North Maclean Industrial Estate
Interim Development Access

Technical Memorandum

CH Hydrangea Pty Ltd

12th June 2024

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/961/12

Date: 09/08/2024

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Document Issue History

Report File Name	Prepared	Reviewed	Issued	Date	Issued to
P5708.001T North Maclean Industrial Estate Interim Access Technical Memorandum	J. Kirkham	F. Jones	F. Jones	28/11/2023	Erin Dyer via Email
P5708.002T North Maclean Industrial Estate Interim Development Access Technical Memorandum	J. Kirkham	F. Jones	F. Jones	12/12/2023	Erin Dyer via Email
P5708.003T North Maclean Industrial Estate Interim Development Access Technical Memorandum	J. Kirkham	F. Jones	F. Jones	06/06/2024	Erin Dyer via Email
P5708.004T North Maclean Industrial Estate Interim Development Access Technical Memorandum	J. Kirkham	F. Jones	F. Jones	12/06/2024	Erin Dyer via Email

1. INTRODUCTION

1.1 Background

Bitzios Consulting (Bitzios) has been commissioned by CH Hydrangea Pty Ltd (applicant) to provide traffic engineering services in relation to a proposed industrial subdivision at 4499-4651 Mount Lindesay Highway, North Maclean (subject site). The subject site is formally described as Lot 39 on SP258739 and is located within the Logan City Council (Council) Local Government Area (LGA) and the Greater Flagstone Priority Development Area (PDA) and as such is under the jurisdiction of Economic Development Queensland (EDQ).

Bitzios was previously engaged by the applicant to prepare a TIA in support of a change application over the subject site (DEV2018/961), which included Reconfiguring a Lot - 1 into 11 lots (5 industrial/business lots, 1 drainage/open space lot, 1 pump station lot, 4 drainage lots). This was subsequently approved, with the applicant seeking to commence developing the site.

However, it is understood that proposed Mount Lindesay Highway Service Road (Service Road) and connected site accesses for Stage 1 and 2 of the approved development, are impacted by delays associated with EPBC Approval of the required tree clearing. As a result, the timing of approved service road is expected to be delayed for up to two (2) years. As such, the applicant has proposed to provide an interim development access arrangement from the Mount Lindesay Highway / Crowson Lane intersection to accommodate a portion of the development until such time as the planned Service Road is able to be constructed.

1.2 Purpose of this Technical Memorandum

As outlined above, the applicant proposes to provide an interim development access from the Mount Lindesay Highway / Crowson Lane intersection to accommodate a portion of the approved development until such time as the ultimate (approved) arrangements can be provided. As such, the purpose of this technical memorandum is to review the proposed interim access arrangements and undertake a detailed (SIDRA) intersection assessment to confirm the interim arrangements will not impact the surrounding road network.

This technical memorandum has been amended following the department of State Development and Infrastructure further issues letter, dated 24th April 2023, and subsequent meeting held on 30th May 2024 with the department of Transport and Main Roads representatives.

1.3 Proposed Development

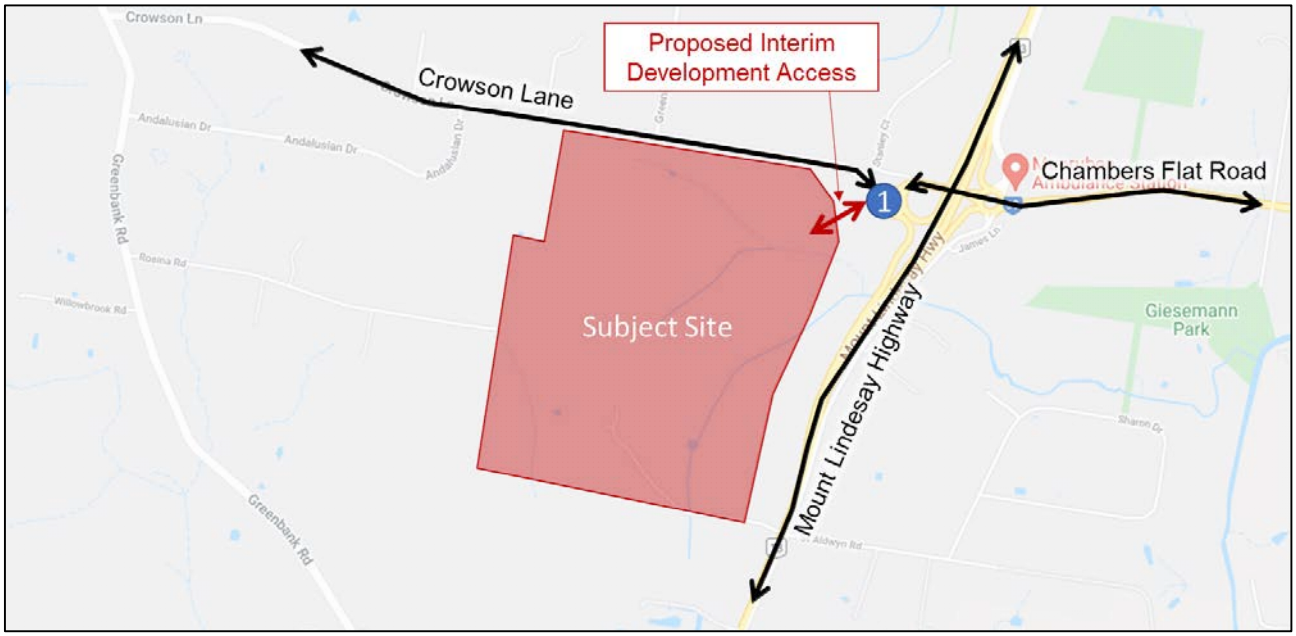
The proposed interim development consists of the following:

- **Use:** Industry and Warehouse
- **Yield:** a maximum of 187,500m^2 GFA
- **Access:** an interim development access connection from the Mount Lindesay Highway / Crowson Lane intersection

The proposed ultimate development aligns entirely with the previous approval (DEV2018/961) and as such, has not been assessed herein.

2. ROAD NETWORK OVERVIEW

Figure 2.1 illustrates key elements of the existing road network close to the subject site.



Source: Google Maps

Figure 2.1: Road Network

Table 2.1 provides a summary of the key roads located near the subject site.

Table 2.1: Key Roads

Road Name	Jurisdiction	Hierarchy	Cross Section	Posted Speed
Crowson Lane	Council	Arterial	2 lanes undivided	80km/h
Chambers Flat Road	Council	Arterial	2 lanes undivided	80km/h
Mount Lindesay Highway	TMR [1]	Highway	2 lanes divided	90km/h

1. TMR = Department of Transport and Main Roads

Table 2.2 provides a summary of the key intersections located near the subject site.

Table 2.2: Key Intersections

ID	Name	Jurisdiction	Control
1	Mount Lindesay Highway / Crowson Lane	TMR [1]	Roundabout

1. TMR = Department of Transport and Main Roads

3. TRAFFIC GENERATION

3.1 Background Traffic

3.1.1 Traffic Survey Data

Turning movement surveys were undertaken at the Mount Lindesay Highway / Crowson Lane intersection (Intersection 1) on Wednesday 25th October 2023, with the following peak hours recorded:

- **AM Peak Period:** 7:00am to 8:00am
- **PM Peak Period:** 3:15pm to 4:15pm.

A copy of the traffic survey data is provided at **Appendix A**.

3.1.2 Traffic Growth Rate

TMR's segment data for the Mount Lindesay Highway at site 10098 shows a 1.66% p.a. linear growth rate for background traffic over the past 10 years. As such, a 1.66% p.a. linear growth rate has been adopted.

3.2 Development Traffic Volumes

3.2.1 Trip Generation Rates

Table 3.1 summarises the proposed trip generation rates adopted from the previous approval.

Table 3.1: Trip Generation Rates

Land Use	AM Peak	PM Peak	Unit
Industry & Warehouse	0.4	0.4	Trips / 100m^2 GFA

3.2.2 Directional Splits

Table 3.2 summarises the proposed directional traffic splits adopted from the previous approval.

Table 3.2: Directional Splits

Land Use	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Industry & Warehouse	70%	30%	100%	40%	60%	100%

3.2.2.1 Traffic Volumes

Table 3.3 summarises the peak hour traffic demands expected to be generated by the proposed development under the interim development access arrangements.

Table 3.3: Estimated Traffic Demands

Land Use	AM Peak (Trips)			PM Peak (Trips)		
	In	Out	Total	In	Out	Total
Warehouse	525	225	750	300	450	750

In summary, the subject site may generate 750 trips in the AM peak and 750 trips in the PM peak.

3.3 Network Distribution

Table 3.4 summarises the road network distributions for the interim development access. These align with the previously approved and ultimate distribution.

Table 3.4: Traffic Distribution

Land Use	North	South	East	West
Industry & Warehouse	65%	10%	10%	15%

3.4 Design Traffic Volumes

For the purposes of the traffic assessment, we have assumed the following:

- **Interim Access Year of Opening**: 2026
- **Interim Access 10-year Post Opening Design Horizon**: 2036.

2026 has been assessed as the year of opening as requested by TMR. The applicant is intending to have the interim access operational by mid-2025 subject to approval and construction timing. As such, the 2026 timing is expected to be conservative.

