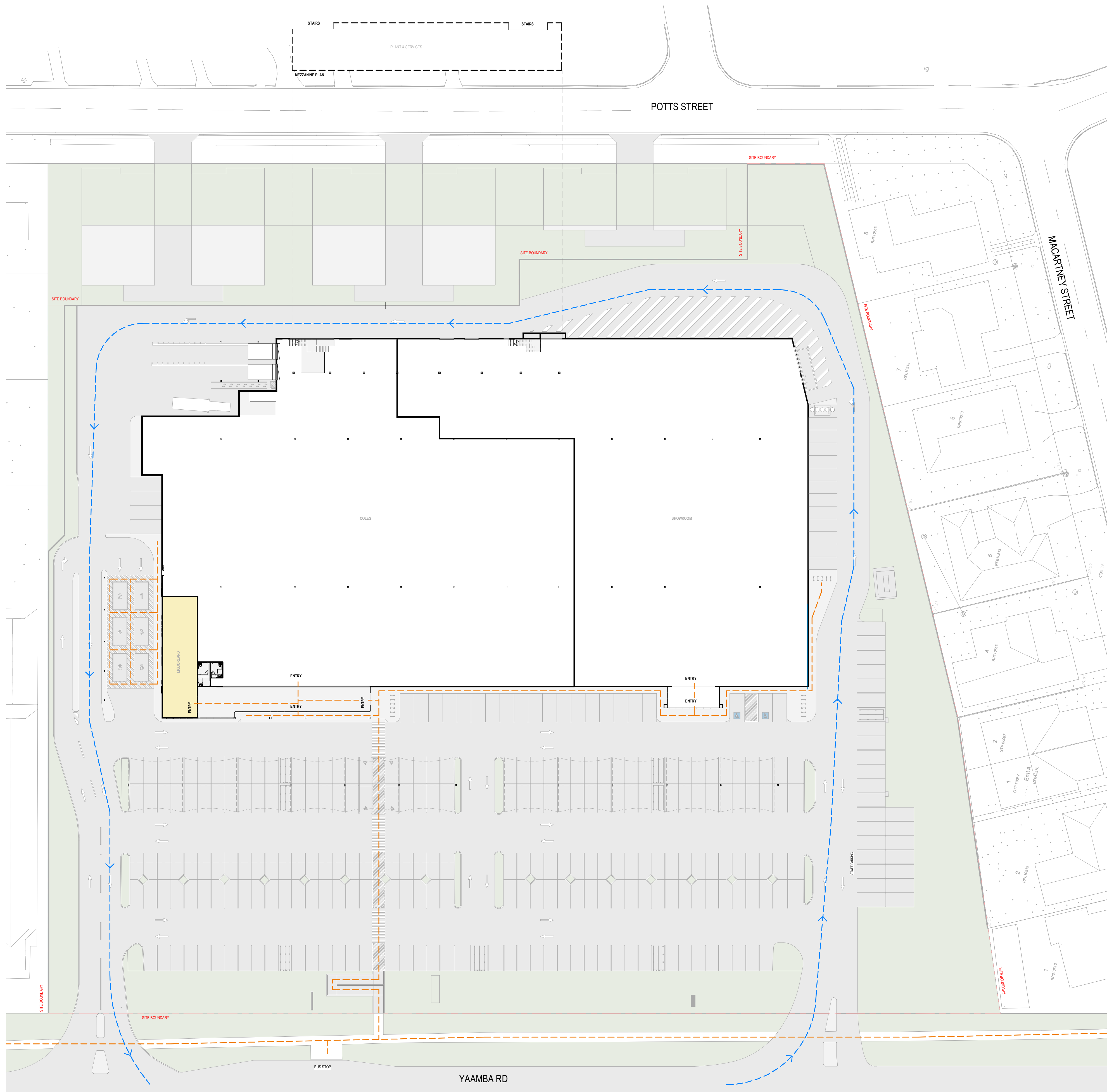
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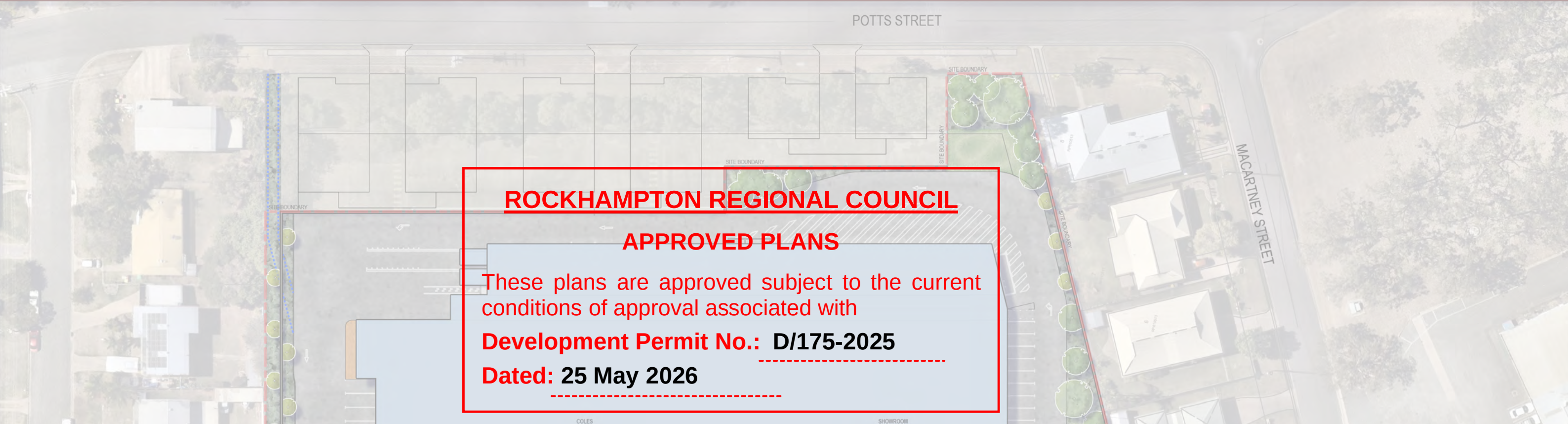
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**Development Permit No.: D/175-2025**

**Dated: 25 May 2026**





# Coles Norman Gardens Development

## LANDSCAPE CONCEPT DESIGN REPORT







**Client**

Coles Group Property Developments Ltd

**Project Address**

452-488 Yaamba Road, Norman  
Gardens, QLD 4701

**Contact**

02 Landscape Architecture  
(07) 3831 0681

**Document Number**

590 SD\_LR002\_B  
Date: 29/10/2025

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**Landscape Concept Plan**

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# Introduction

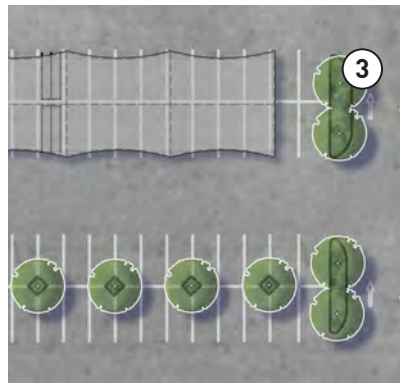
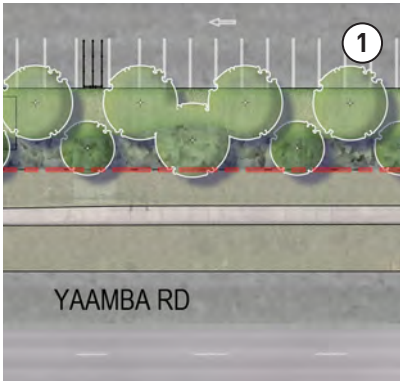
## Design Intent

The proposed vegetation within the site reflects the Rockhampton Region Planning Scheme District Centre Zone and Specialised Centre Zone codes. These include the selection of species to be 50% locally native and for the design to be based on 3-tiers where space permits. The landscape Concept Design aims to soften and enhance the appearance of the development by providing a landscape response that is consistent with and contributes to the character of the locality. Trees within car park areas are to have a clean trunk with a minimum height of two metres. Planting within carpark areas is to include subsurface drainage plumbed to stormwater and be irrigated with an automatic irrigation system.

The landscape Concept Design includes a landscape strip on the state controlled road frontage that exceeds 1.5 metres in width for the full frontage length of the site and which includes large canopy tree species which are appropriately scaled for this extent. (fig. 1)

Existing mature site vegetation is proposed to be retained where practical and will inform the character of the planting response. (fig. 2)

Where shade sails are not provided in the carparks, small canopy trees are proposed at a rate of one tree per three carspaces in single sided bays and one per six in double sided bays. (fig. 3)





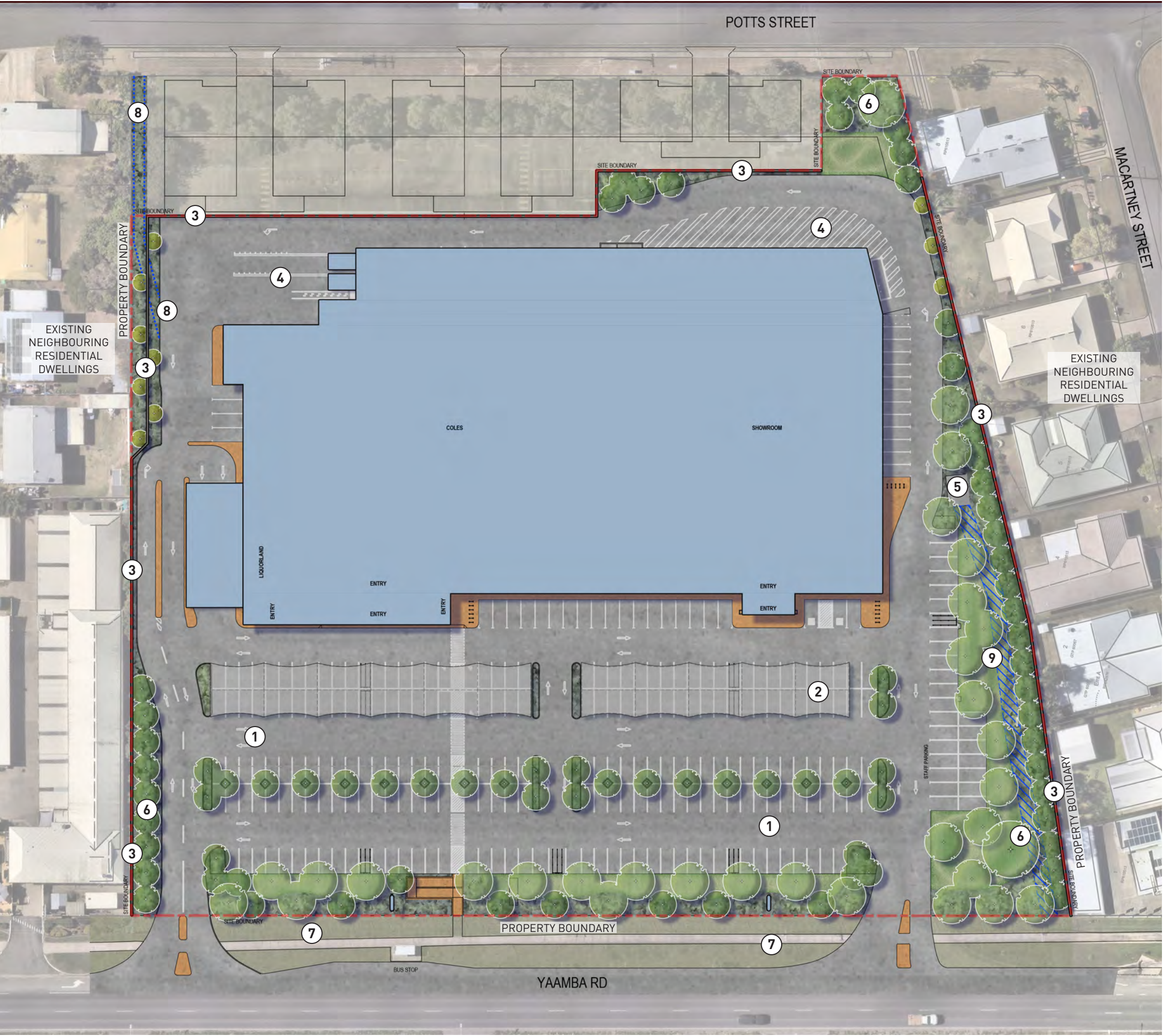
# Landscape Concept Plan

## LEGEND

- ① Carpark
- ② Carpark Shade Sails
- ③ Acoustic Fence
- ④ Loading Bay
- ⑤ Transformer
- ⑥ Retain existing mature vegetation where not adversely impacted by proposed new works in accordance with AS 4970:2025
- ⑦ Existing road verge to be retained and made good where impacted by new works
- ⑧ Planted Overland Flow Path - Native sedge species
- ⑨ Services Easement

## KEY

-  Large Canopy Trees
-  Small Canopy Trees
-  Columnar Canopy Trees
-  Understorey Planting
-  Turf





# Soft Works Character

## Large Canopy Trees



**CORYMBIA intermedia**  
H: 20-25m | W: 10-12m



**CORYMBIA citriodora**  
H: 20-25m | W: 10-12m



**EUCALYPTUS melanophloia**  
H: 20-25m | W: 10-12m



**EUCALYPTUS populnea**  
H: 15-20m | W: 10-12m

## Columnar Canopy Trees



**BACKHOUSIA citriodora**  
H: 6-8m | W: 3-4m



**ELAEOCARPUS reticulatus**  
H: 5-10m | W: 3-5m



**ELAEOCARPUS eumundii**  
H: 8-10m | W: 3-5m

## Small Canopy Trees



**ACACIA pendula**  
H: 7-9m | W: 5-6m



**CALLISTEMON viminalis**  
H: 4-8m | W: 2-6m



**GEIJERA parviflora**  
H: 7-9m | W: 5-6m



**MELALEUCA viridiflora**  
H: 8-10m | W: 4-6m



**CUPANIOPSIS anacardioides**  
H: 8-12m | W: 4-8m



# Soft Works Character

## Understorey Species Palette



**HARDENBERGIA violacea**



**BAECKEA virgata**



**AUSTROMYRTUS dulcis**



**CAREX appressa**



**EREMOPHILA maculata**



**CRINUM pedunculatum**



**EREMOPHILA glabra**



**GREVILLEA 'Bronze Rambler'**



**FICINIA nodosa**



**GREVILLEA 'Moonlight'**



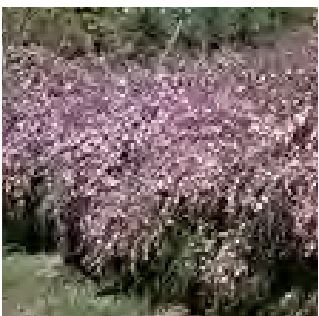
**GREVILLEA 'Coconut Ice'**



**HOVEA acutifolia**



**Bulbine bulbosa**



**LEPTOSPERMUM 'Pink Cascade'**



**LIRIOPE 'Evergreen Giant'**



**LOMANDRA longifolia**



**MELALEUCA thymifolia**



**MYOPORUM parvifolium**



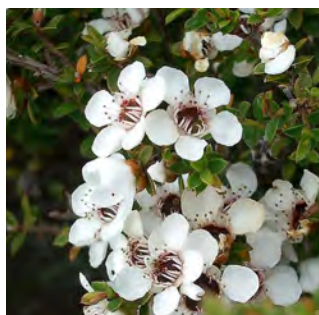
**OZOTHAMNUS diosmifolius**



**PULTENAEA villosa**



**LOMANDRA 'Tanika'**



**LEPTOSPERMUM scoparium**



**GREVILLEA 'Cooroora Cascade'**



**SYZYGIUM 'Cascade'**



**SYZYGIUM 'Tiny Trev'**



**MELALEUCA nodosa**



**WESTRINGIA 'Grey Box'**



**WESTRINGIA 'Mundi'**



**LEPTOSPERMUM flavescens 'Cardwell'**





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Australian Institute of  
Landscape Architects



## MIXED USE DEVELOPMENT

452-488 YAAMBA ROAD, NORMAN GARDENS

## STORMWATER MANAGEMENT REPORT

### ROCKHAMPTON REGIONAL COUNCIL

#### APPROVED PLANS

FOR: COLES GROUP PROPERTY DEVELOPMENTS PTY LTD

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.:** D/175-2025

**Dated:** 25 May 2026

**REPORT NUMBER:** R001-G21097





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The information contained in this report has been prepared based on the information made available to Michael Bale and Associates at the time of preparation. This document, design parameters, and conclusions rely on external data sources, and the accuracy of this document is correct to the extent of the information provided to us.

This report has been prepared solely for the benefit of our client. We do not accept any liability for damage or loss resulting from reliance on this report, or any part of it, by any party other than the client (named on the front page of this report).

#### Document Control

|                          |                                            |                        |
|--------------------------|--------------------------------------------|------------------------|
| <b>Author:</b>           | Salvatore Cautela                          |                        |
| <b>Reviewer</b>          | Ian Grieves                                |                        |
| <b>Approver<br/>RPEQ</b> | Michael Bale<br>RPEQ 15543                 |                        |
| <b>Report Title</b>      | R001 – G21097 – Stormwater Management Plan |                        |
| <b>Revision</b>          | 02                                         | <b>Date</b> 17/03/2026 |

#### Revision History

| Revision | Date       | Author | Approver | Description                         |
|----------|------------|--------|----------|-------------------------------------|
| 01       | 15/10/2025 | SC     | MB       | For Council Lodgement               |
| 02       | 17/03/2026 | SC     | MB       | Updated Stormwater Treatment System |
|          |            |        |          |                                     |
|          |            |        |          |                                     |

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- Phone: (07) 5538 0431
- Email: [reception@michaelbale.com.au](mailto:reception@michaelbale.com.au)

#### Client Contact Details

- Client: Coles Group Property Developments Pty Ltd



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## 1. Introduction

This report has been prepared to support the lodgement of a mixed-use development application to approve the construction of a new development, comprising of a commercial centre. The development is proposed to take place over the following parcel of land:

|                               |                                           |
|-------------------------------|-------------------------------------------|
| <b>Property Address:</b>      | 452-488 Yaamba Road, Norman Gardens       |
| <b>Property Description:</b>  | Lot 25 on RP610513                        |
| <b>Client:</b>                | Coles Group Property Developments Pty Ltd |
| <b>Council:</b>               | Rockhampton Regional Council              |
| <b>Development Site Area:</b> | 23,455m <sup>2</sup>                      |
| <b>Registered Site Area:</b>  | 26,630m <sup>2</sup>                      |

The purpose of this report is to address the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

This report intends to assess the likely impact of the proposed development in relation to stormwater quantity and quality, and the adequacy of the existing stormwater infrastructure to accommodate the proposed development.

### 1.1 Revision History

This version of the report is the first version and has been prepared to support the associated development application.

### 1.2 Related Reports

This report is intended to be read in conjunction with the associated development submission documents current as of the date of this report.



## 2. Property Description

### 2.1 Site Locality

The proposed development is situated at 452-488 Yaamba Road, Norman Gardens and is described as Lot 25 on RP610513.

The property is located within the Rockhampton Regional Council Local Government Area and is in close proximity to local commercial and residential centres.

The subject site is bounded by Yaamba Road to the west, Potts Street to the east and existing residential developments to the north and south. The total area of the existing allotment contained in this proposal is 23,455 m<sup>2</sup>.

Full details of the site topography and existing features are shown on the detailed site survey included in Appendix A. A general locality plan is presented in Figure 2.1 below:



Figure 2-1: Site Locality (Courtesy of Queensland Globe – Accessed 10/10/2023)



## **2.2 Land Usage**

Lot 25 at 452-488 Yaamba Road is presently occupied by an existing single commercial development (Bunnings) and associated car parking areas.

The site is accessible via two (2) existing vehicle crossovers along Yaamba Road.

## **2.3 Topography and Drainage**

The detailed survey data obtained for the project site indicates that the majority of the surface grades towards the north-east corner of the allotment. A portion of the site also grades towards the south-west. Approximate levels on the development site vary from 29.81m (AHD) at the north-east corner of the development site to 33.09m (AHD) towards the north-west corner of the development site. The average grade of the site has been calculated to be approximately 2%, grading towards the north-eastern boundary.

A copy of the detailed site survey by Vision Surveys Queensland has been attached to this report as Appendix A.

## **2.4 Upstream Catchment**

The site survey information indicate that the site surface is generally at a higher level to the adjacent properties. The development site is therefore not expected to be impacted by an upstream catchment and no allowance for upstream catchment flows have been considered in this report.



### 3. Proposed Development

The proposed development consists of:

- The modification of the existing commercial site to comprise a new Coles supermarket, Liquor Land and showroom use.
- The modification of existing associated driveways, parking facilities and other hardstand surfaces associated with the proposed development.

The impervious area of the proposed development has been measured to cover approximately 84% of the development site.

Construction works for the site will consist of minor earthworks, general lot shaping and civil roadworks.

Additional works on site will include the construction of water reticulation, sewer reticulation, electrical and telecommunications services and stormwater management works (quantity and quality).

External works for the development will comprise of verge works in Yaamba Road including modification to vehicle crossovers and services connections. No further external works are proposed as part of this development.



## 4. Lawful Point of Discharge

In the existing case, the site contains internal stormwater drainage infrastructure that captures runoff generated from the site and discharges these flows towards Council's stormwater infrastructure located within Potts Street via a Ø600 RCP outlet pipe. No existing stormwater detention or water quality treatment devices have been identified on site.

The stormwater runoff generated from the entirety of the site is to be treated internally and discharged towards the realigned stormwater infrastructure which is to be located within a 3.0m wide stormwater drainage easement in the northeast corner of the site. Flows later discharge towards Potts Street via an existing Ø600 RCP stormwater pipe as well as a 3.0m wide channel which is to convey flows up to a 1% AEP towards Potts Street via overland sheet flow. This arrangement is outlined in the Engineering Drawings attached in Appendix B.

The proposed discharge arrangement is considered to comply with the requirements of a lawful point of discharge and will be maintained following the development of the site. It is not anticipated that any stormwater will be directed towards any adjacent properties.

QUDM (2017) provides a three-part framework for the identification of a lawful point of discharge for a development site. The first assessment item is to consider if the proposed development will alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property. As the proposed development is not considered likely to worsen the flows received by the existing stormwater infrastructure surrounding the development site, the proposed point of discharge is considered to satisfy the requirements set out in Section 3.9.1 – Lawful Point of Discharge Test.

This compliance is further demonstrated in the following pages where it is shown that the proposed development will result in no worsening of peak flows from the development site.



## 5. Site Specific Hydrology

### 5.1 Introduction

The proposed development will involve the construction of an extension to the existing commercial building, access driveways and other associated hardstand surfaces. This will result in a minor increase to the coefficient of discharge, and the peak stormwater discharge rates of the developed site.

This section of the report addresses peak stormwater discharge resulting from the site, identifies whether attenuation measures are necessary to ensure “no-worsening” of the peak flows from the site and provides sizing information for any required attenuation measures.

### 5.2 Methodology

The methodology of the hydrologic analysis involves the use of both the Rational Method and DRAINS runoff-routing software.

The Rational Method, as described by the Queensland Urban Drainage Manual (QUDM 2017), provides a simple means for the assessment of the peak discharge rate for design storms. The rational method does not provide a reliable basis for the determination of runoff volume or hydrograph shape.

DRAINS software (by Watercom) is a computer-based model that incorporates time-area routing processes to more accurately determine the volume and shape of the hydrograph during a storm event. DRAINS also includes storage-routing processes that can simulate the effect of stormwater detention systems.

The Rational Method is used in the hydrologic analysis to calibrate and verify the results of the DRAINS software modelling, in lieu of the availability of gauged information.

Once calibrated and verified, the DRAINS software modelling is used to calculate all the pre and post development hydrographs that are used in the assessment, and for the design of the proposed stormwater detention system.

### 5.3 Catchment Definition

In the existing case, the site has been modelled as a singular catchment represented by the commercial areas with the fraction impervious measured from the detailed survey provided for the site.

In the developed case, the development site is also represented by a singular commercial catchment for stormwater quality & quantity calculations. The fraction impervious is reflective of the proposed architectural arrangement. Table 5.1 below summarises the catchment properties used for the Rational Method calculations.

*Table 5.1: Catchment Parameters*

| Catchment        | Catchment Area       | Fraction Impervious |
|------------------|----------------------|---------------------|
| Pre-Development  | 23,455m <sup>2</sup> | 83%                 |
| Post-Development | 23,455m <sup>2</sup> | 84%                 |

### 5.4 Site Specific Rational Method Calculations

#### Time of Concentration

The time of concentration for the pre- and post-development catchments have been calculated in accordance with QUDM. The Friends sheet flow equation has been used to determine the time of concentration ( $t_c$ ) for the ground catchments. The time of concentration for the roof catchments have been estimated using standard inlet times in combination with expected length of piped flows. Refer to Table 5.2 below for the calculated time of concentration for each catchment.



Table 5.2: Time of Concentration

| Catchment        | Catchment Area       | Time of Concentration |
|------------------|----------------------|-----------------------|
| Pre-Development  | 23,455m <sup>2</sup> | 10.0 minutes          |
| Post-Development | 23,455m <sup>2</sup> | 11.0 minutes          |

**C<sub>10</sub> Value**

The C<sub>10</sub> values for the existing site conditions and developed site conditions have been calculated in accordance with QUDM (2016) Table 4.5.3. A summary of the C<sub>10</sub> values adopted for the site are presented in Table 5.3 below.

Table 5.3: C<sub>10</sub> Values

| Catchment        | Rainfall Intensity, <sup>1</sup> I <sub>10</sub> / Fraction Impervious | C <sub>10</sub> |
|------------------|------------------------------------------------------------------------|-----------------|
| Pre-Development  | 65.70mm/hr / 83%                                                       | 0.859           |
| Post-Development | 65.70mm/hr / 84%                                                       | 0.862           |

**Summary of Flow – Rational Method**

The Rational Method was used to calculate runoff from the site in the pre-developed and post developed scenarios. The anticipated peak discharge is detailed in Table 5.4 below.

Table 5.4: Development Runoff Calculations – Commercial Site

| AEP               | 39%<br>(m <sup>3</sup> /s) | 18%<br>(m <sup>3</sup> /s) | 10%<br>(m <sup>3</sup> /s) | 5%<br>(m <sup>3</sup> /s) | 2%<br>(m <sup>3</sup> /s) | 1%<br>(m <sup>3</sup> /s) |
|-------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|
| Pre-development   | 0.511                      | 0.759                      | 0.937                      | 1.132                     | 1.464                     | 1.657                     |
| Post-development  | 0.498                      | 0.740                      | 0.913                      | 1.103                     | 1.426                     | 1.610                     |
| <b>Difference</b> | <b>-0.013</b>              | <b>-0.020</b>              | <b>-0.024</b>              | <b>-0.029</b>             | <b>-0.038</b>             | <b>-0.047</b>             |

Table 5.4 demonstrates that the proposed commercial development will result in a decrease in stormwater flows towards the LPOD. Therefore, it will **not** be necessary to provide the development site with on-site stormwater detention systems or mitigation methods to reduce the peak discharge of local storm events.

While detention is **not** considered necessary for the proposed development DRAINS hydrologic software was utilised to design the proposed overland flow path located within the proposed drainage easement. Refer to Section 5.5 and 5.6 below for information regarding the design process and overland flow path parameters.

**5.5 DRAINS Design Process**

DRAINS hydrologic software has been utilised to undertake the assessment of pre-development and post-development stormwater discharge for the purposes of the on-site detention specification process.

DRAINS version 2025.01 has been utilised in this assessment.

**DRAINS Parameters***Modifiable Inputs*

The DRAINS software package has several inputs that can be used to manipulate the hydraulic behaviour of the Initial Loss – Continuing Loss (IL-CL) model. The values adopted in this model are all default values and are presented in Table 5.5 below.



*Table 5.5: DRAINS Modifiable Inputs*

| Input                                   | Modelled Value          |
|-----------------------------------------|-------------------------|
| Impervious Area Initial Loss (mm)       | 1                       |
| Impervious Area Continuing Loss (mm/hr) | 0                       |
| Pervious Area Initial Loss (mm)         | 35.0                    |
| Pervious Area Continuing Loss (mm/hr)   | 1.7                     |
| Applicable Overland Flow Equation       | Kinematic Wave Equation |

A Pervious Area Initial Loss value of 35.0mm and Continuing Loss value of 1.7mm/hr were extracted from the ARR Data Hub and are specific to the site's geographical location.

An Impervious Area Initial Loss of 1mm and Continuing Loss of 0mm has been adopted as a default value for this site. The Kinematic Wave Equation has been adopted as the most accurate Overland Flow Equation for this model. The Kinematic Wave Equation is the default equation adopted in DRAINS and is most accurate when measuring non-uniform flows and flows that are affected by lateral inflows and outflows.

### 5.6 Drainage Easement / Overland Flow Path Capacity

A 3.0m wide stormwater drainage easement along the northern boundary has been incorporated in design of the future residential development adjacent.

The stormwater drainage easement contains a Ø600mm stormwater pipe that conveys runoff generated from the commercial development towards the LPOD in Potts Street. It is proposed that the existing stormwater discharge arrangement be realigned within the easement as part of this application. Refer to the Engineering Drawing DA03-G21097-Stormwater Layout Plan attached within Appendix B for details of the internal stormwater diversion.

The stormwater drainage easement has also been designed as an overland flow channel to convey surcharged flows towards the LPOD.

The DRAINS modelling software has been utilised to calculate the stormwater runoff expected to be discharged via overland sheet flow from the commercial development to the LPOD via the drainage easement, ensuring the easement is designed with adequate capacity.

The proposed drainage easement / overland flow path is to consist of a 3.0m turf lined swale with a depth of 0.20m.

Figure 5.1 below shows a depiction of the DRAINS model used to represent the stormwater runoff from the overall subject site.



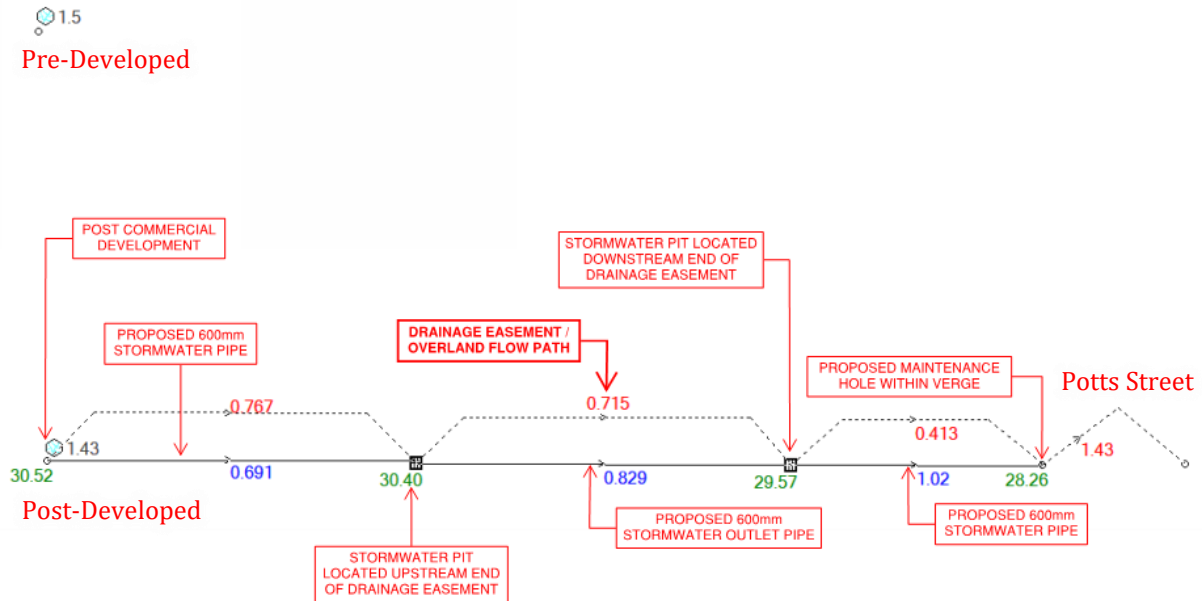


Figure 5.1: DRAINS Model Screenshot (Commercial Site - 1% AEP Storm Event)

Table 5.6 below demonstrates that the proposed overland flow channel has a maximum water depth of 0.2m,  $d*V$  product of  $0.284\text{m}^2/\text{s}$  and has sufficient capacity to cater for flows up to an AEP 1% Design Storm.

Table 5.6: Summary of Overland Flow Channel Design Parameters

| Overland Flow Channel Design Parameters |            |          |                       |                        |               |           |
|-----------------------------------------|------------|----------|-----------------------|------------------------|---------------|-----------|
| Channel Dimensions                      | Depth (m)  | Base (m) | Left Side Slope (1:x) | Right Side Slope (1:x) | Manning's 'n' | Slope (%) |
|                                         | 0.2        | 3.0      | 0                     | 0                      | 0.035         | 2.5%      |
| Channel Properties                      | Flow Width | A        | P                     | R                      | D*V (m²/s)    |           |
|                                         | 3.00m      | 0.60     | 3.40                  | 0.18                   | 0.284         |           |
| Channel Velocity, V (m/s)               |            |          | 1.421 m/s             |                        |               |           |
| Channel Capacity, Q (m³/s)              |            |          | 0.853 m³/s            |                        |               |           |



## 6. Stormwater Quality

### 6.1 Introduction

This section of the report aims to identify the requirements for stormwater quality management resulting from the proposed development, and identify suitable stormwater treatment devices to comply with relevant requirements of the State Planning Policy and Rockhampton Regional Council Planning Scheme Guidelines.

### 6.2 State Planning Policy Assessment

An assessment has been undertaken to determine whether the development proposal necessitates compliance with the State Planning Policy (SPP) objectives. The following trigger questions are used to determine whether SPP compliance is required. If all trigger questions are answered “No”, then SPP compliance is not required, and the development is subject to Local Authority Assessment only.

*Table 6.1: State Planning Policy Trigger Questions*

| Trigger Question                                                                                                                          | Development Response |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Material Change of Use for Urban Purposes with a land area greater than 2,500m <sup>2</sup> and:                                          | Yes                  |
| a. Will result in an impervious area greater than 25% of the net developable area; or                                                     | Yes                  |
| b. Will result in 6 or more dwellings.                                                                                                    | N/A                  |
| Reconfiguration of Lot for Urban Purposes that involves a land area greater than 2,500m <sup>2</sup> , and will result in 6 or more lots. | N/A                  |

As the above trigger questions are applicable to this development, the site is required to achieve the design objectives of the State Planning Policy.

### 6.3 Water Quality Objectives and Methodology

Table 6.1 indicates that the proposed development triggers the requirement for the development to achieve the Water Quality Objectives for Central Queensland outlined in the State Planning Policy. As such, the development must demonstrate the following minimum reductions in mean annual pollutant loads from the unmitigated development:

*Table 6.2: Water Quality Objectives*

| Pollutant                      | Minimum Reduction in Mean Load (%) |
|--------------------------------|------------------------------------|
| Total Suspended Solids (kg/yr) | 85                                 |
| Total Phosphorus (kg/yr)       | 60                                 |
| Total Nitrogen (kg/yr)         | 45                                 |
| Gross Pollutants (kg/yr)       | 90                                 |

To design and assess the achievement of these stormwater quality objectives the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.4.0 has been utilised to size suitable stormwater quality improvement devices as described in the following sections.



#### 6.4 Catchment Areas & Source Nodes

The catchment areas used in the MUSIC model for the site are limited to the net developable area of the development site and are outlined in Table 6.3 below:

Table 6.3: Pollutant Export Parameters

| Catchment Type                   | Catchment Area       |
|----------------------------------|----------------------|
| Roof Area (100% Impervious)      | 8,061m <sup>2</sup>  |
| Hardstand Area (100% Impervious) | 498m <sup>2</sup>    |
| Landscape Area (100% Pervious)   | 3,736m <sup>2</sup>  |
| Driveway Area (100% Impervious)  | 11,160m <sup>2</sup> |

#### 6.5 Recorded Rainfall Data – Rockhampton Regional Council

Rainfall data for the site was taken from the Rockhampton Rainfall Station (ID 39083) using the dates 1/1/1939 – 31/03/2010 in accordance with the Water By Design – MUSIC Modelling Guidelines (2018) using a 6 minute time step.

Rainfall over this time period was modelled using MUSIC to calculate the pollutant generation and treatment effectiveness of the proposed systems.

#### 6.6 Rainfall-Runoff Parameters

Rainfall-runoff parameters were taken in accordance with the Water By Design – MUSIC Modelling Guidelines (2018) using *Urban Commercial* land use, as tabulated in Table 6.4 below:

Table 6.4: MUSIC Modelling Parameters

| Parameter                           | Commercial Values |
|-------------------------------------|-------------------|
| Rainfall threshold (mm)             | 1.00              |
| Soil storage capacity (mm)          | 18                |
| Initial storage (%)                 | 10                |
| Field capacity (mm)                 | 80                |
| Infiltration capacity coefficient a | 243               |
| Infiltration capacity exponent b    | 0.6               |
| Initial depth (mm)                  | 50                |
| Daily recharge rate (%)             | 0                 |
| Daily baseflow rate (%)             | 31                |
| Daily deep seepage rate             | 0                 |

#### 6.7 Pollutant Export Parameters

Pollutant export parameters were taken in accordance with Water By Design – MUSIC Modelling Guidelines (2018) using *Urban Commercial* land use.

The split catchment approach was utilised for each surface type, with the input parameters shown in Table 6.5 below:



Table 6.5: Pollutant Export Parameters - Commercial

| Flow Type | Surface Type | TSS log <sup>10</sup> values |      | TP log <sup>10</sup> values |      | TN log <sup>10</sup> values |      |
|-----------|--------------|------------------------------|------|-----------------------------|------|-----------------------------|------|
| Baseflow  | Roof         | N/A                          | N/A  | N/A                         | N/A  | N/A                         | N/A  |
|           | Roads        | 0.78                         | 0.39 | -0.60                       | 0.50 | 0.32                        | 0.30 |
|           | Ground       | 0.78                         | 0.39 | -0.60                       | 0.50 | 0.32                        | 0.30 |
| Stormflow | Roof         | 1.30                         | 0.38 | -0.89                       | 0.34 | 0.37                        | 0.34 |
|           | Roads        | 2.43                         | 0.38 | -0.30                       | 0.34 | 0.37                        | 0.34 |
|           | Ground       | 2.16                         | 0.38 | -0.39                       | 0.34 | 0.37                        | 0.34 |

## 6.8 Proposed Treatment Device Details

The proposed stormwater quality treatment train includes an Ocean Protect filter system to treat stormwater flows from the entirety of the catchment. This system is to provide primary treatment of stormwater flows. The proposed development will contain a Jellyfish Filter. Flows from the entirety of the catchment are proposed to be directed towards the treatment tank. The treatment devices for the development are to be located underground in the northeast corner of the development and will receive flows generated from the subject site. For further information on the location and details of the proposed treatment areas, refer to the Engineering Drawings attached with Appendix B.

### Proprietary Treatment Device (Ocean Protect Environmental Products)

The Ocean Protect treatment train is a compact implementation of multiple stormwater treatment elements. It is comprised of OceanGuard pit inserts which act as a pre-treatment device and Jellyfish Filter which provides primary treatment for the site. The Ocean Protect treatment train is typically designed to provide stormwater treatment in ultra-urban environment by meeting water quality standard whilst increasing yield and hence cost effectiveness for developers.

Ocean Protect's OceanGuard filtration solutions are water quality devices that are installed within stormwater inlet pits to capture contaminants close to the surface for ease of maintenance. Ocean Protect's OceanGuard filtration offers a decentralized approach to stormwater treatment which assists in achieving site water quality goals.

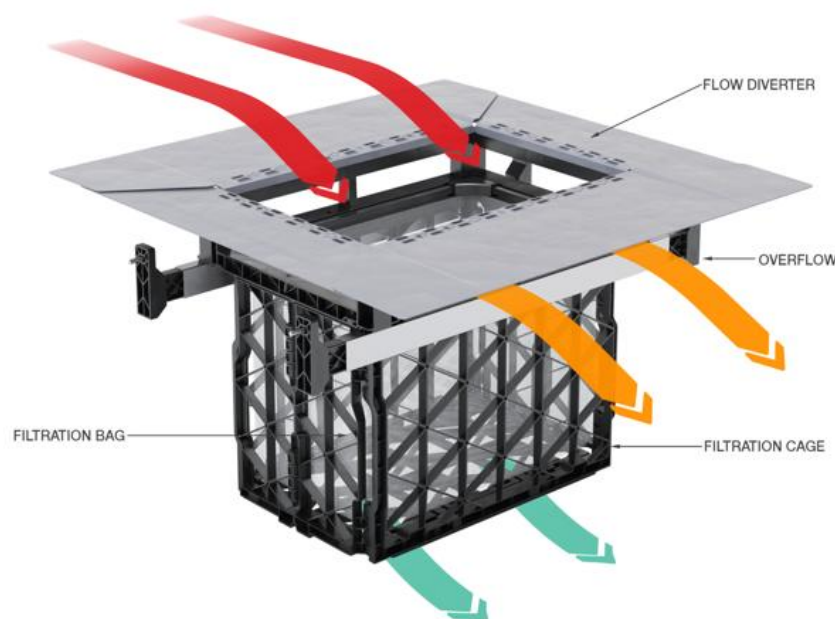


Figure 6.1: Ocean Protect OceanGuard Pit Insert Pre-Treatment Screening Device.



This revolutionary stormwater quality device is the latest in filtration technology and uses gravity, flow rotation and up-flow membrane filtration to provide stormwater treatment in a compact underground system.

The Jellyfish filter utilises unique filtration cartridges, that have a large membrane surface area, resulting in high pollutant removal capacities and high flow rates.

Each filter cartridge has a number of ‘tentacles’ that catch and remove floatables, litter, oil, debris, TSS, silt-sized particles (as small as 2 microns) and a high percentage of particulate-bound pollutants; including phosphorus, nitrogen, metals and hydrocarbons.

The Jellyfish filter has a much smaller footprint than other best-management practices (BMPs), which can offer greater design flexibility.

The high flow capacity and membrane filtration tentacle design means the Jellyfish Filter system can be effectively deployed in a variety of structures including manholes, precast vaults, or cast-in-place structures.

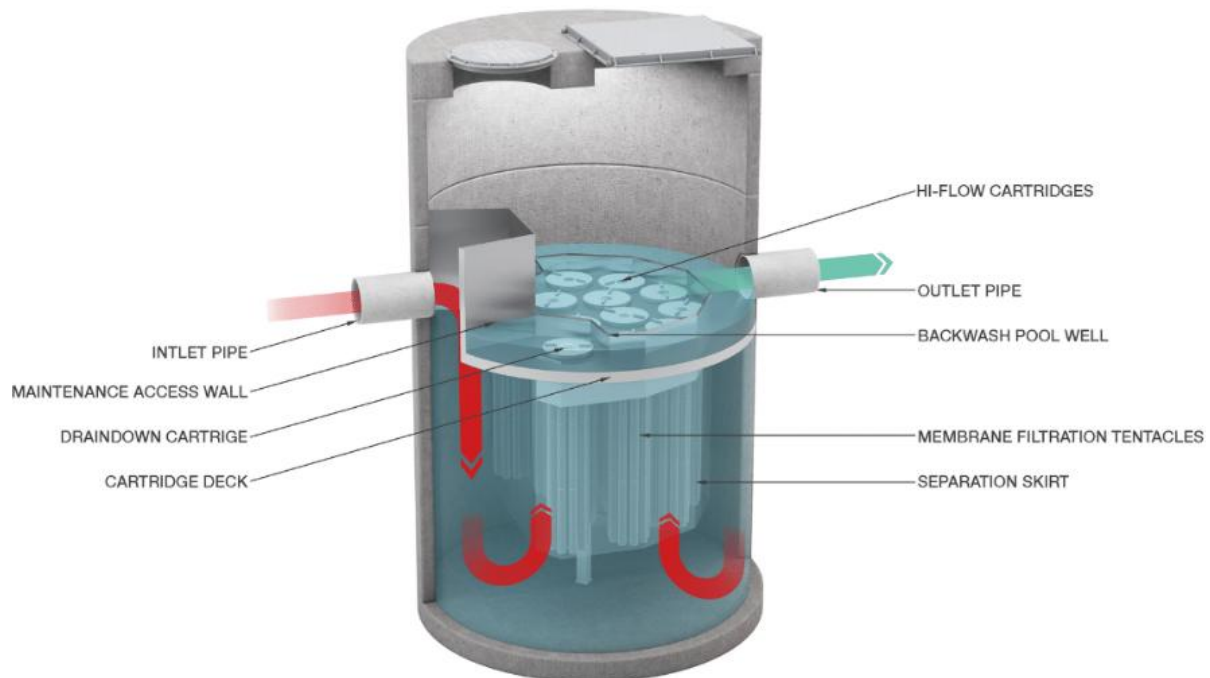


Figure 6.2: Jellyfish Filter Diagrammatic Layout

The Ocean Protect Treatment Train system has proven compliance with the South-East Queensland Water by Design Music Modelling Guidelines requirements (2018) and has been accepted for use by the Rockhampton Regional Council. The total requirement for treatment devices for the subject site is presented in 6.7 below:

Table 6.7: Site Specific Ocean Protect Treatment Train Requirements

| Device Type               | Commercial Development |
|---------------------------|------------------------|
| JellyFish Filter          | 1 (Model: JF3300-18-3) |
| OceanGuard Filter Inserts | 5 (Min.)               |

The Jellyfish Filter is to be located underground in the northeast corner of the site towards the loading dock.

## 6.9 MUSIC Model Diagrams

A diagrammatic layout of the MUSIC model interface used to model the proposed development with the proposed treatment devices incorporated for the site is presented in Figure 6.3 below.

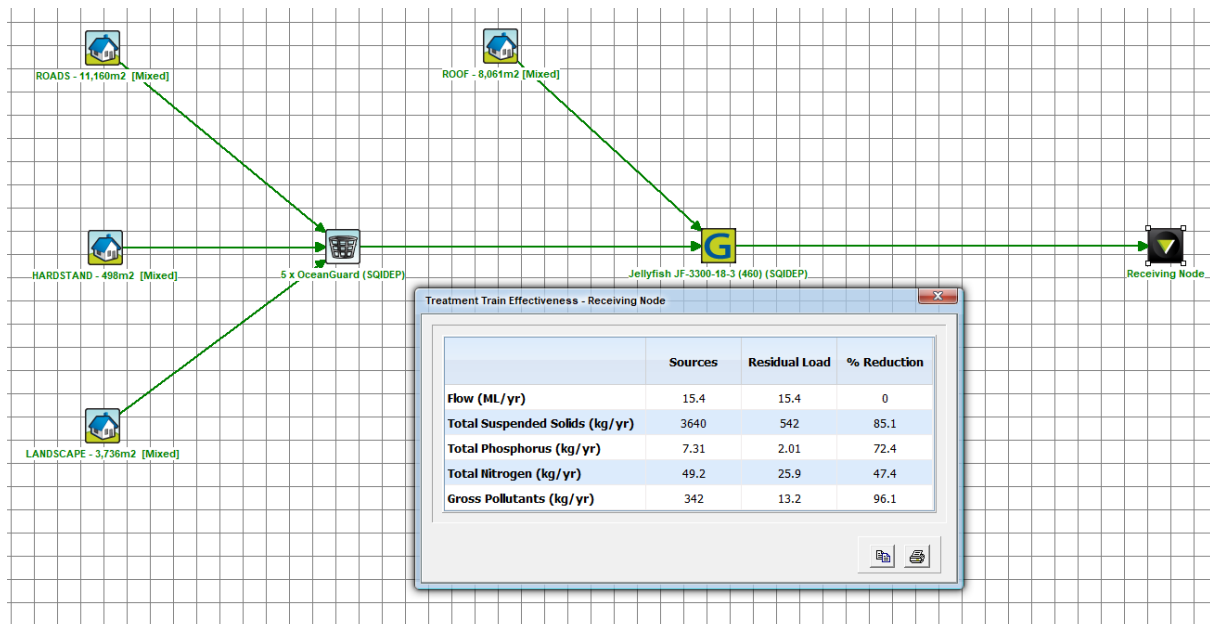


Figure 6.3: MUSIC Model Results Commercial

## 6.10 MUSIC Modelling Results

MUSIC was used to model the treatment train effectiveness in terms of the percentage of pollutants being removed from the system using the proposed treatment devices.

The results of the MUSIC modelling compared to the stated Water Quality Objectives (WQO's) are presented below:

Table 6.7: MUSIC Modelling Results

| Potential Pollutant            | Target WQO's | Commercial |
|--------------------------------|--------------|------------|
| Total Suspended Solids (kg/yr) | 85%          | 85.1%      |
| Total Phosphorus (kg/yr)       | 60%          | 72.4%      |
| Total Nitrogen (kg/yr)         | 45%          | 47.4%      |
| Gross Pollutants (kg/yr)       | 90%          | 100%       |

The results indicate that the proposed treatment devices are efficient in achieving the water quality objectives and exceeds the minimum required pollutant reduction targets.



## **7. Conceptual Erosion and Sediment Control Plan**

### **7.1 Introduction**

During construction, it shall be the responsibility of the Principal Contractor to ensure that the development complies with the relevant erosion and sediment control objectives, as outlined in the State Planning Policy and the Rockhampton Regional Council Planning Scheme.

This section of the report provides suggested inclusions in an erosion and sediment control plan for the proposed development site. This plan includes recommendations for monitoring & reporting responsibilities and the construction of site-specific sedimentation and erosion control measures. Detailed drawings specifying the proposed erosion and sediment control measures are to be provided at the Operational Works stage of the development.

### **7.2 General Erosion and Sediment Control Measures**

It shall be the responsibility of the Principal Contractor to ensure the following erosion and sediment control measures are implemented on site:

- Clean stormwater runoff from upstream allotments is to be directed away from the development site using earth bunds or cut-off drains, as deemed appropriate by a suitable supervisor;
- The prevention of sediment runoff towards other allotments via the effective implementation of silt fences, sediment basins or other mitigation devices as deemed appropriate by a suitable supervisor;
- Sediment runoff shall also be prevented from entering the Council stormwater drainage system via the implementation of control measures such as gully pit sediment barriers;
- Erosion shakedown points shall be established at all vehicular access points, with shakedown areas regularly swept clean and sediment removed; and
- Erosion and sediment control measures are not to be removed from the development site until the site is completely rehabilitated and the surface is capable of resisting erosion.

### **7.3 Spoil and Stockpile Management Measures**

It shall be the responsibility of the Principal Contractor to ensure the following spoil and stockpile management measures are implemented on site:

- Where the stockpiling of spoil and excess earthworks is necessary on the development site, stockpiles shall be established as far away as possible from stormwater inlets and pipelines to reduce the likelihood of sediment runoff; and
- Stockpiles are to be established within a designated zone of fill material and should be surrounded with appropriate erosion and sediment control measures.

### **7.4 Training Requirements**

It shall be the responsibility of the Principal Contractor to ensure the following training protocols are implemented on the development site:

- Site induction courses shall include details of an environmental management reporting system, through which personnel will be able to report perceived erosion and sediment control issues on site.

## 8. Engineering Constraints

### 8.1 Earthworks

The development will involve minor earthworks to reshape some of the current surfaces, provide infrastructure trenches, and to facilitate the construction of the commercial building extension, carparks and shared access driveways.

The development site is shown as not being potentially affected by Acid Sulfate Soils on Rockhampton Regional Council's Online Mapping service, as shown in Figure 8.1 below: of the Rockhampton Regional Council Planning Scheme Interactive Mapping below:



Figure 8.1: Excerpt from Rockhampton Regional Council's Online Mapping Portal – Acid Sulfate Soils

Given that the proposed development is located outside the extent of Acid Sulphate Soils areas, a full Acid Sulphate Assessment is not required for the proposed development, pending detailed geotechnical investigation of the site.

### 8.2 Erosion and Sediment Control

During earthworks, there will be inevitable areas of exposed earth, stripped areas and stockpiles. Appropriate methods to manage this process and ensure minimal impacts to surrounding properties, infrastructure and receiving waters will therefore be required.

The development will therefore require the preparation of a comprehensive Erosion and Sediment Control Plan with supporting documentation, certified by a Registered Professional Engineer and Certified Professional in Erosion and Sediment Control. It is anticipated that the development conditions will reflect these requirements and require compliance with State Policy 2017 and Rockhampton Regional Council's Guidelines prior to the commencement of construction.



### 8.3 Vehicular Access and External Verge Works

External works will be required within the Council verge to permit vehicular access to the proposed development and to upgrade the existing verge where necessary.

Modifications to both of the existing Vehicle Crossovers (VXO) are proposed for access to the commercial development from Yaamba Road. All VXOs are to be in accordance with the relevant requirements of Rockhampton Region Planning Scheme and AS2890:2009 – Parking Facilities.

Internal driveways and parking facilities will be required to comply with AS2890.1:2004 with relevant private certification included as part of the building works.

Verge upgrades will be the subject of detailed design by a qualified landscape architect with RPEQ certification of as-constructed drawings provided to Council at the completion works.

Refer to Traffic Management Report associated with this development application for more information regarding the vehicle crossovers and access works.

### 8.4 Flooding

The development site is outside the extent of flood affected areas, as shown in the depiction below of the Rockhampton Regional Plan Interactive Mapping below:



Figure 8.2: Excerpt from Rockhampton Regional Council's Online Mapping Portal

The proposed development is located outside of the flood hazard zone as shown by the Rockhampton Regional Council Flood Hazard Overlay Map. Therefore, a Flood Impact Assessment report is not required for this development.

## 8.5 Water Connection

### Existing Connection

The site survey by Vison Surveys Queensland has been reviewed to assess the presence of water services available for the proposed development. It is confirmed that in the existing case the total site is serviced by an existing Ø63mm water property connection, connecting into the existing Ø200mm water main located within Yaamba Road.

### Proposed Connection

It is proposed that the development be serviced via a new Ø150mm water property connection, connecting directly into the existing Ø200mm watermain located within Yaamba Road.

Further detailing of the water connection is to be demonstrated during the OPW phase. Internal connection details are also to be demonstrated during the plumbing and drainage application phase by the hydraulic engineer.

## 8.6 Sewer Connection

### Existing Services

The site survey by Vison Surveys Queensland has been reviewed to assess the presence of sewer services available for the proposed development. The overall site is currently serviced via an existing Ø150mm sewer property connection that connects directly into an existing Ø1050mm sewer manhole located along the southern boundary of the site. The sewer main then traverses south between 7 and 9 MacArtney Street, ultimately connecting into the Ø150mm sewer main located within the MacArtney Street road reserve.

### Proposed Services

It is proposed that the commercial development be serviced via the existing sewer property connection, connecting directly into the existing sewer manhole located within the development site.

It is proposed that a new Ø150mm sewer main be constructed within the development site traversing the southern boundary as part of this development application and is to service the future residential development to the east of the site as part of a separate development approval.

Refer to the Engineering Drawings attached within Appendix B of this report for the location of the proposed sewer connection.

Further detailing of the sewer connection is to be demonstrated during the OPW phase. Internal connection details are also to be demonstrated during the plumbing and drainage application phase by the hydraulic engineer.

## 8.7 Electrical

According to the DBYD information, there is no existing Underground Assets within the Road reserves fronting the development.

Above ground Ergon Energy assets have been identified to Yaamba Road and Potts Street frontage.

An existing PMT and Ergon Energy electrical easement have been identified along the southern boundary of the development site. No works are proposed at the existing PMT or the electrical easement. Therefore, no changes or alterations are anticipated to the existing PMT and easement as result of the development.



Further investigation will need to be carried out by the Electrical Engineer and Ergon Energy during Design Development to determine the extent of any upgrade works that may be required for the proposed development.

### **8.8 Telecommunications**

According to the survey information, several Telstra pits have been identified within the verge of Yaamba Road and Potts Street fronting the development site.

Further investigation will need to be carried out by the Electrical Consultant and NBN during Design Development to determine the extent of any upgrade works that may be required for the proposed development.

### **8.9 Gas**

According to the DBYD and survey information, there is an existing medium pressure gas main along the full length of Potts Street frontage.

Further investigation will need to be carried out by the Services Consultant and APA during Design Development to determine the extent of any upgrade works that may be required for the proposed future residential development.

## 9. Conclusion

This report has been prepared to support the lodgement of a mixed-use development application to approve the construction of a new development, comprising of a commercial centre. The development is proposed to take place over the following parcel of land:

The development is proposed to take place over the following parcel of land:

|                               |                                           |
|-------------------------------|-------------------------------------------|
| <b>Property Address:</b>      | 452-488 Yaamba Road, Norman Gardens       |
| <b>Property Description:</b>  | Lot 25 on RP610513                        |
| <b>Client:</b>                | Coles Group Property Developments Pty Ltd |
| <b>Council:</b>               | Rockhampton Regional Council              |
| <b>Development Site Area:</b> | 23,455m <sup>2</sup>                      |
| <b>Registered Site Area:</b>  | 26,630m <sup>2</sup>                      |

This report has addressed the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

This report describes the design process for specifications of the following key infrastructure elements that will ensure the management of stormwater to achieve necessary standards.

- Stormwater detention for the proposed development,
  - Detention is **not** required for the proposed catchment.
- Stormwater quality treatment for the proposed development,
  - The installation of a Jellyfish Filter (Model: JF-3300-18-3 (460)) five (5) OceanGuard field inlet pit inserts positioned upstream, to treat flows generated from the entirety of the site (refer Section 6 of this report for treatment arrangements).

This report has addressed the management of stormwater quantity and quality and demonstrated that no additional works are required to ensure that the proposed development complies with all necessary state and local government policies.

It is the opinion of this report that the proposed stormwater quantity and quality management systems are suitable for a development of this scale and potential impacts.



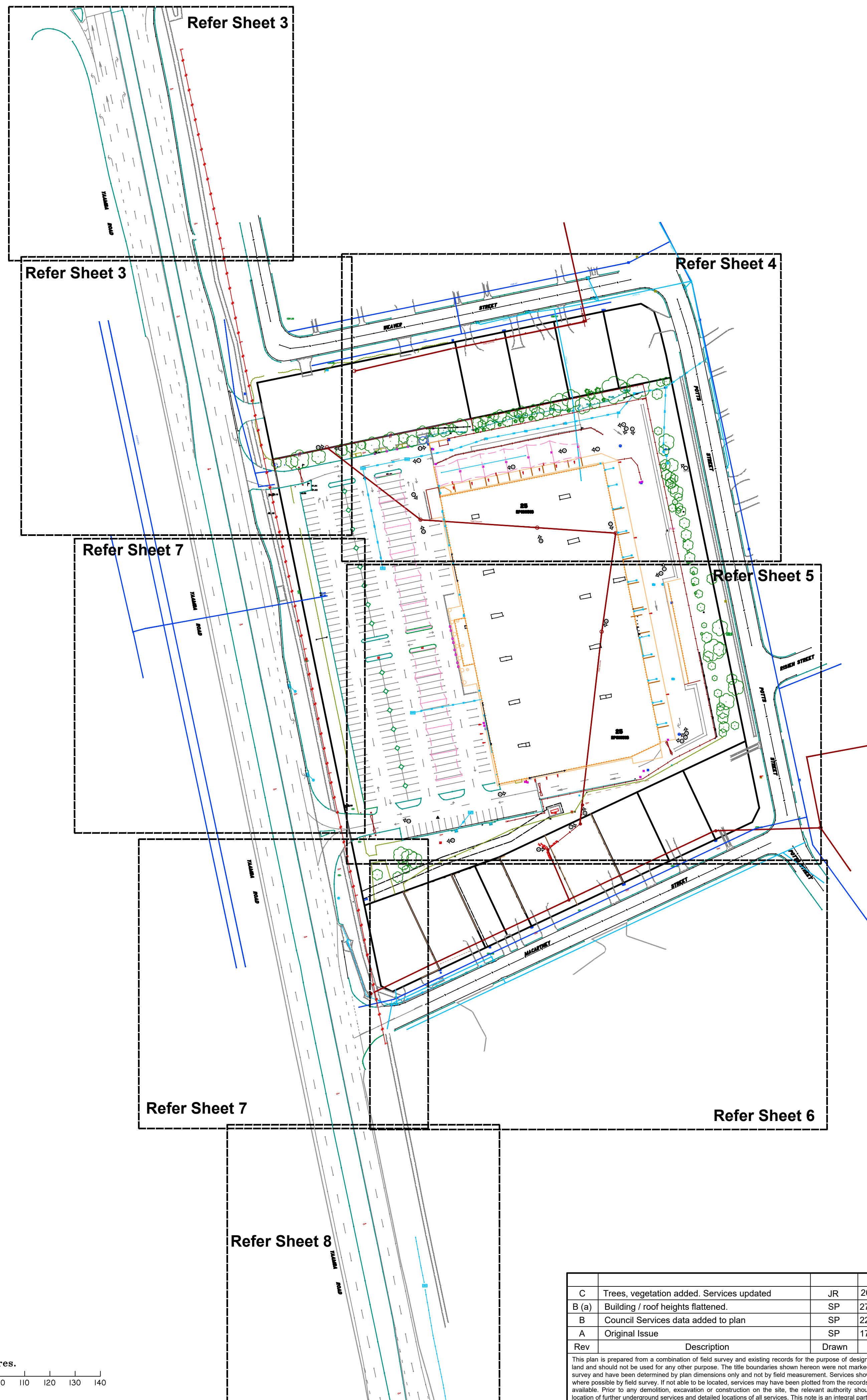
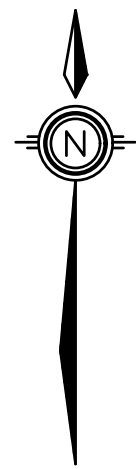


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# **Appendix A**

## **Site Survey & Architectural Drawings**

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① →  
DENOTES PHOTO N° & DIRECTION

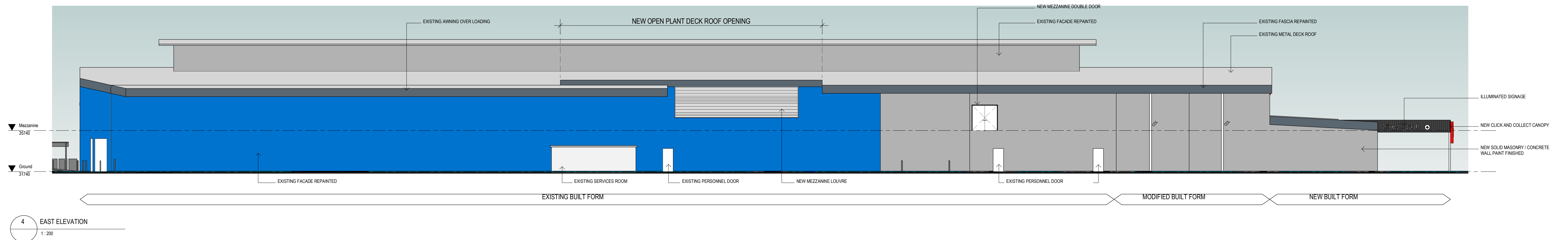
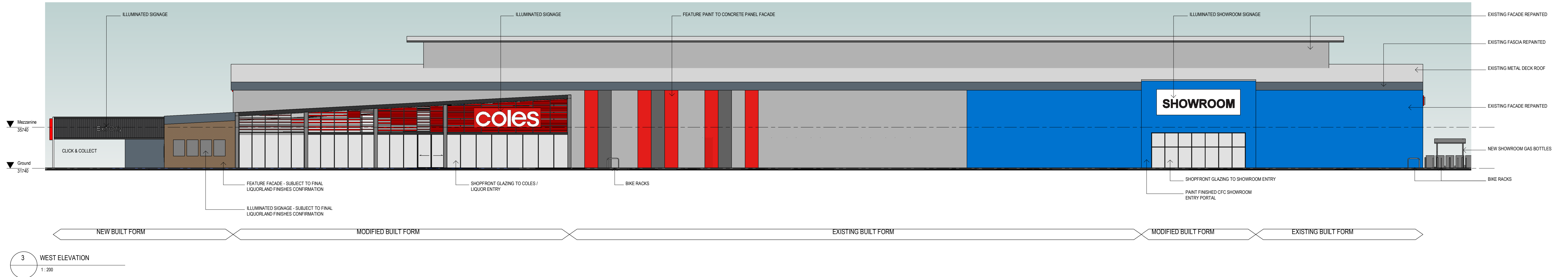
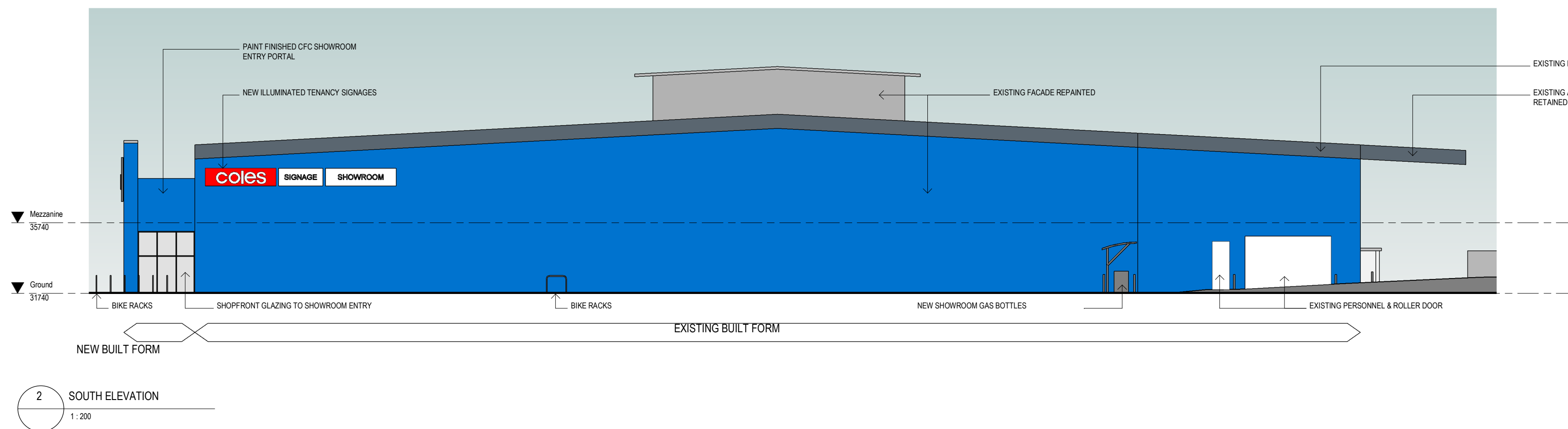
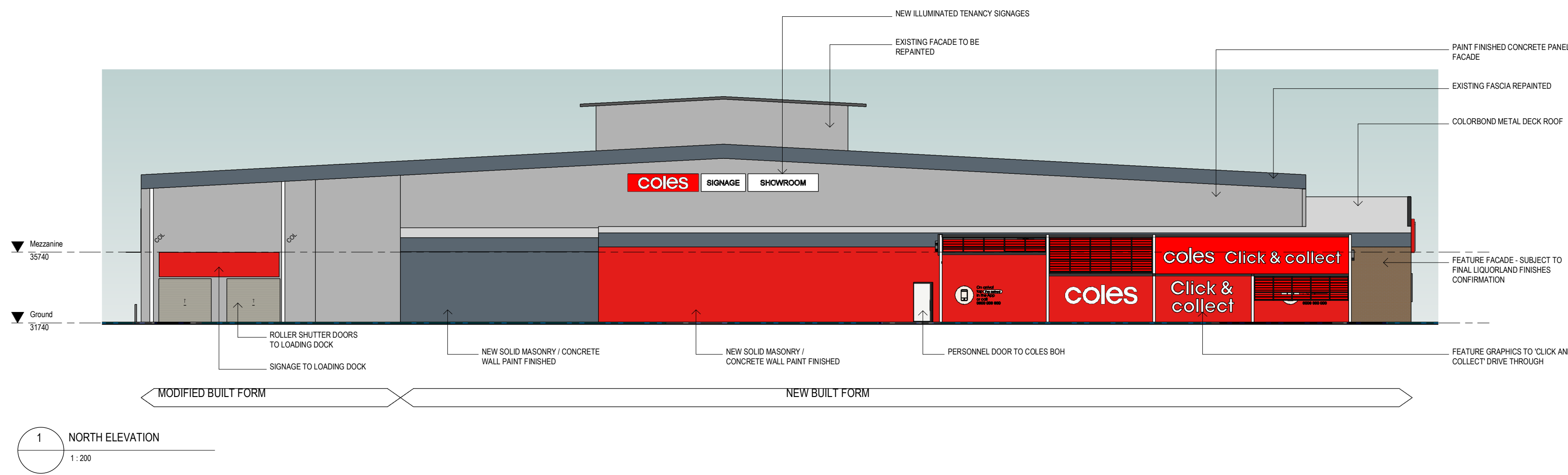
Scale 1:1000 - Lengths are in Metres.  
10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                           |       |      |            | CONTOUR & DETAIL PLAN |                                                                                                                                                                                                                                                                                          |                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------|------|------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Trees, vegetation added. Services updated |       | JR   | 20/12/2021 | JS                    | <b>PROJECT:</b> Survey - Bunnings Rockhampton<br><b>LOCATION:</b> 452-488 Yaamba Road, Norman Gardens<br>Real Property Description: Lot 25 on RP610513<br><b>CLIENT:</b> Bunnings Group Limited<br><br>Parish: Murchison<br>County: Livingstone<br>Local Authority: Rockhampton Regional |                               |
| B (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Building / roof heights flattened.        |       | SP   | 27/07/2015 | -                     |                                                                                                                                                                                                                                                                                          | Horiz. Datum: MGA             |
| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Council Services data added to plan       |       | SP   | 22/06/2015 | WE                    |                                                                                                                                                                                                                                                                                          | Vert. Datum: AHD              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Original Issue                            |       | SP   | 17/06/2015 | WE                    |                                                                                                                                                                                                                                                                                          | Contour Interval: 0.25 metres |
| Rev                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Description                               | Drawn | Date | Checked    |                       |                                                                                                                                                                                                                                                                                          |                               |
| <p>This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. Services shown hereon have been located where possible by field survey. If not able to be located, services may have been plotted from the records of relevant authorities where available. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of this plan.</p> |                                           |       |      |            |                       |                                                                                                                                                                                                                                                                                          |                               |



|                      |                       |
|----------------------|-----------------------|
| Scale: 1:1000 @ A1   | Drawing No: 15245-CD1 |
| Drawn: SP/JR         | Sheet: 1 of 8         |
| Surveyor: W. Elliott | Revision: Rev C       |







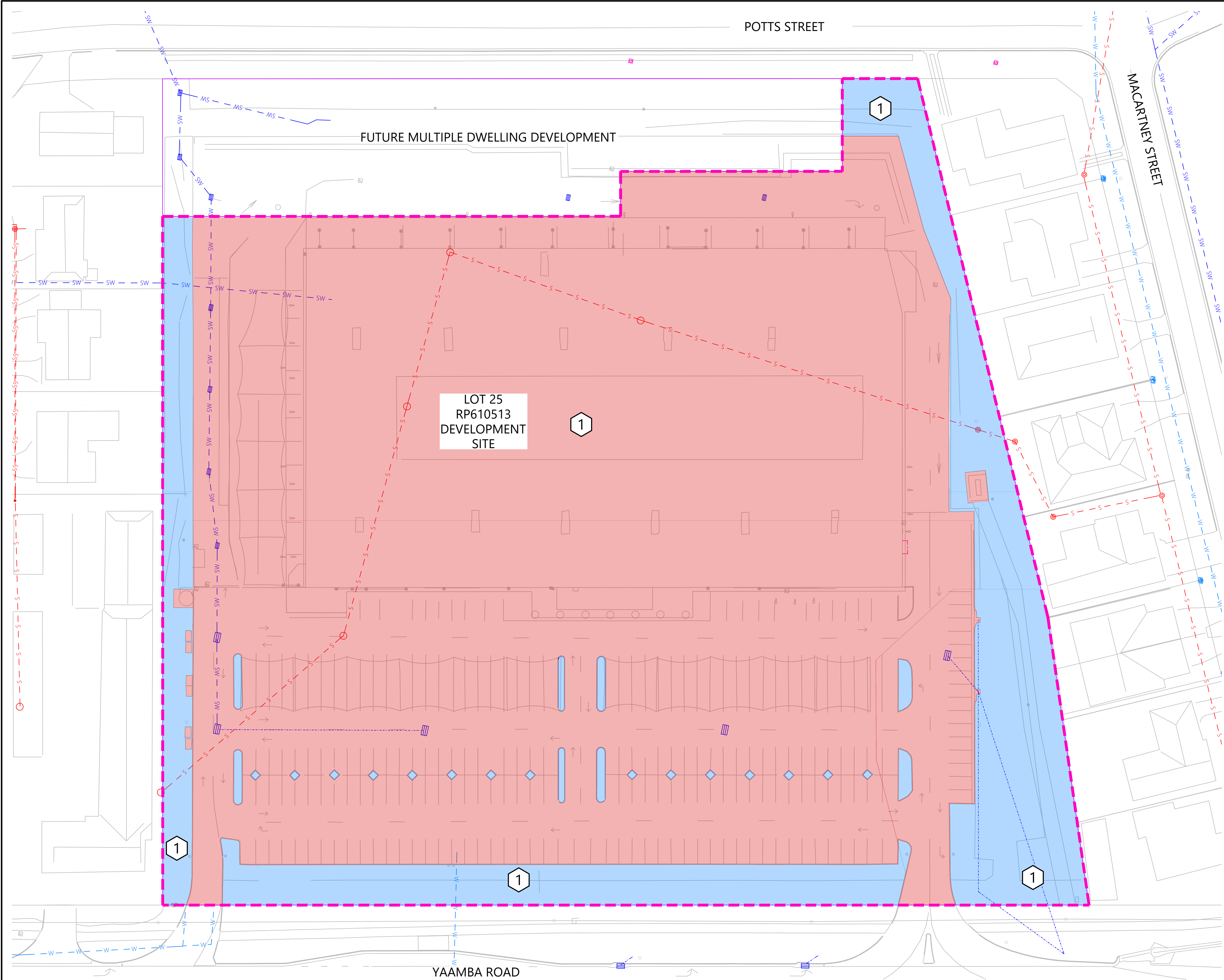
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# **Appendix B**

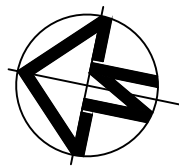
# **Engineering Drawings**

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PRE-DEVELOPED CATCHMENT LAYOUT PLAN  
SCALE 1:400



| LEGEND                                                        |                                   |
|---------------------------------------------------------------|-----------------------------------|
| <span style="color: magenta;">---</span>                      | SITE BOUNDARY                     |
| <span style="color: magenta;">---</span>                      | POST-DEVELOPED CATCHMENT BOUNDARY |
| <span style="border: 1px solid black; padding: 2px;">1</span> | CATCHMENT LABELS                  |

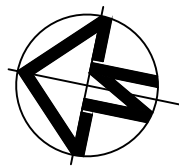
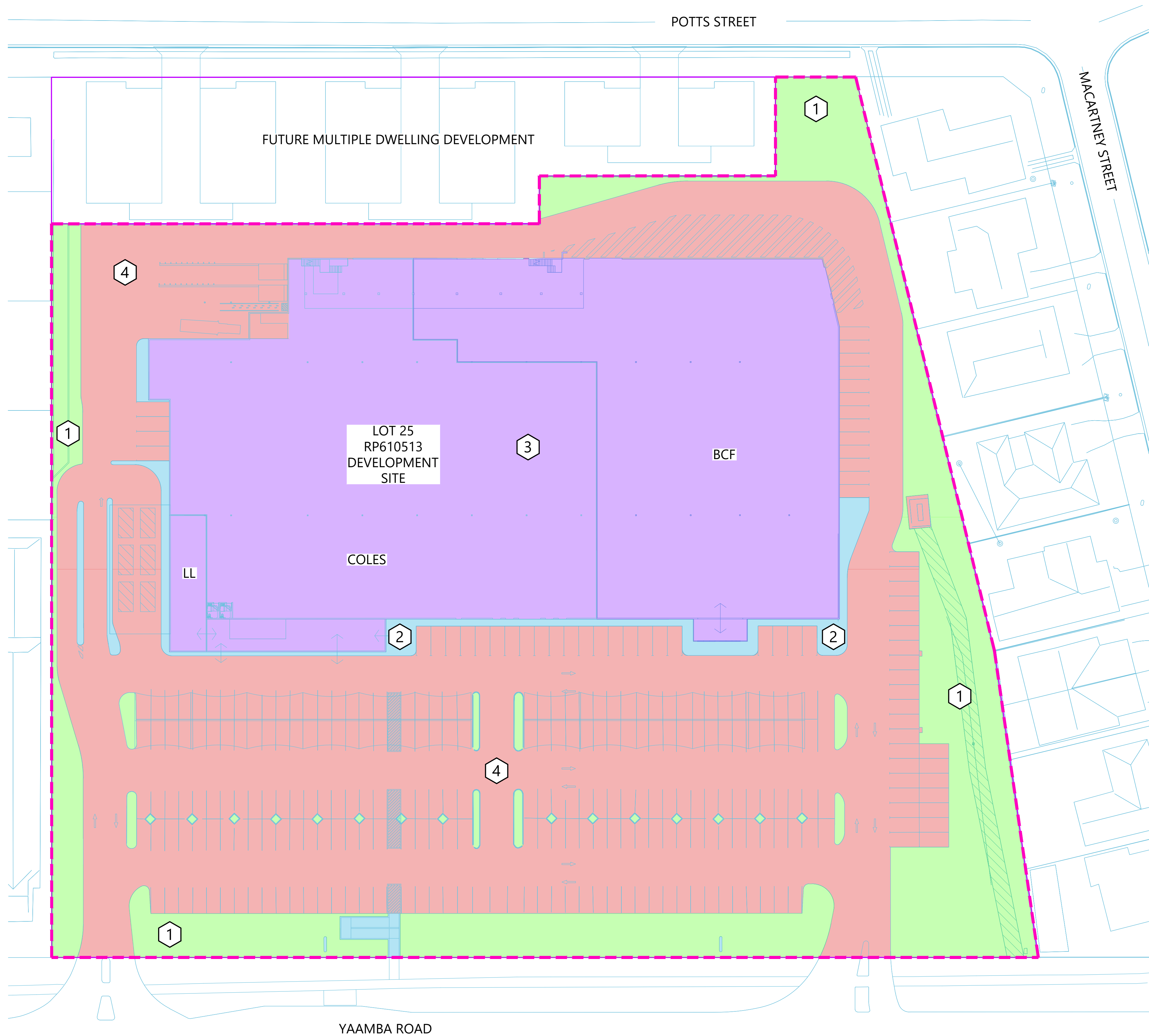
| NOTES / WARNINGS                                                               |  |
|--------------------------------------------------------------------------------|--|
| 1. THESE DRAWINGS ARE FOR DA PURPOSES ONLY AND NOT TO BE USED FOR CONSTRUCTION |  |

| PRE-DEVELOPED CATCHMENT AREAS |      |           |                          |                 |                    |
|-------------------------------|------|-----------|--------------------------|-----------------|--------------------|
| LEGEND                        | NAME | AREA (m²) | DESCRIPTION              | TOTAL AREA (m²) | PERCENT IMPERVIOUS |
|                               | 1    | 19,387    | CATCHMENT 1 - IMPERVIOUS | 23,455          | 83%                |
|                               |      | 4,068     | CATCHMENT 1 - PERVIOUS   |                 |                    |

