TRAFFIC MANAGEMENT PLAN

Version 02.3 2026

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Form 1.TMP.10-2021.TPP.DFT

TMP01 - Master TMP
Hunter Indoor Sports Centre

Traffic Plan
Professionals Pty Ltd

CONTENT

1 DOCUMENT AUTHOR

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	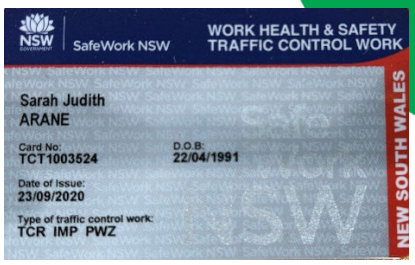
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12 May 2026	

2 DOCUMENT HISTORY

Reviewed By	Version	Date	Comments
HISC Project Group	V01/25	28 May 2025	Update Matrix and Reference Docs
HISC Project Group	V02/26	13 March 2026	Update Matrix and Reference Docs
HISC Project Group	V02.1 26	24 March 2026	Update Reference Docs
HISC Project Group	V02.2 26	13 April 2026	Update to event sample details

3 DISTRIBUTION

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6 TERMS AND DEFINITIONS

Terms	Definitions
TfNSW	Transport for New South Wales
PAX	Person Amount X
ADT	Average Daily Traffic
AS/NZS	Australian Standards/New Zealand Standards
PAC	Police Area Command
LGA	Local Government Area
PWZ/TMP	Prepare a Work Zone/Traffic Management Plan
VMS	Variable Message Sign
LT	Light Tower
TGS	Traffic Guidance System
TMP	Traffic Management Plan
HISC	Hunter Indoor Sport Centre
VPAX	Vehicle Compacity
MJS	McDonald Jones Stadium

7 EXECUTIVE SUMMARY

The Traffic Management Plan (TMP) reviews the effective management of Traffic, Transport, and Parking for events held at the Hunter Indoor Sports Centre (HISC), and also the impact of contemporaneous operations occurring at HISC and neighboring McDonald Jones Stadium and Newcastle International Hockey Stadium.

This Transport Management Plan (TMP) contains the following significant components.

1. Compliance: Sections (s) 1-14, these sections, cover Approvals, Planning, Strategies and Risk.
2. Operations: Sections (s) 15-19, describes the Event Details, Road Closures, Speed Reductions, Transport, Parking, VMS, and Lightower Locations. The Operations Section is usually printed as quick reference material along the TGSs for the Traffic Manager on the day(s) of the event.

This TMP evaluates two scenarios where operations at HISC require traffic management outside of the day-to-day arrangements.

Scenario 1 details at a HISC only level what mitigation measures an Insignificant, Minor, Low and Medium impact event operation requires.

Scenario 2 details at a multi-venue level what mitigation measures an Insignificant, Minor, Low, Medium, High, Very High and Major impact event requires.

This **Low and Medium Impact TMP** details the traffic management controls to be put in place should an event be occurring at HISC of between 1100-1700 (Scenario 1c) and 1700-2500 (Scenario 1d) and suggested additional traffic controls if an event occurring at an additional venue results in a *combined patronage* of between 2500 and 5000 pax at one time (Scenario 2d).

An example of when Scenario 2 conditions would occur include a show court event at HISC while a small sports event or conference simultaneously takes place at the MJS.

The Events Assessment Matrices below provide a simple-to-use tool to triage such events and for staff to make an informed decision. Below are the criteria considered for each impact level:

ASSESSMENT

- HISC Impact (Insignificant, Minor, Low and Medium) – *Does this HISC event exceed or impacts the onsite parking or are there other events occurring within the precinct that impact the event parking onsite.*
- Multi Venue Impact (Insignificant, Minor, Low, Medium, High, Very High and Major) – *A Multi venue event(s) that exceeds or impacts the onsite parking of both venue or other events that impact the event parking onsite.*
- TfNSW Rating (1, 2, 3 and 4) see Traffic & Transport Management of Special Events.
- Venue Pax per day or at any one time (day/time),

CONSIDERATIONS

- Road Closures
- Parking (Onsite or Overflow)
- Park n Ride
- Shuttle Bus Services
- Competing Events (Stadium, Hockey)

APPROVALS

- Applications Required (also see Section 13- Road Approvals Matrix),
- The TMP or TGS to be used for each scenario where applicable.

IMPACT SUMMARY

PAX Range	Scenario 1 - HISC Impact Only *(No reliance on MJS Parking)*	Scenario 2 - Multi-Venue Impact (HISC, MJS, Hockey Centre and external sports fields)
<690	Scenario 1a	*N/A*
690 - 1,100	Scenario 1b	Scenario 2a
1,100 – 1,700	Scenario 1c	Scenario 2b
1,700 – 2,500	Scenario 1d	Scenario 2c
2,500 – 5,000	*N/A*	Scenario 2d
5,000 – 15,000	*N/A*	Scenario 2e
15,000 – 25,000	*N/A*	Scenario 2f
25,000+	*N/A*	Scenario 2g

Scenario 1- HISC Attendance only

ASSESSMENT				CONSIDERATIONS				APPROVALS	
Scenario	**Impact**	**RMS Rating**	**Venue PAX**	**Road Closures**	**HISC Parking 231 Carparks 1:3 car/pax**	**Drop Off Zone**	**Shuttle Bus Services**	**Applications**	**TMP/ TGS**
1a	**Insignificant**	NA	<690	No	Parking on site	No	No	N/A	N/A
1b	**Minor**	NA	>690-1100	No	Parking on site and off site	No	No	N/A	N/A
1c	**Low**	4	>1100-1700	No	Onsite managed & On-Street	Yes	No	TfNSW (ROL)	TMP01 TGS4003.DFT & CONSIDER TGS4002.DFT
1d	**Medium**	3	>1700-2500+	No	Onsite managed & On-Street	Yes	No	TfNSW (ROL) Council (ROL & EA)	TMP01 TGS4003.DFT 4002.DFT CONSIDER TGS4005.DFT

Examples of the types of events and frequency that fall into the impact categories above include:

Event	Attendees	Frequency
Friday Night	<600 pax	Weekly
Waratah League	500-800 pax	Competition March – September. Weekly games (Sat afternoon/Sunday)
NBL 1	690-1100 pax	April - August - majority of matches (approx. 14 per year)
	1100-1700 pax*	April- August - infrequent (e.g. rival clashes or finals)
Full House Events	2500	Occasional – 1 or 2 per annum

** NSWBA Utilisation Model*

Scenario 2- Multi-Venue attendance (Addresses the potential for combined patrons of HISC, MJS, Hockey Centre and external sports fields)

ASSESSMENT			CONSIDERATIONS						APPLICATIONS	HISC CONTROLS
Scenario	Impact	RMS rating	Pax/Event	Road Closures	HISC Parking 231 Carparks 1:3 car/pax	MJS Parking 900 Carparks 1:3 car/pax	Drop Off Zone	Shuttle Bus Services	Approvals	TMP/TGS
2a	**Insignificant**	NA	<1100	No	Onsite & On-Street	Onsite	No	No	N/A	N/A
2b	**Minor**	4	1100-1700	No	Onsite managed & On-Street	Onsite	Yes	No	N/A	TGS4003.DFT & CONSIDER TGS4002.DFT
2c	**Low**	3	1700- 2500	No	Onsite managed & On-street	Onsite	Yes	No	TfNSW (ROL) Council (ROL)	TGS4003.DFT TGS4002.DFT CONSIDER TGS4005.DFT
2d	**Medium**	2	2500-5000	No	Onsite managed	Onsite & On-street	Yes	No	TfNSW (ROL) Council (ROL & EA)	TGS4003.DFT TGS4002.DFT CONSIDER TGS4004.DFT
2e	**High**	1	5K- 15K	No	Onsite managed	Onsite managed & On-street	Yes	Yes*	TfNSW (ROL) Council (ROL & EA)	TGS4002.DFT TGS4003.DFT TGS4004.DFT TMP01.DFT - MJS 2025 LOW IMPACT
2f	**Very High**	1	15K-25K	Yes Young Rd, Turton Rd	Onsite managed	Onsite managed & On-street	Yes	Yes*	TfNSW (ROL) Council (ROL) Police (User Pay)	TMP02.DFT – Or TMP03.DFT MJS 2025 MEDIUM IMPACT
2g	**Major**	1	25K+	Yes Young Rd, Turton Rd	Onsite managed	Onsite managed & On-street	Offsite Young Rd	Yes* Park n Ride	TfNSW (ROL) Council (ROL) Police (User Pay)	TMP04.DFT - MJS 2025 HIGH IMPACT

**refer section 17.8 for parking thresholds.*

In the impact categories detailed in the Scenario 2 matrix, should HISC have a capacity patronage of 2500, and the additional number of attendees across the multiple venues fall into Scenarios 2e, 2f or 2g, the HISC traffic management strategy would implement the controls outlined in this TMP under Scenario 1d while also

deferring to the controls activated per the applicable McDonald Jones Stadium Traffic Management Plans- Low, Medium or High Impact Events.

8 SCOPE

This plan addresses the traffic management for the proposed works following consultation and assessments from the respective stakeholders listed in this document.

Where applicable, the document includes the provision for the safe movement of vehicle and pedestrian traffic, the protection of workers from passing traffic, the design, installation and removal of any necessary temporary detours, the provision of traffic controllers, and the installation of temporary advance warning signs and safety barriers.

Road closures are minimised to maintain regular traffic flow and various traffic control devices and measures are used to create the relevant Traffic Control Plans.

This document is to be read in conjunction with the following:

#	Document	Version
1	TfNSW Guide to Transport & Management for Special Events	3.45
2	TfNSW Traffic Control at Worksites Manual	6.1
3	AS/NZS	2890.6-2009.
4	Local Government Act 1993	No 30
5	Roads Act 1993	No 33
6	Australian Standard	1742
7	The Use of Variable Message Sign (VMS) TfNSW Policy	10.408
8	Traffic Management Master Plan - Roche Estate	V01.2021
9	Risk Management - Guidelines	ISO31000:2018
10	Safework Australia – Traffic Management: Guide for events	April 2021
11	Safework Information Sheet – Traffic Management	April 2021
12	Traffic Event Management Plan - SECA	May 2025
13	Traffic Impact Assessment – SECA Solutions	May 2025

9 OBJECTIVES

The core objectives for the Traffic Management Plan are to:

1. Ensure the safety of its employees, contractors, the public, TfNSW personnel, pedestrians, cyclists and traffic.
2. Keep traffic delays to a minimum,
3. Maintain satisfactory property access,
4. Minimise disruption to businesses,
5. For works near speed cameras, traffic lights & traffic counters, etc.
   a) Inform the TfNSW Representative and
   b) Not damage the equipment,

c) Make suitable arrangements where required.
d) When required, obtain approvals and licenses such as Road Occupancy, Direction to Restrict (DTR for Speed Limit Sign Authorisation) and Traffic Signals,

6. Minimise disturbance to the environment,
7. Design temporary roadways and detours per the TfNSW Road Design Guide and
8. Meet TfNSW Traffic Control at Worksites Technical Manual.

10 MANAGEMENT OF THE TMP

Traffic Plan Professionals Pty Ltd has undertaken that it will provide the Traffic Guidance Schemes (TGS) for the events at the site location.