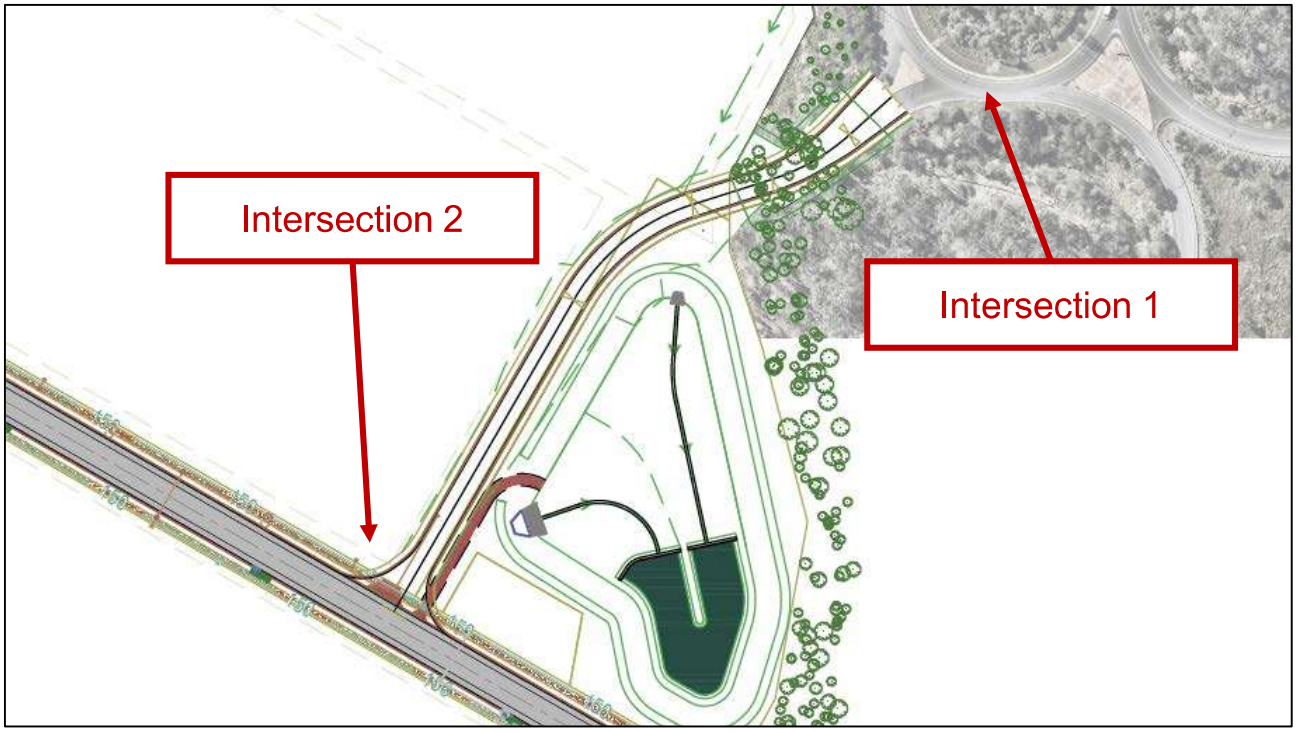
A 10-year design horizon assessment has been undertaken to comply with the requirements of TMR's Guide to Traffic Impact Assessments (GTIA). However, in reality it is expected that the interim development access arrangements will be removed by the end of 2027, well before the assessed 2036 timeframe and all access will be provided as per the previous approval.

Design traffic volumes are included at **Appendix B**.

4. INTERIM DEVELOPMENT ACCESS REVIEW

4.1 Overview

The interim development access is proposed to be provided as a new connection between the Mount Lindesay Highway / Crowson Lane intersection and the northernmost internal road as illustrated in Figure 4.1.



Source: Arcadis

Figure 4.1: Interim Development Access

4.2 SIDRA Assessment

The proposed interim development yields are well below what was approved and assessed as part of the previous approval. As such, no additional external impacts are expected from an operational perspective. However, to ensure the proposed interim access arrangements do not result in an unsafe outcome on the surrounding road network, the following detailed intersection assessments have been undertaken:

- **Intersection 1 (Mount Lindesay Highway / Crowson Lane / Site Access):** Intersection 1 has been assessed to confirm the proposed development will not result in excessive queueing extending back towards the first internal intersection within the site
- **Intersection 2 (Site Access / Internal Road):** An assessment has been undertaken to confirm that the T-intersection will operate suitably and will not result in extensive queues back to Intersection 1.

Refer to civil engineering documentation for concept drawings of the interim access arrangements.

4.2.1 Intersection 1 SIDRA Assessment

Figure 4.2 illustrates the modelled geometry of Intersection 1.

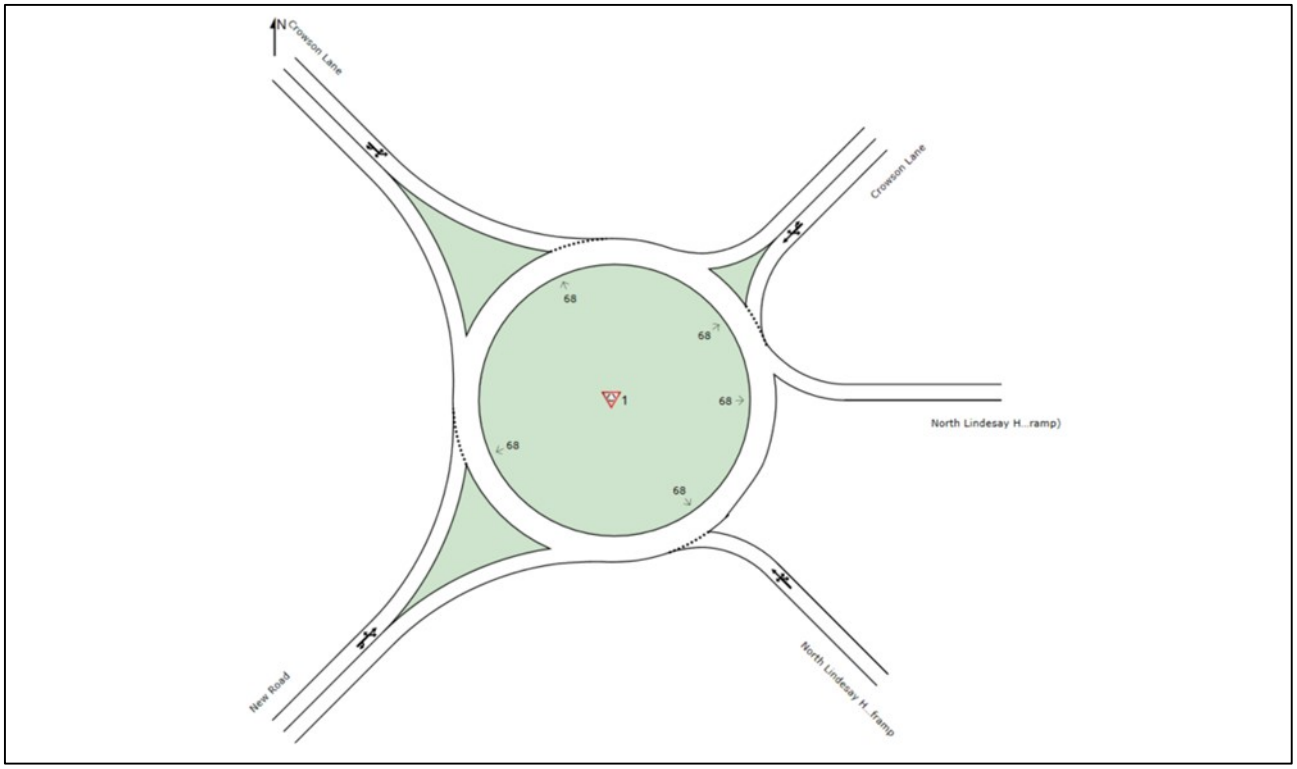


Figure 4.2: SIDRA Geometry: Intersection 1

Table 4.1 summarises the SIDRA results for Intersection 1. Detailed SIDRA outputs have been included at **Appendix C**.

Table 4.1: SIDRA Results: Intersection 1

Year	Peak	Scenario	Volume (vph)	Degree of Saturation	Average Delay (s)	Level of Service	95th Percentile Queue (m)
2026	AM	With Development	1,127	0.5	6	A	34
	PM		1,119	0.4	7	A	23
2036	AM	With Development	1,181	0.5	7	A	39
	PM		1,169	0.4	7	A	24

In summary, the study intersection operates within the acceptable performance thresholds for a priority-controlled roundabout (DOS <0.85) during the relevant design horizons. Additionally, the intersection operates with a maximum average delay of 15 seconds and queue length of 39m across all design scenarios.

Based on the above, the proposed interim access arrangement is considered suitable.

4.2.2 Intersection 2 SIDRA Assessment

Figure 4.3 illustrates the modelled geometry of Intersection 2.