9/10/2025 3:35 PM

|                                                           |  |       |  |                                         |  |     |  |                                                                                                                                      |  |    |  |                                                                |  |  |  |                                                                                                                                                                                                                                                               |  |  |  |                                                                                  |  |  |  |                                                                          |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |  |                                                                      |  |  |  |
|-----------------------------------------------------------|--|-------|--|-----------------------------------------|--|-----|--|--------------------------------------------------------------------------------------------------------------------------------------|--|----|--|----------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------------------------------------------------------|--|--|--|
| <div>01 ORIGINAL ISSUE</div> <div>ISSUE DESCRIPTION</div> |  |       |  | STATUS                                  |  |     |  | SURVEYOR                                                                                                                             |  |    |  | CLIENT                                                         |  |  |  | <div><div>Michael Bale &amp; Associates</div><div>Structural and Civil Engineering Consultancy</div></div> <div>Level 3, 18 Orchid Avenue,<br/>Surfers Paradise<br/>PO BOX 1715, Surfers Paradise 4217<br/>Ph: 07 5538 0431<br/>mail@michaelbale.com.au</div> |  |  |  | PROJECT TITLE:<br><div>COLES<br/>NORMAN GARDENS<br/>ROCKHAMPTON NORTH, QLD</div> |  |  |  | DRAWING TITLE:<br><div>PRE-DEVELOPED<br/>CATCHMENT<br/>LAYOUT PLAN</div> |  |  |  | NOTES:<br>THESE DRAWINGS REMAIN THE PROPERTY OF MICHAEL BALE & ASSOCIATES PTY LTD. AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION.<br>THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY MICHAEL BALE & ASSOCIATES.<br>EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION. |  |  |  |                                                                      |  |  |  |
|                                                           |  |       |  | FOR DA APPROVAL<br>NOT FOR CONSTRUCTION |  |     |  | <div><div>VISIONS</div><div>VISIONS ENGINEERING</div><div>76 Denham Street<br/>Rockhampton, QLD, 4700<br/>(07) 4927 1744</div></div> |  |    |  | <div><div>coles</div><div>Value the Australian way</div></div> |  |  |  |                                                                                                                                                                                                                                                               |  |  |  |                                                                                  |  |  |  |                                                                          |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |  |                                                                      |  |  |  |
|                                                           |  |       |  | R.P.E.Q No :                            |  |     |  | CERTIFIED                                                                                                                            |  |    |  | SCALE                                                          |  |  |  |                                                                                                                                                                                                                                                               |  |  |  |                                                                                  |  |  |  |                                                                          |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |  | ARCHITECT                                                            |  |  |  |
|                                                           |  |       |  | HEIGHT DATUM                            |  | AHD |  | DESIGNER                                                                                                                             |  | SB |  | SCALE 1:400                                                    |  |  |  |                                                                                                                                                                                                                                                               |  |  |  |                                                                                  |  |  |  |                                                                          |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |  | Level 2, 235 Edward Street<br>Brisbane, QLD, 4000<br>+61 7 3370 4600 |  |  |  |
| GRID                                                      |  | LOCAL |  | CHECKER                                 |  | IG  |  | <div>4 2 0 4 8 12 16 20</div> <div>1:400 (A1) - 1:800 (A3)</div>                                                                     |  |    |  | <div><div>Hames Sharley</div></div>                            |  |  |  |                                                                                                                                                                                                                                                               |  |  |  |                                                                                  |  |  |  |                                                                          |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |  |                                                                      |  |  |  |
| ORIGINAL SIZE                                             |  | A1    |  | APPROVER                                |  | MB  |  |                                                                                                                                      |  |    |  |                                                                |  |  |  |                                                                                                                                                                                                                                                               |  |  |  |                                                                                  |  |  |  |                                                                          |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  |  |                                                                      |  |  |  |





| LEGEND |                                   |
|--------|-----------------------------------|
|        | SITE BOUNDARY                     |
|        | POST-DEVELOPED CATCHMENT BOUNDARY |
|        | CATCHMENT LABELS                  |

| NOTES / WARNINGS |                                                                             |
|------------------|-----------------------------------------------------------------------------|
| 1.               | THESE DRAWINGS ARE FOR DA PURPOSES ONLY AND NOT TO BE USED FOR CONSTRUCTION |

| POST-DEVELOPED CATCHMENT AREAS |      |                        |                           |                              |                    |
|--------------------------------|------|------------------------|---------------------------|------------------------------|--------------------|
| LEGEND                         | NAME | AREA (m <sup>2</sup> ) | DESCRIPTION               | TOTAL AREA (m <sup>2</sup> ) | PERCENT IMPERVIOUS |
|                                | 1    | 3,736                  | CATCHMENT 1 - LANDSCAPING | 23,455                       | 84%                |
|                                | 2    | 498                    | CATCHMENT 1 - HARDSTAND   |                              |                    |
|                                | 3    | 8,061                  | CATCHMENT 1 - ROOF        |                              |                    |
|                                | 4    | 11,160                 | CATCHMENT 1 - DRIVEWAY    |                              |                    |

POST-DEVELOPED CATCHMENT LAYOUT PLAN  
SCALE 1:400

| STATUS                                  |           |          |    |
|-----------------------------------------|-----------|----------|----|
| FOR DA APPROVAL<br>NOT FOR CONSTRUCTION |           |          |    |
| R.P.E.Q No:                             | CERTIFIED |          |    |
| HEIGHT DATUM                            | AHD       | DESIGNER | SB |
| GRID                                    | LOCAL     | CHECKER  | IG |
| ORIGINAL SIZE                           | A1        | APPROVER | MB |

|          |  |                                                              |  |
|----------|--|--------------------------------------------------------------|--|
| SURVEYOR |  | 76 Denham Street<br>Rockhampton, QLD, 4700<br>(07) 4927 1744 |  |
|          |  | SCALE                                                        |  |
|          |  | SCALE 1:400                                                  |  |
|          |  |                                                              |  |
|          |  | 1:400 (A1) - 1:800 (A3)                                      |  |

|        |  |                                                                                                                                     |  |
|--------|--|-------------------------------------------------------------------------------------------------------------------------------------|--|
| CLIENT |  | 249 Musgrave Street<br>Rockhampton, QLD, 4701<br>(07) 4930 8400                                                                     |  |
|        |  | ARCHITECT                                                                                                                           |  |
|        |  | Level 3, 18 Orchid Avenue,<br>Surfers Paradise<br>PO BOX 1715, Surfers Paradise 4217<br>Ph: 07 5538 0431<br>mail@michaelbale.com.au |  |
|        |  |                                                                                                                                     |  |

**MICHAEL BALE & ASSOCIATES**  
Structural and Civil Engineering Consultancy  
Level 3, 18 Orchid Avenue,  
Surfers Paradise  
PO BOX 1715, Surfers Paradise 4217  
Ph: 07 5538 0431  
mail@michaelbale.com.au

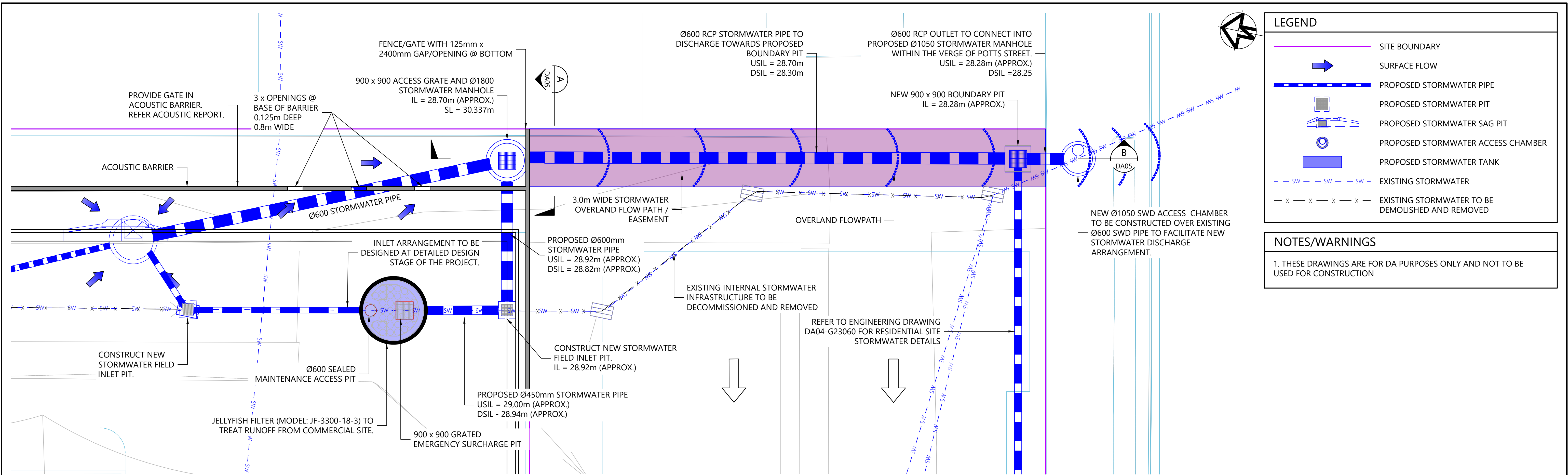
|                |                                                   |  |
|----------------|---------------------------------------------------|--|
| PROJECT TITLE: | COLES<br>NORMAN GARDENS<br>ROCKHAMPTON NORTH, QLD |  |
| DRAWING TITLE: | POST-DEVELOPED<br>CATCHMENT<br>LAYOUT PLAN        |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|
| <b>NOTES:</b><br>THESE DRAWINGS REMAIN THE PROPERTY OF MICHAEL BALE & ASSOCIATES PTY LTD. AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION.<br>THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY MICHAEL BALE & ASSOCIATES.<br>EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION. |             |          |
| DRAWING No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PROJECT No. | REVISION |
| DA02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | G21097      | - 01     |

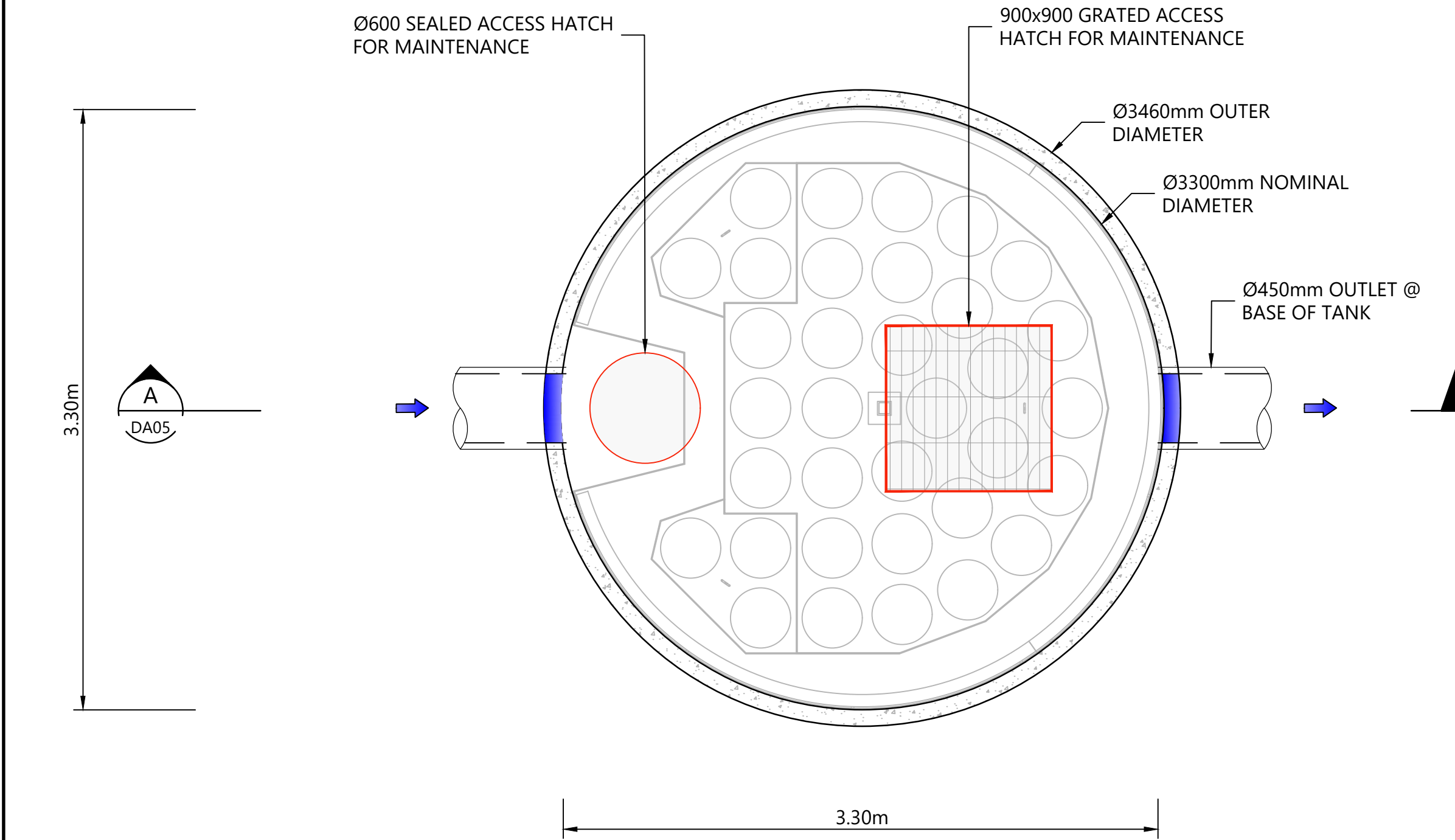




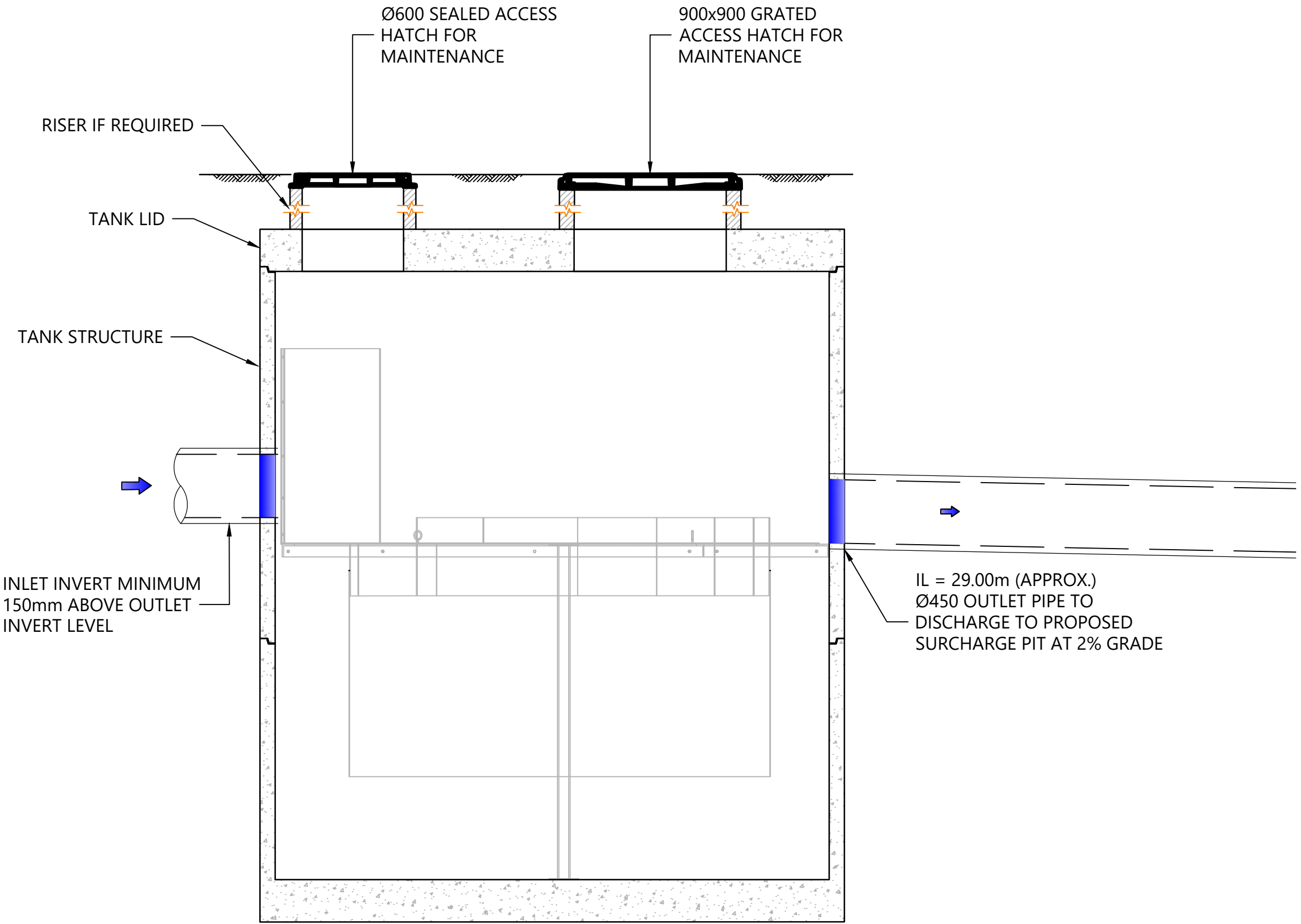




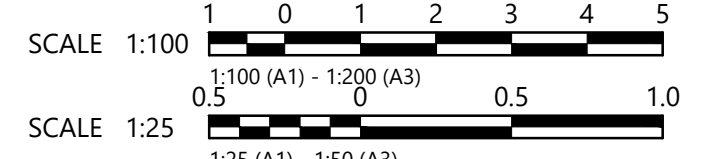
STORMWATER TANK DETAILS: LOCATION PLAN  
SCALE 1:100



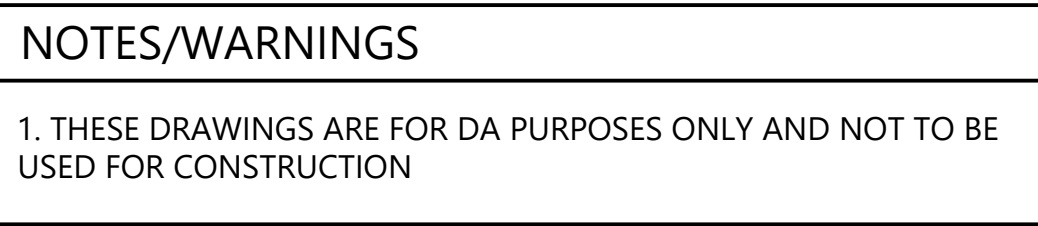
STORMWATER TANK DETAILS: PLAN VIEW  
SCALE 1:25



STORMWATER TANK DETAILS: SECTION A-A  
SCALE 1:25

|                                                           |                                     |        |          |                                                                                                                                                                  |           |                                                                                                                                                                    |               |                                                                                                                                                                                                                                                                                            |  |                                                                                       |  |                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|-----------------------------------------------------------|-------------------------------------|--------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| STATUS<br><b>FOR DA APPROVAL<br/>NOT FOR CONSTRUCTION</b> |                                     |        |          | SURVEYOR<br><br>76 Denham Street<br>Rockhampton, QLD, 4700<br>(07) 4927 1744 |           | CLIENT<br><br>249 Musgrave Street<br>Rockhampton, QLD, 4701<br>(07) 4930 8400 |               | ARCHITECT<br><br>Structural and Civil Engineering Consultancy<br>Level 3, 18 Orchard Avenue,<br>Surfers Paradise<br>PO BOX 1715, Surfers Paradise 4217<br>Ph: 07 5538 0431<br>mail@michaelbale.com.au |  | PROJECT TITLE:<br><b>COLES<br/>NORMAN GARDENS<br/>ROCKHAMPTON NORTH, QLD</b>          |  | DRAWING TITLE:<br><b>STORMWATER<br/>TANK DETAILS<br/>SHEET 1 OF 2</b> |  | NOTES:<br>THESE DRAWINGS REMAIN THE PROPERTY OF MICHAEL BALE & ASSOCIATES PTY LTD. AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION. THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY MICHAEL BALE & ASSOCIATES. EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION. |  |
| 02                                                        | UPDATED STORMWATER TREATMENT SYSTEM | SC     | 17.03.26 | R.P.E.Q No:                                                                                                                                                      | CERTIFIED | SCALE                                                                                                                                                              | 1 0 1 2 3 4 5 |                                                                                                                                                                                                        |  |  |  | DRAWING No.   PROJECT No.   REVISION<br>DA04 - G21097 - 02            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| 01                                                        | ORIGINAL ISSUE                      | SB     | 15.10.25 | HEIGHT DATUM                                                                                                                                                     | AHD       | DESIGNER                                                                                                                                                           | SB            |                                                                                                                                                                                                                                                                                            |  |                                                                                       |  |                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| ISSUE                                                     | DESCRIPTION                         | AUTHOR | DATE     | GRID                                                                                                                                                             | LOCAL     | CHECKER                                                                                                                                                            | IG            |                                                                                                                                                                                                                                                                                            |  |                                                                                       |  |                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|                                                           |                                     |        |          | ORIGINAL SIZE                                                                                                                                                    | A1        | APPROVER                                                                                                                                                           | MB            |                                                                                                                                                                                                                                                                                            |  |                                                                                       |  |                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |





|                                                               |                |           |          |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
|---------------------------------------------------------------|----------------|-----------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| STATUS<br><div>FOR DA APPROVAL<br/>NOT FOR CONSTRUCTION</div> |                |           |          | SURVEYOR<br><div>76 Denham Street<br/>Rockhampton, QLD, 4700<br/>(07) 4927 1744</div> |  |  |  | CLIENT<br><div>249 Musgrave Street<br/>Rockhampton, QLD, 4701<br/>(07) 4930 8400<br/><br/>Value the Australian way</div> |  |  |  |  MICHAEL BALE & ASSOCIATES<br>Structural and Civil Engineering Consultancy |  |  |  | PROJECT TITLE:<br><div>COLES<br/>NORMAN GARDENS<br/>ROCKHAMPTON NORTH, QLD</div> |  |  |  | NOTES:<br>THESE DRAWINGS REMAIN THE PROPERTY OF MICHAEL BALE & ASSOCIATES PTY LTD AND MUST NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION.<br>THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION.<br>THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY MICHAEL BALE & ASSOCIATES.<br>EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION.<br>ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION. |  |  |  |
|                                                               |                |           |          |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| R.P.E.Q No :                                                  |                | CERTIFIED |          | SCALE<br><div>0.500.51.0<br/>1:25 (A1) - 1:50 (A3)</div>                                                                                                                  |  |  |  | ARCHITECT<br><div>Level 2, 235 Edward Street<br/>Brisbane, QLD, 4000<br/>+61 7 3370 4600<br/><br/></div>                 |  |  |  | DRAWING TITLE:<br><div>STORMWATER<br/>TANK DETAILS<br/>SHEET 2 OF 2</div>                                                                                       |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| HEIGHT DATUM                                                  | AHD            | DESIGNER  | SB       |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| GRID                                                          | LOCAL          | CHECKER   | IG       |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| ORIGINAL SIZE                                                 | A1             | APPROVER  | MB       |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| 01                                                            | ORIGINAL ISSUE | SB        | 09.10.25 |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
| ISSUE                                                         | DESCRIPTION    | AUTHOR    | DATE     |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  |                                                                                                                                                                 |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
|                                                               |                |           |          |                                                                                                                                                                           |  |  |  |                                                                                                                                                                                                               |  |  |  | DRAWING No. PROJECT No. REVISION<br>DA05 - G21097 - 01                                                                                                          |  |  |  |                                                                                  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |



9/04/2025 1:13 PM

ISSUE

|       |                |        |          |
|-------|----------------|--------|----------|
| 01    | ORIGINAL ISSUE | DB     | 09.10.25 |
| ISSUE | DESCRIPTION    | AUTHOR | DATE     |

|                                         |           |          |    |
|-----------------------------------------|-----------|----------|----|
| STATUS                                  |           |          |    |
| FOR DA APPROVAL<br>NOT FOR CONSTRUCTION |           |          |    |
| R.P.E.Q No.:                            | CERTIFIED |          |    |
| HEIGHT DATUM                            | AHD       | DESIGNER | SB |
| GRID                                    | LOCAL     | CHECKER  | IG |
| ORIGINAL SIZE                           | A1        | APPROVER | MB |

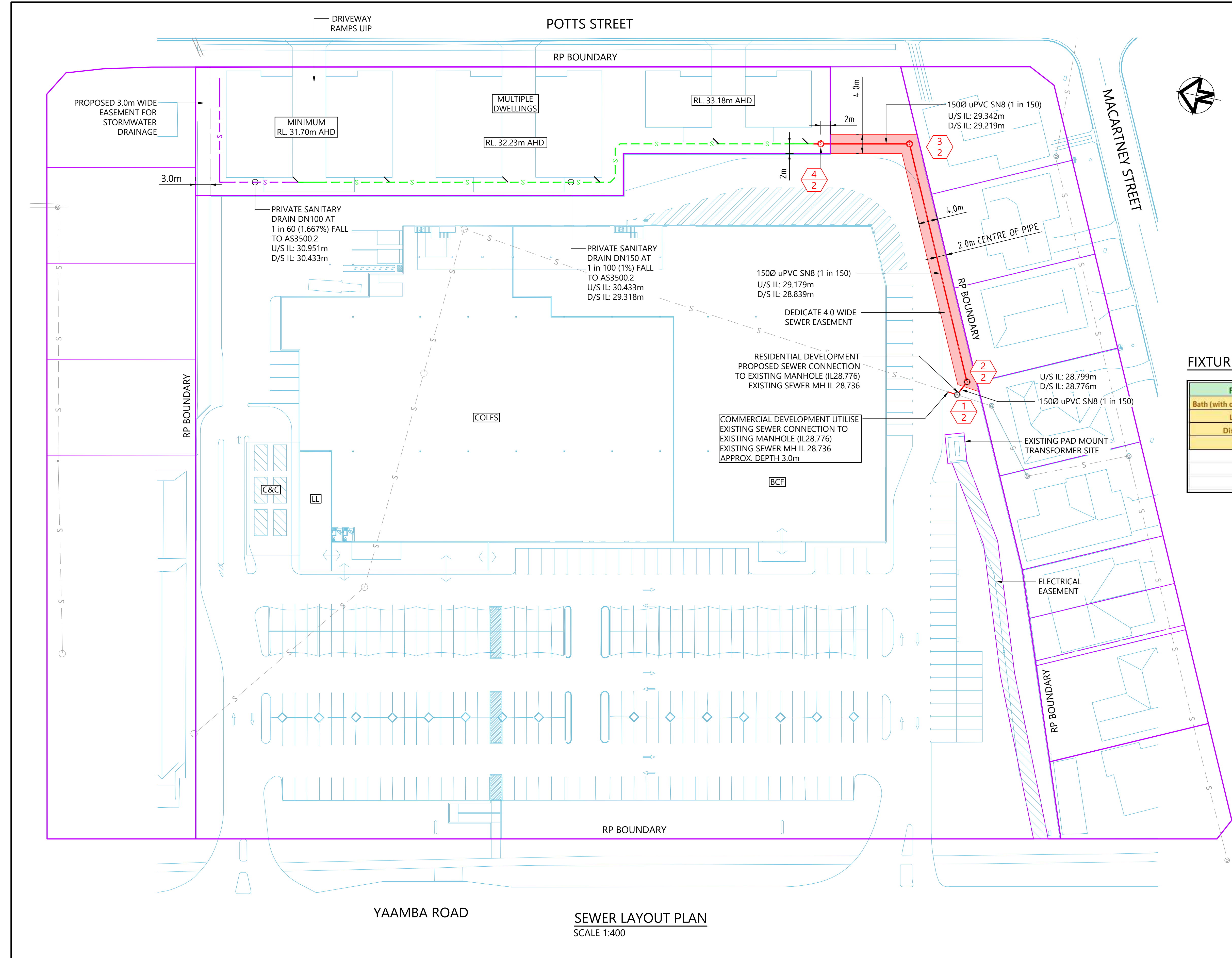
|                                                                                      |  |                                                                                       |  |
|--------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
| SURVEYOR                                                                             |  | 76 Denham Street<br>Rockhampton, QLD, 4700<br>(07) 4927 1744                          |  |
|  |  | SCALE                                                                                 |  |
| SCALE 1:400                                                                          |  |  |  |
|                                                                                      |  | 1:400 (A1) - 1:800 (A3)                                                               |  |

|                                                                                       |  |                                                                      |  |
|---------------------------------------------------------------------------------------|--|----------------------------------------------------------------------|--|
| CLIENT                                                                                |  | 249 Musgrave Street<br>Rockhampton, QLD, 4701<br>(07) 4930 8400      |  |
|  |  | ARCHITECT                                                            |  |
|                                                                                       |  | Level 2, 235 Edward Street<br>Brisbane, QLD, 4000<br>+61 7 3370 4600 |  |
|  |  |                                                                      |  |

|                                                                                       |  |                                                                                                                                     |  |
|---------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------|--|
|  |  | Structural and Civil Engineering Consultancy                                                                                        |  |
|                                                                                       |  | Level 3, 18 Orchid Avenue,<br>Surfers Paradise<br>PO BOX 1715, Surfers Paradise 4217<br>Ph: 07 5538 0431<br>mail@michaelbale.com.au |  |

|                |  |                                                   |  |
|----------------|--|---------------------------------------------------|--|
| PROJECT TITLE: |  | COLES<br>NORMAN GARDENS<br>ROCKHAMPTON NORTH, QLD |  |
| DRAWING TITLE: |  | SEWER<br>LAYOUT PLAN                              |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |          |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|----|
| NOTES:<br>THESE DRAWINGS REMAIN THE PROPERTY OF MICHAEL BALE & ASSOCIATES PTY LTD. AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION.<br>THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY MICHAEL BALE & ASSOCIATES.<br>EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION. |             |          |    |
| DRAWING No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PROJECT No. | REVISION |    |
| DA07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | G21097      | -        | 01 |



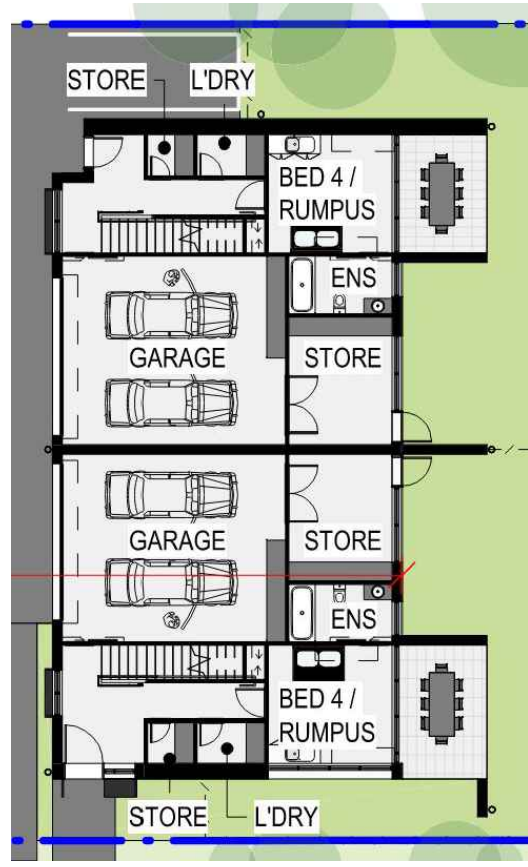
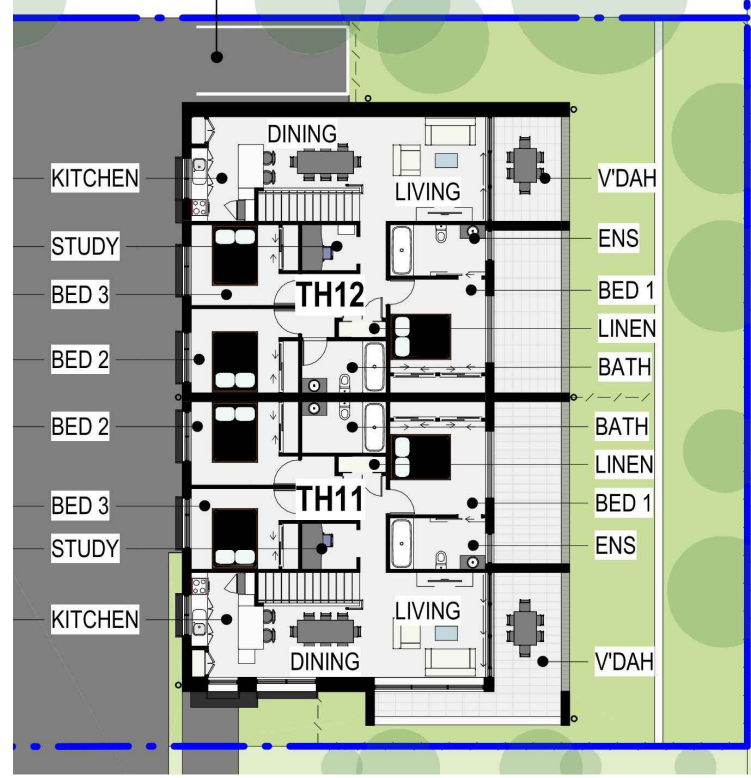
|                                                                                     |                                                     |
|-------------------------------------------------------------------------------------|-----------------------------------------------------|
| LEGEND                                                                              |                                                     |
|  | PROPERTY BOUNDARY                                   |
|  | EASEMENT BOUNDARY EXISTING                          |
|  | EASEMENT BOUNDARY PROPOSED                          |
|  | PROPOSED DN150 SEWER MAINTENANCE HOLE & PC          |
|  | STRUCTURE LABEL                                     |
|  | EXISTING SEWER PLOTTED                              |
|  | (1 in 60) PRIVATE SANITARY DRAIN DN100 TO AS3500.2  |
|  | (1 in 100) PRIVATE SANITARY DRAIN DN150 TO AS3500.2 |

- UNDERGROUND SERVICES EXISTING IN THIS AREA.
- CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF WORKS.

#### FIXTURE UNIT CALCULATIONS TO AS 3500.2

| Fixtures                      | Fixture Unit Ratings | Quantity | Fixture Units |
|-------------------------------|----------------------|----------|---------------|
| Bath (with or without shower) | 6                    | 6        | 36            |
| Laundry                       | 5                    | 2        | 10            |
| Dishwasher                    | 3                    | 2        | 6             |
| Sink                          | 1                    | 2        | 2             |
| Total per block of 2 TH       |                      |          | 54            |
| Total per block of 1 TH       |                      |          | 27            |
| Total                         |                      |          | 270           |

#### TYPICAL 'BLOCK OF 2' TOWNHOUSES







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# **Appendix C**

## **RRC Codes**

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**Table 9.3.6.3.1 Development outcomes for assessable development**

**Stormwater management - General**

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | RESPONSE / COMPLIANCE                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Stormwater management - General</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                       |
| <p><b>P01</b><br/>Development provides a stormwater management system which achieves the integrated management of stormwater to:</p> <ul style="list-style-type: none"> <li>a) ensure that flooding impacts do not increase, including upstream or downstream of the development <u>site</u>;</li> <li>b) avoid net worsening of stormwater peak discharges and <u>runoff</u> volumes;</li> <li>c) utilises the use of <u>water sensitive urban design</u> principles; and</li> <li>d) ensure the <u>site</u> maximizes opportunities for capture and reuse.</li> </ul> <p>Editor's note—A stormwater management plan may be required to demonstrate compliance with the performance outcome.</p> | <p><b>AO1.1</b><br/>Development provides a stormwater management system which is designed in compliance with <a href="#">SC6.18— Stormwater management planning scheme policy</a>, <a href="#">SC6.10 — Flood hazard planning scheme policy</a>, <a href="#">Queensland Urban Drainage Manual</a>, <a href="#">Capricorn Municipal Development Guidelines</a> and <a href="#">Australian Rainfall and Runoff</a>.</p> <p><b>AND</b></p> <p><b>AO1.2</b><br/>Stormwater is conveyed to a <u>lawful point of discharge</u> in accordance with the <a href="#">Queensland Urban Drainage Manual</a>.</p> | <p><b>Complies –</b><br/>A Stormwater Management Plan has been prepared for the proposed development.<br/>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.</p> |
| <p><b>P02</b><br/>Development provides a stormwater management system which:</p> <ul style="list-style-type: none"> <li>a) has sufficient capacity to safely convey run-off taking into account increased run-off from impervious surfaces and flooding in local catchments;</li> <li>b) maximises the use of natural <u>waterway</u> corridors and natural channel design principles; and</li> <li>c) efficiently integrates with existing stormwater treatments upstream and downstream.</li> </ul>                                                                                                                                                                                             | <p><b>AO2.1</b><br/>Development provides a stormwater management system which is designed in compliance with <a href="#">SC6.18 — Stormwater management planning scheme policy</a>, <a href="#">Queensland Urban Drainage Manual</a>, <a href="#">Capricorn Municipal Development Guidelines</a> and <a href="#">Australian Rainfall and Runoff</a>.</p>                                                                                                                                                                                                                                              | <p><b>Complies -</b><br/>A Stormwater Management Plan has been prepared for the proposed development.<br/>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.</p> |
| <p><b>P03</b><br/>Development ensures that the location and design of stormwater detention and water quality treatment</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO3.1</b><br/>Development provides for stormwater detention and water quality treatment facilities which are located outside of a <u>waterway</u>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Complies -</b><br/>A Stormwater Management Plan has been prepared for the proposed development.</p>                                                                             |



|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <p>facilities:</p> <ul style="list-style-type: none"> <li>a) minimise risk to people and property;</li> <li>b) provide for safe access and maintenance; and</li> <li>c) provide for the safe recreational use of stormwater management features.</li> </ul> | <p><b>AND</b></p> <p><b>A03.2</b><br/>Development provides for stormwater detention in accordance with <a href="#">SC6.18 — Stormwater management planning scheme policy</a>, <a href="#">Queensland Urban Drainage Manual</a>, <a href="#">Capricorn Municipal Development Guidelines</a> and <a href="#">Australian Rainfall and Runoff</a>.</p> <p><b>AND</b></p> <p><b>A03.3</b><br/>Development provides a stormwater quality treatment system which is designed in accordance with <a href="#">State Planning Policy - Water Quality</a>.</p> | <p>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|

#### Environmental values

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | RESPONSE / COMPLIANCE |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Environmental values</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| <p><b>P04</b><br/>Development and drainage works including stormwater channels, creek modification works, bridges, culverts and major drains, protect and enhance the environmental values of the <a href="#">waterway</a> corridors and drainage paths and permit terrestrial and aquatic fauna movement.</p> <p>Editor's note—Compliance with the performance outcomes and acceptable outcomes should be demonstrated by the submission of a <a href="#">site</a>-based stormwater management plan for development.</p> | <p><b>A04.1</b><br/>Development ensures natural <a href="#">waterway</a> corridors and drainage paths are retained.</p> <p><b>AND</b></p> <p><b>A04.2</b><br/>Development incorporates the use of natural channel design principles in constructed components to maximise environmental benefits and <a href="#">waterway</a> stability in accordance with the <a href="#">Queensland Urban Drainage Manual</a>, <a href="#">Capricorn Municipal Development Guidelines</a> and <a href="#">Australian Rainfall and Runoff</a>.</p> <p><b>AND</b></p> <p><b>A04.3</b><br/>Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in accordance with</p> | <p>N/A</p>            |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                        |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | the <a href="#">Queensland Urban Drainage Manual</a> , <a href="#">Capricorn Municipal Development Guidelines</a> and <a href="#">Australian Rainfall and Runoff</a> . |     |
| <b>P05</b><br>Development protects and enhances the environmental and water quality values of waterways, creeks and estuaries within or external to the <a href="#">site</a> .<br><br>Editor's note—The <a href="#">State Planning Policy - Guideline - Water Quality</a> and Section 9 of the <a href="#">Environmental Protection Act 1994</a> define environmental values as 'a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety.' | No acceptable outcome is nominated.                                                                                                                                    | N/A |

#### Overland flow path tenure

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ACCEPTABLE OUTCOMES                 | RESPONSE / COMPLIANCE |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------|
| <b>Overland flow path tenure</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                     |                       |
| <b>P06</b><br>All overland flow paths are maintained under tenure arrangements that facilitate efficient infrastructure and enhance environmental sustainability.<br><br>Editor's note—As a guide, <a href="#">Council</a> prefers that the location of <a href="#">Council</a> owned assets are contained within a road reserve, <a href="#">drainage system</a> is contained within a road reserve, drainage easement, drainage reserve, public reserve, public pathway, <a href="#">park</a> or <a href="#">waterway</a> corridor. | No acceptable outcome is nominated. | N/A                   |

#### Detention Systems

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                     | ACCEPTABLE OUTCOMES                                                                                                                    | RESPONSE / COMPLIANCE                                                                             |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Detention Systems</b>                                                                                                 |                                                                                                                                        |                                                                                                   |
| <b>P07</b><br>Detention basins are designed, located and constructed on land solely dedicated for stormwater management. | <b>A07.1</b><br>Detention basins are designed in accordance with <a href="#">SC6.18 Stormwater management planning scheme policy</a> . | <b>Complies -</b><br>A Stormwater Management Plan has been prepared for the proposed development. |



|                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                      |                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                      | Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.                                                                                                      |
| <b>P08</b><br>Development ensures that location and design of stormwater detention and water quality treatment: <ul style="list-style-type: none"> <li>a) minimises risk to people and property;</li> <li>b) provides for safe access and maintenance; and</li> <li>c) minimises ecological impacts to creeks and waterways.</li> </ul>                         | <b>A08.1</b><br>Development provides a stormwater management system designed in accordance with <a href="#">SC6.10 Flood hazard planning scheme policy</a> and <a href="#">SC6.18 Stormwater management planning scheme policy</a> . | <b>Complies -</b><br>A Stormwater Management Plan has been prepared for the proposed development.<br>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details. |
| <b>P09</b><br>Flood plain storage and function, and detention system functions are maintained. This shall include ensuring that: <ul style="list-style-type: none"> <li>a) detention system design does not remove <a href="#">floodplain</a> storage; and</li> <li>b) detention systems continue to operate effectively during a major storm event.</li> </ul> | No acceptable outcome is nominated.                                                                                                                                                                                                  | <b>Complies -</b><br>A Stormwater Management Plan has been prepared for the proposed development.<br>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details. |
| <b>P010</b><br>Detention basins shall not be provided in locations that prevent easy access to or maintenance of the detention basin.                                                                                                                                                                                                                           | <b>A010.1</b><br>The location of detention basins are in accordance with <a href="#">SC6.18 Stormwater management planning scheme policy</a> .                                                                                       | N/A                                                                                                                                                                          |

#### Efficiency and whole of life cycle cost

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                               | ACCEPTABLE OUTCOMES                 | RESPONSE / COMPLIANCE                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Efficiency and whole of life cycle cost</b>                                                                                                                                                                                                                                                                                     |                                     |                                                                                                                                                                              |
| <b>P011</b><br>Development ensures that there is sufficient <a href="#">site area</a> to accommodate an effective stormwater management system.<br><br>Editor's note—Compliance with the performance outcome should be demonstrated by the submission of a <a href="#">site</a> -based stormwater management plan for development. | No acceptable outcome is nominated. | <b>Complies -</b><br>A Stormwater Management Plan has been prepared for the proposed development.<br>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details. |
| <b>P012</b><br>Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the:                                                                                                                                                                                             | No acceptable outcome is nominated. | <b>Complies -</b><br>A Stormwater Management Plan has been prepared for the proposed development.                                                                            |

|                                                                                                                                                                                                                                                                                                                                                                         |                                     |                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>a) existing capacity of stormwater infrastructure within and external to the <u>site</u>, and any planned stormwater infrastructure upgrades;</li> <li>b) safe management of stormwater discharge from existing and future upslope development; and</li> <li>c) implications for adjacent and down-slope development.</li> </ul> |                                     | Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.                                                                                                               |
| <p><b>P013</b><br/>Development provides proposed stormwater infrastructure which:</p> <ul style="list-style-type: none"> <li>a) remains fit for purpose for the life of the development and maintains full functionality in the design storm event; and</li> <li>b) can be safely accessed and maintained in a cost effective way.</li> </ul>                           | No acceptable outcome is nominated. | <p><b>Complies -</b><br/>A Stormwater Management Plan has been prepared for the proposed development.<br/>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.</p> |

## Erosion and sediment control

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ACCEPTABLE OUTCOMES                                                                                                                                                             | RESPONSE / COMPLIANCE                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Erosion and sediment control</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                 |                                                                                                                                                                                                                        |
| <p><b>P014</b><br/>Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development <u>site</u> from construction activities, including vegetation clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect:</p> <ul style="list-style-type: none"> <li>a) the environmental values and water quality objectives of waters;</li> <li>b) <u>waterway</u> hydrology; and</li> <li>c) the maintenance and serviceability of stormwater infrastructure.</li> </ul> | <p><b>A014.1</b><br/>Erosion and sediment control plan is to be designed and implemented in accordance with the <a href="#">Capricorn Municipal Development Guidelines</a>.</p> | An Erosion and Sediment Control Plan is to be designed during the detailed design stage of the project. The ESCP is to be RPEQ certified and incorporated into the construction management plan prior to construction. |

## Water quality within catchment areas



**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                     | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RESPONSE / COMPLIANCE |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Water quality within catchment areas</b>                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| <p><b>PO15</b><br/>For development proposals within the Fitzroy River sub-basin, relevant environmental values are recognised and enhanced, and relevant water quality objectives are addressed.</p> <p>Editor's note—Section 3.2 of <a href="#">Queensland Water Quality Guidelines 2009</a> identifies values for water quality for waters in the Central Coast Queensland region.</p> | <p><b>A015.1</b><br/>Development complies with the provisions of the <a href="#">State Planning Policy - Guideline - Water Quality</a>.</p> <p><b>AND</b></p> <p><b>A015.2</b><br/>Development adjoining the full supply height above the Fitzroy River Barrage includes the provision of an effective <a href="#">buffer</a> that assists in filtering <a href="#">runoff</a>, including:</p> <ul style="list-style-type: none"> <li>a) a <a href="#">buffer</a> distance of 100 metres to the water supply height of the barrage which excludes <a href="#">cropping</a> or grazing of a low intensity nature; and</li> <li>b) fencing and water troughs installed on the land to prevent encroachment of animals within 100 metres of the full supply height above the barrage.</li> </ul> | N/A                   |

**Protecting water quality**

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                 | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Protecting water quality</b>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>PO16</b><br/>The development is compatible with the land use constraints of the <a href="#">site</a> for:</p> <ul style="list-style-type: none"> <li>a) achieving stormwater design objectives; and</li> <li>b) avoiding or minimising the entry of contaminants into, and transport of contaminants in stormwater.</li> </ul> | <p><b>A016.1</b><br/>Development is undertaken in accordance with a stormwater management plan that:</p> <ul style="list-style-type: none"> <li>a) incorporates stormwater quality control measures to achieve the design objectives set out in the <a href="#">State Planning Policy - Guideline - Water Quality</a>;</li> <li>b) provides for achievable stormwater quality treatment measures reflecting land use constraints, such as soil type, landscape features (including landform), nutrient hazardous areas, acid sulfate soil and rainfall erosion potential; and</li> </ul> | <p><b>Complies -</b><br/>A Stormwater Management Plan has been prepared for the proposed development.<br/>Refer to the Stormwater Management Plan (Ref: R001-G21097) for details.</p> <p>Proprietary Treatment Devices have been utilised for stormwater treatment. The construction, operation &amp; maintenance manual will be provided by ATLAN stormwater during the purchasing process.</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <p>c) accounts for development type, construction phase, local landscape, climatic conditions and design objectives.</p> <p>Editor's note—A stormwater management plan includes the design, construction, operation, maintenance of the stormwater system.</p> <p>Editor's note—<a href="#">SC6.18 — Stormwater management planning scheme policy</a> provides guidance on preparing a stormwater quality management plan.</p> |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

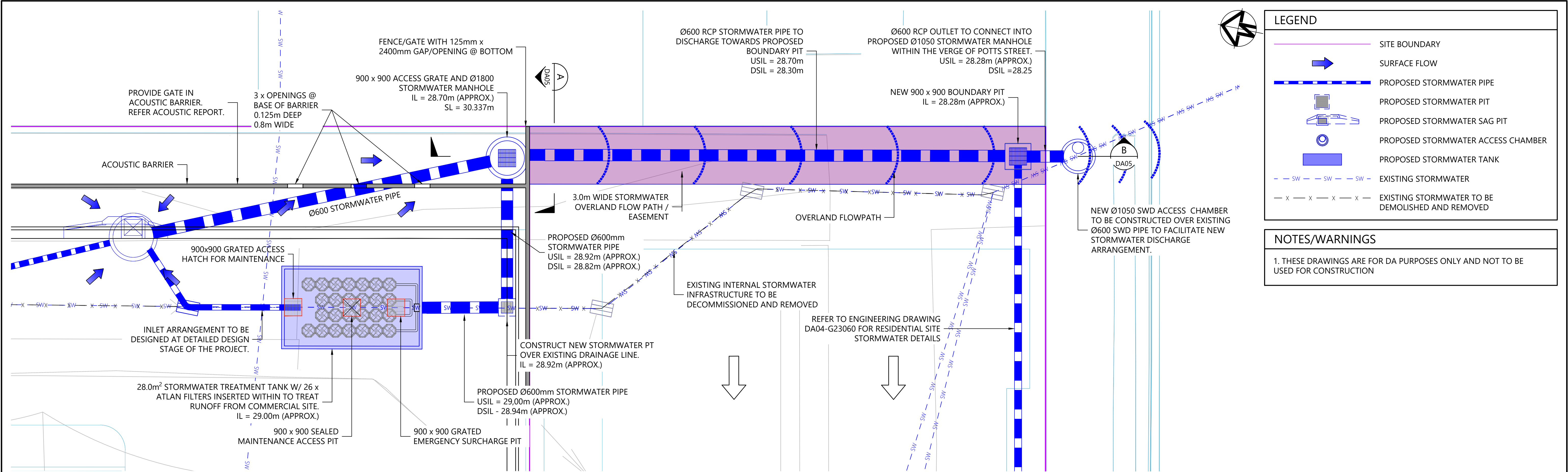
### Protecting water quality in existing natural waterways

**Table 9.3.6.3.1 Development outcomes for assessable development (part)**

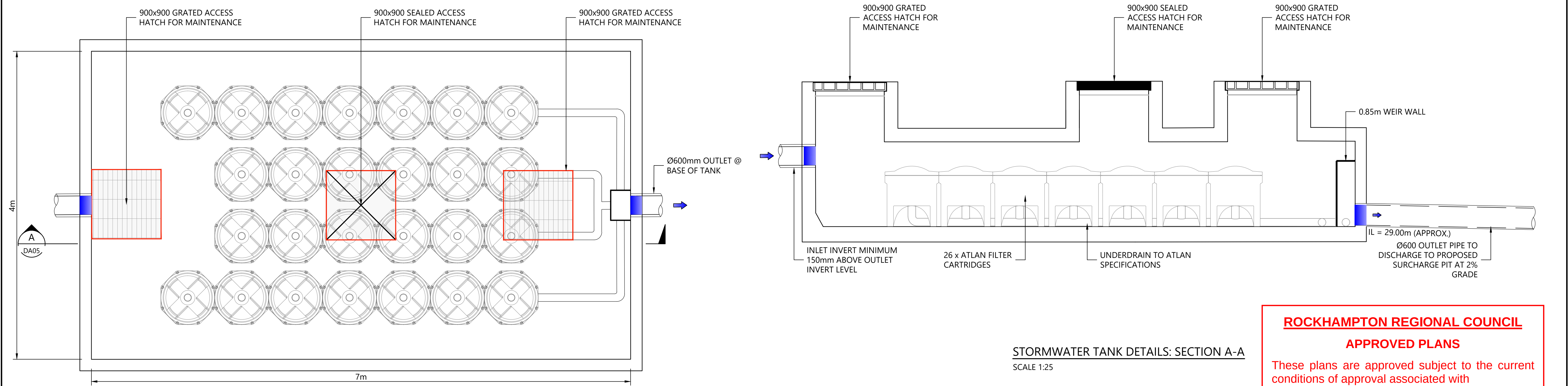
| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | RESPONSE / COMPLIANCE |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Protecting water quality in existing natural waterways</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| <p><b>PO17</b><br/>The <u>waterway</u> is designed for stormwater flow management, stormwater quality management and the following end use purposes:</p> <ul style="list-style-type: none"> <li>a) amenity including aesthetics,</li> <li>b) landscaping and recreation;</li> <li>c) flood management;</li> <li>d) stormwater harvesting as part of an integrated water cycle management plan;</li> <li>e) as a sustainable aquatic habitat; and</li> <li>f) the protection of water environmental values.</li> </ul> | No acceptable outcome is nominated.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | N/A                   |
| <p><b>PO18</b><br/>The <u>waterway</u> is located in a way that is compatible with existing tidal waterways.</p>                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>A018.1</b><br/>Where the <u>waterway</u> is located adjacent to, or connected to, a tidal <u>waterway</u> by means of a weir, lock, pumping system or similar:</p> <ul style="list-style-type: none"> <li>a) there is sufficient flushing or a tidal range of more than 0.3 metres; or</li> <li>b) any tidal flow alteration does not adversely impact on the tidal <u>waterway</u>; or</li> <li>c) there is no introduction of salt water into freshwater environments.</li> </ul> | N/A                   |



|                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                            |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <p><b>P019</b><br/>The construction phase for the <u>waterway</u> is compatible with protecting water environmental values in existing natural waterways.</p> | <p><b>A019.1</b><br/>Erosion and sediment control measures are incorporated during construction to achieve design objectives set out in <a href="#">State Planning Policy - Guideline - Water Quality</a>.</p> <p>Editor's note—Erosion and sediment control is to be designed and implemented in accordance with the International Erosion Control Association Best Practice Erosion and Sediment Control Guidelines.</p> | <p>N/A</p> |
| <p><b>P020</b><br/>Stormwater overflows from the <u>waterway</u> do not result in lower water quality objectives in existing natural waterways.</p>           | <p><b>A020.1</b><br/>Stormwater run-off entering non-tidal waterways is pre-treated prior to release in accordance with the guideline design objectives, water quality objectives of local waterways, and any relevant local area stormwater management plan.</p>                                                                                                                                                          | <p>N/A</p> |



STORMWATER TANK DETAILS: LOCATION PLAN  
SCALE 1:100



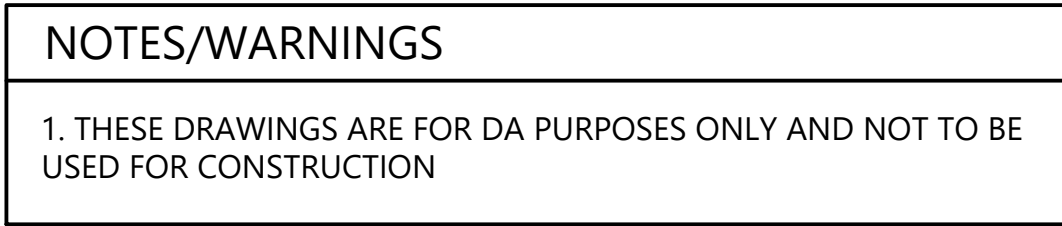
STORMWATER TANK DETAILS: SECTION A-A  
SCALE 1:25

STORMWATER TANK DETAILS: PLAN VIEW  
SCALE 1:25

**ROCKHAMPTON REGIONAL COUNCIL**  
**APPROVED PLANS**  
These plans are approved subject to the current conditions of approval associated with  
**Development Permit No.: D/175-2025**  
**Dated: 25 May 2026**

|                                                                                                                              |  |  |  |                                                                                                                                                                                                                     |  |  |  |                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                         |                                                                                                                                                                                              |                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
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**Development Permit No.: D/175-2025**  
**Dated: 25 May 2026**



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## **ROCKHAMPTON REGIONAL COUNCIL**

### **APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.: D/175-2025**

**Dated: 25 May 2026**

# Traffic Engineering Report

Proposed Shop & Showroom Development

At 452-488 Yaamba Road, Norman Gardens

On behalf of Coles Group Property Developments Ltd







**Disclaimer**

This report has been prepared by Colliers for the exclusive use of the client for the specific purpose stated within. The findings, conclusions, and recommendations presented in this report are based on the information available, assumptions made, and methodologies applied at the time of analysis.

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Revision Record

| No. | Author      | Reviewed/Approved        | Description | Date       |
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| 3.  |             |                          |             |            |
| 4.  |             |                          |             |            |

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# 1. Introduction

## 1.1. Background

Colliers International Engineering and Design (TTMC) Pty Ltd has been engaged by Coles Group Property Development Ltd to prepare this traffic engineering report investigating a proposed shop and showroom development at 452-488 Yaamba Road, Norman Gardens.

## 1.2. Scope

The scope of the transport aspects investigated includes:

- Reviewing the prevailing traffic and transport conditions surrounding the site.
- Identifying parking supply required to cater for development demands.
- Assessing the parking layout to provide efficient and safe internal circulation and manoeuvring.
- Assessing the access configuration to provide efficient and safe manoeuvring between the site and the public road network for cars, service vehicles, cyclists, and pedestrians.
- Assessing the internal service vehicle layouts to provide efficiency and safety for on-site service vehicle operation
- Reviewing access to a suitable level of public and active transport provisions.
- Identification of likely traffic volumes and traffic distribution from the development.
- Identification of likely traffic impacts of development on the surrounding road network.

The development plans have been assessed against the following guidelines and planning documents:

- Rockhampton Regional Council Planning Scheme (2015), specifically:
  - Access, Parking and Transport Code (APT Code) – refer Appendix E for responses.
- Queensland State Development and Assessment Provisions (SDAP), specifically:
  - State Code 1: Development in a state-controlled road environment – refer Appendix F for responses.
- Australian Standards for Parking Facilities, specifically:
  - Part 1: Off-street car parking (AS2890.1:2004)
  - Part 2: Off-street commercial vehicle facilities (AS2890.2:2019)
  - Part 3: Bicycle parking (AS2890.3:2015)
  - Part 6: Off-street parking for people with disabilities (AS2890.6:2009).



- Department of Transport and Main Roads 'Guide to Traffic Impact Assessment' (GTIA).
- Department of Transport and Main Roads 'Road Planning and Design Manual' (RPDM).
- Austroads' 'Guide to Road Design' (GRD)

### 1.3. Site Location & Existing Use

The site is located at 452-488 Yaamba Road, Norman Gardens, as shown in Figure 1.1. It has road frontage to Yaamba Road and Potts Street and is described as Lot 25 on RP610513.

The site is subject to an original development approval for a Retail Showroom granted in December 2003 (Council reference: D-1004/2000). Consistent with the development approval the site currently contains a large format retail showroom development (approximately 8,300m<sup>2</sup> GFA) that has approximately 270 on-site car parking spaces and is accessed via a northern left-in-only access and southern left-in / left-out access to Yaamba Road.

The site was initially tenanted by Hardware House and more recently by Bunnings. Since the relocation of Bunnings in 2018 the site has been vacant.



Figure 1.1: Site location

Source: Nearmap

## 1.4. Previous Development Application / Approval

A development permit for a material change of use for a shopping centre, showroom, and multiple dwelling was lodged with Council in 2022 (Council reference: D/77-2022). Whilst the application was not finalised it is important to note that the State Assessment Referral Agency (SARA) provided a Referral agency response – with conditions on 5 April 2023 (SARA reference: 2207-29909 SRA) which approved the proposed Yaamba Road vehicular site access arrangements that included a southern right-in / left-in / left-out access intersection with signal control and a northern left-in / left-out access.



## 2. The Proposed Development

### 2.1. Development Profile

The development application seeks approval for a shop and showroom development, comprising a supermarket, liquor store, and showroom to be contained generally within the existing on-site building (previously occupied by Bunnings). Table 2.1 summarises the type and scale of the proposed uses. A copy of the proposed development plans is included in **Appendix A**.

Table 2.1: Development Extents Summary

| Land Use     | Extent                         |
|--------------|--------------------------------|
| Supermarket  | 4,113 m <sup>2</sup> GFA       |
| Liquor Store | 150 m <sup>2</sup> GFA         |
| Showroom     | 3,541 m <sup>2</sup> GFA       |
| <b>Total</b> | <b>7,804 m<sup>2</sup> GFA</b> |

### 2.2. Parking

The existing at-grade car parking area is proposed to be retained, and additional (new) parking is proposed resulting in a total of 283 spaces being provided. Further details regarding parking provisions are included in Section 4.

### 2.3. Access

Consistent with the currently approved site access arrangements (SARA/DTMR approval) two vehicular site accesses are proposed to service the the development, including:

- A southern right-in / left-in / left-out access to Yaamba Road (reconfiguration of the existing left-in / left-out access).
- A northern left-in / left-out access to Yaamba Road (reconfiguration of the existing left-in-only access).

A new pedestrian / cyclist site access is proposed to Yaamba Road.

Further details regarding the proposed access arrangements are included in Section 5.

### 2.4. Servicing

Designated service vehicle loading areas are proposed at the rear of the site intended to accommodate all service vehicles associated with the development. Further details regarding the proposed servicing arrangements are included in Section 6.

## 3. Site Travel Environment

### 3.1. Active Transport Facilities and Services

#### 3.1.1. Public Transport

An indented bus bay is located on the Yaamba Road site frontage which currently services Bus Route 410 which operates between the city centre and Parkhurst to the north of the site. The service currently operates hourly from approximately 8am to 5pm Monday to Friday.

#### 3.1.2. Pedestrian and Cyclist Network

A formal (concrete) pedestrian footpath exists along the Yaamba Road site frontage. The nearest formal pedestrian crossings of Yaamba Road include:

- Underpass of Yaamba Road north of the Farm Street intersection
- Signalised crossing of Yaamba Road at the Richardson Road intersection south of the site

On-road cyclist facilities are limited to cycle lanes on both sides of Yaamba Road. Off-road facilities are limited to the north side of Farm Street, west of Yaamba Road, where a 2.5m shared off-road path exists. Figure 3.1 below presents Council's planned cycle network.



Figure 3.1: Council Bicycle Network



## 3.2. The Road Network

### 3.2.1. Road Hierarchy

The majority of roads within and surrounding the project area are administered by the Council, the exception being Yaamba Road (Bruce Highway) which is administered by the Department of Transport and Main Roads (DTMR). The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 3.1. Figure 3.2 presents the current road hierarchy.

Table 3.1: Local Road Hierarchy & Characteristics

| Road                            | Speed Limit | Lanes         | Classification           |
|---------------------------------|-------------|---------------|--------------------------|
| Yaamba Road (Bruce Highway)     | 70kph       | 4 (divided)   | Highway / Urban Arterial |
| Farm Street                     | 60kph       | 2 (undivided) | Urban Sub-arterial       |
| Richardson Road / Yewdale Drive | 60kph       | 4 (divided)   | Urban Sub-arterial       |
| Macartney Street                | 50kph       | 2 (undivided) | Urban Access Street      |
| Potts Street                    | 50kph       | 2 (undivided) | Urban Access Street      |

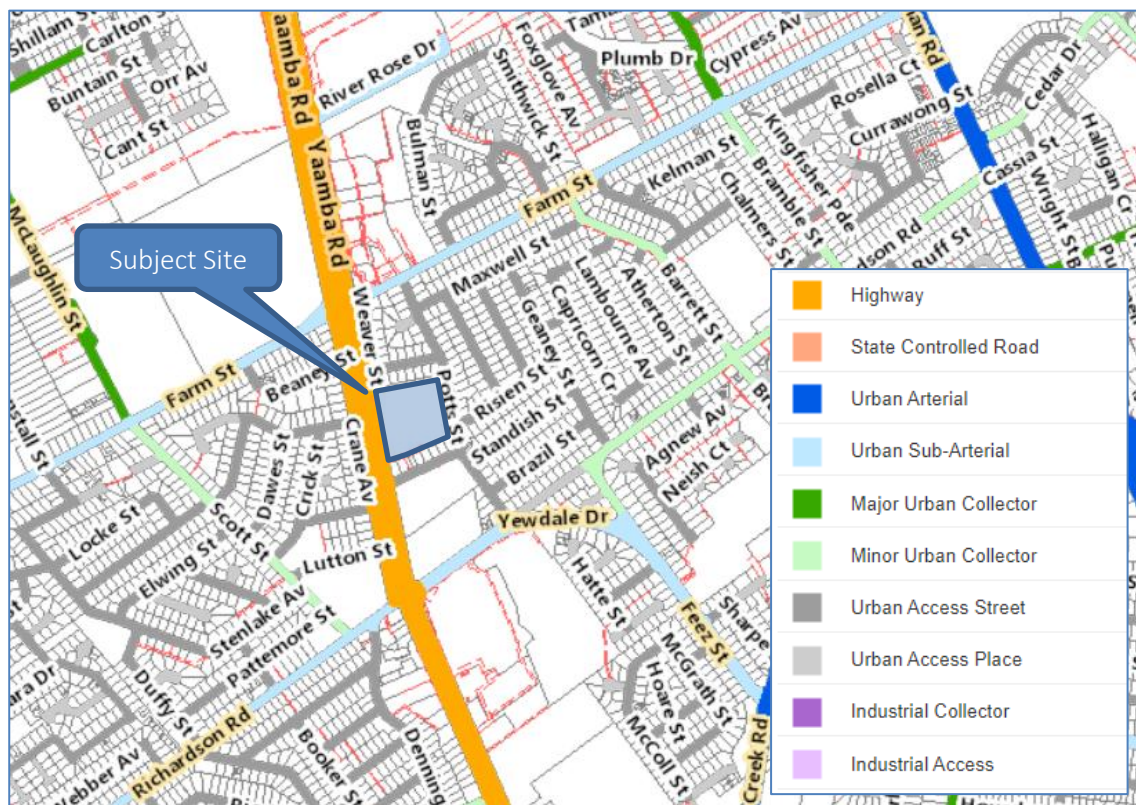


Figure 3.2: Council Road Hierarchy

The intersections of Yaamba Road / Farm Street and Yaamba Road / Richardson Road / Yewdale Drive are signalised, with U-turns permitted on the southern and northern approaches, respectively. All other intersections in the local area are priority-controlled.

### 3.2.2. Surveyed Traffic Volumes

Colliers conducted traffic movement surveys at the following locations on Thursday 14 August 2025, from 6-9am and 2-6pm, and on Saturday 16 August 2025 from 10am-2pm:

- Yaamba Rd / Farm St signalised intersection
- Yaamba Rd / Macartney St intersection
- Yaamba Rd / Richardson Rd / Yewdale Drive signalised intersection

The road peak hours were found to be typically 7:45-8:45am and 3:00-4:00pm on the Thursday and 11:15am-12:15pm on the Saturday. Traffic volume diagrams detailing the results of the survey are contained in **Appendix B**.

## 3.3. Transport Planning

### 3.3.1. Council

Review of the *Local Government Infrastructure Plan* indicates there are no planned transport infrastructure projects or upgrades in the local area that would affect, or be affected by, the proposed development.

### 3.3.2. State

The Department of Transport and Main Roads is continuing the planning and preservation of land for the Rockhampton Ring Road. Whilst this major transport infrastructure project does not directly impact the proposed development, when completed it will likely result in a reduction of traffic demand on Yaamba Road (Bruce Highway) and a consequential improvement in traffic operations along this key road route.



## 4. Parking Arrangements

### 4.1. Parking Supply

#### 4.1.1. Car parking

Table 9.3.1.3.2 of the RRC's 'APT Code' provides guidance on the minimum car parking space requirements for the land-use under consideration. Table 4.1 sets out the minimum parking requirements.

Additionally, with reference to the Building Code of Australia, a Class 6 building requires parking for people with a disability (PWD) to be provided at a minimum rate of 1 PWD space per 50 standard spaces.

Table 4.1: Planning Scheme Acceptable Outcome Car Parking Supply Requirement

| Land Use                          | Council Requirement              | Extent                        | Requirement       | Provision |
|-----------------------------------|----------------------------------|-------------------------------|-------------------|-----------|
| Shop (supermarket & liquor store) | 1 space per 25m <sup>2</sup> GFA | 4,263m <sup>2</sup> GFA       | 171 spaces        | 283       |
| Showroom                          | 1 space per 40m <sup>2</sup> GFA | 3,541m <sup>2</sup> GFA       | 89 spaces         |           |
| <i>Sub-total</i>                  |                                  | <i>7,805m<sup>2</sup> GFA</i> | <i>260 spaces</i> |           |

As detailed in Table 4.1, the development scheme proposes a total of 283 car parking spaces which exceeds the planning scheme acceptable outcome requirement of 260 spaces.

#### 4.1.2. Bicycle Parking

Table SC6.4.7.1 – Bicycle parking facilities provision rates of Council's Bicycle Network Planning Scheme Policy requires parking as summarised in Table 4.2.

Whilst the development plans do not detail bicycle parking facilities it is noted that there are adequate external areas that can accommodate parking spaces. It is recommended that the identified parking facilities are provided for the development noting that Class 1 security spaces for employees is considered to be excessive for a shopping centre development and Class 2 facilities are more appropriate. Parking and access facilities are to be provided in accordance with AS 2890.3:2015.

Table 4.2: Planning Scheme Acceptable Outcome Bicycle Parking Supply Requirement

| Land Use                          | Council Requirement                                                                                                        | Extent                  | Requirement                             |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------|
| Shop (supermarket & liquor store) | 1 space per 300m <sup>2</sup> GFA for employees (Class 1)<br>1 space per 500m <sup>2</sup> GFA for visitors (Class 3)      | 4,263m <sup>2</sup> GFA | 15 employee spaces<br>9 visitor spaces  |
| Showroom                          | 1 space per 750m <sup>2</sup> GFA for employees (Class 1 or 2)<br>1 space per 750m <sup>2</sup> GFA for visitors (Class 3) | 3,541m <sup>2</sup> GFA | 5 employee space<br>5 visitor space     |
| Sub-total                         |                                                                                                                            |                         | 20 employee spaces<br>14 visitor spaces |

**Notes:**

Class 1 is High security level with fully-enclosed individual locker

Class 2 is Medium security level with lockable enclosure, shelter or compound fitted with class 3 facilities where the cyclist is responsible for locking the bicycle within the communal enclosure.

Class 3 is Low security level with bicycle rails or racks to which both the bicycle frame and wheels can be locked.

## 4.2. Parking Layout

Council's 'APT Code' requires the design and layout of parking areas to be in accordance with the Australian Standards AS2890.1 and AS2890.2. Table 4.3 identifies the characteristics of the proposed parking area with respect to the Council requirements. The last column identifies the compliance of each design aspect. The proposed car parking area layout complies with the applicable design standard and is therefore acceptable. It is noted that the geometry typically exceeds the minimum dimensional standards providing for a more user-friendly parking area.

Table 4.3: Car Parking Area Design Requirements

| Design Aspect                                                                                                                                                             | Standard                                              | Proposed Provision                                       | Compliance                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------|
| <b>Car Parking</b>                                                                                                                                                        |                                                       |                                                          |                                                                |
| Parking space length: <ul style="list-style-type: none"> <li>Staff space (Class 1)</li> <li>Visitor space (Class 3A)</li> <li>PWD space (Class 5)</li> </ul>              | 5.4m (min)<br>5.4m (min)<br>5.4m (min)                | 5.4m (min)<br>5.4m (min)<br>5.4m (min)                   | AS2890.1 Compliant<br>AS2890.1 Compliant<br>AS2890.6 Compliant |
| Parking space width: <ul style="list-style-type: none"> <li>Staff space (Class 1)</li> <li>Visitor space (Class 3A)</li> <li>PWD space (Class 5) 'Shared Area'</li> </ul> | 2.4m (min)<br>2.6m (min)<br>2.4m + 2.4m 'Shared Area' | 2.4m (min)<br>2.6m (approx)<br>2.4m + 2.4m 'Shared Area' | AS2890.1 Compliant<br>AS2890.1 Compliant<br>AS2890.6 Compliant |
| Aisle Width: <ul style="list-style-type: none"> <li>Parking aisle</li> <li>2-way Circulation road/ramp</li> <li>1-way Circulation road/ramp</li> </ul>                    | 6.6m (min)<br>5.5m (min)<br>3.0m (min)                | 6.6m (approx)<br>6.5m (min)<br>3.0m (min)                | AS2890.1 Compliant<br>AS2890.1 Compliant<br>AS2890.1 Compliant |
| Parking envelope clearance                                                                                                                                                | Located as per Figure 5.2 of AS2890.1                 | Located as per Figure 5.2 of AS2890.1                    | AS2890.1 Compliant                                             |
| Maximum Gradient: <ul style="list-style-type: none"> <li>PWD parking</li> <li>Parking aisle</li> </ul>                                                                    | 1:40 (2.5%)<br>1:20 (5.0%)                            | Generally Flat<br>Generally Flat                         | AS2890.6 Compliant<br>AS2890.1 Compliant                       |
| Blind Aisle Extension                                                                                                                                                     | 1.0m extension to aisle width beyond final space      | Not applicable                                           | Not applicable.                                                |
| Height Clearance: <ul style="list-style-type: none"> <li>Passenger Vehicle Minimum</li> <li>Service Vehicle Minimum</li> <li>Over PWD space</li> </ul>                    | 2.3m (min)<br>4.5m (min)<br>2.5m (min)                | >2.3m (min)<br>>4.5m (min)<br>>2.5m (min)                | AS2890.1 Compliant<br>AS2890.2 Compliant<br>AS2890.6 Compliant |



## 5. Service Vehicle Arrangements

### 5.1. Service Vehicle Requirements

Council's 'APT Code' refers to 'AS2890.2' with respect to service vehicles and on-site design of service vehicle areas. 'AS2890.2' provides no guidance regarding the number or type of service vehicle loading bays required.

However, the service vehicle demands associated with the proposed development have been considered based on Coles design standards and past experience.

The types of service vehicles anticipated to service the development include:

- 19m Articulated Vehicle (AV) for Coles goods deliveries;
- Heavy Rigid Vehicle (HRV), Medium Rigid Vehicle (MRV) and Small Rigid Vehicle (SRV) for goods deliveries associated with the specialty retail and showroom uses; and
- Refuse Collection Vehicle (RCV).

### 5.2. Proposed Servicing Arrangements

To cater for the servicing demands of the proposed development designated service vehicle areas are proposed at the south-east (showroom) and north-east (Coles) corners of the building. These areas include adequate provision for an AV and HRV associated with Coles, HRV for the showroom, and all refuse collection vehicles.

The proposed design layout of the development can accommodate the relevant design vehicles of the proposed development ensuring all such vehicles can enter and exit the site in a forward direction. Importantly, all site ingress of service vehicles is proposed at the southern site access to Yaamba Road and egress at the northern site access with on-site circulation in an anti-clockwise direction.

As demonstrated in Colliers drawing number 19BRT0086-21A (**Appendix B**) the development layout, including both Yaamba Road site accesses and internal circulation and manoeuvring areas, is adequate to accommodate the swept paths of the relevant design vehicles.

Overall, the proposed servicing arrangements are considered suitable for the development site.

## 6. Vehicular Site Access Arrangements

Two vehicular site accesses are proposed to service the development, including:

- A southern left-in / right-in / left-out access to Yaamba Road (reconfiguration of the existing left-in / left-out access).
- A northern left-in / left-out access to Yaamba Road (reconfiguration of the existing left-in-only access).

The adequacy of each of the proposed accesses is addressed in the following sections.

### 6.1. Yaamba Road Southern Access

The existing southern left-in / left-out vehicular site access crossover to Yaamba Road is proposed to be retained generally in its current location and provide for direct right turns into the access. It is noted that the proposed access is situated approximately 5m south of the approved location (current development approval).

The purpose of the proposed right-in component is primarily to mitigate traffic impacts of the development at the signalised Farm Street intersection to the north by avoiding U-turns at the intersection which would otherwise consume intersection capacity and increase safety risk associated with potential conflict between U-turn movements and the left turn out of Farm Street. Refer to Section 7.5 for further information relating to traffic impacts.

#### 6.1.1. Sight Distance

Analysis in the vertical and horizontal planes has been undertaken for both the right turn into the access and left turn out of the access. The minimum distance requirements have been calculated as follows:

Right Turn into Access (Safe Intersection Sight Distance, Table 3.2 Austroads GRD4A)

- Longitudinal grade = -1.8%
- $d = 0.36$
- $O_T = 3.0 \text{ sec}$
- $R_T = 2.0 \text{ sec}$
- $V = 80 \text{ kph}$
- $h_1 = 1.1 \text{ m}$  (right turning driver)
- $h_2 = 1.25 \text{ m}$  (upper part of southbound approaching vehicle)
- $\text{SISD} = 181 \text{ m}$
- Grade correction (Table 3.4 Austroads GRD4A) = +4m



- Grade corrected SISD = 185m

Right Turn into Access (Minimum Gap Sight Distance, Table 3.5 Austroads GRD4A)

- $h_1 = 1.1$  m (right turning driver)
- $h_2 = 0.65$  m (southbound approaching vehicle headlight)
- $t_a = 6.0$  sec (Table 3.5 Austroads GRD4A, major road right turn across 3 lanes)
- $V = 80$  kph
- MGSD = 133.3m (say 134 m)

Left Turn out of Access (Safe Intersection Sight Distance, Table 3.2 Austroads GRD4A)

- Longitudinal grade = -1.8%
- $d = 0.36$
- $O_T = 3.0$  sec
- $R_T = 2.0$  sec
- $V = 80$  kph
- $h_1 = 1.1$  m (right turning driver)
- $h_2 = 1.25$  m (upper part of southbound approaching vehicle)
- SISD = 181 m
- Grade correction (Table 3.4 Austroads GRD4A) = +4m
- Grade corrected SISD = 185m

Left Turn out Access (Minimum Gap Sight Distance, Table 3.5 Austroads GRD4A)

- $h_1 = 1.1$  m (right turning driver)
- $h_2 = 0.65$  m (southbound approaching vehicle headlight)
- $t_a = 5.0$  sec (Table 3.5 Austroads GRD4A, major road left turn)
- $V = 80$  kph
- MGSD = 111.1m (say 112 m)

The above-mentioned minimum sight distances are presented in Colliers drawing number 19BRT0086-19A Sheet 6 (**Appendix B**).

The analysis indicates the minimum Safe Intersection Sight Distance, and Minimum Gap Sight Distance, is achieved for both movements to/from the southbound traffic lanes on Yaamba Road north of the site access

subject to the removal of existing landscaping/vegetation within the central median for approximately 130m north of the site access as indicated in Colliers drawing number 19BRT0086-19A (**Appendix B**). The removed landscaping could be replaced with the same low-level landscaping that exists in the median north of this area.