The Council, TfNSW or consenting authorities require that all traffic control works to be carried out by Work Cover NSW certified and accredited personnel.

11 IMPLEMENTATION

Traffic Management for work or events sites will be per the TfNSW Traffic Control at Work Sites Manual as modified to site conditions.

Implementing these plans is the client's responsibility and shall be carried out by SafeWork NSW certified and accredited personnel.

12 PLANNING STRATEGIES & TMP APPROVAL

Preparation of the final draft plans, assessment and approvals are required by the following stakeholders.

Agency	Area
NSW Police	Newcastle PAC
Council	City of Newcastle (Council)
TfNSW	Regional and Outer Metropolitan
NCTC	Newcastle Traffic Committee

The final TMP, once resolved through the above stakeholders, is to be submitted for approval to the NCTC Chairperson (City of Newcastle). Notification of the utilisation of the TMP must be provided to the NCTC Chairperson 3 months prior to any expected event to allow notification of all road network stakeholders. Should confirmation of an event be received with less than 3 months prior to the implementation date, notification must be provided as soon as practicable, and approvals are to be obtained under direct consultation with the NCTC Chairperson (City of Newcastle).

The TMP must be reviewed if requested in writing by the NCTC Chairperson. This may be requested following advice from any major stakeholder or in response to issues related to the delivery of the TMP for any future event.

13 ROAD APPROVALS

To regulate traffic or install a traffic control device(s) on a public road in NSW requires road approvals (consent) from either/or both TfNSW and the Local Government (Council/Shire). These Consenting authorities may also need the NSW Police Form 1 to be completed and approved as part of the approval process. These individual approvals are required for each instance to implement the TMP.

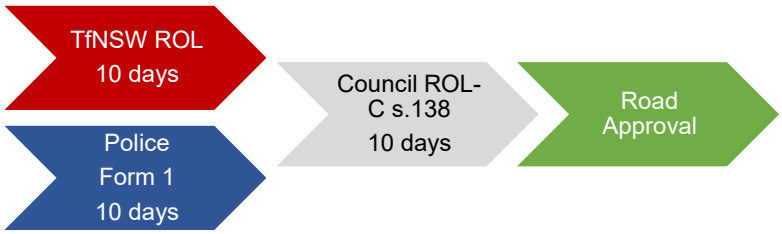
ROL (TfNSW) - The placement of a VMS(s), the Phasing of Traffic Lights, regulating of traffic or the closure(s) of a lane or road on state roads or intersecting side roads will require a ROL to be lodged with TfNSW **OPLINC** (including the associated TMP and TGS).

ROL-C (Council) - A Road Occupancy Licence (Local Road) is required for the use of part or all of a Council Road (including roadway, footpath or nature strip within Council Road reserve) to carry out different types of works.

The application form must be submitted at least **5 business days** before the permit is required or **10 days prior** to the commencement of works for a complex Traffic Management Plan (TMP), including works requiring the closures or interaction of multiple roadways. All applications must include a Traffic Guidance Scheme (TGS), Certificate of Currency, Notification leaflet/letter and Distribution Map.

You will need to complete the **Roads-Road Occupancy Application Form** and submit it, along with all supporting documentation, to **traffic@ncc.nsw.gov.au**

The below matrix provides an overview of the workflow approval process.

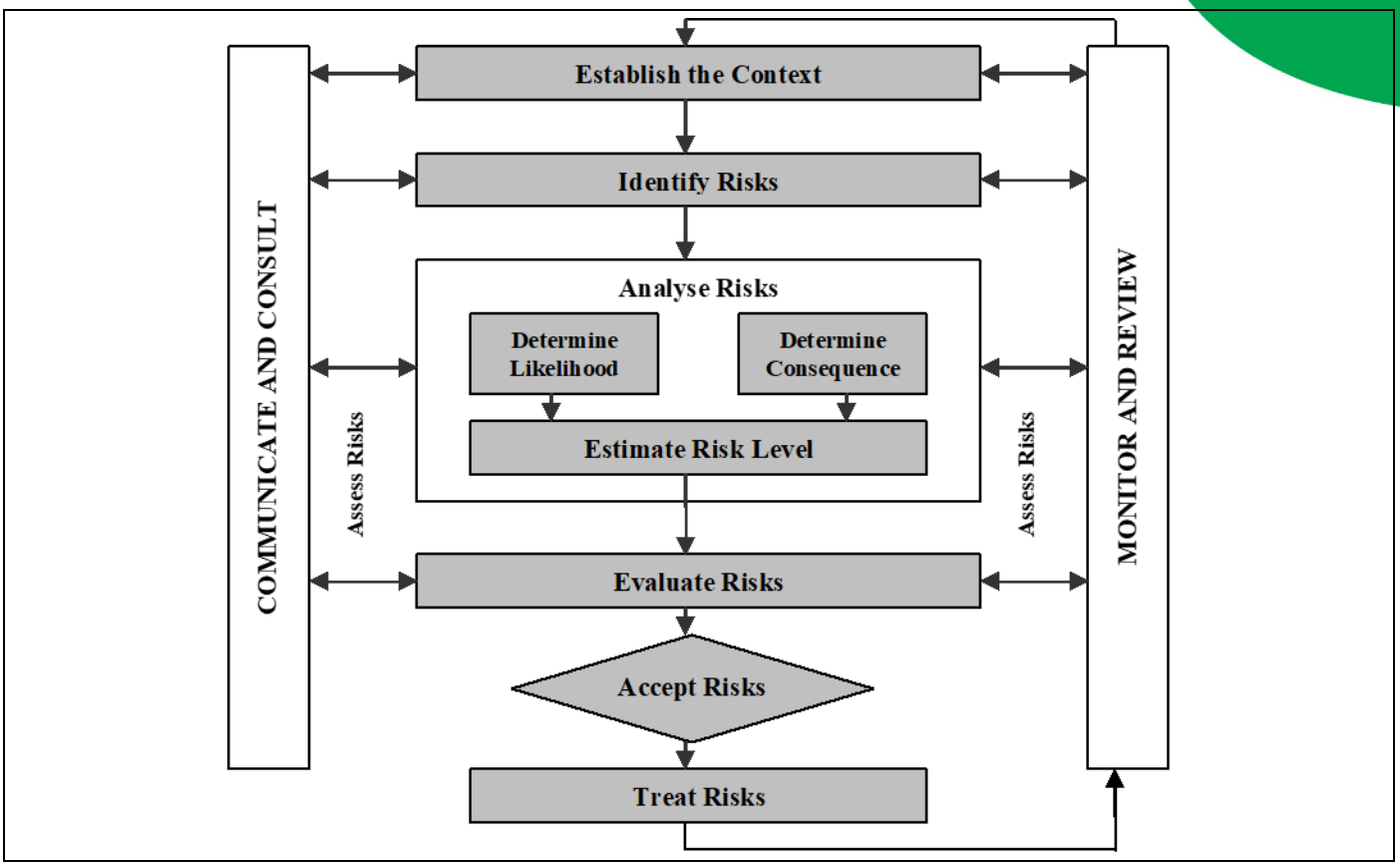
Sequence	Agency	Document	Time Frame
1	TfNSW	Road Occupancy Licence (ROL)	10 Business Days
2	NSW Police	Notice of Intention to Hold a Public Assembly (Form 1)	10 Business Days
3	Council	**Road Occupancy Licence (ROL-C)**. (Roads Act s.138)	10 Business Days
The total process timeframe is 20 Days (not including weekends)			
Notes:		Both the **ROL** and **Form 1** can be lodged at the same time. However, you will need these approvals to be lodged with the **ROL-C** (Roads Act s.138) to the City of Newcastle (Council). If the TMP requires User Paid Police to be engaged to conduct **Point Duties,** the **Notice and Request for Services with NSW Police** must lodge at least 90 days from the event date.	

	All forms are available online and can be easily searched using document headings.

14 RISK MANAGEMENT

14.1 RISK MANAGEMENT PROCESS

Throughout the Risk Management process, we will link activities to the Australian Standards AS ISO 31000:2018. These standards provide a systematic approach to Risk Management.



14.2 RISK TOLERANCE

A risk rating determined to be higher than a "low" or a "moderate" level (see: "Risk Assessment Tool" below for descriptions of these terms should result in senior management assessing the viability of implementing the suggested additional control measures.

Even where a residual risk of a "low" or moderate" level exists, senior management should further evaluate where it is viable to reduce the likelihood or consequences of that stated risk.

14.3 Risk Assessment Tool

The risk assessment tool acts as a guide to determine an appropriate rating for each risk. However, it is important to note that risk is subjective, and therefore, any ratings applied are considered in this context.

Likelihood	Consequences				
	Insignificant (1) *(Minor problem easily handled by normal day to day processes)*	**Minor (2)** *(Some disruption possible, e.g. damage equal to $500k)*	**Moderate (3)** *(Significant time/resources required, e.g. damage equal to $1 million)*	**Major (4)** *(Operations severely damaged, e.g. damage equal to $10 million)*	**Catastrophic (5)** *(Business survival is at risk damage equal to $25 million)*
Rare (1) *(e.g. <3% chance)*	**2**	**3**	**4**	**5**	**6**
Unlikely (2) *(e.g. between 3% and 10% chance)*	**3**	**4**	**5**	**6**	**7**
Moderate (3) *(e.g. between 10% and 50% chance)*	**4**	**5**	**6**	**7**	**8**
Likely (4) *(e.g. between 50% and 90% chance)*	**5**	**6**	**7**	**8**	**9**
Almost certain (5) *(e.g. >90% chance)*	**6**	**7**	**8**	**9**	**10**

14.4 Risk Score Evaluation

Risk Score	Risk Level	Response
2-4	Low	Manage through routine procedures
5-6	Moderate	Specific procedures and monitoring required, specify management responsibility
7-8	High	Action plan required specific senior management attention and specified responsibility
9-10	Extreme	Immediate action required, senior management needed with detailed plan and Senior Management responsibility noted

14.5 Risk Treatments

Treatment of the risks associated with hazards identified will involve appropriately selecting a treatment option as indicated below.

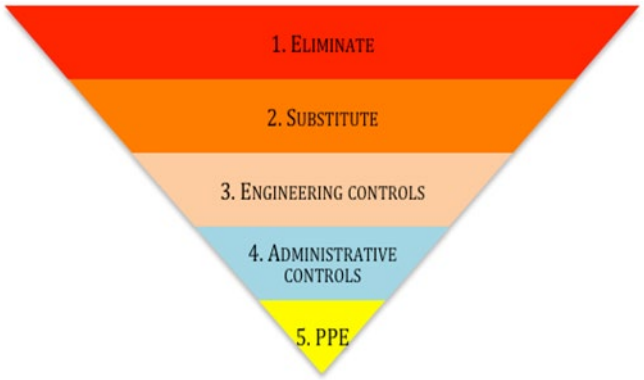
The Hierarchy of Hazard Controls is recommended as the best-practice approach to addressing the source of real/safety risks and thus eliminating or minimising such risks. When a hazard is identified, it shall be:

1. Eliminated (designed out, eliminated),
2. Substituted (i.e. if a hazardous work practice exists it should be replaced with non-hazardous or less hazardous work practice),
3. Isolated (if nothing could be done in short term the hazard should be isolated, so it does not impose a risk to a person),
4. Controlled through engineering methods (guarded away using covers etc.),
5. Controlled through Administrative means (procedures/practices, inductions, instructions, workplace training etc.),
6. Persons protected by PPE (Personal Protective Equipment).