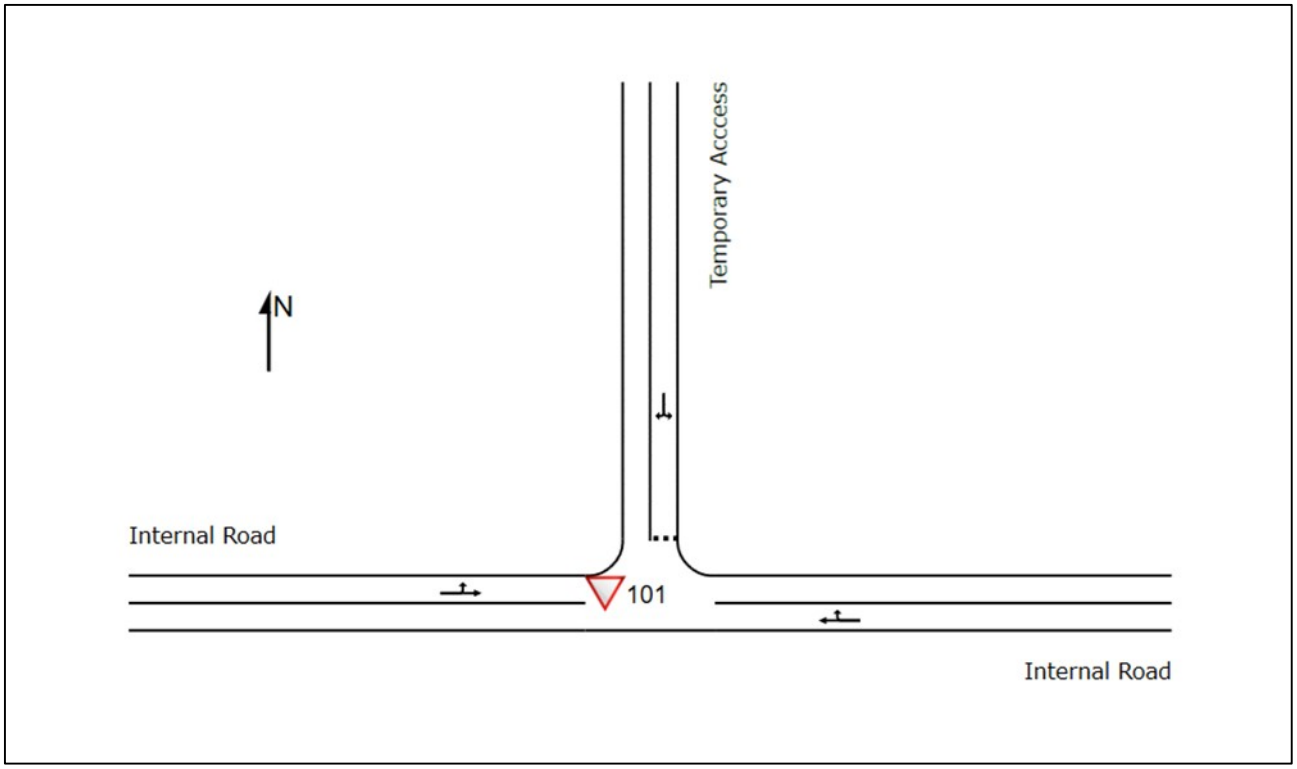


Figure 4.3: SIDRA Geometry: Intersection 2

Table 4.2 summarises the SIDRA results for Intersection 2. As the intersection is only proposed to be used by the development, no growth rate has been applied. This results in 2026 and 2036 volumes remaining the same.

Detailed SIDRA outputs have been included at **Appendix C**.

Table 4.2: SIDRA Results: Internal Intersection

Year	Peak	Scenario	Volume (vph)	Degree of Saturation	Average Delay (s)	Level of Service	95th Percentile Queue (m)
2026 & 2036	AM	With Development	792	0.6	7.0	A*	34
	PM		793	0.4	7.0	A*	17

**Worst performing leg of intersection*

In summary, the study intersection operates within the acceptable performance thresholds for a priority-controlled T-intersection (DOS <0.80) during the relevant design horizons Additionally, the intersection operates with a maximum average delay of 9 seconds and queue length of 34m across all design scenarios.

Based on the above, the proposed interim development access arrangement is considered suitable.

4.1 Cross Section

The interim development access has been designed to provide a pavement width of 8m, which aligns with the travel lane requirements for an Industrial Connector Street.

Importantly, swept path diagrams have been prepared demonstrating that a 26m B-Double is able manoeuvre in and out of the proposed development via the interim development access intersection.

A copy of the relevant swept path diagrams is included at **Appendix D.**

4.2 Internal Road Volumes

Table 4.4 provides a summary of our review of the internal road traffic volumes against EDQ's requirements

Table 4.3: Road Cross Sections

Hierarchy	Permittable Traffic Volumes	Proposed Traffic Volumes
Industrial Connector	<7,500vpd	Maximum 7,500vpd

In summary, the proposed development is expected to generate a maximum of 7,500vpd, of which, all traffic will access the site via the proposed interim development access.

These traffic volumes would only be present at the very entrance to the site, as each development is expected to remove traffic from the internal road network when entering / servicing a particular lot. Resulting in traffic volumes progressively decreasing the further the road network expands into the site.

In summary, the proposed road hierarchy is generally in accordance with the previously approved development and EDQ's requirements.

4.3 Intersection Spacing

Table 4.5 provides a summary of the internal intersection spacing.

Table 4.4: Road Cross Sections

Hierarchy	Requirement	Minimum Provision	Compliant
Industrial Connector	150m	>200m	Yes

In summary, the proposed internal intersection spacing complies with EDQ's requirements.

5. SUMMARY

In summary:

- CH Hydrangea Pty Ltd is seeking to provide an interim development access arrangement to the approved industrial development subdivision at 4499-4651, due to delays associated with the EPBC Approval for the required tree clearing, postponing the construction of the Mount Lindesay Highway Service Road
- It is understood that the development will be provided in accordance with the previous approval once the Mount Lindesay Highway Service Road is able to be constructed
- The interim access is proposed to accommodate a maximum of 187,500m^2 GFA of Industry and warehouse uses
- SIDRA intersection analysis has been undertaken to confirm that the proposed interim access configuration is sufficiently designed to accommodate the proposed yield
- The proposed interim access pavement width is generally considered suitable from a traffic engineering perspective
- The proposed intersection spacing complies with EDQ requirements.

Based on the findings of this report, we are of the opinion that the proposed interim development access will result in a lesser impact outcome compared to the previous PDA approval. Therefore, there are no traffic engineering related matters to preclude approval of this development application.

Additionally, it is recommended that as part of the interim access approval that the applicant is conditioned to:

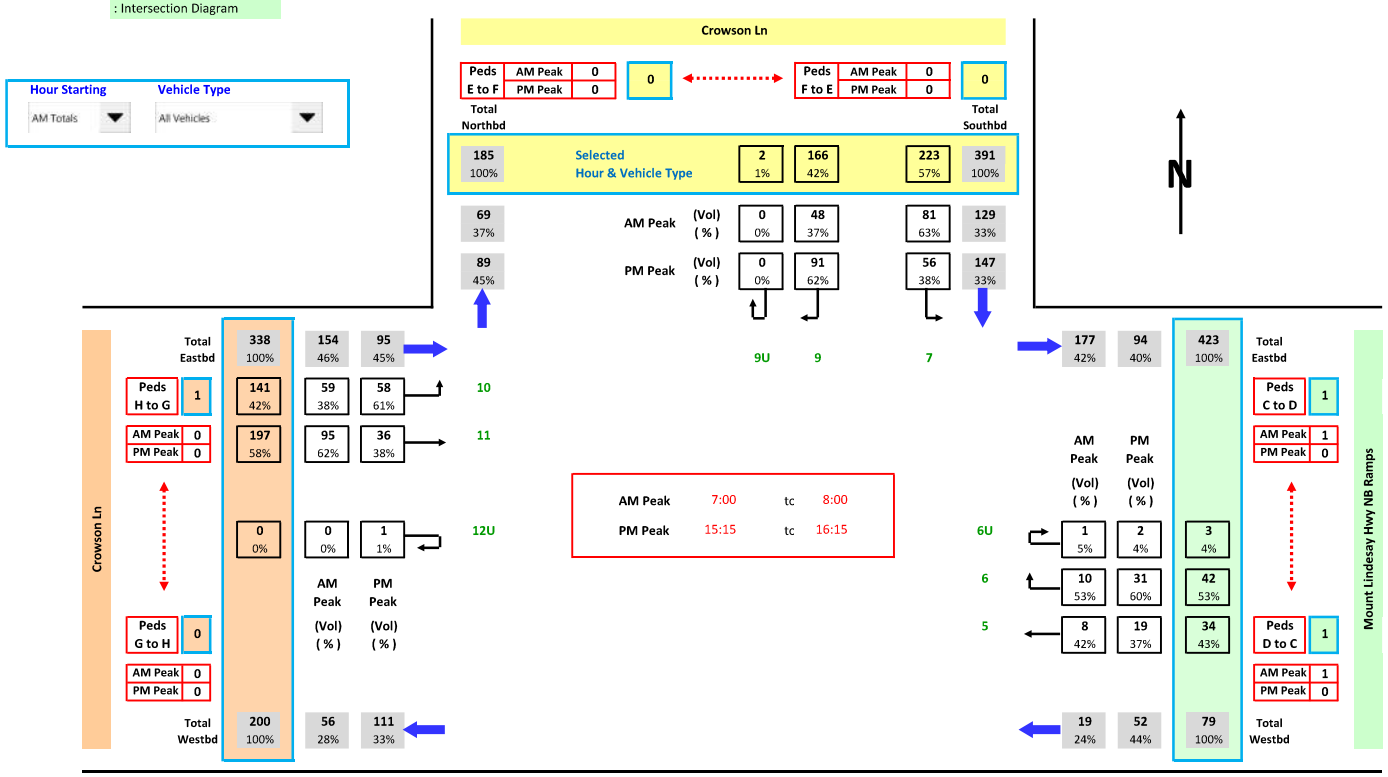
- Decommission the interim access prior to the end of the 2027 calendar year
- Limit the development yields to 187,500m^2 GFA of industrial land use, until such time as the interim access has been decommissioned and at least Stage 1A of the ultimate service road is provided.