### 6.1.2. Access Design

The design of the proposed access (as depicted in Colliers drawing number 19BRT0086-19A (**Appendix B**), at and within the site frontage boundary, has been assessed against the provisions of AS2890 series. Table 6.1 summarises the design and location requirements and the proposed provisions for the relocated southern access.

Table 6.1: Yaamba Rd Southern Vehicle Site Access Requirements & Proposed Design Summary

| Design Aspect                | AS2890 Requirement                      | Proposed Provision                    | Compliance         |
|------------------------------|-----------------------------------------|---------------------------------------|--------------------|
| Category                     | 4                                       | 4                                     | Compliant          |
| Crossover Width              | 6-8m entry / 1-3m separator / 6-8m exit | 6.8m entry / 1.5m separator / 4m exit | Alternate Solution |
| Pedestrian Visibility Splays | 2m x 2.5m                               | 2m x 2.5m (minimum)                   | Compliant          |
| Gradient of first 6m         | 1:20 (5%)                               | Generally Flat                        | Compliant          |

The proposed arrangements comply with the design requirements however an alternate solution is proposed for the crossover width. The design widths of the entry and exit components of the access have been minimised to reduce pedestrian crossing distances but are adequate to accommodate the swept path requirements of the relevant design vehicles as demonstrated in Colliers drawing number 19BRT0086-19A (**Appendix B**).

### 6.1.3. External Works

The recommended external road works required to support the proposed access are detailed in Section 7.7.

## 6.2. Yaamba Road Northern Access

The existing northern left-in vehicular site access crossover to Yaamba Road is proposed to be reconfigured to incorporate a left-in / left-out arrangement.

The purpose of the proposed left-out component is primarily required to provide a site egress for heavy/service vehicles in order to avoid heavy vehicle circulation through the on-site car parking areas.

### 6.2.1. Sight Distance

Analysis in the vertical and horizontal planes has been undertaken for the left turn out of the access. The minimum distance requirements have been calculated as follows:

Left Turn out of Access (Safe Intersection Sight Distance, Table 3.2 Austroads GRD4A)

- Longitudinal grade = +1.0%



- $d = 0.36$
- $O_T = 3.0 \text{ sec}$
- $R_T = 2.0 \text{ sec}$
- $V = 80 \text{ kph}$
- $h_1 = 1.1 \text{ m}$  (right turning driver)
- $h_2 = 1.25 \text{ m}$  (upper part of southbound approaching vehicle)
- $\text{SISD} = 181 \text{ m}$
- Grade correction (Table 3.4 Austroads GRD4A) = 0m
- Grade corrected SISD = 181m

Left Turn out Access (Minimum Gap Sight Distance, Table 3.5 Austroads GRD4A)

- $h_1 = 1.1 \text{ m}$  (right turning driver)
- $h_2 = 0.65 \text{ m}$  (southbound approaching vehicle headlight)
- $t_a = 5.0 \text{ sec}$  (Table 3.5 Austroads GRD4A, major road left turn)
- $V = 80 \text{ kph}$
- $\text{MGSD} = 111.1\text{m}$  (say 112 m)

The above-mentioned minimum sight distances are presented in Colliers drawing number 19BRT0086-19A Sheet 6 (**Appendix B**).

The analysis indicates the minimum Safe Intersection Sight Distance and Minimum Gap Sight Distance is achieved to/from the southbound traffic lanes on Yaamba Road north of the site access.

### 6.2.2. Access Crossover Design

The design of the proposed access crossover has been assessed against the provisions of AS2890 series. Table 6.1 summarises the design and location requirements and the proposed provisions for the relocated southern access.

Table 6.2: Yaamba Rd Northern Vehicle Site Access Requirements & Proposed Design Summary

| Design Aspect                | AS2890 Requirement                      | Proposed Provision                      | Compliance         |
|------------------------------|-----------------------------------------|-----------------------------------------|--------------------|
| Category                     | 4                                       | 4                                       | Compliant          |
| Crossover Width              | 6-8m entry / 1-3m separator / 6-8m exit | 4.5m entry / 1.5m separator / 4.5m exit | Alternate Solution |
| Pedestrian Visibility Splays | 2m x 2.5m                               | 2m x 2.5m (minimum)                     | Compliant          |
| Gradient of first 6m         | 1:20 (5%)                               | Generally Flat                          | Compliant          |

The proposed arrangements comply with the design requirements however an alternate solution is proposed for the crossover width. The design widths of the entry and exit components of the access have been minimised to reduce pedestrian crossing distances but are adequate to accommodate the swept path requirements of the relevant design vehicles as demonstrated in Colliers drawing number 19BRT0086-19A (Appendix B).

### 6.2.3. External Works

The recommended external road works required to support the proposed access are detailed in Section 7.6.

## 6.3. Active Transport Access

It is proposed that pedestrian and cyclist access to the development will be facilitated via a dedicated site access located midway along the Yaamba Road site frontage, adjacent the existing bus stop, and internal pathways that connect to the on-site building.

The proposed internal pedestrian and cyclist path network provides for good connectivity between Yaamba Road and the building. Detailed design and construction of all facilities is to be in accordance with the relevant standards.

## 7. Traffic Impact Assessment

### 7.1. Scope of Impact Assessment

The potential traffic impacts of the proposal have been considered in terms of intersection performance (peak hour traffic). Three road peak hour periods have been assessed including Weekday AM and PM, and Saturday peak hours.

Detailed intersection analysis has been undertaken for intersections on the Yaamba Road corridor including the Farm Street, two site accesses, Macartney Street and Richardson Road intersections. The results of the intersection analyses have been used to also undertake an intersection delay assessment and road safety assessment for the state-controlled road network in accordance with DTMR's Guide to Traffic Impact Assessment (refer Section 8 and 9 respectively).

As discussed in Section 1.1 the southern site access intersection has been assessed for two potential scenarios, including:

- **Scenario 1:** includes a left-in / left-out southern site access i.e. no direct right turns into the site access with all such traffic demands being applied to the southbound U-turn movement at the Farm Street intersection.
- **Scenario 2:** includes a signalised direct right turn into the southern site access i.e. no additional southbound U-turn demands at Farm Street intersection.

Table 7.1 summarises the state-controlled intersections assessed and their relevant assessment year/s.

Due to the relatively low increase in peak hour traffic demands at Council-controlled intersections detailed analysis is considered unnecessary.

Table 7.1: Scope of Yaamba Road Intersections Traffic Impact Assessment

| Intersection / Site Access                    | Assessment Year/s      |
|-----------------------------------------------|------------------------|
| Yaamba Rd / Farm St intersection              | Opening Year (2027)    |
| Yaamba Rd / Northern Site Access intersection | 10-year horizon (2037) |
| Yaamba Rd / Southern Site Access intersection | 10-year horizon (2037) |
| Yaamba Rd / Macartney St intersection         | Opening Year (2027)    |
| Yaamba Rd / Richardson Rd intersection        | Opening Year (2027)    |



## 7.2. Without Development (Base) Traffic Volumes

Consistent with DTMR advice received from the previous traffic impact assessment (current development approval) future traffic volumes on the Yaamba Road corridor at the opening year and 10-year design horizon year have been estimated by application of an annual average compound growth rate of 1% to the surveyed 2025 volumes.

Detailed traffic volumes diagrams are presented in **Appendix C**.

## 7.3. Development Traffic

### 7.3.1. Estimated Trip Generation & Segmentation

Trip generation for the supermarket has been based on results of comprehensive traffic generation surveys of existing standalone supermarket developments in south-east Queensland undertaken by Colliers.

Trip generation for the proposed showroom component has been based on US ITE trip rates for Sporting Goods Superstore (861).

Not all trips associated with the development will be new trips on the road network. Other trip types would include diverted drop-in trips and undiverted (or pass-by) drop-in trips. For the purposes of this assessment trip types have been categorised as either 'new trips' or 'pass-by trips.'

Detailed trip generation and segmentation assumptions and calculations are included in **Appendix C**.

### 7.3.2. Estimated Trip Distribution

The peak hourly in:out proportional splits are assumed to be 50:50 for each peak hour period.

Pass-by trips have been assumed to occur from both northbound and southbound flows on Yaamba Road with the volumes being directly proportional to the northbound and southbound passing traffic flows in each peak hour period.

The directional distribution of new trips has been estimated based on the likely residential catchments surrounding the site and the likely approach and departure routes motorists would take based on likely travel time comparisons of potentially alternate routes. The estimates are also based on the economic analysis undertaken for the application which detail primary and secondary trade catchment areas and their respective anticipated trade proportions.

Detailed approach and departure trip distributions are presented in **Appendix C**.

The estimated development traffic volumes, including peak hour and daily demands, on the surrounding road network are presented in **Appendix C**.

## 7.4. Analysis of Yaamba Road / Farm Street Intersection

### 7.4.1. SIDRA Analysis

The existing intersection configuration has been analysed for the 2027 peak hour volumes, under the two potential southern site access scenarios, using SIDRA 10 analysis software. A Network analysis was undertaken which includes the Farm Street intersection, both site access intersections, the Macartney Street intersection and the Richardson Road intersection.

For the signal-controlled intersections the existing signal phasings have been adopted.

Additionally, the following SIDRA input parameters have been applied to produce analysis that minimises delay at the intersections:

- Network Performance Measure (Network Data dialog and tab) set to 'Delay' (default setting).
- Network Cycle Time Option (Network Timing dialog, Timing Options tab) set to 'Optimum Cycle Time' which identifies the optimum signal cycle time and phase times to result in optimised delay.

The two potential southern site access scenarios assessed include:

- **Scenario 1:** includes a left-in / left-out southern site access i.e. no direct right turns into the site access with all such traffic demands being applied to the southbound U-turn movement at the Farm Street intersection.
- **Scenario 2:** includes a signalised direct right turn into the southern site access i.e. no additional southbound U-turn demands at Farm Street intersection.

Table 7.2 summarises the analysis outputs for the 2027 design year. Detailed analysis output summaries are presented in **Appendix D**.

Key findings of the opening year (2027) analysis are as follows:

- Access Scenario 1 yields significant differences to Scenario 2 due to the additional U-turn demands at the intersection. This includes significant increase in queuing on the right turn / U-turn from Yaamba Road south approach. Whilst contained within the existing turn lane length this has the potential to impede northbound through traffic flow due to right turning vehicles commencing deceleration within the through lane.
- Access Scenario 2 results in similar extent of queuing within the right turn / U-turn lane on Yaamba Road south approach as the Base Case. Whilst not indicative in the analysis results the removal of significant U-turn movements (when compared to Access Scenario 1) reduces conflicts with left turning traffic from Farm Street east. This indicates that provision of direct right turns from Yaamba Road into the southern site access could be considered an effective impact-mitigating measure.

Table 7.2: Summary of Sidra Outputs – 2027 (Yaamba Road / Farm Street Signalised Intersection)

| Case                 | Degree of Saturation (%) | Intersection Delay (Average / Worst) | Yaamba Rd Through Movement Average Delays (sec) |             | 95 <sup>th</sup> Percentile Critical Queue (m) |      |       |      |
|----------------------|--------------------------|--------------------------------------|-------------------------------------------------|-------------|------------------------------------------------|------|-------|------|
|                      |                          |                                      | North-bound                                     | South-bound | South                                          | East | North | West |
| Weekday AM Peak Hour |                          |                                      |                                                 |             |                                                |      |       |      |
| Base Case            | 90.3                     | 47 / 87                              | 13                                              | 67          | 94                                             | 115  | 256   | 75   |
| Project – Scenario 1 | 90.3                     | 48 / 87                              | 16                                              | 67          | 111                                            | 115  | 263   | 77   |
| Project – Scenario 2 | 90.3                     | 47 / 87                              | 15                                              | 67          | 107                                            | 115  | 263   | 77   |
| Weekday PM Peak Hour |                          |                                      |                                                 |             |                                                |      |       |      |
| Base Case            | 90.1                     | 41 / 85                              | 8                                               | 68          | 67                                             | 76   | 215   | 108  |
| Project – Scenario 1 | 90.1                     | 42 / 87                              | 8                                               | 68          | 143                                            | 76   | 233   | 108  |
| Project – Scenario 2 | 90.1                     | 41 / 87                              | 8                                               | 68          | 77                                             | 76   | 233   | 108  |
| Saturday Peak Hour   |                          |                                      |                                                 |             |                                                |      |       |      |
| Base Case            | 90.1                     | 38 / 86                              | 2                                               | 68          | 57                                             | 43   | 224   | 76   |
| Project – Scenario 1 | 90.1                     | 39 / 88                              | 2                                               | 68          | 123                                            | 50   | 241   | 76   |
| Project – Scenario 2 | 90.1                     | 38 / 88                              | 2                                               | 68          | 63                                             | 50   | 241   | 76   |

Scenario 1 = no right turn into southern site access (left-in / left-out only).

Scenario 2 = signalised right turn into southern site access.

## 7.5. Analysis of Yaamba Road / Northern Site Access Intersection

### 7.5.1. Turn Warrant Assessment

A turn lane warrant analysis has been undertaken in accordance with DTMR's 'Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersection (Sep 2020)' based on the estimated 2037 peak hour volumes at the site access.

Table 7.3 details the parameters and turn lane treatment types required at the proposed development site access. The assessment indicates that a full-length left turn lane (Type AUL) treatment is warranted.

The configuration at the existing site access includes a Type AUL (full length left turn lane) treatment. It is recommended that this arrangement be retained but works are undertaken to modify the existing pavement marking on Yaamba Road to include provision of a shared turn lane / cycle lane consistent with the treatments that have been installed on Yaamba Road at adjacent intersections and property accesses. Colliers drawing number 19BRT0086-19A (**Appendix B**) depicts the recommended arrangements.

Table 7.3: Turn Lane Warrant Assessment – Yaamba Road / Northern Site Access Intersection

| AM Peak Hour               |                |           | PM Peak Hour   |                |           | SAT Peak Hour  |                |           |
|----------------------------|----------------|-----------|----------------|----------------|-----------|----------------|----------------|-----------|
| Left Turn into Site Access |                |           |                |                |           |                |                |           |
| Q <sub>M</sub>             | Q <sub>L</sub> | Treatment | Q <sub>M</sub> | Q <sub>L</sub> | Treatment | Q <sub>M</sub> | Q <sub>L</sub> | Treatment |
| 726                        | 92             | AUL       | 602            | 205            | AUL       | 562            | 200            | AUL       |



## 7.5.2. SIDRA Analysis

The site access intersection has been analysed for the 2037 peak hour volumes, under the two potential southern site access scenarios, using SIDRA 10 analysis software.

The two potential southern site access scenarios assessed include:

- **Scenario 1:** includes a left-in / left-out southern site access i.e. no direct right turns into the site access with all such traffic demands being applied to the southbound U-turn movement at the Farm Street intersection.
- **Scenario 2:** includes a signalised direct right turn into the southern site access i.e. no additional southbound U-turn demands at Farm Street intersection.

Table 7.4 summarises the analysis outputs for the left turn out of the site access under the 2037 design year traffic demands for access Scenarios 1 and 2. Detailed analysis output summaries are presented in **Appendix D**.

The analysis indicates that all movements would operate well within acceptable limits with the highest average delay being 5-seconds and 95<sup>th</sup> percentile queue length being 4m (or 1 vehicle length).

Table 7.4: Summary of Sidra Outputs – 2037 (Yaamba Road / Northern Site Access Intersection)

| Case                 | Degree of Saturation (%) | Average / Worst Delay (sec) | 95 <sup>th</sup> Percentile Critical Queue (m) |      |       |      |
|----------------------|--------------------------|-----------------------------|------------------------------------------------|------|-------|------|
|                      |                          |                             | South                                          | East | North | West |
| Weekday AM Peak Hour |                          |                             |                                                |      |       |      |
| Project – Scenario 1 | 6.7                      | 5                           | -                                              | 2    | -     | -    |
| Project – Scenario 2 | 6.6                      | 5                           | -                                              | 2    | -     | -    |
| Weekday PM Peak Hour |                          |                             |                                                |      |       |      |
| Project – Scenario 1 | 12.8                     | 4                           | -                                              | 4    | -     | -    |
| Project – Scenario 2 | 12.8                     | 4                           | -                                              | 4    | -     | -    |
| Saturday Peak Hour   |                          |                             |                                                |      |       |      |
| Project – Scenario 1 | 11.8                     | 3                           | -                                              | 4    | -     | -    |
| Project – Scenario 2 | 11.7                     | 3                           | -                                              | 4    | -     | -    |

Scenario 1 = no right turn into northern site access (left-in / left-out only).

Scenario 2 = signalised right turn into northern site access.

## 7.6. Analysis of Yaamba Road / Southern Site Access Intersection

### 7.6.1. Turn Warrant Assessment

A turn lane warrant analysis has been undertaken in accordance with DTMR's 'Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersection (Sep 2020)' based on the estimated 2037 peak hour volumes at the site access.

Table 7.5 details the parameters and turn lane treatment types required at the proposed development site access. The assessment indicates that full-length left turn (Type AUL) and full-length right turn (Type CHR) lane treatments are warranted.

Table 7.5: Turn Lane Warrant Assessment – Yaamba Road / Southern Site Access Intersection

| AM Peak Hour                |                |           | PM Peak Hour   |                |           | SAT Peak Hour  |                |           |
|-----------------------------|----------------|-----------|----------------|----------------|-----------|----------------|----------------|-----------|
| Left Turn into Site Access  |                |           |                |                |           |                |                |           |
| Q <sub>M</sub>              | Q <sub>L</sub> | Treatment | Q <sub>M</sub> | Q <sub>L</sub> | Treatment | Q <sub>M</sub> | Q <sub>L</sub> | Treatment |
| 735                         | 19             | AUL       | 625            | 41             | AUL       | 580            | 49             | AUL       |
| Right Turn into Site Access |                |           |                |                |           |                |                |           |
| Q <sub>M</sub>              | Q <sub>R</sub> | Treatment | Q <sub>M</sub> | Q <sub>R</sub> | Treatment | Q <sub>M</sub> | Q <sub>R</sub> | Treatment |
| 2057                        | 58             | CHR       | 1960           | 139            | CHR       | 1851           | 141            | CHR       |

### 7.6.2. SIDRA Analysis

The site access intersection has been analysed for the 2037 peak hour volumes, under two potential southern site access scenarios, using SIDRA 10 analysis software.

The two potential southern site access scenarios assessed include:

- **Scenario 1:** includes a left-in / left-out southern site access i.e. no direct right turns into the site access with all such traffic demands being applied to the southbound U-turn movement at the Farm Street intersection.
- **Scenario 2:** includes a signalised direct right turn into the southern site access i.e. no additional southbound U-turn demands at Farm Street intersection.

Table 7.6 summarises the analysis outputs for the 2037 design year. Detailed analysis output summaries are presented in **Appendix D**.

Key findings of the analysis are as follows:

- Both Access Scenarios would operate at acceptable levels of performance.
- Access Scenario 1 (left-in / left-out only) has the least impact on through traffic flows on Yaamba Road.
- Access Scenario 2 (signalised southbound and right turn into access) results in minor average delays on through traffic flow (maximum of 7-seconds during the weekday PM peak hour).

- Noting that Access Scenario 1 results in significant impacts at the Farm Street intersection it is concluded that Access Scenario 2 is the optimum performance access arrangement.

Table 7.6: Summary of Sidra Outputs – 2037 (Yaamba Road / Southern Site Access Intersection)

| Case                 | Degree of Saturation (%) | Intersection Delay (Average / Worst) | Yaamba Rd Through Movement Average Delays (sec) |             | 95 <sup>th</sup> Percentile Critical Queue (m) |      |       |      |
|----------------------|--------------------------|--------------------------------------|-------------------------------------------------|-------------|------------------------------------------------|------|-------|------|
|                      |                          |                                      | North-bound                                     | South-bound | South                                          | East | North | West |
| Weekday AM Peak Hour |                          |                                      |                                                 |             |                                                |      |       |      |
| Project – Scenario 1 | 40.8                     | 1 / 7                                | 0                                               | 0           | 0                                              | 7    | 0     | -    |
| Project – Scenario 2 | 50.5                     | 3 / 68                               | 0                                               | 3           | 26                                             | 12   | 113   | -    |
| Weekday PM Peak Hour |                          |                                      |                                                 |             |                                                |      |       |      |
| Project – Scenario 1 | 52.5                     | 1 / 7                                | 0                                               | 0           | 0                                              | 21   | 0     | -    |
| Project – Scenario 2 | 53.1                     | 6 / 41                               | 0                                               | 7           | 44                                             | 70   | 117   | -    |
| Saturday Peak Hour   |                          |                                      |                                                 |             |                                                |      |       |      |
| Project – Scenario 1 | 48.5                     | 1 / 6                                | 0                                               | 0           | 0                                              | 19   | 0     | -    |
| Project – Scenario 2 | 50.1                     | 5 / 38                               | 0                                               | 3           | 43                                             | 74   | 56    | -    |

Scenario 1 = no right turn into northern site access (left-in / left-out only).

Scenario 2 = signalised right turn into northern site access.

## 7.7. Analysis of Yaamba Rd / Macartney St Intersection

### 7.7.1. Turn Warrant Assessment

A turn lane treatment warrant analysis has been undertaken in accordance with DTMR's 'Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersection (Sep 2020)' to determine if the proposed development traffic demands warrant a change to the existing left turn treatment on Yaamba Road. It is currently constructed with a Type BAL (basic left turn) treatment.

Table 7.7 details the parameters and turn lane treatment types required at the proposed development site access based on the estimated 2027 base and project scenario peak hour traffic volumes.

The assessment indicates that the base case volumes would warrant a Type AUL(s) treatment (short left turn lane) whilst the project case warrants a Type AUL treatment (full length left turn lane).

Table 7.7: Turn Lane Warrant Assessment – Yaamba Road / Macartney Street Intersection

| Case    | AM Peak Hour   |                |           | PM Peak Hour   |                |           | SAT Peak Hour  |                |           |
|---------|----------------|----------------|-----------|----------------|----------------|-----------|----------------|----------------|-----------|
|         | Q <sub>M</sub> | Q <sub>L</sub> | Treatment | Q <sub>M</sub> | Q <sub>L</sub> | Treatment | Q <sub>M</sub> | Q <sub>L</sub> | Treatment |
| Base    | 649            | 20             | AUL(s)    | 544            | 8              | AUL(s)    | 505            | 5              | AUL(s)    |
| Project | 701            | 48             | AUL       | 680            | 81             | AUL       | 640            | 77             | AUL       |



## 7.7.2. SIDRA Analysis

The existing intersection configuration has been analysed for the 2027 peak hour periods using SIDRA 10 analysis software. Table 7.8 summarises the analysis outputs and detailed analysis output summaries are presented in **Appendix D**.

The analysis indicates that the proposed development would have an insignificant and negligible impact on the performance of the intersection with marginal increase in degree of saturation, average delay, and queuing. No mitigating upgrade works are required at the intersection as a consequence of the proposed development.

Table 7.8: Summary of Sidra Outputs - 2027 (Yaamba Road / Macartney Street Intersection)

| Case                 | Degree of Saturation | Average/<br>Worst Delay<br>(sec) | 95th Percentile Critical Queue (m) |       |
|----------------------|----------------------|----------------------------------|------------------------------------|-------|
|                      |                      |                                  | East                               | North |
| Weekday AM Peak Hour |                      |                                  |                                    |       |
| Base Case            | 36.7                 | 1 / 10                           | 2                                  | 0     |
| Project Case         | 40.4                 | 1 / 11                           | 2                                  | 0     |
| Weekday PM Peak Hour |                      |                                  |                                    |       |
| Base Case            | 31.3                 | 1 / 9                            | 1                                  | 0     |
| Project Case         | 40.0                 | 1 / 10                           | 1                                  | 0     |
| Saturday Peak Hour   |                      |                                  |                                    |       |
| Base Case            | 29.6                 | 1 / 8                            | 1                                  | 0     |
| Project Case         | 36.8                 | 1 / 9                            | 1                                  | 0     |

## 7.8. Analysis of Yaamba Road / Richardson Road Intersection

### 7.8.1. SIDRA Analysis

The existing intersection configuration has been analysed for the 2027 weekday PM peak hour period using SIDRA 10 analysis software using existing signal phasing. Cycle and phase times were determined by SIDRA based on delay optimised analysis method as per the analysis of the Farm Street intersection (refer Section 7.5.1 for commentary). Table 7.9 summarises the analysis outputs and detailed analysis output summaries are presented in **Appendix D**.

The analysis indicates that the proposed development would generally have a minor impact on the performance of the intersection with marginal increase in degree of saturation and tolerable increase in average delay.

However, the 95<sup>th</sup> percentile queue length on the right turn lane on Yaamba Road north approach reaches 114m due to the proposed development, which exceeds the 85m queue length capacity of the turn lane.

Therefore, the existing right turn lane is required to be extended to mitigate the impact of the development.

Table 7.9: Summary of Sidra Outputs - 2027 (Yaamba Road / Richardson Road Signalised Intersection)

| Case                 | Degree of Saturation | Average/<br>Worst Delay | Level of Service | 95th Percentile Critical Queue (m) |      |       |      |
|----------------------|----------------------|-------------------------|------------------|------------------------------------|------|-------|------|
|                      |                      |                         |                  | South                              | East | North | West |
| Weekday AM Peak Hour |                      |                         |                  |                                    |      |       |      |
| Base Case            | 90.1                 | 39 / 79                 | D                | 190                                | 122  | 101   | 102  |
| Project Case         | 90.1                 | 39 / 79                 | D                | 193                                | 122  | 105   | 105  |
| Weekday PM Peak Hour |                      |                         |                  |                                    |      |       |      |
| Base Case            | 90.6                 | 41 / 81                 | D                | 222                                | 113  | 63    | 84   |
| Project Case         | 90.8                 | 42 / 81                 | D                | 231                                | 113  | 134   | 88   |
| Saturday Peak Hour   |                      |                         |                  |                                    |      |       |      |
| Base Case            | 90.4                 | 41 / 82                 | D                | 224                                | 82   | 22    | 69   |
| Project Case         | 90.6                 | 40 / 82                 | D                | 232                                | 80   | 95    | 71   |

Note: South & North approaches queue length refers to right turn / U-turn lane.

## 8. Intersection Delay Assessment

In accordance with DTMR's Guide to Traffic Impact Assessment (GTIA) an aggregate average delay analysis has been undertaken for the state-controlled road network extending from the Farm Street intersection to the Richardson Road intersection.

The analysis identifies the change in total average delay to Base Case (without proposed development) traffic demands within the study area due to the proposed development.

Importantly, the two site access scenarios have been assessed for the Project Case (with proposed development) to clearly identify and compare the impacts of the two scenarios.

Detailed average delay calculations are presented in **Appendix E**.

Table 8.1 summarises the overall aggregate average delays under the Base Case and the two Project Cases.

The analysis indicates that Access Scenario 1 (left-in / left-out southern site access) would result in an 1.9% increase in aggregate average delay. DTMR's GTIA identifies that where aggregate delays exceed 5% increase of Base Case delays impact mitigating works should be undertaken.

The analysis indicates that Access Scenario 2 (signalised right-in / left-in / left-out southern site access) would result in a 1.5% decrease in aggregate average delay indicating that provision of this access arrangement effectively mitigates the impacts of the development if its site access were to be restricted to left-in / left-out.

It is therefore concluded that a signalised southern site access, incorporating direct right turns from Yaamba Road into the site, is the superior site access arrangement.

**Table 8.1: Aggregate Average Delay Calculations Summary**

| Case                                                                                       | Aggregate Delay<br>(vehicle-minutes) | Percent Change<br>from Base Case |
|--------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|
| Base Case                                                                                  | 13,615                               |                                  |
| Project Case Scenario 1<br>(left-in / left-out southern site access)                       | 13,870                               | 1.9%                             |
| Project Case Scenario 2<br>(signalised right-in / left-in / left-out southern site access) | 13,410                               | -1.5%                            |



## 9. Road Safety Risk Assessment

A road safety risk assessment has been undertaken for state-controlled intersections within the study area to identify road safety issues associated with the existing conditions, the impacts of the proposed development, and mitigation measures. The detailed risk assessment is presented in **Appendix F**.

The following summarises the key issues and recommended mitigation measures:

- Yaamba Road / Farm Street intersection:
  - If site access is restricted to left-in / left-out (i.e. no direct right turn from Yaamba Road into the site) additional U-turning traffic at the intersection would increase the safety risk of rear-end and angle collisions.
  - Provision of a direct right turn into the site from Yaamba Road would effectively mitigate this safety impact.
- Yaamba Road / Southern Site Access intersection:
  - A priority-controlled right turn movement from Yaamba Road into the site access would result in a high safety risk associated with potential angle collisions.
  - Full signal control of the right turn movement from Yaamba Road into the site access and the southbound movements on Yaamba Road would mitigate this safety impact.
  - The existing Type AUL(s) short left turn treatment on Yaamba Road should be extended to a Type AUL full-length left turn treatment due to the increased left turning volume from Yaamba Road into the site access.
- Yaamba Road / Macartney Street intersection:
  - The existing Type BAL basic left turn treatment is insufficient for existing traffic volumes which warrant provision of a Type AUL(s) short left turn treatment. The additional traffic volumes associated with the development warrant provision of a Type AUL full-length left turn treatment. However, it is noted that the separation distance between the intersection and the developments southern site access limits the provision to a Type AUL(s) short left turn treatment.
- Yaamba Road / Richardson Road intersection:
  - Additional demand on the Yaamba Road northern approach right turn / U-turn lane due to the development will result in queuing extending out of the existing turn lane length resulting in increased risk of rear-end collisions.
  - Extension of the existing lane to accommodate the design queue length, plus deceleration length, would mitigate this safety impact.

## 10. Proposed Road Upgrades

Based on the results of the traffic impact assessment, including consideration of safety, delay and performance analysis as documented herein, it is recommended that the following site access arrangements and external road upgrade work be undertaken as part of the development. The preliminary functional layout plan presented in Colliers drawing 19BRT0086-19A (**Appendix B**) depicts the recommended concept design.

- Yaamba Road northern site access restricted to left-in / left-out movements with the existing Type AUL full-length left turn treatment on Yaamba Road retained with provision of a shared left turn / cycle lane treatment.
- Yaamba Road southern site access restricted to right-in / left-in / left out movements incorporating the following:
  - Full signal control of the right turn movement and southbound movements on Yaamba Road (i.e. no filter right turn). The northbound through movements on Yaamba Road to be unsignalised.
  - Provision of a Type CHR full-length right turn lane to be constructed within the existing central median on Yaamba Road having a total length of 135m including 45m design queue length and 90m deceleration length.
  - Provision of a Type AUL full-length left turn lane on Yaamba Road having a total length of 120m including 20m design queue length (AV) and 100m deceleration length.
  - The existing bus stop on Yaamba Road, located in between the two site accesses, to be retained in its current location. This places the bus stop within the above-mentioned left turn deceleration lane.
  - Provision of a shared left turn / cycle lane treatment.
  - Provision of a high angle entry left turn slip lane on the site access for left turns from the site onto Yaamba Road.
  - Provision of pedestrian-actuated signal controlled crossings of the site access entry and exit. The crossing of the left turn slip lane is to include amber-red signal control aspects for vehicles exiting the site.
- Yaamba Road / Macartney Street intersection to be upgraded to include a Type AUL(s) short left turn treatment on Yaamba Road and a 1 shared left turn / cycle lane treatment. It is acknowledged that the 'with development' traffic volumes warrant a Type AUL full-length left turn treatment, however, provision of the full-length is not possible due to the proximity of the southern site access.
- Yaamba Road / Richardson Road intersection to be upgraded to include an extended right turn / U-turn lane on the Yaamba Road northern approach. The required length of lane is 234m including 134m design queue length and 100m deceleration length.

## 11. Safety Assessment of Proposed Design

The following safety assessment is provided to address the road safety risks associated with the recommended / proposed site access and road upgrade design as depicted in Colliers drawing 19BRT0086-19A (**Appendix B**).

- Direct right turn from Yaamba Road into southern site access:
  - The proposed full signal control of the right turn movement provides the highest level of control and mitigation of potential angle collisions and pedestrian movement along the Yaamba Road site frontage.
  - The proposed right turn lane length provides adequate storage and deceleration length in accordance with standards to minimise risk of rear-end collisions.
- Left turn deceleration lane length on Yaamba Road for southern site access:
  - The design provides for a Type AUL full-length left turn lane with the existing bus stop being retained within this lane length. There is potential for conflict between buses leaving the stop and vehicles entering the left turn lane.
  - However, the likelihood of this potential conflict occurring is low due to the low frequency of buses potentially stopping. Current bus services that potentially use this stop include:
    - Route 20 which operates approximately half-hourly during weekday peak hours and 2-3 hourly on weekends;
    - Route 410 which operates hourly on weekdays.
  - The proposed design provides separation from the bus stop equivalent to a Type AUL(s) short left turn treatment which allows for a vehicle to enter the left turn lane if a bus is stopped at the bus stop.
  - It is noted that an alternative location for the bus stop, if the current design is deemed inappropriate by the assessing authorities, is to the north of the existing left turn deceleration lane for the northern site access (south of the Farm Street intersection).
- Left turn deceleration lane length on Yaamba Road for the Macartney Street intersection:
  - Due to the proximity of the southern site access provision of a full-length left turn lane is not physically possible. The design therefore includes a Type AUL(s) short left turn treatment with separated cycle lane.
  - The lack of full-length deceleration is unlikely to result in increased safety risk because:
    - The majority of additional left turning traffic using this lane would have just exited the southern site access whereby these vehicles are required to give-way to southbound through traffic and



thereby require safe gaps in the southbound traffic flow. It follows that the likelihood of the ensuing interaction between left turning and through vehicles would be low.

- It is important to acknowledge that under existing traffic demands a Type AUL(s) short left turn treatment is warranted and the provision of such a treatment is a significant improvement in terms of safety risk.
- Right turn lane on Yaamba Road northern approach to Richardson Road intersection:
  - The proposed right turn lane length provides adequate storage and deceleration length in accordance with standards to minimise risk of rear-end collisions.

It is concluded that the proposed site access arrangements and road upgrade design does not present any significant new safety risks.

## 12. Summary and Conclusions

### 12.1. Proposed Development

The development seeks approval for a shop and showroom development comprising a supermarket with associated specialty retail tenancy (liquor store), and a showroom. The existing retail warehouse development on the site (previously occupied by Bunnings) will be effectively retained.

### 12.2. Car Parking Arrangements

A total of 283 car parking spaces is proposed for the development with the existing car parking area retained where possible with additional (new) parking spaces in select locations. The supply represents adequate and appropriate parking supply that exceeds the planning scheme acceptable outcome requirement (260 spaces).

The proposed car parking area layout satisfies Council's design standards and is suitable for the development.

### 12.3. Bicycle Parking Arrangements

Whilst the development plans do not indicate specific parking facilities there is opportunities for the provision of staff and visitor parking within the development. In accordance with Council requirements it is recommended that a total of 27 parking spaces, including 20 employee spaces and 14 visitor spaces, are provided.

### 12.4. Site Access Arrangements

Consistent with the currently approved site access arrangements (SARA/DTMR approval) two vehicular site accesses are proposed to service the commercial part of the development, including:

- A southern right-in / left-in / left-out access to Yaamba Road (reconfiguration of the existing left-in / left-out access).
- A northern left-in / left-out access to Yaamba Road (reconfiguration of the existing left-in-only access).

The accesses are designed and located generally in accordance with relevant standards.

A new pedestrian / cyclist site access is proposed to Yaamba Road.

### 12.5. Service Vehicle Arrangements

The proposed development design layout provides for all necessary service vehicles in accordance with Council requirements and the operational requirements of the development.

## 12.6. Traffic Impact Assessment

The following key conclusions are drawn from the assessment of the potential traffic impacts of the proposed development:

- The **Yaamba Rd / Farm St intersection** can accommodate the proposed development without adverse impacts subject to the provision of a direct right turn from Yaamba Road into the developments southern site access. This impact-mitigating arrangement removes the need for development traffic to undertake southbound U-turn movements at the Farm Street intersection which would otherwise consume intersection capacity and increase the safety risk associated with potential conflict between U-turns and left turns out of Farm Street east.
- The **Yaamba Rd / Northern Site Access** intersection is anticipated to operate safely and efficiently. The recommended left turn lane treatment on Yaamba Road is detailed in Colliers drawing number 19BRT0086-19A (**Appendix B**).
- The **Yaamba Rd / Southern Site Access** intersection is anticipated to operate safely and efficiently with the provision of right-in / left-in / left-out movements. Full signal control of the right turn and southbound movements on Yaamba Road is required. The recommended road upgrade and site access turn treatments are detailed in Colliers drawing number 19BRT0086-19A (**Appendix B**).
- The **Yaamba Rd / Macartney Street** intersection should be upgraded to incorporate a Type AUL(s) short left turn deceleration lane on the Yaamba Rd southbound approach as detailed in Colliers drawing number 19BRT0086-19A (**Appendix B**).
- The **Yaamba Rd / Richardson Rd** intersection should be upgraded to incorporate a 214m long right turn lane on the Yaamba Rd northern approach as detailed in Colliers drawing number 19BRT0086-19A (**Appendix B**).



## 13. Traffic Impact Assessment Certification

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

- I am satisfied that all submitted components comprising the traffic impact assessment as documented herein have been completed in accordance with the *Guide to Traffic Impact Assessment* published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and
- the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that
- I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

A handwritten signature in black ink, appearing to read "D. Grummitt", with a stylized, cursive script.

David Grummitt | RPEQ (19356) MIEAust NER  
Director

Colliers International Engineering and Design (TTMC) Pty Ltd

Email: [david.grummitt@colliers.com](mailto:david.grummitt@colliers.com)

3 November 2025

## Appendix A    Development Plans

GFA SCHEDULE

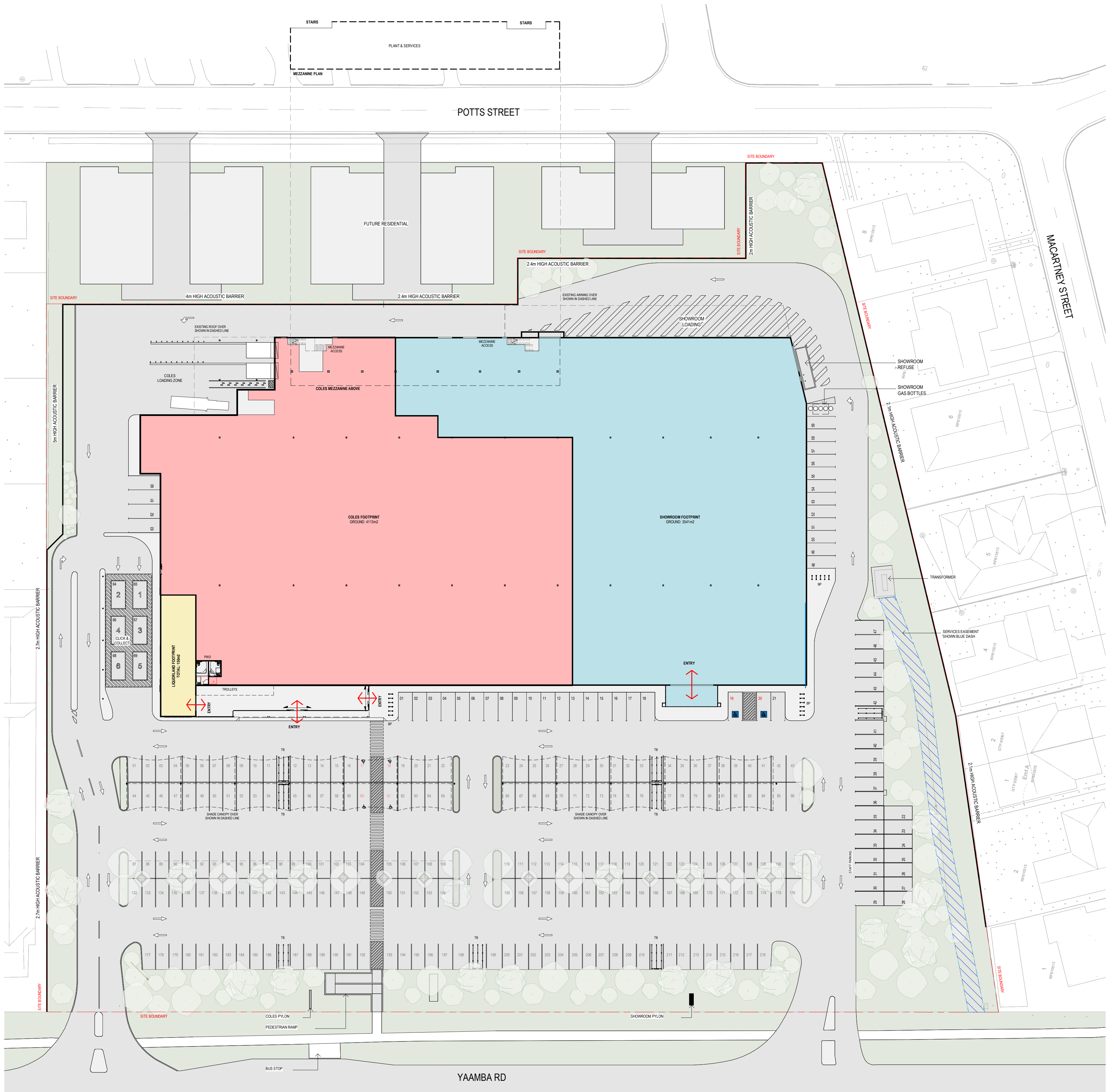
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|----------------------|---------|
| COLES SUPERMARKET    | 4113    |
| SHOWROOM             | 3541    |
| LIQUORLAND           | 150     |
| AMENITIES            | 17      |
| TOTAL PROPOSED GFA : | 7821 m2 |
| TOTAL EXISTING GFA : | 7923 m2 |

CAR PARK SCHEDULE

|                           |     |
|---------------------------|-----|
| EXISTING STANDARD CARPARK | 214 |
| EXISTING DISABLED CARPARK | 4   |
| TOTAL EXISTING CARPARKS : | 218 |
| NEW STANDARD CARPARK      | 57  |
| NEW DISABLED CARPARK      | 2   |
| NEW CLICK & COLLECT       | 6   |
| NEW HD VAN CARPARKS       | 4   |
| TOTAL PROPOSED CARPARKS : | 69  |
| TOTAL CARPARKS :          | 287 |

CARPARK RATIO

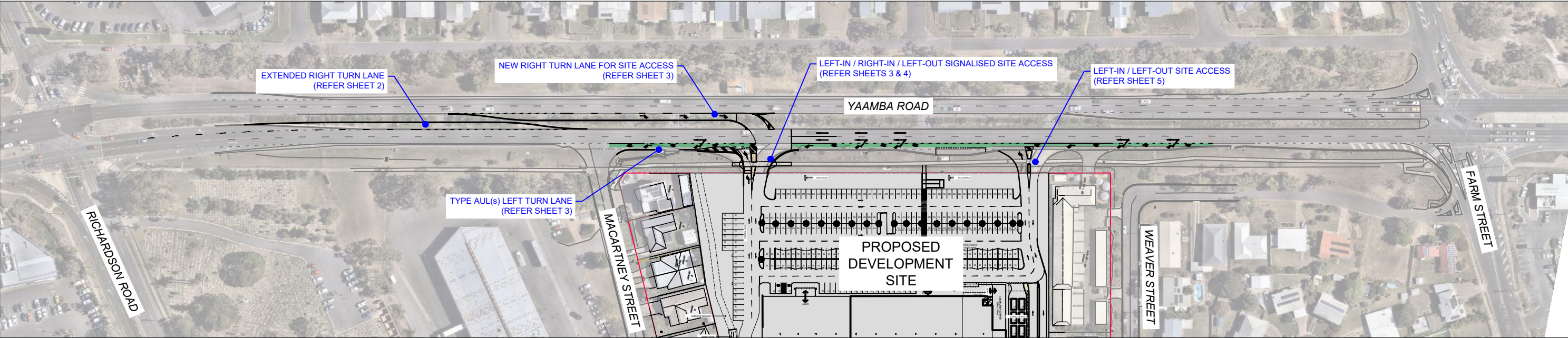
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|-------------------------|------|
| NUM. OF CARS PER 100 m2 | 3.66 |
|-------------------------|------|







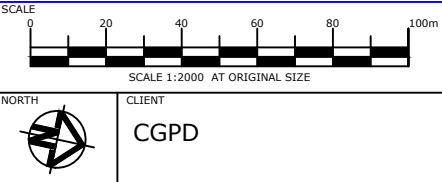
## Appendix B     Colliers Drawings



  
DAVID GRUMMITT

DIRECTOR  
RPEQ 19356  
APPROVED 23 Oct 2025

| REV. | DATE     | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
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CLIENT

CGPD

|               |                                                                                         |
|---------------|-----------------------------------------------------------------------------------------|
| PROJECT       | 452 YAAMBA ROAD, NORMAN GARDENS                                                         |
| DRAWING TITLE | PRELIMINARY FUNCTIONAL LAYOUT PLAN<br>SITE ACCESS & EXTERNAL ROAD WORKS<br>CONTEXT PLAN |

|                |              |               |        |
|----------------|--------------|---------------|--------|
| PROJECT NUMBER | 19BRT00086   | ORIGINAL SIZE | A3     |
| DRAWING NUMBER | 19BRT0086-19 | REVISION      | A      |
| DATE           | 23 Oct 2025  | SHEET         | 1 OF 7 |





EXTENDED RIGHT TURN LANE TO RICHARDSON ROAD  
SIGNALISED INTERSECTION  
Design speed = 80kph  
Longitudinal grade = 2.0% downgrade (approx.)  
Deceleration length (80-0kph, 2.5m/s<sup>2</sup>) = 100m  
Grade correction factor = 1.0  
Corrected Deceleration length = 100m  
Storage length (SIDRA 95th %ile queue) = 134m  
Lane width = 3.5m  
Taper length = 25m

REFER SHEET 3 FOR CONTINUATION

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|      |          |                       |       |         |          |
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SCALE

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NORTH

CLIENT

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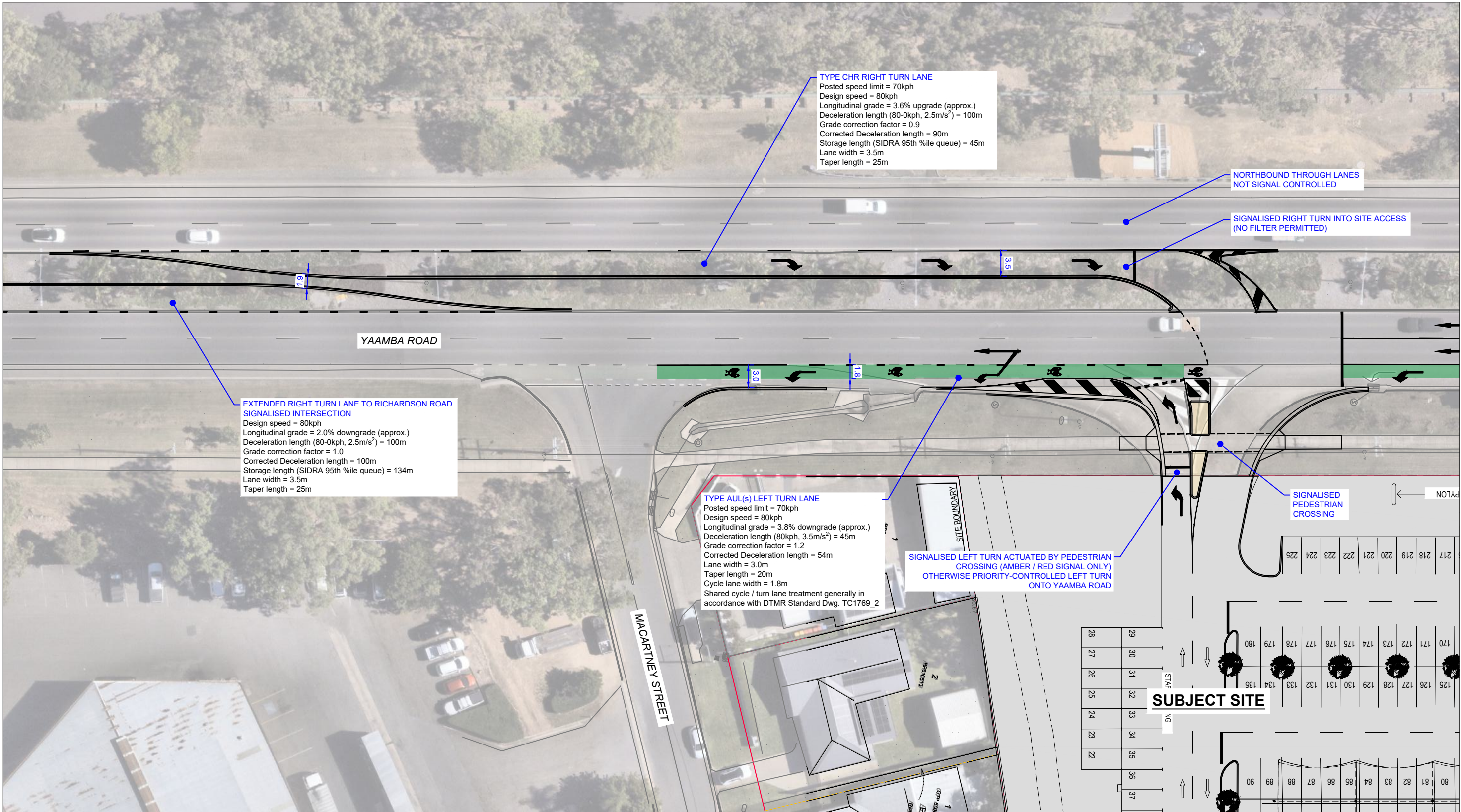
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|---------------|---------------------------------------------------------------------------------------------------------------------------|----------------|--------------|---------------|--------|
| PROJECT       | 452 YAAMBA ROAD, NORMAN GARDENS                                                                                           | PROJECT NUMBER | 19BRT00086   | ORIGINAL SIZE | A3     |
| DRAWING TITLE | PRELIMINARY FUNCTIONAL LAYOUT PLAN<br>RIGHT TURN LANE EXTENSION<br>YAAMBA RD NORTH APPROACH TO RICHARDSON RD INTERSECTION | DRAWING NUMBER | 19BRT0086-19 | REVISION      | A      |
|               |                                                                                                                           | DATE           | 23 Oct 2025  | SHEET         | 2 OF 7 |



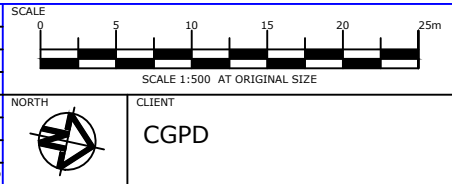
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DIRECTOR

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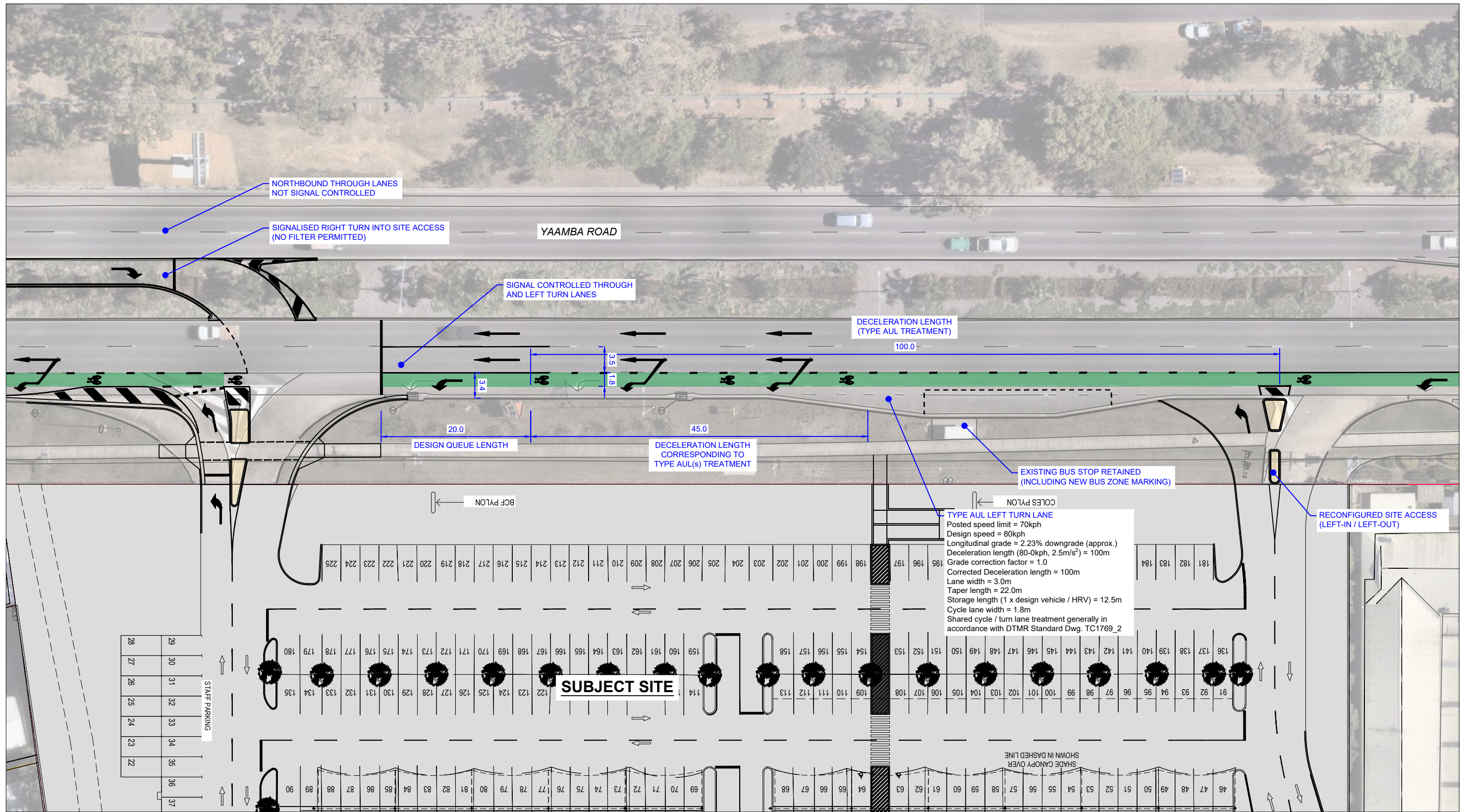
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| DRAWING TITLE | PRELIMINARY FUNCTIONAL LAYOUT PLAN<br>YAAMBA RD SOUTHERN SITE ACCESS &<br>YAAMBA RD NORTH APPROACH TO MACARTNEY ST INTERSECTION |

|                |              |               |        |
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| PROJECT NUMBER | 19BRT00086   | ORIGINAL SIZE | A3     |
| DRAWING NUMBER | 19BRT0086-19 | REVISION      | A      |
| DATE           | 23 Oct 2025  | SHEET         | 3 OF 7 |



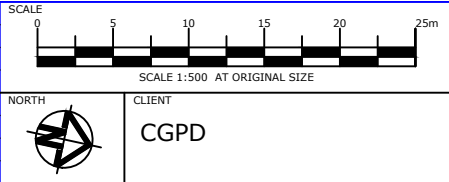
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APPROVED 23 Oct 2025  
DIRECTOR  
RPEQ 19356

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|               |                                                                        |
|---------------|------------------------------------------------------------------------|
| PROJECT       | 452 YAAMBA ROAD, NORMAN GARDENS                                        |
| DRAWING TITLE | PRELIMINARY FUNCTIONAL LAYOUT PLAN<br>YAAMBA RD NORTHERN SITE FRONTAGE |

|                |              |               |        |
|----------------|--------------|---------------|--------|
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| DRAWING NUMBER | 19BRT0086-19 | REVISION      | A      |
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RPEQ 19356  
APPROVED 23 Oct 2025

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NORTH



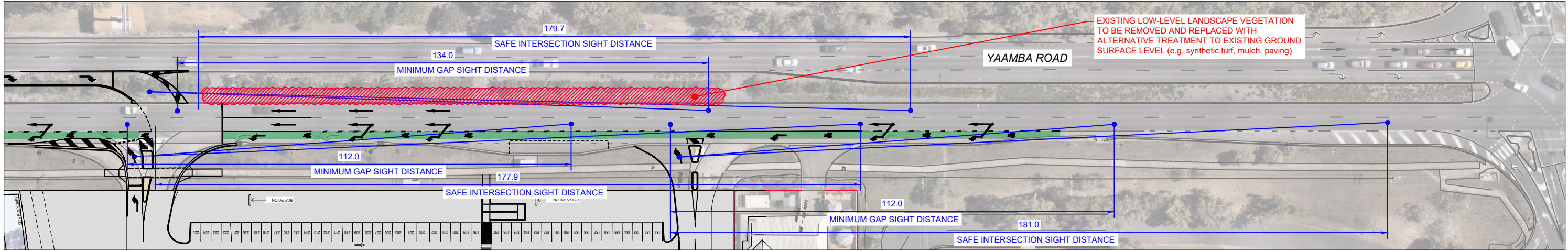
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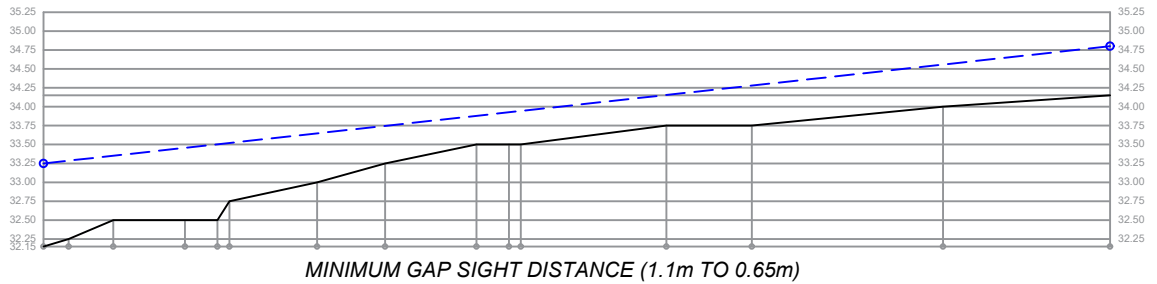
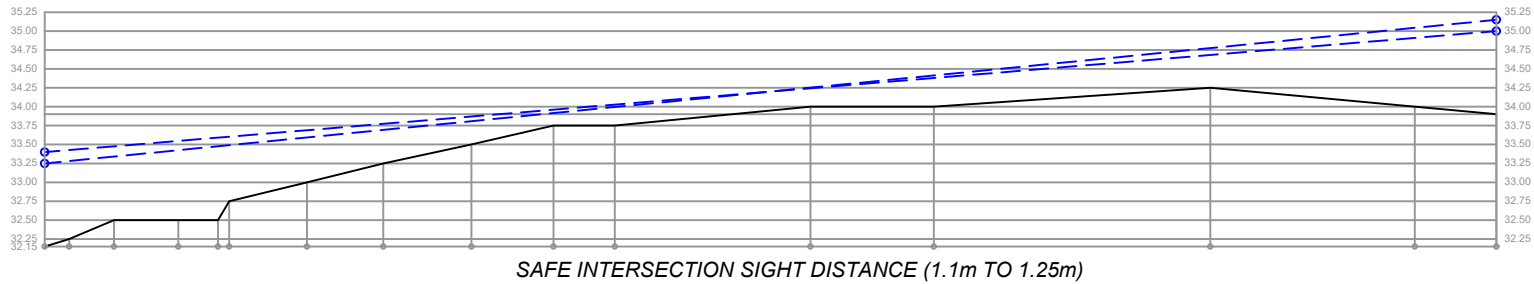
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|                                                                                              |                                |                     |
|----------------------------------------------------------------------------------------------|--------------------------------|---------------------|
| PROJECT<br><b>452 YAAMBA ROAD, NORMAN GARDENS</b>                                            | PROJECT NUMBER<br>19BRT00086   | ORIGINAL SIZE<br>A3 |
| DRAWING TITLE<br><b>PRELIMINARY FUNCTIONAL LAYOUT PLAN</b><br>YAAMBA RD NORTHERN SITE ACCESS | DRAWING NUMBER<br>19BRT0086-19 | REVISION<br>A       |
|                                                                                              | DATE<br>23 Oct 2025            | SHEET<br>5 OF 7     |

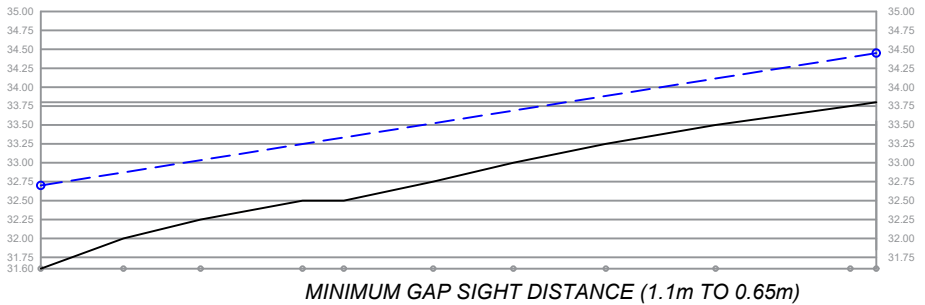
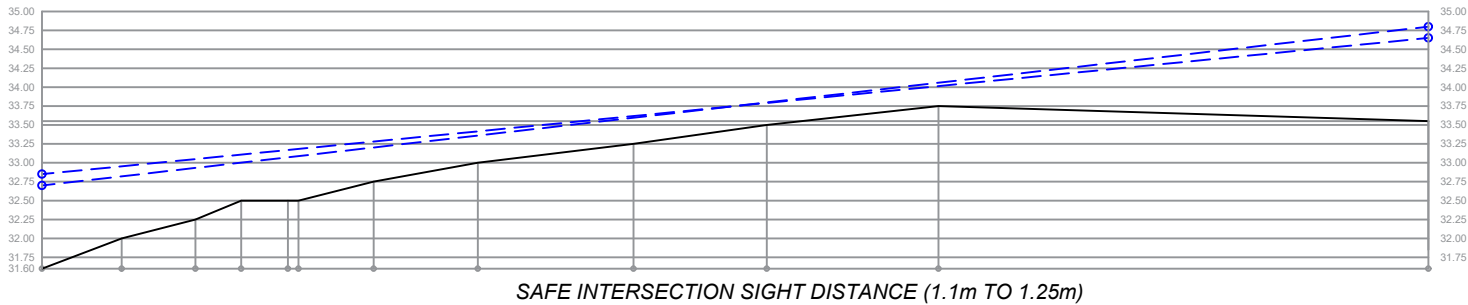




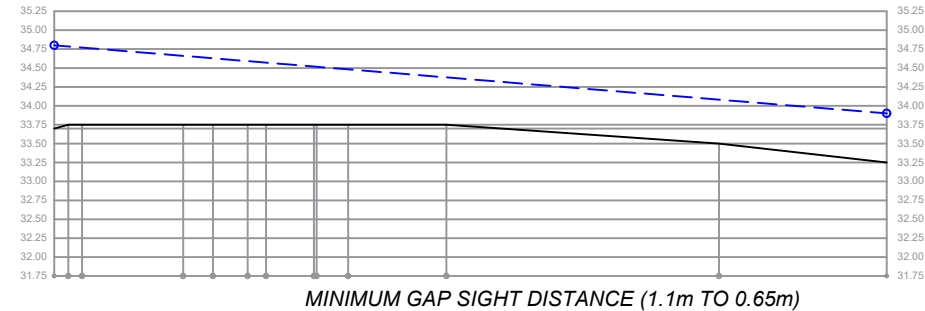
SOUTHERN SITE ACCESS - RIGHT TURN INTO ACCESS



SOUTHERN SITE ACCESS - LEFT TURN OUT OF ACCESS

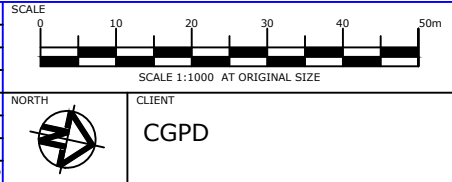


SOUTHERN SITE ACCESS - LEFT TURN OUT OF ACCESS



**DIRECTOR**  
DAVID GRUMMITT  
APPROVED 23 Oct 2025  
RPEQ 19356

| REV. | DATE     | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|------|----------|-----------------------|-------|---------|----------|
| A    | 23-10-25 | ORIGINAL ISSUE        | DG    | DG      | DG       |

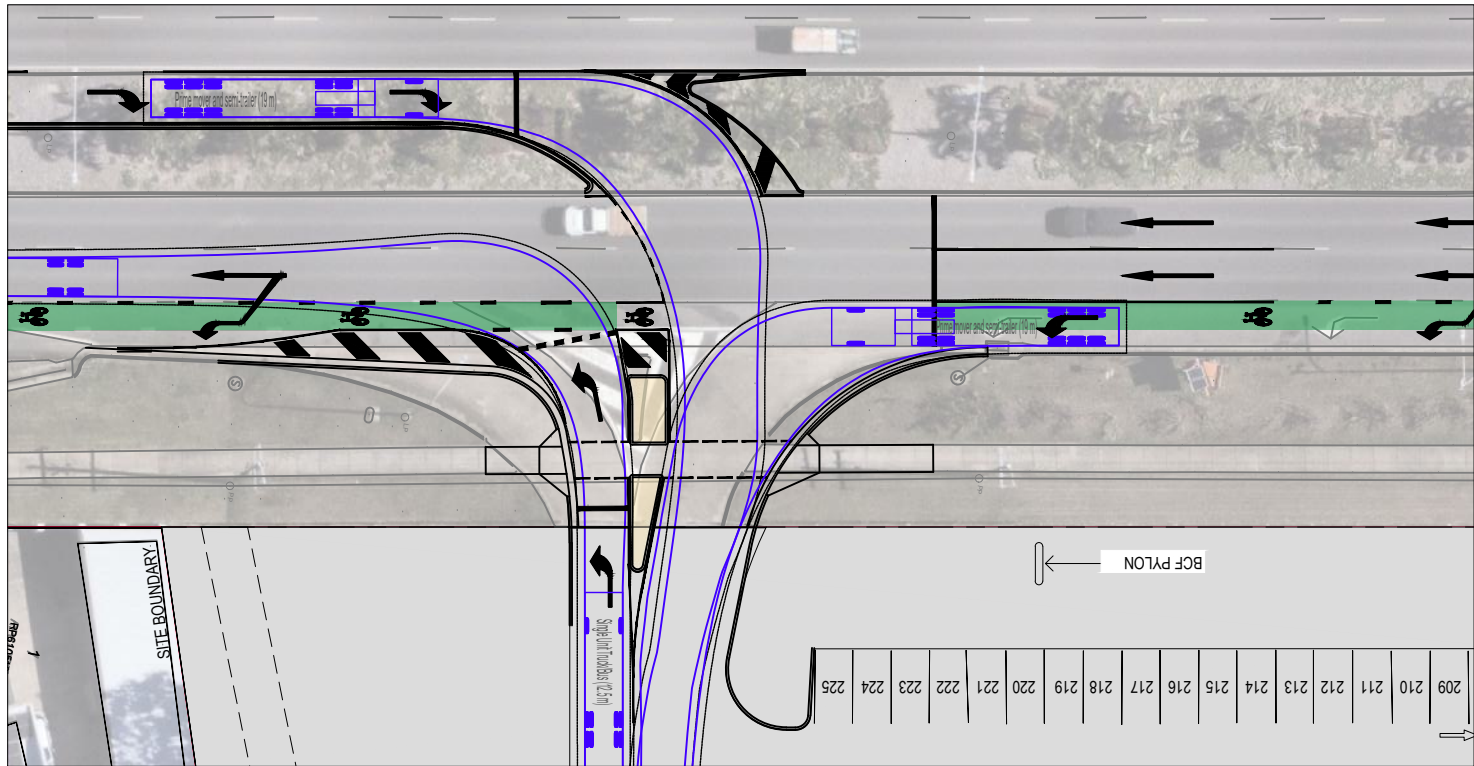


Colliers International Engineering  
& Design (TTMC) Pty Ltd  
ABN 65 010 868 621  
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000  
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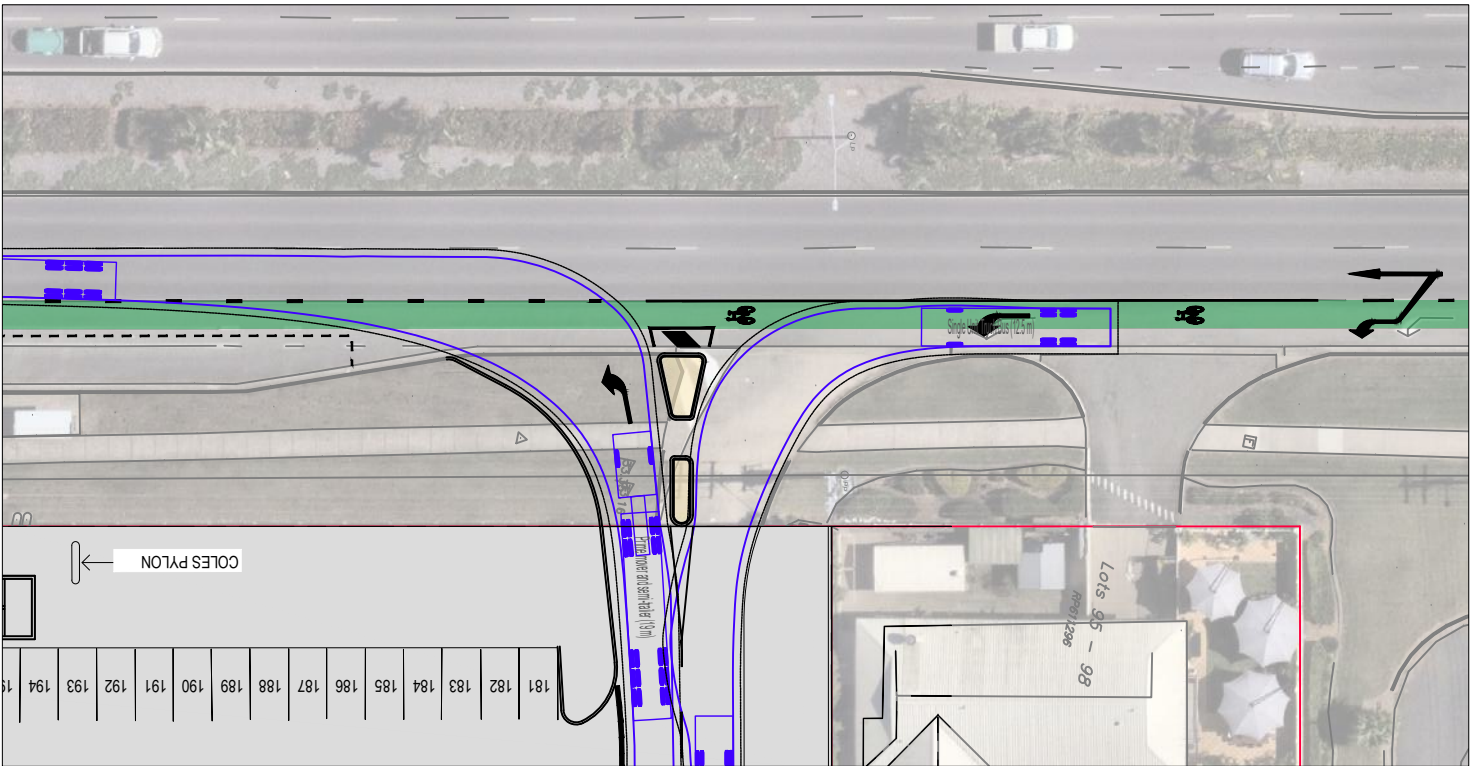
PROJECT  
**452 YAAMBA ROAD, NORMAN GARDENS**  
DRAWING TITLE  
**PRELIMINARY FUNCTIONAL LAYOUT PLAN**  
**SITE ACCESS MOTORIST SIGHT DISTANCE ANALYSIS**

|                                       |                            |
|---------------------------------------|----------------------------|
| PROJECT NUMBER<br><b>19BRT00086</b>   | ORIGINAL SIZE<br><b>A3</b> |
| DRAWING NUMBER<br><b>19BRT0086-19</b> | REVISION<br><b>A</b>       |
| DATE<br><b>23 Oct 2025</b>            | SHEET<br><b>6 OF 7</b>     |

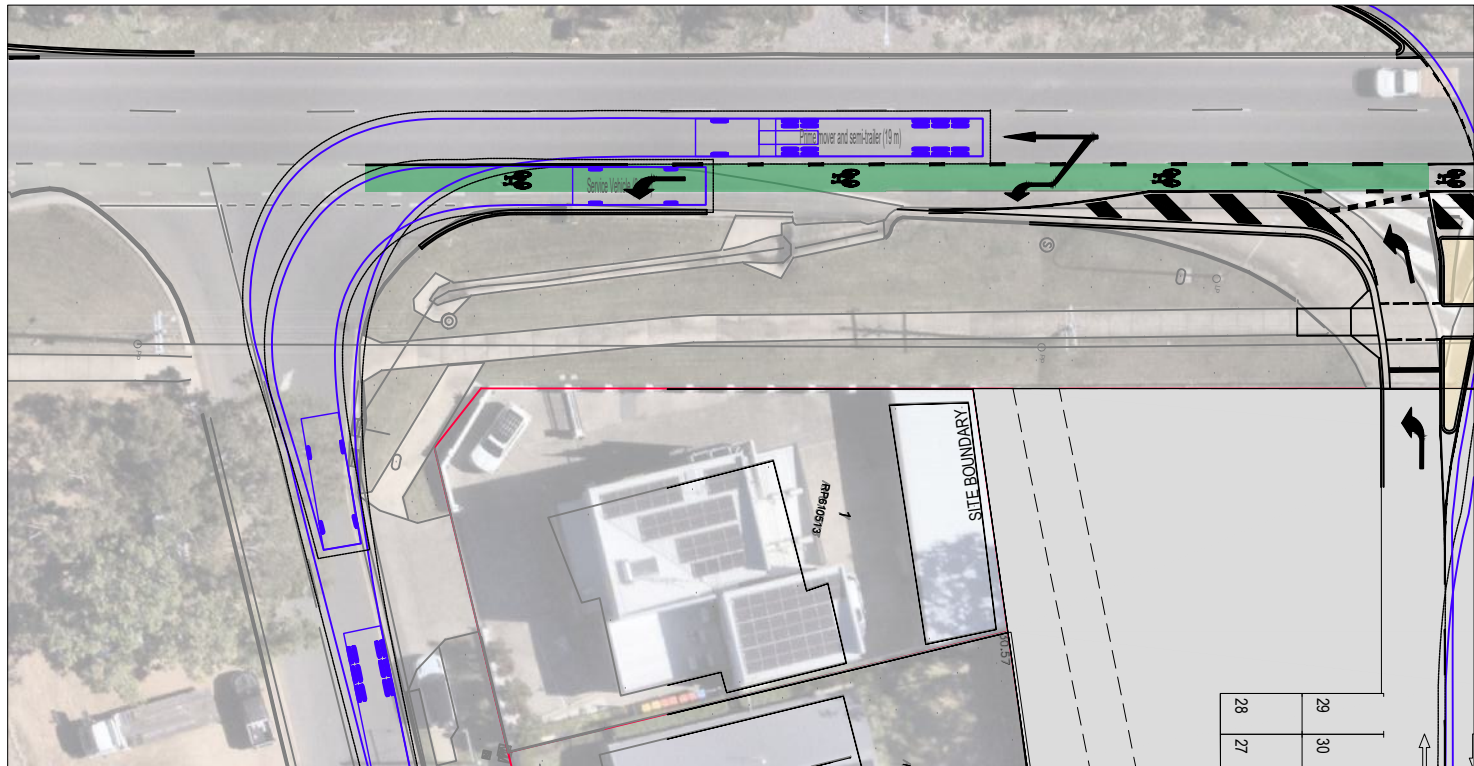




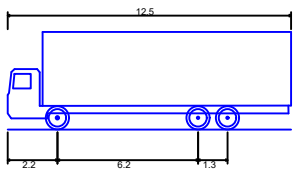
SOUTHERN SITE ACCESS - 19m ARTICULATED VEHICLE & 12.5m HEAVY RIGID VEHICLE



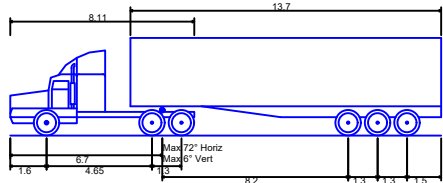
NORTHERN SITE ACCESS - 19m ARTICULATED VEHICLE & 12.5m HEAVY RIGID VEHICLE



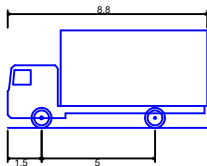
SOUTHERN SITE ACCESS - 19m ARTICULATED VEHICLE & 8.8m SERVICE VEHICLE



Single Unit Truck/Bus (12.5 m)  
Overall Length 12.500m  
Overall Width 2.500m  
Overall Body Height 4.300m  
Min Body Ground Clearance 0.490m  
Track Width 2.500m  
Lock-to-lock time 6.00s  
Curb to Curb Turning Radius 12.500m



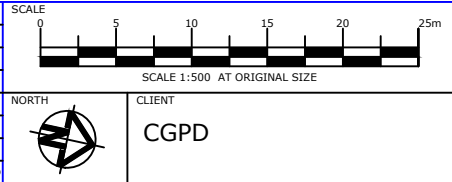
Prime mover and semi-trailer (19 m)  
Overall Length 19.000m  
Overall Width 2.500m  
Overall Body Height 4.300m  
Min Body Ground Clearance 0.540m  
Track Width 2.500m  
Lock-to-lock time 6.00s  
Curb to Curb Turning Radius 12.500m



Service Vehicle (8.8 m)  
Overall Length 8.800m  
Overall Width 2.500m  
Overall Body Height 4.300m  
Min Body Ground Clearance 0.427m  
Track Width 2.500m  
Lock-to-lock time 4.00s  
Curb to Curb Turning Radius 12.500m

DIRECTOR  
DAVID GRUMMITT RPEQ 19356  
APPROVED 23 Oct 2025

| REV. | DATE     | ORIGINAL ISSUE | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|------|----------|----------------|-----------------------|-------|---------|----------|
| A    | 23-10-25 | ORIGINAL ISSUE |                       | DG    | DG      | DG       |



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|               |                                                                   |
|---------------|-------------------------------------------------------------------|
| PROJECT       | 452 YAAMBA ROAD, NORMAN GARDENS                                   |
| DRAWING TITLE | PRELIMINARY FUNCTIONAL LAYOUT PLAN<br>VEHICLE SWEEP PATH ANALYSIS |

|                |              |               |        |
|----------------|--------------|---------------|--------|
| PROJECT NUMBER | 19BRT00086   | ORIGINAL SIZE | A3     |
| DRAWING NUMBER | 19BRT0086-19 | REVISION      | A      |
| DATE           | 23 Oct 2025  | SHEET         | 7 OF 7 |