The controls should be used in order as indicated - starting from Eliminate as the best approach and then working down the options. A combination of hazard controls from the list above could be used to address any one hazard at one time - a hazard control on its own is not exhaustive and can be used in a combination with one or more other controls.

The primary aim of risk control is to eliminate the risk; the best way of achieving this is to eliminate the hazard. If this is not possible, the risk must be minimised by utilising the ALARP principle.

Nomination	Multiplier	Outcome
A	=	As
L	=	Low
A	=	As
R	=	Reasonably
P	=	Practicable



SA/SNZ HB 205:2017 states that the most effective form of risk control is to eliminate the hazard. However, suppose this is not reasonably practicable to eliminate the hazard. In that case, the risk must be minimised to the lowest reasonably practicable level by taking the following measures in the order and as determined by the risk assessment (Hierarchy of Controls).

If no single control is appropriate, a combination of the above controls will be taken to minimise the risk to the lowest reasonably practicable level.

14.6 Risk Assessment Plan (Risk Register)

A list of potential causes, consequences and control measures relevant to HISC Scenario 1c and 1d are provided. This should not be considered an exhaustive list

#	HAZARD	RISK	CURRENT			CONTROL MEASURES	RESIDUAL			RESPONSIBILITY
			LIKELIHOOD	CONSEQUENCE	RISK RATING		LIKELIHOOD	CONSEQUENCE	RISK RATING	
TRAFFIC RISKS										
1	Cyclist and or Vehicle/ Pedestrian interaction	Short Term Injury Long Term Injury	4	3	H	Road closures within the venue to ensure minimal interaction. Traffic controllers control access within the site where pedestrians may be gathering. First aid trained person onsite. Relevant Signage advising cyclists/drivers of pedestrians ahead. All staff should be in a hi-vis vest when working around traffic.	2	2	L	Event Organiser Traffic Control
2	Illegal Parking	Short Term Injury Financial Delay	3	1	L	Attendees advised as to their responsibility to park in a compliant/allocated location. Council are responsible for non-compliant Parking & regulatory enforcement.	2	1	L	All patrons Event Organiser
3	Overcrowding on roads	Death Short Term Injury Long Term Injury Delay	2	3	M	Tickets are typically pre-purchased, and numbers for the site pre-ascertained Playlists assist with patronage numbers and movement. Traffic controller to assist carpark access	2	1	L	Event Organiser Traffic Controller
4	Road Subsidence	Death Short Term Injury Long Term Injury Delay	4	3	M	All staff along the internal roads must be vigilant, monitor the surface, and report any damage to the event organiser.	2	2	L	Venue Event Organiser LGA

						LGA responsible for external road network				
5	Traffic Jam in the surrounding area	Short Term Injury Long Term Injury Delay	3	2	M	Custom TGS's for the event. Undertake consultation with relevant stakeholders as part of planning. Traffic Controller onsite during the live event to monitor areas and liaise with the nominated rep. Traffic queues observed during ingress and Egress. Venue times extend to allow for longer staggered ingress. Various egress strategies to assist with Egress.	2	2	L	Site Manager Traffic Control
6	Vehicle Breakdown	Financial Delay	3	2	M	Alternate routes are to be utilised. Contingency routes are to be considered as part of planning.	1	2	L	Event Organiser Traffic Controller Police
WEATHER RISKS										
7	Exposure to Cold	Short Term Injury Financial Reputation	2	3	M	Thermal first aid sheets shall be in all first aid kits and first aid on site. Staff to be provided with relevant PPE. Call Emergency Services 000 Ambulance.	1	2	L	Event Organiser First aid Traffic Control
8	Exposure to Sun	Short Term Injury Financial Reputation	4	2	M	All staff to wear Sun rated caps/hats where possible. Sunscreen is available to staff from the supervisor. Water available from supervisor & staff reminded to bring a spare supply. All TC's reminded to use sunscreen and protective clothing.	2	2	L	First aid Event Organiser Traffic Control
9	Heavy Rain	Death Short Term Injury Long Term Injury Delay	2	4	M	Supply wet weather gear for the crew if required. Medics/trained first aiders onsite during the event. Unsafe areas to be barricaded off. Ensure when installing Signage not to block existing drains/water flow.	2	2	L	First aid Event Organiser Traffic Control

10	Lightning	Death Short Term Injury Long Term Injury	1	5	M	Refer AS1768 Monitor BOM for any change in weather. Do not hold stop/slow bat during lightning. Where possible, seek shelter if safe to do so.	1	4	L	Event Organiser Traffic Control
11	Strong Wind	Death Short Term Injury Financial	3	3	M	BOM to be monitored throughout the event by the Event Organiser. All supervisors are to be advised of any noteworthy change. Medics/trained first aiders onsite during the event. If an injury occurs, call Emergency Services 000 Ambulance / Police. All temporary signs are to be weighted in high wind areas.	3	2	M	First Aid Event Organiser Traffic Control
HEALTH RISKS										
12	Medical Emergency	Death Short Term Injury Long Term Injury Financial Delay Reputation	2	3	M	Emergency access routes are always planned and kept clear. Communications to ensure all parties are abreast. Emergency services to be contacted on 000. Dedicated Emergency Services routes & access points with a clear path for fast access, traffic controllers are handling access points.	2	2	L	Medical Manager Event Organiser Traffic Control
13	Staff Fatigue	Short Term Injury Delay	2	2	L	TPP Fatigue Management Plan implemented. Team leader(s) is to monitor staff and ensure fatigued staff is replaced. The rostering manager to ensure rosters are compliant with FMP.	2	2	L	Roster Manager Team leader Traffic Control
SITE RISKS										
14	Slip/Trip/Falls	Short Term Injury Long Term Injury	3	2	M	Site inspection to identify hazards & remove/treat same in your immediate work area only. Traffic control are to monitor areas and advise of any spills/potential slip hazards that may exist. Ensure pathways are lit sufficiently on significant pedestrian routes.	2	2	L	Event Organiser First Aid Traffic Control

						Install light towers in poorly lit areas.				
MISCELLANEOUS										
15	Communication Failure	Death Short Term Injury Financial Reputation	3	2	M	Consultation with stakeholders ensures that everyone is aware of correct procedures in case of loss of communication. Monitor/report any issues with radios. Radio check on commencement of shift. Contract only reliable radio supplier with a proven record. Backup radios used to replace any faulty radios. Use of Instant messenger apps as backup (i.e.. WhatsApp), use encryption where possible.	2	2	L	Telecommunications Provider Two Way Radio Provider Event Organiser Emergency Services

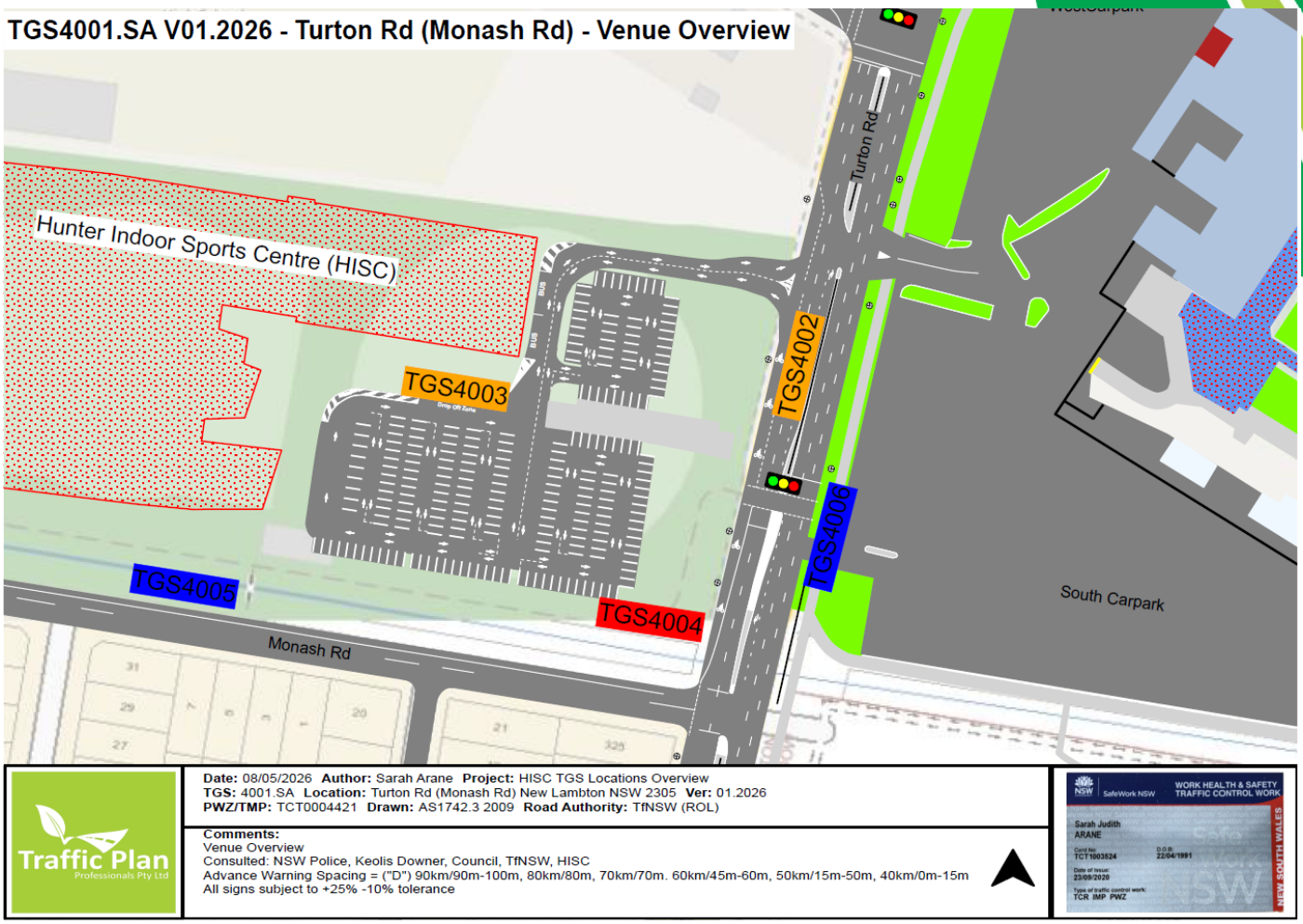
15 EVENT DETAILS

The table below will be filled out for each event when submitting the TMP with the Council and Traffic for NSW applications.

Event Name	
Event Date(s)	
Event Time(s)	
Gates Open Times	
Bump In/Out Date(s) & Time(s)	
Road Closure Dates/Times(s)	
Venue(s)	Hunter Indoor Sports Centre
Event Pax	1100-1700 (Low Impact Events) or 1700-2500 (Medium Impact Events)
Demographic	
Event Contact	**General Contact:** E: admin@newcastlebasketball.com.au P: 02 4961 3185 **Events and Operations:** E: ian.mckensey@newcastlebasketball.com.au M: 0432 111 382
Notes	

16 VENUE MAP(S)

The venue map below provides an overview of the event boundaries regarding the associated road closures, control points and Parking for the event.