Appendix A: Traffic Survey Data

Job No. : AUQLD8088
Client : Bitzios Consulting
Suburb : North MacLean
Location : 1. Crowson Ln / Mount Lindesay Hwy NB Ramps

Day/Date : Wed, 25th Oct 2023
Weather : Fine
Description : Classified Intersection Count
: Intersection Diagram

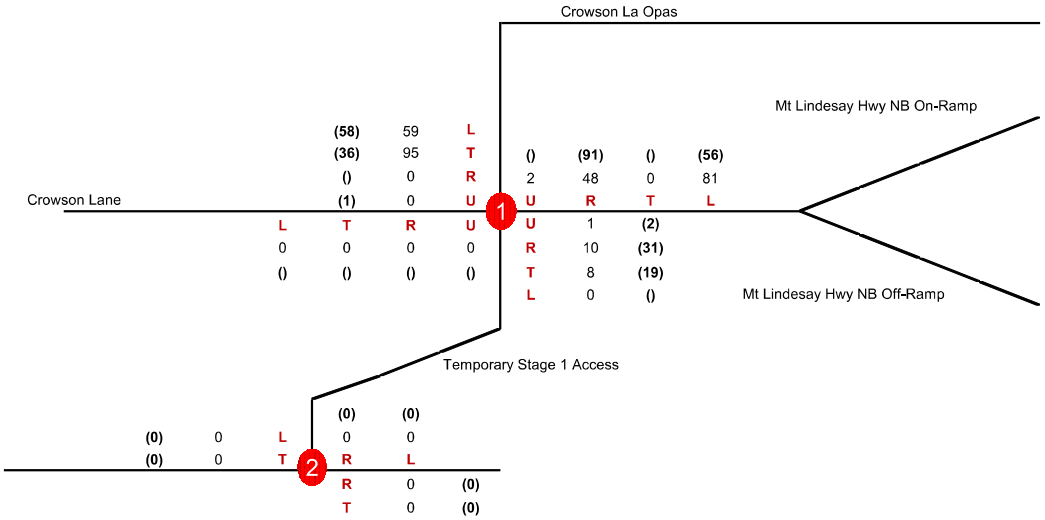
MATRIX Traffic and Transport Data



Appendix B: Design Traffic Volumes

TRAFFIC GENERATION

Survey Traffic Volumes (2023)



INTERSECTION VOLUMES

	AM	PM
#1	304	(294)
#2	0	(0)

DETAILS

Survey Year	2023	2023
Peak Period	AM	PM
Base Year	2026	2026
Growth Rate	1.66%	1.66%
Growth Fact	NA	NA

DOCUMENT CONTROL

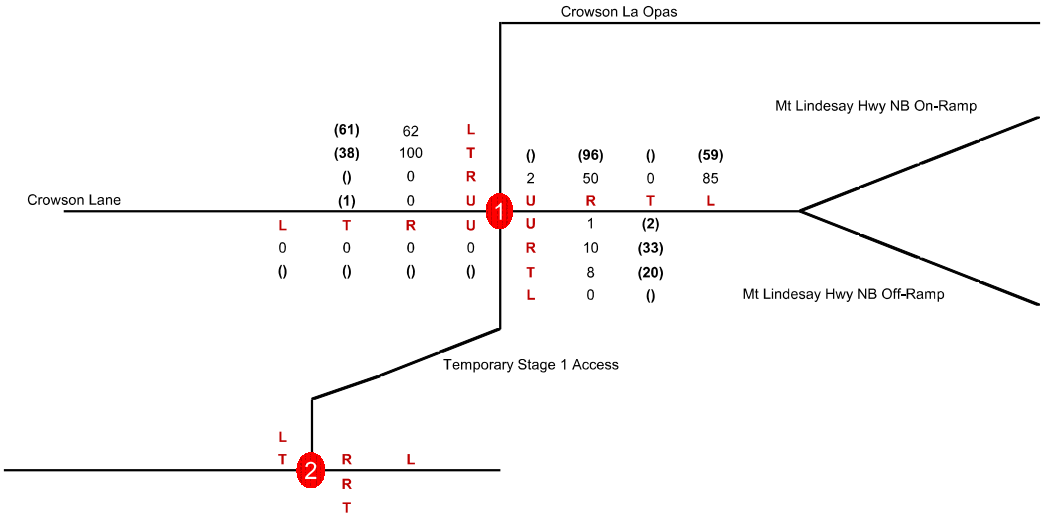
Job Number:	P6068
Prepared By:	JK
Reviewed By:	FJ
Job Name:	4653-4691 Mount Lindsey Highway North Maclean TES
Prepared Date:	6/06/2024
Reviewed Date:	6/06/2024
File Path:	P:\P5708 North Maclean Industrial Estate TES\Technical\Traffic Gen\005_Temp Access\

LEGEND

##	AM Peak Period
(##)	PM Peak Period
1	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

TRAFFIC GENERATION

Background Traffic Volumes (2026)



INTERSECTION VOLUMES

	AM	PM
#1	319	(309)
#2	0	(0)

DETAILS

Survey Year	2023	2023
Peak Period	AM	PM
Base Year	2026	2026
Growth Rate	1.66%	1.66%
Growth Fact	1.05	1.05

DOCUMENT CONTROL

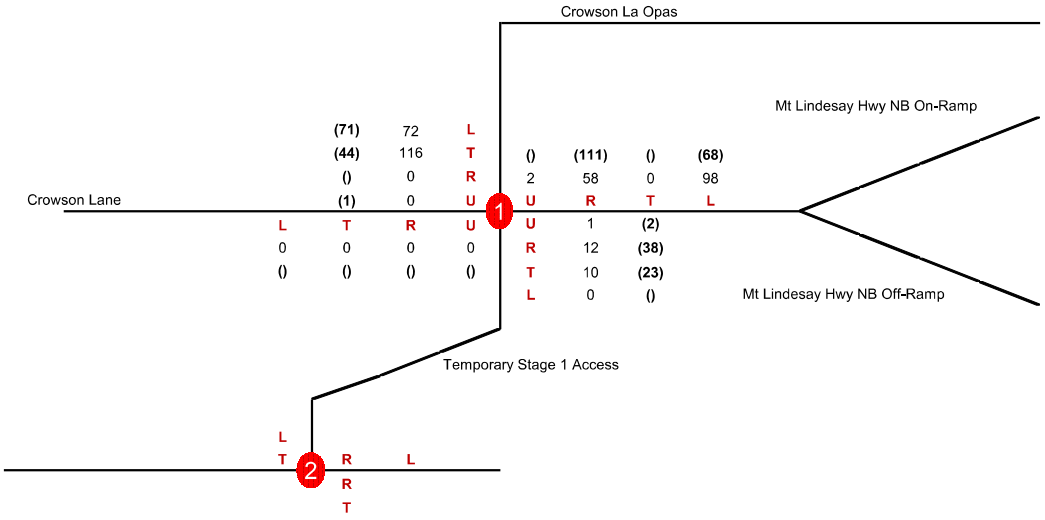
Job Number:	P6068
Prepared By:	JK
Reviewed By:	FJ
Job Name:	4653-4691 Mount Lindsey Highway North Maclean TES
Prepared Date:	6/06/2024
Reviewed Date:	6/06/2024
File Path:	P:\P5708 North Maclean Industrial Estate TES\Technical\Traffic Gen\005_Temp Access\

LEGEND

##	AM Peak Period
(##)	PM Peak Period
1	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

TRAFFIC GENERATION

Background Traffic Volumes (2036)



INTERSECTION VOLUMES

	AM	PM
#1	370	(357)
#2	0	(0)

DETAILS

Survey Year	2023	2023
Peak Period	AM	PM
Design Year	2036	2036
Growth Rate	1.66%	1.66%
Growth Fact	1.22	1.22

DOCUMENT CONTROL

Job Number:	P6068
Prepared By:	JK
Reviewed By:	FJ
Job Name:	4653-4691 Mount Lindsey Highway North Maclean TES
Prepared Date:	6/06/2024
Reviewed Date:	6/06/2024
File Path:	P:\P5708 North Maclean Industrial Estate TES\Technical\Traffic Gen\005_Temp Access\

LEGEND

##	AM Peak Period
(##)	PM Peak Period
1	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

CALCULATIONS

Proposed Development Generation

Table 1: Development Yields

Scenario	Lot Size	Unit	Plot Ratio	Yield	Unit
Interim Access Limit	N/A	m^2	40%	187,500	m^2

Table 2: Peak Period Traffic Generation Rates

Land Use	AM Peak	PM Peak	Unit	Source
Interim Access Limit	0.40	0.40	Trips / $100m^2$	DEV2018/961

Table 3A: Directional Traffic Distribution

Land Use	AM Peak			PM Peak		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Interim Access Limit	70%	30%	100%	40%	60%	100%

Table 4A: Traffic Generation - New Trips

Land Use	AM Peak			PM Peak		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Interim Access Limit	525	225	750	300	450	750