## Appendix C    Traffic Volumes Diagrams

**2025 Surveyed Peak Hour Volumes**

**Legend:**  
 AM Peak (Blue)  
 PM Peak (Red)  
 SAT Peak (Green)

**Yaamba Road**

**Intersection 1: Farm Street**

Approach from North:

|      |      |
|------|------|
| 1135 | 1108 |
| 1215 | 1071 |
| 1120 | 1248 |

Approach from South:

|      |      |
|------|------|
| 982  | 995  |
| 1120 | 1074 |
| 1073 | 1293 |

**Intersection 2: Northern Site Access**

Approach from North:

|     |      |      |
|-----|------|------|
| 995 | 1074 | 1293 |
|-----|------|------|

Approach from South:

|     |      |      |
|-----|------|------|
| 995 | 1074 | 1293 |
|-----|------|------|

**Intersection 3: Southern Site Access**

Approach from North:

|     |      |      |
|-----|------|------|
| 995 | 1074 | 1293 |
|-----|------|------|

Approach from South:

|     |      |      |
|-----|------|------|
| 995 | 1074 | 1293 |
|-----|------|------|

**Intersection 4: McCartney Street**

Approach from North:

|     |      |      |
|-----|------|------|
| 995 | 1074 | 1293 |
|-----|------|------|

Approach from South:

|     |      |      |
|-----|------|------|
| 997 | 1075 | 1293 |
|-----|------|------|

**Intersection 5: Richardson Road**

Approach from North:

|     |      |      |
|-----|------|------|
| 992 | 1067 | 1273 |
|-----|------|------|

Approach from South:

|      |      |      |
|------|------|------|
| 1013 | 1099 | 1304 |
|------|------|------|

**Intersection 6: Richardson Road**

Approach from North:

|      |      |
|------|------|
| 908  | 951  |
| 1203 | 1102 |
| 1188 | 1441 |

Approach from South:

|      |      |
|------|------|
| 908  | 951  |
| 1203 | 1102 |
| 1188 | 1441 |

Proposed Tenancy Areas

| Tenancy/Stage | GFA (m <sup>2</sup> ) |      | Former GFA's from 2022 application |
|---------------|-----------------------|------|------------------------------------|
| Supermarket   | 4605                  | 3950 |                                    |
| Liquor        | 160                   | 150  |                                    |
|               |                       | 120  |                                    |
|               |                       | 170  |                                    |
|               |                       | 120  |                                    |
| Sub-total     | 4765                  |      |                                    |
| Showroom      |                       | 3515 |                                    |
| TOTAL         | 8280                  |      |                                    |

Trip Generation (Supermarket & Specialty)

| Peak Period | Gen. Rate (trips/100m <sup>2</sup> ) | Trips | IN   | OUT  |
|-------------|--------------------------------------|-------|------|------|
| Thurs AM    | 6.31                                 | 301   | 150  | 150  |
| Thurs PM    | 14.6                                 | 696   | 348  | 348  |
| Sat         | 14.1                                 | 672   | 336  | 336  |
| Daily       | 162.2                                | 7730  | 3865 | 3865 |

Thurs PM and Sat generation rate based on survey data from Coles Retail Development - 23-29 Oak Street, Andergrove QLD (18BRT0228)  
AM rate based on patronage surveys of Coles Alderley and Kedron (average ratio of PM to AM, Alderley = 33.5%, Kedron = 52.9%, **average = 43.2%** )  
Daily rate based on patronage surveys of Coles Alderley and Kedron (average ratio of PM to Daily, Alderley = 9.5%, Kedron = 8.5%, **average = 9.0%** )

Trip Segmentation (Supermarket & Specialty)

| Peak Period | New Trips % | Trips | IN   | OUT  | Pass-by Trips % | Trips | IN   | OUT  |
|-------------|-------------|-------|------|------|-----------------|-------|------|------|
| Thurs AM    | 72%         | 216   | 108  | 108  | 28%             | 84    | 42   | 42   |
| Thurs PM    | 72%         | 501   | 250  | 250  | 28%             | 195   | 97   | 97   |
| Sat         | 72%         | 484   | 242  | 242  | 28%             | 188   | 94   | 94   |
| Daily       | 72%         | 5566  | 2783 | 2783 | 28%             | 2164  | 1082 | 1082 |

Note: Proportions based on Table F1 of DTMR GARID (2006)

NEW TRIPS Directional Distribution (Supermarket & Specialty)

| Approach Route                                      | %      | Trips IN |          |     |       |
|-----------------------------------------------------|--------|----------|----------|-----|-------|
|                                                     |        | Thurs AM | Thurs PM | Sat | Daily |
| Yaamba Road (north)                                 | 25.6%  | 28       | 64       | 62  | 712   |
| Farm Street (west)                                  | 14.0%  | 15       | 35       | 34  | 390   |
| Richardson Road (west) via Yaamba                   | 11.2%  | 12       | 28       | 27  | 312   |
| Richardson Road (west) via Yewdale, Potts           | 0.0%   | 0        | 0        | 0   | 0     |
| Yaamba Road (south) via Yaamba Rd                   | 8.6%   | 9        | 22       | 21  | 239   |
| Yaamba Road (south) via Yewdale, Potts              | 0.0%   | 0        | 0        | 0   | 0     |
| Yewdale Drive (south) via Yaamba Rd                 | 11.3%  | 12       | 28       | 27  | 314   |
| Yewdale Drive (south) via Geaney, Standish, Potts   | 0.0%   | 0        | 0        | 0   | 0     |
| Dean Street (south-east) via Geaney,Standish, Potts | 0.0%   | 0        | 0        | 0   | 0     |
| Dean Street (south-east) via Farm St, Yaamba        | 15.3%  | 17       | 38       | 37  | 426   |
| Farm Street (east/north-east) via Potts             | 0.0%   | 0        | 0        | 0   | 0     |
| Farm Street (east/north-east) via Yaamba            | 14.0%  | 15       | 35       | 34  | 390   |
| Totals                                              | 100.0% | 108      | 250      | 242 | 2783  |

NEW TRIPS Directional Distribution (Supermarket & Specialty)

| Departure Route                                 | %      | Trips OUT |          |     |       |
|-------------------------------------------------|--------|-----------|----------|-----|-------|
|                                                 |        | Thurs AM  | Thurs PM | Sat | Daily |
| Yaamba Road (north) via Yaamba (u-turn)         | 23.3%  | 25        | 58       | 56  | 648   |
| Yaamba Road (north) via Macartney, Potts, Farm  | 5.3%   | 6         | 13       | 13  | 147   |
| Farm St (west) via Yaamba (u-turn)              | 3.0%   | 3         | 8        | 7   | 83    |
| Richardson Road (west)                          | 22.8%  | 25        | 57       | 55  | 634   |
| Yaamba Road (south)                             | 7.0%   | 8         | 18       | 17  | 195   |
| Yewdale Drive (south)                           | 19.3%  | 21        | 48       | 47  | 537   |
| Richardson Road (east) via Macartney, Standish  | 9.0%   | 10        | 23       | 22  | 250   |
| Farm Street (east) via Macartney, Potts,Maxwell | 10.3%  | 11        | 26       | 25  | 287   |
| Totals                                          | 100.0% | 108       | 250      | 242 | 2783  |

PASS-BY (undiverted) TRIPS Distribution (Supermarket & Specialty)

| Yaamba Rd Direction | Thurs AM  |      |           | Thurs PM  |      |           | Sat       |      |           | Daily     |      |           |
|---------------------|-----------|------|-----------|-----------|------|-----------|-----------|------|-----------|-----------|------|-----------|
|                     | Base Vol. | %    | Dev. Vol. | Base Vol. | %    | Dev. Vol. | Base Vol. | %    | Dev. Vol. | Base Vol. | %    | Dev. Vol. |
| Northbound          | 896       | 40%  | 17        | 1032      | 50%  | 48        | 1069      | 51%  | 48        | 10510     | 47%  | 509       |
| Southbound          | 1350      | 60%  | 25        | 1042      | 50%  | 49        | 1018      | 49%  | 46        | 11835     | 53%  | 573       |
| Total               | 2246      | 100% | 42        | 2074      | 100% | 97        | 2087      | 100% | 94        | 22345     | 100% | 1082      |

Trip Generation (Showroom) - ITE trip rates for Retail (800-899) - Sporting Goods Superstore (861)

| Peak Period | Gen. Rate (trips/100m <sup>2</sup> ) | Trips | IN  | OUT |
|-------------|--------------------------------------|-------|-----|-----|
| Thurs AM    | 0.64                                 | 22    | 19  | 4   |
| Thurs PM    | 2.62                                 | 83    | 37  | 46  |
| Sat         | 3.33                                 | 105   | 54  | 52  |
| Daily       | 35.1                                 | 1232  | 616 | 616 |

Peak hour trip rates are a proportion of ITE and TMR rates. Daily rates have been extracted from TMR data. TBC with DG. No Thursday rate provided therefore have used Friday

Multi-purpose trips0.9

Trip Segmentation (Showroom)

| Peak Period | New Trips % | Trips | IN  | OUT | Pass-by Trips % | Trips | IN | OUT |
|-------------|-------------|-------|-----|-----|-----------------|-------|----|-----|
| Thurs AM    | 100%        | 22    | 19  | 4   | 0%              | 0     | 0  | 0   |
| Thurs PM    | 100%        | 83    | 37  | 46  | 0%              | 0     | 0  | 0   |
| Sat         | 100%        | 105   | 54  | 52  | 0%              | 0     | 0  | 0   |
| Daily       | 100%        | 1232  | 616 | 616 | 0%              | 0     | 0  | 0   |

NEW TRIPS Directional Distribution (Showroom)

| Approach Route                                      | %      | Trips IN |          |     |       |
|-----------------------------------------------------|--------|----------|----------|-----|-------|
|                                                     |        | Thurs AM | Thurs PM | Sat | Daily |
| Yaamba Road (north)                                 | 25.6%  | 5        | 10       | 14  | 158   |
| Farm Street (west)                                  | 14.0%  | 3        | 5        | 8   | 86    |
| Richardson Road (west) via Yaamba                   | 11.2%  | 2        | 4        | 6   | 69    |
| Richardson Road (west) via Yewdale, Potts           | 0.0%   | 0        | 0        | 0   | 0     |
| Yaamba Road (south) via Yaamba Rd                   | 8.6%   | 2        | 3        | 5   | 53    |
| Yaamba Road (south) via Yewdale, Potts              | 0.0%   | 0        | 0        | 0   | 0     |
| Yewdale Drive (south) via Yaamba Rd                 | 11.3%  | 2        | 4        | 6   | 70    |
| Yewdale Drive (south) via Geaney, Standish, Potts   | 0.0%   | 0        | 0        | 0   | 0     |
| Dean Street (south-east) via Geaney,Standish, Potts | 0.0%   | 0        | 0        | 0   | 0     |
| Dean Street (south-east) via Farm St                | 15.3%  | 3        | 6        | 8   | 94    |
| Farm Street (east/north-east) via Potts             | 0.0%   | 0        | 0        | 0   | 0     |
| Farm Street (east/north-east) via Yaamba            | 14.0%  | 3        | 5        | 8   | 86    |
| Totals                                              | 100.0% | 19       | 37       | 54  | 616   |

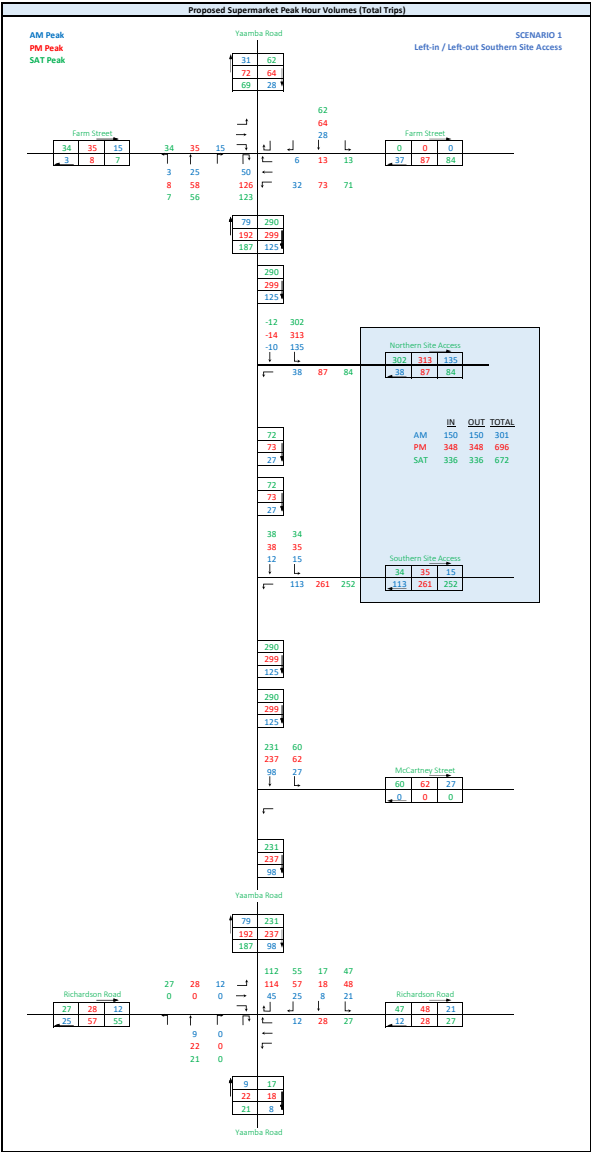
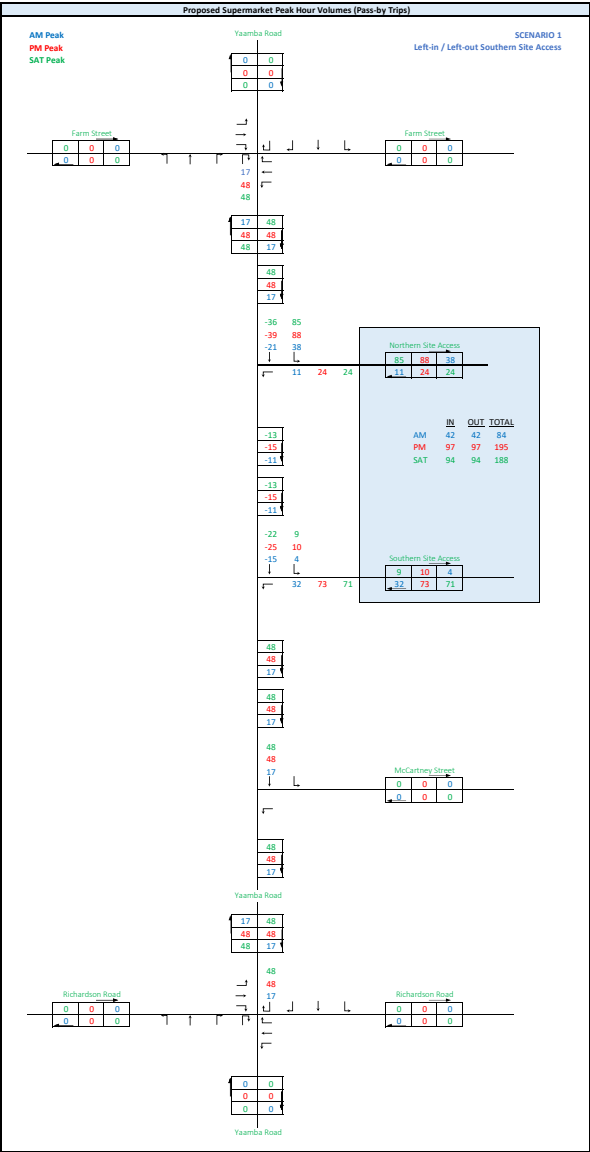
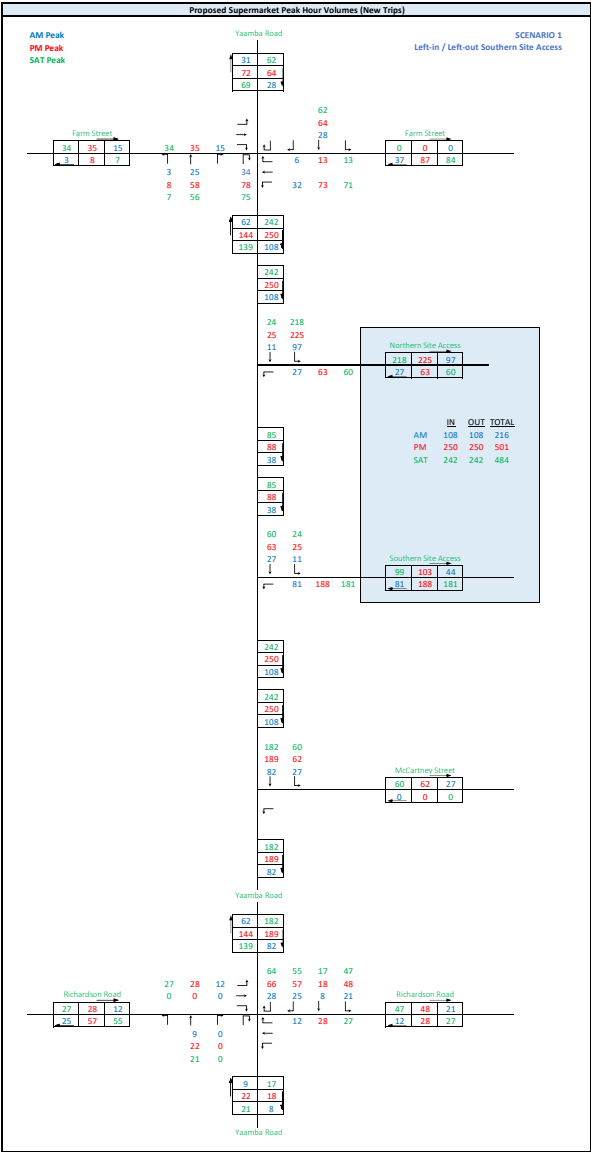
NEW TRIPS Directional Distribution (Showroom)

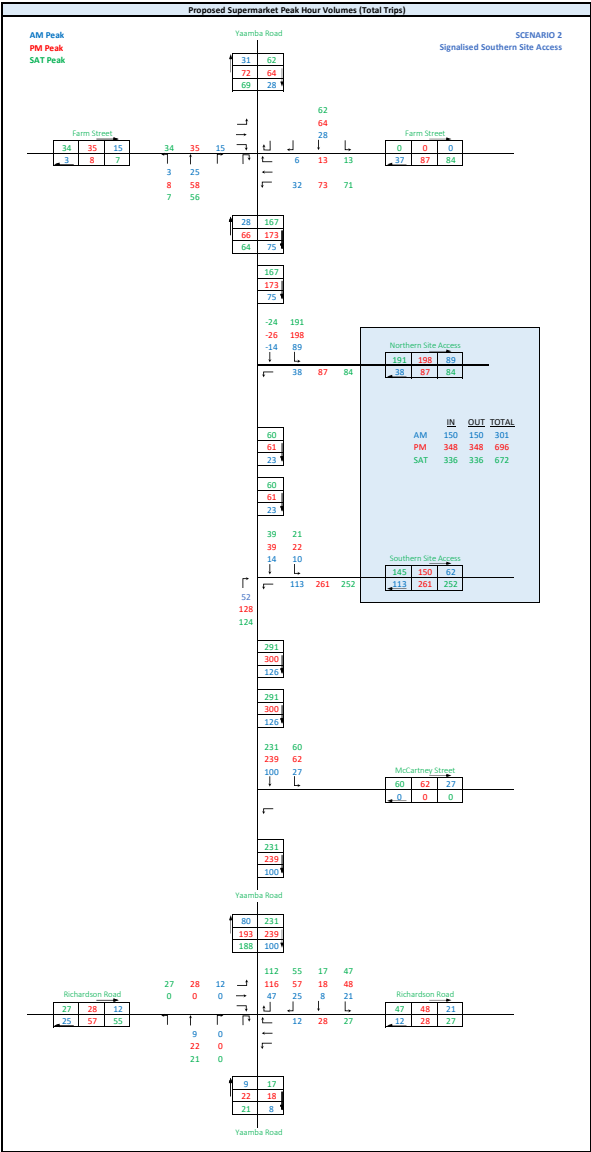
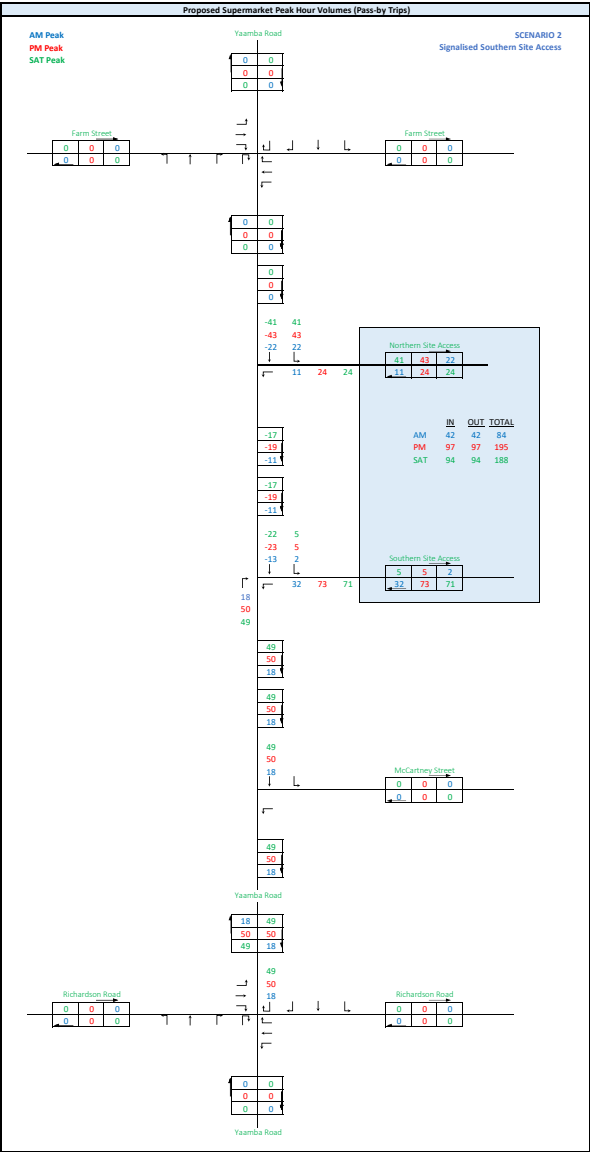
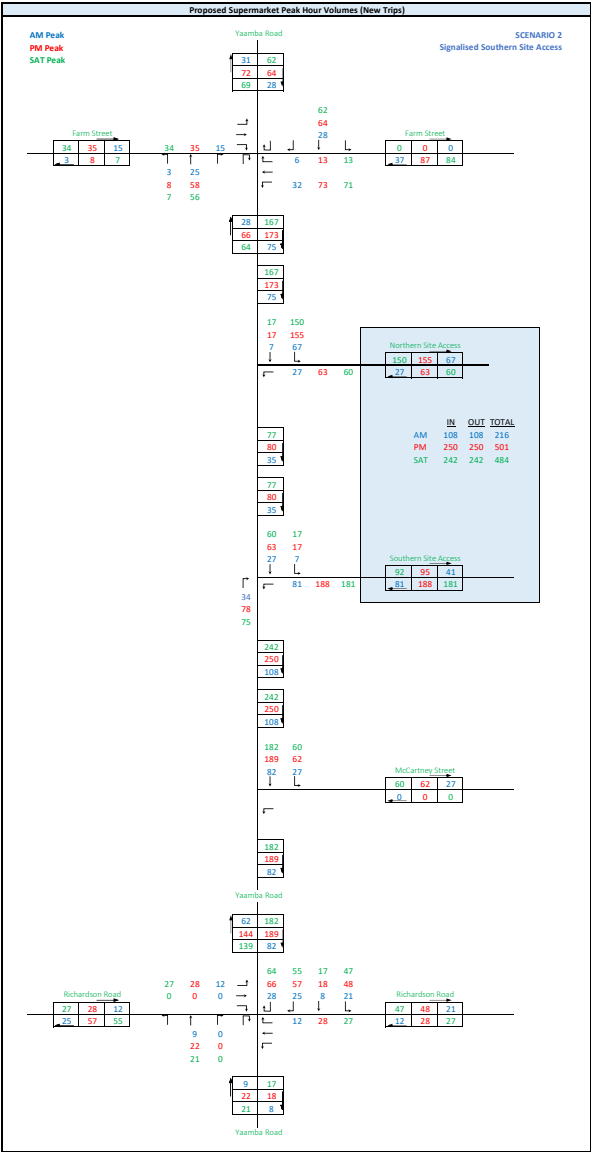
| Departure Route                                 | %      | Trips OUT |          |     |       |
|-------------------------------------------------|--------|-----------|----------|-----|-------|
|                                                 |        | Thurs AM  | Thurs PM | Sat | Daily |
| Yaamba Road (north) via Yaamba (u-turn)         | 23.3%  | 1         | 11       | 12  | 144   |
| Yaamba Road (north) via Macartney, Potts, Farm  | 5.3%   | 0         | 2        | 3   | 33    |
| Farm St (west) via Yaamba (u-turn)              | 3.0%   | 0         | 1        | 2   | 18    |
| Richardson Road (west)                          | 22.8%  | 1         | 10       | 12  | 140   |
| Yaamba Road (south)                             | 7.0%   | 0         | 3        | 4   | 43    |
| Yewdale Drive (south)                           | 19.3%  | 1         | 9        | 10  | 119   |
| Richardson Road (east) via Macartney, Standish  | 9.0%   | 0         | 4        | 5   | 55    |
| Farm Street (east) via Macartney, Potts,Maxwell | 10.3%  | 0         | 5        | 5   | 63    |
| Totals                                          | 100.0% | 4         | 46       | 52  | 616   |

PASS-BY (undiverted) TRIPS Distribution (Showroom)

| Yaamba Rd Direction | Thurs AM  |   |           | Thurs PM  |   |           | Sat       |   |           | Daily     |   |           |
|---------------------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|
|                     | Base Vol. | % | Dev. Vol. | Base Vol. | % | Dev. Vol. | Base Vol. | % | Dev. Vol. | Base Vol. | % | Dev. Vol. |
| Northbound          |           |   |           |           |   |           |           |   |           |           |   |           |
| Southbound          |           |   |           |           |   |           |           |   |           |           |   |           |
| Total               |           |   |           |           |   |           |           |   |           |           |   |           |



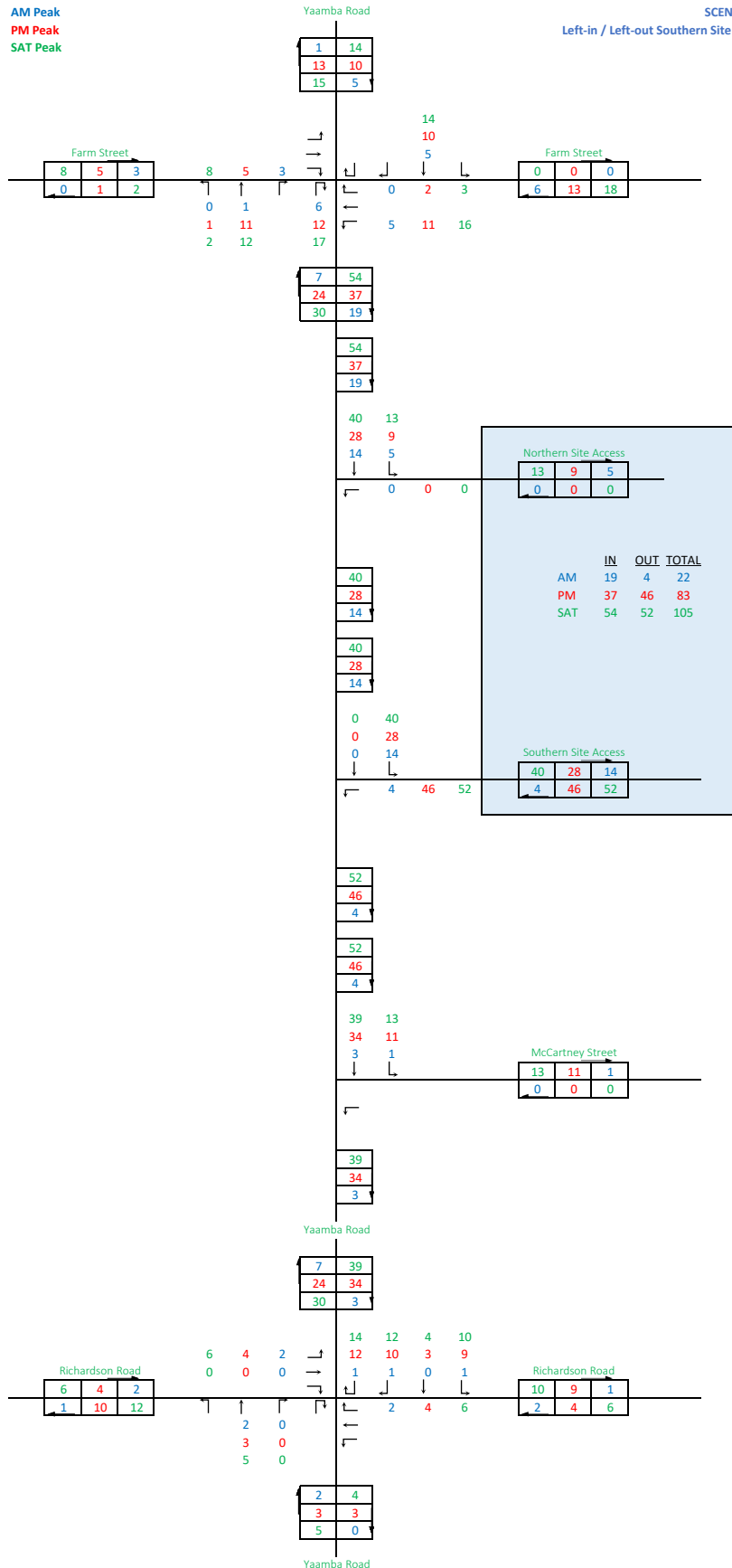




Proposed Showroom Peak Hour Volumes (Total Trips)

AM Peak  
PM Peak  
SAT Peak

SCENARIO 1  
Left-in / Left-out Southern Site Access

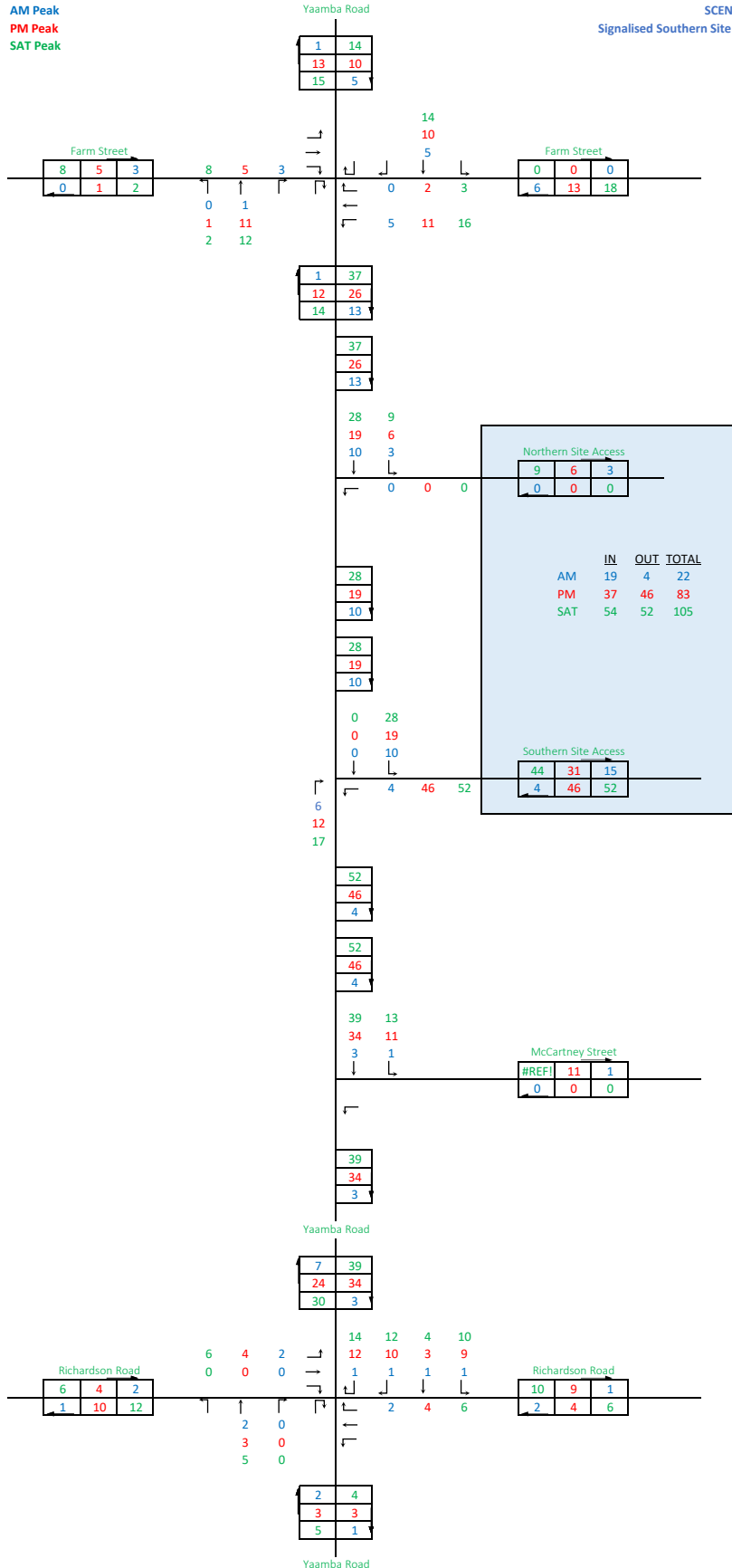




Proposed Showroom Peak Hour Volumes (Total Trips)

AM Peak  
PM Peak  
SAT Peak

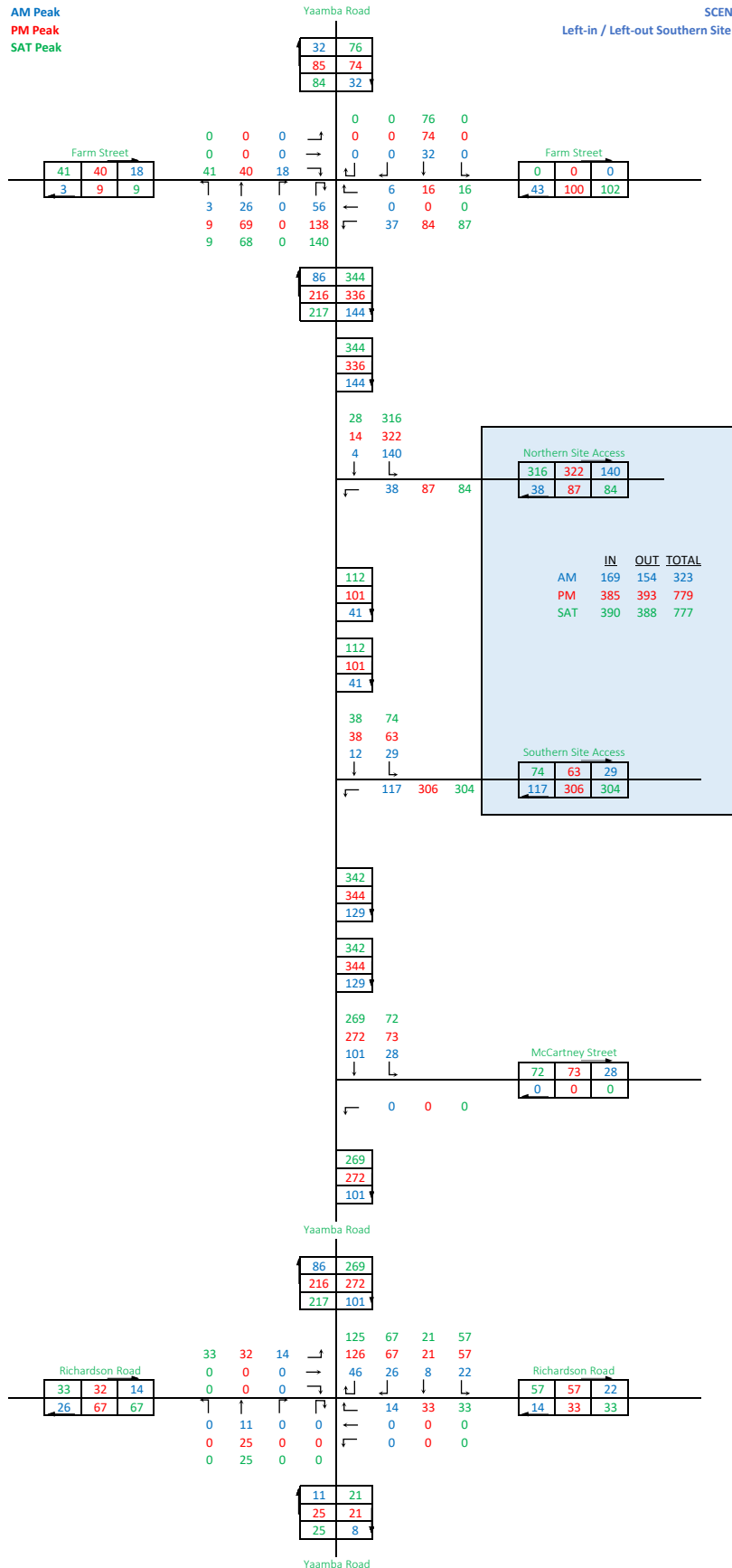
SCENARIO 2  
Signalised Southern Site Access



Proposed Development Total (Supermarket + Showroom) Peak Hour Volumes

AM Peak  
PM Peak  
SAT Peak

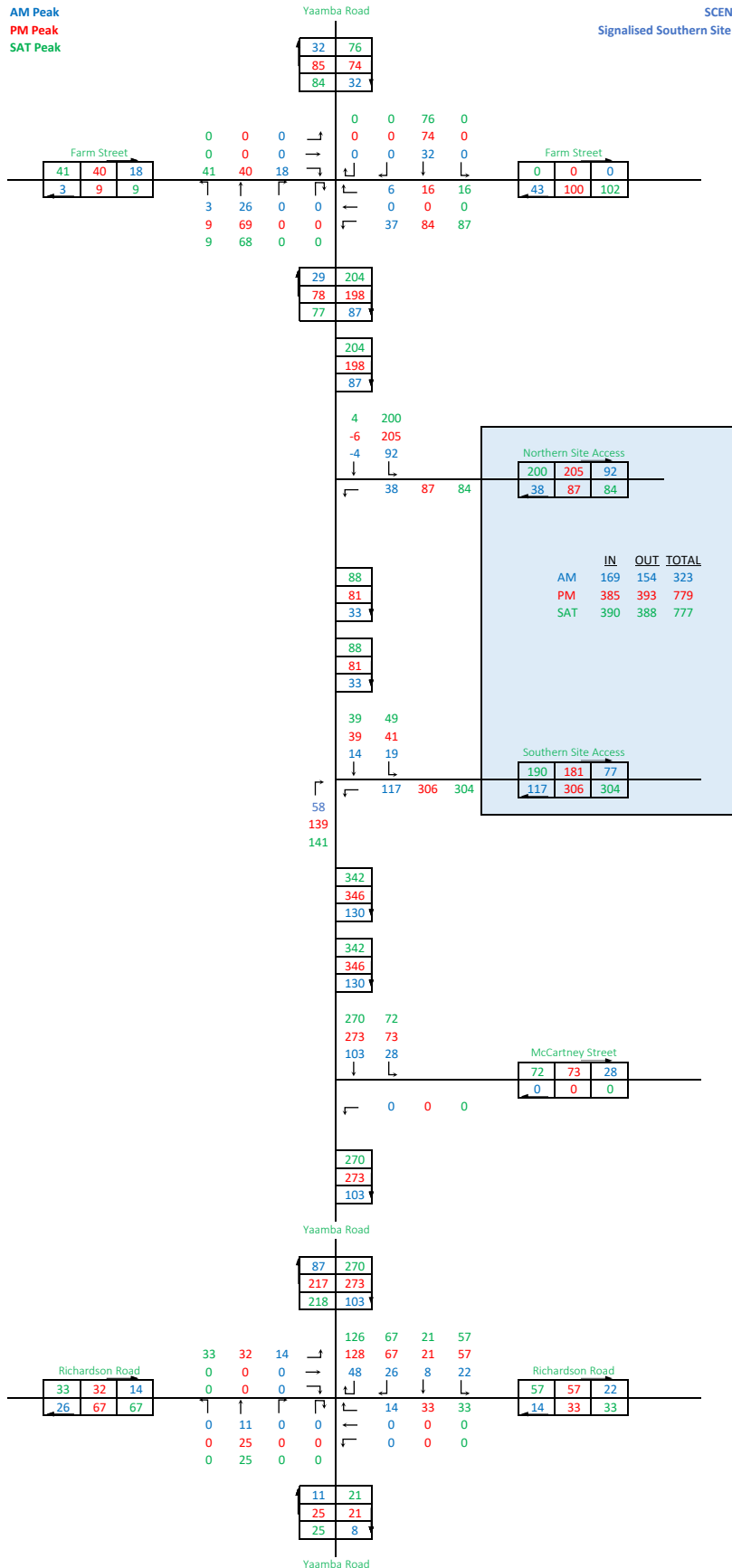
SCENARIO 1  
Left-in / Left-out Southern Site Access



Proposed Development Total (Supermarket + Showroom) Peak Hour Volumes

AM Peak  
PM Peak  
SAT Peak

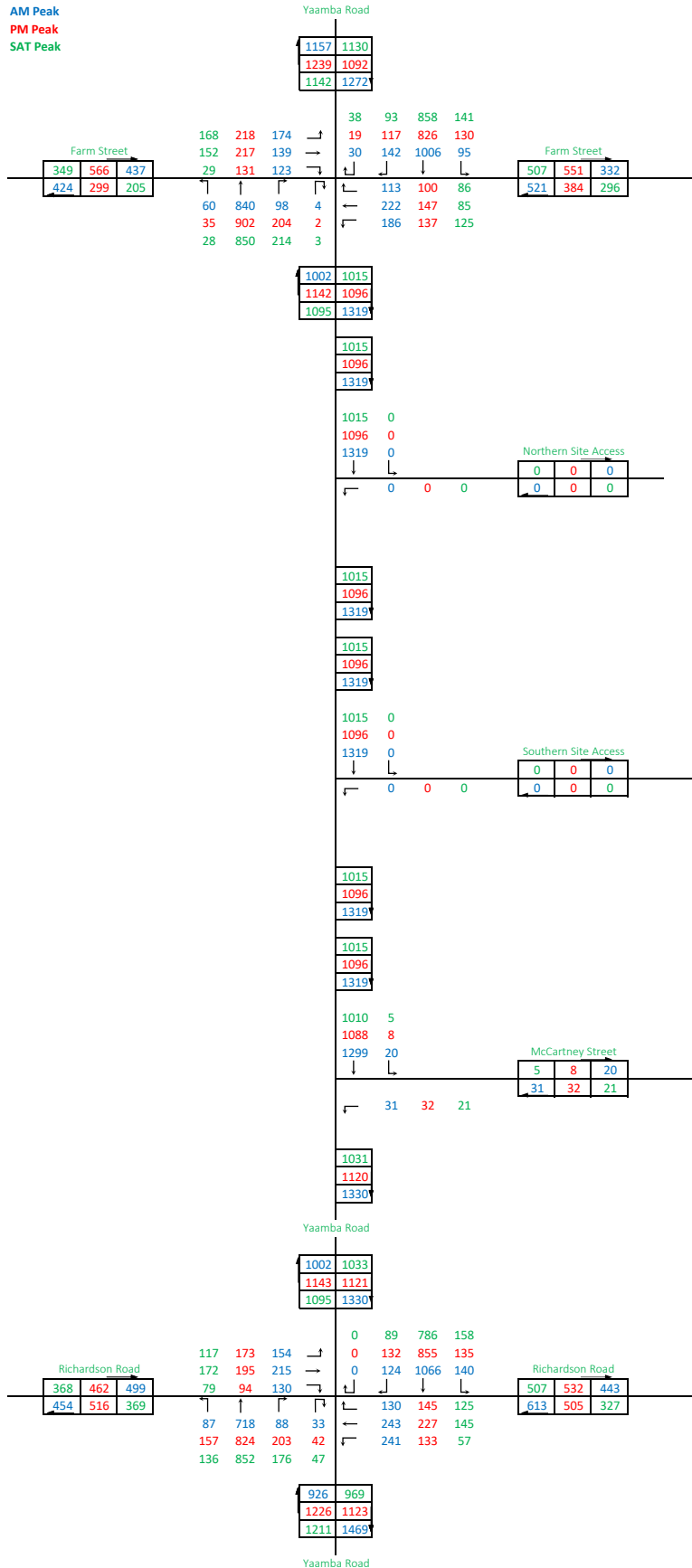
SCENARIO 2  
Signalised Southern Site Access





Estimated 2027 BASE (Background) Peak Hour Volumes

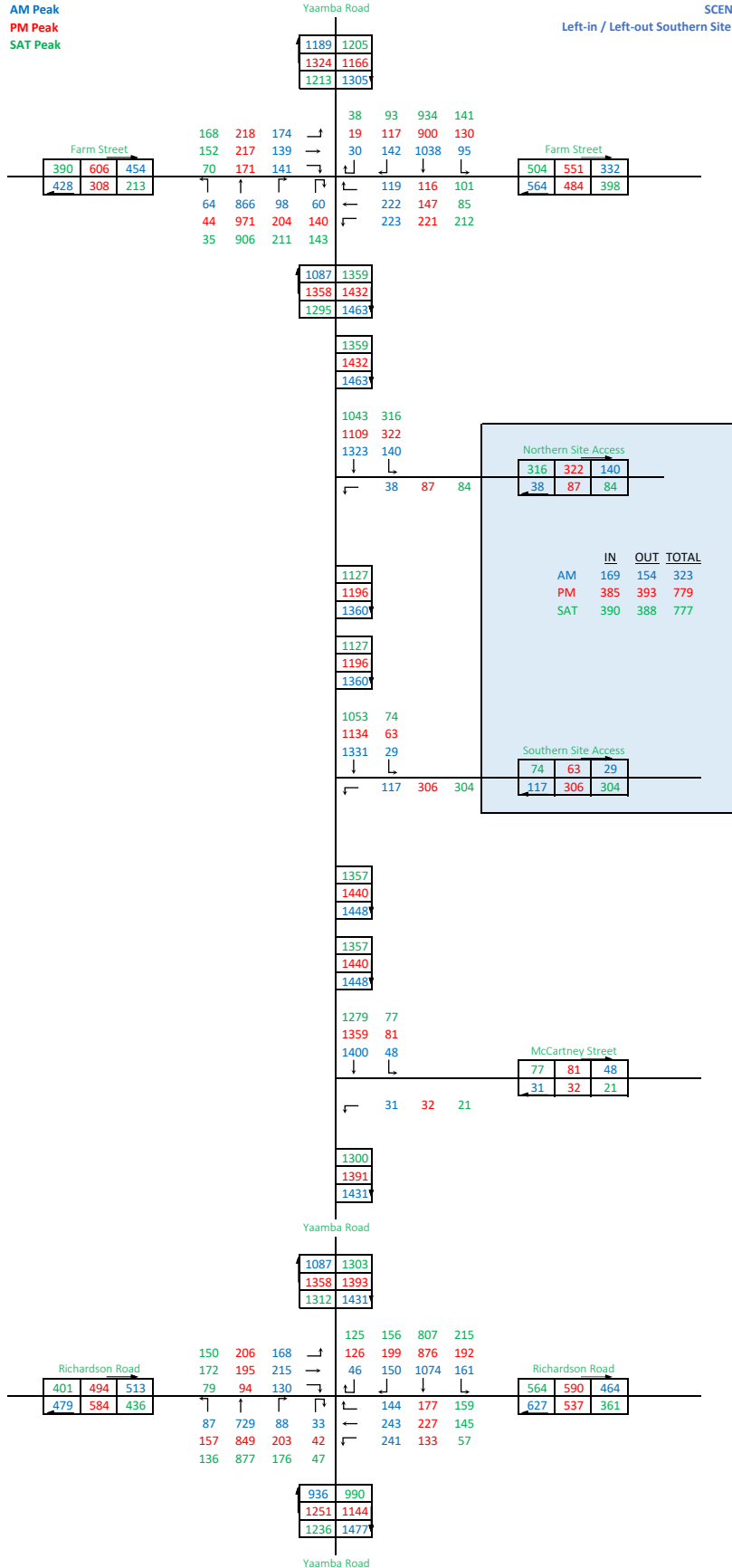
AM Peak  
PM Peak  
SAT Peak



Estimated 2027 PROJECT (Base + Proposed Development) Peak Hour Volumes

AM Peak  
PM Peak  
SAT Peak

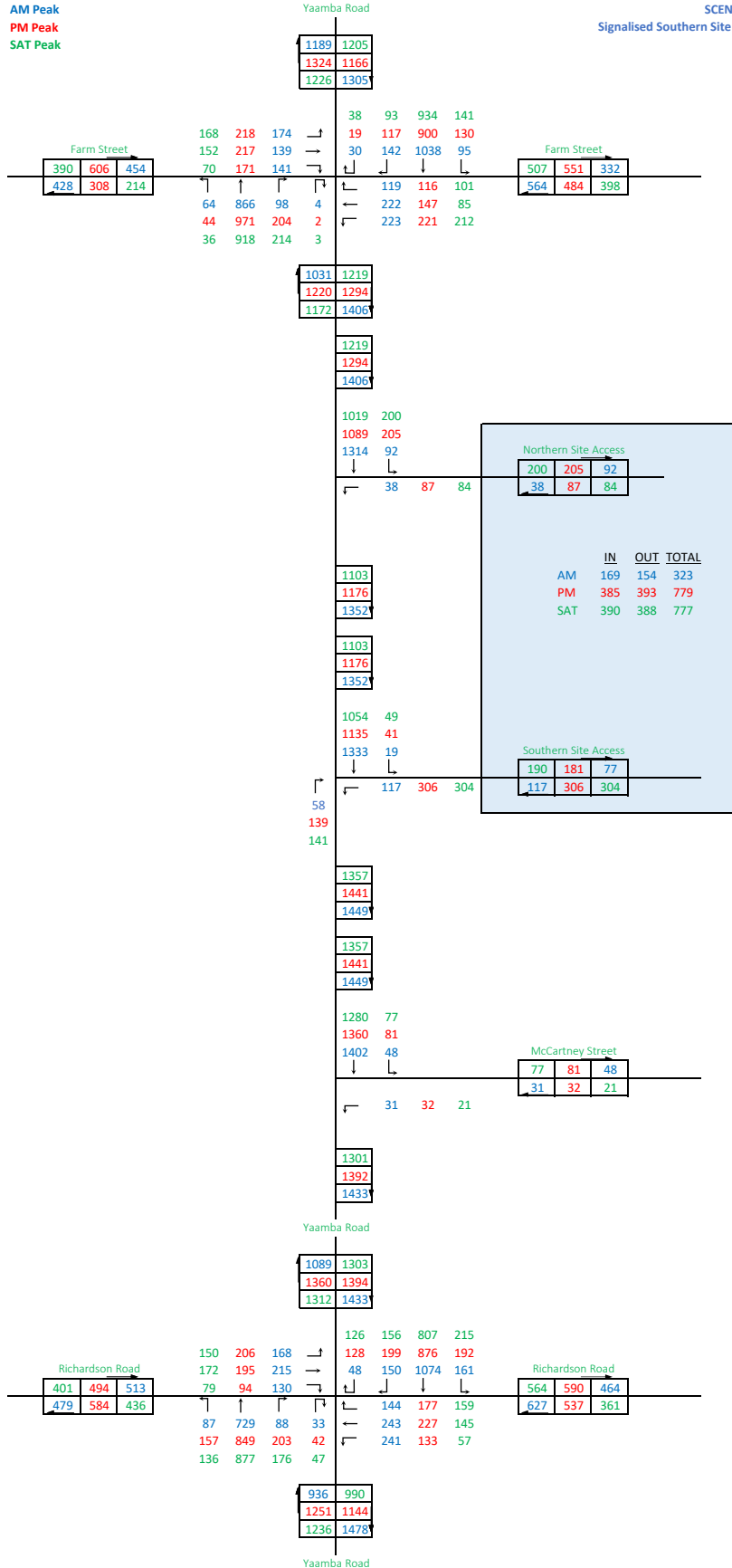
SCENARIO 1  
Left-in / Left-out Southern Site Access



Estimated 2027 PROJECT (Base + Proposed Development) Peak Hour Volumes

AM Peak  
PM Peak  
SAT Peak

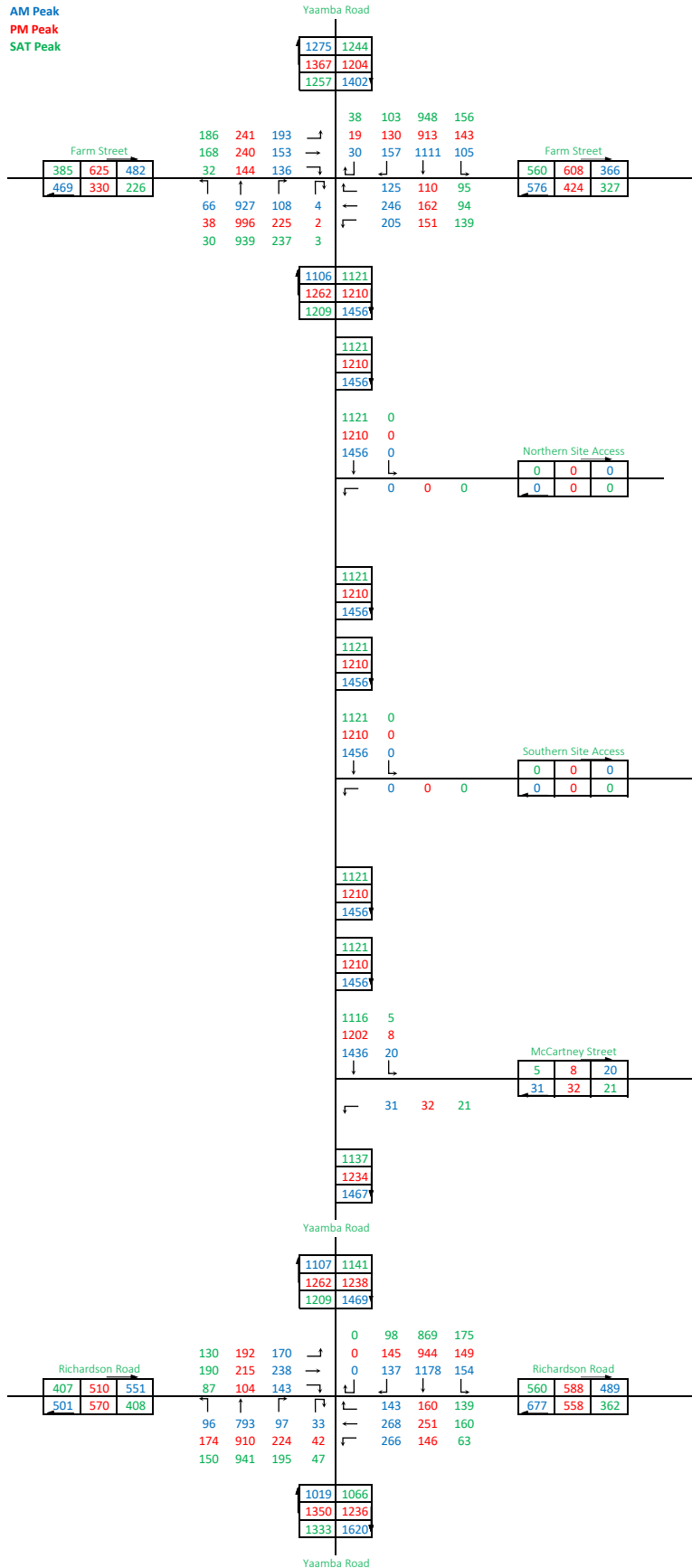
SCENARIO 2  
Signalised Southern Site Access





Estimated 2037 BASE (Background) Peak Hour Volumes

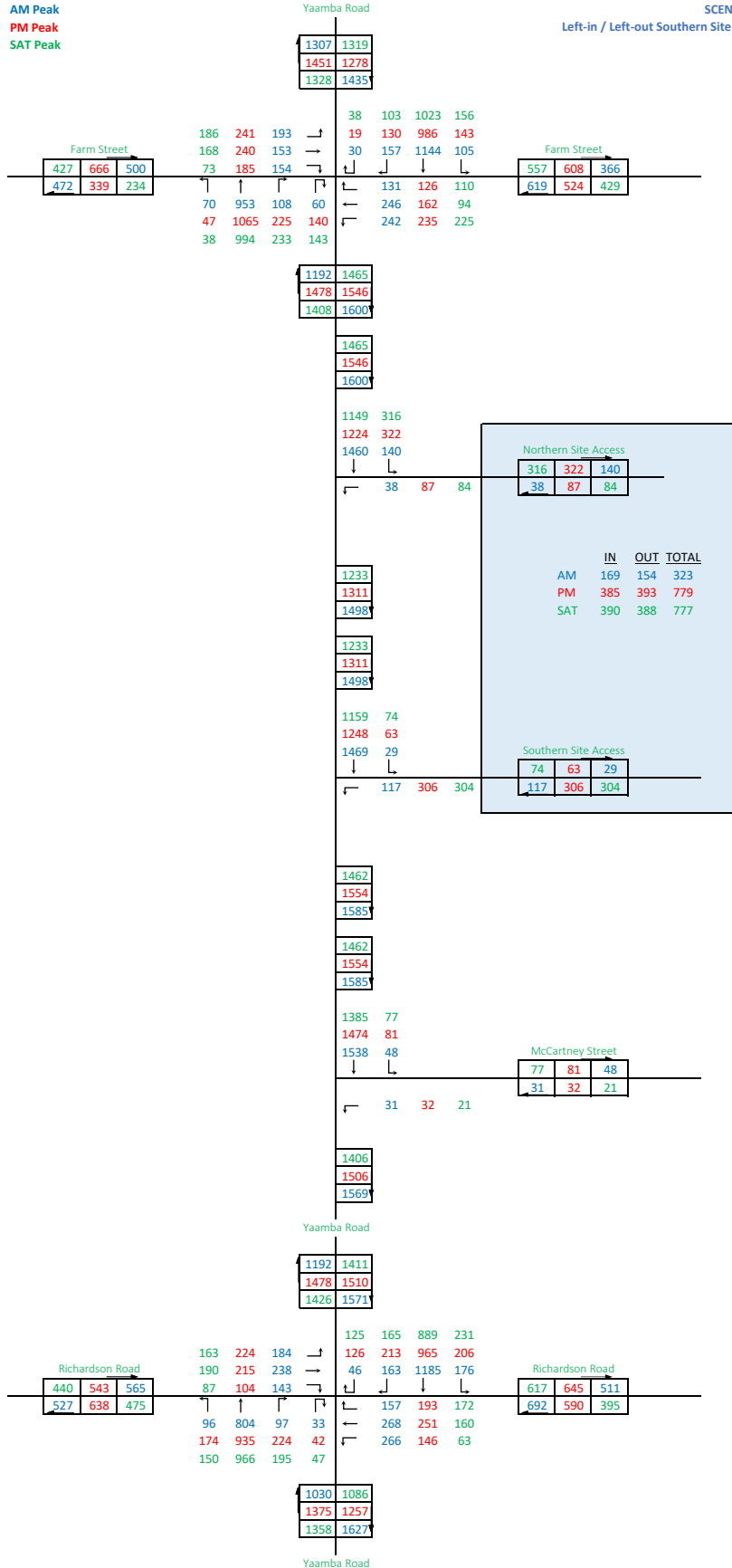
AM Peak  
PM Peak  
SAT Peak



Estimated 2037 PROJECT (Base + Proposed Development) Peak Hour Volumes

AM Peak  
PM Peak  
SAT Peak

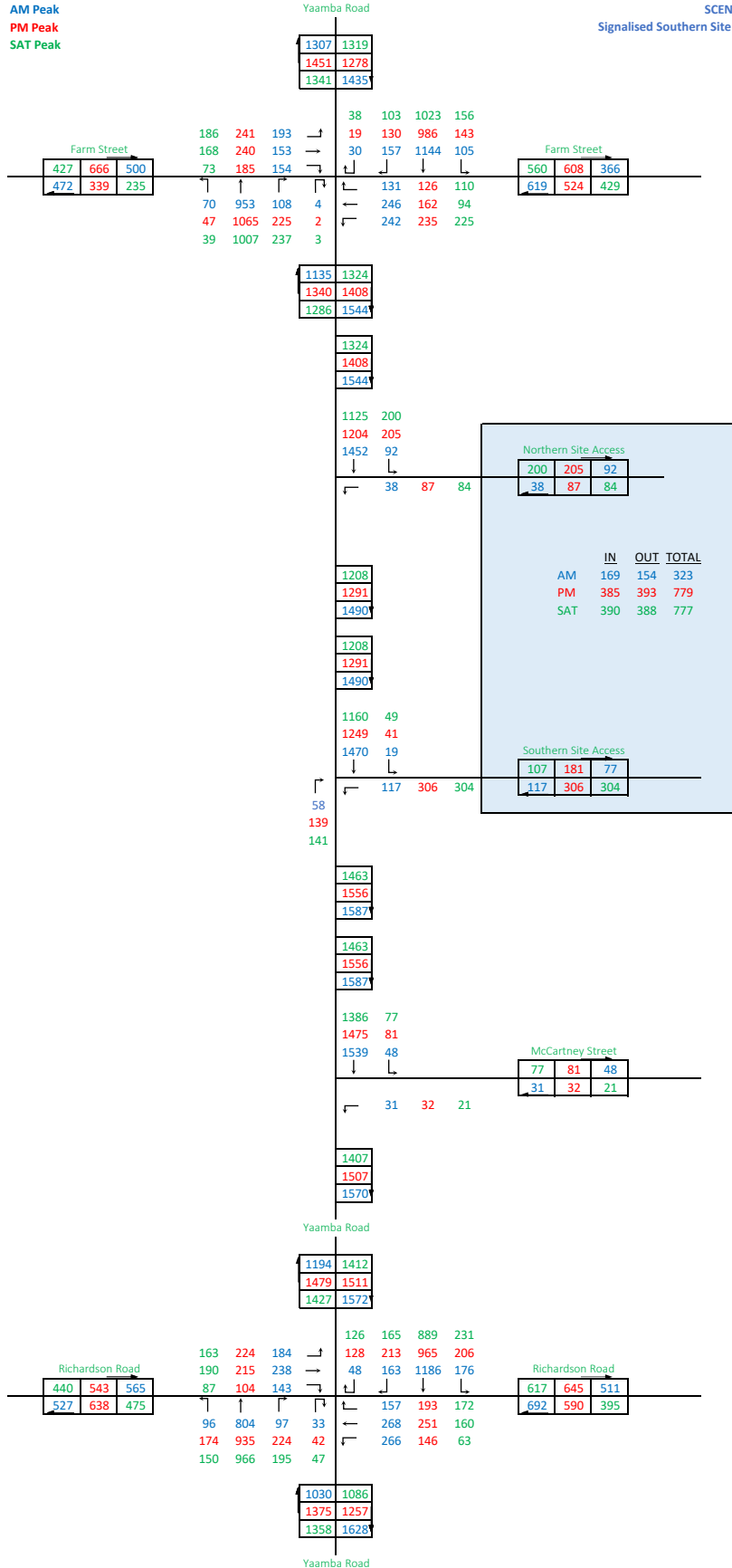
SCENARIO 1  
Left-in / Left-out Southern Site Access



Estimated 2037 PROJECT (Base + Proposed Development) Peak Hour Volumes

AM Peak  
PM Peak  
SAT Peak

SCENARIO 2  
Signalised Southern Site Access





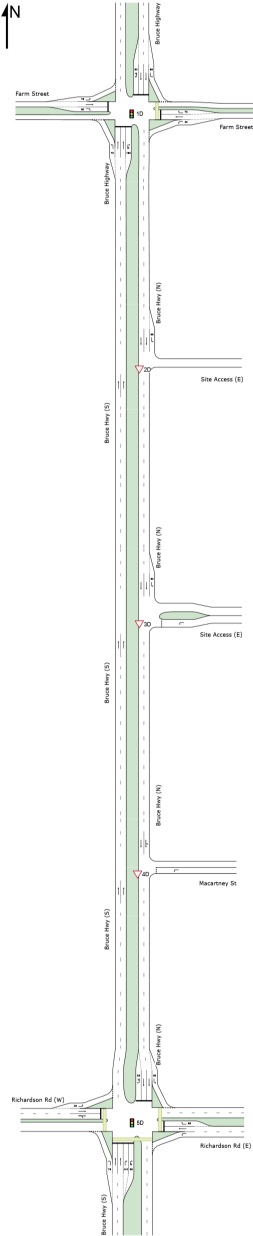
## Appendix D    SIDRA Analysis Outputs

# NETWORK LAYOUT

 Network: [N101] 2027 AM BASE (General)

2024 AM BASE  
Network Category: (None)  
Network Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



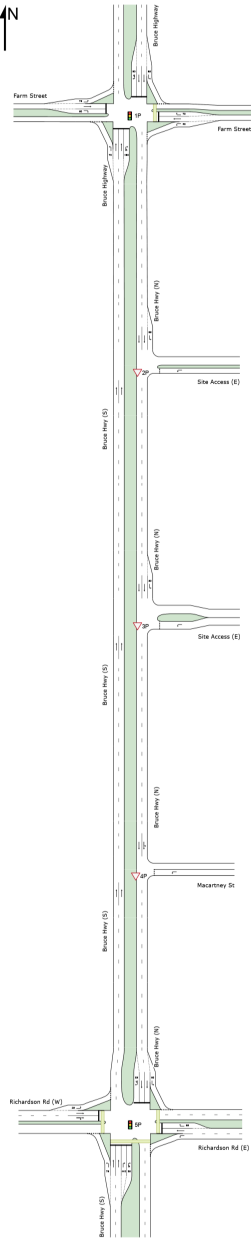
| SITES IN NETWORK |        |                     |
|------------------|--------|---------------------|
| Site ID          | CCG ID | Site Name           |
| 1D               | NA     | SITE 1_2027 AM Base |
| 2D               | NA     | SITE 2_2027 AM Base |
| 3D               | NA     | SITE 3_2027 AM Base |
| 4D               | NA     | SITE 4_2027 AM Base |
| 5D               | NA     | SITE 5_2027 AM Base |

# NETWORK LAYOUT

 Network: [N102] 2027 AM PROJECT - SCENARIO 1 (General)

2024 AM PROJECT - SCENARIO 1  
Network Category: (None)  
Network Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| SITES IN NETWORK |        |                        |
|------------------|--------|------------------------|
| Site ID          | CCG ID | Site Name              |
| 1P               | NA     | SITE 1_2027 AM Project |
| 2P               | NA     | SITE 2_2027 AM Project |
| 3P               | NA     | SITE 3_2027 AM Project |
| 4P               | NA     | SITE 4_2027 AM Project |
| 5P               | NA     | SITE 5_2027 AM Project |

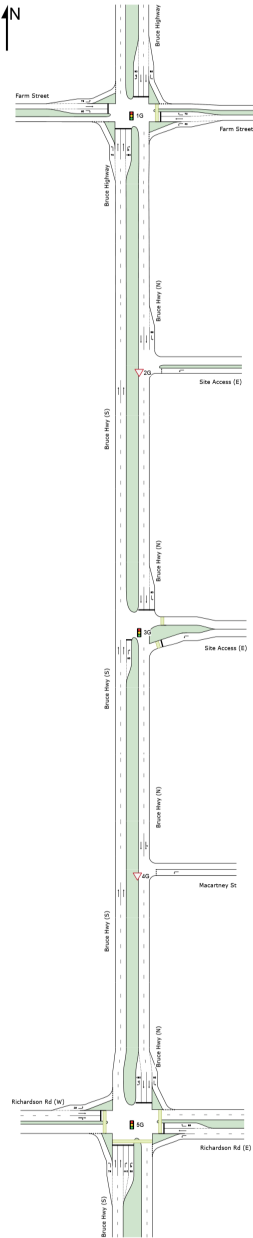


# NETWORK LAYOUT

 Network: [N103] 2027 AM PROJECT - SCENARIO 2 (General)

New Network  
Network Category: (None)  
Network Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| SITES IN NETWORK |        |                        |
|------------------|--------|------------------------|
| Site ID          | CCG ID | Site Name              |
| 1G               | NA     | SITE 1_2027 AM Project |
| 2G               | NA     | SITE 2_2027 AM Project |
| 3G               | NA     | SITE 3_2027 AM Project |
| 4G               | NA     | SITE 4_2027 AM Project |
| 5G               | NA     | SITE 5_2027 AM Project |

# SITE LAYOUT

 Site: [1D] SITE 1\_2027 AM Base (2027 AM BASE)

Bruce Hwy / Farm St - Existing Intersection

2024 Weekday AM Peak Hour

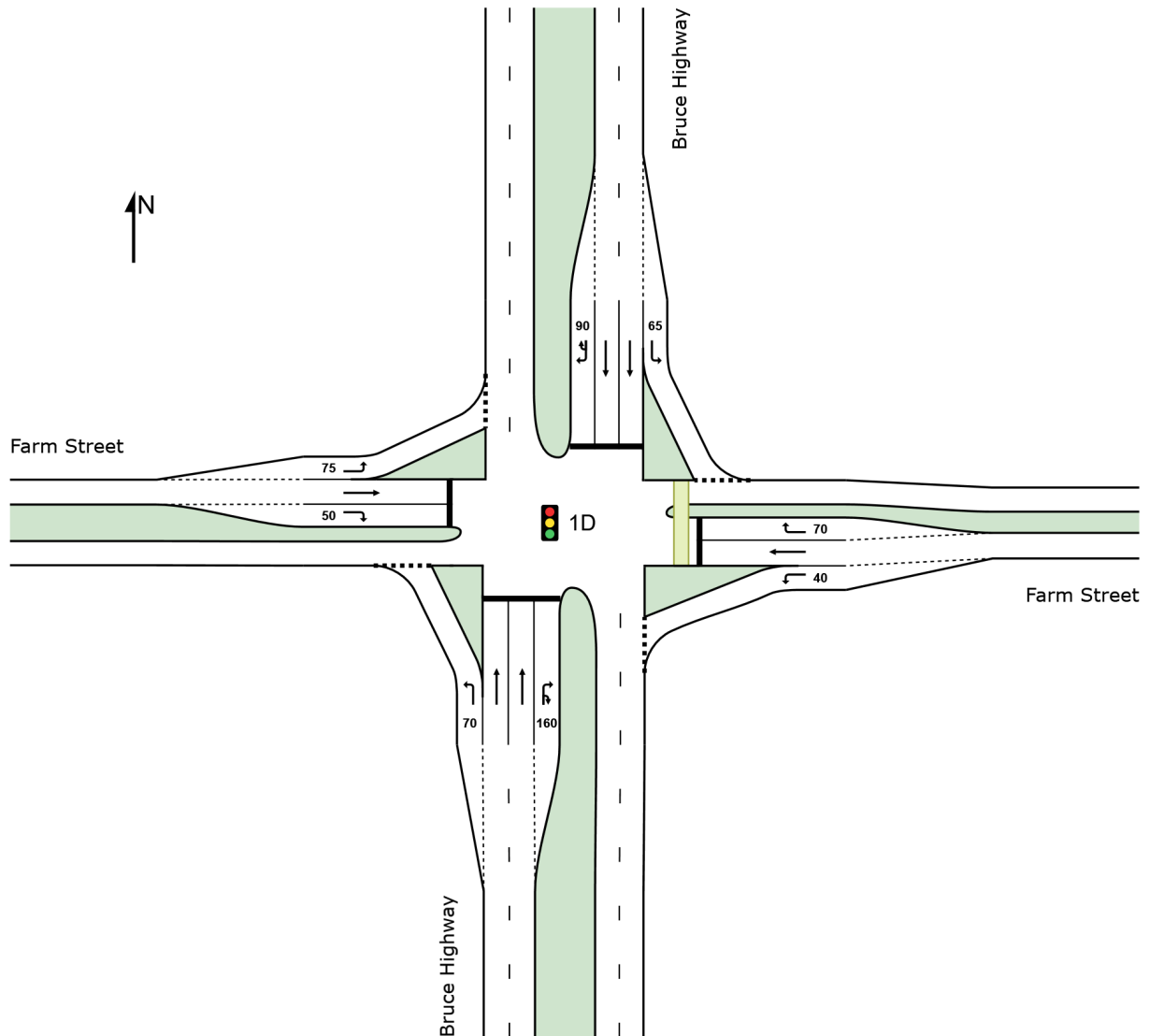
BASE Case

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated

**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Organisation: COLLIERS INTERNATIONAL ENGINEERING & DESIGN (TTMC) | Licence: NETWORK / FLOATING | Created: Thursday, October 23, 2025 9:03:47 PM

Project: C:\WORK\WORKING FILES\19BRT0086 Coles Rockhampton\3-Supermarket DA (2025)\19BRT0086 SA01\_B.sipx

# MOVEMENT SUMMARY

 **Site: [1D] SITE 1\_2027 AM Base (2027 AM BASE)**  
**Network: [N101] 2027 AM BASE (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Weekday AM Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated    Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %    | [ Total HV ]  | %    |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Highway         |      |           |              |      |               |      |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 63           | 0.0  | 63            | 0.0  | 0.051     | 6.7         | LOS A            | 0.1               | 0.4      | 0.02       | 0.66           | 0.02                       | 49.2        |
| 2                            | T1   | All MCs   | 884          | 7.0  | 884           | 7.0  | 0.558     | 13.3        | LOS B            | 12.6              | 93.6     | 0.53       | 0.46           | 0.53                       | 51.1        |
| 3                            | R2   | All MCs   | 103          | 4.0  | 103           | 4.0  | * 0.304   | 47.7        | LOS D            | 5.1               | 36.9     | 0.84       | 0.77           | 0.84                       | 27.9        |
| 3u                           | U    | All MCs   | 4            | 0.0  | 4             | 0.0  | 0.304     | 48.2        | LOS D            | 5.1               | 36.9     | 0.84       | 0.77           | 0.84                       | 12.6        |
| Approach                     |      |           | 1055         | 6.3  | 1055          | 6.3  | 0.558     | 16.4        | LOS B            | 12.6              | 93.6     | 0.53       | 0.51           | 0.53                       | 46.9        |
| East: Farm Street            |      |           |              |      |               |      |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 196          | 2.0  | 196           | 2.0  | 0.233     | 31.8        | LOS C            | 6.0               | 42.7     | 0.60       | 1.28           | 0.60                       | 26.1        |
| 5                            | T1   | All MCs   | 234          | 2.0  | 234           | 2.0  | * 0.903   | 79.8        | LOS E            | 16.1              | 114.5    | 1.00       | 1.06           | 1.34                       | 28.4        |
| 6                            | R2   | All MCs   | 119          | 2.0  | 119           | 2.0  | 0.377     | 53.5        | LOS D            | 6.3               | 44.5     | 0.93       | 0.78           | 0.93                       | 32.3        |
| Approach                     |      |           | 548          | 2.0  | 548           | 2.0  | 0.903     | 57.0        | LOS E            | 16.1              | 114.5    | 0.84       | 1.08           | 0.99                       | 26.6        |
| North: Bruce Highway         |      |           |              |      |               |      |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 100          | 5.0  | 100           | 5.0  | 0.073     | 24.5        | LOS C            | 0.5               | 3.8      | 0.15       | 1.09           | 0.15                       | 38.4        |
| 8                            | T1   | All MCs   | 1059         | 6.0  | 1059          | 6.0  | * 0.900   | 67.3        | LOS E            | 34.8              | 256.1    | 1.00       | 1.05           | 1.20                       | 23.1        |
| 9                            | R2   | All MCs   | 149          | 4.0  | 149           | 4.0  | 0.900     | 86.3        | LOS F            | 12.3              | 88.3     | 1.00       | 1.00           | 1.37                       | 26.9        |
| 9u                           | U    | All MCs   | 32           | 0.0  | 32            | 0.0  | 0.900     | 86.8        | LOS F            | 12.3              | 88.3     | 1.00       | 1.00           | 1.37                       | 26.8        |
| Approach                     |      |           | 1340         | 5.6  | 1340          | 5.6  | 0.900     | 66.7        | LOS E            | 34.8              | 256.1    | 0.94       | 1.04           | 1.14                       | 21.9        |
| West: Farm Street            |      |           |              |      |               |      |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 183          | 11.0 | 183           | 11.0 | 0.234     | 7.3         | LOS A            | 1.9               | 14.5     | 0.29       | 1.03           | 0.29                       | 38.8        |
| 11                           | T1   | All MCs   | 146          | 10.0 | 146           | 10.0 | * 0.900   | 71.5        | LOS E            | 9.9               | 75.0     | 1.00       | 1.03           | 1.40                       | 27.8        |
| 12                           | R2   | All MCs   | 129          | 11.0 | 129           | 11.0 | 0.860     | 74.0        | LOS E            | 8.5               | 65.0     | 1.00       | 0.98           | 1.33                       | 18.0        |
| Approach                     |      |           | 459          | 10.7 | 459           | 10.7 | 0.900     | 46.6        | LOS D            | 9.9               | 75.0     | 0.72       | 1.01           | 0.94                       | 28.9        |
| All Vehicles                 |      |           | 3402         | 5.9  | 3402          | 5.9  | 0.903     | 46.8        | LOS D            | 34.8              | 256.1    | 0.77       | 0.88           | 0.90                       | 28.6        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