17 TRAFFIC MANAGEMENT

Traffic management is regulated by implementing tailored TGSs designed to meet event-specific operations during the event and the impacts of other events. As a result, this plan is prepared to safely control traffic with minimal impact on non-event stakeholders, as recommended in the TfNSW Guide to Traffic and Transport Management for Special Events.

The TfNSW Guide to Traffic and Transport Management for Special Events reads that a TGS be a Risk Management Plan for traffic in the risk management context. However, a TGS shall not be an acceptable form of risk management, and the event organiser should seek an independent risk review.

At its core, the prepared TGSs implement various short-term road closures to manage vehicular and pedestrian flow within the precinct safely.

17.1 Traffic Guidance Schemes (TGS)

Traffic Guidance Schemes **TGS4001.SA-TGS4006.SA** (see appendix) provide the control measures for regulating traffic management in conjunction with pedestrian interaction in Scenarios 1b, 1c, 1d.

17.2 Traffic Control Points, Road and Lane Closures and Detours

Short-term lane closures and control points will be implemented at the following location(s) during scenario 1c, 1d and Scenario 2d conditions.

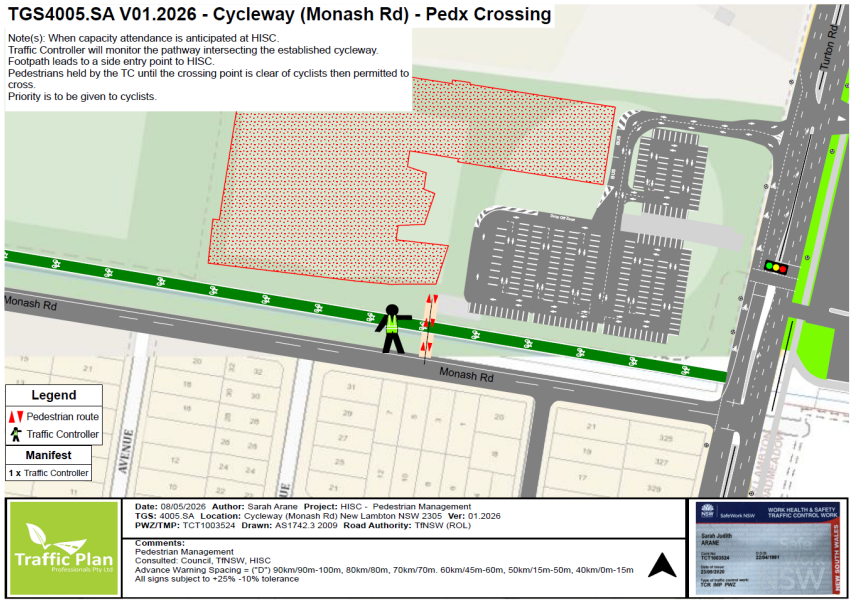
Traffic Control Points

TGS	Road (Intersection or Location)	Road Authority	Timings	Control	Notes
4002	Turton Rd (HISC)	TfNSW (ROL)	4 hours pre-event to 2 hours post-event	TC, Advance Warning Signage	TC and signage to advise of limited parking.

17.3 Pedestrian Ingress and Egress

Pedestrian access will remain unrestricted under all Scenario 1 a-c event conditions at HISC (up to 1700 patrons), as the volume of pedestrian traffic for ingress and egress to the venue is minimal and does not warrant additional control measures.

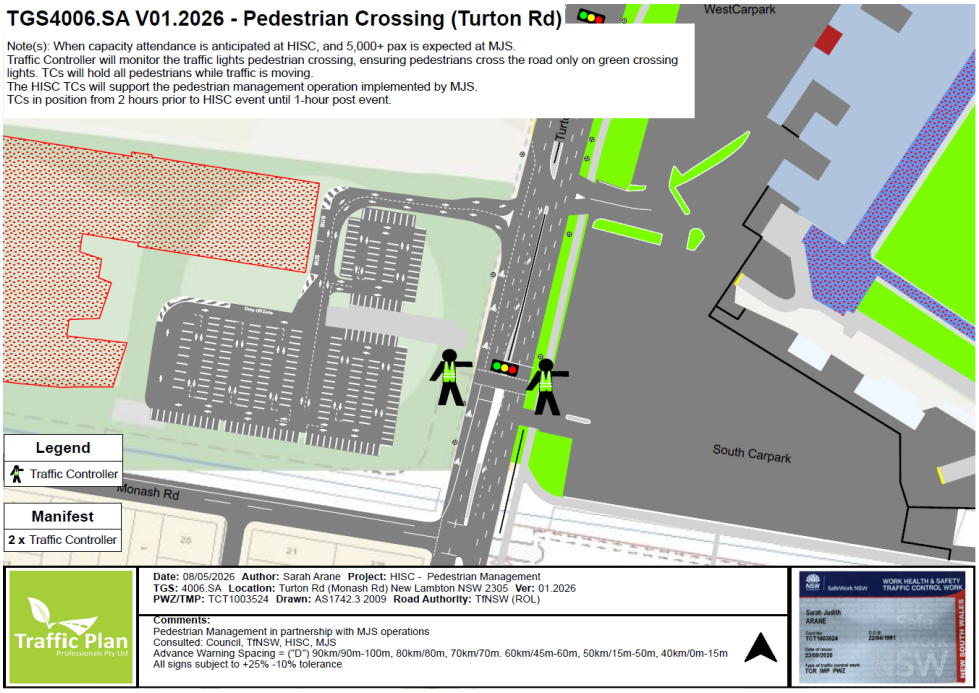
Under Scenario 1d attendee volumes of between 1700 and 2500 patrons, TGS4005.SA will be implemented with a Traffic Controller assisting with pedestrian management at the cycleway crossing point on the Monash Rd side entrance.



During Scenario 2e, 2f and 2g conditions, multi-venue events at the HISC and MJS, where a significant volume of pedestrian traffic is expected to be crossing Turton Rd in either direction, appropriate pedestrian and traffic management protocols will be implemented to ensure safe and efficient movement of crowds in and around the precinct.

To support the additional pedestrian volumes contributed by HISC during Scenario 2e, 2f and 2g conditions, additional traffic controllers will be engaged by HISC to assist at the pedestrian traffic lights on Turton Rd. As per TGS4006.SA, traffic controllers will manage pedestrians crossing the road to ensure patrons adhere to the traffic lights.

These pedestrian controllers will be operating as per TGS4006.SA in accompaniment to any pedestrian operations that may be undertaken by MJS as per the relevant MJS TMP conditions implemented (refer Section 7 matrix).



17.4 User-Paid Policing

At the time of this traffic assessment, User Paid Police will not be required for HISC events.

17.5 Vehicle Emergency Access

In the case of an emergency, vehicle access entry/exit points shall be in the following locations.

Location	Notes
Turton Rd (Main entrance)	Entrance will be under traffic control; all emergency vehicles are permitted through

17.6 Public Transport

Public transport services will not be impacted by Low to Medium-impact events at HISC, but these services may find heavier than usual use.

Patrons attending HISC have access to regular bus services, with the nearest bus stops located on Turton Road and Lambton Road. Bus routes 13, 23, 25, 26, and 27 provide convenient access to the area, running services toward the Stadium and the surrounding precinct.

KDH will be notified on a regular basis of the upcoming event schedules and should a need for greater capacity be identified this will be addressed on an as-needs basis.

However, it should be noted that sporting and concert events held at McDonald Jones Stadium can affect local bus routes, with additional route services, shuttles, and Park and Ride buses implemented during major events. Under these Scenario 2 conditions, consultation with McDonald Jones Stadium and Keolis Downer will be undertaken to minimise any potential impacts on the non-event community.

The Newcastle Transport Network Map highlights different bus routes available to patrons. For further information, visit https://newcastletransport.info/

17.7 Event Parking

Onsite parking is available with approximately 231 parking spaces inclusive of seven Accessible Parking spaces. A drop-off zone will operate within the carpark.

During Scenario 1c and 1d Low and Medium-impact events, and all Scenario 2 event conditions, onsite parking operations will be managed by Traffic Controllers for carpark access and drop-off zone management.

Spaces will be reserved for players and match officials, and once the carpark reaches capacity spectators will be directed to utilize the surrounding on-street and council car parking.

17.8 Street Parking

The nearby on-street parking has been assessed as sufficient for the requirements of a Scenario 1c and 1d events occurring at HISC and also when Scenario 2d patronage volumes are attending nearby venues, particularly when taking into consideration a percentage of eventgoers for any venue will opt to use public transport, rideshare, drop off, or walk/bike arrival options.

Below is a map of identified parking zones within a 1.5km walk of the HISC site (see Appendix 10). This map deliberately excludes the McDonald Jones Stadium carpark, as well as street parking directly outside residences to ensure thorough assessment of alternative parking solutions.

In addition, a breakdown of each identified area with approximate number of car spaces and projected patron numbers based on a car occupancy of 1:3 is listed included in Appendix 11- Parking areas and vehicle calculations.

For Scenario 1c Low-impact events being held at HISC of up to 1700 patrons, if every single attendee was to arrive by car, the estimated parking spaces required is calculated to be 567 (based on 1 car per 3 attendees). This means an additional 336 offsite car spaces would need to be used.

For Scenario 1d Medium-Impact event conditions, up to 2500 patrons, the estimated number of parking spaces required is 834 (1 car per 3 attendees). An additional 603 offsite car spaces would need to be utilized.

As identified in Appendix 11, the on-street parking surrounding the proposed location provides more than the required number of spaces during a Scenario 1d event. These spaces are not weather-dependent.

Under Scenario 2 conditions, should an event be occurring at McDonald Jones Stadium concurrently to events at HISC, the MJS stadium carpark with a 900-vehicle capacity would be utilised by stadium patrons as would be expected under their normal operational conditions.

In Scenario 2e, at approx. 10,000 pax, a joint-venue shuttle bus service may be implemented in accordance with MJS TMP01- Low Impact Events.

Refer to section 17.11 for further details on proposed shared shuttle bus arrangements.

It is anticipated that the use of overflow parking sites such as Wanderers Oval, Richardson Park, and Newcastle Entertainment Centre would be considered during Scenario 2e, 2f and 2g.

In these scenarios, should these overflow parking areas be unable to be used due to inclement weather, the shuttle bus service will be promoted to attendees of the venues as an alternative transport option.

Refer also to the *Traffic Impact Assessment* – SECA Solutions (Appendix 6).