Table 5: External Traffic Distribution

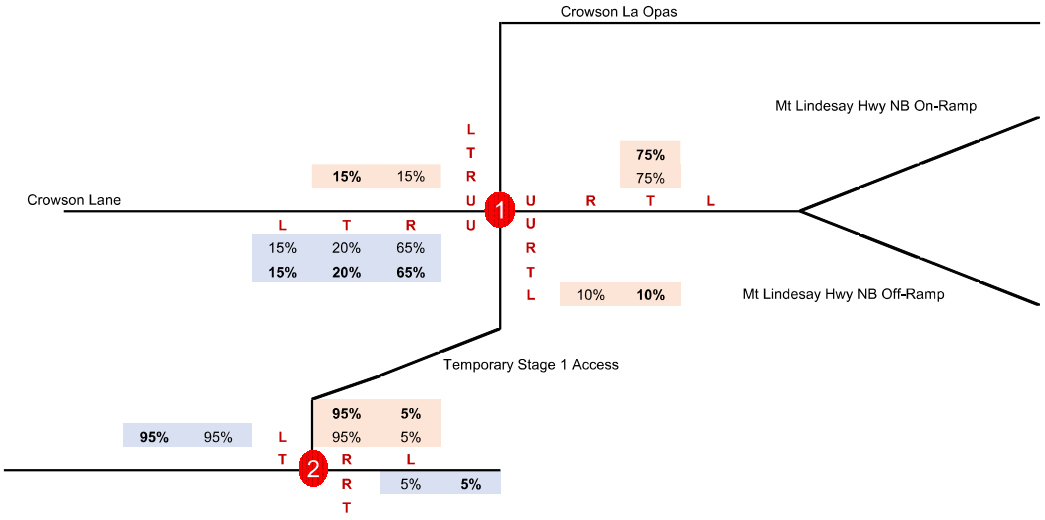
Direction	%
To / from north on Mt Lindesay	65%
To / from south on Mt Lindesay	10%
To / from east on Chambers Flat	10%
To / from west on Crowson	15%
Total	**100%**

Table 6: Growth Factors

Scenario	Year	%	Factor
Survey	2023	1.66%	1.00
Background	2026	1.66%	1.05
10-year	2036	1.66%	1.22

TRAFFIC GENERATION

Proposed Development Distribution



INTERSECTION VOLUMES

	AM	PM
#1		
#2		

DETAILS

Survey Year	2023	2023
Peak Period	AM	PM
Base Year	2026	2026
Growth Rate	1.66%	1.66%
Growth Fact	NA	NA

DOCUMENT CONTROL

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Reviewed Date:	6/06/2024
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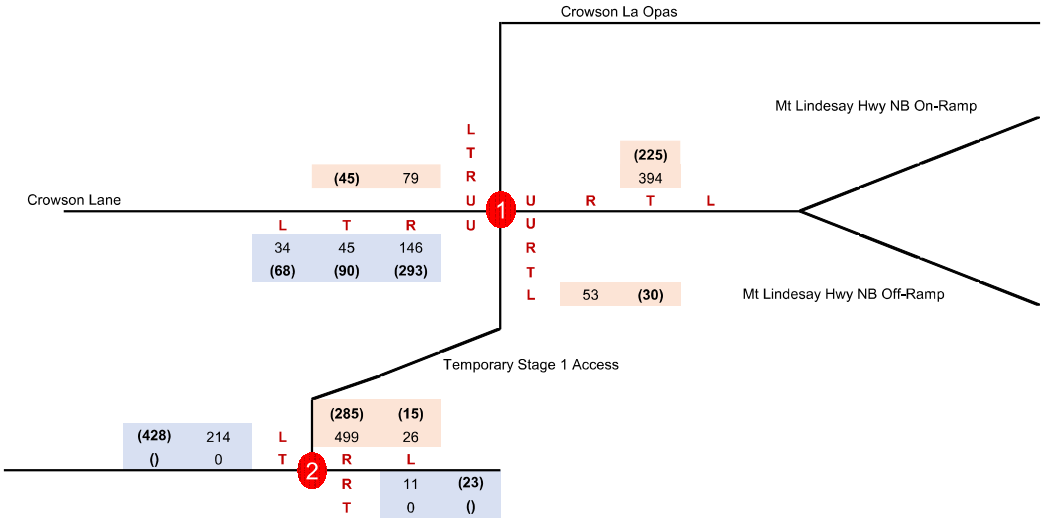
LEGEND

##	AM Peak Period
(##)	PM Peak Period
	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

TRAFFIC GENERATION

Interim Scenario Development Generated Traffic Volumes



INTERSECTION VOLUMES

	AM	PM
#1	750	(750)
#2	750	(750)

DETAILS

Survey Year	2023	2023
Peak Period	AM	PM
Base Year	2026	2026
Growth Rate	1.66%	1.66%
Growth Fact	N/A	N/A

DOCUMENT CONTROL

Job Number:	P6068
Prepared By:	JK
Reviewed By:	FJ
Job Name:	4653-4691 Mount Lindsey Highway North Maclean TES
Prepared Date:	6/06/2024
Reviewed Date:	6/06/2024
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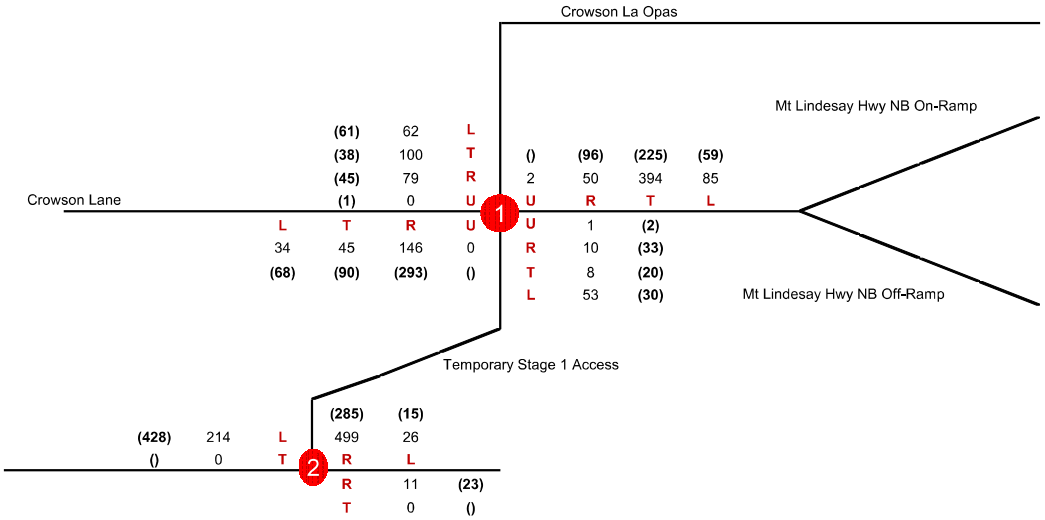
LEGEND

##	AM Peak Period
(##)	PM Peak Period
	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

TRAFFIC GENERATION

Design Traffic Volumes (2026)



INTERSECTION VOLUMES

	AM	PM
#1	1069	**(1059)**
#2	750	**(750)**

DETAILS

Survey Year	**2023**	**2023**
Peak Period	**AM**	**PM**
Base Year	**2026**	**2026**
Growth Rate	**1.66%**	**1.66%**
Growth Fact	**1.05**	**1.05**

DOCUMENT CONTROL

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Reviewed By:	FJ
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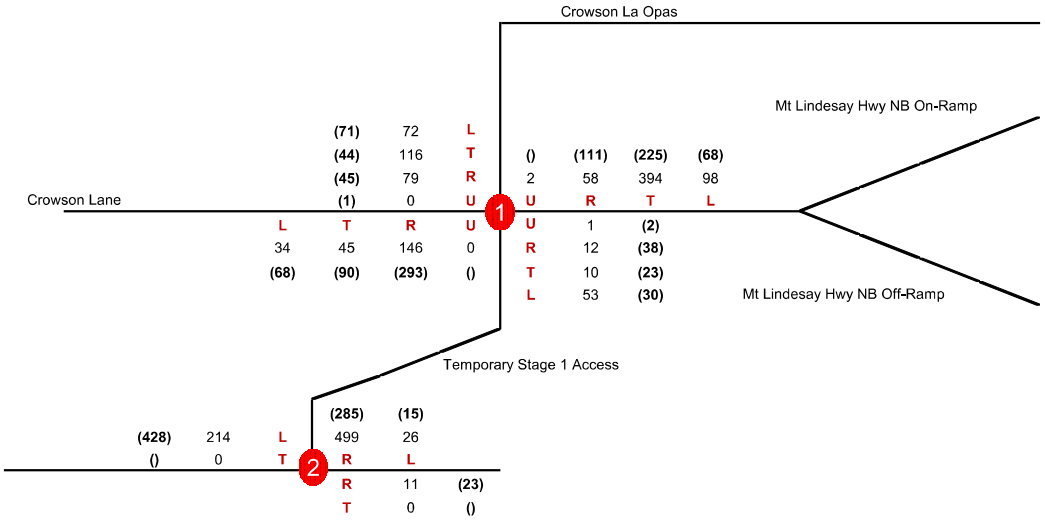
LEGEND

##	AM Peak Period
(##)	PM Peak Period
1	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

TRAFFIC GENERATION

Design Traffic Volumes (2036)



INTERSECTION VOLUMES

	AM	PM
#1	1120	(1107)
#2	750	(750)

DETAILS

Survey Year	2023	2023
Peak Period	AM	PM
Base Year	2036	2036
Growth Rate	1.66%	1.66%
Growth Fact	1.22	1.22

DOCUMENT CONTROL

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Reviewed By:	FJ
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Prepared Date:	6/06/2024
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LEGEND