## Pedestrian Movement Performance



# MOVEMENT SUMMARY

 **Site: [1P] SITE 1\_2027 AM Project (2027 AM PROJECT - SCENARIO 1)**

**Network: [N102] 2027 AM PROJECT - SCENARIO 1 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |       |            |                |                            |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|-------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |       | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          |       |            |                |                            |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m     |            |                |                            | km/h        |
| South: Bruce Highway         |      |           |              |      |               |      |           |             |                  |                   |       |            |                |                            |             |
| 1                            | L2   | All MCs   | 67           | 0.0  | 67            | 0.0  | 0.055     | 6.8         | LOS A            | 0.1               | 0.4   | 0.02       | 0.66           | 0.02                       | 49.3        |
| 2                            | T1   | All MCs   | 912          | 7.0  | 912           | 7.0  | 0.607     | 15.9        | LOS B            | 14.9              | 110.6 | 0.60       | 0.53           | 0.60                       | 48.5        |
| 3                            | R2   | All MCs   | 103          | 4.0  | 103           | 4.0  | * 0.623   | 54.9        | LOS D            | 9.1               | 64.8  | 0.96       | 0.81           | 0.96                       | 25.7        |
| 3u                           | U    | All MCs   | 63           | 0.0  | 63            | 0.0  | 0.623     | 55.4        | LOS E            | 9.1               | 64.8  | 0.96       | 0.81           | 0.96                       | 11.1        |
| Approach                     |      |           | 1145         | 5.9  | 1145          | 5.9  | 0.623     | 21.0        | LOS C            | 14.9              | 110.6 | 0.62       | 0.58           | 0.62                       | 42.6        |
| East: Farm Street            |      |           |              |      |               |      |           |             |                  |                   |       |            |                |                            |             |
| 4                            | L2   | All MCs   | 235          | 2.0  | 235           | 2.0  | 0.328     | 35.7        | LOS D            | 7.5               | 53.4  | 0.71       | 1.25           | 0.71                       | 21.4        |
| 5                            | T1   | All MCs   | 234          | 2.0  | 234           | 2.0  | * 0.903   | 78.9        | LOS E            | 16.2              | 115.3 | 1.00       | 1.07           | 1.35                       | 28.4        |
| 6                            | R2   | All MCs   | 125          | 2.0  | 125           | 2.0  | 0.369     | 52.1        | LOS D            | 6.5               | 46.2  | 0.92       | 0.78           | 0.92                       | 32.7        |
| Approach                     |      |           | 594          | 2.0  | 594           | 2.0  | 0.903     | 56.2        | LOS E            | 16.2              | 115.3 | 0.87       | 1.08           | 1.00                       | 25.2        |
| North: Bruce Highway         |      |           |              |      |               |      |           |             |                  |                   |       |            |                |                            |             |
| 7                            | L2   | All MCs   | 100          | 5.0  | 100           | 5.0  | 0.073     | 24.9        | LOS C            | 0.5               | 3.8   | 0.16       | 1.10           | 0.16                       | 38.2        |
| 8                            | T1   | All MCs   | 1093         | 6.0  | 1093          | 6.0  | * 0.900   | 66.8        | LOS E            | 35.7              | 263.1 | 1.00       | 1.05           | 1.19                       | 23.4        |
| 9                            | R2   | All MCs   | 149          | 4.0  | 149           | 4.0  | 0.900     | 86.7        | LOS F            | 12.3              | 88.3  | 1.00       | 1.00           | 1.37                       | 26.9        |
| 9u                           | U    | All MCs   | 32           | 0.0  | 32            | 0.0  | 0.900     | 87.2        | LOS F            | 12.3              | 88.3  | 1.00       | 1.00           | 1.37                       | 26.8        |
| Approach                     |      |           | 1374         | 5.6  | 1374          | 5.6  | 0.900     | 66.4        | LOS E            | 35.7              | 263.1 | 0.94       | 1.04           | 1.14                       | 21.9        |
| West: Farm Street            |      |           |              |      |               |      |           |             |                  |                   |       |            |                |                            |             |
| 10                           | L2   | All MCs   | 183          | 11.0 | 183           | 11.0 | 0.237     | 7.9         | LOS A            | 2.3               | 17.8  | 0.34       | 1.11           | 0.34                       | 37.7        |
| 11                           | T1   | All MCs   | 146          | 10.0 | 146           | 10.0 | 0.822     | 64.4        | LOS E            | 9.3               | 70.5  | 1.00       | 0.95           | 1.24                       | 29.4        |
| 12                           | R2   | All MCs   | 148          | 11.0 | 148           | 11.0 | * 0.900   | 77.4        | LOS E            | 10.1              | 77.1  | 1.00       | 1.03           | 1.40                       | 17.4        |
| Approach                     |      |           | 478          | 10.7 | 478           | 10.7 | 0.900     | 46.8        | LOS D            | 10.1              | 77.1  | 0.75       | 1.03           | 0.94                       | 28.5        |
| All Vehicles                 |      |           | 3591         | 5.8  | 3591          | 5.8  | 0.903     | 47.6        | LOS D            | 35.7              | 263.1 | 0.80       | 0.90           | 0.93                       | 27.8        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [1G] SITE 1\_2027 AM Project (2027 AM PROJECT - SCENARIO 2)**

**Network: [N103] 2027 AM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %    | [ Total HV ]  | %    | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                   |                            | km/h        |
| South: Bruce Highway         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 1                            | L2   | All MCs   | 67           | 0.0  | 67            | 0.0  | 0.055     | 6.7         | LOS A            | 0.1               | 0.4      | 0.02       | 0.66              | 0.02                       | 49.2        |
| 2                            | T1   | All MCs   | 912          | 7.0  | 912           | 7.0  | 0.596     | 15.1        | LOS B            | 14.4              | 106.8    | 0.58       | 0.51              | 0.58                       | 49.3        |
| 3                            | R2   | All MCs   | 103          | 4.0  | 103           | 4.0  | * 0.351   | 51.3        | LOS D            | 5.4               | 38.8     | 0.88       | 0.77              | 0.88                       | 26.9        |
| 3u                           | U    | All MCs   | 4            | 0.0  | 4             | 0.0  | 0.351     | 51.8        | LOS D            | 5.4               | 38.8     | 0.88       | 0.77              | 0.88                       | 11.8        |
| Approach                     |      |           | 1086         | 6.3  | 1086          | 6.3  | 0.596     | 18.2        | LOS B            | 14.4              | 106.8    | 0.58       | 0.55              | 0.58                       | 45.5        |
| East: Farm Street            |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 4                            | L2   | All MCs   | 235          | 2.0  | 235           | 2.0  | 0.289     | 34.2        | LOS C            | 7.5               | 53.2     | 0.65       | 1.28              | 0.65                       | 24.2        |
| 5                            | T1   | All MCs   | 234          | 2.0  | 234           | 2.0  | * 0.903   | 79.5        | LOS E            | 16.2              | 115.0    | 1.00       | 1.07              | 1.35                       | 28.4        |
| 6                            | R2   | All MCs   | 125          | 2.0  | 125           | 2.0  | 0.383     | 52.9        | LOS D            | 6.6               | 46.7     | 0.93       | 0.78              | 0.93                       | 32.5        |
| Approach                     |      |           | 594          | 2.0  | 594           | 2.0  | 0.903     | 56.0        | LOS E            | 16.2              | 115.0    | 0.85       | 1.09              | 0.98                       | 26.0        |
| North: Bruce Highway         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 7                            | L2   | All MCs   | 100          | 5.0  | 100           | 5.0  | 0.073     | 24.8        | LOS C            | 0.5               | 3.8      | 0.15       | 1.08              | 0.15                       | 38.6        |
| 8                            | T1   | All MCs   | 1093         | 6.0  | 1093          | 6.0  | * 0.900   | 66.8        | LOS E            | 35.7              | 263.1    | 1.00       | 1.05              | 1.19                       | 23.4        |
| 9                            | R2   | All MCs   | 149          | 4.0  | 149           | 4.0  | 0.900     | 86.7        | LOS F            | 12.3              | 88.3     | 1.00       | 1.00              | 1.37                       | 26.9        |
| 9u                           | U    | All MCs   | 32           | 0.0  | 32            | 0.0  | 0.900     | 87.2        | LOS F            | 12.3              | 88.3     | 1.00       | 1.00              | 1.37                       | 26.8        |
| Approach                     |      |           | 1374         | 5.6  | 1374          | 5.6  | 0.900     | 66.4        | LOS E            | 35.7              | 263.1    | 0.94       | 1.04              | 1.14                       | 22.0        |
| West: Farm Street            |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 10                           | L2   | All MCs   | 183          | 11.0 | 183           | 11.0 | 0.237     | 7.8         | LOS A            | 2.2               | 17.1     | 0.33       | 1.09              | 0.33                       | 37.8        |
| 11                           | T1   | All MCs   | 146          | 10.0 | 146           | 10.0 | 0.822     | 64.4        | LOS E            | 9.3               | 70.5     | 1.00       | 0.95              | 1.24                       | 29.4        |
| 12                           | R2   | All MCs   | 148          | 11.0 | 148           | 11.0 | * 0.900   | 77.4        | LOS E            | 10.1              | 77.1     | 1.00       | 1.03              | 1.40                       | 17.4        |
| Approach                     |      |           | 478          | 10.7 | 478           | 10.7 | 0.900     | 46.8        | LOS D            | 10.1              | 77.1     | 0.74       | 1.03              | 0.94                       | 28.6        |
| All Vehicles                 |      |           | 3532         | 5.9  | 3532          | 5.9  | 0.903     | 47.1        | LOS D            | 35.7              | 263.1    | 0.79       | 0.90              | 0.91                       | 28.3        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [1E] SITE 1\_2027 PM Base (2027 PM BASE)**  
**Network: [N104] 2027 PM BASE (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Weekday PM Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|----------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m   |                |                            |             | km/h |
| South: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 1                            | L2   | All MCs   | 37           | 6.0 | 37            | 6.0 | 0.027     | 6.7         | LOS A            | 0.0               | 0.2        | 0.02           | 0.67                       | 0.02        | 48.2 |
| 2                            | T1   | All MCs   | 949          | 4.0 | 949           | 4.0 | 0.514     | 7.7         | LOS A            | 9.3               | 67.3       | 0.36           | 0.32                       | 0.36        | 57.7 |
| 3                            | R2   | All MCs   | 215          | 1.0 | 215           | 1.0 | * 0.388   | 36.8        | LOS D            | 9.0               | 63.5       | 0.75           | 0.78                       | 0.75        | 31.8 |
| 3u                           | U    | All MCs   | 2            | 0.0 | 2             | 0.0 | 0.388     | 37.3        | LOS D            | 9.0               | 63.5       | 0.75           | 0.78                       | 0.75        | 15.5 |
| Approach                     |      |           | 1203         | 3.5 | 1203          | 3.5 | 0.514     | 12.9        | LOS B            | 9.3               | 67.3       | 0.42           | 0.42                       | 0.42        | 50.0 |
| East: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 4                            | L2   | All MCs   | 144          | 2.0 | 144           | 2.0 | 0.164     | 14.3        | LOS B            | 3.7               | 26.1       | 0.47           | 1.08                       | 0.47        | 30.1 |
| 5                            | T1   | All MCs   | 155          | 5.0 | 155           | 5.0 | * 0.900   | 71.1        | LOS E            | 10.4              | 75.9       | 1.00           | 1.03                       | 1.39        | 27.9 |
| 6                            | R2   | All MCs   | 105          | 2.0 | 105           | 2.0 | 0.645     | 65.8        | LOS E            | 6.3               | 44.9       | 1.00           | 0.82                       | 1.06        | 29.2 |
| Approach                     |      |           | 404          | 3.1 | 404           | 3.1 | 0.900     | 49.5        | LOS D            | 10.4              | 75.9       | 0.81           | 0.99                       | 0.98        | 28.8 |
| North: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 7                            | L2   | All MCs   | 137          | 4.0 | 137           | 4.0 | 0.120     | 21.8        | LOS C            | 1.3               | 9.1        | 0.27           | 1.29                       | 0.27        | 35.8 |
| 8                            | T1   | All MCs   | 869          | 4.0 | 869           | 4.0 | * 0.901   | 68.3        | LOS E            | 29.8              | 215.4      | 1.00           | 1.05                       | 1.23        | 21.8 |
| 9                            | R2   | All MCs   | 123          | 9.0 | 123           | 9.0 | 0.900     | 84.0        | LOS F            | 9.7               | 72.6       | 1.00           | 1.00                       | 1.41        | 26.5 |
| 9u                           | U    | All MCs   | 20           | 0.0 | 20            | 0.0 | 0.900     | 84.5        | LOS F            | 9.7               | 72.6       | 1.00           | 1.00                       | 1.41        | 26.5 |
| Approach                     |      |           | 1149         | 4.5 | 1149          | 4.5 | 0.901     | 64.8        | LOS E            | 29.8              | 215.4      | 0.91           | 1.07                       | 1.14        | 22.3 |
| West: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 10                           | L2   | All MCs   | 229          | 5.0 | 229           | 5.0 | 0.274     | 6.7         | LOS A            | 1.9               | 13.8       | 0.25           | 1.05                       | 0.25        | 37.5 |
| 11                           | T1   | All MCs   | 228          | 1.0 | 228           | 1.0 | * 0.900   | 70.9        | LOS E            | 15.3              | 108.3      | 1.00           | 1.05                       | 1.33        | 28.5 |
| 12                           | R2   | All MCs   | 138          | 5.0 | 138           | 5.0 | 0.575     | 62.3        | LOS E            | 7.8               | 57.0       | 0.99           | 0.80                       | 0.99        | 20.8 |
| Approach                     |      |           | 596          | 3.5 | 596           | 3.5 | 0.900     | 44.2        | LOS D            | 15.3              | 108.3      | 0.71           | 0.99                       | 0.83        | 29.7 |
| All Vehicles                 |      |           | 3353         | 3.8 | 3353          | 3.8 | 0.901     | 40.6        | LOS D            | 29.8              | 215.4      | 0.69           | 0.81                       | 0.81        | 30.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

## Pedestrian Movement Performance



# MOVEMENT SUMMARY

 Site: [1Q] SITE 1\_2027 PM Project (2027 PM PROJECT - SCENARIO 1)

Network: [N105] 2027 PM PROJECT - SCENARIO 1 (General)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 46           | 6.0 | 46            | 6.0 | 0.033     | 6.7         | LOS A            | 0.0               | 0.2      | 0.02       | 0.67           | 0.02                       | 48.1        |
| 2                            | T1   | All MCs   | 1022         | 4.0 | 1022          | 4.0 | 0.555     | 7.9         | LOS A            | 10.7              | 77.4     | 0.39       | 0.35           | 0.39                       | 57.3        |
| 3                            | R2   | All MCs   | 215          | 1.0 | 215           | 1.0 | * 0.808   | 48.5        | LOS D            | 20.3              | 143.1    | 0.96       | 0.89           | 1.04                       | 27.5        |
| 3u                           | U    | All MCs   | 147          | 0.0 | 147           | 0.0 | 0.808     | 49.0        | LOS D            | 20.3              | 143.1    | 0.96       | 0.89           | 1.04                       | 12.2        |
| Approach                     |      |           | 1431         | 3.2 | 1431          | 3.2 | 0.808     | 18.2        | LOS B            | 20.3              | 143.1    | 0.52       | 0.49           | 0.54                       | 44.0        |
| East: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 233          | 2.0 | 233           | 2.0 | 0.399     | 24.8        | LOS C            | 7.3               | 52.2     | 0.75       | 1.21           | 0.75                       | 22.0        |
| 5                            | T1   | All MCs   | 155          | 5.0 | 155           | 5.0 | * 0.900   | 71.1        | LOS E            | 10.4              | 75.9     | 1.00       | 1.03           | 1.39                       | 27.9        |
| 6                            | R2   | All MCs   | 122          | 2.0 | 122           | 2.0 | 0.748     | 68.0        | LOS E            | 7.5               | 53.6     | 1.00       | 0.88           | 1.15                       | 28.7        |
| Approach                     |      |           | 509          | 2.9 | 509           | 2.9 | 0.900     | 49.2        | LOS D            | 10.4              | 75.9     | 0.89       | 1.07           | 1.04                       | 26.0        |
| North: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 137          | 4.0 | 137           | 4.0 | 0.122     | 23.9        | LOS C            | 1.3               | 9.2      | 0.30       | 1.37           | 0.30                       | 34.6        |
| 8                            | T1   | All MCs   | 947          | 4.0 | 947           | 4.0 | * 0.901   | 68.3        | LOS E            | 32.1              | 232.7    | 1.00       | 1.05           | 1.22                       | 22.3        |
| 9                            | R2   | All MCs   | 123          | 9.0 | 123           | 9.0 | 0.900     | 86.2        | LOS F            | 9.7               | 72.6     | 1.00       | 1.00           | 1.41                       | 26.5        |
| 9u                           | U    | All MCs   | 20           | 0.0 | 20            | 0.0 | 0.900     | 86.6        | LOS F            | 9.7               | 72.6     | 1.00       | 1.00           | 1.41                       | 26.5        |
| Approach                     |      |           | 1227         | 4.4 | 1227          | 4.4 | 0.901     | 65.4        | LOS E            | 32.1              | 232.7    | 0.92       | 1.08           | 1.14                       | 21.9        |
| West: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 229          | 5.0 | 229           | 5.0 | 0.289     | 7.1         | LOS A            | 2.3               | 17.1     | 0.30       | 1.17           | 0.30                       | 35.3        |
| 11                           | T1   | All MCs   | 228          | 1.0 | 228           | 1.0 | * 0.901   | 70.9        | LOS E            | 15.4              | 108.4    | 1.00       | 1.05           | 1.33                       | 28.5        |
| 12                           | R2   | All MCs   | 180          | 5.0 | 180           | 5.0 | 0.744     | 65.6        | LOS E            | 10.8              | 78.6     | 1.00       | 0.88           | 1.10                       | 20.0        |
| Approach                     |      |           | 638          | 3.6 | 638           | 3.6 | 0.901     | 46.5        | LOS D            | 15.4              | 108.4    | 0.75       | 1.04           | 0.90                       | 28.3        |
| All Vehicles                 |      |           | 3805         | 3.6 | 3805          | 3.6 | 0.901     | 42.3        | LOS D            | 32.1              | 232.7    | 0.74       | 0.85           | 0.86                       | 29.1        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [1H] SITE 1\_2027 PM Project (2027 PM PROJECT - SCENARIO 2)**

**Network: [N106] 2027 PM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|----------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m   |                |                            |             | km/h |
| South: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 1                            | L2   | All MCs   | 46           | 6.0 | 46            | 6.0 | 0.033     | 6.7         | LOS A            | 0.0               | 0.2        | 0.02           | 0.67                       | 0.02        | 48.1 |
| 2                            | T1   | All MCs   | 1022         | 4.0 | 1022          | 4.0 | 0.555     | 7.9         | LOS A            | 10.7              | 77.4       | 0.39           | 0.35                       | 0.39        | 57.3 |
| 3                            | R2   | All MCs   | 215          | 1.0 | 215           | 1.0 | * 0.429   | 40.2        | LOS D            | 9.6               | 67.8       | 0.80           | 0.79                       | 0.80        | 30.5 |
| 3u                           | U    | All MCs   | 2            | 0.0 | 2             | 0.0 | 0.429     | 40.8        | LOS D            | 9.6               | 67.8       | 0.80           | 0.79                       | 0.80        | 14.4 |
| Approach                     |      |           | 1285         | 3.6 | 1285          | 3.6 | 0.555     | 13.3        | LOS B            | 10.7              | 77.4       | 0.45           | 0.43                       | 0.45        | 49.6 |
| East: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 4                            | L2   | All MCs   | 233          | 2.0 | 233           | 2.0 | 0.285     | 20.9        | LOS C            | 7.2               | 51.6       | 0.62           | 1.28                       | 0.62        | 26.4 |
| 5                            | T1   | All MCs   | 155          | 5.0 | 155           | 5.0 | * 0.900   | 71.1        | LOS E            | 10.4              | 75.9       | 1.00           | 1.03                       | 1.39        | 27.9 |
| 6                            | R2   | All MCs   | 122          | 2.0 | 122           | 2.0 | 0.748     | 68.0        | LOS E            | 7.5               | 53.6       | 1.00           | 0.88                       | 1.15        | 28.7 |
| Approach                     |      |           | 509          | 2.9 | 509           | 2.9 | 0.900     | 47.4        | LOS D            | 10.4              | 75.9       | 0.83           | 1.11                       | 0.98        | 27.7 |
| North: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 7                            | L2   | All MCs   | 137          | 4.0 | 137           | 4.0 | 0.119     | 23.6        | LOS C            | 1.3               | 9.2        | 0.28           | 1.32                       | 0.28        | 35.3 |
| 8                            | T1   | All MCs   | 947          | 4.0 | 947           | 4.0 | * 0.901   | 68.3        | LOS E            | 32.1              | 232.8      | 1.00           | 1.05                       | 1.22        | 22.3 |
| 9                            | R2   | All MCs   | 123          | 9.0 | 123           | 9.0 | 0.900     | 86.2        | LOS F            | 9.7               | 72.6       | 1.00           | 1.00                       | 1.41        | 26.5 |
| 9u                           | U    | All MCs   | 20           | 0.0 | 20            | 0.0 | 0.900     | 86.6        | LOS F            | 9.7               | 72.6       | 1.00           | 1.00                       | 1.41        | 26.5 |
| Approach                     |      |           | 1227         | 4.4 | 1227          | 4.4 | 0.901     | 65.4        | LOS E            | 32.1              | 232.8      | 0.92           | 1.08                       | 1.13        | 22.0 |
| West: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 10                           | L2   | All MCs   | 229          | 5.0 | 229           | 5.0 | 0.289     | 7.1         | LOS A            | 2.3               | 17.1       | 0.30           | 1.17                       | 0.30        | 35.3 |
| 11                           | T1   | All MCs   | 228          | 1.0 | 228           | 1.0 | * 0.901   | 70.9        | LOS E            | 15.4              | 108.4      | 1.00           | 1.05                       | 1.33        | 28.5 |
| 12                           | R2   | All MCs   | 180          | 5.0 | 180           | 5.0 | 0.744     | 65.6        | LOS E            | 10.8              | 78.6       | 1.00           | 0.88                       | 1.10        | 20.0 |
| Approach                     |      |           | 638          | 3.6 | 638           | 3.6 | 0.901     | 46.5        | LOS D            | 15.4              | 108.4      | 0.75           | 1.04                       | 0.90        | 28.3 |
| All Vehicles                 |      |           | 3660         | 3.8 | 3660          | 3.8 | 0.901     | 41.3        | LOS D            | 32.1              | 232.8      | 0.71           | 0.85                       | 0.83        | 30.0 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [1F] SITE 1\_2027 SAT Base (2027 SAT BASE)**  
**Network: [N107] 2027 SAT BASE (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Saturday Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | [ Dist ] |            |                |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m        |            |                | km/h        |
| South: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |             |
| 1                            | L2   | All MCs   | 29           | 0.0 | 29            | 0.0 | 0.019     | 6.6         | LOS A            | 0.0               | 0.1      | 0.02       | 0.69           | 48.0        |
| 2                            | T1   | All MCs   | 895          | 4.0 | 895           | 4.0 | 0.415     | 1.9         | LOS A            | 2.7               | 19.4     | 0.11       | 0.10           | 66.5        |
| 3                            | R2   | All MCs   | 225          | 0.0 | 225           | 0.0 | *0.333    | 29.7        | LOS C            | 8.1               | 56.7     | 0.65       | 0.76           | 34.9        |
| 3u                           | U    | All MCs   | 3            | 0.0 | 3             | 0.0 | 0.333     | 30.3        | LOS C            | 8.1               | 56.7     | 0.65       | 0.76           | 18.2        |
| Approach                     |      |           | 1153         | 3.1 | 1153          | 3.1 | 0.415     | 7.5         | LOS A            | 8.1               | 56.7     | 0.22       | 0.24           | 55.9        |
| East: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |          |            |                |             |
| 4                            | L2   | All MCs   | 132          | 2.0 | 132           | 2.0 | 0.141     | 11.4        | LOS B            | 2.6               | 18.6     | 0.37       | 1.00           | 32.7        |
| 5                            | T1   | All MCs   | 89           | 0.0 | 89            | 0.0 | 0.830     | 68.7        | LOS E            | 5.8               | 40.5     | 1.00       | 0.92           | 28.4        |
| 6                            | R2   | All MCs   | 91           | 0.0 | 91            | 0.0 | *0.900    | 79.5        | LOS E            | 6.1               | 43.0     | 1.00       | 0.98           | 26.4        |
| Approach                     |      |           | 312          | 0.8 | 312           | 0.8 | 0.900     | 47.6        | LOS D            | 6.1               | 43.0     | 0.73       | 0.97           | 28.6        |
| North: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |             |
| 7                            | L2   | All MCs   | 148          | 1.0 | 148           | 1.0 | 0.122     | 21.6        | LOS C            | 0.9               | 6.3      | 0.20       | 1.14           | 37.9        |
| 8                            | T1   | All MCs   | 903          | 4.0 | 903           | 4.0 | *0.901    | 68.3        | LOS E            | 30.9              | 223.7    | 1.00       | 1.05           | 22.0        |
| 9                            | R2   | All MCs   | 98           | 3.0 | 98            | 3.0 | 0.900     | 85.3        | LOS F            | 9.4               | 66.8     | 1.00       | 1.00           | 26.4        |
| 9u                           | U    | All MCs   | 40           | 0.0 | 40            | 0.0 | 0.900     | 85.8        | LOS F            | 9.4               | 66.8     | 1.00       | 1.00           | 26.3        |
| Approach                     |      |           | 1189         | 3.4 | 1189          | 3.4 | 0.901     | 64.5        | LOS E            | 30.9              | 223.7    | 0.90       | 1.06           | 22.4        |
| West: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |          |            |                |             |
| 10                           | L2   | All MCs   | 177          | 3.0 | 177           | 3.0 | 0.211     | 5.9         | LOS A            | 0.6               | 4.5      | 0.13       | 1.00           | 37.2        |
| 11                           | T1   | All MCs   | 160          | 2.0 | 160           | 2.0 | *0.900    | 70.9        | LOS E            | 10.7              | 76.4     | 1.00       | 1.02           | 27.9        |
| 12                           | R2   | All MCs   | 31           | 0.0 | 31            | 0.0 | 0.181     | 61.6        | LOS E            | 1.7               | 11.9     | 0.96       | 0.72           | 20.3        |
| Approach                     |      |           | 367          | 2.3 | 367           | 2.3 | 0.900     | 38.8        | LOS D            | 10.7              | 76.4     | 0.58       | 0.99           | 31.3        |
| All Vehicles                 |      |           | 3021         | 2.9 | 3021          | 2.9 | 0.901     | 37.9        | LOS D            | 30.9              | 223.7    | 0.58       | 0.73           | 31.7        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Intersection and Approach LOS values are based on average delay for all vehicle movements.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

## Pedestrian Movement Performance



# MOVEMENT SUMMARY

 **Site: [1R] SITE 1\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 1)**  
**Network: [N108] 2027 SAT PROJECT - SCENARIO 1 (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|----------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m   |                |                            |             | km/h |
| South: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 1                            | L2   | All MCs   | 37           | 0.0 | 37            | 0.0 | 0.024     | 6.6         | LOS A            | 0.0               | 0.2        | 0.02           | 0.68                       | 0.02        | 48.1 |
| 2                            | T1   | All MCs   | 954          | 4.0 | 954           | 4.0 | 0.450     | 2.4         | LOS A            | 3.7               | 27.0       | 0.15           | 0.13                       | 0.15        | 65.6 |
| 3                            | R2   | All MCs   | 222          | 0.0 | 222           | 0.0 | * 0.685   | 37.6        | LOS D            | 17.6              | 123.0      | 0.86           | 0.84                       | 0.86        | 31.2 |
| 3u                           | U    | All MCs   | 151          | 0.0 | 151           | 0.0 | 0.685     | 38.1        | LOS D            | 17.6              | 123.0      | 0.86           | 0.84                       | 0.86        | 15.0 |
| Approach                     |      |           | 1363         | 2.8 | 1363          | 2.8 | 0.685     | 12.2        | LOS B            | 17.6              | 123.0      | 0.34           | 0.34                       | 0.34        | 49.5 |
| East: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 4                            | L2   | All MCs   | 223          | 2.0 | 223           | 2.0 | 0.348     | 18.3        | LOS B            | 6.6               | 47.0       | 0.66           | 1.22                       | 0.66        | 25.5 |
| 5                            | T1   | All MCs   | 89           | 0.0 | 89            | 0.0 | 0.707     | 64.1        | LOS E            | 5.5               | 38.8       | 1.00           | 0.84                       | 1.13        | 29.4 |
| 6                            | R2   | All MCs   | 106          | 0.0 | 106           | 0.0 | * 0.900   | 78.8        | LOS E            | 7.2               | 50.3       | 1.00           | 1.00                       | 1.45        | 26.6 |
| Approach                     |      |           | 419          | 1.1 | 419           | 1.1 | 0.900     | 43.4        | LOS D            | 7.2               | 50.3       | 0.82           | 1.08                       | 0.96        | 26.9 |
| North: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 7                            | L2   | All MCs   | 148          | 1.0 | 148           | 1.0 | 0.123     | 23.4        | LOS C            | 0.9               | 6.7        | 0.23           | 1.21                       | 0.23        | 36.9 |
| 8                            | T1   | All MCs   | 983          | 4.0 | 983           | 4.0 | * 0.901   | 68.0        | LOS E            | 33.3              | 241.4      | 1.00           | 1.05                       | 1.21        | 22.6 |
| 9                            | R2   | All MCs   | 98           | 3.0 | 98            | 3.0 | 0.900     | 87.3        | LOS F            | 9.4               | 66.8       | 1.00           | 1.00                       | 1.42        | 26.4 |
| 9u                           | U    | All MCs   | 40           | 0.0 | 40            | 0.0 | 0.900     | 87.8        | LOS F            | 9.4               | 66.8       | 1.00           | 1.00                       | 1.42        | 26.3 |
| Approach                     |      |           | 1269         | 3.4 | 1269          | 3.4 | 0.901     | 64.9        | LOS E            | 33.3              | 241.4      | 0.91           | 1.06                       | 1.12        | 22.1 |
| West: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 10                           | L2   | All MCs   | 177          | 3.0 | 177           | 3.0 | 0.222     | 6.1         | LOS A            | 0.8               | 5.4        | 0.16           | 1.04                       | 0.16        | 36.2 |
| 11                           | T1   | All MCs   | 160          | 2.0 | 160           | 2.0 | * 0.900   | 70.9        | LOS E            | 10.7              | 76.4       | 1.00           | 1.02                       | 1.38        | 27.9 |
| 12                           | R2   | All MCs   | 74           | 0.0 | 74            | 0.0 | 0.436     | 63.5        | LOS E            | 4.3               | 29.8       | 0.99           | 0.77                       | 0.99        | 19.9 |
| Approach                     |      |           | 411          | 2.1 | 411           | 2.1 | 0.900     | 41.6        | LOS D            | 10.7              | 76.4       | 0.64           | 0.99                       | 0.79        | 30.0 |
| All Vehicles                 |      |           | 3462         | 2.7 | 3462          | 2.7 | 0.901     | 38.8        | LOS D            | 33.3              | 241.4      | 0.64           | 0.77                       | 0.75        | 30.3 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 Site: [1I] SITE 1\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 2)

Network: [N109] 2027 SAT PROJECT - SCENARIO 2 (General)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Farm St - Existing Intersection  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|-------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |       | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |       |            |                |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m     |            |                |                            | km/h        |
| South: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 1                            | L2   | All MCs   | 38           | 0.0 | 38            | 0.0 | 0.024     | 6.6         | LOS A            | 0.0               | 0.2   | 0.02       | 0.68           | 0.02                       | 48.1        |
| 2                            | T1   | All MCs   | 966          | 4.0 | 966           | 4.0 | 0.456     | 2.4         | LOS A            | 3.8               | 27.6  | 0.15       | 0.13           | 0.15                       | 65.5        |
| 3                            | R2   | All MCs   | 225          | 0.0 | 225           | 0.0 | * 0.372   | 33.7        | LOS C            | 8.9               | 62.5  | 0.71       | 0.77           | 0.71                       | 33.1        |
| 3u                           | U    | All MCs   | 3            | 0.0 | 3             | 0.0 | 0.372     | 34.3        | LOS C            | 8.9               | 62.5  | 0.71       | 0.77           | 0.71                       | 16.6        |
| Approach                     |      |           | 1233         | 3.1 | 1233          | 3.1 | 0.456     | 8.4         | LOS A            | 8.9               | 62.5  | 0.25       | 0.27           | 0.25                       | 54.9        |
| East: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 4                            | L2   | All MCs   | 223          | 2.0 | 223           | 2.0 | 0.256     | 16.8        | LOS B            | 6.5               | 46.5  | 0.56       | 1.25           | 0.56                       | 28.4        |
| 5                            | T1   | All MCs   | 89           | 0.0 | 89            | 0.0 | 0.707     | 64.1        | LOS E            | 5.5               | 38.8  | 1.00       | 0.84           | 1.13                       | 29.4        |
| 6                            | R2   | All MCs   | 106          | 0.0 | 106           | 0.0 | * 0.900   | 78.8        | LOS E            | 7.2               | 50.3  | 1.00       | 1.00           | 1.45                       | 26.6        |
| Approach                     |      |           | 419          | 1.1 | 419           | 1.1 | 0.900     | 42.6        | LOS D            | 7.2               | 50.3  | 0.76       | 1.10           | 0.91                       | 28.0        |
| North: Bruce Highway         |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 7                            | L2   | All MCs   | 148          | 1.0 | 148           | 1.0 | 0.121     | 23.1        | LOS C            | 0.9               | 6.3   | 0.21       | 1.17           | 0.21                       | 37.3        |
| 8                            | T1   | All MCs   | 983          | 4.0 | 983           | 4.0 | * 0.901   | 68.0        | LOS E            | 33.3              | 241.4 | 1.00       | 1.05           | 1.21                       | 22.6        |
| 9                            | R2   | All MCs   | 98           | 3.0 | 98            | 3.0 | 0.900     | 87.3        | LOS F            | 9.4               | 66.8  | 1.00       | 1.00           | 1.42                       | 26.4        |
| 9u                           | U    | All MCs   | 40           | 0.0 | 40            | 0.0 | 0.900     | 87.8        | LOS F            | 9.4               | 66.8  | 1.00       | 1.00           | 1.42                       | 26.3        |
| Approach                     |      |           | 1269         | 3.4 | 1269          | 3.4 | 0.901     | 64.8        | LOS E            | 33.3              | 241.4 | 0.91       | 1.06           | 1.12                       | 22.2        |
| West: Farm Street            |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 10                           | L2   | All MCs   | 177          | 3.0 | 177           | 3.0 | 0.224     | 6.1         | LOS A            | 0.8               | 5.4   | 0.16       | 1.04           | 0.16                       | 36.2        |
| 11                           | T1   | All MCs   | 160          | 2.0 | 160           | 2.0 | * 0.900   | 70.9        | LOS E            | 10.7              | 76.4  | 1.00       | 1.02           | 1.38                       | 27.9        |
| 12                           | R2   | All MCs   | 74           | 0.0 | 74            | 0.0 | 0.436     | 63.5        | LOS E            | 4.3               | 29.8  | 0.99       | 0.77           | 0.99                       | 19.9        |
| Approach                     |      |           | 411          | 2.1 | 411           | 2.1 | 0.900     | 41.6        | LOS D            | 10.7              | 76.4  | 0.64       | 0.99           | 0.79                       | 29.9        |
| All Vehicles                 |      |           | 3332         | 2.9 | 3332          | 2.9 | 0.901     | 38.3        | LOS D            | 33.3              | 241.4 | 0.61       | 0.76           | 0.73                       | 31.1        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

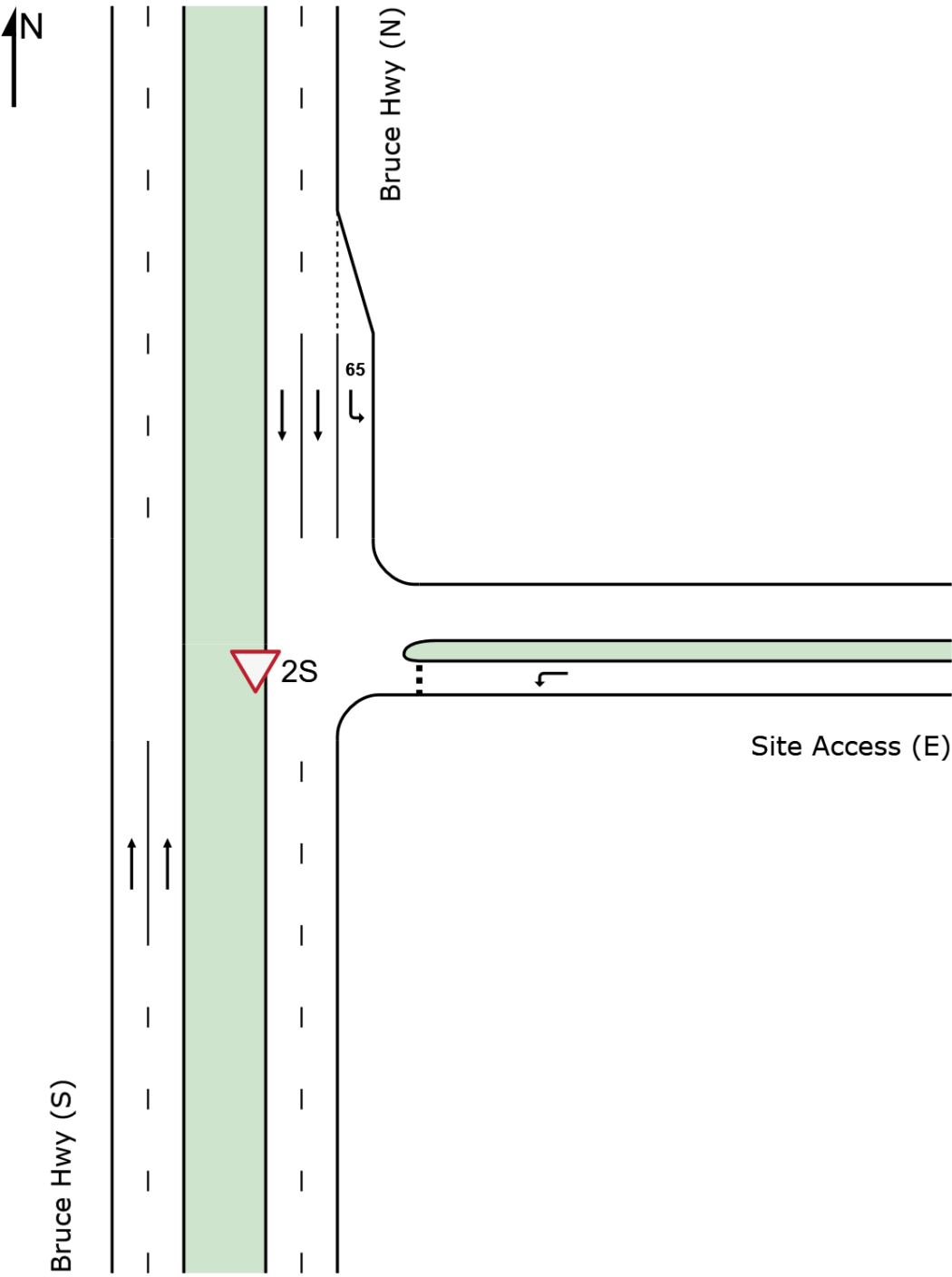
\* Critical Movement (Signal Timing)

# SITE LAYOUT

▽ Site: [2S] SITE 2\_2037 AM Project (2037 AM PROJECT - SCENARIO 1)

Bruce Hwy / Northern Site Access  
2034 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





# MOVEMENT SUMMARY

Site: [2S] SITE 2\_2037 AM Project (2037 AM PROJECT - SCENARIO 1)  
Network: [N111] 2037 AM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Northern Site Access  
2034 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|-----|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |     | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |     |            |                |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m   |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 2                            | T1   | All MCs   | 1255         | 6.0 | 1255          | 6.0 | 0.331     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| Approach                     |      |           | 1255         | 6.0 | 1255          | 6.0 | 0.331     | 0.0         | NA               | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 4                            | L2   | All MCs   | 40           | 0.0 | 40            | 0.0 | 0.067     | 4.9         | LOS A            | 0.3               | 1.9 | 0.60       | 0.53           | 0.60                       | 12.0        |
| Approach                     |      |           | 40           | 0.0 | 40            | 0.0 | 0.067     | 4.9         | LOS A            | 0.3               | 1.9 | 0.60       | 0.53           | 0.60                       | 12.0        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 7                            | L2   | All MCs   | 147          | 0.0 | 147           | 0.0 | 0.079     | 6.4         | LOS A            | 0.0               | 0.0 | 0.00       | 0.61           | 0.00                       | 40.5        |
| 8                            | T1   | All MCs   | 1537         | 6.0 | 1537          | 6.0 | 0.405     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.7        |
| Approach                     |      |           | 1684         | 5.5 | 1684          | 5.5 | 0.405     | 0.6         | NA               | 0.0               | 0.0 | 0.00       | 0.05           | 0.00                       | 65.1        |
| All Vehicles                 |      |           | 2979         | 5.6 | 2979          | 5.6 | 0.405     | 0.4         | NA               | 0.3               | 1.9 | 0.01       | 0.04           | 0.01                       | 65.8        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [2M] SITE 2\_2037 AM Project (2037 AM PROJECT - SCENARIO 2 )  
Network: [N112] 2037 AM PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Northern Site Access  
2034 Weekday AM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 2                            | T1   | All MCs   | 1195         | 6.0 | 1195          | 6.0 | 0.315     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00           | 0.00                       | 69.8        |
| Approach                     |      |           | 1195         | 6.0 | 1195          | 6.0 | 0.315     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00           | 0.00                       | 69.8        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 40           | 0.0 | 40            | 0.0 | 0.066     | 4.9         | LOS A            | 0.3               | 1.9      | 0.60       | 0.53           | 0.60                       | 12.0        |
| Approach                     |      |           | 40           | 0.0 | 40            | 0.0 | 0.066     | 4.9         | LOS A            | 0.3               | 1.9      | 0.60       | 0.53           | 0.60                       | 12.0        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 97           | 0.0 | 97            | 0.0 | 0.052     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61           | 0.00                       | 40.5        |
| 8                            | T1   | All MCs   | 1528         | 6.0 | 1528          | 6.0 | 0.403     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00           | 0.00                       | 69.7        |
| Approach                     |      |           | 1625         | 5.6 | 1625          | 5.6 | 0.403     | 0.4         | NA               | 0.0               | 0.0      | 0.00       | 0.04           | 0.00                       | 66.5        |
| All Vehicles                 |      |           | 2860         | 5.7 | 2860          | 5.7 | 0.403     | 0.3         | NA               | 0.3               | 1.9      | 0.01       | 0.03           | 0.01                       | 66.6        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [2T] SITE 2\_2037 PM Project (2037 PM PROJECT - SCENARIO 1)  
Network: [N114] 2037 PM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Northern Site Access  
2034 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1556         | 4.0 | 1555          | 4.0 | 0.405     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1556         | 4.0 | 1555          | 4.0 | 0.405     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 92           | 0.0 | 92            | 0.0 | 0.128     | 3.8         | LOS A            | 0.5               | 3.8      | 0.57       | 0.50              | 13.2        |
| Approach                     |      |           | 92           | 0.0 | 92            | 0.0 | 0.128     | 3.8         | LOS A            | 0.5               | 3.8      | 0.57       | 0.50              | 13.2        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 339          | 0.0 | 337           | 0.0 | 0.180     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 40.4        |
| 8                            | T1   | All MCs   | 1288         | 4.0 | 1282          | 4.0 | 0.334     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1627         | 3.2 | 1619          | 3.2 | 0.334     | 1.4         | NA               | 0.0               | 0.0      | 0.00       | 0.13              | 59.8        |
| All Vehicles                 |      |           | 3275         | 3.5 | 3266          | 3.5 | 0.405     | 0.8         | NA               | 0.5               | 3.8      | 0.02       | 0.08              | 62.1        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY

Site: [2N] SITE 2\_2037 PM Project (2037 PM PROJECT - SCENARIO 2)  
Network: [N115] 2037 PM PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Northern Site Access  
2034 Weekday PM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1411         | 4.0 | 1411          | 4.0 | 0.367     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1411         | 4.0 | 1411          | 4.0 | 0.367     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 4                            | L2   | All MCs   | 92           | 0.0 | 92            | 0.0 | 0.128     | 3.7         | LOS A            | 0.5               | 3.8      | 0.56       | 0.49              | 0.56                       | 13.2        |
| Approach                     |      |           | 92           | 0.0 | 92            | 0.0 | 0.128     | 3.7         | LOS A            | 0.5               | 3.8      | 0.56       | 0.49              | 0.56                       | 13.2        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 7                            | L2   | All MCs   | 216          | 0.0 | 216           | 0.0 | 0.115     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 0.00                       | 40.4        |
| 8                            | T1   | All MCs   | 1267         | 4.0 | 1267          | 4.0 | 0.330     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1483         | 3.4 | 1483          | 3.4 | 0.330     | 1.0         | NA               | 0.0               | 0.0      | 0.00       | 0.09              | 0.00                       | 62.4        |
| All Vehicles                 |      |           | 2985         | 3.6 | 2985          | 3.6 | 0.367     | 0.6         | NA               | 0.5               | 3.8      | 0.02       | 0.06              | 0.02                       | 63.5        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [2U] SITE 2\_2037 SAT Project (2037 SAT PROJECT - SCENARIO 1)  
Network: [N117] 2037 SAT PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Northern Site Access  
2034 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1501         | 2.0 | 1501          | 2.0 | 0.386     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1501         | 2.0 | 1501          | 2.0 | 0.386     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 88           | 0.0 | 88            | 0.0 | 0.118     | 3.4         | LOS A            | 0.5               | 3.5      | 0.55       | 0.47              | 13.6        |
| Approach                     |      |           | 88           | 0.0 | 88            | 0.0 | 0.118     | 3.4         | LOS A            | 0.5               | 3.5      | 0.55       | 0.47              | 13.6        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 333          | 0.0 | 333           | 0.0 | 0.177     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 40.4        |
| 8                            | T1   | All MCs   | 1209         | 3.0 | 1209          | 3.0 | 0.313     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1542         | 2.4 | 1542          | 2.4 | 0.313     | 1.4         | NA               | 0.0               | 0.0      | 0.00       | 0.13              | 59.5        |
| All Vehicles                 |      |           | 3132         | 2.1 | 3132          | 2.1 | 0.386     | 0.8         | NA               | 0.5               | 3.5      | 0.02       | 0.08              | 62.0        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [20] SITE 2\_2037 SAT Project (2037 SAT PROJECT - SCENARIO 2)  
Network: [N118] 2037 SAT PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Northern Site Access  
2034 Saturday Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|-----|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |     | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |     |            |                |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m   |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 2                            | T1   | All MCs   | 1354         | 2.0 | 1354          | 2.0 | 0.348     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| Approach                     |      |           | 1354         | 2.0 | 1354          | 2.0 | 0.348     | 0.0         | NA               | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 4                            | L2   | All MCs   | 88           | 0.0 | 88            | 0.0 | 0.117     | 3.3         | LOS A            | 0.5               | 3.5 | 0.54       | 0.46           | 0.54                       | 13.8        |
| Approach                     |      |           | 88           | 0.0 | 88            | 0.0 | 0.117     | 3.3         | LOS A            | 0.5               | 3.5 | 0.54       | 0.46           | 0.54                       | 13.8        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 7                            | L2   | All MCs   | 211          | 0.0 | 211           | 0.0 | 0.112     | 6.4         | LOS A            | 0.0               | 0.0 | 0.00       | 0.61           | 0.00                       | 40.4        |
| 8                            | T1   | All MCs   | 1184         | 3.0 | 1184          | 3.0 | 0.306     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| Approach                     |      |           | 1395         | 2.5 | 1395          | 2.5 | 0.306     | 1.0         | NA               | 0.0               | 0.0 | 0.00       | 0.09           | 0.00                       | 62.2        |
| All Vehicles                 |      |           | 2837         | 2.2 | 2837          | 2.2 | 0.348     | 0.6         | NA               | 0.5               | 3.5 | 0.02       | 0.06           | 0.02                       | 63.5        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

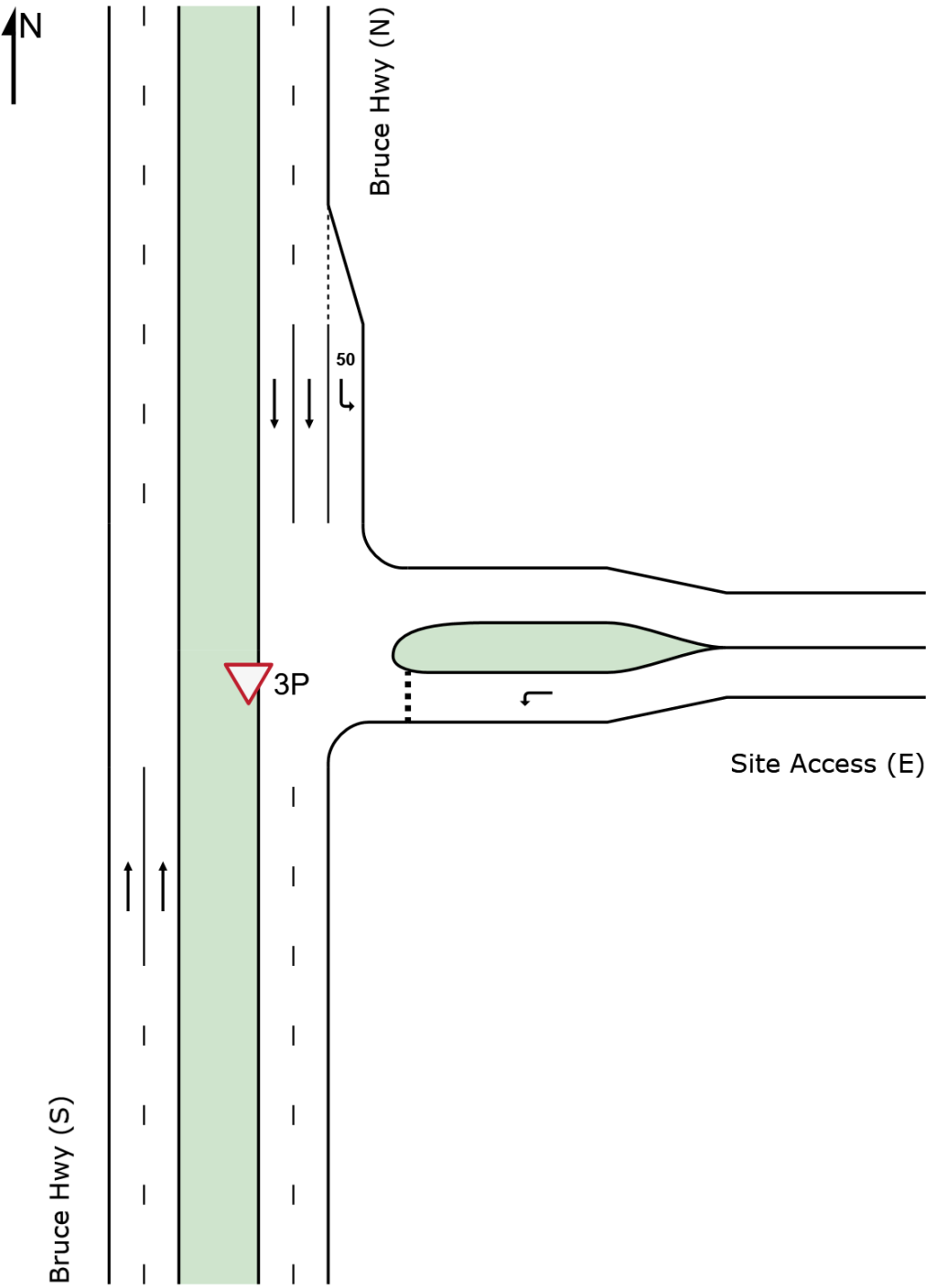


# SITE LAYOUT

▽ Site: [3P] SITE 3\_2027 AM Project (2027 AM PROJECT - SCENARIO 1)

Bruce Hwy / Southern Site Access  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



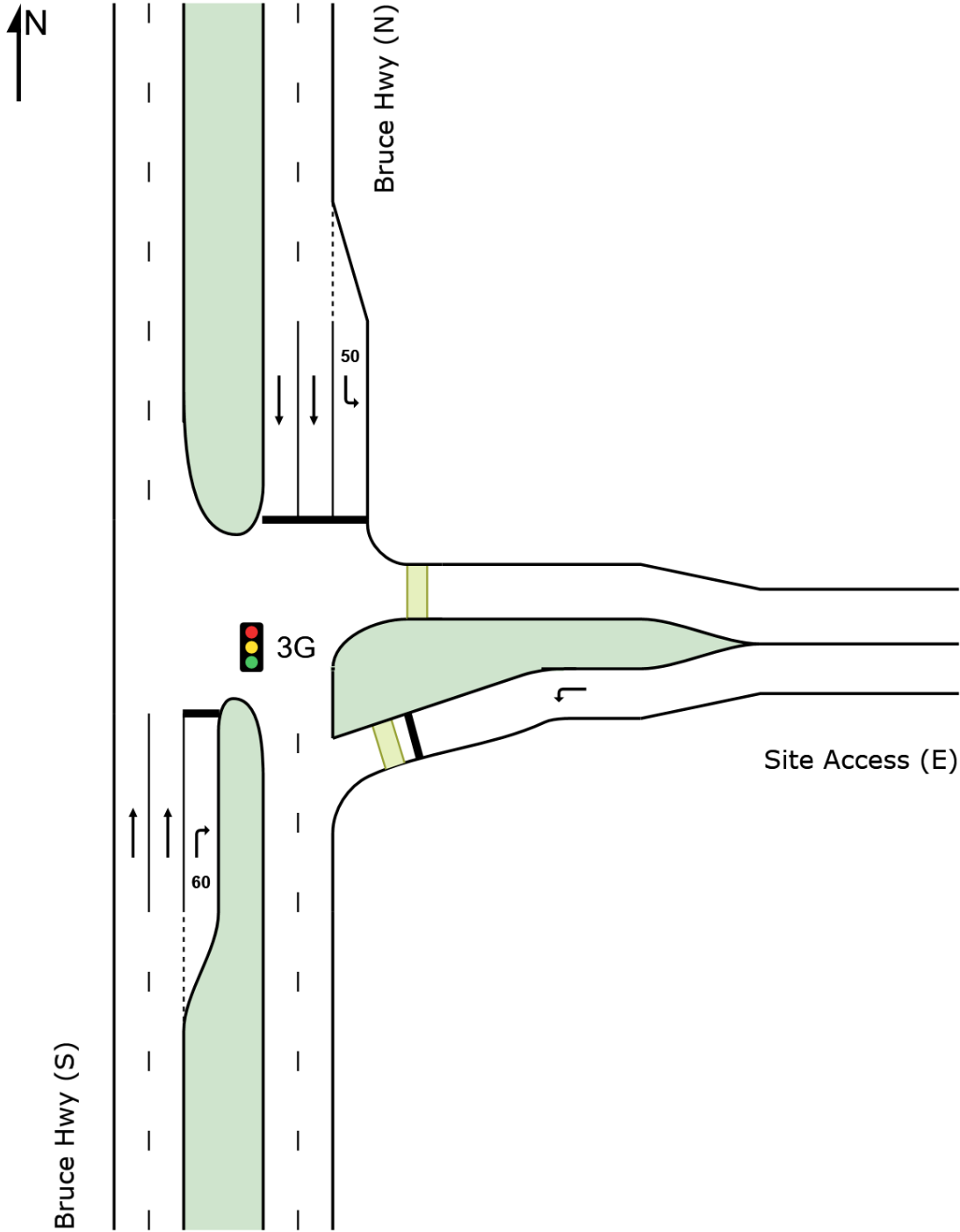


## SCENARIO 2)

2024 Weekday AM Peak Hour

Site Category: (None)

## Site Scenario: 1 | Local Volumes



# MOVEMENT SUMMARY

Site: [3P] SITE 3\_2027 AM Project (2027 AM PROJECT - SCENARIO 1)  
Network: [N102] 2027 AM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1144         | 6.0 | 1144          | 6.0 | 0.302     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1144         | 6.0 | 1144          | 6.0 | 0.302     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 4                            | L2   | All MCs   | 123          | 0.0 | 123           | 0.0 | 0.219     | 5.3         | LOS A            | 0.8               | 5.6      | 0.64       | 0.66              | 0.66                       | 13.1        |
| Approach                     |      |           | 123          | 0.0 | 123           | 0.0 | 0.219     | 5.3         | LOS A            | 0.8               | 5.6      | 0.64       | 0.66              | 0.66                       | 13.1        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 7                            | L2   | All MCs   | 31           | 0.0 | 31            | 0.0 | 0.016     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 0.00                       | 37.2        |
| 8                            | T1   | All MCs   | 1401         | 6.0 | 1401          | 6.0 | 0.369     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1432         | 5.9 | 1432          | 5.9 | 0.369     | 0.2         | NA               | 0.0               | 0.0      | 0.00       | 0.01              | 0.00                       | 68.2        |
| All Vehicles                 |      |           | 2699         | 5.7 | 2699          | 5.7 | 0.369     | 0.3         | NA               | 0.8               | 5.6      | 0.03       | 0.04              | 0.03                       | 63.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY

 **Site: [3G] SITE 3\_2027 AM Project (2027 AM PROJECT - SCENARIO 2)**

**Network: [N103] 2027 AM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |                    |     |                    |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------------|-----|--------------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows       |     | Arrival Flows      |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] veh/h | %   | [ Total HV ] veh/h | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |                    |     |                    |     |           |             |                  |                   |          |            |                |                            |             |
| 2                            | T1   | All MCs   | 1085               | 6.0 | 1085               | 6.0 | 0.286     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00           | 0.00                       | 69.8        |
| 3                            | R2   | All MCs   | 61                 | 0.0 | 61                 | 0.0 | 0.355     | 65.0        | LOS E            | 3.6               | 24.9     | 1.00       | 0.76           | 1.00                       | 6.7         |
| Approach                     |      |           | 1146               | 5.7 | 1146               | 5.7 | 0.355     | 3.5         | LOS A            | 3.6               | 24.9     | 0.05       | 0.04           | 0.05                       | 40.7        |
| East: Site Access (E)        |      |           |                    |     |                    |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 123                | 0.0 | 123                | 0.0 | * 0.396   | 3.2         | LOS A            | 1.3               | 8.8      | 0.45       | 0.76           | 0.45                       | 6.2         |
| Approach                     |      |           | 123                | 0.0 | 123                | 0.0 | 0.396     | 3.2         | LOS A            | 1.3               | 8.8      | 0.45       | 0.76           | 0.45                       | 6.2         |
| North: Bruce Hwy (N)         |      |           |                    |     |                    |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 20                 | 0.0 | 20                 | 0.0 | 0.014     | 9.4         | LOS A            | 0.2               | 1.6      | 0.21       | 0.64           | 0.21                       | 28.6        |
| 8                            | T1   | All MCs   | 1403               | 6.0 | 1403               | 6.0 | * 0.458   | 2.7         | LOS A            | 13.1              | 96.6     | 0.26       | 0.23           | 0.26                       | 52.4        |
| Approach                     |      |           | 1423               | 5.9 | 1423               | 5.9 | 0.458     | 2.8         | LOS A            | 13.1              | 96.6     | 0.26       | 0.24           | 0.26                       | 51.6        |
| All Vehicles                 |      |           | 2693               | 5.5 | 2693               | 5.5 | 0.458     | 3.1         | LOS A            | 13.1              | 96.6     | 0.18       | 0.18           | 0.18                       | 41.2        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |              |           |             |                  |                       |          |            |                |             |              |             |
|---------------------------------|--------------|-----------|-------------|------------------|-----------------------|----------|------------|----------------|-------------|--------------|-------------|
| Mov ID                          | Crossing     | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |          | Prop. Qued | Eff. Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |              | ped/h     | sec         |                  | [ Ped ped             | Dist ] m |            |                | sec         | m            | m/sec       |
| East: Site Access (E)           |              |           |             |                  |                       |          |            |                |             |              |             |
| P2                              | Full         | 11        | 53.0        | LOS E            | 0.0                   | 0.0      | 0.94       | 0.94           | 68.4        | 20.0         | 0.29        |
| P2S                             | Slip/ Bypass | 11        | 48.1        | LOS E            | 0.0                   | 0.0      | 0.90       | 0.90           | 63.4        | 20.0         | 0.32        |
| All Pedestrians                 |              | 21        | 50.5        | LOS E            | 0.0                   | 0.0      | 0.92       | 0.92           | 65.9        | 20.0         | 0.30        |

# MOVEMENT SUMMARY

Site: [3Q] SITE 3\_2027 PM Project (2027 PM PROJECT - SCENARIO 1)  
Network: [N105] 2027 PM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1429         | 4.0 | 1429          | 4.0 | 0.372     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1429         | 4.0 | 1429          | 4.0 | 0.372     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 4                            | L2   | All MCs   | 322          | 0.0 | 322           | 0.0 | 0.481     | 6.0         | LOS A            | 2.7               | 18.7     | 0.66       | 0.91              | 0.97                       | 12.5        |
| Approach                     |      |           | 322          | 0.0 | 322           | 0.0 | 0.481     | 6.0         | LOS A            | 2.7               | 18.7     | 0.66       | 0.91              | 0.97                       | 12.5        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 7                            | L2   | All MCs   | 66           | 0.0 | 66            | 0.0 | 0.035     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 0.00                       | 37.2        |
| 8                            | T1   | All MCs   | 1194         | 4.0 | 1194          | 4.0 | 0.311     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1260         | 3.8 | 1260          | 3.8 | 0.311     | 0.4         | NA               | 0.0               | 0.0      | 0.00       | 0.03              | 0.00                       | 66.1        |
| All Vehicles                 |      |           | 3012         | 3.5 | 3012          | 3.5 | 0.481     | 0.8         | NA               | 2.7               | 18.7     | 0.07       | 0.11              | 0.10                       | 55.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

 **Site: [3H] SITE 3\_2027 PM Project (2027 PM PROJECT - SCENARIO 2)**

**Network: [N106] 2027 PM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 2                            | T1   | All MCs   | 1284         | 4.0 | 1284          | 4.0 | 0.334     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00           | 0.00                       | 69.8        |
| 3                            | R2   | All MCs   | 146          | 0.0 | 146           | 0.0 | 0.311     | 28.8        | LOS C            | 4.6               | 32.2     | 0.57       | 0.74           | 0.57                       | 12.5        |
| Approach                     |      |           | 1431         | 3.6 | 1431          | 3.6 | 0.334     | 3.0         | LOS A            | 4.6               | 32.2     | 0.06       | 0.08           | 0.06                       | 42.3        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 322          | 0.0 | 322           | 0.0 | * 0.485   | 5.4         | LOS A            | 9.9               | 69.6     | 0.84       | 1.02           | 0.84                       | 6.1         |
| Approach                     |      |           | 322          | 0.0 | 322           | 0.0 | 0.485     | 5.4         | LOS A            | 9.9               | 69.6     | 0.84       | 1.02           | 0.84                       | 6.1         |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 43           | 0.0 | 43            | 0.0 | 0.038     | 8.5         | LOS A            | 0.2               | 1.5      | 0.09       | 0.63           | 0.09                       | 29.7        |
| 8                            | T1   | All MCs   | 1195         | 4.0 | 1195          | 4.0 | * 0.479   | 0.9         | LOS A            | 3.3               | 23.8     | 0.07       | 0.07           | 0.07                       | 63.3        |
| Approach                     |      |           | 1238         | 3.9 | 1238          | 3.9 | 0.479     | 1.1         | LOS A            | 3.3               | 23.8     | 0.07       | 0.08           | 0.07                       | 60.4        |
| All Vehicles                 |      |           | 2991         | 3.3 | 2991          | 3.3 | 0.485     | 2.5         | LOS A            | 9.9               | 69.6     | 0.15       | 0.18           | 0.15                       | 36.3        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |              |           |             |                  |                       |          |            |                |             |              |             |
|---------------------------------|--------------|-----------|-------------|------------------|-----------------------|----------|------------|----------------|-------------|--------------|-------------|
| Mov ID                          | Crossing     | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |          | Prop. Qued | Eff. Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |              | ped/h     | sec         |                  | [ Ped ped             | Dist ] m |            |                | sec         | m            | m/sec       |
| East: Site Access (E)           |              |           |             |                  |                       |          |            |                |             |              |             |
| P2                              | Full         | 11        | 53.0        | LOS E            | 0.0                   | 0.0      | 0.94       | 0.94           | 68.4        | 20.0         | 0.29        |
| P2S                             | Slip/ Bypass | 11        | 48.1        | LOS E            | 0.0                   | 0.0      | 0.90       | 0.90           | 63.4        | 20.0         | 0.32        |
| All Pedestrians                 |              | 21        | 50.5        | LOS E            | 0.0                   | 0.0      | 0.92       | 0.92           | 65.9        | 20.0         | 0.30        |

# MOVEMENT SUMMARY

Site: [3R] SITE 3\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 1)  
Network: [N108] 2027 SAT PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |      | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |      |            |                   |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m    |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1381         | 2.0 | 1381          | 2.0 | 0.355     | 0.0         | LOS A            | 0.0               | 0.0  | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1381         | 2.0 | 1381          | 2.0 | 0.355     | 0.0         | NA               | 0.0               | 0.0  | 0.00       | 0.00              | 0.00                       | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
| 4                            | L2   | All MCs   | 320          | 0.0 | 320           | 0.0 | 0.447     | 5.1         | LOS A            | 2.4               | 17.1 | 0.63       | 0.82              | 0.88                       | 13.2        |
| Approach                     |      |           | 320          | 0.0 | 320           | 0.0 | 0.447     | 5.1         | LOS A            | 2.4               | 17.1 | 0.63       | 0.82              | 0.88                       | 13.2        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
| 7                            | L2   | All MCs   | 78           | 0.0 | 78            | 0.0 | 0.042     | 6.4         | LOS A            | 0.0               | 0.0  | 0.00       | 0.61              | 0.00                       | 37.2        |
| 8                            | T1   | All MCs   | 1108         | 3.0 | 1108          | 3.0 | 0.287     | 0.0         | LOS A            | 0.0               | 0.0  | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1186         | 2.8 | 1186          | 2.8 | 0.287     | 0.4         | NA               | 0.0               | 0.0  | 0.00       | 0.04              | 0.00                       | 65.3        |
| All Vehicles                 |      |           | 2887         | 2.1 | 2887          | 2.1 | 0.447     | 0.8         | NA               | 2.4               | 17.1 | 0.07       | 0.11              | 0.10                       | 55.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY



Site: [3I] SITE 3\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 2)

Network: [N109] 2027 SAT PROJECT - SCENARIO 2 (General)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
Network Scenario: 1 | Local Volumes Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 2                            | T1   | All MCs   | 1234         | 2.0 | 1234          | 2.0 | 0.317     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00           | 0.00                       | 69.8        |
| 3                            | R2   | All MCs   | 148          | 0.0 | 148           | 0.0 | 0.287     | 33.4        | LOS C            | 5.5               | 38.2     | 0.66       | 0.76           | 0.66                       | 11.3        |
| Approach                     |      |           | 1382         | 1.8 | 1382          | 1.8 | 0.317     | 3.6         | LOS A            | 5.5               | 38.2     | 0.07       | 0.08           | 0.07                       | 39.3        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 320          | 0.0 | 320           | 0.0 | * 0.467   | 7.8         | LOS A            | 10.5              | 73.5     | 0.85       | 1.05           | 0.85                       | 5.7         |
| Approach                     |      |           | 320          | 0.0 | 320           | 0.0 | 0.467     | 7.8         | LOS A            | 10.5              | 73.5     | 0.85       | 1.05           | 0.85                       | 5.7         |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 52           | 0.0 | 52            | 0.0 | 0.048     | 13.3        | LOS B            | 0.8               | 5.5      | 0.28       | 0.66           | 0.28                       | 24.7        |
| 8                            | T1   | All MCs   | 1109         | 3.0 | 1109          | 3.0 | * 0.460   | 4.3         | LOS A            | 8.1               | 58.0     | 0.27       | 0.24           | 0.27                       | 46.0        |
| Approach                     |      |           | 1161         | 2.9 | 1161          | 2.9 | 0.460     | 4.7         | LOS A            | 8.1               | 58.0     | 0.27       | 0.26           | 0.27                       | 43.9        |
| All Vehicles                 |      |           | 2863         | 2.0 | 2863          | 2.0 | 0.467     | 4.5         | LOS A            | 10.5              | 73.5     | 0.24       | 0.26           | 0.24                       | 30.6        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |              |           |             |                  |                       |          |            |                |             |              |             |
|---------------------------------|--------------|-----------|-------------|------------------|-----------------------|----------|------------|----------------|-------------|--------------|-------------|
| Mov ID                          | Crossing     | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |          | Prop. Qued | Eff. Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |              | ped/h     | sec         |                  | [ Ped ped             | Dist ] m |            |                | sec         | m            | m/sec       |
| East: Site Access (E)           |              |           |             |                  |                       |          |            |                |             |              |             |
| P2                              | Full         | 11        | 53.0        | LOS E            | 0.0                   | 0.0      | 0.94       | 0.94           | 68.4        | 20.0         | 0.29        |
| P2S                             | Slip/ Bypass | 11        | 48.1        | LOS E            | 0.0                   | 0.0      | 0.90       | 0.90           | 63.4        | 20.0         | 0.32        |
| All Pedestrians                 |              | 21        | 50.5        | LOS E            | 0.0                   | 0.0      | 0.92       | 0.92           | 65.9        | 20.0         | 0.30        |

# MOVEMENT SUMMARY

Site: [3S] SITE 3\_2037 AM Project (2037 AM PROJECT - SCENARIO 1)  
Network: [N111] 2037 AM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2034 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1255         | 6.0 | 1255          | 6.0 | 0.331     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1255         | 6.0 | 1255          | 6.0 | 0.331     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 4                            | L2   | All MCs   | 123          | 0.0 | 123           | 0.0 | 0.248     | 6.6         | LOS A            | 0.9               | 6.5      | 0.69       | 0.74              | 0.77                       | 12.1        |
| Approach                     |      |           | 123          | 0.0 | 123           | 0.0 | 0.248     | 6.6         | LOS A            | 0.9               | 6.5      | 0.69       | 0.74              | 0.77                       | 12.1        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |                            |             |
| 7                            | L2   | All MCs   | 31           | 0.0 | 31            | 0.0 | 0.016     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 0.00                       | 37.2        |
| 8                            | T1   | All MCs   | 1546         | 6.0 | 1546          | 6.0 | 0.408     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1577         | 5.9 | 1577          | 5.9 | 0.408     | 0.2         | NA               | 0.0               | 0.0      | 0.00       | 0.01              | 0.00                       | 68.3        |
| All Vehicles                 |      |           | 2955         | 5.7 | 2955          | 5.7 | 0.408     | 0.4         | NA               | 0.9               | 6.5      | 0.03       | 0.04              | 0.03                       | 63.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Minor Road Approach LOS values are based on average delay for all vehicle movements.  
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).  
Two-Way Sign Control Capacity Model: SIDRA Standard.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

 **Site: [3M] SITE 3\_2037 AM Project (2037 AM PROJECT - SCENARIO 2 )**

**Network: [N112] 2037 AM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access

2034 Weekday AM Peak Hour

PROJECT Case (Scenario 2 - signalised southern site access)

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)

**Network Scenario: 1 | Local Volumes**

**Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|----------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m   |                |                            |             | km/h |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 2                            | T1   | All MCs   | 1195         | 6.0 | 1195          | 6.0 | 0.315     | 0.0         | LOS A            | 0.0               | 0.0        | 0.00           | 0.00                       | 0.00        | 69.8 |
| 3                            | R2   | All MCs   | 61           | 0.0 | 61            | 0.0 | 0.355     | 67.8        | LOS E            | 3.7               | 25.7       | 1.00           | 0.78                       | 1.00        | 6.4  |
| Approach                     |      |           | 1256         | 5.7 | 1256          | 5.7 | 0.355     | 3.3         | LOS A            | 3.7               | 25.7       | 0.05           | 0.04                       | 0.05        | 41.5 |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 4                            | L2   | All MCs   | 123          | 0.0 | 123           | 0.0 | * 0.450   | 3.6         | LOS A            | 1.7               | 12.0       | 0.52           | 0.85                       | 0.52        | 6.1  |
| Approach                     |      |           | 123          | 0.0 | 123           | 0.0 | 0.450     | 3.6         | LOS A            | 1.7               | 12.0       | 0.52           | 0.85                       | 0.52        | 6.1  |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 7                            | L2   | All MCs   | 20           | 0.0 | 20            | 0.0 | 0.014     | 9.4         | LOS A            | 0.2               | 1.6        | 0.21           | 0.64                       | 0.21        | 28.6 |
| 8                            | T1   | All MCs   | 1547         | 6.0 | 1547          | 6.0 | * 0.505   | 3.0         | LOS A            | 15.3              | 112.7      | 0.29           | 0.26                       | 0.29        | 51.3 |
| Approach                     |      |           | 1567         | 5.9 | 1567          | 5.9 | 0.505     | 3.1         | LOS A            | 15.3              | 112.7      | 0.29           | 0.26                       | 0.29        | 50.6 |
| All Vehicles                 |      |           | 2946         | 5.6 | 2946          | 5.6 | 0.505     | 3.2         | LOS A            | 15.3              | 112.7      | 0.20           | 0.19                       | 0.20        | 41.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |              |       |       |                  |                       |          |            |                |        |        |             |
|---------------------------------|--------------|-------|-------|------------------|-----------------------|----------|------------|----------------|--------|--------|-------------|
| Mov ID                          | Crossing     | Dem.  | Aver. | Level of Service | AVERAGE BACK OF QUEUE |          | Prop. Qued | Eff. Stop Rate | Travel | Travel | Aver. Speed |
|                                 |              | Flow  | Delay |                  |                       |          |            |                | Time   | Dist.  |             |
|                                 |              | ped/h | sec   |                  | [ Ped ped             | Dist ] m |            |                | sec    | m      |             |
| East: Site Access (E)           |              |       |       |                  |                       |          |            |                |        |        |             |
| P2                              | Full         | 11    | 53.0  | LOS E            | 0.0                   | 0.0      | 0.94       | 0.94           | 68.4   | 20.0   | 0.29        |
| P2S                             | Slip/ Bypass | 11    | 48.1  | LOS E            | 0.0                   | 0.0      | 0.90       | 0.90           | 63.4   | 20.0   | 0.32        |
| All Pedestrians                 |              | 21    | 50.5  | LOS E            | 0.0                   | 0.0      | 0.92       | 0.92           | 65.9   | 20.0   | 0.30        |

# MOVEMENT SUMMARY

Site: [3T] SITE 3\_2037 PM Project (2037 PM PROJECT - SCENARIO 1)  
Network: [N114] 2037 PM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2034 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1556         | 4.0 | 1555          | 4.0 | 0.405     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1556         | 4.0 | 1555          | 4.0 | 0.405     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 322          | 0.0 | 322           | 0.0 | 0.525     | 7.3         | LOS A            | 3.0               | 20.8     | 0.71       | 1.02              | 11.6        |
| Approach                     |      |           | 322          | 0.0 | 322           | 0.0 | 0.525     | 7.3         | LOS A            | 3.0               | 20.8     | 0.71       | 1.02              | 11.6        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 66           | 0.0 | 66            | 0.0 | 0.035     | 6.4         | LOS A            | 0.0               | 0.0      | 0.00       | 0.61              | 37.2        |
| 8                            | T1   | All MCs   | 1314         | 4.0 | 1307          | 4.0 | 0.340     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1380         | 3.8 | 1373          | 3.8 | 0.340     | 0.3         | NA               | 0.0               | 0.0      | 0.00       | 0.03              | 66.4        |
| All Vehicles                 |      |           | 3258         | 3.5 | 3250          | 3.5 | 0.525     | 0.9         | NA               | 3.0               | 20.8     | 0.07       | 0.11              | 55.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY

 **Site: [3N] SITE 3\_2037 PM Project (2037 PM PROJECT - SCENARIO 2)**

**Network: [N115] 2037 PM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access

2034 Weekday PM Peak Hour

PROJECT Case (Scenario 2 - signalised southern site access)

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)

**Network Scenario: 1 | Local Volumes**

**Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|-------------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. ]          | Dist ]     |                   |                            |             |      |
|                              |      |           | veh/h        |     | veh/h         |     |           |             |                  | veh               | m          |                   |                            | km/h        |      |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
| 2                            | T1   | All MCs   | 1411         | 4.0 | 1411          | 4.0 | 0.367     | 0.0         | LOS A            | 0.0               | 0.0        | 0.00              | 0.00                       | 0.00        | 69.7 |
| 3                            | R2   | All MCs   | 146          | 0.0 | 146           | 0.0 | 0.313     | 40.5        | LOS D            | 6.3               | 44.3       | 0.78              | 0.78                       | 0.78        | 9.8  |
| Approach                     |      |           | 1557         | 3.6 | 1557          | 3.6 | 0.367     | 3.8         | LOS A            | 6.3               | 44.3       | 0.07              | 0.07                       | 0.07        | 38.6 |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
| 4                            | L2   | All MCs   | 322          | 0.0 | 322           | 0.0 | * 0.531   | 11.3        | LOS B            | 10.0              | 70.0       | 0.90              | 1.13                       | 0.90        | 5.3  |
| Approach                     |      |           | 322          | 0.0 | 322           | 0.0 | 0.531     | 11.3        | LOS B            | 10.0              | 70.0       | 0.90              | 1.13                       | 0.90        | 5.3  |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
| 7                            | L2   | All MCs   | 43           | 0.0 | 43            | 0.0 | 0.038     | 13.4        | LOS B            | 0.7               | 4.9        | 0.30              | 0.66                       | 0.30        | 24.6 |
| 8                            | T1   | All MCs   | 1315         | 4.0 | 1315          | 4.0 | * 0.526   | 6.6         | LOS A            | 16.2              | 117.4      | 0.40              | 0.36                       | 0.40        | 38.6 |
| Approach                     |      |           | 1358         | 3.9 | 1358          | 3.9 | 0.526     | 6.8         | LOS A            | 16.2              | 117.4      | 0.40              | 0.37                       | 0.40        | 37.8 |
| All Vehicles                 |      |           | 3237         | 3.4 | 3237          | 3.4 | 0.531     | 5.8         | LOS A            | 16.2              | 117.4      | 0.29              | 0.30                       | 0.29        | 28.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |             |           |             |                  |                       |        |            |                |             |              |             |
|---------------------------------|-------------|-----------|-------------|------------------|-----------------------|--------|------------|----------------|-------------|--------------|-------------|
| Mov ID                          | Crossing    | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |        | Prop. Qued | Eff. Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |             | ped/h     | sec         |                  | [ Ped ]               | Dist ] |            |                | sec         | m            | m/sec       |
|                                 |             |           |             |                  | ped                   | m      |            |                |             |              |             |
| East: Site Access (E)           |             |           |             |                  |                       |        |            |                |             |              |             |
| P2                              | Full        | 11        | 53.0        | LOS E            | 0.0                   | 0.0    | 0.94       | 0.94           | 68.4        | 20.0         | 0.29        |
| P2S                             | Slip/Bypass | 11        | 48.1        | LOS E            | 0.0                   | 0.0    | 0.90       | 0.90           | 63.4        | 20.0         | 0.32        |
| All Pedestrians                 |             | 21        | 50.5        | LOS E            | 0.0                   | 0.0    | 0.92       | 0.92           | 65.9        | 20.0         | 0.30        |