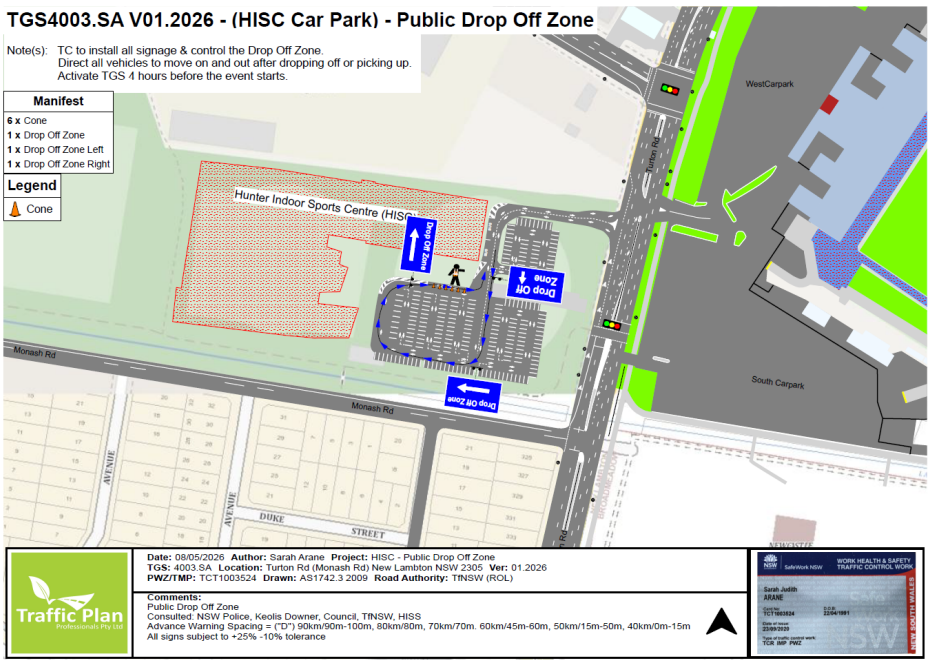
17.9 Rideshare Locations

Drop-off zones are available within the venue parking; these can be used as a ride-share solution.

17.10 Public Drop-Off/Pickup Zone.

Public drop-off and pick-up zones will be operational on event days, with dedicated areas provided within the venue's parking facilities.

The Table and TGS below outline the drop-off /pickup zone locations and operations.



TGS	Road (Intersection or Location)	Road Authority	Timings	Notes
4003	HISC Carpark (Turton Rd)	NA	4 hours before the event starts and operates until the event ends or zone is clear	TC to install Signage 4 hours before the event starts on event day and keep the zone clear for event drop-offs/pickups.

17.11 Shuttle Bus Services

Shuttle bus services for HISC only events (Scenario 1) will not be required due to the low number of patrons accessing the area.

In Scenario 2e, 2f, 2g conditions where the MJS Low-Impact TMP is activated and a crowd of over 10,000 attendees is expected at the stadium, a shuttle bus service is in operation.

Should a HISC event be occurring concurrently to MJS it is proposed that event-goers to the basketball stadium also make use of this service to alleviate some of the reliance on the on-street parking surrounding the two venues.

This joint-operation would be collaborated on a per-event basis, with any identified need for increases to bus numbers, or extended operating periods to be actioned.

In scenarios where HISC patrons are also encouraged to utilise the shuttle services, HISC would contribute to the planning, implementation and cost of this operation. Further planning regarding the finer details of these collaborations will be finalised at a later date, with these details not inside the scope of this TMP.

When a multi-venue shuttle service is in operation, HISC patrons will be communicated with in advance of the availability of this transport option and the recommendation to make use of the service.

Per the MJS Low-Impact TMP, shuttle buses operating for the stadium will continue to use the Turton Rd frontage of HISC as a shuttle stop for loading/unloading attendees, with capacity for three buses to use this space.

17.12 Accessible Parking

Accessible Parking is available onsite at HISC, with seven signposted spaces available on a first-come first served basis.

17.13 Regulatory Signage

No additional regulatory signage will be required during Scenario 1c or 1d event conditions at HISC.

17.14 Speed Zones

No temporary speed reduction zones will be implemented for Scenario 1c or 1d events.

17.15 Lighting Towers

No additional light lowers are required during events at HISC, with the proposed permanent lighting strategy providing sufficient lighting for safe pedestrian movement.

17.16 Communications

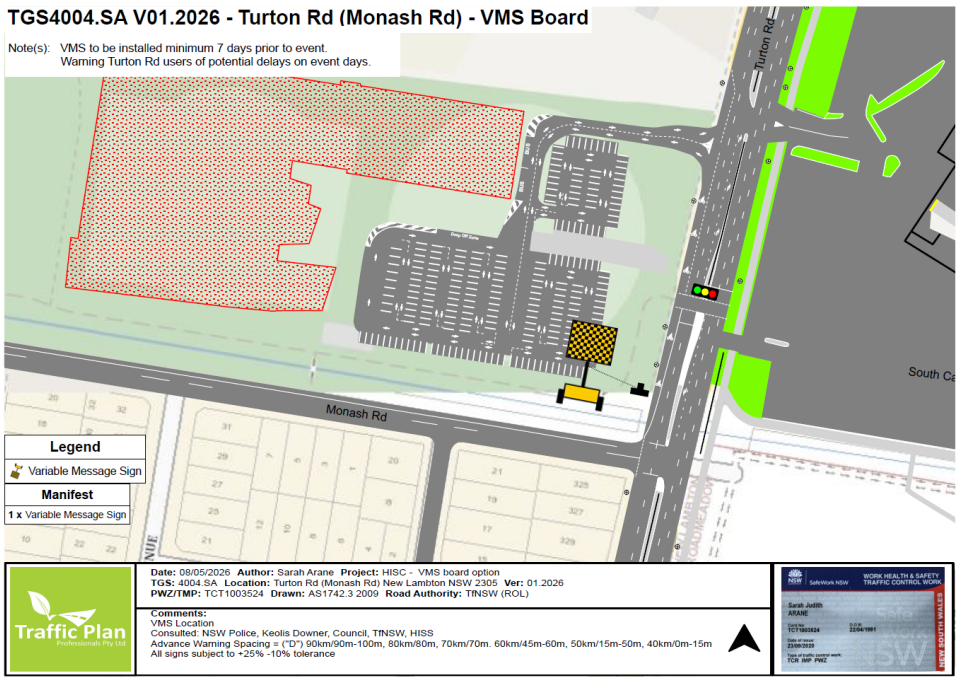
To effectively capture HISC patronage and communicate changes to parking operations, the implementation of a dedicated communication plan is required.

Refer to the attached*: (Draft) Hunter Indoor Sports Stadium: Event-Day Communications Plan* as appendices to this document.

17.17 Variable Message Signs

VMS (Variable Message Sign) boards may be considered on a per-event basis for advance warning or notification of changed traffic conditions for Medium-impact events at HISC.

A VMS board located directly outside the venue may be considered for use in the 7 days prior to a Scenario 1d Medium-impact event to warn Turton Rd users of increased traffic expected. Refer to TGS4004.SA for location.



However, it should be noted that McDonald Jones Stadium regularly uses VMS boards for standalone concerts and sporting events.

Should Scenario 2 event conditions occur, in consultation with the Stadium, a joint VMS board strategy is proposed to be developed, where these VMS boards may also be utilised by HISC to provide additional pre-event notice if deemed necessary.

This strategy involves combined VMS messaging on MJS VMS boards that are in positions that will have the most impact in pre-warning patrons of upcoming multi-venue events.

The messaging will be determined on a per-event basis in collaboration between the venues.

In the event that a combined VMS strategy is implemented, HISC would assist in the organisation and contribute to the operating costs of these. Further planning regarding the finer details of these collaborations will be finalised at a later date, with these details not inside the scope of this TMP.

17.18 Public Notifications

Due to the impact on surrounding residents during Medium-impact events at HISC (Scenario 1d), resident notification letters may be recommended as part of the pre-event strategy. This may be determined on a per-event basis following consideration of the impact of the event based on the time of day, type of crowd and other factors.

As reviewed in the *Traffic Impact Assessment – SECA Solution V08-February 2026*.

18 CONSULTATION AND CONTACTS

The list below is the practitioners consulted as document owners, stakeholders, or approval authorities for this document.

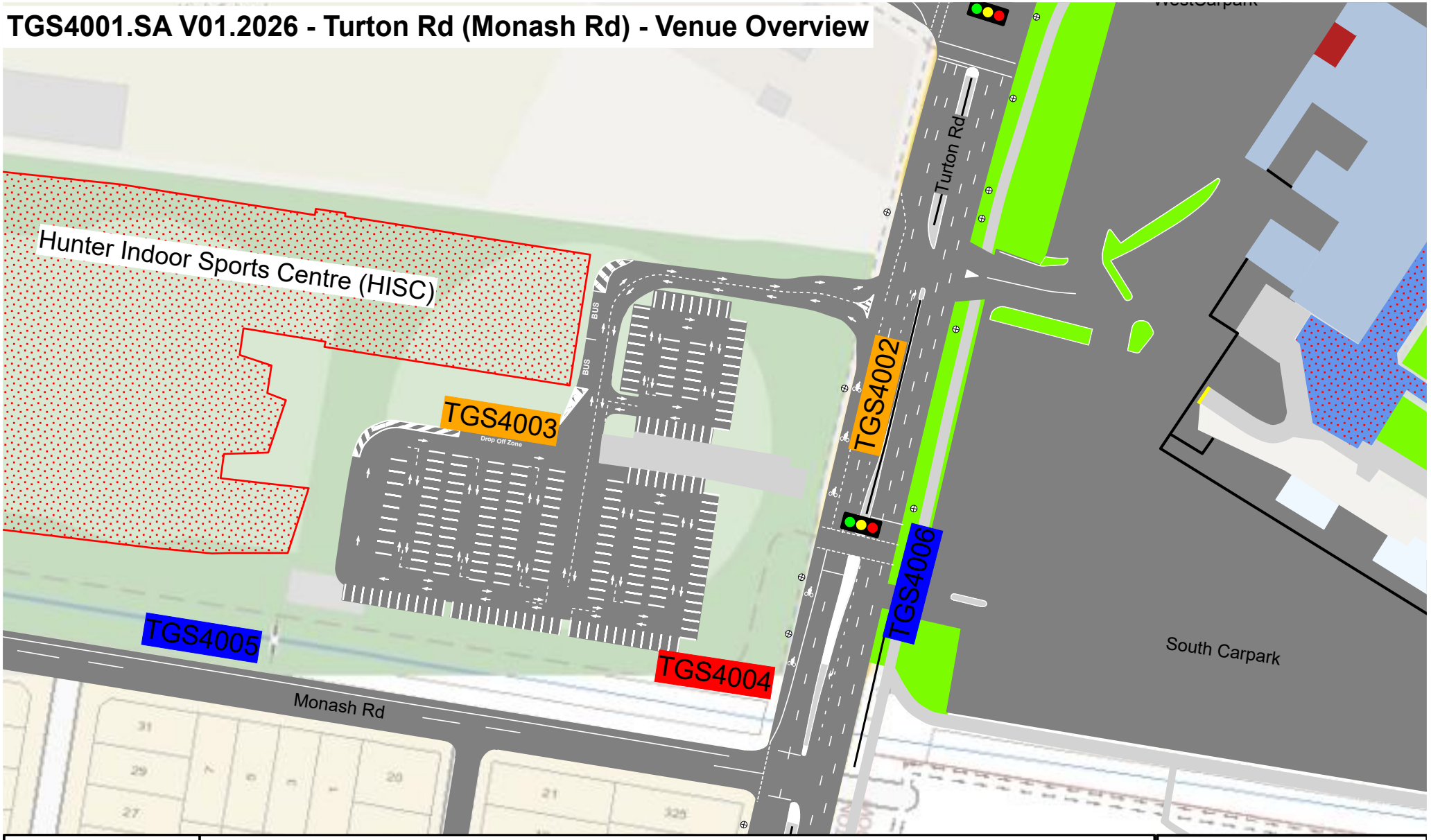
NAME	ORGANISATION	ROLE	PHONE
Sarah Arane	Traffic Plan Professionals Pty Ltd	Planning and Operations Officer, Projects & Events Division	0402 003 355
Ryan Tranter	City of Newcastle (Council)	Manager - Transport & Regulation	0478 879 330
Dean Mantle	Venues NSW (Stadium)	Venue Manager	0466 858 592
Luke Daniels	Venues NSW (NEC)	General Manager	0439 332 424
Rosie Sutcliffe	(Urbis)	Project Statutory Planner	0407 294 925
Simon Haire	(BNSW)	Project Director and Client Representative	0428 600 657
Amy Saper	Keolis Downer	Network Coordinator and Planner	0429 435 957
Mark Reece	NSW Police	Traffic Services	(02) 4926 6534
Aaron Visser	City of Newcastle (Council)	Senior Traffic Engineer	(02) 4974 1412

19 APPENDIX

The appendices below form part of the TMP and should be read in part of/or whole when reviewing the above information.