##	AM Peak Period
(##)	PM Peak Period
1	Intersection ID
1	Turn ID
L	Left Movement
T	Through Movement
U	U-turn Movement

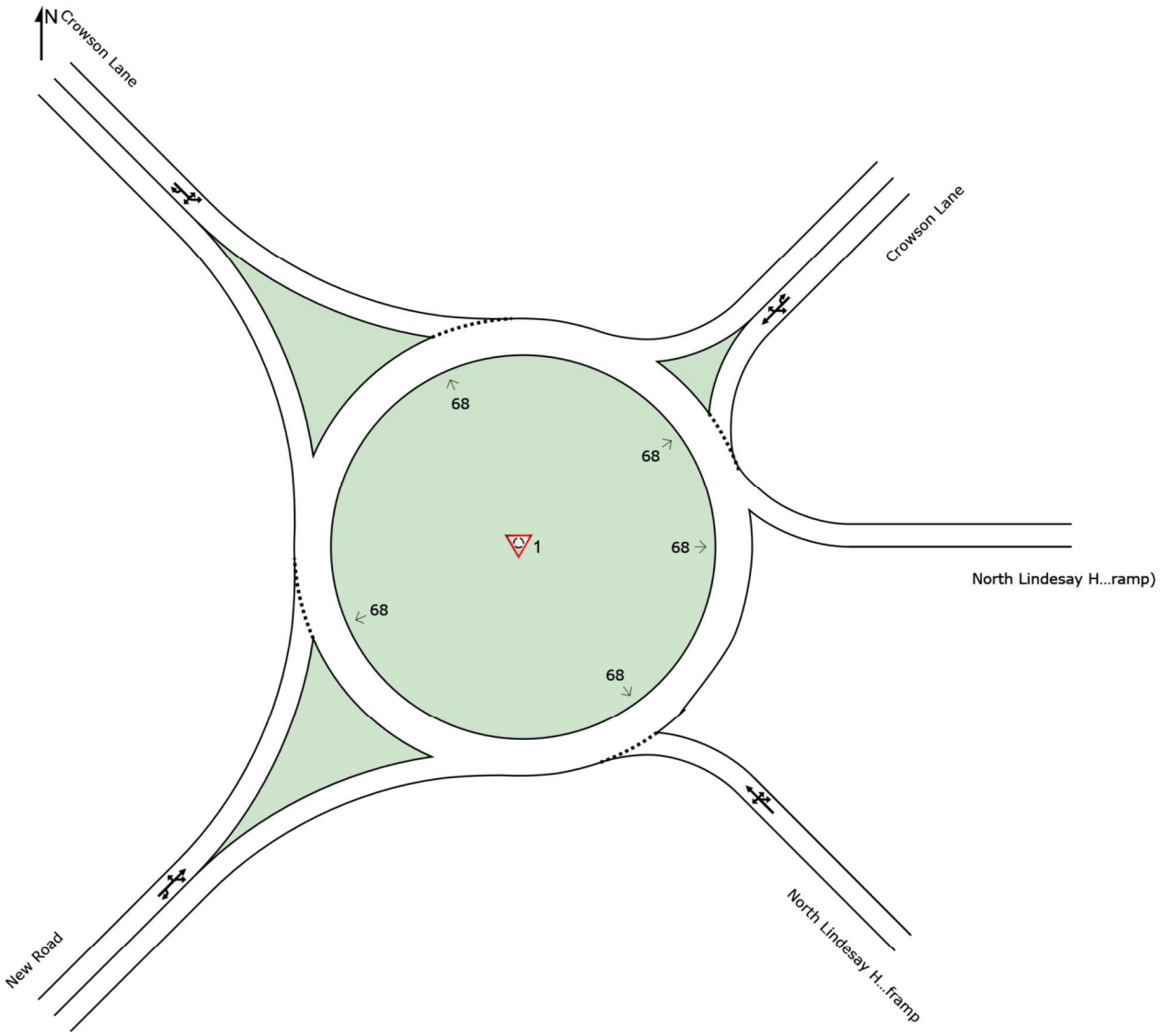
Appendix C: SIDRA Outputs

SITE LAYOUT

Site: 1 [Int_1_2026AM_Design (Site Folder: Intersection 1)]

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Crowson Lane / Mount Lindesay Highway
Site Category: (None)
Roundabout

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



Organisation: BITZIOS CONSULTING | Licence: PLUS / FLOATING | Created: Thursday, 6 June 2024 12:12:08 PM
Project: P:\P5708 North Maclean Industrial Estate TES\Technical\SIDRA\24 06 06 - SIDRA\24 06 06_P5708_North Maclean Industrial Estate Temporary Access.sip9

MOVEMENT SUMMARY

Site: 1 [Int_1_2026AM_Design (Site Folder: Intersection 1)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Crowson Lane / Mount Lindesay Highway
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: North Lindesay Highway offramp															
21	L2	All MCs	56	33.0	56	33.0	0.087	5.5	LOS A	0.6	4.8	0.70	0.60	0.70	48.2
22	T1	All MCs	8	1.0	8	1.0	0.087	5.2	LOS A	0.6	4.8	0.70	0.60	0.70	53.5
23	R2	All MCs	11	20.0	11	20.0	0.087	12.8	LOS B	0.6	4.8	0.70	0.60	0.70	48.6
23b	R3	All MCs	1	1.0	1	1.0	0.087	13.7	LOS B	0.6	4.8	0.70	0.60	0.70	52.7
Approach			76	27.2	76	27.2	0.087	6.6	LOS A	0.6	4.8	0.70	0.60	0.70	49.0
NorthEast: Crowson Lane															
24b	L3	All MCs	89	18.0	89	18.0	0.512	5.2	LOS A	3.8	33.8	0.68	0.55	0.69	51.2
25	T1	All MCs	415	33.0	415	33.0	0.512	5.5	LOS A	3.8	33.8	0.68	0.55	0.69	44.9
26	R2	All MCs	53	35.0	53	35.0	0.512	12.8	LOS B	3.8	33.8	0.68	0.55	0.69	50.1
26u	U	All MCs	2	1.0	2	1.0	0.512	14.7	LOS B	3.8	33.8	0.68	0.55	0.69	48.4
Approach			559	30.7	559	30.7	0.512	6.2	LOS A	3.8	33.8	0.68	0.55	0.69	46.8
NorthWest: Crowson Lane															
27	L2	All MCs	65	10.0	65	10.0	0.202	3.2	LOS A	1.1	9.6	0.43	0.45	0.43	52.6
27a	L1	All MCs	105	21.0	105	21.0	0.202	3.4	LOS A	1.1	9.6	0.43	0.45	0.43	54.0
29	R2	All MCs	83	33.0	83	33.0	0.202	11.2	LOS B	1.1	9.6	0.43	0.45	0.43	40.4
29u	U	All MCs	1	1.0	1	1.0	0.202	13.4	LOS B	1.1	9.6	0.43	0.45	0.43	53.3
Approach			255	22.0	255	22.0	0.202	5.9	LOS A	1.1	9.6	0.43	0.45	0.43	49.1
SouthWest: New Road															
30	L2	All MCs	36	33.0	36	33.0	0.173	2.6	LOS A	1.0	9.2	0.26	0.45	0.26	51.0
31	T1	All MCs	47	33.0	47	33.0	0.173	3.0	LOS A	1.0	9.2	0.26	0.45	0.26	48.6
32a	R1	All MCs	154	33.0	154	33.0	0.173	8.9	LOS A	1.0	9.2	0.26	0.45	0.26	49.6
32u	U	All MCs	1	33.0	1	33.0	0.173	13.1	LOS B	1.0	9.2	0.26	0.45	0.26	31.1
Approach			238	33.0	238	33.0	0.173	6.8	LOS A	1.0	9.2	0.26	0.45	0.26	49.6
All Vehicles			1127	29.0	1127	29.0	0.512	6.3	LOS A	3.8	33.8	0.54	0.51	0.54	48.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Roundabout 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.

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Project: P:\P5708 North Maclean Industrial Estate TES\Technical\SIDRA\24 06 06 - SIDRA\24 06 06_P5708_North Maclean Industrial Estate Temporary Access.sip9