# MOVEMENT SUMMARY

Site: [3U] SITE 3\_2037 SAT Project (2037 SAT PROJECT - SCENARIO 1)  
Network: [N117] 2037 SAT PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access  
2034 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |      | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |      |            |                   |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m    |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1501         | 2.0 | 1501          | 2.0 | 0.386     | 0.0         | LOS A            | 0.0               | 0.0  | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1501         | 2.0 | 1501          | 2.0 | 0.386     | 0.0         | NA               | 0.0               | 0.0  | 0.00       | 0.00              | 0.00                       | 69.7        |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
| 4                            | L2   | All MCs   | 320          | 0.0 | 320           | 0.0 | 0.485     | 6.2         | LOS A            | 2.7               | 18.9 | 0.66       | 0.92              | 0.99                       | 12.4        |
| Approach                     |      |           | 320          | 0.0 | 320           | 0.0 | 0.485     | 6.2         | LOS A            | 2.7               | 18.9 | 0.66       | 0.92              | 0.99                       | 12.4        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |      |            |                   |                            |             |
| 7                            | L2   | All MCs   | 78           | 0.0 | 78            | 0.0 | 0.042     | 6.4         | LOS A            | 0.0               | 0.0  | 0.00       | 0.61              | 0.00                       | 37.2        |
| 8                            | T1   | All MCs   | 1220         | 3.0 | 1220          | 3.0 | 0.316     | 0.0         | LOS A            | 0.0               | 0.0  | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1298         | 2.8 | 1298          | 2.8 | 0.316     | 0.4         | NA               | 0.0               | 0.0  | 0.00       | 0.04              | 0.00                       | 65.6        |
| All Vehicles                 |      |           | 3119         | 2.1 | 3119          | 2.1 | 0.485     | 0.8         | NA               | 2.7               | 18.9 | 0.07       | 0.11              | 0.10                       | 55.5        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

 **Site: [30] SITE 3\_2037 SAT Project (2037 SAT PROJECT - SCENARIO 2)**

**Network: [N118] 2037 SAT PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Southern Site Access

2034 Saturday Peak Hour

PROJECT Case (Scenario 2 - signalised southern site access)

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)

**Network Scenario: 1 | Local Volumes**

**Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|-------------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. ]          | Dist ]     |                   |                            |             |      |
|                              |      |           | veh/h        |     | veh/h         |     |           |             |                  | veh               | m          |                   |                            | km/h        |      |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
| 2                            | T1   | All MCs   | 1354         | 2.0 | 1354          | 2.0 | 0.348     | 0.0         | LOS A            | 0.0               | 0.0        | 0.00              | 0.00                       | 0.00        | 69.8 |
| 3                            | R2   | All MCs   | 148          | 0.0 | 148           | 0.0 | 0.304     | 38.2        | LOS D            | 6.1               | 42.9       | 0.74              | 0.77                       | 0.74        | 10.2 |
| Approach                     |      |           | 1502         | 1.8 | 1502          | 1.8 | 0.348     | 3.8         | LOS A            | 6.1               | 42.9       | 0.07              | 0.08                       | 0.07        | 38.7 |
| East: Site Access (E)        |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
| 4                            | L2   | All MCs   | 320          | 0.0 | 320           | 0.0 | * 0.501   | 10.3        | LOS B            | 10.6              | 74.0       | 0.88              | 1.11                       | 0.88        | 5.4  |
| Approach                     |      |           | 320          | 0.0 | 320           | 0.0 | 0.501     | 10.3        | LOS B            | 10.6              | 74.0       | 0.88              | 1.11                       | 0.88        | 5.4  |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |            |                   |                            |             |      |
| 7                            | L2   | All MCs   | 52           | 0.0 | 52            | 0.0 | 0.046     | 12.3        | LOS B            | 0.7               | 4.8        | 0.25              | 0.65                       | 0.25        | 25.6 |
| 8                            | T1   | All MCs   | 1221         | 3.0 | 1221          | 3.0 | * 0.494   | 3.4         | LOS A            | 7.8               | 55.7       | 0.24              | 0.22                       | 0.24        | 49.4 |
| Approach                     |      |           | 1273         | 2.9 | 1273          | 2.9 | 0.494     | 3.8         | LOS A            | 7.8               | 55.7       | 0.24              | 0.23                       | 0.24        | 47.2 |
| All Vehicles                 |      |           | 3095         | 2.1 | 3095          | 2.1 | 0.501     | 4.5         | LOS A            | 10.6              | 74.0       | 0.22              | 0.25                       | 0.22        | 31.4 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |              |           |             |                  |                       |        |            |                |             |              |             |
|---------------------------------|--------------|-----------|-------------|------------------|-----------------------|--------|------------|----------------|-------------|--------------|-------------|
| Mov ID                          | Crossing     | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |        | Prop. Qued | Eff. Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |              | ped/h     | sec         |                  | [ Ped ]               | Dist ] |            |                | sec         | m            | m/sec       |
|                                 |              |           |             |                  | ped                   | m      |            |                |             |              |             |
| East: Site Access (E)           |              |           |             |                  |                       |        |            |                |             |              |             |
| P2                              | Full         | 11        | 53.0        | LOS E            | 0.0                   | 0.0    | 0.94       | 0.94           | 68.4        | 20.0         | 0.29        |
| P2S                             | Slip/ Bypass | 11        | 48.1        | LOS E            | 0.0                   | 0.0    | 0.90       | 0.90           | 63.4        | 20.0         | 0.32        |
| All Pedestrians                 |              | 21        | 50.5        | LOS E            | 0.0                   | 0.0    | 0.92       | 0.92           | 65.9        | 20.0         | 0.30        |

# SITE LAYOUT

▽ Site: [4D] SITE 4\_2027 AM Base (2027 AM BASE)

Bruce Hwy / Macartney St - Existing Intersection

2024 Weekday AM Peak Hour

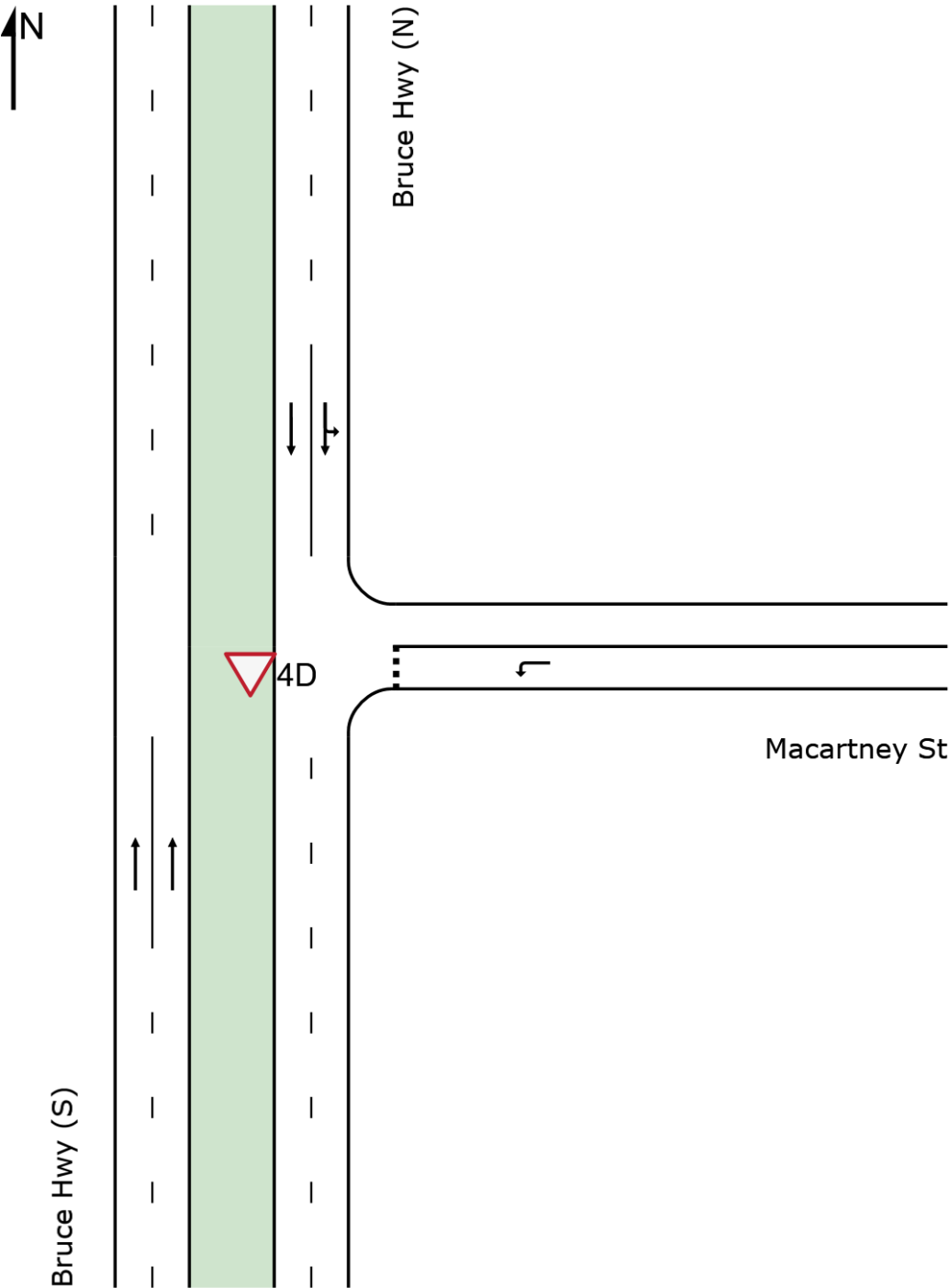
BASE Case

Site Category: (None)

Give-Way (Two-Way)

Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





# MOVEMENT SUMMARY

Site: [4D] SITE 4\_2027 AM Base (2027 AM BASE)  
Network: [N101] 2027 AM BASE (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Weekday AM Peak Hour  
BASE Case  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1055         | 6.0  | 1055          | 6.0  | 0.278     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1055         | 6.0  | 1055          | 6.0  | 0.278     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 33           | 6.0  | 33            | 6.0  | 0.060     | 10.4        | LOS B            | 0.2               | 1.4      | 0.58       | 0.80              | 31.9        |
| Approach                     |      |           | 33           | 6.0  | 33            | 6.0  | 0.060     | 10.4        | LOS B            | 0.2               | 1.4      | 0.58       | 0.80              | 31.9        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 21           | 10.0 | 21            | 10.0 | 0.367     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.02              | 52.5        |
| 8                            | T1   | All MCs   | 1367         | 6.0  | 1367          | 6.0  | 0.367     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.01              | 68.7        |
| Approach                     |      |           | 1388         | 6.1  | 1388          | 6.1  | 0.367     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.01              | 67.8        |
| All Vehicles                 |      |           | 2476         | 6.0  | 2476          | 6.0  | 0.367     | 0.2         | NA               | 0.2               | 1.4      | 0.01       | 0.02              | 67.9        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

▼ Site: [4P] SITE 4\_2027 AM Project (2027 AM PROJECT - SCENARIO 1)  
Network: [N102] 2027 AM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |     |            |                |                            |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|-----|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |     | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          |     |            |                |                            |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m   |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |     |            |                |                            |             |
| 2                            | T1   | All MCs   | 1144         | 6.0  | 1144          | 6.0  | 0.302     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| Approach                     |      |           | 1144         | 6.0  | 1144          | 6.0  | 0.302     | 0.0         | NA               | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |     |            |                |                            |             |
| 4                            | L2   | All MCs   | 33           | 6.0  | 33            | 6.0  | 0.064     | 10.9        | LOS B            | 0.2               | 1.5 | 0.61       | 0.83           | 0.61                       | 31.2        |
| Approach                     |      |           | 33           | 6.0  | 33            | 6.0  | 0.064     | 10.9        | LOS B            | 0.2               | 1.5 | 0.61       | 0.83           | 0.61                       | 31.2        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |     |            |                |                            |             |
| 7                            | L2   | All MCs   | 51           | 10.0 | 51            | 10.0 | 0.403     | 5.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.04           | 0.00                       | 52.0        |
| 8                            | T1   | All MCs   | 1474         | 6.0  | 1474          | 6.0  | 0.403     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.02           | 0.00                       | 67.5        |
| Approach                     |      |           | 1524         | 6.1  | 1524          | 6.1  | 0.403     | 0.2         | NA               | 0.0               | 0.0 | 0.00       | 0.02           | 0.00                       | 65.7        |
| All Vehicles                 |      |           | 2701         | 6.1  | 2701          | 6.1  | 0.403     | 0.3         | NA               | 0.2               | 1.5 | 0.01       | 0.02           | 0.01                       | 67.2        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Minor Road Approach LOS values are based on average delay for all vehicle movements.  
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).  
Two-Way Sign Control Capacity Model: SIDRA Standard.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4G] SITE 4\_2027 AM Project (2027 AM PROJECT - SCENARIO 2)  
Network: [N103] 2027 AM PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1146         | 6.0  | 1146          | 6.0  | 0.302     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1146         | 6.0  | 1146          | 6.0  | 0.302     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 33           | 6.0  | 33            | 6.0  | 0.061     | 10.7        | LOS B            | 0.2               | 1.5      | 0.59       | 0.80              | 31.5        |
| Approach                     |      |           | 33           | 6.0  | 33            | 6.0  | 0.061     | 10.7        | LOS B            | 0.2               | 1.5      | 0.59       | 0.80              | 31.5        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 51           | 10.0 | 51            | 10.0 | 0.404     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.04              | 52.0        |
| 8                            | T1   | All MCs   | 1476         | 6.0  | 1476          | 6.0  | 0.404     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.02              | 67.5        |
| Approach                     |      |           | 1526         | 6.1  | 1526          | 6.1  | 0.404     | 0.2         | NA               | 0.0               | 0.0      | 0.00       | 0.02              | 65.7        |
| All Vehicles                 |      |           | 2705         | 6.1  | 2705          | 6.1  | 0.404     | 0.3         | NA               | 0.2               | 1.5      | 0.01       | 0.02              | 67.3        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4E] SITE 4\_2027 PM Base (2027 PM BASE)  
Network: [N104] 2027 PM BASE (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Weekday PM Peak Hour  
BASE Case  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1203         | 4.0  | 1203          | 4.0  | 0.313     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1203         | 4.0  | 1203          | 4.0  | 0.313     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 34           | 3.0  | 34            | 3.0  | 0.050     | 8.9         | LOS A            | 0.2               | 1.2      | 0.52       | 0.73              | 34.2        |
| Approach                     |      |           | 34           | 3.0  | 34            | 3.0  | 0.050     | 8.9         | LOS A            | 0.2               | 1.2      | 0.52       | 0.73              | 34.2        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 8            | 13.0 | 8             | 13.0 | 0.303     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.01              | 51.9        |
| 8                            | T1   | All MCs   | 1145         | 5.0  | 1145          | 5.0  | 0.303     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.3        |
| Approach                     |      |           | 1154         | 5.1  | 1154          | 5.1  | 0.303     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 68.8        |
| All Vehicles                 |      |           | 2391         | 4.5  | 2391          | 4.5  | 0.313     | 0.2         | NA               | 0.2               | 1.2      | 0.01       | 0.01              | 68.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY

Site: [4Q] SITE 4\_2027 PM Project (2027 PM PROJECT - SCENARIO 1)  
Network: [N105] 2027 PM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1429         | 4.0  | 1429          | 4.0  | 0.372     | 0.1         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1429         | 4.0  | 1429          | 4.0  | 0.372     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 34           | 3.0  | 34            | 3.0  | 0.059     | 10.0        | LOS B            | 0.2               | 1.4      | 0.57       | 0.79              | 32.4        |
| Approach                     |      |           | 34           | 3.0  | 34            | 3.0  | 0.059     | 10.0        | LOS B            | 0.2               | 1.4      | 0.57       | 0.79              | 32.4        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 85           | 13.0 | 85            | 13.0 | 0.400     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.07              | 50.6        |
| 8                            | T1   | All MCs   | 1431         | 5.0  | 1431          | 5.0  | 0.400     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.03              | 66.3        |
| Approach                     |      |           | 1516         | 5.4  | 1516          | 5.4  | 0.400     | 0.3         | NA               | 0.0               | 0.0      | 0.00       | 0.03              | 63.3        |
| All Vehicles                 |      |           | 2979         | 4.7  | 2979          | 4.7  | 0.400     | 0.3         | NA               | 0.2               | 1.4      | 0.01       | 0.03              | 66.8        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [4H] SITE 4\_2027 PM Project (2027 PM PROJECT - SCENARIO 2)  
Network: [N106] 2027 PM PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1432         | 4.0  | 1432          | 4.0  | 0.373     | 0.1         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1432         | 4.0  | 1432          | 4.0  | 0.373     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 34           | 3.0  | 34            | 3.0  | 0.057     | 9.9         | LOS A            | 0.2               | 1.4      | 0.56       | 0.77              | 32.7        |
| Approach                     |      |           | 34           | 3.0  | 34            | 3.0  | 0.057     | 9.9         | LOS A            | 0.2               | 1.4      | 0.56       | 0.77              | 32.7        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 85           | 13.0 | 85            | 13.0 | 0.400     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.07              | 50.6        |
| 8                            | T1   | All MCs   | 1432         | 5.0  | 1432          | 5.0  | 0.400     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.03              | 66.3        |
| Approach                     |      |           | 1517         | 5.4  | 1517          | 5.4  | 0.400     | 0.3         | NA               | 0.0               | 0.0      | 0.00       | 0.03              | 63.3        |
| All Vehicles                 |      |           | 2982         | 4.7  | 2982          | 4.7  | 0.400     | 0.3         | NA               | 0.2               | 1.4      | 0.01       | 0.03              | 66.8        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Minor Road Approach LOS values are based on average delay for all vehicle movements.  
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).  
Two-Way Sign Control Capacity Model: SIDRA Standard.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4F] SITE 4\_2027 SAT Base (2027 SAT BASE)  
Network: [N107] 2027 SAT BASE (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Saturday Peak Hour  
BASE Case  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1153         | 2.0 | 1153          | 2.0 | 0.296     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1153         | 2.0 | 1153          | 2.0 | 0.296     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 22           | 0.0 | 22            | 0.0 | 0.030     | 8.3         | LOS A            | 0.1               | 0.7      | 0.49       | 0.69              | 35.2        |
| Approach                     |      |           | 22           | 0.0 | 22            | 0.0 | 0.030     | 8.3         | LOS A            | 0.1               | 0.7      | 0.49       | 0.69              | 35.2        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 5            | 0.0 | 5             | 0.0 | 0.275     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.01              | 56.0        |
| 8                            | T1   | All MCs   | 1063         | 2.0 | 1063          | 2.0 | 0.275     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.5        |
| Approach                     |      |           | 1068         | 2.0 | 1068          | 2.0 | 0.275     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.2        |
| All Vehicles                 |      |           | 2243         | 2.0 | 2243          | 2.0 | 0.296     | 0.1         | NA               | 0.1               | 0.7      | 0.00       | 0.01              | 68.9        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4R] SITE 4\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 1)  
Network: [N108] 2027 SAT PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1381         | 2.0 | 1381          | 2.0 | 0.355     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1381         | 2.0 | 1381          | 2.0 | 0.355     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Macartney St           |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 22           | 0.0 | 22            | 0.0 | 0.034     | 9.2         | LOS A            | 0.1               | 0.8      | 0.53       | 0.73              | 33.7        |
| Approach                     |      |           | 22           | 0.0 | 22            | 0.0 | 0.034     | 9.2         | LOS A            | 0.1               | 0.8      | 0.53       | 0.73              | 33.7        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 81           | 0.0 | 81            | 0.0 | 0.368     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.07              | 54.3        |
| 8                            | T1   | All MCs   | 1346         | 2.0 | 1346          | 2.0 | 0.368     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.03              | 65.9        |
| Approach                     |      |           | 1427         | 1.9 | 1427          | 1.9 | 0.368     | 0.3         | NA               | 0.0               | 0.0      | 0.00       | 0.04              | 63.9        |
| All Vehicles                 |      |           | 2831         | 1.9 | 2831          | 1.9 | 0.368     | 0.2         | NA               | 0.1               | 0.8      | 0.00       | 0.02              | 67.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY

Site: [4I] SITE 4\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 2)  
Network: [N109] 2027 SAT PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|-----|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |     | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |     |            |                |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m   |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 2                            | T1   | All MCs   | 1381         | 2.0 | 1381          | 2.0 | 0.355     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.7        |
| Approach                     |      |           | 1381         | 2.0 | 1381          | 2.0 | 0.355     | 0.0         | NA               | 0.0               | 0.0 | 0.00       | 0.00           | 0.00                       | 69.7        |
| East: Macartney St           |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 4                            | L2   | All MCs   | 22           | 0.0 | 22            | 0.0 | 0.033     | 9.0         | LOS A            | 0.1               | 0.8 | 0.53       | 0.71           | 0.53                       | 34.0        |
| Approach                     |      |           | 22           | 0.0 | 22            | 0.0 | 0.033     | 9.0         | LOS A            | 0.1               | 0.8 | 0.53       | 0.71           | 0.53                       | 34.0        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                |                            |             |
| 7                            | L2   | All MCs   | 81           | 0.0 | 81            | 0.0 | 0.368     | 5.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.07           | 0.00                       | 54.3        |
| 8                            | T1   | All MCs   | 1347         | 2.0 | 1347          | 2.0 | 0.368     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.03           | 0.00                       | 65.9        |
| Approach                     |      |           | 1428         | 1.9 | 1428          | 1.9 | 0.368     | 0.3         | NA               | 0.0               | 0.0 | 0.00       | 0.04           | 0.00                       | 63.9        |
| All Vehicles                 |      |           | 2832         | 1.9 | 2832          | 1.9 | 0.368     | 0.2         | NA               | 0.1               | 0.8 | 0.00       | 0.02           | 0.00                       | 67.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4J] SITE 4\_2037 AM Base (2037 AM BASE )  
Network: [N110] 2037 AM BASE (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Weekday AM Peak Hour  
BASE Case  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1165         | 6.0  | 1165          | 6.0  | 0.307     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1165         | 6.0  | 1165          | 6.0  | 0.307     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 33           | 6.0  | 33            | 6.0  | 0.068     | 11.4        | LOS B            | 0.2               | 1.6      | 0.64       | 0.85              | 30.5        |
| Approach                     |      |           | 33           | 6.0  | 33            | 6.0  | 0.068     | 11.4        | LOS B            | 0.2               | 1.6      | 0.64       | 0.85              | 30.5        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 21           | 10.0 | 21            | 10.0 | 0.405     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.02              | 52.5        |
| 8                            | T1   | All MCs   | 1512         | 6.0  | 1512          | 6.0  | 0.405     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.01              | 68.7        |
| Approach                     |      |           | 1533         | 6.1  | 1533          | 6.1  | 0.405     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.01              | 67.9        |
| All Vehicles                 |      |           | 2731         | 6.0  | 2731          | 6.0  | 0.405     | 0.2         | NA               | 0.2               | 1.6      | 0.01       | 0.01              | 68.0        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4S] SITE 4\_2037 AM Project (2037 AM PROJECT - SCENARIO 1)  
Network: [N111] 2037 AM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1255         | 6.0  | 1255          | 6.0  | 0.331     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1255         | 6.0  | 1255          | 6.0  | 0.331     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 33           | 6.0  | 33            | 6.0  | 0.073     | 12.1        | LOS B            | 0.2               | 1.7      | 0.66       | 0.86              | 29.6        |
| Approach                     |      |           | 33           | 6.0  | 33            | 6.0  | 0.073     | 12.1        | LOS B            | 0.2               | 1.7      | 0.66       | 0.86              | 29.6        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 51           | 10.0 | 51            | 10.0 | 0.441     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.04              | 52.1        |
| 8                            | T1   | All MCs   | 1619         | 6.0  | 1619          | 6.0  | 0.441     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.02              | 67.6        |
| Approach                     |      |           | 1669         | 6.1  | 1669          | 6.1  | 0.441     | 0.2         | NA               | 0.0               | 0.0      | 0.00       | 0.02              | 65.9        |
| All Vehicles                 |      |           | 2957         | 6.1  | 2957          | 6.1  | 0.441     | 0.3         | NA               | 0.2               | 1.7      | 0.01       | 0.02              | 67.3        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Minor Road Approach LOS values are based on average delay for all vehicle movements.  
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).  
Two-Way Sign Control Capacity Model: SIDRA Standard.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4M] SITE 4\_2037 AM Project (2037 AM PROJECT - SCENARIO 2 )  
Network: [N112] 2037 AM PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Weekday AM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %    | [ Total HV ]  | %    | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1257         | 6.0  | 1257          | 6.0  | 0.331     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| Approach                     |      |           | 1257         | 6.0  | 1257          | 6.0  | 0.331     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 0.00                       | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 4                            | L2   | All MCs   | 33           | 6.0  | 33            | 6.0  | 0.069     | 11.7        | LOS B            | 0.2               | 1.7      | 0.64       | 0.85              | 0.64                       | 30.1        |
| Approach                     |      |           | 33           | 6.0  | 33            | 6.0  | 0.069     | 11.7        | LOS B            | 0.2               | 1.7      | 0.64       | 0.85              | 0.64                       | 30.1        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |                            |             |
| 7                            | L2   | All MCs   | 51           | 10.0 | 51            | 10.0 | 0.442     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.04              | 0.00                       | 52.1        |
| 8                            | T1   | All MCs   | 1620         | 6.0  | 1620          | 6.0  | 0.442     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.02              | 0.00                       | 67.6        |
| Approach                     |      |           | 1671         | 6.1  | 1671          | 6.1  | 0.442     | 0.2         | NA               | 0.0               | 0.0      | 0.00       | 0.02              | 0.00                       | 65.9        |
| All Vehicles                 |      |           | 2960         | 6.1  | 2960          | 6.1  | 0.442     | 0.2         | NA               | 0.2               | 1.7      | 0.01       | 0.02              | 0.01                       | 67.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY



Site: [4K] SITE 4\_2037 PM Base (2037 PM BASE )

Network: [N113] 2037 PM BASE (General)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection

2034 Weekday PM Peak Hour

BASE Case

Site Category: (None)

Give-Way (Two-Way)

Network Scenario: 1 | Local Volumes

Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1328         | 4.0  | 1328          | 4.0  | 0.346     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1328         | 4.0  | 1328          | 4.0  | 0.346     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 34           | 3.0  | 34            | 3.0  | 0.055     | 9.5         | LOS A            | 0.2               | 1.3      | 0.54       | 0.76              | 33.2        |
| Approach                     |      |           | 34           | 3.0  | 34            | 3.0  | 0.055     | 9.5         | LOS A            | 0.2               | 1.3      | 0.54       | 0.76              | 33.2        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 8            | 13.0 | 8             | 13.0 | 0.334     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.01              | 51.9        |
| 8                            | T1   | All MCs   | 1265         | 5.0  | 1265          | 5.0  | 0.334     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.3        |
| Approach                     |      |           | 1274         | 5.1  | 1274          | 5.1  | 0.334     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 68.9        |
| All Vehicles                 |      |           | 2636         | 4.5  | 2636          | 4.5  | 0.346     | 0.2         | NA               | 0.2               | 1.3      | 0.01       | 0.01              | 68.5        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: C:\WORK\WORKING FILES\19BRT0086 Coles Rockhampton\3-Supermarket DA (2025)\19BRT0086 SA01\_B.sipx

# MOVEMENT SUMMARY

Site: [4T] SITE 4\_2037 PM Project (2037 PM PROJECT - SCENARIO 1)  
Network: [N114] 2037 PM PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1556         | 4.0  | 1555          | 4.0  | 0.405     | 0.1         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1556         | 4.0  | 1555          | 4.0  | 0.405     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 34           | 3.0  | 34            | 3.0  | 0.065     | 10.8        | LOS B            | 0.2               | 1.5      | 0.62       | 0.83              | 31.3        |
| Approach                     |      |           | 34           | 3.0  | 34            | 3.0  | 0.065     | 10.8        | LOS B            | 0.2               | 1.5      | 0.62       | 0.83              | 31.3        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 85           | 13.0 | 85            | 13.0 | 0.430     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.06              | 50.7        |
| 8                            | T1   | All MCs   | 1552         | 5.0  | 1545          | 5.0  | 0.430     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.03              | 66.4        |
| Approach                     |      |           | 1637         | 5.4  | 1630          | 5.4  | 0.430     | 0.3         | NA               | 0.0               | 0.0      | 0.00       | 0.03              | 63.7        |
| All Vehicles                 |      |           | 3226         | 4.7  | 3219          | 4.7  | 0.430     | 0.3         | NA               | 0.2               | 1.5      | 0.01       | 0.02              | 66.9        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4N] SITE 4\_2037 PM Project (2037 PM PROJECT - SCENARIO 2)  
Network: [N115] 2037 PM PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Weekday PM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |      | Arrival Flows |      | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |      | [ Total HV ]  |      |           |             |                  | [ Veh. ]          | [ Dist ] |            |                   |             |
|                              |      |           | veh/h        | %    | veh/h         | %    | v/c       | sec         |                  | veh               | m        |            |                   | km/h        |
| South: Bruce Hwy (S)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1557         | 4.0  | 1557          | 4.0  | 0.405     | 0.1         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| Approach                     |      |           | 1557         | 4.0  | 1557          | 4.0  | 0.405     | 0.1         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.7        |
| East: Macartney St           |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 34           | 3.0  | 34            | 3.0  | 0.059     | 10.4        | LOS B            | 0.2               | 1.5      | 0.58       | 0.78              | 31.9        |
| Approach                     |      |           | 34           | 3.0  | 34            | 3.0  | 0.059     | 10.4        | LOS B            | 0.2               | 1.5      | 0.58       | 0.78              | 31.9        |
| North: Bruce Hwy (N)         |      |           |              |      |               |      |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 85           | 13.0 | 85            | 13.0 | 0.432     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.06              | 50.7        |
| 8                            | T1   | All MCs   | 1553         | 5.0  | 1553          | 5.0  | 0.432     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.03              | 66.4        |
| Approach                     |      |           | 1638         | 5.4  | 1638          | 5.4  | 0.432     | 0.3         | NA               | 0.0               | 0.0      | 0.00       | 0.03              | 63.7        |
| All Vehicles                 |      |           | 3228         | 4.7  | 3228          | 4.7  | 0.432     | 0.3         | NA               | 0.2               | 1.5      | 0.01       | 0.02              | 67.0        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [4L] SITE 4\_2037 SAT Base (2037 SAT BASE )  
Network: [N116] 2037 SAT BASE (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Saturday Peak Hour  
BASE Case  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|-------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop of Rate | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. veh        | Dist ] m |            | to Depart         | km/h        |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  |                   |          |            |                   |             |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 2                            | T1   | All MCs   | 1273         | 2.0 | 1273          | 2.0 | 0.327     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| Approach                     |      |           | 1273         | 2.0 | 1273          | 2.0 | 0.327     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.8        |
| East: Macartney St           |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 4                            | L2   | All MCs   | 22           | 0.0 | 22            | 0.0 | 0.032     | 8.7         | LOS A            | 0.1               | 0.8      | 0.51       | 0.71              | 34.4        |
| Approach                     |      |           | 22           | 0.0 | 22            | 0.0 | 0.032     | 8.7         | LOS A            | 0.1               | 0.8      | 0.51       | 0.71              | 34.4        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                   |             |
| 7                            | L2   | All MCs   | 5            | 0.0 | 5             | 0.0 | 0.303     | 5.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.01              | 56.0        |
| 8                            | T1   | All MCs   | 1175         | 2.0 | 1175          | 2.0 | 0.303     | 0.0         | LOS A            | 0.0               | 0.0      | 0.00       | 0.00              | 69.5        |
| Approach                     |      |           | 1180         | 2.0 | 1180          | 2.0 | 0.303     | 0.0         | NA               | 0.0               | 0.0      | 0.00       | 0.00              | 69.2        |
| All Vehicles                 |      |           | 2475         | 2.0 | 2475          | 2.0 | 0.327     | 0.1         | NA               | 0.1               | 0.8      | 0.00       | 0.01              | 69.0        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



# MOVEMENT SUMMARY

Site: [4U] SITE 4\_2037 SAT Project (2037 SAT PROJECT - SCENARIO 1)  
Network: [N117] 2037 SAT PROJECT - SCENARIO 1 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |        |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|--------|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |        | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | Dist ] |            |                   |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m      |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |        |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1501         | 2.0 | 1501          | 2.0 | 0.386     | 0.1         | LOS A            | 0.0               | 0.0    | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1501         | 2.0 | 1501          | 2.0 | 0.386     | 0.1         | NA               | 0.0               | 0.0    | 0.00       | 0.00              | 0.00                       | 69.7        |
| East: Macartney St           |      |           |              |     |               |     |           |             |                  |                   |        |            |                   |                            |             |
| 4                            | L2   | All MCs   | 22           | 0.0 | 22            | 0.0 | 0.038     | 9.8         | LOS A            | 0.1               | 0.9    | 0.57       | 0.77              | 0.57                       | 32.8        |
| Approach                     |      |           | 22           | 0.0 | 22            | 0.0 | 0.038     | 9.8         | LOS A            | 0.1               | 0.9    | 0.57       | 0.77              | 0.57                       | 32.8        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |        |            |                   |                            |             |
| 7                            | L2   | All MCs   | 81           | 0.0 | 81            | 0.0 | 0.396     | 5.0         | LOS A            | 0.0               | 0.0    | 0.00       | 0.07              | 0.00                       | 54.4        |
| 8                            | T1   | All MCs   | 1458         | 2.0 | 1458          | 2.0 | 0.396     | 0.0         | LOS A            | 0.0               | 0.0    | 0.00       | 0.03              | 0.00                       | 66.2        |
| Approach                     |      |           | 1539         | 1.9 | 1539          | 1.9 | 0.396     | 0.3         | NA               | 0.0               | 0.0    | 0.00       | 0.03              | 0.00                       | 64.2        |
| All Vehicles                 |      |           | 3062         | 1.9 | 3062          | 1.9 | 0.396     | 0.2         | NA               | 0.1               | 0.9    | 0.00       | 0.02              | 0.00                       | 67.5        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

Site: [40] SITE 4\_2037 SAT Project (2037 SAT PROJECT - SCENARIO 2)  
Network: [N118] 2037 SAT PROJECT - SCENARIO 2 (General)  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Macartney St - Existing Intersection  
2034 Saturday Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Give-Way (Two-Way)  
Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |     |            |                   |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|-----|------------|-------------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |     | Prop. Qued | Eff. Stop of Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |     |            |                   |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m   |            |                   |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                   |                            |             |
| 2                            | T1   | All MCs   | 1502         | 2.0 | 1502          | 2.0 | 0.386     | 0.1         | LOS A            | 0.0               | 0.0 | 0.00       | 0.00              | 0.00                       | 69.7        |
| Approach                     |      |           | 1502         | 2.0 | 1502          | 2.0 | 0.386     | 0.1         | NA               | 0.0               | 0.0 | 0.00       | 0.00              | 0.00                       | 69.7        |
| East: Macartney St           |      |           |              |     |               |     |           |             |                  |                   |     |            |                   |                            |             |
| 4                            | L2   | All MCs   | 22           | 0.0 | 22            | 0.0 | 0.036     | 9.6         | LOS A            | 0.1               | 0.9 | 0.55       | 0.74              | 0.55                       | 33.1        |
| Approach                     |      |           | 22           | 0.0 | 22            | 0.0 | 0.036     | 9.6         | LOS A            | 0.1               | 0.9 | 0.55       | 0.74              | 0.55                       | 33.1        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |     |            |                   |                            |             |
| 7                            | L2   | All MCs   | 81           | 0.0 | 81            | 0.0 | 0.397     | 5.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.07              | 0.00                       | 54.4        |
| 8                            | T1   | All MCs   | 1459         | 2.0 | 1459          | 2.0 | 0.397     | 0.0         | LOS A            | 0.0               | 0.0 | 0.00       | 0.03              | 0.00                       | 66.2        |
| Approach                     |      |           | 1540         | 1.9 | 1540          | 1.9 | 0.397     | 0.3         | NA               | 0.0               | 0.0 | 0.00       | 0.03              | 0.00                       | 64.2        |
| All Vehicles                 |      |           | 3064         | 1.9 | 3064          | 1.9 | 0.397     | 0.2         | NA               | 0.1               | 0.9 | 0.00       | 0.02              | 0.00                       | 67.5        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

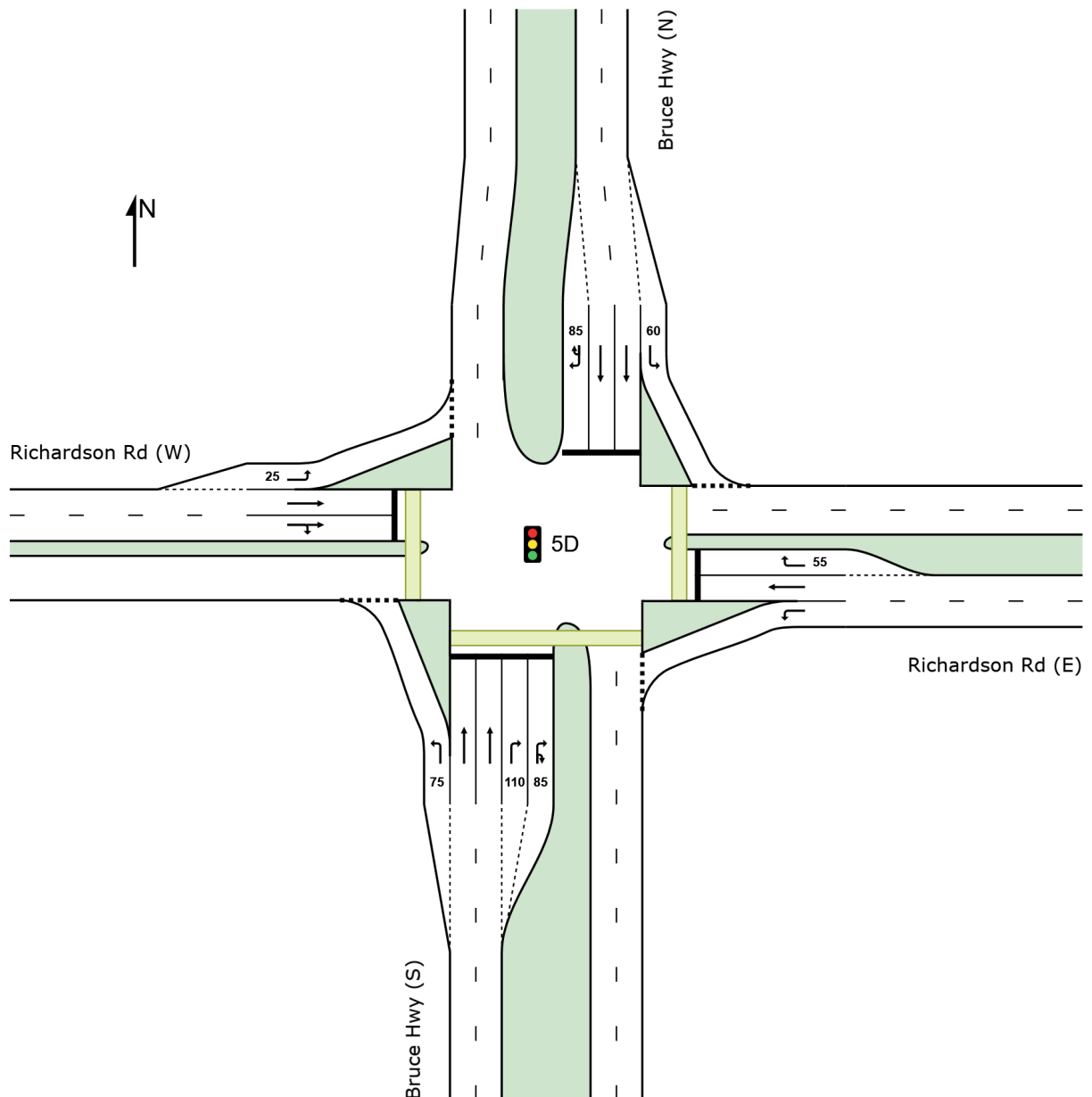
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

 Site: [5D] SITE 5\_2027 AM Base (2027 AM BASE)

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday AM Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated  
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: C:\WORK\WORKING FILES\19BRT0086 Coles Rockhampton\3-Supermarket DA (2025)\19BRT0086 SA01\_B.sipx

# MOVEMENT SUMMARY

 **Site: [5D] SITE 5\_2027 AM Base (2027 AM BASE)**  
**Network: [N101] 2027 AM BASE (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday AM Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated    Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|----------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m   |                |                            |             | km/h |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 1                            | L2   | All MCs   | 92           | 1.0 | 92            | 1.0 | 0.074     | 14.0        | LOS B            | 0.9               | 6.0        | 0.23           | 1.19                       | 0.23        | 30.5 |
| 2                            | T1   | All MCs   | 756          | 6.0 | 756           | 6.0 | 0.900     | 64.7        | LOS E            | 25.8              | 189.7      | 1.00           | 1.05                       | 1.25        | 21.2 |
| 3                            | R2   | All MCs   | 93           | 1.0 | 93            | 1.0 | * 0.744   | 74.0        | LOS E            | 4.4               | 31.2       | 1.00           | 0.85                       | 1.22        | 21.0 |
| 3u                           | U    | All MCs   | 35           | 0.0 | 35            | 0.0 | 0.744     | 76.2        | LOS E            | 3.8               | 26.3       | 1.00           | 0.85                       | 1.24        | 27.2 |
| Approach                     |      |           | 975          | 4.8 | 975           | 4.8 | 0.900     | 61.2        | LOS E            | 25.8              | 189.7      | 0.93           | 1.04                       | 1.15        | 21.5 |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 4                            | L2   | All MCs   | 254          | 0.0 | 254           | 0.0 | 0.342     | 10.4        | LOS B            | 5.6               | 39.1       | 0.44           | 1.00                       | 0.44        | 41.8 |
| 5                            | T1   | All MCs   | 256          | 2.0 | 256           | 2.0 | * 0.900   | 70.8        | LOS E            | 17.2              | 122.2      | 1.00           | 1.06                       | 1.31        | 10.5 |
| 6                            | R2   | All MCs   | 137          | 1.0 | 137           | 1.0 | 0.482     | 60.4        | LOS E            | 7.5               | 52.9       | 0.96           | 0.79                       | 0.96        | 8.3  |
| Approach                     |      |           | 646          | 1.0 | 646           | 1.0 | 0.900     | 44.9        | LOS D            | 17.2              | 122.2      | 0.77           | 0.98                       | 0.89        | 19.4 |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 7                            | L2   | All MCs   | 147          | 4.0 | 147           | 4.0 | 0.104     | 6.8         | LOS A            | 0.2               | 1.3        | 0.03           | 0.69                       | 0.03        | 41.1 |
| 8                            | T1   | All MCs   | 1122         | 6.0 | 1122          | 6.0 | * 0.628   | 8.9         | LOS A            | 13.7              | 101.1      | 0.46           | 0.41                       | 0.46        | 57.1 |
| 9                            | R2   | All MCs   | 131          | 2.0 | 131           | 2.0 | 0.243     | 36.2        | LOS D            | 5.2               | 36.8       | 0.71           | 0.75                       | 0.71        | 19.4 |
| 9u                           | U    | All MCs   | 1            | 0.0 | 1             | 0.0 | 0.243     | 37.8        | LOS D            | 5.2               | 36.8       | 0.71           | 0.75                       | 0.71        | 19.9 |
| Approach                     |      |           | 1401         | 5.4 | 1401          | 5.4 | 0.628     | 11.3        | LOS B            | 13.7              | 101.1      | 0.43           | 0.47                       | 0.43        | 51.1 |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 10                           | L2   | All MCs   | 162          | 8.0 | 162           | 8.0 | 0.167     | 23.6        | LOS C            | 2.6               | 19.4       | 0.41           | 1.35                       | 0.41        | 12.1 |
| 11                           | T1   | All MCs   | 226          | 1.0 | 226           | 1.0 | 0.901     | 79.8        | LOS E            | 14.4              | 102.4      | 1.00           | 1.10                       | 1.39        | 9.9  |
| 12                           | R2   | All MCs   | 137          | 2.0 | 137           | 2.0 | * 0.901   | 74.3        | LOS E            | 14.4              | 102.4      | 1.00           | 1.05                       | 1.34        | 20.5 |
| Approach                     |      |           | 525          | 3.4 | 525           | 3.4 | 0.901     | 61.0        | LOS E            | 14.4              | 102.4      | 0.82           | 1.16                       | 1.08        | 12.9 |
| All Vehicles                 |      |           | 3547         | 4.2 | 3547          | 4.2 | 0.901     | 38.5        | LOS D            | 25.8              | 189.7      | 0.69           | 0.82                       | 0.81        | 27.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Intersection and Approach LOS values are based on average delay for all vehicle movements.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

## Pedestrian Movement Performance



# MOVEMENT SUMMARY

 **Site: [5P] SITE 5\_2027 AM Project (2027 AM PROJECT - SCENARIO 1)**

**Network: [N102] 2027 AM PROJECT - SCENARIO 1 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 92           | 1.0 | 92            | 1.0 | 0.077     | 14.4        | LOS B            | 0.9               | 6.1      | 0.25       | 1.23           | 0.25                       | 29.8        |
| 2                            | T1   | All MCs   | 767          | 6.0 | 767           | 6.0 | 0.900     | 64.6        | LOS E            | 26.2              | 193.1    | 1.00       | 1.05           | 1.25                       | 21.3        |
| 3                            | R2   | All MCs   | 93           | 1.0 | 93            | 1.0 | * 0.744   | 74.0        | LOS E            | 4.4               | 31.2     | 1.00       | 0.85           | 1.22                       | 21.0        |
| 3u                           | U    | All MCs   | 35           | 0.0 | 35            | 0.0 | 0.744     | 76.2        | LOS E            | 3.8               | 26.3     | 1.00       | 0.85           | 1.24                       | 27.2        |
| Approach                     |      |           | 986          | 4.9 | 986           | 4.9 | 0.900     | 61.2        | LOS E            | 26.2              | 193.1    | 0.93       | 1.04           | 1.15                       | 21.5        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 254          | 0.0 | 254           | 0.0 | 0.344     | 10.7        | LOS B            | 5.8               | 40.5     | 0.45       | 1.01           | 0.45                       | 41.5        |
| 5                            | T1   | All MCs   | 256          | 2.0 | 256           | 2.0 | * 0.901   | 70.8        | LOS E            | 17.2              | 122.3    | 1.00       | 1.06           | 1.31                       | 10.5        |
| 6                            | R2   | All MCs   | 152          | 1.0 | 152           | 1.0 | 0.532     | 60.7        | LOS E            | 8.4               | 59.1     | 0.97       | 0.80           | 0.97                       | 8.2         |
| Approach                     |      |           | 661          | 1.0 | 661           | 1.0 | 0.901     | 45.4        | LOS D            | 17.2              | 122.3    | 0.78       | 0.98           | 0.90                       | 19.1        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 169          | 4.0 | 169           | 4.0 | 0.120     | 6.8         | LOS A            | 0.2               | 1.5      | 0.03       | 0.70           | 0.03                       | 40.9        |
| 8                            | T1   | All MCs   | 1131         | 6.0 | 1131          | 6.0 | * 0.637   | 9.3         | LOS A            | 14.3              | 105.3    | 0.47       | 0.42           | 0.47                       | 56.8        |
| 9                            | R2   | All MCs   | 158          | 2.0 | 158           | 2.0 | 0.418     | 40.0        | LOS D            | 9.1               | 64.7     | 0.80       | 0.79           | 0.80                       | 18.3        |
| 9u                           | U    | All MCs   | 48           | 0.0 | 48            | 0.0 | 0.418     | 41.6        | LOS D            | 9.1               | 64.7     | 0.80       | 0.79           | 0.80                       | 18.4        |
| Approach                     |      |           | 1506         | 5.2 | 1506          | 5.2 | 0.637     | 13.3        | LOS B            | 14.3              | 105.3    | 0.47       | 0.50           | 0.47                       | 48.4        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 177          | 8.0 | 177           | 8.0 | 0.201     | 23.1        | LOS C            | 2.9               | 21.5     | 0.46       | 1.32           | 0.46                       | 11.3        |
| 11                           | T1   | All MCs   | 226          | 1.0 | 226           | 1.0 | 0.902     | 78.7        | LOS E            | 14.7              | 104.5    | 1.00       | 1.15           | 1.40                       | 9.8         |
| 12                           | R2   | All MCs   | 137          | 2.0 | 137           | 2.0 | * 0.902   | 74.2        | LOS E            | 14.7              | 104.5    | 1.00       | 1.05           | 1.34                       | 20.6        |
| Approach                     |      |           | 540          | 3.5 | 540           | 3.5 | 0.902     | 59.3        | LOS E            | 14.7              | 104.5    | 0.82       | 1.18           | 1.08                       | 12.8        |
| All Vehicles                 |      |           | 3694         | 4.1 | 3694          | 4.1 | 0.902     | 38.6        | LOS D            | 26.2              | 193.1    | 0.70       | 0.83           | 0.82                       | 27.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [5G] SITE 5\_2027 AM Project (2027 AM PROJECT - SCENARIO 2)**  
**Network: [N103] 2027 AM PROJECT - SCENARIO 2 (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday AM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated    Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 92           | 1.0 | 92            | 1.0 | 0.077     | 14.4        | LOS B            | 0.9               | 6.1      | 0.25       | 1.23           | 0.25                       | 29.8        |
| 2                            | T1   | All MCs   | 767          | 6.0 | 767           | 6.0 | 0.900     | 64.6        | LOS E            | 26.2              | 193.1    | 1.00       | 1.05           | 1.25                       | 21.3        |
| 3                            | R2   | All MCs   | 93           | 1.0 | 93            | 1.0 | * 0.744   | 74.0        | LOS E            | 4.4               | 31.2     | 1.00       | 0.85           | 1.22                       | 21.0        |
| 3u                           | U    | All MCs   | 35           | 0.0 | 35            | 0.0 | 0.744     | 76.2        | LOS E            | 3.8               | 26.3     | 1.00       | 0.85           | 1.24                       | 27.2        |
| Approach                     |      |           | 986          | 4.9 | 986           | 4.9 | 0.900     | 61.2        | LOS E            | 26.2              | 193.1    | 0.93       | 1.04           | 1.15                       | 21.5        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 254          | 0.0 | 254           | 0.0 | 0.344     | 10.7        | LOS B            | 5.8               | 40.6     | 0.45       | 1.01           | 0.45                       | 41.5        |
| 5                            | T1   | All MCs   | 256          | 2.0 | 256           | 2.0 | * 0.901   | 70.8        | LOS E            | 17.2              | 122.3    | 1.00       | 1.06           | 1.31                       | 10.5        |
| 6                            | R2   | All MCs   | 152          | 1.0 | 152           | 1.0 | 0.532     | 60.7        | LOS E            | 8.4               | 59.1     | 0.97       | 0.80           | 0.97                       | 8.2         |
| Approach                     |      |           | 661          | 1.0 | 661           | 1.0 | 0.901     | 45.4        | LOS D            | 17.2              | 122.3    | 0.78       | 0.98           | 0.90                       | 19.1        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 169          | 4.0 | 169           | 4.0 | 0.120     | 6.8         | LOS A            | 0.2               | 1.5      | 0.03       | 0.70           | 0.03                       | 40.9        |
| 8                            | T1   | All MCs   | 1131         | 6.0 | 1131          | 6.0 | * 0.637   | 9.3         | LOS A            | 14.3              | 105.4    | 0.47       | 0.42           | 0.47                       | 56.7        |
| 9                            | R2   | All MCs   | 158          | 2.0 | 158           | 2.0 | 0.424     | 40.1        | LOS D            | 9.3               | 65.6     | 0.80       | 0.79           | 0.80                       | 18.3        |
| 9u                           | U    | All MCs   | 51           | 0.0 | 51            | 0.0 | 0.424     | 41.7        | LOS D            | 9.3               | 65.6     | 0.80       | 0.79           | 0.80                       | 18.3        |
| Approach                     |      |           | 1508         | 5.2 | 1508          | 5.2 | 0.637     | 13.3        | LOS B            | 14.3              | 105.4    | 0.47       | 0.50           | 0.47                       | 48.3        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 177          | 8.0 | 177           | 8.0 | 0.202     | 23.0        | LOS C            | 2.9               | 21.5     | 0.46       | 1.32           | 0.46                       | 11.3        |
| 11                           | T1   | All MCs   | 226          | 1.0 | 226           | 1.0 | 0.901     | 78.7        | LOS E            | 14.7              | 104.5    | 1.00       | 1.15           | 1.40                       | 9.8         |
| 12                           | R2   | All MCs   | 137          | 2.0 | 137           | 2.0 | * 0.901   | 74.2        | LOS E            | 14.7              | 104.5    | 1.00       | 1.05           | 1.34                       | 20.6        |
| Approach                     |      |           | 540          | 3.5 | 540           | 3.5 | 0.901     | 59.3        | LOS E            | 14.7              | 104.5    | 0.82       | 1.18           | 1.08                       | 12.8        |
| All Vehicles                 |      |           | 3696         | 4.1 | 3696          | 4.1 | 0.901     | 38.6        | LOS D            | 26.2              | 193.1    | 0.70       | 0.83           | 0.82                       | 27.4        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [5E] SITE 5\_2027 PM Base (2027 PM BASE)**  
**Network: [N104] 2027 PM BASE (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday PM Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated    Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|------------|----------------|----------------------------|-------------|------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |      |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m   |                |                            |             | km/h |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 1                            | L2   | All MCs   | 165          | 2.0 | 165           | 2.0 | 0.132     | 15.7        | LOS B            | 1.6               | 11.6       | 0.25           | 1.27                       | 0.25        | 28.3 |
| 2                            | T1   | All MCs   | 867          | 5.0 | 867           | 5.0 | * 0.900   | 62.7        | LOS E            | 30.4              | 222.2      | 1.00           | 1.05                       | 1.23        | 21.9 |
| 3                            | R2   | All MCs   | 214          | 1.0 | 214           | 1.0 | 0.900     | 78.9        | LOS E            | 9.2               | 64.8       | 1.00           | 0.99                       | 1.42        | 20.1 |
| 3u                           | U    | All MCs   | 44           | 0.0 | 44            | 0.0 | 0.900     | 80.9        | LOS F            | 8.3               | 58.3       | 1.00           | 0.99                       | 1.44        | 26.4 |
| Approach                     |      |           | 1291         | 3.8 | 1291          | 3.8 | 0.900     | 60.0        | LOS E            | 30.4              | 222.2      | 0.90           | 1.07                       | 1.14        | 21.6 |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 4                            | L2   | All MCs   | 140          | 1.0 | 140           | 1.0 | 0.165     | 7.0         | LOS A            | 1.3               | 9.3        | 0.21           | 0.79                       | 0.21        | 46.5 |
| 5                            | T1   | All MCs   | 239          | 1.0 | 239           | 1.0 | * 0.900   | 68.1        | LOS E            | 16.0              | 112.8      | 1.00           | 1.05                       | 1.32        | 10.4 |
| 6                            | R2   | All MCs   | 153          | 0.0 | 153           | 0.0 | 0.597     | 59.8        | LOS E            | 8.6               | 60.5       | 0.99           | 0.81                       | 0.99        | 7.9  |
| Approach                     |      |           | 532          | 0.7 | 532           | 0.7 | 0.900     | 49.7        | LOS D            | 16.0              | 112.8      | 0.79           | 0.91                       | 0.93        | 16.5 |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 7                            | L2   | All MCs   | 142          | 1.0 | 142           | 1.0 | 0.100     | 6.7         | LOS A            | 0.1               | 0.8        | 0.03           | 0.70                       | 0.03        | 41.2 |
| 8                            | T1   | All MCs   | 900          | 6.0 | 900           | 6.0 | 0.494     | 7.6         | LOS A            | 8.6               | 63.2       | 0.35           | 0.31                       | 0.35        | 58.7 |
| 9                            | R2   | All MCs   | 139          | 4.0 | 139           | 4.0 | * 0.263   | 36.6        | LOS D            | 5.6               | 40.3       | 0.72           | 0.75                       | 0.72        | 19.3 |
| 9u                           | U    | All MCs   | 1            | 0.0 | 1             | 0.0 | 0.263     | 38.2        | LOS D            | 5.6               | 40.3       | 0.72           | 0.75                       | 0.72        | 19.7 |
| Approach                     |      |           | 1182         | 5.2 | 1182          | 5.2 | 0.494     | 10.9        | LOS B            | 8.6               | 63.2       | 0.36           | 0.41                       | 0.36        | 50.7 |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |            |                |                            |             |      |
| 10                           | L2   | All MCs   | 182          | 1.0 | 182           | 1.0 | 0.197     | 20.5        | LOS C            | 3.3               | 23.6       | 0.49           | 1.32                       | 0.49        | 10.7 |
| 11                           | T1   | All MCs   | 205          | 0.0 | 205           | 0.0 | * 0.906   | 77.2        | LOS E            | 12.0              | 84.2       | 1.00           | 1.14                       | 1.43        | 9.7  |
| 12                           | R2   | All MCs   | 99           | 1.0 | 99            | 1.0 | 0.906     | 76.4        | LOS E            | 12.0              | 84.2       | 1.00           | 1.04                       | 1.38        | 20.3 |
| Approach                     |      |           | 486          | 0.6 | 486           | 0.6 | 0.906     | 55.8        | LOS E            | 12.0              | 84.2       | 0.81           | 1.19                       | 1.07        | 12.4 |
| All Vehicles                 |      |           | 3491         | 3.3 | 3491          | 3.3 | 0.906     | 41.2        | LOS D            | 30.4              | 222.2      | 0.69           | 0.84                       | 0.83        | 26.0 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

## Pedestrian Movement Performance

# MOVEMENT SUMMARY

 **Site: [5Q] SITE 5\_2027 PM Project (2027 PM PROJECT - SCENARIO 1)**

**Network: [N105] 2027 PM PROJECT - SCENARIO 1 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|-------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |       | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          |       |            |                |                            |             |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m     |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 1                            | L2   | All MCs   | 165          | 2.0 | 165           | 2.0 | 0.145     | 16.3        | LOS B            | 1.6               | 11.6  | 0.32       | 1.40           | 0.32                       | 26.3        |
| 2                            | T1   | All MCs   | 894          | 5.0 | 894           | 5.0 | * 0.902   | 62.7        | LOS E            | 31.7              | 231.2 | 1.00       | 1.05           | 1.23                       | 22.0        |
| 3                            | R2   | All MCs   | 214          | 1.0 | 214           | 1.0 | 0.900     | 79.5        | LOS E            | 9.2               | 64.8  | 1.00       | 0.99           | 1.42                       | 20.1        |
| 3u                           | U    | All MCs   | 44           | 0.0 | 44            | 0.0 | 0.900     | 80.9        | LOS F            | 8.3               | 58.3  | 1.00       | 0.99           | 1.44                       | 26.4        |
| Approach                     |      |           | 1317         | 3.8 | 1317          | 3.8 | 0.902     | 60.2        | LOS E            | 31.7              | 231.2 | 0.91       | 1.09           | 1.15                       | 21.4        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 4                            | L2   | All MCs   | 140          | 1.0 | 140           | 1.0 | 0.167     | 7.2         | LOS A            | 1.4               | 9.8   | 0.21       | 0.80           | 0.21                       | 46.3        |
| 5                            | T1   | All MCs   | 239          | 1.0 | 239           | 1.0 | * 0.900   | 68.1        | LOS E            | 16.0              | 112.8 | 1.00       | 1.05           | 1.32                       | 10.4        |
| 6                            | R2   | All MCs   | 186          | 0.0 | 186           | 0.0 | 0.728     | 62.6        | LOS E            | 11.0              | 77.2  | 1.00       | 0.87           | 1.08                       | 7.6         |
| Approach                     |      |           | 565          | 0.7 | 565           | 0.7 | 0.900     | 51.2        | LOS D            | 16.0              | 112.8 | 0.81       | 0.93           | 0.97                       | 15.7        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 7                            | L2   | All MCs   | 202          | 1.0 | 202           | 1.0 | 0.143     | 6.7         | LOS A            | 0.2               | 1.4   | 0.03       | 0.71           | 0.03                       | 40.5        |
| 8                            | T1   | All MCs   | 922          | 6.0 | 922           | 6.0 | 0.510     | 8.0         | LOS A            | 9.2               | 68.0  | 0.37       | 0.33           | 0.37                       | 58.3        |
| 9                            | R2   | All MCs   | 209          | 4.0 | 209           | 4.0 | * 0.757   | 48.0        | LOS D            | 18.5              | 132.6 | 0.95       | 0.87           | 0.99                       | 16.4        |
| 9u                           | U    | All MCs   | 133          | 0.0 | 133           | 0.0 | 0.757     | 49.6        | LOS D            | 18.5              | 132.6 | 0.95       | 0.87           | 0.99                       | 16.0        |
| Approach                     |      |           | 1466         | 4.5 | 1466          | 4.5 | 0.757     | 17.3        | LOS B            | 18.5              | 132.6 | 0.46       | 0.51           | 0.47                       | 42.8        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |       |            |                |                            |             |
| 10                           | L2   | All MCs   | 217          | 1.0 | 217           | 1.0 | 0.327     | 21.5        | LOS C            | 4.9               | 34.8  | 0.66       | 1.26           | 0.66                       | 8.6         |
| 11                           | T1   | All MCs   | 205          | 0.0 | 205           | 0.0 | 0.909     | 76.1        | LOS E            | 12.5              | 88.0  | 1.00       | 1.14           | 1.44                       | 9.6         |
| 12                           | R2   | All MCs   | 99           | 1.0 | 99            | 1.0 | * 0.909   | 76.6        | LOS E            | 12.5              | 88.0  | 1.00       | 1.05           | 1.39                       | 20.2        |
| Approach                     |      |           | 521          | 0.6 | 521           | 0.6 | 0.909     | 53.5        | LOS D            | 12.5              | 88.0  | 0.86       | 1.17           | 1.11                       | 11.9        |
| All Vehicles                 |      |           | 3869         | 3.2 | 3869          | 3.2 | 0.909     | 41.7        | LOS D            | 31.7              | 231.2 | 0.72       | 0.86           | 0.86                       | 25.0        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)



# MOVEMENT SUMMARY

 **Site: [5H] SITE 5\_2027 PM Project (2027 PM PROJECT - SCENARIO 2)**

**Network: [N106] 2027 PM PROJECT - SCENARIO 2 (General)**

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Weekday PM Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated    Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |        |            |                     |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|--------|------------|---------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |        | Prop. Qued | Eff. Stop of Cycles | Aver. Speed |
|                              |      |           | [ Total HV ] |     | [ Total HV ]  |     |           |             |                  | [ Veh. ]          | Dist ] |            | Rate to Depart      | km/h        |
|                              |      |           | veh/h        | %   | veh/h         | %   | v/c       | sec         |                  | veh               | m      |            |                     |             |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |        |            |                     |             |
| 1                            | L2   | All MCs   | 165          | 2.0 | 165           | 2.0 | 0.145     | 16.3        | LOS B            | 1.6               | 11.6   | 0.32       | 1.40                | 26.2        |
| 2                            | T1   | All MCs   | 894          | 5.0 | 894           | 5.0 | *0.902    | 62.7        | LOS E            | 31.7              | 231.2  | 1.00       | 1.05                | 22.0        |
| 3                            | R2   | All MCs   | 214          | 1.0 | 214           | 1.0 | 0.900     | 79.5        | LOS E            | 9.2               | 64.8   | 1.00       | 0.99                | 20.1        |
| 3u                           | U    | All MCs   | 44           | 0.0 | 44            | 0.0 | 0.900     | 80.9        | LOS F            | 8.3               | 58.3   | 1.00       | 0.99                | 26.4        |
| Approach                     |      |           | 1317         | 3.8 | 1317          | 3.8 | 0.902     | 60.2        | LOS E            | 31.7              | 231.2  | 0.91       | 1.09                | 21.4        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |        |            |                     |             |
| 4                            | L2   | All MCs   | 140          | 1.0 | 140           | 1.0 | 0.167     | 7.2         | LOS A            | 1.4               | 9.8    | 0.22       | 0.80                | 46.3        |
| 5                            | T1   | All MCs   | 239          | 1.0 | 239           | 1.0 | *0.900    | 68.1        | LOS E            | 16.0              | 112.8  | 1.00       | 1.05                | 10.4        |
| 6                            | R2   | All MCs   | 186          | 0.0 | 186           | 0.0 | 0.728     | 62.6        | LOS E            | 11.0              | 77.2   | 1.00       | 0.87                | 7.6         |
| Approach                     |      |           | 565          | 0.7 | 565           | 0.7 | 0.900     | 51.2        | LOS D            | 16.0              | 112.8  | 0.81       | 0.93                | 15.7        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |        |            |                     |             |
| 7                            | L2   | All MCs   | 202          | 1.0 | 202           | 1.0 | 0.143     | 6.7         | LOS A            | 0.2               | 1.4    | 0.03       | 0.71                | 40.5        |
| 8                            | T1   | All MCs   | 922          | 6.0 | 922           | 6.0 | 0.510     | 8.0         | LOS A            | 9.2               | 68.0   | 0.37       | 0.33                | 58.3        |
| 9                            | R2   | All MCs   | 209          | 4.0 | 209           | 4.0 | *0.763    | 48.3        | LOS D            | 18.8              | 134.1  | 0.95       | 0.87                | 16.3        |
| 9u                           | U    | All MCs   | 135          | 0.0 | 135           | 0.0 | 0.763     | 49.9        | LOS D            | 18.8              | 134.1  | 0.95       | 0.87                | 15.9        |
| Approach                     |      |           | 1468         | 4.5 | 1468          | 4.5 | 0.763     | 17.4        | LOS B            | 18.8              | 134.1  | 0.46       | 0.51                | 42.7        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |        |            |                     |             |
| 10                           | L2   | All MCs   | 217          | 1.0 | 217           | 1.0 | 0.329     | 21.5        | LOS C            | 4.9               | 34.8   | 0.66       | 1.26                | 8.6         |
| 11                           | T1   | All MCs   | 205          | 0.0 | 205           | 0.0 | 0.908     | 76.0        | LOS E            | 12.5              | 87.9   | 1.00       | 1.14                | 9.6         |
| 12                           | R2   | All MCs   | 99           | 1.0 | 99            | 1.0 | *0.908    | 76.5        | LOS E            | 12.5              | 87.9   | 1.00       | 1.05                | 20.3        |
| Approach                     |      |           | 521          | 0.6 | 521           | 0.6 | 0.908     | 53.4        | LOS D            | 12.5              | 87.9   | 0.86       | 1.17                | 11.9        |
| All Vehicles                 |      |           | 3872         | 3.2 | 3872          | 3.2 | 0.908     | 41.7        | LOS D            | 31.7              | 231.2  | 0.72       | 0.86                | 25.0        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Intersection and Approach LOS values are based on average delay for all vehicle movements.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [5F] SITE 5\_2027 SAT Base (2027 SAT BASE)**  
**Network: [N107] 2027 SAT BASE (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Saturday Peak Hour  
BASE Case  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 143          | 2.0 | 143           | 2.0 | 0.103     | 15.6        | LOS B            | 0.8               | 5.6      | 0.14       | 1.05           | 0.14                       | 32.1        |
| 2                            | T1   | All MCs   | 897          | 3.0 | 897           | 3.0 | * 0.900   | 62.6        | LOS E            | 31.2              | 223.8    | 1.00       | 1.05           | 1.22                       | 22.0        |
| 3                            | R2   | All MCs   | 185          | 0.0 | 185           | 0.0 | 0.900     | 79.3        | LOS E            | 8.5               | 59.3     | 1.00       | 0.99           | 1.43                       | 20.0        |
| 3u                           | U    | All MCs   | 49           | 0.0 | 49            | 0.0 | 0.900     | 81.5        | LOS F            | 7.4               | 52.1     | 1.00       | 0.98           | 1.45                       | 26.2        |
| Approach                     |      |           | 1275         | 2.3 | 1275          | 2.3 | 0.900     | 60.5        | LOS E            | 31.2              | 223.8    | 0.90       | 1.04           | 1.14                       | 21.8        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 60           | 0.0 | 60            | 0.0 | 0.068     | 6.0         | LOS A            | 0.3               | 1.8      | 0.11       | 0.73           | 0.11                       | 47.8        |
| 5                            | T1   | All MCs   | 153          | 0.0 | 153           | 0.0 | * 0.900   | 71.1        | LOS E            | 10.2              | 71.6     | 1.00       | 1.02           | 1.39                       | 10.0        |
| 6                            | R2   | All MCs   | 132          | 1.0 | 132           | 1.0 | 0.820     | 71.0        | LOS E            | 8.4               | 59.1     | 1.00       | 0.94           | 1.25                       | 6.8         |
| Approach                     |      |           | 344          | 0.4 | 344           | 0.4 | 0.900     | 59.7        | LOS E            | 10.2              | 71.6     | 0.85       | 0.94           | 1.11                       | 12.9        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 166          | 0.0 | 166           | 0.0 | 0.112     | 6.7         | LOS A            | 0.1               | 0.9      | 0.03       | 0.71           | 0.03                       | 40.5        |
| 8                            | T1   | All MCs   | 827          | 3.0 | 827           | 3.0 | 0.385     | 2.2         | LOS A            | 2.7               | 19.5     | 0.12       | 0.11           | 0.12                       | 66.3        |
| 9                            | R2   | All MCs   | 94           | 0.0 | 94            | 0.0 | * 0.142   | 29.1        | LOS C            | 3.1               | 21.6     | 0.59       | 0.71           | 0.59                       | 21.7        |
| 9u                           | U    | All MCs   | 1            | 0.0 | 1             | 0.0 | 0.142     | 30.7        | LOS C            | 3.1               | 21.6     | 0.59       | 0.71           | 0.59                       | 23.1        |
| Approach                     |      |           | 1088         | 2.3 | 1088          | 2.3 | 0.385     | 5.2         | LOS A            | 3.1               | 21.6     | 0.15       | 0.25           | 0.15                       | 57.6        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 123          | 1.0 | 123           | 1.0 | 0.130     | 16.5        | LOS B            | 2.3               | 16.1     | 0.45       | 1.32           | 0.45                       | 10.7        |
| 11                           | T1   | All MCs   | 181          | 0.0 | 181           | 0.0 | * 0.904   | 76.0        | LOS E            | 9.8               | 68.5     | 1.00       | 1.03           | 1.44                       | 9.7         |
| 12                           | R2   | All MCs   | 83           | 0.0 | 83            | 0.0 | 0.904     | 77.3        | LOS E            | 9.8               | 68.5     | 1.00       | 1.02           | 1.41                       | 20.1        |
| Approach                     |      |           | 387          | 0.3 | 387           | 0.3 | 0.904     | 57.4        | LOS E            | 9.8               | 68.5     | 0.82       | 1.12           | 1.12                       | 12.6        |
| All Vehicles                 |      |           | 3095         | 1.8 | 3095          | 1.8 | 0.904     | 40.6        | LOS D            | 31.2              | 223.8    | 0.62       | 0.76           | 0.79                       | 26.9        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Intersection and Approach LOS values are based on average delay for all vehicle movements.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

## Pedestrian Movement Performance

# MOVEMENT SUMMARY

 **Site: [5R] SITE 5\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 1)**  
**Network: [N108] 2027 SAT PROJECT - SCENARIO 1 (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 1 - LILO southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 143          | 2.0 | 143           | 2.0 | 0.112     | 16.2        | LOS B            | 0.8               | 5.4      | 0.18       | 1.07           | 0.18                       | 32.1        |
| 2                            | T1   | All MCs   | 923          | 3.0 | 923           | 3.0 | * 0.901   | 62.8        | LOS E            | 32.2              | 231.5    | 1.00       | 1.05           | 1.22                       | 22.1        |
| 3                            | R2   | All MCs   | 185          | 0.0 | 185           | 0.0 | 0.900     | 80.0        | LOS F            | 8.5               | 59.3     | 1.00       | 0.99           | 1.43                       | 20.0        |
| 3u                           | U    | All MCs   | 49           | 0.0 | 49            | 0.0 | 0.900     | 81.5        | LOS F            | 7.4               | 52.1     | 1.00       | 0.98           | 1.45                       | 26.2        |
| Approach                     |      |           | 1301         | 2.3 | 1301          | 2.3 | 0.901     | 60.8        | LOS E            | 32.2              | 231.5    | 0.91       | 1.04           | 1.15                       | 21.8        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 60           | 0.0 | 60            | 0.0 | 0.068     | 6.2         | LOS A            | 0.3               | 2.3      | 0.13       | 0.74           | 0.13                       | 47.6        |
| 5                            | T1   | All MCs   | 153          | 0.0 | 153           | 0.0 | 0.776     | 61.8        | LOS E            | 9.4               | 65.8     | 1.00       | 0.90           | 1.16                       | 11.3        |
| 6                            | R2   | All MCs   | 167          | 1.0 | 167           | 1.0 | * 0.900   | 76.3        | LOS E            | 11.3              | 79.5     | 1.00       | 1.03           | 1.38                       | 6.4         |
| Approach                     |      |           | 380          | 0.4 | 380           | 0.4 | 0.900     | 59.4        | LOS E            | 11.3              | 79.5     | 0.86       | 0.93           | 1.09                       | 12.5        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 226          | 0.0 | 226           | 0.0 | 0.154     | 6.7         | LOS A            | 0.2               | 1.5      | 0.03       | 0.72           | 0.03                       | 39.8        |
| 8                            | T1   | All MCs   | 849          | 3.0 | 849           | 3.0 | 0.407     | 3.2         | LOS A            | 3.9               | 27.8     | 0.17       | 0.15           | 0.17                       | 64.8        |
| 9                            | R2   | All MCs   | 164          | 0.0 | 164           | 0.0 | * 0.548   | 38.6        | LOS D            | 13.4              | 94.0     | 0.82       | 0.82           | 0.82                       | 18.6        |
| 9u                           | U    | All MCs   | 132          | 0.0 | 132           | 0.0 | 0.548     | 40.2        | LOS D            | 13.4              | 94.0     | 0.82       | 0.82           | 0.82                       | 18.7        |
| Approach                     |      |           | 1372         | 1.9 | 1372          | 1.9 | 0.548     | 11.5        | LOS B            | 13.4              | 94.0     | 0.29       | 0.39           | 0.29                       | 48.0        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 158          | 1.0 | 158           | 1.0 | 0.228     | 17.2        | LOS B            | 3.1               | 21.6     | 0.60       | 1.27           | 0.60                       | 9.1         |
| 11                           | T1   | All MCs   | 181          | 0.0 | 181           | 0.0 | 0.906     | 74.8        | LOS E            | 10.1              | 70.9     | 1.00       | 1.09           | 1.45                       | 9.6         |
| 12                           | R2   | All MCs   | 83           | 0.0 | 83            | 0.0 | * 0.906   | 77.4        | LOS E            | 10.1              | 70.9     | 1.00       | 1.03           | 1.41                       | 20.1        |
| Approach                     |      |           | 422          | 0.4 | 422           | 0.4 | 0.906     | 53.8        | LOS D            | 10.1              | 70.9     | 0.85       | 1.15           | 1.12                       | 12.3        |
| All Vehicles                 |      |           | 3475         | 1.7 | 3475          | 1.7 | 0.906     | 40.4        | LOS D            | 32.2              | 231.5    | 0.65       | 0.78           | 0.80                       | 26.1        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).  
Vehicle movement LOS values are based on average delay per movement.  
Intersection and Approach LOS values are based on average delay for all vehicle movements.  
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.  
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.  
  