#	Document Name
1	TGS4001.SA V01.2026 - Turton Rd (Monash Rd) - Venue Overview
2	TGS4002.DFT V01.2025 - Turton Rd (Monash Rd) - Controlled Car Park Access
3	TGS4003.DFT V01.2025 - (HISC Car Park) - Public Drop Off Zone
4	TGS4004.SA V01.2025- Turton Rd (HISC Car Park) - VMS Location
5	TGS4005.SA V01.2026- Cycleway (Monash Rd) Pedx Crossing
6	TGS4006.SA V01.2026- Pedestrian Crossing (Turton Rd)
7	Traffic Event Management Plan – SECA Solutions – May 2025
8	Traffic Impact Assessment – SECA Solutions – May 2025
9	Hunter_Indoor_Sports Centre_Communications_Plan – V01 - DRAFT
10	Identified on street and public car parks in surrounding area.
11	Parking areas and vehicle calculations

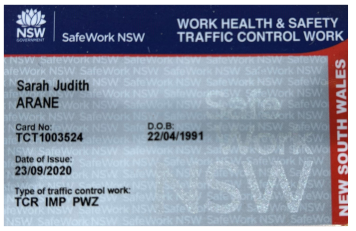
TGS4001.SA V01.2026 - Turton Rd (Monash Rd) - Venue Overview



Traffic Plan Professionals Pty Ltd

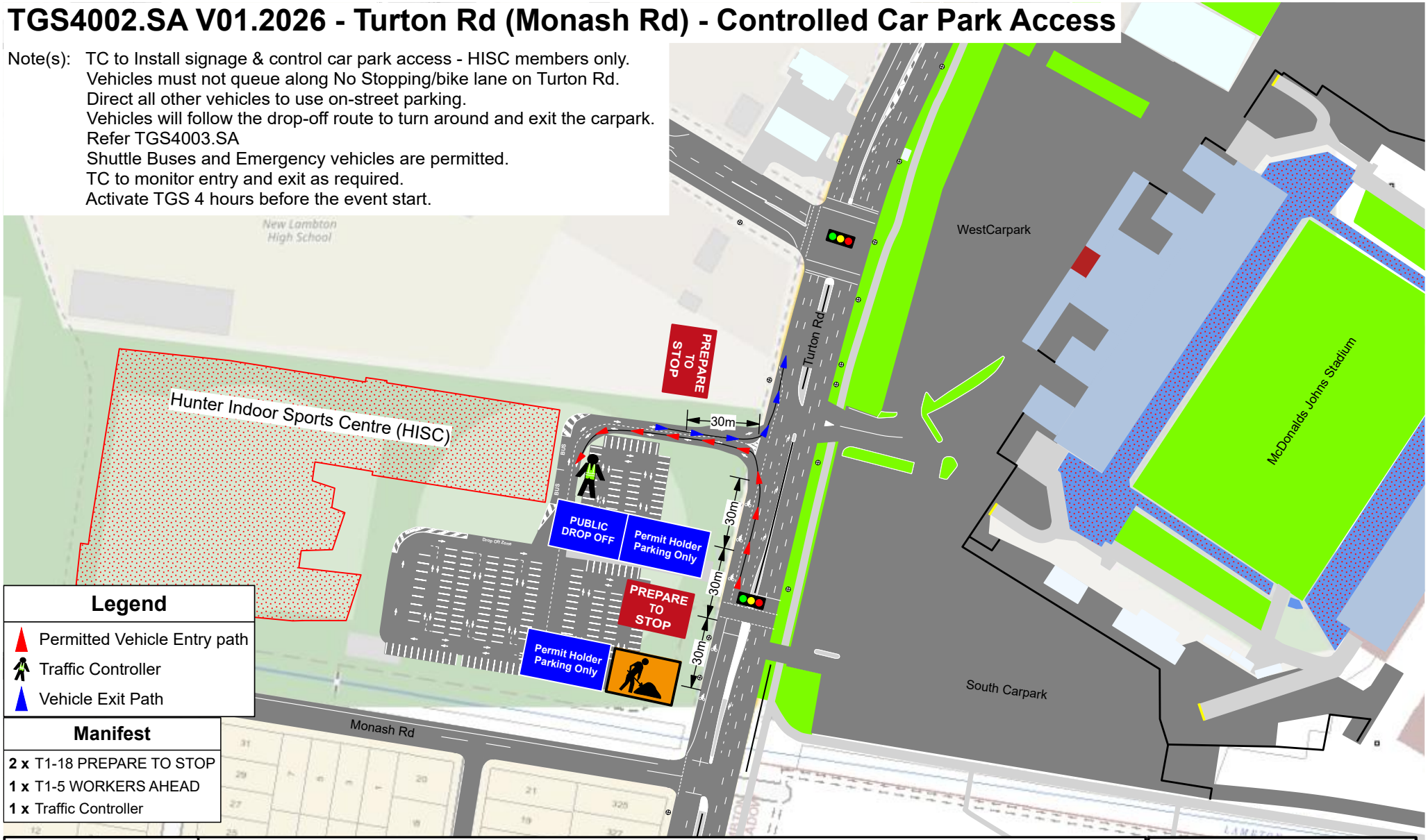
Date: 08/05/2026 **Author:** Sarah Arane **Project:** HISC TGS Locations Overview
TGS: 4001.SA **Location:** Turton Rd (Monash Rd) New Lambton NSW 2305 **Ver:** 01.2026
PWZ/TMP: TCT0004421 **Drawn:** AS1742.3 2009 **Road Authority:** TfNSW (ROL)

Comments:
Venue Overview
Consulted: NSW Police, Keolis Downer, Council, TfNSW, HISC
Advance Warning Spacing = ("D") 90km/90m-100m, 80km/80m, 70km/70m. 60km/45m-60m, 50km/15m-50m, 40km/0m-15m
All signs subject to +25% -10% tolerance



TGS4002.SA V01.2026 - Turton Rd (Monash Rd) - Controlled Car Park Access

Note(s): TC to Install signage & control car park access - HISC members only.
Vehicles must not queue along No Stopping/bike lane on Turton Rd.
Direct all other vehicles to use on-street parking.
Vehicles will follow the drop-off route to turn around and exit the carpark.
Refer TGS4003.SA
Shuttle Buses and Emergency vehicles are permitted.
TC to monitor entry and exit as required.
Activate TGS 4 hours before the event start.



Legend

- Permitted Vehicle Entry path
- Traffic Controller
- Vehicle Exit Path

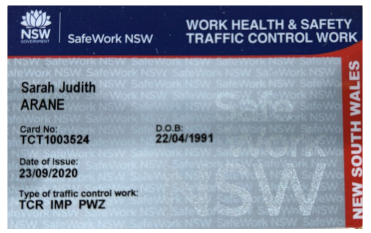
Manifest

2 x T1-18 PREPARE TO STOP
1 x T1-5 WORKERS AHEAD
1 x Traffic Controller

Traffic Plan Professionals Pty Ltd

Date: 08/05/2026 **Author:** Sarah Arane **Project:** HISC - Controlled Access Parking
TGS: 4002.SA **Location:** Turton Rd (Monash Rd) New Lambton NSW 2305 **Ver:** 01.2025
PWZ/TMP: TCT1003524 **Drawn:** AS1742.3 2009 **Road Authority:** TfNSW (ROL)

Comments:
Car Park Controlled Access Only
Consulted: NSW Police, Keolis Downer, Council, TfNSW, HISS
Advance Warning Spacing = ("D") 90km/90m-100m, 80km/80m, 70km/70m. 60km/45m-60m, 50km/15m-50m, 40km/0m-15m
All signs subject to +25% -10% tolerance



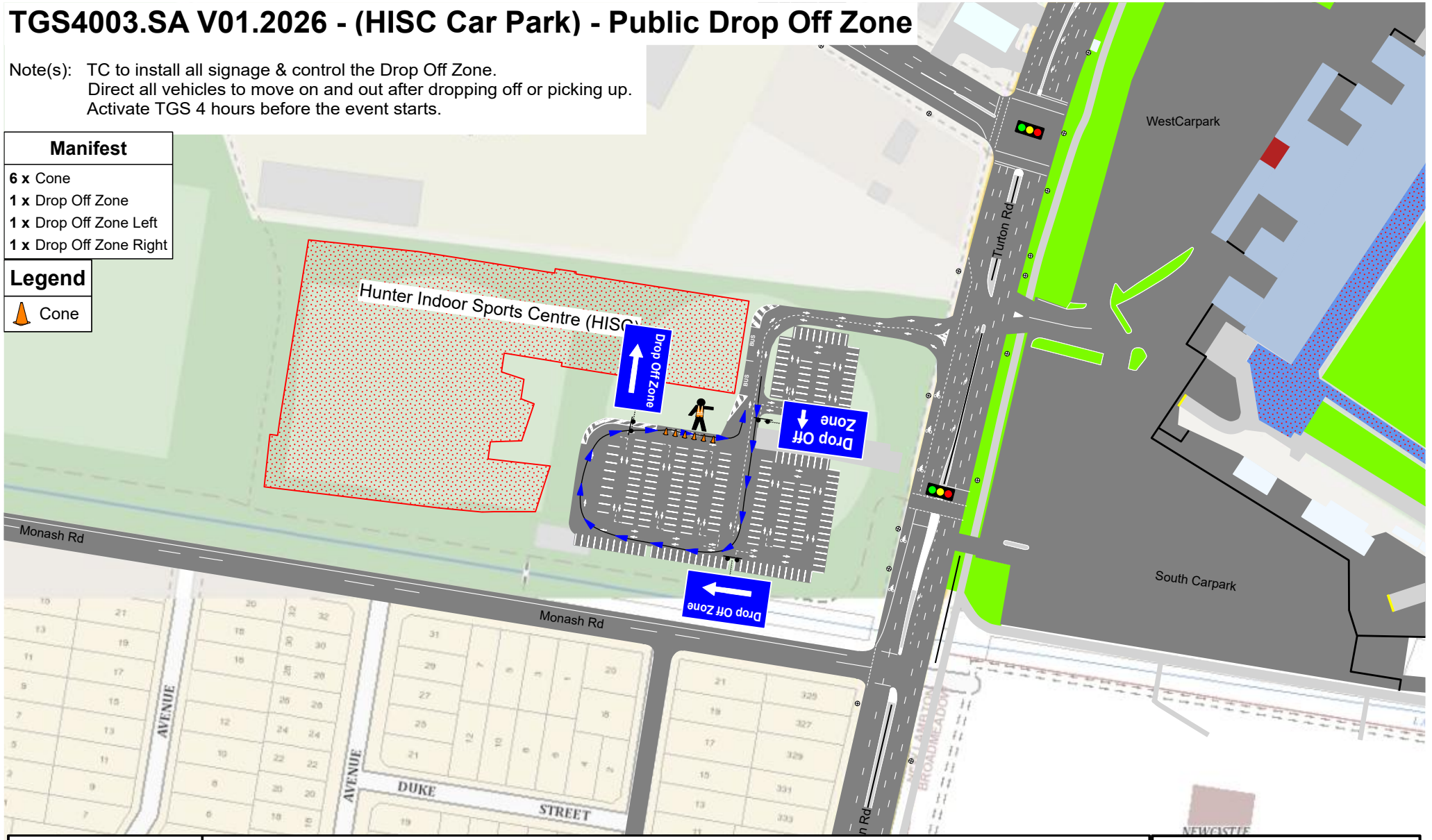
TGS4003.SA V01.2026 - (HISC Car Park) - Public Drop Off Zone

Note(s): TC to install all signage & control the Drop Off Zone.
Direct all vehicles to move on and out after dropping off or picking up.
Activate TGS 4 hours before the event starts.