MOVEMENT SUMMARY

Site: 1 [Int_1_2026PM_Design (Site Folder: Intersection 1)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Crowson Lane / Mount Lindesay Highway
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: North Lindesay Highway offramp															
21	L2	All MCs	32	33.0	32	33.0	0.080	4.3	LOS A	0.5	3.8	0.56	0.55	0.56	47.7
22	T1	All MCs	21	5.0	21	5.0	0.080	4.1	LOS A	0.5	3.8	0.56	0.55	0.56	52.8
23	R2	All MCs	35	6.0	35	6.0	0.080	11.3	LOS B	0.5	3.8	0.56	0.55	0.56	49.8
23b	R3	All MCs	2	1.0	2	1.0	0.080	12.6	LOS B	0.5	3.8	0.56	0.55	0.56	52.1
Approach			89	15.2	89	15.2	0.080	7.2	LOS A	0.5	3.8	0.56	0.55	0.56	50.0
NorthEast: Crowson Lane															
24b	L3	All MCs	62	12.0	62	12.0	0.375	5.0	LOS A	2.5	21.5	0.66	0.57	0.66	50.6
25	T1	All MCs	237	33.0	237	33.0	0.375	5.5	LOS A	2.5	21.5	0.66	0.57	0.66	44.3
26	R2	All MCs	101	11.0	101	11.0	0.375	12.1	LOS B	2.5	21.5	0.66	0.57	0.66	50.2
26u	U	All MCs	1	1.0	1	1.0	0.375	14.6	LOS B	2.5	21.5	0.66	0.57	0.66	47.7
Approach			401	24.1	401	24.1	0.375	7.1	LOS A	2.5	21.5	0.66	0.57	0.66	47.2
NorthWest: Crowson Lane															
27	L2	All MCs	64	12.0	64	12.0	0.145	4.3	LOS A	0.9	7.2	0.61	0.56	0.61	51.8
27a	L1	All MCs	40	19.0	40	19.0	0.145	4.5	LOS A	0.9	7.2	0.61	0.56	0.61	53.4
29	R2	All MCs	47	33.0	47	33.0	0.145	12.5	LOS B	0.9	7.2	0.61	0.56	0.61	39.8
29u	U	All MCs	1	1.0	1	1.0	0.145	14.5	LOS B	0.9	7.2	0.61	0.56	0.61	52.7
Approach			153	20.3	153	20.3	0.145	7.0	LOS A	0.9	7.2	0.61	0.56	0.61	48.3
SouthWest: New Road															
30	L2	All MCs	72	33.0	72	33.0	0.370	3.2	LOS A	2.6	23.1	0.44	0.49	0.44	50.1
31	T1	All MCs	95	33.0	95	33.0	0.370	3.6	LOS A	2.6	23.1	0.44	0.49	0.44	47.5
32a	R1	All MCs	308	33.0	308	33.0	0.370	9.5	LOS A	2.6	23.1	0.44	0.49	0.44	48.9
32u	U	All MCs	1	33.0	1	33.0	0.370	13.7	LOS B	2.6	23.1	0.44	0.49	0.44	30.6
Approach			476	33.0	476	33.0	0.370	7.4	LOS A	2.6	23.1	0.44	0.49	0.44	48.8
All Vehicles			1119	26.7	1119	26.7	0.375	7.2	LOS A	2.6	23.1	0.55	0.53	0.55	48.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Roundabout 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: 1 [Int_1_2036AM_Design (Site Folder: Intersection 1)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Crowson Lane / Mount Lindesay Highway
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: North Lindesay Highway offramp															
21	L2	All MCs	56	33.0	56	33.0	0.093	5.6	LOS A	0.6	5.1	0.71	0.61	0.71	48.0
22	T1	All MCs	11	1.0	11	1.0	0.093	5.2	LOS A	0.6	5.1	0.71	0.61	0.71	53.4
23	R2	All MCs	13	20.0	13	20.0	0.093	12.9	LOS B	0.6	5.1	0.71	0.61	0.71	48.5
23b	R3	All MCs	1	1.0	1	1.0	0.093	13.8	LOS B	0.6	5.1	0.71	0.61	0.71	52.6
Approach			80	26.3	80	26.3	0.093	6.8	LOS A	0.6	5.1	0.71	0.61	0.71	49.0
NorthEast: Crowson Lane															
24b	L3	All MCs	103	18.0	103	18.0	0.540	5.6	LOS A	4.4	38.5	0.71	0.61	0.75	50.9
25	T1	All MCs	415	33.0	415	33.0	0.540	6.0	LOS A	4.4	38.5	0.71	0.61	0.75	44.6
26	R2	All MCs	61	35.0	61	35.0	0.540	13.3	LOS B	4.4	38.5	0.71	0.61	0.75	49.9
26u	U	All MCs	2	1.0	2	1.0	0.540	15.1	LOS B	4.4	38.5	0.71	0.61	0.75	48.1
Approach			581	30.4	581	30.4	0.540	6.7	LOS A	4.4	38.5	0.71	0.61	0.75	46.7
NorthWest: Crowson Lane															
27	L2	All MCs	76	10.0	76	10.0	0.223	3.2	LOS A	1.3	10.8	0.44	0.45	0.44	52.7
27a	L1	All MCs	122	21.0	122	21.0	0.223	3.4	LOS A	1.3	10.8	0.44	0.45	0.44	54.1
29	R2	All MCs	83	33.0	83	33.0	0.223	11.2	LOS B	1.3	10.8	0.44	0.45	0.44	40.4
29u	U	All MCs	1	1.0	1	1.0	0.223	13.4	LOS B	1.3	10.8	0.44	0.45	0.44	53.4
Approach			282	21.5	282	21.5	0.223	5.7	LOS A	1.3	10.8	0.44	0.45	0.44	49.6
SouthWest: New Road															
30	L2	All MCs	36	33.0	36	33.0	0.176	2.7	LOS A	1.0	9.4	0.29	0.45	0.29	50.8
31	T1	All MCs	47	33.0	47	33.0	0.176	3.1	LOS A	1.0	9.4	0.29	0.45	0.29	48.4
32a	R1	All MCs	154	33.0	154	33.0	0.176	9.0	LOS A	1.0	9.4	0.29	0.45	0.29	49.5
32u	U	All MCs	1	33.0	1	33.0	0.176	13.2	LOS B	1.0	9.4	0.29	0.45	0.29	31.1
Approach			238	33.0	238	33.0	0.176	6.9	LOS A	1.0	9.4	0.29	0.45	0.29	49.5
All Vehicles			1181	28.5	1181	28.5	0.540	6.5	LOS A	4.4	38.5	0.56	0.54	0.58	48.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Roundabout 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: 1 [Int_1_2036PM_Design (Site Folder: Intersection 1)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Crowson Lane / Mount Lindesay Highway
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: North Lindesay Highway offramp															
21	L2	All MCs	32	33.0	32	33.0	0.089	4.4	LOS A	0.5	4.2	0.58	0.56	0.58	47.5
22	T1	All MCs	24	5.0	24	5.0	0.089	4.2	LOS A	0.5	4.2	0.58	0.56	0.58	52.7
23	R2	All MCs	40	6.0	40	6.0	0.089	11.4	LOS B	0.5	4.2	0.58	0.56	0.58	49.6
23b	R3	All MCs	2	1.0	2	1.0	0.089	12.7	LOS B	0.5	4.2	0.58	0.56	0.58	52.0
Approach			98	14.4	98	14.4	0.089	7.4	LOS A	0.5	4.2	0.58	0.56	0.58	49.9
NorthEast: Crowson Lane															
24b	L3	All MCs	72	12.0	72	12.0	0.401	5.1	LOS A	2.8	23.4	0.68	0.58	0.68	50.5
25	T1	All MCs	237	33.0	237	33.0	0.401	5.6	LOS A	2.8	23.4	0.68	0.58	0.68	44.1
26	R2	All MCs	117	11.0	117	11.0	0.401	12.2	LOS B	2.8	23.4	0.68	0.58	0.68	50.0
26u	U	All MCs	1	1.0	1	1.0	0.401	14.7	LOS B	2.8	23.4	0.68	0.58	0.68	47.5
Approach			426	23.4	426	23.4	0.401	7.3	LOS A	2.8	23.4	0.68	0.58	0.68	47.2
NorthWest: Crowson Lane															
27	L2	All MCs	75	12.0	75	12.0	0.163	4.4	LOS A	1.0	8.2	0.62	0.56	0.62	51.8
27a	L1	All MCs	46	19.0	46	19.0	0.163	4.6	LOS A	1.0	8.2	0.62	0.56	0.62	53.4
29	R2	All MCs	47	33.0	47	33.0	0.163	12.5	LOS B	1.0	8.2	0.62	0.56	0.62	39.8
29u	U	All MCs	1	1.0	1	1.0	0.163	14.5	LOS B	1.0	8.2	0.62	0.56	0.62	52.8
Approach			169	19.7	169	19.7	0.163	6.8	LOS A	1.0	8.2	0.62	0.56	0.62	48.7
SouthWest: New Road															
30	L2	All MCs	72	33.0	72	33.0	0.380	3.4	LOS A	2.6	23.8	0.47	0.50	0.47	50.0
31	T1	All MCs	95	33.0	95	33.0	0.380	3.8	LOS A	2.6	23.8	0.47	0.50	0.47	47.3
32a	R1	All MCs	308	33.0	308	33.0	0.380	9.7	LOS A	2.6	23.8	0.47	0.50	0.47	48.7
32u	U	All MCs	1	33.0	1	33.0	0.380	13.9	LOS B	2.6	23.8	0.47	0.50	0.47	30.5
Approach			476	33.0	476	33.0	0.380	7.6	LOS A	2.6	23.8	0.47	0.50	0.47	48.6
All Vehicles			1169	26.0	1169	26.0	0.401	7.4	LOS A	2.8	23.8	0.58	0.54	0.58	48.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Roundabout 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.