\* Critical Movement (Signal Timing)

# MOVEMENT SUMMARY

 **Site: [5I] SITE 5\_2027 SAT Project (2027 SAT PROJECT - SCENARIO 2)**  
**Network: [N109] 2027 SAT PROJECT - SCENARIO 2 (General)**  
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Bruce Hwy / Richardson St - Existing Intersection  
2024 Saturday Peak Hour  
PROJECT Case (Scenario 2 - signalised southern site access)  
Site Category: (None)  
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120.0 seconds (Network Optimum Cycle Time - Minimum Delay)  
**Network Scenario: 1 | Local Volumes      Site Scenario: 1 | Local Volumes**

| Vehicle Movement Performance |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
|------------------------------|------|-----------|--------------|-----|---------------|-----|-----------|-------------|------------------|-------------------|----------|------------|----------------|----------------------------|-------------|
| Mov ID                       | Turn | Mov Class | Demand Flows |     | Arrival Flows |     | Deg. Satn | Aver. Delay | Level of Service | 95% Back Of Queue |          | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed |
|                              |      |           | [ Total HV ] | %   | [ Total HV ]  | %   |           |             |                  | [ Veh. veh        | Dist ] m |            |                |                            | km/h        |
| South: Bruce Hwy (S)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 1                            | L2   | All MCs   | 143          | 2.0 | 143           | 2.0 | 0.112     | 16.2        | LOS B            | 0.8               | 5.4      | 0.18       | 1.07           | 0.18                       | 32.1        |
| 2                            | T1   | All MCs   | 923          | 3.0 | 923           | 3.0 | * 0.901   | 62.8        | LOS E            | 32.2              | 231.5    | 1.00       | 1.05           | 1.22                       | 22.1        |
| 3                            | R2   | All MCs   | 185          | 0.0 | 185           | 0.0 | 0.900     | 80.0        | LOS F            | 8.5               | 59.3     | 1.00       | 0.99           | 1.43                       | 20.0        |
| 3u                           | U    | All MCs   | 49           | 0.0 | 49            | 0.0 | 0.900     | 81.5        | LOS F            | 7.4               | 52.1     | 1.00       | 0.98           | 1.45                       | 26.2        |
| Approach                     |      |           | 1301         | 2.3 | 1301          | 2.3 | 0.901     | 60.8        | LOS E            | 32.2              | 231.5    | 0.91       | 1.04           | 1.15                       | 21.8        |
| East: Richardson Rd (E)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 4                            | L2   | All MCs   | 60           | 0.0 | 60            | 0.0 | 0.068     | 6.1         | LOS A            | 0.3               | 2.0      | 0.12       | 0.74           | 0.12                       | 47.7        |
| 5                            | T1   | All MCs   | 153          | 0.0 | 153           | 0.0 | 0.776     | 61.8        | LOS E            | 9.4               | 65.8     | 1.00       | 0.90           | 1.16                       | 11.3        |
| 6                            | R2   | All MCs   | 167          | 1.0 | 167           | 1.0 | * 0.900   | 76.3        | LOS E            | 11.3              | 79.5     | 1.00       | 1.03           | 1.38                       | 6.4         |
| Approach                     |      |           | 380          | 0.4 | 380           | 0.4 | 0.900     | 59.4        | LOS E            | 11.3              | 79.5     | 0.86       | 0.93           | 1.09                       | 12.5        |
| North: Bruce Hwy (N)         |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 7                            | L2   | All MCs   | 226          | 0.0 | 226           | 0.0 | 0.154     | 6.7         | LOS A            | 0.2               | 1.5      | 0.03       | 0.72           | 0.03                       | 39.8        |
| 8                            | T1   | All MCs   | 849          | 3.0 | 849           | 3.0 | 0.407     | 3.2         | LOS A            | 3.9               | 27.8     | 0.17       | 0.15           | 0.17                       | 64.8        |
| 9                            | R2   | All MCs   | 164          | 0.0 | 164           | 0.0 | * 0.550   | 38.6        | LOS D            | 13.5              | 94.5     | 0.83       | 0.82           | 0.83                       | 18.6        |
| 9u                           | U    | All MCs   | 133          | 0.0 | 133           | 0.0 | 0.550     | 40.2        | LOS D            | 13.5              | 94.5     | 0.83       | 0.82           | 0.83                       | 18.7        |
| Approach                     |      |           | 1373         | 1.9 | 1373          | 1.9 | 0.550     | 11.6        | LOS B            | 13.5              | 94.5     | 0.29       | 0.39           | 0.29                       | 48.0        |
| West: Richardson Rd (W)      |      |           |              |     |               |     |           |             |                  |                   |          |            |                |                            |             |
| 10                           | L2   | All MCs   | 158          | 1.0 | 158           | 1.0 | 0.229     | 17.2        | LOS B            | 3.1               | 21.6     | 0.60       | 1.27           | 0.60                       | 9.1         |
| 11                           | T1   | All MCs   | 181          | 0.0 | 181           | 0.0 | 0.906     | 74.8        | LOS E            | 10.1              | 70.8     | 1.00       | 1.09           | 1.45                       | 9.6         |
| 12                           | R2   | All MCs   | 83           | 0.0 | 83            | 0.0 | * 0.906   | 77.4        | LOS E            | 10.1              | 70.8     | 1.00       | 1.03           | 1.41                       | 20.1        |
| Approach                     |      |           | 422          | 0.4 | 422           | 0.4 | 0.906     | 53.8        | LOS D            | 10.1              | 70.8     | 0.85       | 1.14           | 1.12                       | 12.3        |
| All Vehicles                 |      |           | 3476         | 1.7 | 3476          | 1.7 | 0.906     | 40.4        | LOS D            | 32.2              | 231.5    | 0.65       | 0.78           | 0.80                       | 26.1        |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)



## Appendix E     Average Delay Impact Calculations

## Delay Impact Analysis

Intersection Delay Impact Calculations - Yaamba Rd / Farm St Interchange

| 2027 Opening Year Scenario                                                                                                     |          |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |       |        |
|--------------------------------------------------------------------------------------------------------------------------------|----------|----------------------|----------------------|--------------------|-------------------------|-----------------------|----------------------|----------------------|--------------------|-------------------------|-----------------------|--------------------|----------------------|--------------------|-------|--------|
| Project Case: SCENARIO 2 Existing Conditions (as changed @ Farm St Intersection and left-in/left-out at southern intersection) |          |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |       |        |
| Leg                                                                                                                            | Movement | Weekday AM Peak Hour |                      |                    |                         |                       | Weekday PM Peak Hour |                      |                    |                         |                       | Saturday Peak Hour |                      |                    |       |        |
|                                                                                                                                |          | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume        | Base Case Avg. Delay | Base Case Veh-Mins |       |        |
| Yaamba Rd (S)                                                                                                                  | Left     | 63                   | 6.9                  | 7.0                | 6.8                     | 7.1                   | 37                   | 6.9                  | 6.1                | 6.7                     | 4.1                   | 23                 | 6.4                  | 8.2                | 6.6   |        |
|                                                                                                                                | Thru     | 884                  | 13.3                 | 118.0              | 13.3                    | 118                   | 942                  | 12.8                 | 117.9              | 12.5                    | 105                   | 13                 | 28.3                 | 24                 | 33.8  |        |
|                                                                                                                                | Right    | 473                  | 47.3                 | 81.0               | 54.9                    | 94.2                  | 727                  | 36.8                 | 131.0              | 48.5                    | 173.8                 | 125                | 29.2                 | 111.4              | 111.4 |        |
|                                                                                                                                | 4        | 48.2                 | 3.2                  | 35.4               | 3.7                     | 2                     | 37.3                 | 1.2                  | 49                 | 3.6                     | 3                     | 30.3               | 1.5                  | 38.1               | 1.9   |        |
| Farm St (E)                                                                                                                    | Left     | 130                  | 11.8                 | 103.9              | 35.7                    | 110.6                 | 144                  | 14.3                 | 84.3               | 24.8                    | 50.5                  | 132                | 11.4                 | 25.1               | 18.3  | 40.1   |
|                                                                                                                                | Thru     | 234                  | 79.8                 | 311.2              | 78.9                    | 307.7                 | 155                  | 71.1                 | 183.7              | 71.1                    | 183.7                 | 89                 | 68.7                 | 301.9              | 68.7  | 301.9  |
|                                                                                                                                | Right    | 126                  | 12.5                 | 106.1              | 52.1                    | 103.9                 | 126                  | 12.5                 | 106.1              | 52.1                    | 103.9                 | 79                 | 12.5                 | 106.1              | 79    | 12.5   |
|                                                                                                                                | 138      | 100                  | 24.5                 | 18.8               | 24.9                    | 41.5                  | 137                  | 21.8                 | 49.8               | 23.9                    | 54.6                  | 146                | 21.8                 | 57.8               | 23.8  | 57.8   |
| Yaamba Rd (N)                                                                                                                  | Left     | 1059                 | 67.3                 | 1187.0             | 66.8                    | 1179.0                | 869                  | 68.3                 | 989.2              | 68.3                    | 989.2                 | 801                | 68.3                 | 1057.0             | 801   | 68.3   |
|                                                                                                                                | Thru     | 149                  | 86.0                 | 214.3              | 86.7                    | 215.3                 | 121                  | 84                   | 177.2              | 86.2                    | 176.7                 | 36                 | 85.0                 | 189.0              | 36    | 85.0   |
|                                                                                                                                | Right    | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120                | 86.8                 | 46.3               | 87.2  | 46.5   |
|                                                                                                                                | Left     | 383                  | 7.3                  | 22.5               | 7.9                     | 24.1                  | 220                  | 6.6                  | 25.6               | 7.1                     | 27.1                  | 127                | 5.4                  | 17.4               | 6.1   | 18.9   |
| Farm St (W)                                                                                                                    | Thru     | 146                  | 71.5                 | 174.0              | 64.4                    | 126.7                 | 228                  | 76.9                 | 209.4              | 70.9                    | 209.4                 | 140                | 70.9                 | 189.1              | 140   | 70.9   |
|                                                                                                                                | Right    | 120                  | 74                   | 130.3              | 77.4                    | 136.4                 | 136                  | 62.3                 | 151.3              | 60.6                    | 150.9                 | 31                 | 61.6                 | 111.8              | 61.6  | 111.8  |
| Totals                                                                                                                         |          |                      |                      | 2653.9             |                         | 2396.5                |                      |                      | 2368.8             |                         | 2363.5                |                    |                      | 2368.8             |       | 1954.9 |

Intersection Aggregate Delay 6831.7 veh-mins

Base Case 7018.9 veh-mins

% Change **-3.7%**

| 2027 Opening Year Scenario                                                                                                          |          |                      |                      |                    |                         |                       |             |                      |                    |                         |                       |             |                      |                    |                         |                       |      |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------|----------------------|--------------------|-------------------------|-----------------------|-------------|----------------------|--------------------|-------------------------|-----------------------|-------------|----------------------|--------------------|-------------------------|-----------------------|------|--|--|
| Project Case: SCENARIO 2 Existing Conditions (as changed @ Farm St Intersection AND Signalled Southern site access (right turn in)) |          |                      |                      |                    |                         |                       |             |                      |                    |                         |                       |             |                      |                    |                         |                       |      |  |  |
| Leg                                                                                                                                 | Movement | Weekday AM Peak Hour |                      |                    |                         |                       |             | Weekday PM Peak Hour |                    |                         |                       |             |                      | Saturday Peak Hour |                         |                       |      |  |  |
|                                                                                                                                     |          | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins |      |  |  |
| Yaamba Rd (S)                                                                                                                       | Left     | 88                   | 6.7                  | 7.0                | 6.7                     | 7.0                   | 37          | 6.7                  | 4.1                | 6.7                     | 4.1                   | 29          | 6.6                  | 3.2                | 6.6                     | 3.2                   |      |  |  |
|                                                                                                                                     | Thru     | 884                  | 13.3                 | 1010               | 13.1                    | 122.9                 | 590         | 17.7                 | 122.8              | 7.9                     | 121.0                 | 890         | 1.9                  | 2.4                | 2.4                     | 181.9                 |      |  |  |
|                                                                                                                                     | Right    | 103                  | 47.3                 | 81.0               | 51.3                    | 81.0                  | 125         | 40.2                 | 131.0              | 40.2                    | 131.0                 | 125         | 21.4                 | 101.9              | 101.9                   | 101.9                 |      |  |  |
| Farm St (E)                                                                                                                         | Left     | 4                    | 48.2                 | 9.2                | 53.8                    | 9.5                   | 2           | 87.3                 | 12.2               | 40.8                    | 14.4                  | 4           | 80.2                 | 14.5               | 10.7                    | 2.5                   |      |  |  |
|                                                                                                                                     | Thru     | 206                  | 11.8                 | 103.0              | 34.2                    | 111.7                 | 144         | 14.3                 | 14.3               | 20.9                    | 50.2                  | 132         | 11.4                 | 22.2               | 26.6                    | 26.6                  |      |  |  |
|                                                                                                                                     | Right    | 119                  | 11.8                 | 111.2              | 51.3                    | 103.9                 | 126         | 12.5                 | 103.7              | 52.1                    | 103.9                 | 84          | 12.5                 | 103.9              | 103.9                   | 103.9                 |      |  |  |
| Yaamba Rd (N)                                                                                                                       | Left     | 100                  | 14.5                 | 106.1              | 53.9                    | 104.9                 | 126         | 14.3                 | 121.3              | 48                      | 119.0                 | 146         | 12.5                 | 106.1              | 106.1                   | 106.1                 |      |  |  |
|                                                                                                                                     | Thru     | 1059                 | 24.5                 | 40.8               | 24.8                    | 41.3                  | 137         | 21.8                 | 49.8               | 23.6                    | 53.9                  | 148         | 21.6                 | 53.9               | 13.8                    | 15.4                  | 18.4 |  |  |
|                                                                                                                                     | Right    | 149                  | 86.0                 | 187.8              | 86.8                    | 179.0                 | 121         | 86.2                 | 189.2              | 86.2                    | 189.2                 | 36          | 85.0                 | 189.0              | 189.0                   | 189.0                 |      |  |  |
| Farm St (W)                                                                                                                         | Left     | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120         | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120         | 86.8                 | 46.3               | 87.2                    | 46.3                  | 87.2 |  |  |
|                                                                                                                                     | Thru     | 146                  | 11.5                 | 174.0              | 64.4                    | 126.7                 | 228         | 76.9                 | 209.4              | 70.9                    | 209.4                 | 140         | 70.9                 | 189.1              | 189.1                   | 189.1                 |      |  |  |
|                                                                                                                                     | Right    | 120                  | 74                   | 130.3              | 77.4                    | 136.4                 | 136         | 62.3                 | 146.3              | 60.6                    | 150.9                 | 31          | 61.6                 | 111.8              | 111.8                   | 111.8                 |      |  |  |
| Totals                                                                                                                              |          |                      |                      | 2653.9             |                         | 2378.8                |             |                      | 2368.8             |                         | 2323.4                |             |                      | 2368.8             |                         |                       |      |  |  |

Intersection Aggregate Delay 6831.7 veh-mins

Base Case 6393.3 veh-mins

% Change **-14.4%**

| 2027 Opening Year Scenario                                                                                                         |          |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |                         |                       |
|------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------|----------------------|--------------------|-------------------------|-----------------------|----------------------|----------------------|--------------------|-------------------------|-----------------------|--------------------|----------------------|--------------------|-------------------------|-----------------------|
| Project Case: SCENARIO 3 Existing Conditions (as changed @ Richardson Rd Intersection AND Left-in / Left-out Southern site access) |          |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |                         |                       |
| Leg                                                                                                                                | Movement | Weekday AM Peak Hour |                      |                    |                         |                       | Weekday PM Peak Hour |                      |                    |                         |                       | Saturday Peak Hour |                      |                    |                         |                       |
|                                                                                                                                    |          | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume        | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins |
| Yaamba Rd (S)                                                                                                                      | Left     | 82                   | 14                   | 21.5               | 14.4                    | 22.1                  | 185                  | 15.7                 | 43.2               | 16.3                    | 44.8                  | 143                | 15.6                 | 37.2               | 14.2                    | 38.6                  |
|                                                                                                                                    | Thru     | 792                  | 64.3                 | 815.4              | 64.6                    | 114.0                 | 627                  | 62.7                 | 909.0              | 62.7                    | 909.0                 | 897                | 62.6                 | 1019.9             | 824                     | 1019.9                |
|                                                                                                                                    | Right    | 93                   | 74                   | 114.7              | 74                      | 114.7                 | 124                  | 76.9                 | 231.4              | 76.9                    | 231.4                 | 105                | 76.9                 | 244.5              | 105                     | 244.5                 |
| Richardson Rd (E)                                                                                                                  | Left     | 35                   | 76.2                 | 44.5               | 76.2                    | 44.5                  | 44                   | 80.9                 | 10.3               | 80.9                    | 58.3                  | 49                 | 81.6                 | 66.6               | 61.6                    | 135.6                 |
|                                                                                                                                    | Thru     | 149                  | 86.0                 | 144.0              | 86.0                    | 144.0                 | 126                  | 86.2                 | 144.0              | 86.2                    | 144.0                 | 36                 | 85.0                 | 144.0              | 36                      | 144.0                 |
|                                                                                                                                    | Right    | 255                  | 76.8                 | 102.1              | 76.8                    | 102.1                 | 239                  | 68.1                 | 271.3              | 68.1                    | 271.3                 | 132                | 71.1                 | 181.3              | 118.8                   | 167.6                 |
| Yaamba Rd (N)                                                                                                                      | Left     | 103                  | 10.4                 | 137.0              | 60.7                    | 136.6                 | 133                  | 10.8                 | 136.5              | 62.6                    | 136.6                 | 132                | 11                   | 136.2              | 76.3                    | 167.9                 |
|                                                                                                                                    | Thru     | 1059                 | 6.8                  | 167                | 6.8                     | 167                   | 142                  | 6.8                  | 167                | 6.8                     | 167                   | 140                | 6.8                  | 167                | 140                     | 167                   |
|                                                                                                                                    | Right    | 122                  | 8.9                  | 186.6              | 9.3                     | 179.9                 | 100                  | 7.6                  | 174.0              | 8                       | 174.0                 | 87                 | 7.2                  | 161.1              | 87                      | 161.1                 |
| Richardson Rd (W)                                                                                                                  | Left     | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120                | 86.8                 | 46.3               | 92.1                    | 44.1                  |
|                                                                                                                                    | Thru     | 146                  | 11.5                 | 174.0              | 64.4                    | 126.7                 | 228                  | 76.9                 | 209.4              | 70.9                    | 209.4                 | 140                | 70.9                 | 189.1              | 140                     | 189.1                 |
|                                                                                                                                    | Right    | 127                  | 74.3                 | 149.7              | 74.2                    | 149.4                 | 99                   | 76.4                 | 126.3              | 76.6                    | 126.4                 | 69                 | 77.3                 | 106.9              | 69                      | 106.9                 |
| Totals                                                                                                                             |          |                      |                      | 2706.4             |                         | 2398.8                |                      |                      | 2445.1             |                         | 2445.1                |                    |                      | 2114.1             |                         | 2114.1                |

Intersection Aggregate Delay 6766.5 veh-mins

Base Case 6843.1 veh-mins

% Change **-1.9%**

| 2027 Opening Year Scenario                                                                                                          |          |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |
|-------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------|----------------------|--------------------|-------------------------|-----------------------|----------------------|----------------------|--------------------|-------------------------|-----------------------|--------------------|----------------------|--------------------|
| 6 Case: SCENARIO 3 Existing Conditions (as changed @ Richardson Rd Intersection AND Signalled Southern site access (right turn in)) |          |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |
| Leg                                                                                                                                 | Movement | Weekday AM Peak Hour |                      |                    |                         |                       | Weekday PM Peak Hour |                      |                    |                         |                       | Saturday Peak Hour |                      |                    |
|                                                                                                                                     |          | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume        | Base Case Avg. Delay | Base Case Veh-Mins |
| Yaamba Rd (S)                                                                                                                       | Left     | 92                   | 14                   | 21.5               | 14.4                    | 22.1                  | 185                  | 15.7                 | 43.2               | 16.3                    | 44.8                  | 143                | 15.6                 | 37.2               |
|                                                                                                                                     | Thru     | 792                  | 64.3                 | 815.4              | 64.6                    | 114.0                 | 627                  | 62.7                 | 909.0              | 62.7                    | 909.0                 | 897                | 62.6                 | 1019.9             |
|                                                                                                                                     | Right    | 93                   | 74                   | 114.7              | 74                      | 114.7                 | 124                  | 76.9                 | 231.4              | 76.9                    | 231.4                 | 105                | 76.9                 | 244.5              |
|                                                                                                                                     | Unknown  | 35                   | 76.2                 | 44.5               | 76.2                    | 44.5                  | 44                   | 80.9                 | 10.3               | 80.9                    | 58.3                  | 49                 | 81.6                 | 66.6               |
| Richardson Rd (E)                                                                                                                   | Left     | 254                  | 10.4                 | 140.1              | 40.7                    | 143.3                 | 140.7                | 7                    | 163.3              | 7.2                     | 163.3                 | 100                | 6                    | 6.0                |
|                                                                                                                                     | Thru     | 149                  | 86.0                 | 144.0              | 86.0                    | 144.0                 | 126                  | 86.2                 | 144.0              | 86.2                    | 144.0                 | 36                 | 85.0                 | 144.0              |
|                                                                                                                                     | Right    | 255                  | 76.8                 | 102.1              | 76.8                    | 102.1                 | 239                  | 68.1                 | 271.3              | 68.1                    | 271.3                 | 132                | 71.1                 | 181.3              |
|                                                                                                                                     | Unknown  | 103                  | 10.4                 | 137.0              | 60.7                    | 136.6                 | 133                  | 10.8                 | 136.5              | 62.6                    | 136.6                 | 132                | 11                   | 136.2              |
| Yaamba Rd (N)                                                                                                                       | Left     | 103                  | 6.8                  | 187                | 6.8                     | 187                   | 142                  | 6.7                  | 155.2              | 6.7                     | 155.2                 | 186                | 6.7                  | 185.5              |
|                                                                                                                                     | Thru     | 1232                 | 8.9                  | 186.6              | 9.3                     | 179.9                 | 100                  | 7.6                  | 174.0              | 8                       | 174.0                 | 87                 | 7.2                  | 161.1              |
|                                                                                                                                     | Right    | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120                  | 86.8                 | 46.3               | 87.2                    | 46.5                  | 120                | 86.8                 | 46.3               |
|                                                                                                                                     | Unknown  | 1                    | 37.0                 | 0                  | 43.9                    | 0.7                   | 1                    | 38.2                 | 0                  | 49.9                    | 0.8                   | 1                  | 36.7                 | 0                  |
| Richardson Rd (W)                                                                                                                   | Left     | 362                  | 21.6                 | 63.7               | 21                      | 62.1                  | 182                  | 20.3                 | 62.2               | 21.5                    | 65.2                  | 123                | 16.3                 | 71.2               |
|                                                                                                                                     | Thru     | 226                  | 78.8                 | 100.8              | 78.3                    | 100.4                 | 220                  | 77.2                 | 100.7              | 78.7                    | 101.9                 | 79                 | 77.3                 | 100.8              |
|                                                                                                                                     | Right    | 132                  | 74.3                 | 149.7              | 74.2                    | 149.4                 | 99                   | 76.4                 | 126.3              | 76.6                    | 126.4                 | 69                 | 77.3                 | 106.9              |
|                                                                                                                                     | Unknown  |                      |                      |                    |                         |                       |                      |                      |                    |                         |                       |                    |                      |                    |
| Totals                                                                                                                              |          |                      |                      | 2276.4             |                         | 2281.9                |                      |                      | 2445.1             |                         | 2445.1                |                    |                      | 2114.1             |

Intersection Aggregate Delay 6766.5 veh-mins

Base Case 6843.1 veh-mins

% Change **-1.9%**

Intersection Delay Impact Calculations - "Year 60" St Intersection

2027 Opening Year Scenario

Project Case: SCENARIO 3 Existing Conditions (as changed @ Macarthur St Intersection AND Left-in / Left-out Southern site access)

| Leg              | Movement | Weekday AM Peak Hour |                      |                    |                         | Weekday PM Peak Hour  |             |                      |                    | Saturday Peak Hour      |                       |             |                      |                    |
|------------------|----------|----------------------|----------------------|--------------------|-------------------------|-----------------------|-------------|----------------------|--------------------|-------------------------|-----------------------|-------------|----------------------|--------------------|
|                  |          | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume | Base Case Avg. Delay | Base Case Veh-Mins |
| Macarthur St (E) | Left     | 33                   | 10.4                 | 5.7                | 10.9                    | 6.0                   | 34          | 8.9                  | 3.6                | 10                      | 5.7                   | 22          | 8.9                  | 3.2                |
|                  | Thru     | 22                   | 5                    | 1.8                | 5                       | 1.8                   | 8           | 5                    | 0.7                | 5                       | 0.7                   | 5           | 5                    | 0.4                |
|                  | Right    | 1107                 | 0                    | 0.0                | 0                       | 0.0                   | 1107        | 0                    | 0.0                | 0                       | 0.0                   | 1107        | 0                    | 0.0                |
| Totals           |          |                      |                      | 7.5                |                         | 7.7                   |             |                      | 6.3                |                         | 6.3                   |             |                      | 3.8                |

Intersection Aggregates Delay

|              |       |          |
|--------------|-------|----------|
| Base Case    | 16.6  | veh-mins |
| Project Case | 21.9  | veh-mins |
| % Change     | 31.4% |          |

2027 Opening Year Scenario

Project Case: SCENARIO 3 Existing Conditions (as changed @ Macarthur St Intersection AND Left-in / Left-out Southern site access) (Right turn sat)

| Leg              | Movement | Weekday AM Peak Hour |                      |                    |                         | Weekday PM Peak Hour  |             |                      |                    | Saturday Peak Hour      |                       |             |                      |                    |
|------------------|----------|----------------------|----------------------|--------------------|-------------------------|-----------------------|-------------|----------------------|--------------------|-------------------------|-----------------------|-------------|----------------------|--------------------|
|                  |          | Base Volume          | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume | Base Case Avg. Delay | Base Case Veh-Mins | Project Case Avg. Delay | Project Case Veh-Mins | Base Volume | Base Case Avg. Delay | Base Case Veh-Mins |
| Macarthur St (E) | Left     | 33                   | 10.4                 | 5.7                | 10.9                    | 6.0                   | 34          | 8.9                  | 3.6                | 10                      | 5.7                   | 22          | 8.9                  | 3.2                |
|                  | Thru     | 22                   | 5                    | 1.8                | 5                       | 1.8                   | 8           | 5                    | 0.7                | 5                       | 0.7                   | 5           | 5                    | 0.4                |
|                  | Right    | 1107                 | 0                    | 0.0                | 0                       | 0.0                   | 1107        | 0                    | 0.0                | 0                       | 0.0                   | 1107        | 0                    | 0.0                |
| Totals           |          |                      |                      | 7.5                |                         | 7.7                   |             |                      | 6.3                |                         | 6.3                   |             |                      | 3.8                |

Intersection Aggregate Delay 16.6 veh-mins

Base Case 17.9 veh-mins

% Change **-7.4%**

Base Case

35.5

veh-mins

Project Case

37.6

veh-mins

% Change

5.9%

Intersection Delay Impact Calculations - Yamba Rd / Southern Site Access Intersection

2027 Opening Year Scenario

Project Case: SCENARIO 1 Left in / Left out Southern site access

|              | Leg  | Movement | Weekday AM Peak Hour |          |              |          |             |          | Weekday PM Peak Hour |          |             |          |              |          | Saturday Peak Hour |     |  |  |  |  |
|--------------|------|----------|----------------------|----------|--------------|----------|-------------|----------|----------------------|----------|-------------|----------|--------------|----------|--------------------|-----|--|--|--|--|
|              |      |          | Base Volume          |          | Project Case |          | Base Volume |          | Project Case         |          | Base Volume |          | Project Case |          |                    |     |  |  |  |  |
|              |      |          | Avg. Delay           | Veh-Mins | Avg. Delay   | Veh-Mins | Avg. Delay  | Veh-Mins | Avg. Delay           | Veh-Mins | Avg. Delay  | Veh-Mins | Avg. Delay   | Veh-Mins |                    |     |  |  |  |  |
| Yamba Rd (S) | Thru | 3073     | 0                    | 0.0      | 0            | 0.0      | 1207        | 0        | 0.0                  | 0        | 0.0         | 1133     | 0            | 0.0      | 0                  | 0.0 |  |  |  |  |
| Yamba Rd (N) | Thru | 1388     | 0                    | 0.0      | 0            | 0.0      | 1154        | 0        | 0.0                  | 0        | 0.0         | 1068     | 0            | 0.0      | 0                  | 0.0 |  |  |  |  |
| Totals       |      |          | 0.0                  |          | 0.0          |          | 0.0         |          | 0.0                  |          | 0.0         |          | 0.0          |          | 0.0                |     |  |  |  |  |

Intersection Aggregate Delay

Base Case

0.0

veh-mins

Project Case

0.0

veh-mins

% Change

0.00%

2027 Opening Year Scenario

Project Case: SCENARIO 2 Signalised Southern site access (right turn in))

Intersection Aggregate Delay 16.6 veh-mins

Base Case 17.6 veh-mins

% Change **-5.9%**

| Totals                                                                 |          | 0.0      | 62.5 | 0.0            | 17.3 | 0.0   | 76.5 |
|------------------------------------------------------------------------|----------|----------|------|----------------|------|-------|------|
| Intersection Aggregate Delay                                           |          |          |      |                |      |       |      |
| Base Case                                                              | 0.0      | veh-mins |      |                |      |       |      |
| Project Case                                                           | 156.3    | veh-mins |      |                |      |       |      |
|                                                                        | % Change | RDY(W)   |      |                |      |       |      |
| OVERALL AGGREGATE DELAYS                                               |          |          |      |                |      |       |      |
|                                                                        |          |          |      | Percent Change |      |       |      |
| Base Case                                                              | 13614.8  | veh-mins |      |                |      |       |      |
| Project Case SCENARIO 1 (with Left-in / Left-out Southern Site Access) | 13870.3  | veh-mins |      |                |      | 1.9%  |      |
| Project Case SCENARIO 2 (with Southern Southern Site Access)           | 13410.3  | veh-mins |      |                |      | -1.5% |      |

## Appendix F     Road Safety Assessment

## Yaamba Road / Farm Street Intersection

| Risk Item |                                                                                                                                                                          | Without Development |             |            | With Development |             |            | Mitigation Measures                                      | With Development and Mitigation |             |            | Comments                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|------------------|-------------|------------|----------------------------------------------------------|---------------------------------|-------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                                                                                                                                                          | Likelihood          | Consequence | Risk Score | Likelihood       | Consequence | Risk Score |                                                          | Likelihood                      | Consequence | Risk Score |                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1         | <b>U-turning traffic from Yaamba Rd south</b><br>Chance of angled collisions and rear-end collisions due to increased U-turning traffic                                  | 1                   | 4           | M          | 2                | 4           | M          | Provision of direct right turn into site from Yaamba Rd. | 1                               | 4           | M          | The 'with development' case includes two left-in / left-out site accesses to Yaamba Road. This arrangement would introduce up to 122 vehicles per hour additional U-turning traffic resulting in increased likelihood of collision with left turning traffic from Farm Street east.<br><br>Provision of direct right turn into site would bring risk back to base case conditions level.                                     |
| 2         | <b>Right turning traffic from Yaamba Rd south</b><br>Chance of rear-end collision between right turning traffic and northbound through traffic due to increased queuing. | 2                   | 4           | M          | 3                | 4           | M          | Provision of direct right turn into site from Yaamba Rd. | 1                               | 4           | M          | The 'with development' case includes two left-in / left-out site accesses to Yaamba Road. The 95 <sup>th</sup> percentile queue length on right turn lane increases substantially under weekday PM and Saturday peak hour periods (+80m and +67m respectively) resulting in increased likelihood of rear-end collision.<br><br>Provision of direct right turn into site would bring risk back to base case conditions level. |



## Yaamba Road / Northern Site Access Intersection

| Risk Item |                                                                                                              | Without Development |             |            | With Development |             |            | Mitigation Measures | With Development and Mitigation |             |            | Comments                                                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|------------------|-------------|------------|---------------------|---------------------------------|-------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                                                                                              | Likelihood          | Consequence | Risk Score | Likelihood       | Consequence | Risk Score |                     | Likelihood                      | Consequence | Risk Score |                                                                                                                                                                   |
| 1         | <b>Left turning traffic into site access</b><br>Chance of rear-end collision with southbound through traffic |                     |             |            | 1                | 4           | M          | No Action           |                                 |             |            | Existing Type AUL left turn lane provides for separation of traffic flows.                                                                                        |
| 2         | <b>Left turning traffic out of site access</b><br>Chance of angle collision with southbound through traffic  |                     |             |            | 1                | 4           | M          | No Action           |                                 |             |            | Adequate sight distance is available for left turning motorists out of site access and left turn operates with very good performance i.e. no high average delays. |

## Yaamba Road / Southern Site Access Intersection

| Risk Item |                                                                                                              | Without Development |             |            | With Development |             |            | Mitigation Measures                                                                 | With Development and Mitigation |             |            | Comments                                                                                                                                                                     |
|-----------|--------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|------------------|-------------|------------|-------------------------------------------------------------------------------------|---------------------------------|-------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                                                                                              | Likelihood          | Consequence | Risk Score | Likelihood       | Consequence | Risk Score |                                                                                     | Likelihood                      | Consequence | Risk Score |                                                                                                                                                                              |
| 1         | <b>Left turning traffic into site access</b><br>Chance of rear-end collision with southbound through traffic |                     |             |            | 1                | 4           | M          | Provide appropriate length left turn deceleration lane.                             | 1                               | 4           | M          | A Type AUL(s) short left turn lane exists at the access. The traffic volumes under the 'with development' case warrant a Type AUL treatment (full-length deceleration lane). |
| 2         | <b>Left turning traffic out of site access</b><br>Chance of angle collision with southbound through traffic  |                     |             |            | 1                | 4           | M          | No Action                                                                           |                                 |             |            | Adequate sight distance is available for left turning motorists out of site access and left turn operates with very good performance i.e. no high average delays.            |
| 3         | <b>Right turning traffic into site access</b><br>Chance of angle collision with southbound through traffic.  |                     |             |            | 3                | 5           | H          | The right turn movement and southbound movements should be fully signal-controlled. | 1                               | 5           | M          | Full signal control of conflicting movements would likely result in extremely low likelihood of vehicle collisions.                                                          |

## Yaamba Road / Macartney Street Intersection

| Risk Item |                                                                                                               | Without Development |             |            | With Development |             |            | Mitigation Measures                                           | With Development and Mitigation |             |            | Comments                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|---------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|------------------|-------------|------------|---------------------------------------------------------------|---------------------------------|-------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                                                                                               | Likelihood          | Consequence | Risk Score | Likelihood       | Consequence | Risk Score |                                                               | Likelihood                      | Consequence | Risk Score |                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1         | <b>Left turning traffic into Macartney St</b><br>Chance of rear-end collision with southbound through traffic | 1                   | 3           | L          | 2                | 3           | M          | Type AUL(s) left turn treatment to be installed on Yaamba Rd. | 1                               | 3           | L          | Existing arrangement includes Type BAL treatment. Existing traffic volumes ('without development') warrant provision of a Type AUL (s) short left turn lane treatment. Estimated volumes 'with development' warrant a Type AUL full-length left turn lane. A full-length Type AUL lane is not practically possible due to the separation distance between the intersection and the site access. |
| 2         | <b>Left turning traffic out of Macartney St</b><br>Chance of angle collision with southbound through traffic  | 1                   | 4           | M          | 1                | 4           | M          | No Action                                                     |                                 |             |            |                                                                                                                                                                                                                                                                                                                                                                                                 |

## Yaamba Road / Richardson Road Intersection

| Risk Item |                                                                                                                   | Without Development |             |            | With Development |             |            | Mitigation Measures                      | With Development and Mitigation |             |            | Comments                                                                                                                                                |
|-----------|-------------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|------------------|-------------|------------|------------------------------------------|---------------------------------|-------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                                                                                                   | Likelihood          | Consequence | Risk Score | Likelihood       | Consequence | Risk Score |                                          | Likelihood                      | Consequence | Risk Score |                                                                                                                                                         |
| 1         | <b>Right turning traffic from Yaamba Rd north</b><br>Chance of rear-end collision with southbound through traffic | 1                   | 4           | M          | 2                | 4           | M          | Existing right turn lane to be extended. | 1                               | 4           | M          | Right turn lane recommended to be extended to 234m length, including entry taper. Length contains maximum design queue length plus deceleration length. |



## Appendix G Council's Access, Parking & Transport Code Responses

## Access, parking and transport Code

Table 9.3.1.3.1 Development outcomes for assessable development

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                   | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Access driveways</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                   |
| <b>PO1</b><br>Access driveways are located to avoid conflicts and designed to operate efficiently and safely, taking into account: <ul style="list-style-type: none"> <li>a) the size of the parking area;</li> <li>b) the volume, frequency and type of vehicle traffic;</li> <li>c) the need for some land uses (for example hospitals) to accommodate emergency vehicle access;</li> <li>d) the type of use and the implications on parking and circulation, for example long-term or short-term car parking;</li> <li>e) frontage road function and conditions; and</li> <li>f) the capacity and function of the adjoining street system.</li> </ul> | <b>AO1.1</b><br>Access driveways are not located within: <ul style="list-style-type: none"> <li>a) twenty-five (25) metres of a signalised road intersection;</li> <li>b) twenty (20) metres of an un-signalised road intersection in an industrial or centres zone or ten (10) metres otherwise; and</li> <li>c) one (1) metre of any street signage, power poles, street lights, manholes, stormwater gully pits or other Council asset.</li> </ul> | <b>Complies with AO1.1</b><br>The proposed scheme intends to achieve access via two crossovers to Yaamba Road (state-controlled road).<br>All accesses are designed to give priority to entering vehicles at all times.<br>The accesses are not located within 25m of any intersections and achieve a minimum of one metre to any Council assets. |
| <b>PO2</b><br>Access driveways do not disrupt existing road or footpath infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>AO2.1</b><br>Access driveways: <ul style="list-style-type: none"> <li>a) do not require the modification, relocation or removal of any infrastructure including street trees, fire hydrants, water meters and street signs;</li> <li>b) do not front a traffic island, speed control device, car parking bay, bus stop or other infrastructure within the road carriageway;</li> <li>c) must be sealed and to a formed road;</li> </ul>            | <b>Complies with AO2.1</b><br>All accesses do not impact any infrastructure.                                                                                                                                                                                                                                                                      |

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                      | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                         | RESPONSE / COMPLIANCE                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                           | d) are not constructed over an access point to equipment under the control of a regulatory authority, including storm water pits, water meters, hydrants and telephone pits; and<br>e) are raised or lowered to match the surface level of the driveway, where an access chamber is to be incorporated within the driveway. |                                                                                                                                                                             |
| <b>PO3</b><br>Access driveways are designed and constructed so as to: <ul style="list-style-type: none"> <li>a) enable safe and functional vehicular access from the street to the property; and</li> <li>b) not cause a change in the level of a footpath.</li> </ul>                    | <b>AO3.1</b><br>Access driveways are constructed in compliance with the Capricorn Municipal Development Guidelines.                                                                                                                                                                                                         | <b>Complies with AO3.1</b><br>Access driveways are designed in compliance with the Capricorn Municipal Development Guidelines.                                              |
| <b>PO4</b><br>A driveway does not allow water to pond adjacent to any buildings or cause water to enter a building.                                                                                                                                                                       | <b>AO4.1</b><br>A driveway has a minimum cross fall of one (1) metre (vertical) to 100 metres (horizontal) away from all adjoining buildings.                                                                                                                                                                               | <b>Complies with AO4.1</b><br>Detailed design will ensure adequate cross fall of driveways.                                                                                 |
| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                      | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                         | RESPONSE / COMPLIANCE                                                                                                                                                       |
| <b>Parking</b>                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                             |
| <b>PO5</b><br>Provision is made for on-site vehicle parking: <ul style="list-style-type: none"> <li>a) to meet the demand likely to be generated by the development; and</li> <li>b) to avoid on-street parking where that would adversely impact on the safety or capacity of</li> </ul> | <b>AO5.1</b><br>On-site car parking is provided at the rates set out in Table 9.3.1.3.2 of the access, parking and transport code.<br><br><u>OR</u>                                                                                                                                                                         | <b>Complies with PO5</b><br>The proposed supply exceeds the acceptable outcome requirement. Refer to Section 4.1.1 of Colliers' Traffic Engineering Report for information. |

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                  | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>the road network or unduly impact on local amenity.</p> <p>Editor's note—SC6.6 — Car parking contributions planning scheme policy prescribes circumstances under which an applicant can satisfy PO5.</p>                                           | <p><b>A05.1.2</b><br/>Where a change of use of existing premises is proposed and there is no increase in the gross floor area, the existing number of on-site car parks is retained or increased.</p> <p>AND</p> <p><b>A05.2</b><br/>All parking, loading and manoeuvring facilities for visitors and employees to be located on-site.</p> <p>AND</p> <p><b>A05.3</b><br/>Manoeuvring facilities to be of adequate dimensions to prevent any queuing in a roadway.</p> | <p><b>A05.1.2 Not Applicable</b></p> <p><b>Complies with A05.2</b></p> <p><b>Complies with A05.3</b></p>                                                                                                                                                                                   |
| <p><b>PO6</b><br/>Parking and servicing facilities are designed to meet user requirements.</p>                                                                                                                                                        | <p><b>A06.1</b><br/>Parking spaces, access and manoeuvring facilities, loading facilities and connections to the transport network are sealed and designed in accordance with Australian Standard AS 2890.</p>                                                                                                                                                                                                                                                         | <p><b>Complies with A06.1</b><br/>Parking spaces, access and manoeuvring facilities, loading facilities and connections to the transport network are sealed and designed in accordance with Australian Standard AS 2890. Refer to Section 4.2 of Colliers' Traffic Engineering Report.</p> |
| <p><b>PO7</b><br/>Sites with more than one (1) road frontage (excluding laneways) gain access only from the lower order road, except if it will introduce traffic generated by a non-residential use into a street that is in a residential zone.</p> | <p>No acceptable outcome is nominated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>Complies with PO7</b><br/>No access for the development to Potts Street is proposed in order to minimise impacts on the surrounding residential zone.</p>                                                                                                                            |



| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                      | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PO8</b></p> <p>Parking areas are illuminated in a manner that maximises user safety but minimises the impacts on adjoining residents.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p><b>AO8.1</b></p> <p>Parking areas for uses that operate at night are illuminated in accordance with the requirements of Australian Standard AS 1158.</p> <p>AND</p> <p><b>AO8.2</b></p> <p>Lighting used in parking areas does not cause an environmental nuisance and complies with Australian Standard AS 4282.</p> | <p><b>Complies with AO8.1</b></p> <p>Detailed design of parking areas will be in accordance with the requirements of Australian Standard AS 1158.</p> <p><b>Complies with AO8.2</b></p> <p>Detailed design of parking areas will be in accordance with the requirements of Australian Standard AS 4282.</p> |
| <p><b>PO9</b></p> <p>Car parking areas, pathways and other elements of the transport network are designed to enhance public safety by discouraging crime and antisocial behaviour, having regard to:</p> <ul style="list-style-type: none"> <li>a) provision of opportunities for casual surveillance;</li> <li>b) the use of fencing to define public and private spaces, whilst allowing for appropriate sightlines;</li> <li>c) minimising potential concealment points and assault locations;</li> <li>d) minimising opportunities for graffiti and other vandalism; and</li> <li>e) restricting unlawful access to buildings and between buildings.</li> </ul> | <p>No acceptable outcome is nominated.</p> <p>Editor's note—Refer to Crime Prevention Through Environmental Design (CPTED) guidelines for Queensland for guidance.</p>                                                                                                                                                   | <p><b>Refer to Town Planning Report and/or Architectural Plans/Report.</b></p>                                                                                                                                                                                                                              |

| PERFORMANCE OUTCOMES                                                                                                                                               | ACCEPTABLE OUTCOMES                 | RESPONSE / COMPLIANCE                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PO10</b><br>Parking and servicing areas are kept accessible and available for their intended use at all times during the normal business hours of the activity. | No acceptable outcome is nominated. | <b>Complies with PO10</b><br>No gates are proposed as part of the development. As such, the parking and servicing areas are kept accessible and available for their intended use at all times during the normal business hours of the activity. |

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                    | ACCEPTABLE OUTCOMES                                                                                                                                                                                                            | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Transport</b> <span style="float: right;">impact</span><br>Editor's note—Applicants should note that the Department of Transport and Main Roads may have additional requirements.                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                 |
| <b>PO11</b><br>Development contributes to the creation of a transport network which is designed to: <ul style="list-style-type: none"> <li>a) achieve a high level of permeability and connectivity for all modes of transport, including pedestrians and cyclists, within the development and to the surrounding area; and</li> <li>b) encourage people to walk, cycle or use public transport to and from the site instead of using a car.</li> </ul> | No acceptable outcome is nominated.<br><br>Editor's note—Refer to SC6.19 – Structure plan planning scheme policy for guidance.                                                                                                 | <b>Complies with PO11</b><br>It is proposed that pedestrian and cyclist access to the development will be facilitated via dedicated pedestrian/cyclist site access and paths that connect to the external network. Bicycle parking will be provided in accordance with Council requirements. The development is also well located in terms of Public Transport. |
| <b>PO12</b><br>Development is located on roads that are appropriate for the nature of traffic generated, having regard to the safety and efficiency of the transport network.                                                                                                                                                                                                                                                                           | <b>AO12.1</b><br>Traffic generated by the development is safely accommodated within the design capacity of roads as provided in <a href="#">SC6.15 — Road infrastructure and hierarchy planning scheme policy</a> .<br><br>AND | <b>Complies with PO12</b><br>Section 7 of Colliers' Traffic Engineering Report confirms that the traffic generated by the development is safely accommodated within the design capacity of roads.                                                                                                                                                               |

| PERFORMANCE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                 | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                               | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>AO12.2</b><br/>A road or street does not connect with another road or street that is more than two (2) levels higher or lower in the road hierarchy.</p> <p>AND</p> <p><b>AO12.3</b><br/>The existing infrastructure fronting the proposed development is upgraded in accordance with <a href="#">SC6.15 — Road infrastructure and hierarchy planning scheme policy</a> and <a href="#">Capricorn Municipal Development Guidelines</a>.</p> | <p><b>Not Applicable</b><br/>No new roads are proposed as part of this development.</p> <p><b>Complies with AO12.3</b><br/>Section 7 of Colliers' Traffic Engineering Report confirms that the existing left-turn lanes into the site are sufficient to accommodate the increase in development.</p> |
| <p><b>PO13</b><br/>Where the nature of the development creates a demand, provision is made for set down and pick-up facilities by bus, taxis or private vehicle, which:</p> <ul style="list-style-type: none"> <li>a) are safe for pedestrians and vehicles;</li> <li>b) are conveniently connected to the main component of the development by pedestrian pathway; and</li> <li>c) provide for pedestrian priority and clear sightlines.</li> </ul> | No acceptable outcome is nominated.                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Complies with PO13</b><br/>On-site set down and pick-up facilities are proposed to accommodate such demand.</p>                                                                                                                                                                                |

| PERFORMANCE OUTCOMES                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ACCEPTABLE OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RESPONSE / COMPLIANCE |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Site access                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| <p><b>PO14</b></p> <p>Development does not impact on the safety, operation or function of the road network or system.</p>                                                            | <p><b>AO14.1</b></p> <p>Vehicle manoeuvring into and from the site for all vehicles is designed in accordance with the Australian Standard AS 2890, as updated from time to time.</p> <p>AND</p> <p><b>AO14.2</b></p> <p>No direct property access is gained to a highway, main road, urban arterial or sub arterial road as defined in SC6.16 — Road infrastructure and hierarchy planning scheme policy other than via a service road or a joint access arrangement with other sites.</p> <p>AND</p> <p><b>AO14.3</b></p> <p>Development that generates greater than 100 vehicle movements per day does not gain access to or from an urban access place or urban access streets as defined in SC6.16 — Road infrastructure and hierarchy planning scheme policy.</p> | <p><b>Complies with AO14.1</b></p> <p>Vehicle manoeuvring into and from the site for all vehicles is designed in accordance with the Australian Standard AS 2890.</p> <p>AND</p> <p><b>Complies with PO14</b></p> <p>The existing site includes two accesses to Yaamba Rd (arterial road). The southern access is approved under a separate development approval and the northern access is proposed to be upgraded. Refer to Section 6 of Colliers’ Traffic Engineering Report.</p> <p>AND</p> <p><b>Complies with AO14.3</b></p> |                       |
| <p><b>PO15</b></p> <p>Development facilitates the orderly provision and upgrading of the transport network or contributes to the construction of transport network improvements.</p> | <p>No acceptable outcome is nominated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Complies with PO15</b></p> <p>The development contributes to transport network improvements by the proposed direct right turn from Yaamba Road into the southern site access. This upgrade would reduce demands at the Farm Street intersection which would otherwise consume</p>                                                                                                                                                                                                                                            |                       |



| PERFORMANCE OUTCOMES                                                                                                 | ACCEPTABLE OUTCOMES                                                                                                                                                                 | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                         |
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|                                                                                                                      |                                                                                                                                                                                     | intersection capacity and increase safety risk at the intersection.                                                                                                                                                                                           |
| <b>PO16</b><br>On-site transport network infrastructure integrates safely and effectively with surrounding networks. | <b>AO16.1</b><br>Intersections, connections and access arrangements are designed in accordance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890. | <b>Complies with AO16.1</b><br>Intersections, connections and access arrangements are designed in accordance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890. Refer to Section 6 of Colliers' Traffic Engineering Report. |

| PERFORMANCE OUTCOMES                                                                                                                                                                      | ACCEPTABLE OUTCOMES                                                                                                                                                                        | RESPONSE / COMPLIANCE                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pedestrian and cyclist facilities</b>                                                                                                                                                  |                                                                                                                                                                                            |                                                                                                                                                                                                                                                      |
| <b>PO17</b><br>Development provides safe and convenient pedestrian and cycle movement to the site and within the site having regard to desire lines, users' needs, safety and legibility. | <b>AO17.1</b><br>Pedestrian and cyclist facilities are designed in compliance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890 — Parking facilities.    | <b>Complies with AO17.1</b><br>Pedestrian and cyclist facilities are designed in compliance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890 — Parking facilities. Refer to Colliers' Traffic Engineering Report. |
| <b>PO18</b><br>Provision is made for adequate bicycle parking and end of trip facilities, to meet the likely needs of users and encourage cycle travel.                                   | No acceptable outcome is nominated.<br><br>Editor's note—Provisions are made for parking and end of trip facilities in accordance with the SC6.4 — Bicycle network planning scheme policy. | <b>Complies with PO18</b><br>Bicycle parking will be provided in accordance with Council requirements. Refer to T Colliers' Traffic Engineering Report.                                                                                              |

| PERFORMANCE OUTCOMES                                                                               |                                                                                                                                                                            | ACCEPTABLE OUTCOMES                                                                                                                                                                            | RESPONSE / COMPLIANCE |
|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Servicing                                                                                          |                                                                                                                                                                            |                                                                                                                                                                                                |                       |
| PO19<br>Refuse collection vehicles are able to safely access on-site refuse collection facilities. | AO19.1<br>Refuse collection areas are provided and designed in accordance with the <a href="#">waste management code</a> and <a href="#">Australian Standard AS 2890</a> . | Complies with AO19.1<br>Refuse collection areas are provided and designed in accordance with the waste management code and AS2890. Refer to Section 5 of Colliers’ Traffic Engineering Report. |                       |

## Appendix H    State Code 1 Responses

# State code 1: Development in a state-controlled road environment

**Table 1.2.1: Development in a state-controlled road environment**

| Performance outcomes                                                                                                                                                                                               | Acceptable outcomes                                                                                                                                                                                                                                            | Response                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Buildings and structures</b>                                                                                                                                                                                    |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                         |
| <b>PO1</b> The location of buildings, structures, infrastructure, services and utilities does not create a safety hazard in a state-controlled road, or cause damage to, or obstruct road transport infrastructure | <b>AO1.1</b> Buildings, structures, infrastructure, services and utilities are not located in a state-controlled road.<br>AND                                                                                                                                  | <b>Complies with AO1.1</b><br>Buildings, structures, infrastructure, services and utilities are not located in a state-controlled road.                                                                 |
|                                                                                                                                                                                                                    | <b>AO1.2</b> Buildings, structures, infrastructure, services and utilities can be maintained without requiring access to a state-controlled road.                                                                                                              | <b>Complies with AO1.2</b><br>Buildings, structures, infrastructure, services and utilities can be maintained without requiring access to a state-controlled road.                                      |
| <b>PO2</b> The design and construction of Buildings and structures does not create a safety hazard by distracting users of a state-controlled road.                                                                | <b>AO2.1</b> Facades of buildings and structures facing a state-controlled road are made of non-reflective materials.<br>OR                                                                                                                                    | <b>Complies with AO2.1</b><br>Facades of buildings and structures facing a state-controlled road will be made of non-reflective materials.                                                              |
|                                                                                                                                                                                                                    | <b>AO2.2</b> Facades of buildings and structures do not reflect point light sources into the face of oncoming traffic on a state-controlled road.<br>AND                                                                                                       | <b>Complies with AO2.2</b><br>Facades of buildings and structures do not reflect point light sources into the face of oncoming traffic on a state-controlled road                                       |
|                                                                                                                                                                                                                    | <b>AO2.3</b> External lighting of buildings and structures is not directed into the face of oncoming traffic on a state-controlled road and does not involve flashing or laser lights.<br>AND                                                                  | <b>Complies with AO2.3</b><br>External lighting of buildings and structures is not directed into the face of oncoming traffic on a state-controlled road and does not involve flashing or laser lights. |
|                                                                                                                                                                                                                    | <b>AO2.4</b> Advertising devices visible from a state-controlled road are located and designed in accordance with the Roadside advertising guide, Department of Transport and Main Roads, 2013.                                                                | <b>Complies with AO2.4</b><br>All advertising devices will be located in accordance with the Roadside Advertising Guide.                                                                                |
| <b>PO3</b> Road, pedestrian and bikeway bridges over a state-controlled road are designed and constructed to prevent projectiles from being thrown onto a state-controlled road.                                   | <b>AO3.1</b> Road, pedestrian and bikeway bridges over a state-controlled road include throw protection screens in accordance with section 4.9.3 of the Design criteria for bridges and other structures manual, Department of Transport and Main Roads, 2014. | <b>N/A</b><br>No road, pedestrian and bikeway bridges are proposed over a state-controlled road as part of this development.                                                                            |



| Filling, excavation and retaining structures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PO4</b> Filling and excavation does not interfere with, or result in damage to, infrastructure or services in a state-controlled road.</p> <p>Note: Information on the location of services and public utility plants in a state-controlled road can be obtained from the Dial Before You Dig service.</p> <p>Where development will impact on an existing or future service or public utility plant in a state-controlled road such that the service or public utility plant will need to be relocated, the alternative alignment must comply with the standards and design specifications of the relevant service or public utility provider, and any costs of relocation are to be borne by the developer.</p> | No acceptable outcome is prescribed. | <p><b>Complies with PO4.</b></p> <p>Any filling and excavation activities required for the development will be subject to a construction traffic management plan that ensures no impacts.</p> |
| <p><b>PO5</b> Filling, excavation, building foundations and retaining structures do not undermine, or cause subsidence of, a state-controlled road.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with Volume 3 of the Road Planning And Design Manual 2nd edition, Department of Transport and Main Roads, 2016, is provided.</p>                                                                                                                                                                                                                                                                          | No acceptable outcome is prescribed. | <p><b>Complies with PO5.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p>                                                        |
| <p><b>PO6</b> Filling, excavation, building foundations and retaining structures do not cause ground water disturbance in a state-controlled road.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with Volume 3 of the Road planning and design manual 2nd edition, Department of Transport and Main Roads, 2016, is provided.</p>                                                                                                                                                                                                                                                                           | No acceptable outcome is prescribed. | <p><b>Complies with PO6.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p>                                                        |
| <p><b>PO7</b> Excavation, boring, piling, blasting or fill compaction during construction of a development does not result in ground movement or vibration impacts that would cause damage or nuisance to a state-controlled road, road transport infrastructure or road works.</p> <p>Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with Volume 3 of the Road Planning And Design Manual 2nd edition, Department of Transport and Main Roads, 2016, is provided.</p>                                                                                                                                              | No acceptable outcome is prescribed. | <p><b>Complies with PO7.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p>                                                        |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PO8</b> Development involving the haulage of fill, extracted material or excavated spoil material exceeding 10,000 tonnes per year does not damage the pavement of a state-controlled road.</p> <p>Note: It is recommended a pavement impact assessment is provided in accordance with the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.</p> | <p><b>AO8.1</b> Fill, extracted material and spoil material is not transported to or from the development site on a state-controlled road.</p>                                                                                                                                                               | <p><b>N/A</b></p> <p>Extent of fill/excavation will not exceed 10,000 tonnes. Refer to Civil Engineering Report.</p>                   |
| <p><b>PO9</b> Filling and excavation associated with the construction of vehicular access to a development does not compromise the operation or capacity of existing drainage infrastructure for a state-controlled road.</p>                                                                                                                                                          | <p>No acceptable outcome is prescribed.</p>                                                                                                                                                                                                                                                                  | <p><b>Complies with PO9.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p> |
| <p><b>PO10</b> Fill material used on a development site does not result in contamination of a state-controlled road.</p>                                                                                                                                                                                                                                                               | <p><b>AO10.1</b> Fill material is free of contaminants including acid sulfate content.</p> <p>Note: Soils and rocks should be tested in accordance with AS 1289.0 – Methods of testing soils for engineering purposes and AS 4133.0-2005 – Methods of testing rocks for engineering purposes.</p> <p>AND</p> | <p><b>Complies with P10.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p> |
|                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO10.2</b> Compaction of fill is carried out in accordance with the requirements of AS 1289.0 2000 – Methods of testing soils for engineering purposes.</p>                                                                                                                                            | <p><b>Complies with P10.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p> |
| <p><b>PO11</b> Filling and excavation does not cause wind-blown dust nuisance in a state-controlled road.</p>                                                                                                                                                                                                                                                                          | <p><b>AO11.1</b> Compaction of fill is carried out in accordance with the requirements of AS 1289.0 2000 – Methods of testing soils for engineering purposes.</p> <p>AND</p>                                                                                                                                 | <p><b>Complies with P11.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p> |
|                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO11.2</b> Dust suppression measures are used during filling and excavation activities such as wind breaks or barriers and dampening of ground surfaces.</p>                                                                                                                                           | <p><b>Complies with P11.</b></p> <p>All civil works will be undertaken in accordance with relevant standards to ensure no impacts.</p> |
| Stormwater and drainage                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                              |                                                                                                                                        |
| <p><b>PO12</b> Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a state-controlled road.</p>                                                                                                                                                                                                                        | <p>No acceptable outcome is prescribed.</p>                                                                                                                                                                                                                                                                  | <p><b>Complies with P12.</b></p> <p>Refer to the Development Plans and Stormwater Management Plan</p>                                  |
| <p><b>PO13</b> Run-off from the development site is not unlawfully discharged to a state-controlled road.</p>                                                                                                                                                                                                                                                                          | <p><b>AO13.1</b> Development does not create any new points of discharge to a state-controlled road.</p> <p>AND</p>                                                                                                                                                                                          | <p><b>Complies with P13.</b></p> <p>Refer to the Development Plans and Stormwater Management Plan</p>                                  |
|                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO13.2</b> Stormwater run-off is discharged to a lawful point of discharge.</p> <p>Note: Section 3.4 of the Queensland Urban Drainage Manual, Department of Energy and Water Supply, 2013, provides further information on lawful points of discharge. AND</p>                                         | <p><b>Complies with P13.</b></p> <p>Refer to the Development Plans and Stormwater Management Plan</p>                                  |
|                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO13.3</b> Development does not worsen the condition of an existing lawful point of discharge to the state-controlled road.</p>                                                                                                                                                                        | <p><b>Complies with P13.</b></p> <p>Refer to the Development Plans and Stormwater Management Plan</p>                                  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <b>PO14</b> Run-off from the development site during construction does not cause siltation of stormwater infrastructure affecting a state-controlled road.                                                                                                                                                                                                                                                                                                               | <b>AO14.1</b> Run-off from the development site during construction is not discharged to stormwater infrastructure for a state-controlled road.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Complies with P14.</b><br>Refer to the Development Plans and Stormwater Management Plan                                                                                                                                                                                                                                                                                                                                                       |
| Vehicular access to a state-controlled road                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PO15</b> Vehicular access to a state-controlled road that is a limited access road is consistent with government policy for the management of limited access roads.<br><br>Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.                                                                            | <b>AO15.1</b> Development does not require new or changed access to a limited access road.<br><br>Note: Limited access roads are declared by the transport chief executive under section 54 of the <i>Transport Infrastructure Act 1994</i> and are identified in the DA mapping system.<br><br>OR                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Not Applicable</b><br>Yaamba Road is not a limited access state-controlled road.                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>AO15.2</b> A new or changed access to a limited access road is consistent with the limited access policy for the state-controlled road.<br><br>Note: Limited access policies for limited access roads declared under the <i>Transport Infrastructure Act 1994</i> can be obtained by contacting the relevant Department of Transport and Main Roads regional office.<br><br>AND                                                                                                                                                                                                                                                                                                                                                         | <b>Not Applicable</b><br>Yaamba Road is not a limited access state-controlled road.                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>AO15.3</b> Where a new or changed access is for a service centre, access is consistent with the Service centre policy, Department of Transport and Main Roads, 2013 and the Access policy for roadside service centre facilities on limited access roads, Department of Transport and Main Roads, 2013, and the Service centre strategy for the state-controlled road.<br><br>Note: The Service centre policy, Department of Transport and Main Roads, 2013, Access policy for roadside service centre facilities, Department of Transport and Main Roads, 2013 and the relevant Service centre strategy for a state-controlled road can be accessed by contacting the relevant Department of Transport and Main Roads regional office. | <b>Not Applicable</b><br>Yaamba Road is not a limited access state-controlled road.                                                                                                                                                                                                                                                                                                                                                              |
| <b>PO16</b> The location and design of vehicular access to a state-controlled road (including access to a limited access road) does not create a safety hazard for users of a state-controlled road or result in a worsening of operating conditions on a state-controlled road.<br><br>Note: Where a new or changed access between the premises and a state-controlled road is proposed, the Department of Transport and Main Roads will need to assess the proposal to | <b>AO16.1</b> Vehicular access is provided from a local road.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Complies with PO16</b><br>Vehicular access is provided to Yaamba Road, including an approved southern left-in / left-out access with a proposed upgrade to incorporate a signalised direct right turn into the access, and an upgraded northern access to provide for left-in / left-out movements. The proposed upgrade mitigates the impacts at the Farm St intersection to the north and is anticipated to operate safely and efficiently. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <p>determine if the vehicular access for the development is safe. An assessment can be made by Department of Transport and Main Roads as part of the development assessment process and a decision under section 62 of <i>Transport Infrastructure Act 1994</i> issued.</p> <p>Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p>OR all of the following acceptable outcomes apply:</p> <p><b>AO16.2</b> Vehicular access for the development is consistent with the function and design of the state-controlled road.</p> <p>AND</p>                                                                                                                                                                                                                                                            | <p><b>Complies with AO16.2</b></p> <p>The proposed Yaamba Rd access arrangements are consistent with the function and design of this road.</p>                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>AO16.3</b> Development does not require new or changed access between the premises and the state-controlled road.</p> <p>Note: A decision under section 62 of the <i>Transport Infrastructure Act 1994</i> outlines the approved conditions for use of an existing vehicular access to a <b>state-controlled road</b>. Current section 62 decisions can be obtained from the relevant Department of Transport and Main Roads regional office.</p> <p>AND</p> | <p><b>Complies with PO16</b></p> <p>Vehicular access is provided to Yaamba Road, including an approved southern left-in / left-out access with a proposed upgrade to incorporate a signalised direct right turn into the access, and an upgraded northern access to provide for left-in / left-out movements. The proposed upgrade mitigates the impacts at the Farm St intersection to the north and is anticipated to operate safely and efficiently.</p> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>AO16.4</b> Use of any existing vehicular access to the development is consistent with a decision under section 62 of the <i>Transport Infrastructure Act 1994</i>.</p> <p>Note: The development which is the subject of the application must be of an equivalent use and intensity for which the section 62 approval was issued and the section 62 approval must have been granted no more than 5 years prior to the lodgement of the application. AND</p>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>AO16.5</b> On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles do not queue in a road intersection or on the state-controlled road.</p>                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Vehicular access to local roads within 100 metres of an intersection with a state-controlled road                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>PO17</b> The location and design of vehicular access to a local road within 100 metres of an intersection with a state-controlled road does not create a safety hazard for users of a state-controlled road.</p> <p>Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p>                                                | <p><b>AO17.1</b> Vehicular access is located as far as possible from the state-controlled road intersection.</p> <p>AND</p>                                                                                                                                                                                                                                                                                                                                        | <p><b>Not Applicable</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>AO17.2</b> Vehicular access is in accordance with parts, 3, 4 and 4A of the Road Planning and Design Manual, 2<sup>nd</sup> Edition: Volume 3, Department of Transport and Main Roads, 2016.</p> <p>AND</p>                                                                                                                                                                                                                                                  | <p><b>Not Applicable</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>AO17.3</b> On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles do not queue in the intersection or on the state-controlled road.</p>                                                                                                                                                                                                                                                                      | <p><b>Not Applicable</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Public passenger transport infrastructure on state-controlled roads                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PO18</b> Development does not damage or interfere with public passenger transport infrastructure, public passenger services or pedestrian or cycle access to public passenger transport infrastructure and public passenger services.</p> <p>Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.</p> | <p><b>AO18.1</b> Vehicular access and associated road access works are not located within 5 metres of existing public passenger transport infrastructure.</p> <p>AND</p>                                                                                                                                                                                                                         | <p><b>Complies with AO18.1</b></p> <p>Vehicular access and associated road access works are not located within 5 metres of existing public passenger transport infrastructure.</p>                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO18.2</b> Development does not necessitate the relocation of existing public passenger transport infrastructure.</p> <p>AND</p>                                                                                                                                                                                                                                                           | <p><b>Complies with AO18.2</b></p> <p>Development does not necessitate the relocation of existing public passenger transport infrastructure.</p>                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO18.3</b> On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles using a vehicular access do not obstruct public passenger transport infrastructure and public passenger services or obstruct pedestrian or cycle access to public passenger transport infrastructure and public passenger services.</p> <p>AND</p>                       | <p><b>Complies with AO18.3</b></p> <p>On-site design ensures no impacts to infrastructure will occur.</p>                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO18.4</b> The normal operation of public passenger transport infrastructure or public passenger services is not interrupted during construction of the development.</p>                                                                                                                                                                                                                   | <p><b>Complies with AO18.4</b></p> <p>The normal operation of public passenger transport infrastructure or public passenger services is not interrupted during construction of the development.</p>           |
| Planned upgrades                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                               |
| <p><b>PO19</b> Development does not impede delivery of planned upgrades of state-controlled roads.</p>                                                                                                                                                                                                                                                                                                                                                                 | <p><b>AO19.1</b> Development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road.</p> <p>Note: Land required for the planned upgrade of a state-controlled road is identified in the <a href="#">DA mapping system</a>.</p> <p>OR</p>                                                            | <p><b>Complies with AO19.1</b></p> <p>The development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road</p> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO19.2</b> Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road.</p>                                                                                                      | <p><b>Complies with AO19.2</b></p> <p>The development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road</p> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>OR all of the following acceptable outcomes apply:</p> <p><b>AO19.3</b> Structures and infrastructure located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road are able to be readily relocated or removed without materially affecting the viability or functionality of the development.</p> <p>AND</p> | <p><b>N/A complies with AO19.1/19.2</b></p>                                                                                                                                                                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>AO19.4</b> Vehicular access for the development is consistent with the function and design of the planned upgrade of the state-controlled road.<br>AND                                                                                                                                                                                                                                               | <b>N/A complies with AO19.1/19.2</b>                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>AO19.5</b> Development does not involve filling and excavation of, or material changes to, land required for a planned upgrade to a state-controlled road.<br>AND                                                                                                                                                                                                                                    | <b>N/A complies with AO19.1/19.2</b>                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>AO19.6</b> Land is able to be reinstated to the pre-development condition at the completion of the use.                                                                                                                                                                                                                                                                                              | <b>N/A complies with AO19.1/19.2</b>                                                                                                                                           |
| Network impacts                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                |
| <b>PO20</b> Development does not result in a worsening of operating conditions on the state-controlled road network.<br><br>Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified traffic impact assessment is provided. Please refer to the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome. | No acceptable outcome is prescribed.                                                                                                                                                                                                                                                                                                                                                                    | <b>Complies with PO20</b><br><br>As detailed in Section 7 of Colliers' Traffic Engineering Report, impact-mitigating upgrades are proposed to the road network.                |
| <b>PO21</b> Development does not impose traffic loadings on a state-controlled road which could be accommodated on the local road network.                                                                                                                                                                                                                                                                                                            | <b>AO21.1</b> The layout and design of the development directs traffic generated by the development to the <b>local road</b> network.                                                                                                                                                                                                                                                                   | <b>Complies with PO21</b><br><br>The development utilises the existing/proposed site accesses to Yaamba Road to minimise traffic loading on the state-controlled road network. |
| <b>PO22</b> Upgrade works on, or associated with, a state-controlled road are built in accordance with Queensland road design standards.                                                                                                                                                                                                                                                                                                              | <b>AO22.1</b> Upgrade works required as a result of the development are designed and constructed in accordance with the <i>Road Planning and Design Manual</i> , 2 <sup>nd</sup> edition, Department of Transport and Main Roads, 2016.<br><br>Note: Road works in a state-controlled road require approval under section 33 of the <i>Transport Infrastructure Act 1994</i> before the works commence. | <b>Complies with AO22.1</b><br><br>The required impact-mitigating upgrades will be designed and constructed in accordance with relevant standards.                             |

Table 1.2.3: Development in a future state-controlled road environment

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Acceptable outcomes                                                                                                                                                                                                                                                                |                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>PO32</b> Development does not impede delivery of a future state-controlled road.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>AO32.1</b> Development is not located in a future state-controlled road.<br>OR                                                                                                                                                                                                  | <b>Complies with AO32.1</b><br>Development is not located in a future state-controlled road.    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>AO32.2</b> Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located in a future state-controlled road.                                                                                                  | <b>N/A complies with AO32.1</b>                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OR all of the following acceptable outcomes apply:<br><br><b>AO32.3</b> Structures and infrastructure located in a future state-controlled road are able to be readily relocated or removed without materially affecting the viability or functionality of the development.<br>AND | <b>N/A complies with AO32.1</b>                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>AO32.4</b> Development does not involve filling and excavation of, or material changes to, a future state-controlled road.<br>AND                                                                                                                                               | <b>N/A complies with AO32.1</b>                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>AO32.5</b> Land is able to be reinstated to the pre-development condition at the completion of the use.                                                                                                                                                                         | <b>N/A complies with AO32.1</b>                                                                 |
| <b>PO33</b> Vehicular access to a future state-controlled road is located and designed to not create a safety hazard for users of a future state-controlled road or result in a worsening of operating conditions on a future state-controlled road.<br><br>Note: Where a new or changed access between the premises and a future state-controlled road is proposed, the Department of Transport and Main Roads will need to assess the proposal to determine if the vehicular access for the development is safe. An assessment can be made by Department of Transport and Main Roads as part of the development assessment process and a decision under section 62 of <i>Transport Infrastructure Act 1994</i> issued. | <b>AO33.1</b> Development does not require new or changed access between the premises and a future state-controlled road.<br>AND                                                                                                                                                   | <b>N/A</b><br>Yaamba Rd is not a future state-controlled road.                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>AO33.2</b> Vehicular access for the development is consistent with the function and design of the future state-controlled road.                                                                                                                                                 | <b>N/A</b><br>Yaamba Rd is not a future state-controlled road.                                  |
| <b>PO34</b> Filling, excavation, building foundations and retaining structures do not undermine, or cause subsidence of, a future state-controlled road.<br><br>Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified geotechnical assessment is provided, prepared in accordance with the Road Planning and Design Manual, 2 <sup>nd</sup> edition: Volume 3, Department of Transport and Main Roads, 2016.                                                                                                                                                                                                                                                           | No acceptable outcome is prescribed.                                                                                                                                                                                                                                               | <b>Complies with PO34</b><br>All development works will be undertaken without any such impacts. |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                      | Acceptable outcomes                                                                                                                                                                                                                                                                    |                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.                                                                                                                   |                                                                                                                                                                                                                                                                                        |                                                                                                 |
| <b>PO35</b> Fill material from a development site does not result in contamination of land for a future state-controlled road.<br><br>Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.             | <b>AO35.1</b> Fill material is free of contaminants including acid sulfate content.<br>Note: Soil and rocks should be tested in accordance with AS1289 – Methods of testing soils for engineering purposes and AS4133 2005 – Methods of testing rocks for engineering purposes.<br>AND | <b>Complies with PO35</b><br>All development works will be undertaken without any such impacts. |
|                                                                                                                                                                                                                                                                                                                                                                                                           | <b>AO35.2</b> Compaction of fill is carried out in accordance with the requirements of AS1289.0 2000 – Methods of testing soils for engineering purposes.                                                                                                                              | <b>Complies with PO35</b><br>All development works will be undertaken without any such impacts. |
| <b>PO36</b> Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a future state-controlled road.<br><br>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome. | No acceptable outcome is prescribed.                                                                                                                                                                                                                                                   | <b>Complies with PO36</b><br>Refer civil engineering report.                                    |
| <b>PO37</b> Run-off from the development site is not unlawfully discharged to a future state-controlled road.<br><br>Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.                                                   | <b>AO37.1</b> Development does not create any new points of discharge to a future state-controlled road.<br>AND                                                                                                                                                                        | <b>Complies with PO37</b><br>Refer civil engineering report.                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                           | <b>AO37.2</b> Stormwater run-off is discharged to a lawful point of discharge.<br>Note: Section 3.4 of the Queensland Urban Drainage Manual, Department of Energy and Water Supply, 2013, provides further information on lawful points of discharge.<br>AND                           | <b>Complies with PO37</b><br>Refer civil engineering report.                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                           | <b>AO37.3</b> Development does not worsen the condition of an existing lawful point of discharge to the future state-controlled road.                                                                                                                                                  | <b>Complies with PO37</b><br>Refer civil engineering report.                                    |



**ROCKHAMPTON REGIONAL COUNCIL**

**APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.:** D/175-2025

**Dated:** 25 May 2026

**Environmental Noise Level Impact Assessment for Proposed Coles Supermarket, Liquorland, Showroom Use and Residential, 452-488 Yaamba Road, Norman Gardens**

**conducted for**

**Coles Group Property Developments Ltd**

**Report No: R25079/D3992/Rev.0/06.11.2025**

| Revision No. | Date       | Comment                                                            |
|--------------|------------|--------------------------------------------------------------------|
| Draft        | 17.03.2022 | Draft report R22024.                                               |
| 0            | 30.05.2022 | Original report R22024.                                            |
| 1            | 16.11.2022 | Report R22024 updated with the most recent plans                   |
| Draft1       | 1.10.2025  | Report R25079 with new site plan and proposed occupancies          |
| Draft2       | 9.10.2025  | Acoustic barrier location updated                                  |
| Revision 0   | 6.11.2025  | Final version of amended report with new site plan and occupancies |

Report prepared for: Coles Group Property Developments Ltd  
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.....  
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Our reference: R25079/D3992/Rev.0/06.11.2025

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## INTRODUCTION

The subject site at 452 to 488 Yaamba Road, Norman Gardens (Lot 25 on RP610513) has an existing (not in use) Bunnings warehouse and associated carparking and internal roadways. It is proposed to re-develop this existing building with a Coles supermarket, Liquorland and Showroom use, as well as residential units on the eastern side of the site.

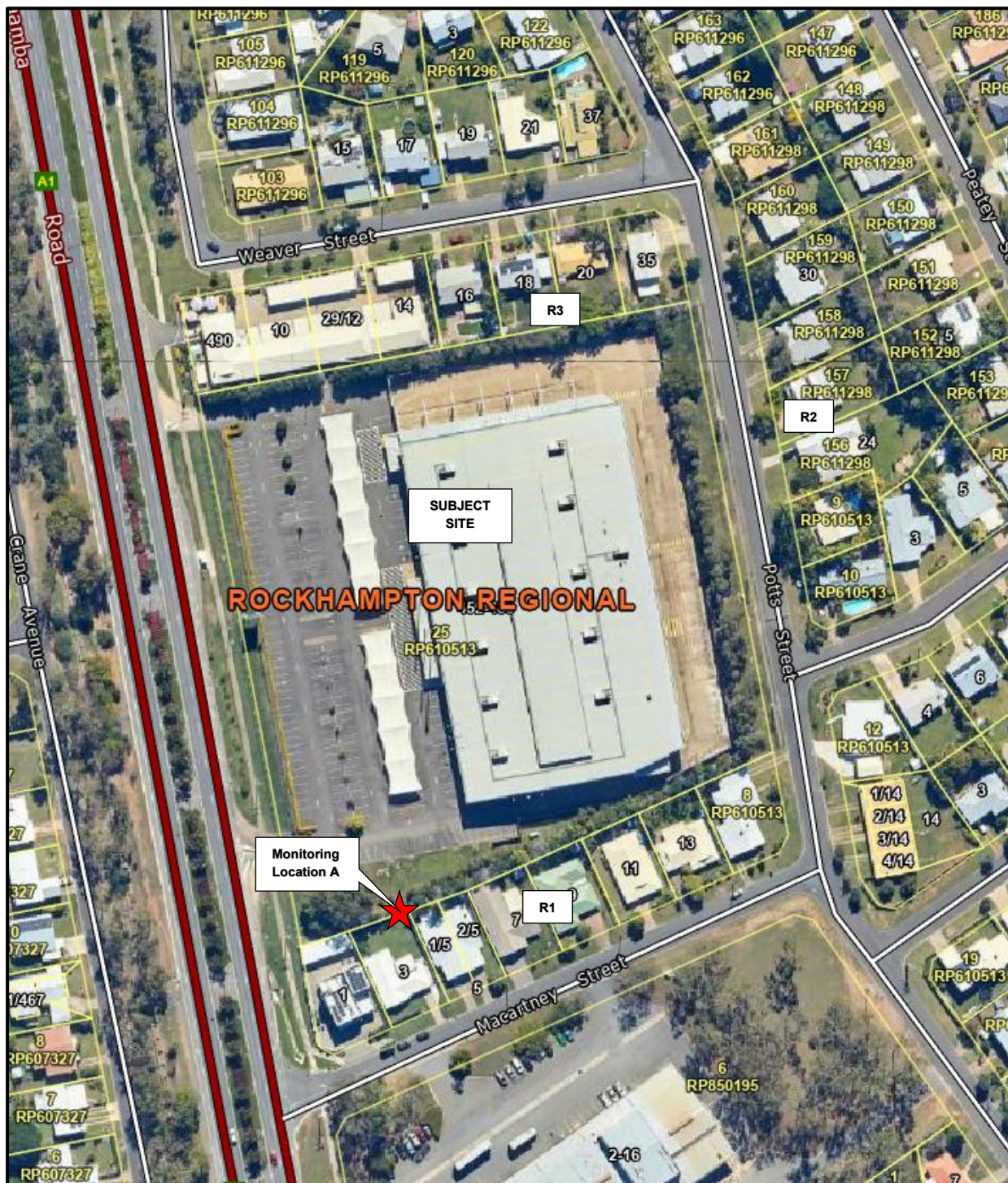
Based on the consultant's site inspection and review of Rockhampton Regional Planning Scheme 2015 noise from the proposed development, namely vehicle activities (including loading docks) and plant and equipment (mechanical exhaust, refrigeration and air-conditioning units), has the potential to noise impact the adjoining existing and proposed residential.

To assess current ambient noise levels relative to the closest existing residential to the subject site a noise logger was located on the subject site at monitoring location A, adjacent to the southern boundary of the subject site with the microphone elevated 1.6 metres above ground level.

This report detailed the results of this ambient noise level assessment, background sound levels, noise limits, potential source noise levels, source noise levels calculated to the closest residential premises, state of compliance with noise limits and any required noise control measures.

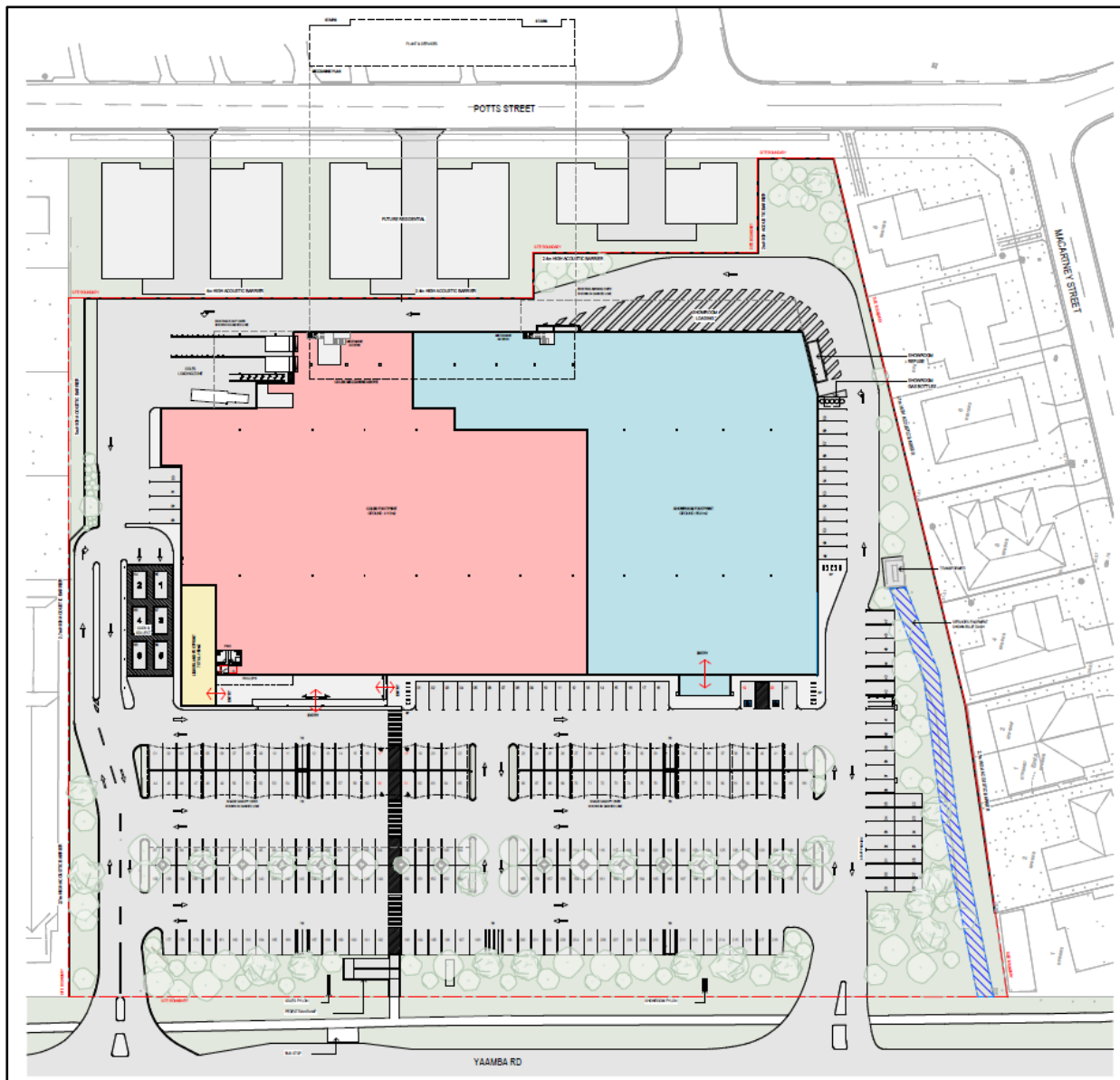
In preparing this report drawing DA01-00, revision E, overall site plan, project number 63413, prepared by Hames Sharley, was referenced.