Manifest
6 x Cone
1 x Drop Off Zone
1 x Drop Off Zone Left
1 x Drop Off Zone Right

Legend

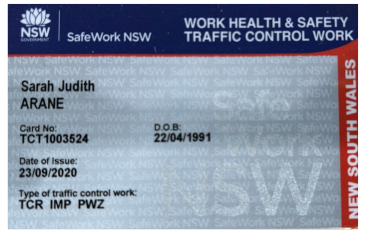
Cone



Date: 08/05/2026 **Author:** Sarah Arane **Project:** HISC - Public Drop Off Zone
TGS: 4003.SA **Location:** Turton Rd (Monash Rd) New Lambton NSW 2305 **Ver:** 01.2026
PWZ/TMP: TCT1003524 **Drawn:** AS1742.3 2009 **Road Authority:** TfNSW (ROL)

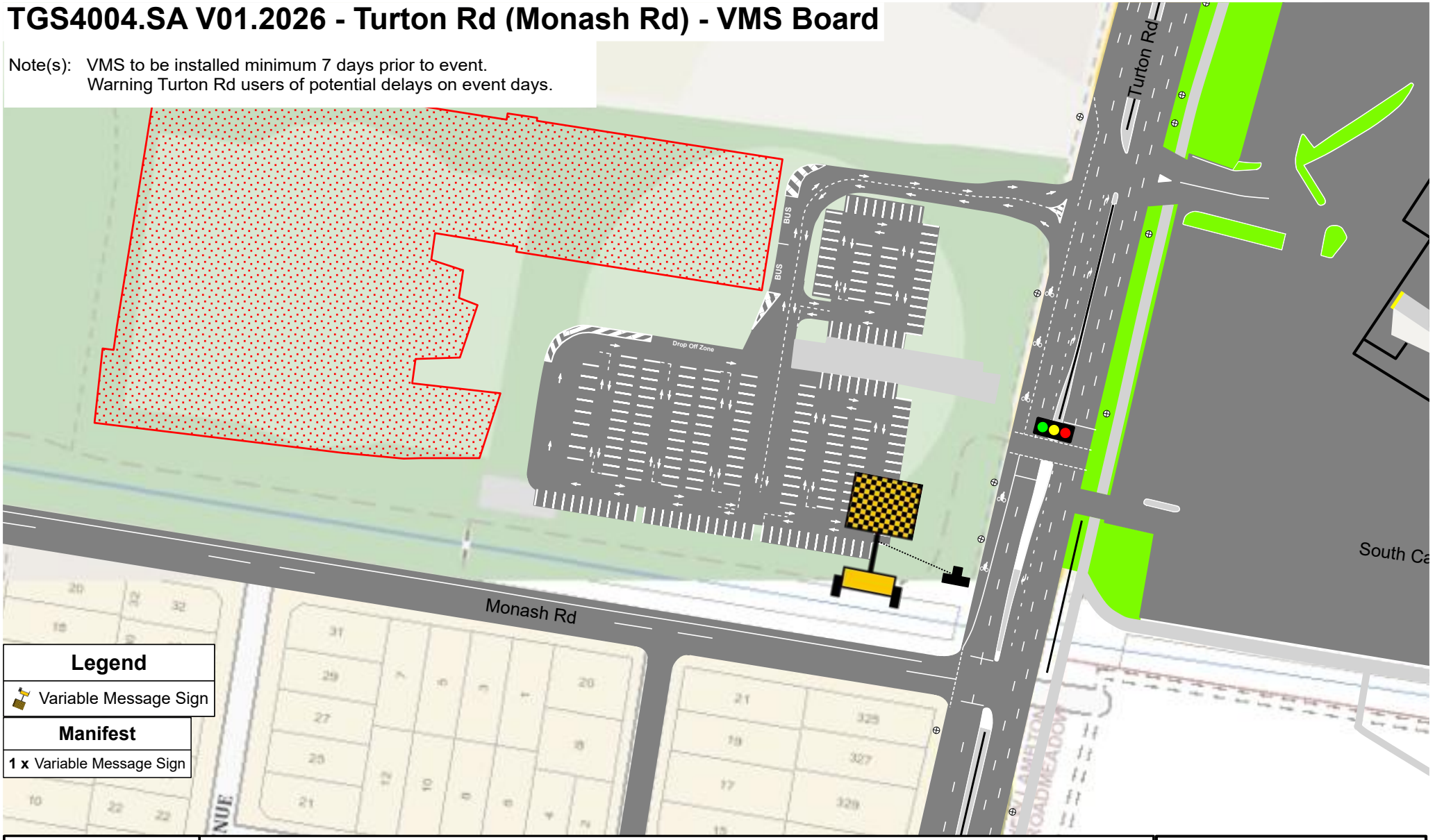
Comments:
Public Drop Off Zone
Consulted: NSW Police, Keolis Downer, Council, TfNSW, HISS
Advance Warning Spacing = ("D") 90km/90m-100m, 80km/80m, 70km/70m. 60km/45m-60m, 50km/15m-50m, 40km/0m-15m
All signs subject to +25% -10% tolerance

Traffic Plan Professionals Pty Ltd



TGS4004.SA V01.2026 - Turton Rd (Monash Rd) - VMS Board

Note(s): VMS to be installed minimum 7 days prior to event.
Warning Turton Rd users of potential delays on event days.



Legend

Variable Message Sign

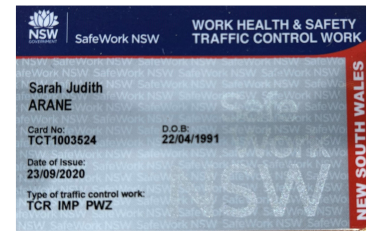
Manifest

1 x Variable Message Sign

Traffic Plan Professionals Pty Ltd

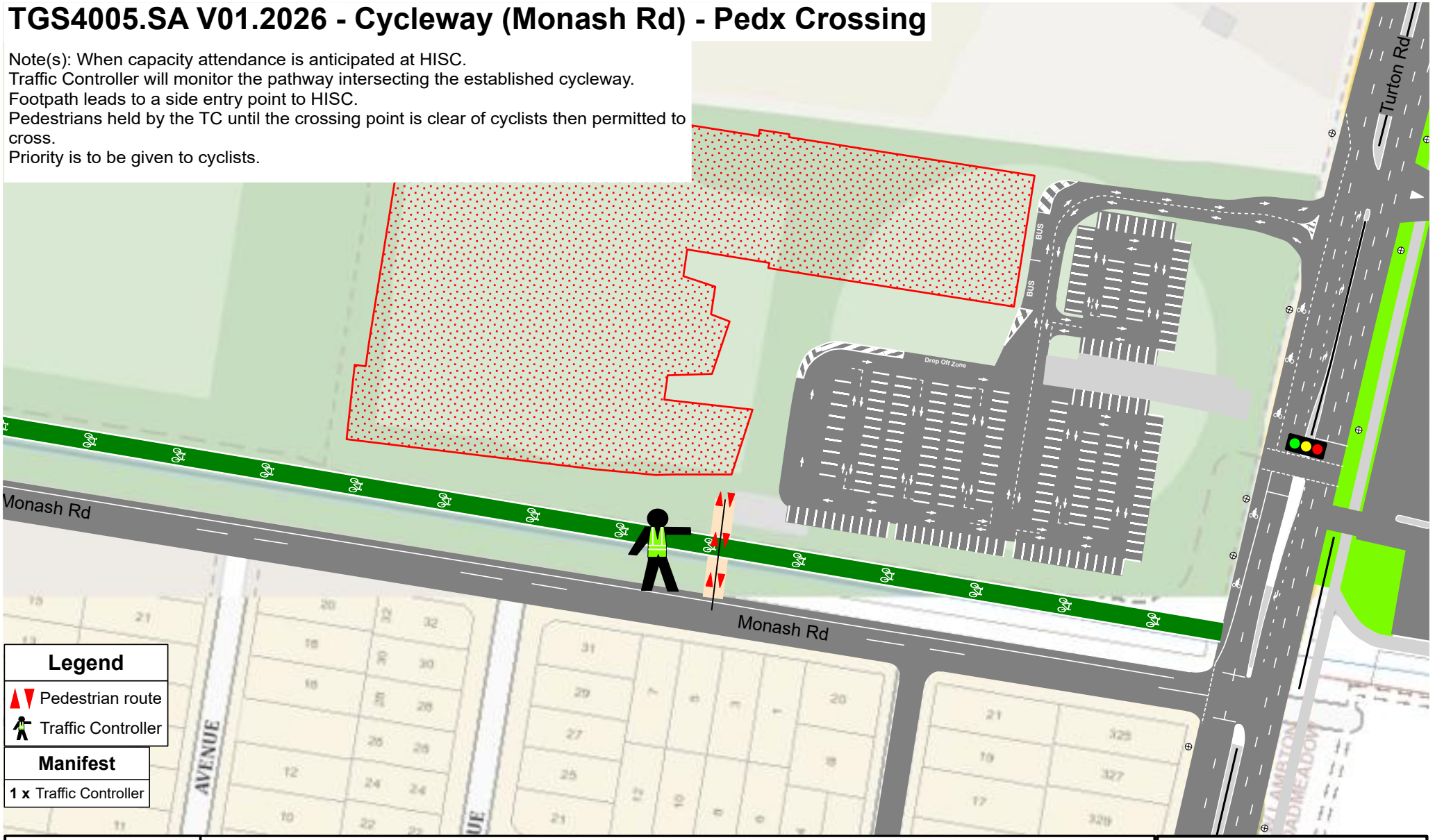
Date: 08/05/2026 **Author:** Sarah Arane **Project:** HISC - VMS board option
TGS: 4004.SA **Location:** Turton Rd (Monash Rd) New Lambton NSW 2305 **Ver:** 01.2026
PWZ/TMP: TCT1003524 **Drawn:** AS1742.3 2009 **Road Authority:** TfNSW (ROL)

Comments:
VMS Location
Consulted: NSW Police, Keolis Downer, Council, TfNSW, HISS
Advance Warning Spacing = ("D") 90km/90m-100m, 80km/80m, 70km/70m. 60km/45m-60m, 50km/15m-50m, 40km/0m-15m
All signs subject to +25% -10% tolerance



TGS4005.SA V01.2026 - Cycleway (Monash Rd) - Pedx Crossing

Note(s): When capacity attendance is anticipated at HISC.
Traffic Controller will monitor the pathway intersecting the established cycleway.
Footpath leads to a side entry point to HISC.
Pedestrians held by the TC until the crossing point is clear of cyclists then permitted to cross.
Priority is to be given to cyclists.