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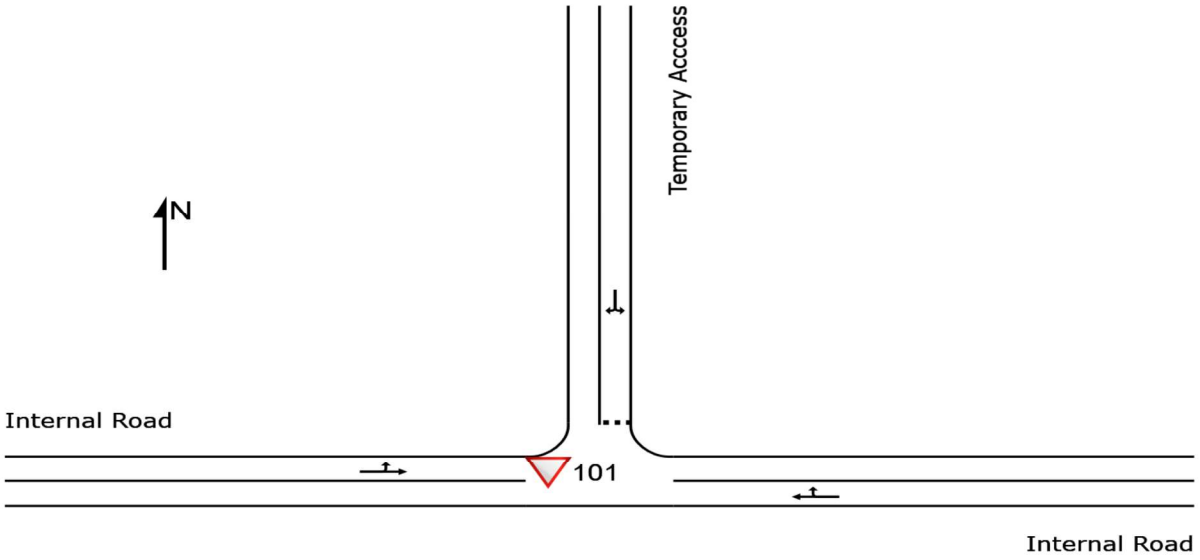
Project: P:\P5708 North Maclean Industrial Estate TES\Technical\SIDRA\24 06 06 - SIDRA\24 06 06_P5708_North Maclean Industrial Estate Temporary Access.sip9

SITE LAYOUT

Site: 101 [Int_2_2026AM_Design (Site Folder: Intersection 2)]

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Internal Road / Temporary Access
Site Category: (None)
Give-Way (Two-Way)

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



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Project: P:\P5708 North Maclean Industrial Estate TES\Technical\SIDRA\24 06 06 - SIDRA\24 06 06_P5708_North Maclean Industrial Estate Temporary Access.sip9

MOVEMENT SUMMARY

Site: 101 [Int_2_2026AM_Design (Site Folder: Intersection 2)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Internal Road / Temporary Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Internal Road															
5	T1	All MCs	1	33.0	1	33.0	0.011	1.2	LOS A	0.0	0.4	0.38	0.54	0.38	51.1
6	R2	All MCs	12	33.0	12	33.0	0.011	6.7	LOS A	0.0	0.4	0.38	0.54	0.38	34.8
Approach			13	33.0	13	33.0	0.011	6.2	NA	0.0	0.4	0.38	0.54	0.38	36.6
North: Temporary Acccess															
7	L2	All MCs	27	33.0	27	33.0	0.574	5.9	LOS A	3.8	34.4	0.17	0.55	0.17	37.9
9	R2	All MCs	525	33.0	525	33.0	0.574	7.6	LOS A	3.8	34.4	0.17	0.55	0.17	46.8
Approach			553	33.0	553	33.0	0.574	7.5	LOS A	3.8	34.4	0.17	0.55	0.17	46.5
West: Internal Road															
10	L2	All MCs	225	33.0	225	33.0	0.150	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	46.8
11	T1	All MCs	1	33.0	1	33.0	0.150	0.0	LOS A	0.0	0.0	0.00	0.57	0.00	52.1
Approach			226	33.0	226	33.0	0.150	5.9	NA	0.0	0.0	0.00	0.57	0.00	46.8
All Vehicles			792	33.0	792	33.0	0.574	7.0	NA	3.8	34.4	0.13	0.55	0.13	46.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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: 101 [Int_2_2026PM_Design (Site Folder: Intersection 2)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

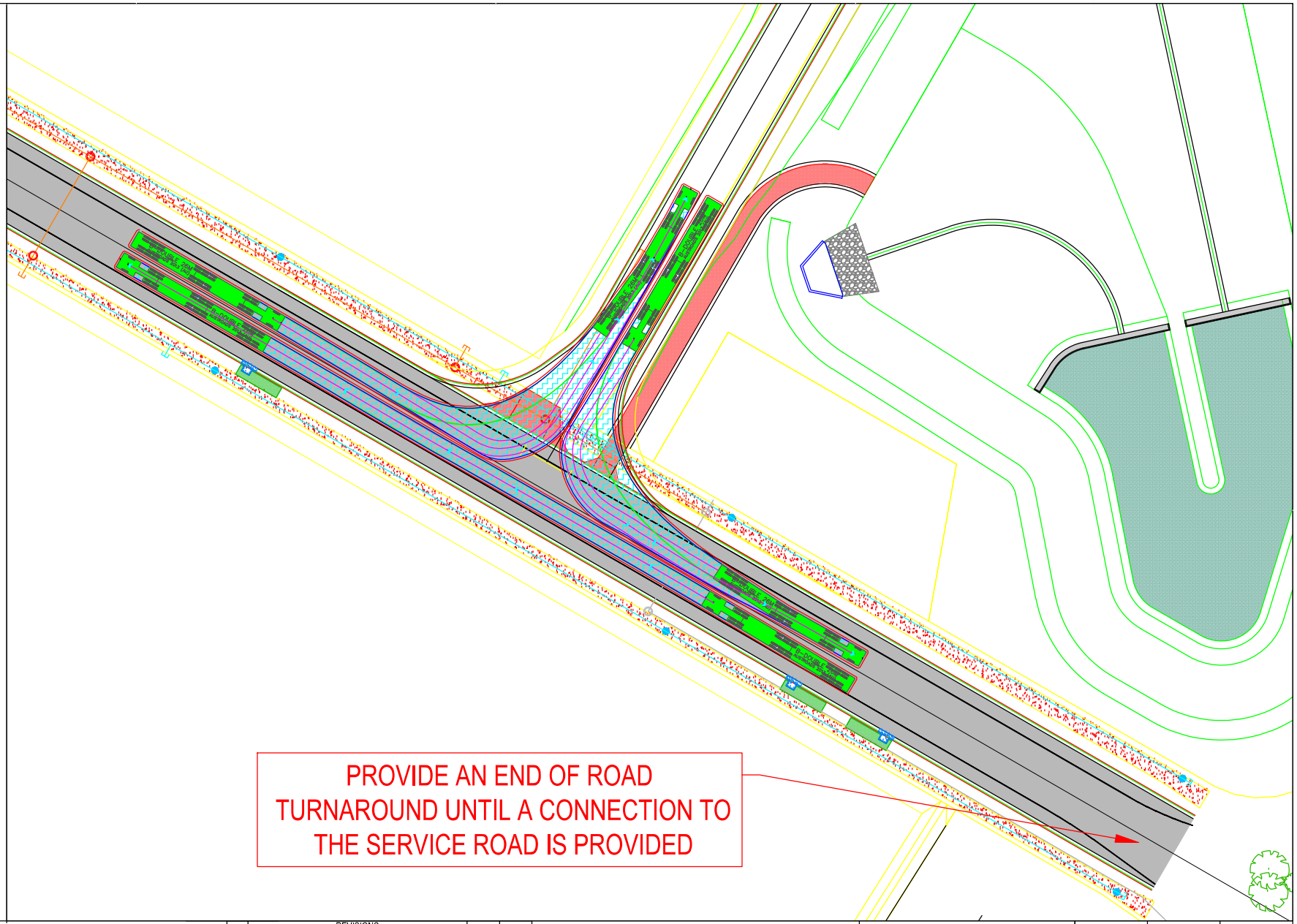
Project No.: P6168
Project Name: 4653-4691 Mount Lindesay Hwy North Maclean TES
Intersection: Internal Road / Temporary Access
Site Category: (None)
Give-Way (Two-Way)

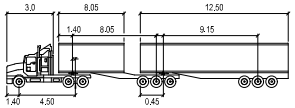
Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Internal Road															
5	T1	All MCs	1	33.0	1	33.0	0.032	3.1	LOS A	0.1	1.1	0.54	0.68	0.54	48.9
6	R2	All MCs	24	33.0	24	33.0	0.032	8.7	LOS A	0.1	1.1	0.54	0.68	0.54	32.8
Approach			25	33.0	25	33.0	0.032	8.5	NA	0.1	1.1	0.54	0.68	0.54	33.6
North: Temporary Acccess															
7	L2	All MCs	16	33.0	16	33.0	0.387	5.9	LOS A	1.9	16.7	0.15	0.55	0.15	36.8
9	R2	All MCs	300	33.0	300	33.0	0.387	8.5	LOS A	1.9	16.7	0.15	0.55	0.15	46.0
Approach			316	33.0	316	33.0	0.387	8.4	LOS A	1.9	16.7	0.15	0.55	0.15	45.8
West: Internal Road															
10	L2	All MCs	451	33.0	451	33.0	0.300	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	46.7
11	T1	All MCs	1	33.0	1	33.0	0.300	0.1	LOS A	0.0	0.0	0.00	0.57	0.00	52.0
Approach			452	33.0	452	33.0	0.300	6.0	NA	0.0	0.0	0.00	0.57	0.00	46.7
All Vehicles			793	33.0	793	33.0	0.387	7.0	NA	1.9	16.7	0.08	0.57	0.08	46.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.

Appendix D: Swept Path Diagrams





B-DOUBLE (26.0m)

meters

Tractor Width	: 2.5	Lock to Lock Time	: 6.0
Trailer Width	: 2.5	Steering Angle	: 23.4
Tractor Track	: 2.5	Articulating Angle	: 70.0
Trailer Track	: 2.5		

DESIGN VEHICLE

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Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	SWEPT PATHS FOR TECH NOTE	J.K	28.11.2023

Scale @ A3 0 4 8 12 16 20 24 28 1:600

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: NORTH MACLEAN INDUSTRIAL TIA

Title: B-DOUBLE SWEPT PATHS

Design	Drawn	Checked
J.K	J.K	F.J

CONCEPT ONLY

Date: 28.11.2023

Project Number	Sheet Number	Issue
P5708	1	001