Refer Figure 1 for locality plan, closest residences and monitoring location A and Figure 2 for the proposed site plan.



**Figure 1**  
Locality Plan, Closest Residences (Numbered 1 to 3) and Monitoring Location A (Top of the Page is North)





**Figure 2**  
**Proposed Site Plan (Top of the Page is East)**

## CRITERIA

### Measurements and Calculations

All noise level measurements were conducted in accordance with the following:

- general requirements of the Queensland environmental protection legislation;
- Environmental Protection (Noise) Policy 2019;
- *Noise Measurement Manual*, Queensland Government – Environmental Protection Agency, Version 4, August 2013; and
- Australian Standard AS 1055-2018, *Acoustics – Description and Measurement of Environmental Noise*.

### Noise Limits – Rockhampton Regional Council

The Rockhampton Regional Planning Scheme 2015 requires protection of amenity of residential areas and makes mention of the Environmental Protection (Noise) Policy (EPP Noise). Noise limits, therefore, have been defined in accordance with the EPP Noise 2019, which only contains the Acoustic Quality Objectives. Reference is also made to the Default Noise Standards of the Environmental Protection Act 1994 for refrigeration and air-conditioning unit noise limits.

The adopted noise limits are as follows:

- air-conditioning and refrigeration:
  - daytime (0700 to 1800 hours): background + 5 dB(A);
  - evening (1800 to 2200 hours): background + 5 dB(A);
  - night-time (2200 to 0700 hours): background + 3 dB(A);
- all other noise sources – Acoustic Quality Objectives:
  - Acoustic quality objectives, daytime and evening, external to dwelling:
    - 50 dB(A)  $L_{Aeq,adj,1H}$ ;
    - 55 dB(A)  $L_{A10,adj,1H}$ ; and
    - 65 dB(A)  $L_{A1,adj,1H}$ ;
  - Acoustic quality objectives, daytime and evening, inside dwelling:
    - 35 dB(A)  $L_{Aeq,adj,1H}$ ;
    - 40 dB(A)  $L_{A10,adj,1H}$ ; and
    - 45 dB(A)  $L_{A1,adj,1H}$ ;
  - Acoustic quality objectives, night-time, inside dwelling:
    - 30 dB(A)  $L_{Aeq,adj,1H}$ ;
    - 35 dB(A)  $L_{A10,adj,1H}$ ; and
    - 40 dB(A)  $L_{A1,adj,1H}$ ;

For the night-time period the internal noise criteria needs to be converted to be equivalent to outside the closest residences. Allowing a 7 dB(A) noise level reduction from outside to inside (based on windows partially closed and in accordance with the Queensland Environmental Protection Agency Ecoaccess Guideline *Planning for Noise Control*) the internal criteria would be equivalent to the following levels external to the dwelling:

- 37 dB(A)  $L_{Aeq,adj,1H}$ ;
- 42 dB(A)  $L_{A10,adj,1H}$ ; and
- 47 dB(A)  $L_{A1,adj,1H}$ .

## AMBIENT NOISE LEVELS

Table 1 details the results of the ambient noise level measurements conducted from monitoring location A, from the subject site side of the rear boundary of 5 Macartney Street, with the microphone elevated 1.6 metres. For details of noise measurement equipment, equipment settings, calibration and atmospheric conditions, refer Appendix A. For all of the results of the ambient noise assessment refer Appendix B.

With respect to noise the following should be noted:

- daytime: 0700 to 1800 hours;
- evening: 1800 to 2200 hours;
- night-time: 2200 to 0700 hours;
- 'A' weighted: adjustment made by the sound level meter to the measured noise to correspond to the response of the human ear. This adjustment is standardised by international noise standards;
- $L_{Aeq,T}$ : the equivalent continuous (or approximately the 'average') 'A' weighted sound pressure level for the measurement period 'T';
- $L_{A1,T}$ : the 'A' weighted sound pressure level exceeded for 1% of the measurement period 'T';
- $L_{A10,T}$ : the 'A' weighted sound pressure level exceeded for 10% of the measurement period 'T', which is an approximation of the 'average of the maximum noise levels';
- $L_{A90,T}$ : the 'A' weighted sound pressure level exceeded for 90% of the measurement period 'T', which is an approximation of the 'average of the minimum noise levels', which is also known as the 'background' noise level.

| <b>Table 1</b><br><b>Results of Ambient Noise Level Measurements, Monitoring Location A</b> |        |             |                            |      |           |      |           |      |           |      |
|---------------------------------------------------------------------------------------------|--------|-------------|----------------------------|------|-----------|------|-----------|------|-----------|------|
| Day                                                                                         | Date   | Time Period | Ambient Noise Level, dB(A) |      |           |      |           |      |           |      |
|                                                                                             |        |             | $L_{Aeq}$                  |      | $L_{A1}$  |      | $L_{A10}$ |      | $L_{A90}$ |      |
|                                                                                             |        |             | Range                      | Av.  | Range     | Av.  | Range     | Av.  | Range     | Av.  |
| Thursday                                                                                    | 4/4/19 | Evening     | 53.7-58.8                  | 56.1 | 63.2-67.5 | 65.7 | 55.8-61.3 | 58.9 | 42.9-50.0 | 46.9 |
|                                                                                             |        | Night       | 45.9-57.1                  | 52.7 | 58.5-67.0 | 64.1 | 46.6-61.2 | 55.8 | 30.9-47.1 | 40.7 |
| Friday                                                                                      | 5/4/19 | Daytime     | 55.7-59.3                  | 57.4 | 63.1-68.4 | 65.7 | 58.8-61.4 | 60.4 | 46.3-51.3 | 49.2 |
|                                                                                             |        | Evening     | 53.4-57.5                  | 55.3 | 63.0-68.6 | 65.6 | 57.0-60.5 | 58.6 | 40.4-46.4 | 43.6 |
|                                                                                             |        | Night       | 45.8-56.3                  | 51.8 | 58.3-67.1 | 63.2 | 47.4-58.3 | 54.6 | 31.6-45.2 | 39.9 |
| Saturday                                                                                    | 6/4/19 | Daytime     | 53.7-64.5                  | 56.8 | 61.1-70.4 | 65.3 | 57.3-60.8 | 59.4 | 43.1-48.9 | 46.6 |
|                                                                                             |        | Evening     | 53.3-56.6                  | 55.2 | 61.4-66.9 | 65.1 | 57.4-59.9 | 58.6 | 41.4-47.2 | 44.6 |
|                                                                                             |        | Night       | 43.8-55.9                  | 50.6 | 56.2-65.6 | 61.5 | 45.2-58.8 | 53.9 | 29.3-47.5 | 39.2 |
| Sunday                                                                                      | 7/4/19 | Daytime     | 53.1-58.6                  | 55.7 | 61.0-70.5 | 65.4 | 57.3-61.6 | 59.0 | 39.1-46.7 | 44.0 |
|                                                                                             |        | Evening     | 49.9-55.3                  | 53.2 | 59.9-66.6 | 64.0 | 54.0-58.8 | 57.1 | 34.0-44.1 | 39.3 |
|                                                                                             |        | Night       | 43.4-57.7                  | 51.9 | 57.1-67.8 | 62.6 | 41.8-61.5 | 55.0 | 29.2-46.2 | 39.2 |
| Monday                                                                                      | 8/4/19 | Daytime     | 55.4-62.1                  | 57.3 | 62.3-73.8 | 66.9 | 58.8-62.8 | 60.3 | 43.8-48.9 | 46.7 |
|                                                                                             |        | Evening     | 51.9-56.3                  | 54.3 | 62.5-66.1 | 64.5 | 55.7-59.8 | 57.8 | 36.9-45.2 | 41.2 |
|                                                                                             |        | Night       | 44.5-58.6                  | 52.9 | 57.8-68.3 | 64.0 | 45.4-62.2 | 56.1 | 31.4-48.2 | 40.7 |

**Table 1**  
**Results of Ambient Noise Level Measurements, Monitoring Location A**

| Day       | Date    | Time Period | Ambient Noise Level, dB(A) |      |                 |      |                  |      |                  |      |
|-----------|---------|-------------|----------------------------|------|-----------------|------|------------------|------|------------------|------|
|           |         |             | L <sub>Aeq</sub>           |      | L <sub>A1</sub> |      | L <sub>A10</sub> |      | L <sub>A90</sub> |      |
|           |         |             | Range                      | Av.  | Range           | Av.  | Range            | Av.  | Range            | Av.  |
| Tuesday   | 9/4/19  | Daytime     | 54.9-64.7                  | 57.5 | 63.8-76.7       | 67.2 | 58.0-61.5        | 60.1 | 43.7-48.6        | 46.9 |
|           |         | Evening     | 52.0-57.7                  | 55.0 | 62.1-67.6       | 65.4 | 52.2-61.2        | 58.5 | 34.5-46.7        | 41.7 |
|           |         | Night       | 45.1-58.4                  | 53.4 | 58.2-68.0       | 64.6 | 46.1-62.6        | 56.9 | 32.5-47.8        | 40.0 |
| Wednesday | 10/4/19 | Daytime     | 55.4-59.5                  | 57.5 | 64.2-71.2       | 66.6 | 58.7-61.8        | 60.6 | 42.7-48.8        | 46.1 |
|           |         | Evening     | 52.1-65.1                  | 56.9 | 61.1-69.1       | 65.7 | 55.7-60.6        | 58.6 | 36.4-44.8        | 41.6 |
|           |         | Night       | 46.1-59.7                  | 52.9 | 58.1-67.9       | 63.9 | 45.9-60.9        | 55.7 | 27.9-47.1        | 39.5 |
| Thursday  | 11/4/19 | Daytime     | 57.2-70.1                  | 61.9 | 63.2-80.2       | 71.4 | 59.3-74.5        | 65.4 | 47.7-60.1        | 53.0 |

From Table 1, the following average ambient noise levels should be noted:

- L<sub>Aeq,T</sub>:
  - daytime: 57.4, 56.8, 55.7, 57.3, 57.5, 57.5, 61.9\* Average = 57.0 dB(A);
  - evening: 56.1, 55.3, 55.2, 53.2, 54.3, 55.0, 56.9 Average = 55.1 dB(A);
  - night-time: 52.7, 51.8, 50.6, 51.9, 52.9, 53.4, 52.9 Average = 52.3 dB(A);
- L<sub>A1,T</sub>:
  - daytime: 65.7, 65.3, 65.4, 66.9, 67.2, 66.6, 71.4\* Average = 66.2 dB(A);
  - evening: 65.7, 65.6, 65.1, 64.0, 64.5, 65.4, 65.7 Average = 65.1 dB(A);
  - night-time: 64.1, 63.2, 61.5, 62.6, 64.0, 64.6, 63.9 Average = 63.4 dB(A);
- L<sub>A10,T</sub>:
  - daytime: 60.4, 59.4, 59.0, 60.3, 60.1, 60.6, 65.4\* Average = 60.0 dB(A);
  - evening: 58.9, 58.6, 58.6, 57.1, 57.8, 58.5, 58.6 Average = 58.3 dB(A);
  - night-time: 55.8, 54.6, 53.9, 55.0, 56.1, 56.9, 55.7 Average = 55.4 dB(A);
- L<sub>A90,T</sub>:
  - daytime: 49.2, 46.6, 44.0, 46.7, 46.9, 46.1, 53.0\* Average = 46.6 dB(A);
  - evening: 46.9, 43.6, 44.6, 39.3, 41.2, 41.7, 41.6 Average = 42.7 dB(A);
  - night-time: 40.7, 39.9, 39.2, 39.2, 40.7, 40.0, 39.5 Average = 39.9 dB(A).
- Excluded from average due to rainfall.

Based on the above the noise limits for plant and equipment noise are:

- daytime (0700 to 1800 hours): 47 dB(A) L<sub>A90,T</sub> + 5 = 52 dB(A) L<sub>Aeq,adj,T</sub>;
- evening (1800 to 2200 hours): 43 dB(A) L<sub>A90,T</sub> + 5 = 48 dB(A) L<sub>Aeq,adj,T</sub>;
- night-time (2200 to 0700 hours): 40 dB(A) L<sub>A90,T</sub> + 5 = 45 dB(A) L<sub>Aeq,adj,T</sub>.

For all other noise sources the noise limits are:

- daytime and evening, external to dwelling:
  - 50 dB(A) L<sub>Aeq,adj,1H</sub>;
  - 55 dB(A) L<sub>A10,adj,1H</sub>; and
  - 65 dB(A) L<sub>A1,adj,1H</sub>;
- night-time, external to dwelling:
  - 37 dB(A) L<sub>Aeq,adj,1H</sub>;
  - 42 dB(A) L<sub>A10,adj,1H</sub>; and
  - 47 dB(A) L<sub>A1,adj,1H</sub>.

The anticipated trading hours for the proposed development are:

- supermarket: daytime and evening;
- Liquorland: daytime and evening;
- Showroom use: daytime and some evening.

It is envisaged that the supermarket loading dock would be accessible 24 hours per day and the Showroom use loading/unloading will be accessible from 0700 to 2200 hours per day.

## SOURCE NOISE LEVELS

### Continuous Noise

From previous noise level measurements conducted by the consultant typical continuous source noise levels are:

- supermarket refrigeration condensers (2 of): 87 dB(A)  $L_{WAeq}$ ;
- supermarket dessicant unit: 76 dB(A)  $L_{WAeq}$ ;
- supermarket air cooled chiller: 71 dB(A)  $L_{WAeq}$ ;
- exhaust fans:
  - amenities: 62 dB(A)  $L_{WAeq}$ ;
  - dump room exhaust: 69 dB(A)  $L_{WAeq}$ ;
  - service room exhaust: 63 dB(A)  $L_{WAeq}$ ;
  - plant room exhaust: 77 dB(A)  $L_{WAeq}$ ;
  - chicken oven (2 of): 68 dB(A)  $L_{WAeq}$ ;
  - bakery oven (2 of): 63 dB(A)  $L_{WAeq}$ ;
  - fish prep. 62 dB(A)  $L_{WAeq}$ ;
  - meat prep. 59 dB(A)  $L_{WAeq}$ ;
  - plant room supply: 76 dB(A)  $L_{WAeq}$ ;
  - O.A. supply: 62 dB(A)  $L_{WAeq}$ ;
- Comms. Room air-conditioner: 54 dB(A)  $L_{WAeq}$ ;
- Cash Room air-conditioner: 44 dB(A)  $L_{WAeq}$ ;
- specialty air-conditioner: 74 dB(A)  $L_{WAeq}$ ;
- Liquorland air-conditioner: 74 dB(A)  $L_{WAeq}$ ;
- Liquorland refrigeration unit: 78 dB(A)  $L_{WAeq}$ ;
- refrigerated trailer (current model): 90 dB(A)  $L_{WAeq}$ ;
- Showroom use air-conditioning (2 of): 78 dB(A)  $L_{WAeq}$ .

For the above plant and equipment, all of the supermarket plant and equipment will be located on a platform on the roof adjacent to the loading dock and including the Comms. Room air-conditioner and the Cash Room air-conditioner. The combined source noise level will be  $87 + 87 + 68 + 70 + 76 + 71 + 54 + 44 = 90$  dB(A)  $L_{WAeq}$ .

For all of the fans the combined noise level will be  $62 + 69 + 63 + 77 + 68 + 68 + 63 + 63 + 62 + 59 + 76 + 62 = 81$  dB(A)  $L_{WAeq}$ .

The following has been assumed with respect to the number of items of plant and equipment:

- supermarket:
  - one dessicant unit;
  - one air cooled chiller;
  - one cardboard compactor;
  - one boiler;
  - two refrigeration condensers;
  - exhaust fans as above;
- Liquorland:
  - one air-conditioning unit;
  - one refrigeration unit;



- Showroom use: two air-conditioning units.

The following are the assumed locations of all of the above plant and equipment:

- supermarket – all plant on the roof to the south of the loading dock;
- Liquorland – all plant centrally located on the roof;
- Showroom use – all plant centrally located on the roof.

With respect to the above plant and equipment, the following hours of operation have been assumed:

- Supermarket – 24 hours per day, 7 days per week;
- Liquorland air-conditioning – daytime and evening, 7 days per week;
- Liquorland refrigeration – 24 hours per day, 7 days per week;
- Showroom use – daytime and evening, 7 days per week.

With respect to trading hours, the supermarket will trade in accordance with the provisions of the Trading (allowable Hours) Act 1990.

It is envisaged that the trading hours for the Liquorland and Showroom use will be no longer than the trading hours for the supermarket.

### Non-Steady Sound (Time Varying Noise)

The following noise levels for time varying noise, adjusted for tonality and impulsiveness (as appropriate) and based on noise assessments conducted for a number of similar premises, are:

- |                               |                                                                                                      |
|-------------------------------|------------------------------------------------------------------------------------------------------|
| • car driving on site:        | 69 dB(A) L <sub>WAeq</sub> , 72 dB(A) L <sub>WA,max</sub> and 75 dB(A) L <sub>WAabsolute max</sub> ; |
| • car door closing:           | 78 dB(A) L <sub>WAeq</sub> , 82 dB(A) L <sub>WA,max</sub> and 85 dB(A) L <sub>WAabsolute max</sub> ; |
| • car engine starting:        | 78 dB(A) L <sub>WAeq</sub> , 80 dB(A) L <sub>WA,max</sub> and 83 dB(A) L <sub>WAabsolute max</sub> ; |
| • people laughing, talking:   | 67 dB(A) L <sub>WAeq</sub> , 70 dB(A) L <sub>WA,max</sub> and 75 dB(A) L <sub>WAabsolute max</sub> ; |
| • semi-trailer unloading:     | 90 dB(A) L <sub>WAeq</sub> , 94 dB(A) L <sub>WA,max</sub> and 98 dB(A) L <sub>WAabsolute max</sub> ; |
| • semi driving:               | 76 dB(A) L <sub>WAeq</sub> , 80 dB(A) L <sub>WA,max</sub> and 82 dB(A) L <sub>WAabsolute max</sub> ; |
| • SRV arriving and unloading: | 83 dB(A) L <sub>WAeq</sub> , 85 dB(A) L <sub>WA,max</sub> and 87 dB(A) L <sub>WAabsolute max</sub> ; |
| • SRV driving:                | 72 dB(A) L <sub>WAeq</sub> , 73 dB(A) L <sub>WA,max</sub> and 75 dB(A) L <sub>WAabsolute max</sub> ; |
| • MRV unloading:              | 84 dB(A) L <sub>WAeq</sub> , 87 dB(A) L <sub>WA,max</sub> and 91 dB(A) L <sub>WAabsolute max</sub> ; |
| • MRV driving:                | 74 dB(A) L <sub>WAeq</sub> , 77 dB(A) L <sub>WA,max</sub> and 82 dB(A) L <sub>WAabsolute max</sub> ; |
| • truck air brakes:           | 81 dB(A) L <sub>WAeq</sub> , 84 dB(A) L <sub>WA,max</sub> and 88 dB(A) L <sub>WAabsolute max</sub> ; |
| • trolley tractor driving:    | 80 dB(A) L <sub>WAeq</sub> , 82 dB(A) L <sub>WA,max</sub> and 85 dB(A) L <sub>WAabsolute max</sub> ; |
| • trolleys off tractor:       | 78 dB(A) L <sub>WAeq</sub> , 81 dB(A) L <sub>WA,max</sub> and 85 dB(A) L <sub>WAabsolute max</sub> ; |
| • waste collection vehicle:   | 85 dB(A) L <sub>WAeq</sub> , 90 dB(A) L <sub>WA,max</sub> and 98 dB(A) L <sub>WAabsolute max</sub> . |

It should be noted that there are no forklifts associated with the subject site.

For the Showroom use loading area there is an awning over this loading area. In this report it has been assumed that there are no specific acoustic requirements for this awning and that the underside of this awning is acoustically reflective.

**NOISE LEVEL IMPACT – CONTINUOUS NOISE**

At the closest residences (residence numbers as per Figure 1, R1 to R3) the continuous source noise levels will be as per Table 2.

| Table 2<br>Continuous Noise Source Noise Levels Calculated to Closest Residences |              |        |                    |                            |                          |                               |         |              |                              |
|----------------------------------------------------------------------------------|--------------|--------|--------------------|----------------------------|--------------------------|-------------------------------|---------|--------------|------------------------------|
| Premises                                                                         | Noise Source |        |                    | Source Noise Level (dB(A)) | Distance to Receptor (m) | Noise Level Reduction (dB(A)) |         |              | Receptor Noise Level (dB(A)) |
|                                                                                  | Type         | Number | Adjustment (dB(A)) |                            |                          | Distance                      | Barrier | Ground       |                              |
| <b><u>Residence R1</u></b>                                                       |              |        |                    |                            |                          |                               |         |              |                              |
| Liquorland                                                                       | A/C          | 1      | 0                  | 74 L <sub>WA</sub>         | 145                      | -51                           | 0       |              | 23                           |
|                                                                                  | Refrig       | 1      | 0                  | 78 L <sub>WA</sub>         | 145                      | -51                           | 0       |              | 27                           |
| Showroom use                                                                     | A/C          | 2      | 0                  | 81 L <sub>WA</sub>         | 49                       | -42                           | 0       |              | 39                           |
| Supermarket                                                                      | Deck         | -      | 0                  | 90 L <sub>WA</sub>         | 105                      | -48                           | -5      |              | 37                           |
|                                                                                  | Roof         | -      | 0                  | 81 L <sub>WA</sub>         | 105                      | -48                           | -5      |              | 28                           |
|                                                                                  | trailer      | 1      | 0                  | 90 L <sub>WA</sub>         | 120                      | -50                           | -12     |              | 28                           |
|                                                                                  |              |        |                    |                            |                          |                               |         | <b>TOTAL</b> | 42                           |
| <b><u>Residence R2</u></b>                                                       |              |        |                    |                            |                          |                               |         |              |                              |
| Liquorland                                                                       | A/C          | 1      | 0                  | 74 L <sub>WA</sub>         | 118                      | -49                           | 0       |              | 25                           |
|                                                                                  | Refrig       | 1      | 0                  | 78 L <sub>WA</sub>         | 118                      | -49                           | 0       |              | 29                           |
| Showroom use                                                                     | A/C          | 2      | 0                  | 81 L <sub>WA</sub>         | 95                       | -48                           | 0       |              | 33                           |
| Supermarket                                                                      | Deck         | -      | 0                  | 90 L <sub>WA</sub>         | 68                       | -45                           | -10     |              | 35                           |
|                                                                                  | Roof         | -      | 0                  | 81 L <sub>WA</sub>         | 78                       | -46                           | -5      |              | 30                           |
|                                                                                  | trailer      | 1      | 0                  | 90 L <sub>WA</sub>         | 63                       | -44                           | -5      |              | 14                           |
|                                                                                  |              |        |                    |                            |                          |                               |         | <b>TOTAL</b> | 39                           |
| <b><u>Residence R3</u></b>                                                       |              |        |                    |                            |                          |                               |         |              |                              |
| Liquorland                                                                       | A/C          | 1      | 0                  | 74 L <sub>WA</sub>         | 40                       | -40                           | 0       |              | 34                           |
|                                                                                  | Refrig       | 1      | 0                  | 78 L <sub>WA</sub>         | 40                       | -40                           | 0       |              | 38                           |
| Showroom use                                                                     | A/C          | 2      | 0                  | 81 L <sub>WA</sub>         | 135                      | -51                           | -5      |              | 25                           |
| Supermarket                                                                      | Deck         | -      | 0                  | 90 L <sub>WA</sub>         | 61                       | -44                           | -10     |              | 36                           |
|                                                                                  | Roof         | -      | 0                  | 81 L <sub>WA</sub>         | 65                       | -44                           | -5      |              | 32                           |
|                                                                                  | trailer      | 1      | 0                  | 90 L <sub>WA</sub>         | 50                       | -42                           | -10     |              | 38                           |
|                                                                                  |              |        |                    |                            |                          |                               |         | <b>TOTAL</b> | 43                           |

With respect to line of sight and barrier calculations, refer site plan for the location of the on-site buildings relative to the closest residences. It should be noted that for some of the roof mounted noise sources the leading edge of the supermarket building is acting as an acoustic barrier, and for some of the other noise sources the supermarket building itself is acting as an acoustic barrier.

For all of the closest residences to the proposed supermarket, Liquorland and Showroom use the combined plant and equipment noise levels comply with the daytime, evening and night-time noise limits, with all of the plant and equipment detailed in Table 2 operating for the complete 24-hour day.

All of the above calculations are based on the assumed number, location and noise level of plant and equipment for the proposed supermarket, Liquorland and Showroom use, with an acoustic barrier for the supermarket rooftop plant deck. This acoustic barrier must provide at least a 10 dB(A) noise level reduction for Residence R1 and R2, as the rooftop plant room structure provides the required noise reduction for R3. An acoustic barrier is also required on the eastern side of the supermarket loading dock – refer time varying noise sources for more details of the required noise level reduction for this acoustic barrier. An acoustic barrier is also required on the northern boundary – refer time varying noise sources for more details of the required noise level reduction for this acoustic barrier

Once a more precise number of items of plant and equipment is known, as well as the location for this plant and equipment and the associated noise levels, plant and equipment noise level impact should be recalculated to the closest residences.

**NOISE LEVEL IMPACT – NON-STEADY SOUND (TIME VARYING NOISE)**

At the closest residences the time varying source noise levels will be as per Table 3 (residence numbers as per Figure 1) for the  $L_{Aeq,adj,15min}$  parameter.

With respect to line of sight and barrier calculations, refer site plan for the location of the on-site buildings and the Noise Control section of this report for the acoustic barrier details.

| Table 3<br>Time Varying Source Noise Levels Calculated to Closest Residences, $L_{Aeq,adj,15min}$ |                                  |                            |                          |                               |         |        |                              |
|---------------------------------------------------------------------------------------------------|----------------------------------|----------------------------|--------------------------|-------------------------------|---------|--------|------------------------------|
| Premises                                                                                          | Noise Source                     | Source Noise Level (dB(A)) | Distance to Receptor (m) | Noise Level Reduction (dB(A)) |         |        | Receptor Noise Level (dB(A)) |
|                                                                                                   |                                  |                            |                          | Distance                      | Barrier | Ground |                              |
| <b>Residence R1</b>                                                                               |                                  |                            |                          |                               |         |        |                              |
| Supermarket Loading Dock                                                                          | semi trailer arriving, departing | 76 $L_{WAeq}$              | 130                      | -50                           | -14     |        | 12                           |
|                                                                                                   | semi trailer unloading           | 90 $L_{WAeq}$              | 115                      | -49                           | -14     |        | 27                           |
|                                                                                                   | MRV unloading                    | 84 $L_{WAeq}$              | 115                      | -49                           | -14     |        | 21                           |
|                                                                                                   | MRV arriving and unloading       | 84 $L_{WAeq}$              | 130                      | -50                           | -14     |        | 20                           |
|                                                                                                   | truck airbrakes                  | 81 $L_{WAeq}$              | 130                      | -50                           | -14     |        | 17                           |
|                                                                                                   | waste collection vehicle         | 85 $L_{WAeq}$              | 120                      | -50                           | -14     |        | 21                           |
| Vehicle movements                                                                                 | semi-trailer driving             | 76 $L_{WAeq}$              | 14                       | -31                           | -10     |        | 35                           |
|                                                                                                   | MRV, Showroom use                | 84 $L_{WAeq}$              | 14                       | -31                           | -10     |        | 43                           |
|                                                                                                   | trolley tractor driving          | 80 $L_{WAeq}$              | 70                       | -45                           | -8      |        | 27                           |
|                                                                                                   | trolleys off tractor             | 78 $L_{WAeq}$              | 120                      | -50                           | -10     |        | 18                           |
| Car park                                                                                          | car driving                      | 69 $L_{WAeq}$              | 70                       | -45                           | -8      |        | 16                           |
|                                                                                                   | car door closing                 | 78 $L_{WAeq}$              | 70                       | -45                           | -8      |        | 25                           |
|                                                                                                   | car engine starting              | 78 $L_{WAeq}$              | 70                       | -45                           | -8      |        | 25                           |
|                                                                                                   | people laughing, talking         | 67 $L_{WAeq}$              | 70                       | -45                           | -8      |        | 14                           |
|                                                                                                   |                                  |                            |                          | TOTAL(daytime, evening)       |         |        | 44                           |
|                                                                                                   |                                  |                            |                          | TOTAL(night-time)             |         |        | 36                           |
| <b>Residence R2</b>                                                                               |                                  |                            |                          |                               |         |        |                              |
| Supermarket Loading Dock                                                                          | semi trailer arriving, departing | 76 $L_{WAeq}$              | 65                       | -44                           | -12     |        | 20                           |
|                                                                                                   | semi trailer unloading           | 90 $L_{WAeq}$              | 65                       | -44                           | -12     |        | 34                           |
|                                                                                                   | MRV unloading                    | 84 $L_{WAeq}$              | 65                       | -44                           | -12     |        | 28                           |
|                                                                                                   | MRV arriving and unloading       | 84 $L_{WAeq}$              | 65                       | -44                           | -12     |        | 28                           |
|                                                                                                   | truck airbrakes                  | 81 $L_{WAeq}$              | 65                       | -44                           | -12     |        | 25                           |
|                                                                                                   | waste collection vehicle         | 85 $L_{WAeq}$              | 65                       | -44                           | -12     |        | 29                           |

| Table 3<br>Time Varying Source Noise Levels Calculated to Closest Residences, $L_{Aeq,adj,15min}$ |                                  |                            |                          |                               |         |        |                              |
|---------------------------------------------------------------------------------------------------|----------------------------------|----------------------------|--------------------------|-------------------------------|---------|--------|------------------------------|
| Premises                                                                                          | Noise Source                     | Source Noise Level (dB(A)) | Distance to Receptor (m) | Noise Level Reduction (dB(A)) |         |        | Receptor Noise Level (dB(A)) |
|                                                                                                   |                                  |                            |                          | Distance                      | Barrier | Ground |                              |
| Vehicle movements                                                                                 | semi-trailer driving             | 76 $L_{WAeq}$              | 57                       | -43                           | -8      |        | 25                           |
|                                                                                                   | MRV, Showroom use                | 84 $L_{WAeq}$              | 57                       | -43                           | 0       |        | 38                           |
|                                                                                                   | trolley tractor driving          | 80 $L_{WAeq}$              | 70                       | -47                           | -8      |        | 25                           |
|                                                                                                   | trolleys off tractor             | 78 $L_{WAeq}$              | 50                       | -48                           | -14     |        | 16                           |
| Carpark                                                                                           | car driving                      | 69 $L_{WAeq}$              | 85                       | -47                           | -8      |        | 14                           |
|                                                                                                   | car door closing                 | 78 $L_{WAeq}$              | 85                       | -47                           | -8      |        | 23                           |
|                                                                                                   | car engine starting              | 78 $L_{WAeq}$              | 85                       | -47                           | -8      |        | 23                           |
|                                                                                                   | people laughing, talking         | 67 $L_{WAeq}$              | 85                       | -47                           | -8      |        | 12                           |
|                                                                                                   |                                  |                            |                          | TOTAL(daytime, evening)       |         |        | 41                           |
|                                                                                                   |                                  |                            |                          | TOTAL(night-time)             |         |        | 37                           |
| Residence R3                                                                                      |                                  |                            |                          |                               |         |        |                              |
| Supermarket Loading Dock                                                                          | semi trailer arriving, departing | 76 $L_{WAeq}$              | 33                       | -38                           | -14     |        | 24                           |
|                                                                                                   | semi trailer unloading           | 90 $L_{WAeq}$              | 53                       | -43                           | -14     |        | 33                           |
|                                                                                                   | MRV unloading                    | 84 $L_{WAeq}$              | 53                       | -43                           | -14     |        | 27                           |
|                                                                                                   | MRV arriving and unloading       | 84 $L_{WAeq}$              | 53                       | -43                           | -14     |        | 27                           |
|                                                                                                   | truck airbrakes                  | 81 $L_{WAeq}$              | 33                       | -38                           | -14     |        | 29                           |
|                                                                                                   | waste collection vehicle         | 85 $L_{WAeq}$              | 53                       | -43                           | -14     |        | 28                           |
| Vehicle movements                                                                                 | semi-trailer driving             | 76 $L_{WAeq}$              | 33                       | -38                           | -14     |        | 24                           |
|                                                                                                   | MRV, Showroom use                | 84 $L_{WAeq}$              | 130                      | -50                           | -14     |        | 20                           |
|                                                                                                   | trolley tractor driving          | 80 $L_{WAeq}$              | 65                       | -44                           | -5      |        | 31                           |
|                                                                                                   | trolleys off tractor             | 78 $L_{WAeq}$              | 65                       | -44                           | -10     |        | 24                           |
| Car park                                                                                          | car driving                      | 69 $L_{WAeq}$              | 65                       | -44                           | -5      |        | 20                           |
|                                                                                                   | car door closing                 | 78 $L_{WAeq}$              | 65                       | -44                           | -5      |        | 29                           |
|                                                                                                   | car engine starting              | 78 $L_{WAeq}$              | 65                       | -44                           | -5      |        | 29                           |
|                                                                                                   | people laughing, talking         | 67 $L_{WAeq}$              | 65                       | -44                           | -5      |        | 18                           |
|                                                                                                   |                                  |                            |                          | TOTAL(daytime, evening)       |         |        | 39                           |
|                                                                                                   |                                  |                            |                          | TOTAL(night-time)             |         |        | 37                           |

For all of the closest residences to the proposed supermarket, Liquorland and Showroom use the combined time varying source noise levels comply with the daytime and evening noise limits, with all of the nominated noise sources occurring for the complete 24-hour day. With due consideration of just what noise sources are likely to occur between 2200 and 0700 hours (supermarket loading dock and vehicles accessing and departing the loading dock), the night-time noise limit is also complied with.

All of the above calculations are based on acoustic barriers for the northern, western and southern sides of the subject site. Refer to the Noise Control section of this report for further details.



## NOISE CONTROL

For the steady state noise sources the Coles supermarket rooftop plant deck requires acoustic barriers to provide the following noise reductions:

- 10 dB(A) to the adjoining residences to the north and east.

Therefore the rooftop plant deck requires acoustic barriers to the north and east, with returns.

Additionally, for the steady state noise of a truck refrigeration unit, a noise reduction of 12 dB(A) is required for the adjoining residences to the north and 5 dB(A) for the residences to the east, and this is easily achieved with the acoustic barriers required for the time varying noise sources.

For the time varying noise sources acoustic barriers are required along/adjacent to the northern, eastern and southern boundaries, for the complete length of these boundaries.

### Southern Boundary

By path difference calculation the required 10 dB(A) noise level reduction for the acoustic barrier on the southern boundary adjacent to residences R1 would be achieved by an acoustic barrier 2.1 metres high for the length depicted in Figure 3. This section of acoustic barrier must be constructed from materials with a minimum Rw 20.

### Eastern Boundary

For the eastern boundary the location of the acoustic barrier is relative to the supermarket loading dock and truck turning areas, as well as the vehicle access roadway. For the highest section of acoustic barrier (loading dock and truck turning), this extends from the south-eastern corner of the supermarket building to the northern boundary. By path difference calculation the required 13 dB(A) noise level reduction for the highest acoustic barrier on the eastern boundary would be achieved by an acoustic barrier 4.0 metres high for the length depicted in Figure 3. The height of this acoustic barrier is relative to existing ground levels, as it is possible that the roadway at the loading dock will be below current/natural ground level. This section of acoustic barrier must be constructed from materials with a minimum Rw 24. From the southern end of the 4.0 metre high acoustic barrier a 2.4 metre high acoustic barrier is required, extending to adjacent to the south-western corner of the future residential on the subject site. The acoustic barrier return along the southern side of the future residential on the subject site and the Potts Street boundary is to be 2.0 metres high, as depicted at Figure 3.

### Northern Boundary

For the northern boundary the wall adjacent to the loading dock and truck turning area needs to provide a noise level reduction of 16 dB(A) to the adjoining residences to the north (residences R2) and for the loading dock access roadway a noise reduction of 11 dB(A) (refer Table 3, Residence R2, vehicle movements, semi-trailer driving).

To achieve a noise level reduction of 11 dB(A) for the northern driveway path difference calculations nominate that the acoustic barrier must be 2.7 metres high. This section of acoustic barrier must be constructed from materials with a minimum Rw 18.

For the loading dock and truck turning area the acoustic barrier must be 5 metres high to achieve the required 15 dB(A) reduction, and this assumes that the truck unloading area is at least 1 metre below natural ground level. The extent of this 5 metre high acoustic barrier is indicated at Figure 3. This 5 metre high acoustic barrier is approximately 66 metres long, then tapering down to 2.7 metres high for the balance of the length of the access roadway. This section of acoustic barrier must be constructed from materials with a minimum Rw 25.

## Acoustic Barrier Design

These acoustic barriers must be the nominated height relative to the adjacent internal road level, be continuous and gap free and have a minimum surface area density of 12.5 kg/m<sup>2</sup>. The only exception to this will be three openings at the base of the northern acoustic barrier at the eastern end of the barrier for stormwater overland flow. Each of these acoustic barrier openings will be approximately 125mm high and 800mm long, located as per Figure 4. As these three openings in the acoustic barrier are so small (and very low in profile) they will not adversely impact on the calculated acoustic performance of the northern acoustic barrier.

The various sections of acoustic barrier must comply with the following minimum Rw values:

- southern boundary: minimum Rw 20;
- eastern boundary adjacent truck turning: minimum Rw 24;
- eastern boundary adjacent Showroom use: minimum Rw 21;
- eastern boundary 2m high barrier: minimum Rw 20
- northern boundary adjacent to driveway: minimum Rw 22, including the taper section between the two different barrier heights;
- northern boundary adjacent loading dock: minimum Rw 25.

Examples of suitable materials of construction include, but is not limited to:

- reinforced concrete;
- concrete block;
- brick;
- hebel panel;
- sheet metal at least 2 mm thick;
- minimum 7.5 mm thick fibrous cement sheeting;
- earth mound;
- lapped timber palings, for example kiln dried softwood palings at least 23 mm thick and overlapped a minimum 20 mm;
- any combination of the above.

## Supermarket Rooftop Plant Deck

For the Coles supermarket rooftop plant platform the required noise reduction is 10 dB(A) to the closest residences to the north and east. Assuming the floor of the plant platform is 1 metre above the supermarket roof and the supermarket roof is 8 metres above the ground level, the noise source is 1.6 metres above the platform floor and is set back from the perimeter of the deck 5 metres, then the required barrier height is 2.5 metres for a 10 dB(A) reduction. For the night-time period an additional 2 dB(A) reduction would be achieved by the reduced night-time noise of the refrigeration condensers, as not all fans of each of the condensers would be operating simultaneously at night. This barrier height is relative to the floor level of the condenser deck. For those sides of the rooftop condenser deck which requires an acoustic barrier, this acoustic barrier must also continue from the floor level of the condenser deck down to within 50 mm of the roof of the supermarket.

For the northern acoustic barrier a return 5m long is required on the western side of the condenser deck. For the eastern acoustic barrier a return 5m long is required on the southern side of the condenser deck.

The supermarket condenser deck platform acoustic barriers, both above and below the platform level, must be constructed from materials with a minimum Rw 18. All internal surfaces of the acoustic barriers for the condenser deck, both above and below the deck, must be fully lined with acoustic absorbent material.

Once the precise location and orientation of the Coles supermarket rooftop condenser deck has been determined, as well as the location and manufacturer's source noise levels for all plant and equipment

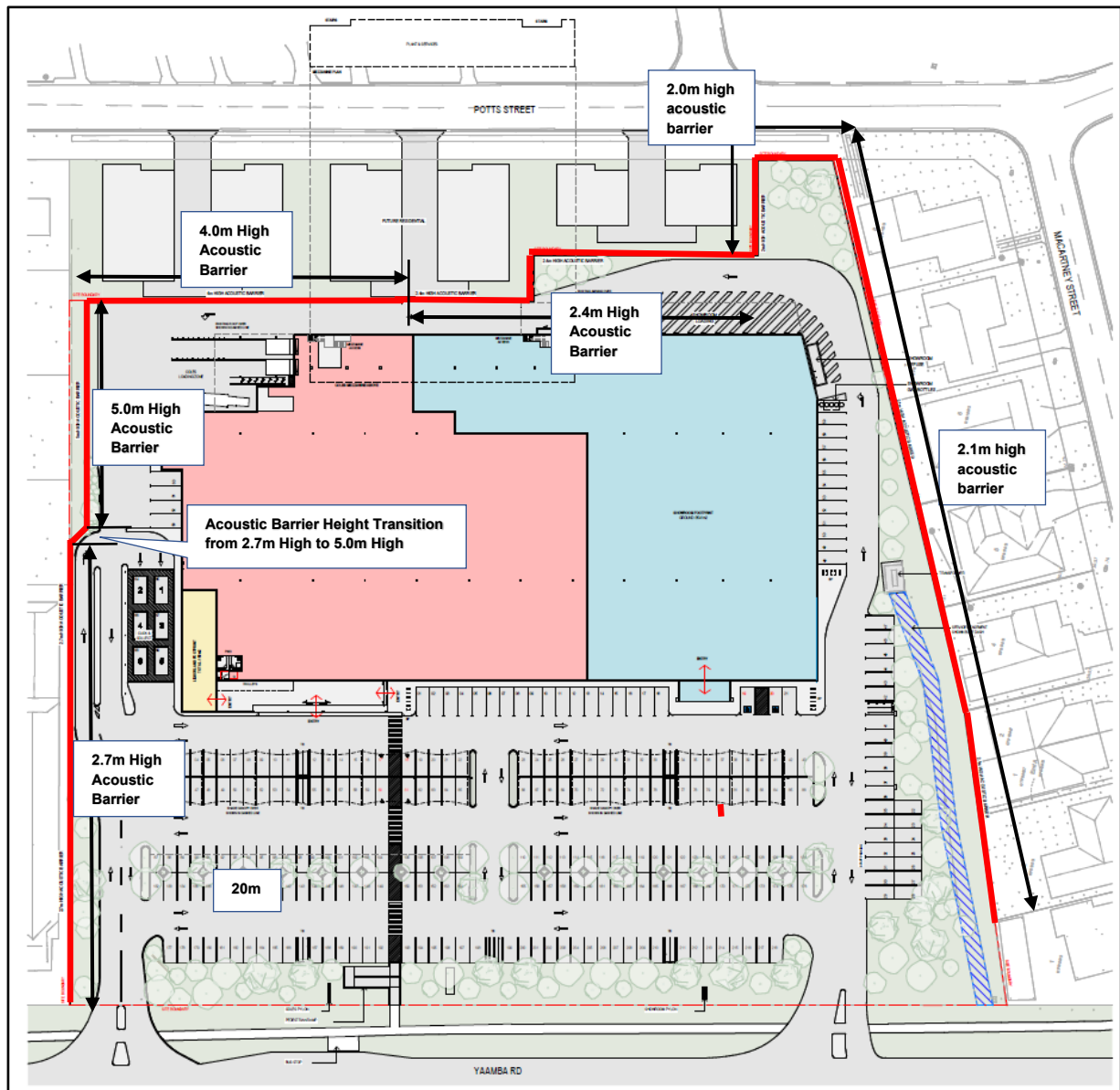
available, steady state noise impact should be re-calculated to confirm (or otherwise) the adequacy of the nominated noise control measures.

### On-Site Residential

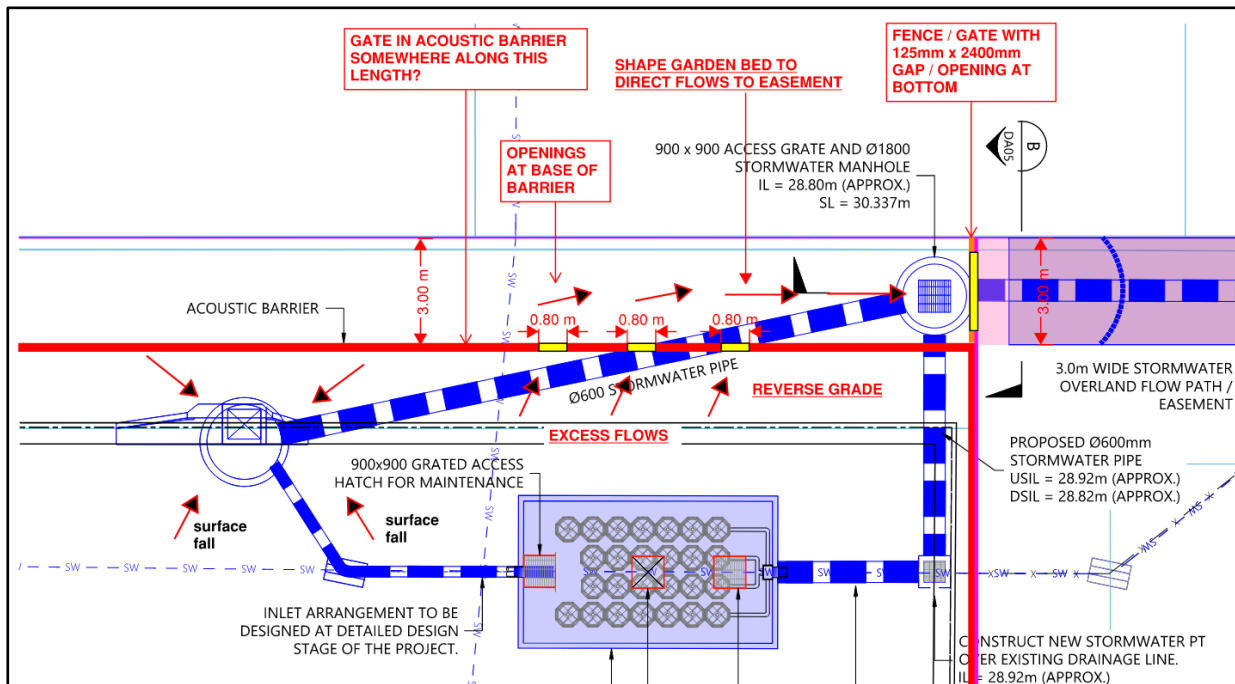
For the stage 4 residential development (ground floor and Level 1) on the eastern side of the subject site all residential units must be air-conditioned to enable the achievement of the internal noise limits. Inside these residential units the living area noise criteria would be 35 to 40 dB(A)  $L_{Aeq,T}$  and the bedroom criteria 30 to 35 dB(A)  $L_{Aeq,T}$ . The loading dock noise level at the upper floor of the closest on-site residential would be 60 dB(A)  $L_{Aeq,T}$  (combined loading dock noise sources), less 35 dB(A) target internal noise level = 25 dB(A) reduction required. In accordance with the Queensland Development Code Mandatory Part 4.4 this is equivalent to Noise Category 1 and requires the following acoustic treatments:

#### Noise Category 1

- Glazing: Rw 27 where total area of glazing for a habitable room is greater than 1.8m<sup>2</sup>  
Rw 24 where total area of glazing for a habitable room is less than or equal to 1.8m<sup>2</sup>
- External walls: Rw 35
- Roof: Rw 35
- Entry doors: Rw 28.



**Figure 3**  
**Property Acoustic Barriers (Bold Red Lines)**



**Figure 4**  
**Location of Openings at the Base of the Northern Acoustic Barrier**

## CONCLUSIONS

The subject site at 452 to 488 Yaamba Road, Norman Gardens (Lot 25 on RP610513) has an existing (not in use) Bunnings warehouse and associated carparking and internal roadways. It is proposed to re-develop this existing building with a Coles supermarket, Liquorland and Showroom use, as well as residential units on the eastern side of the site.

Based on the consultant's site inspection and review of Rockhampton Regional Planning Scheme 2015 noise from the proposed development, namely vehicle activities (including loading docks) and plant and equipment (mechanical exhaust, refrigeration and air-conditioning units), has the potential to noise impact the adjoining existing and proposed residential.

To assess current ambient noise levels relative to the closest residential to the subject site a noise logger was located on the subject site at monitoring location A, adjacent to the southern boundary of the subject site with the microphone elevated 1.6 metres above ground level. This noise logger was on site for a 7-day period. From the ambient noise assessment the background sound levels were determined (with days of adverse weather conditions (rainfall) excluded from the average) and the steady state noise limits calculated. The Acoustic Quality Objectives were used to define the noise limits for the 24-hour period for the time varying noise sources.

Source noise levels were based on data already held by the consultant for other Coles supermarket developments. Source noise levels were calculated to all of the closest residences (numbered R1 to R3 and Figure 1 refers) and compared to the noise limits.

For all potential steady state noise sources compliance with the noise limits was achieved at the closest residences to the south with no additional noise control measures in place. However, for the closest residences to the north and east an acoustic barrier providing a 10 dB(A) reduction is required, and this barrier must be 2.5 metres high relative to the level of the plant platform, on the northern and eastern sides of the supermarket rooftop plant deck, with 5 metre long returns on the western and southern ends.



The supermarket condenser deck platform acoustic barriers, both above and below the platform level, must be constructed from materials with a minimum  $R_w$  18. All internal surfaces of the acoustic barriers for the condenser deck, both above and below the deck, must be fully lined with acoustic absorbent material.

To control the time varying noise sources to the noise limits for the complete 24-hour day acoustic barriers are required for the southern, eastern and northern side boundaries of the subject site, located as per Figure 3.

The acoustic barriers required to control both steady state and time varying noise sources to the noise limits are:

- southern boundary acoustic barrier 2.1 metres high for its complete length, height relative to existing ground levels, with a minimum  $R_w$  20;
- eastern boundary acoustic barrier, 4.0 metres high from the north-eastern corner of the subject site south for a distance of 60 metres, then 2.4 metres high for the remainder of the eastern boundary, then 2.0 metres high on the northern and eastern sides of the open space. This eastern boundary acoustic barrier must be constructed from materials with a minimum  $R_w$  24 for the 4.0m high section of barrier, minimum  $R_w$  21 for the 2.4m high acoustic barrier and minimum  $R_w$  20;
- northern boundary acoustic barrier, from the north-eastern corner of the loading dock truck turning area west for approximately 66 metres at 5.0 metres high, then tapering to 2.7 metres and continuing west at this height for the balance of the northern boundary. The 5.0 metre high section of this acoustic barrier must have a minimum  $R_w$  25 and the 2.7 metre high section of this acoustic barrier (including the taper) a minimum  $R_w$  22.

All acoustic barriers must be continuous and gap free, have a minimum surface area density of 12.5 kg/m<sup>2</sup>, and be located as per Figure 3. The only exception to this will be three openings at the base of the northern acoustic barrier at the eastern end of the barrier for stormwater overland flow. Each of these acoustic barrier openings will be approximately 125mm high and 800mm long, located as per Figure 4. As these three openings in the acoustic barrier are so small (and very low in profile) they will not adversely impact on the calculated acoustic performance of the northern acoustic barrier.

To control loading dock noise (and plant and equipment noise) to the noise limit inside the on-site residential units all of these residential units must be air-conditioned and their materials of construction must provide a minimum noise reduction of 25 dB(A) from outside to inside. In accordance with the Queensland Development Code Mandatory Part 4.4 this is achieved with Noise Category 1 materials of construction.

Once the precise location and orientation of the Coles supermarket rooftop condenser deck, rooftop supermarket fans, Liquorland air-conditioning and refrigeration plant and the Showroom use air-conditioning units has been determined, steady state noise impact should be re-calculated to confirm (or otherwise) the adequacy of the nominated noise control measures.

## RECOMMENDATION

It is recommended that, from an environmental noise perspective, the proposed Coles supermarket, Liquorland, Showroom use and residential and associated internal roadways, carparking and loading docks be approved, provided that the noise control measures detailed in this report are incorporated into this development.

## APPENDIX A: AMBIENT NOISE LEVEL MEASUREMENTS

### Measurement Equipment

The following equipment was used to conduct the ambient noise level study at Monitoring Location A:

- Bruel and Kjaer Type 2250 L Hand Held Analyzer – Serial No. 3004242, with Type BZ 7131, BZ 7132 and BZ 7133 Software and Prepolarised free-field ½" microphone, Type 4189, Serial No. 2879996;
- Bruel and Kjaer Type 3592 outdoor microphone kit, including Type UA1404 outdoor microphone;
- Bruel and Kjaer Type AO 0442 ten metre microphone extension cable; and
- Bruel and Kjaer Type 4231 Sound Level Calibrator, Serial No. 2292747.

All of the above equipment is Type 1 in accordance with the requirements of Australian Standard AS 1259-1990, *Acoustics – Sound Level Meters*, as required by Australian Standard AS 1055-2018.

### Measurement Equipment Settings

The above equipment was used with the following settings:

- Detector: RMS
- Time Weighting: FAST
- Frequency Weighting: A
- Sound Incidence: FRONTAL
- Microphone sensitivity: 35.443 mV/Pa

### Calibration

The sound level meter was calibrated to the required value of 93.8 dB at 1000 Hz immediately before and after the noise level measurements were conducted. At no time was an adjustment of more than ±0.5 dB required. This complies with the requirements of the Australian Standard.

### Monitoring Location

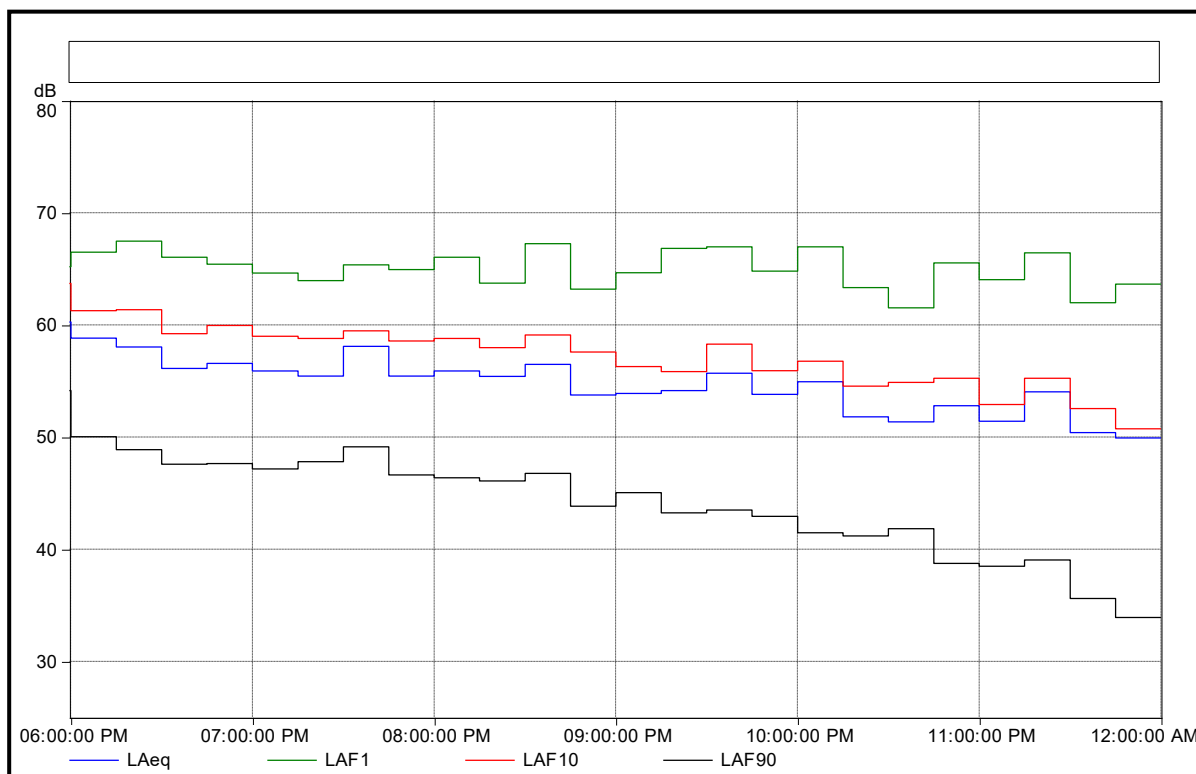
Monitoring Location A was on the subject site side of the common boundary fence between the subject site and the residential to the south, at the rear of 5 Macartney Street, with the microphone elevated 1.6 metres above ground level. Refer Figures 1 and 2 for further details of Monitoring Location A.

### Atmospheric Conditions

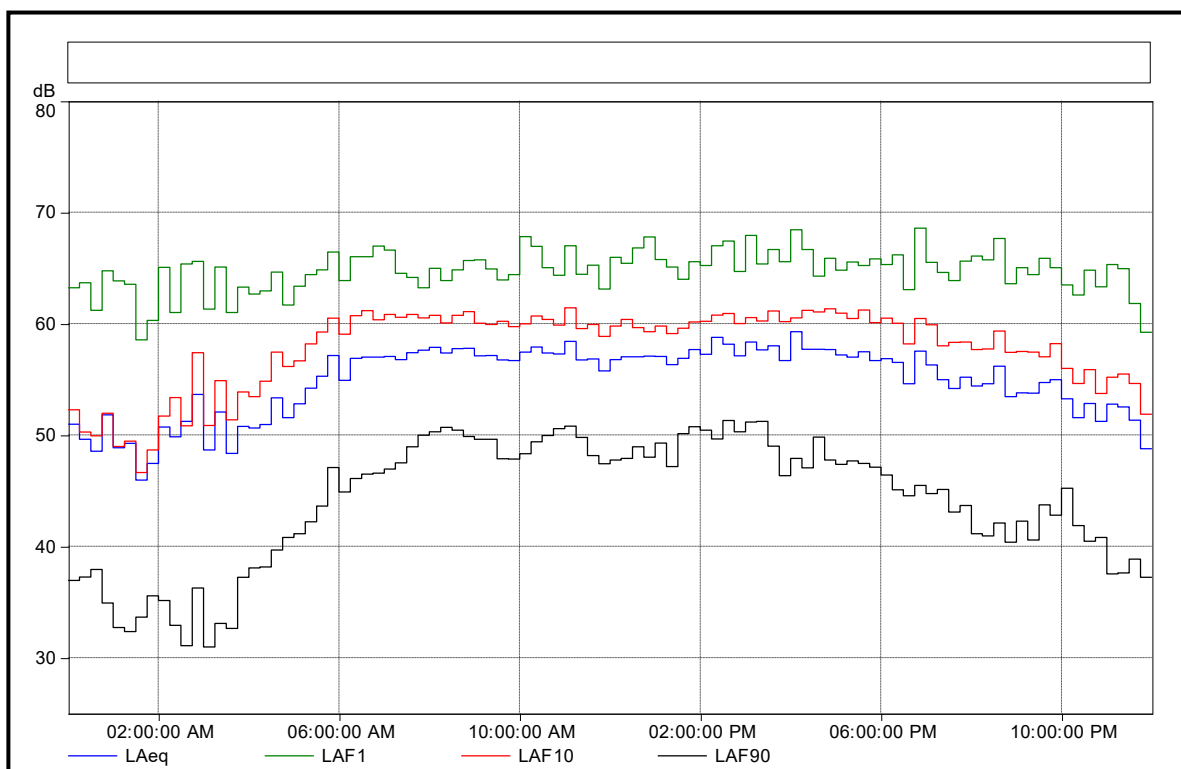
Throughout the 7-day ambient noise assessment atmospheric conditions generally complied with the requirements of the Australian Standard. However, on the final day (Thursday 11<sup>th</sup> April) there was rain and consequently this data was excluded from the averaging.

**APPENDIX B: RESULTS OF AMBIENT NOISE MEASUREMENTS**

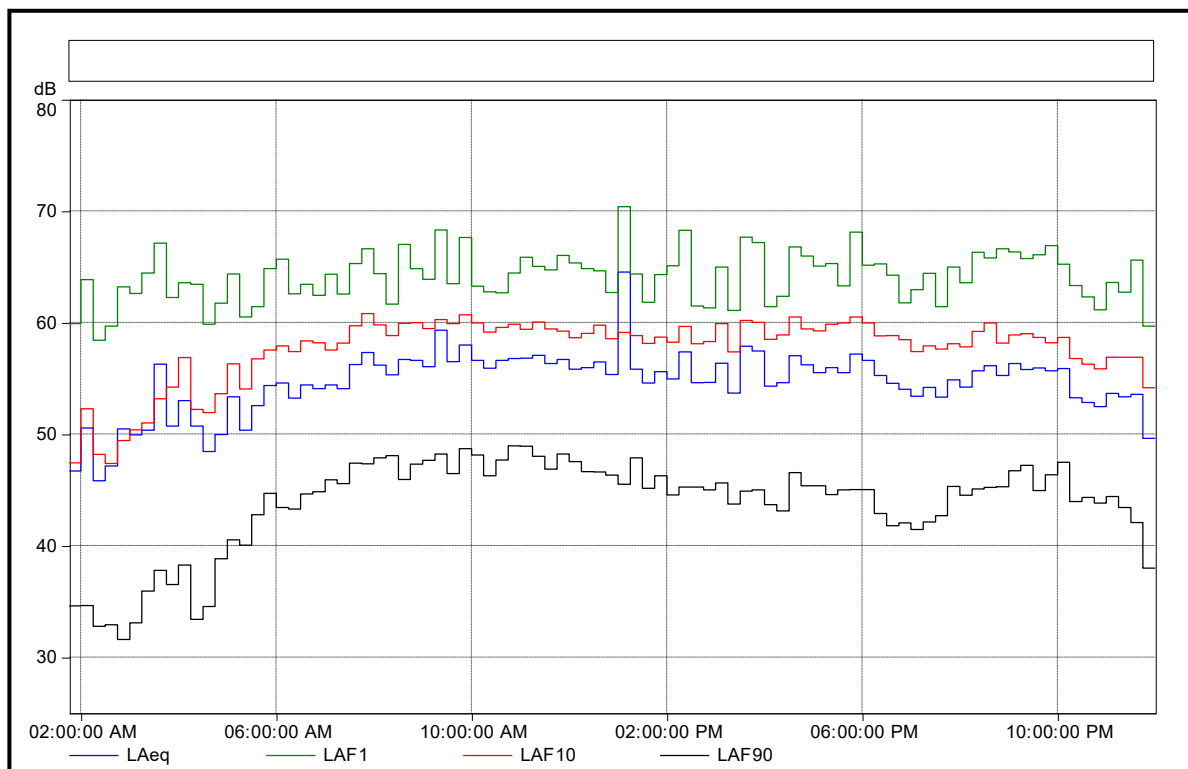
|                           |                        |           |
|---------------------------|------------------------|-----------|
| Instrument:               | 2250-L                 |           |
| Application:              | BZ7133 Version 4.7.5   |           |
| Start Time:               | 04/04/2019 17:59:30    |           |
| End Time:                 | 04/06/2019 01:03:27    |           |
| Elapsed Time:             | 1.07:03:57             |           |
| Bandwidth:                | 1/3-octave             |           |
| Max Input Level:          | 143.92                 |           |
|                           |                        |           |
|                           | Time                   | Frequency |
| Broadband (excl. Peak):   | FSI                    | AC        |
| Broadband Peak:           |                        | C         |
| Spectrum:                 | FS                     | Z         |
|                           |                        |           |
| Instrument Serial Number: | 3004242                |           |
| Microphone Serial Number: | 2879996                |           |
| Input:                    |                        |           |
| Windscreen Correction:    | None                   |           |
| Sound Field Correction:   | Free-field             |           |
|                           |                        |           |
| Calibration Time:         | 04/04/2019 17:53:03    |           |
| Calibration Type:         | External reference     |           |
| Sensitivity:              | 35.4429632425308 mV/Pa |           |



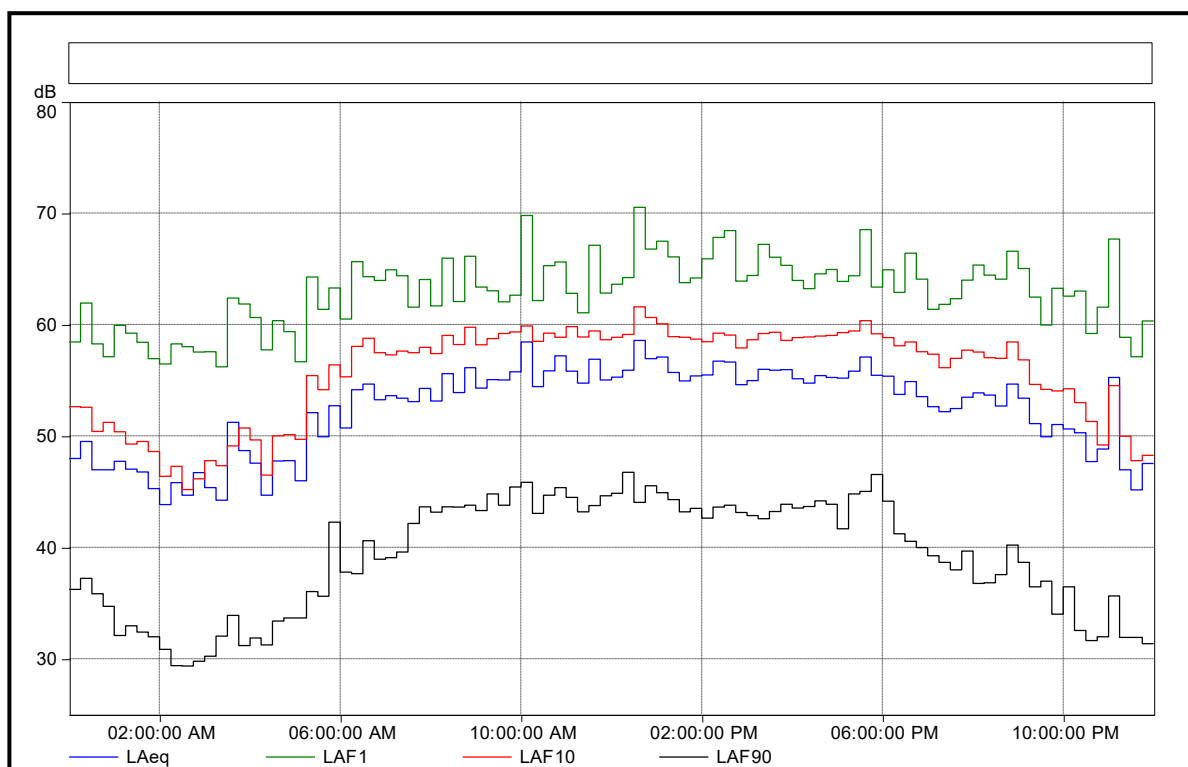
**Day 1**  
**Day 1, Thursday 4 April 2019, from 1800 hours**



**Day 2**  
**Friday 5 April 2019**

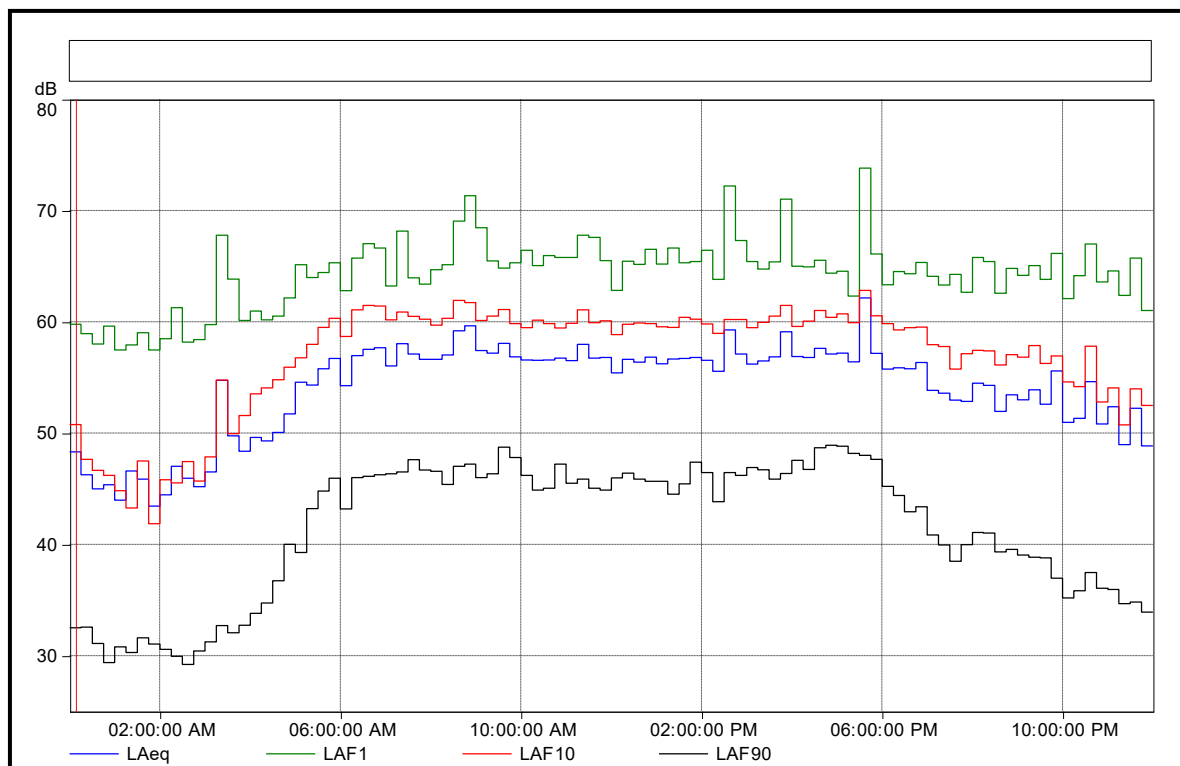


**Day 3**  
**Saturday 6 April 2019**

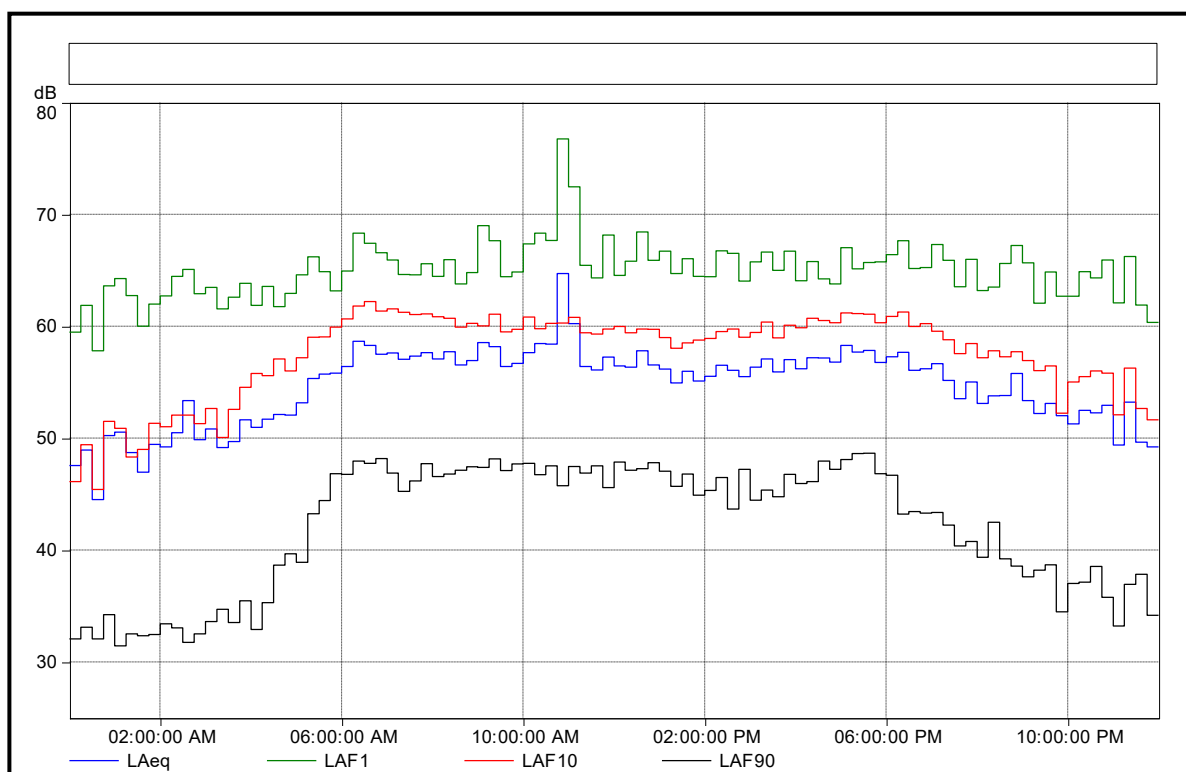


**Day 4**  
**Sunday 7 April 2019**

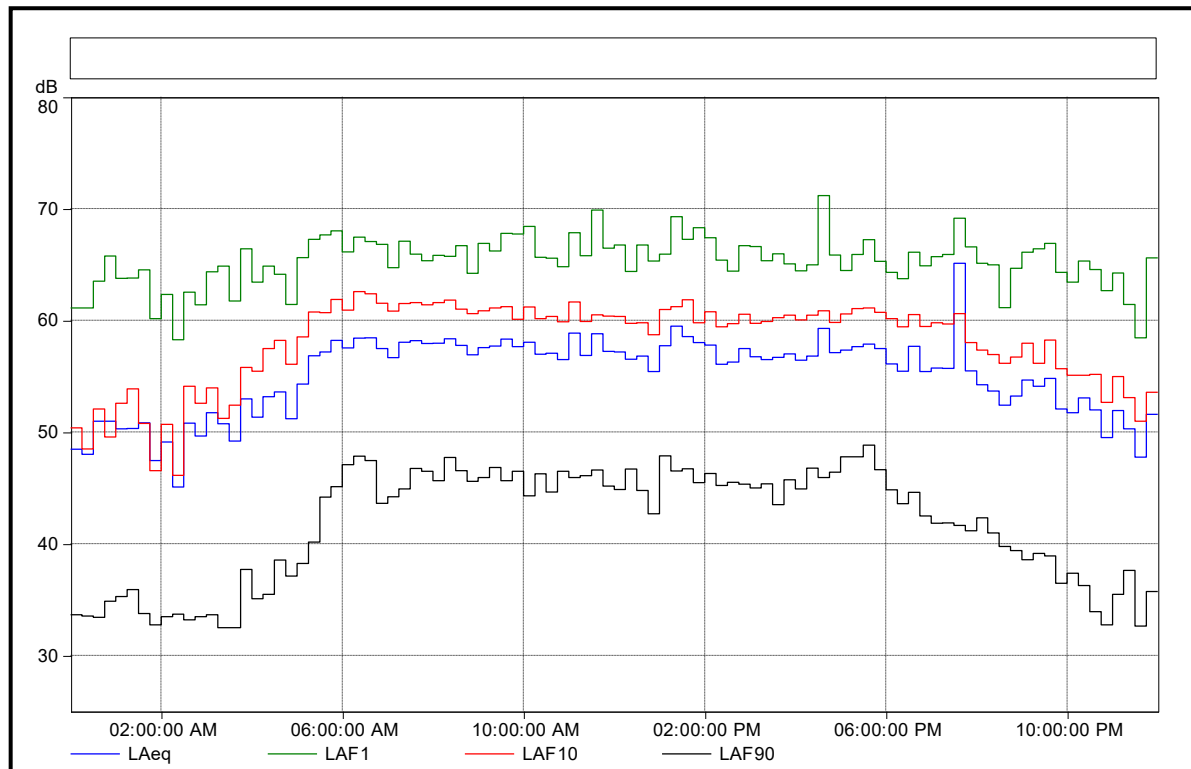




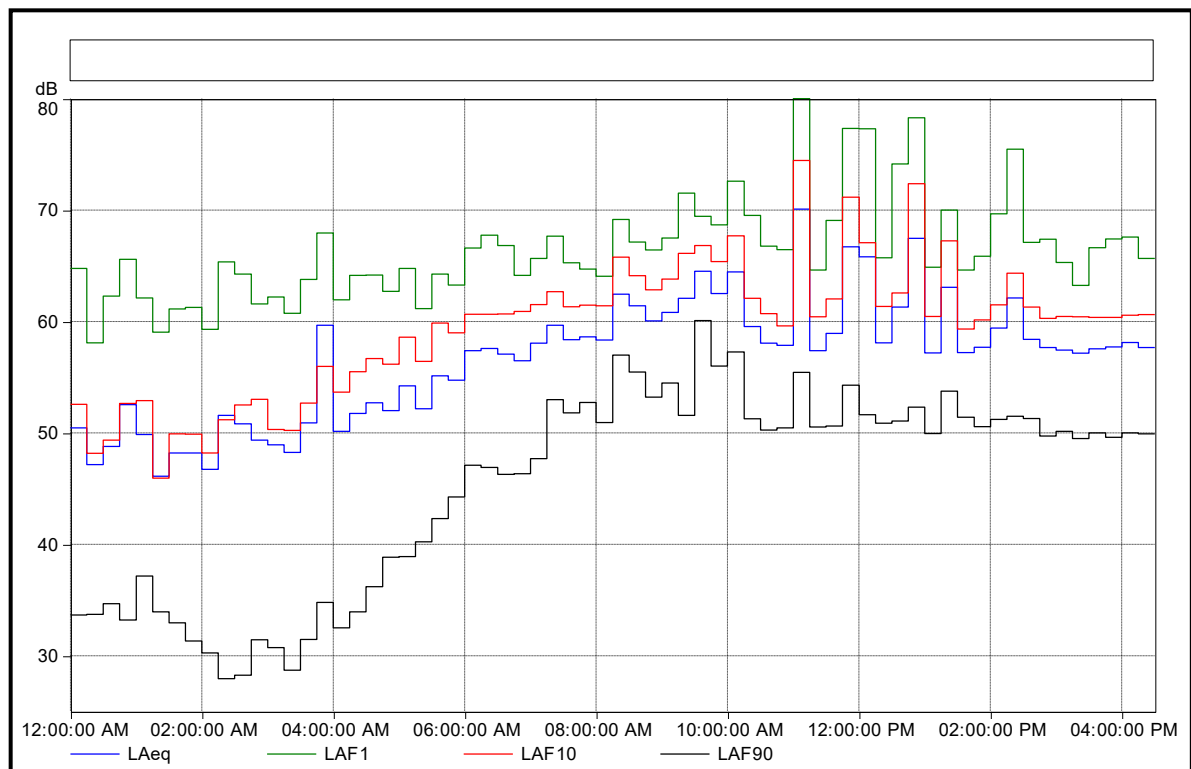
**Day 5**  
**Monday 8 April 2019**



**Day 6**  
**Tuesday 9 April 2019**



**Day 7**  
**Wednesday 10 April 2019**



**Day 8**  
**Thursday 11 April 2019 until 1630 hours**