Legend

- Pedestrian route
- Traffic Controller

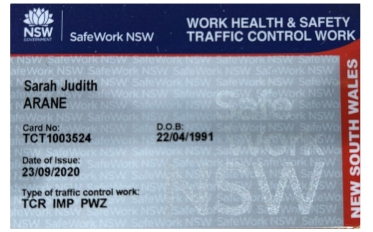
Manifest

1 x Traffic Controller

Traffic Plan Professionals Pty Ltd

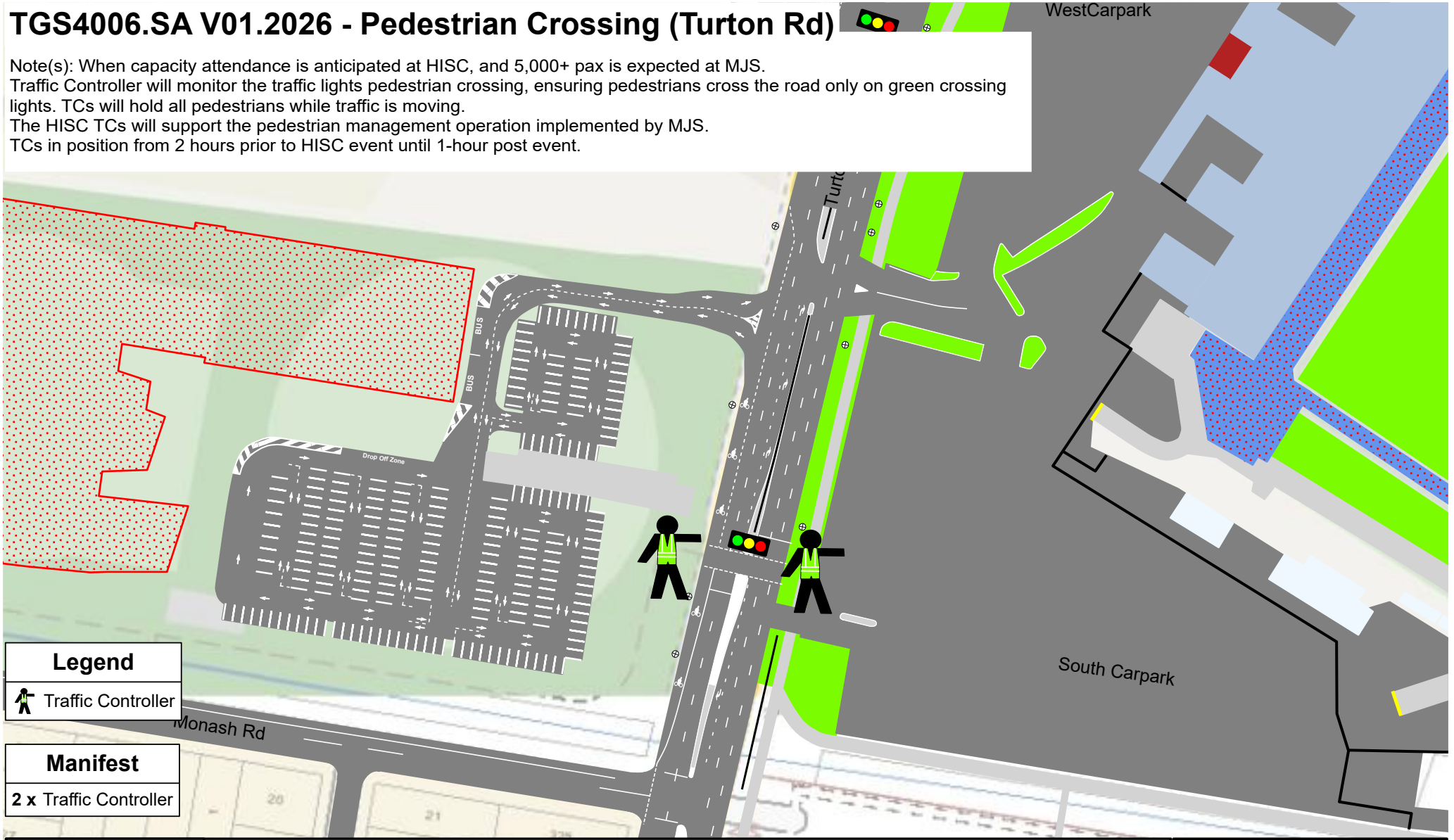
Date: 08/05/2026 **Author:** Sarah Arane **Project:** HISC - Pedestrian Management
TGS: 4005.SA **Location:** Cycleway (Monash Rd) New Lambton NSW 2305 **Ver:** 01.2026
PWZ/TMP: TCT1003524 **Drawn:** AS1742.3 2009 **Road Authority:** TfNSW (ROL)

Comments:
Pedestrian Management
Consulted: Council, TfNSW, HISC
Advance Warning Spacing = ("D") 90km/90m-100m, 80km/80m, 70km/70m. 60km/45m-60m, 50km/15m-50m, 40km/0m-15m
All signs subject to +25% -10% tolerance



TGS4006.SA V01.2026 - Pedestrian Crossing (Turton Rd)

Note(s): When capacity attendance is anticipated at HISC, and 5,000+ pax is expected at MJS.
Traffic Controller will monitor the traffic lights pedestrian crossing, ensuring pedestrians cross the road only on green crossing lights. TCs will hold all pedestrians while traffic is moving.
The HISC TCs will support the pedestrian management operation implemented by MJS.
TCs in position from 2 hours prior to HISC event until 1-hour post event.



Date: 08/05/2026 **Author:** Sarah Arane **Project:** HISC - Pedestrian Management
TGS: 4006.SA **Location:** Turton Rd (Monash Rd) New Lambton NSW 2305 **Ver:** 01.2026
PWZ/TMP: TCT1003524 **Drawn:** AS1742.3 2009 **Road Authority:** TfNSW (ROL)

Comments:
Pedestrian Management in partnership with MJS operations
Consulted: Council, TfNSW, HISC, MJS
Advance Warning Spacing = ("D") 90km/90m-100m, 80km/80m, 70km/70m. 60km/45m-60m, 50km/15m-50m, 40km/0m-15m
All signs subject to +25% -10% tolerance

Traffic Plan Professionals Pty Ltd

NSW SafeWork NSW — WORK HEALTH & SAFETY TRAFFIC CONTROL WORK
Sarah Judith ARANE
Card No: TCT1003524
D.O.B: 22/04/1991
Date of Issue: 23/09/2020
Type of traffic control work: TCR IMP PWZ
NEW SOUTH WALES

Hunter Indoor Sports Centre

Newcastle Basketball Association

Traffic Event Management Plan

May 2026

SECA solution

Hunter Indoor Sports Centre

Basketball Association of Newcastle

Traffic Impact Assessment

May 2026

SECA solution

Hunter Indoor Sports Centre, Turton Road, New Lambton

Traffic Impact Assessment

Author: Cathy Thomas/Sean Morgan

Client: Basketball Association of Newcastle Ltd

Issue: Ver08

Reference: P2614

14 May 2026

Quality Review and Document History

Version	Date	Description	Prepared By	Reviewed and Approved By
Ver01	11/3/24	Draft	C.Thomas	S.Morgan
Ver02	24/3/24	Draft	C.Thomas	S.Morgan
Ver03	18/5/24	Final	C.Thomas	S.Morgan
Ver04	19/8/24	Updated plan	C.Thomas	S.Morgan
Ver05	22/5/25	Draft - Response to Submissions	C.Thomas	S.Morgan
Ver06	30/5/25	Final-Response to Submissions	C.Thomas	S.Morgan
Ver07.2	12/4/26	Updated in response to RFIs	C.Thomas	M. Palamara
Ver08	12/5/26	Final in response to RFIs	C.Thomas	M.Palamara

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Contents

1 Introduction

Background

Seca Solution Pty Ltd has been commissioned by Basketball Association of Newcastle Limited (BANL) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (**SSD- 65595459**) for the proposed Hunter Indoor Sport Centre with courts, indoor stadium, amenities and associated civil and landscaping works, at 2 Monash Road and 24 Wallarah Road, New Lambton.

Description of the Site and Locality

The site is located at 2 Monash Road and 24 Wallarah Road, New Lambton, within the Newcastle local government area (LGA). The site comprises multiple parcels of land and is legally described as:

- Lot 2380 DP755247
- Lot 2379 DP755247
- Lot 2378 DP755247
- Lot 2377 DP755247
- Lot 1 DP1304081

The project area also includes the land on which the existing amenities block is located.

The site is identified in the figure below.

Figure 1-1 Subject Site

The plans for the development allow for a staged development incorporating a mixture of nine courts, a show court, administration office and commercial tenancies to provide ancillary support services. At grade parking will be provided on the site with all vehicle access from Turton Road (left in left out only).

Traffic modelling has been undertaken by Bitzios Consulting in response to requests by Transport for NSW (TfNSW) and in response to the SEARs issued for the project.

Seca Solution has collected current traffic data at the intersection of Turton Road and Monash Road in the vicinity of the site and have observed the traffic operations in the locality of the site during peak periods.

1.1 Scope of Report

This traffic impact assessment supports the Response to Submissions (RTS) and Amendment Report for State Significant Development Application (SSD-65595459) for the proposed Hunter Indoor Sport Centre (HISC) at 2 Monash Road and 24 Wallarah Road, New Lambton. SSD-65595459 sought development consent for an indoor stadium, amenities and associated civil and landscaping works. The Amendment Report seeks changes to the original development proposal SSD-65595459. The key project amendments include moving the building footprint and carpark west, adding turfed open space near Turton Road, and shifting the access driveway south. The realigned pedestrian promenade within the carpark includes a bridge over the open space. The height at the south-eastern corner of the building will be increased to provide flexibility to use the upper level of the building for gymnastics and other activities. There are also minor internal reconfigurations to fit the revised footprint. Within the public domain works include widening the Turton Road footpath, adding pedestrian safety fencing, and retaining the existing cycle/pathway on the southeastern corner of the site. The landscaping and public domain changes mean that four trees on the Turton Road frontage (previously proposed to be removed) can now be retained. On the southern edge of the site, landscaping elements have been removed. Space is provided for the future expansion of pedestrian/cycle route along this corridor (works to be delivered by others). The active recreation area, including a half basketball court, has been deleted from the proposal. Development consent is sought for the entire proposal, with the flexibility to deliver the project in two construction and operational stages.

The scope of this report is to review and assess the external traffic arrangements and impacts for the proposed development, the operation of the proposed access points, internal vehicle circulation and the suitability of parking.

A Green Travel Plan and Event Management Plan have been prepared in conjunction with this report.

1.2 Issues and Objectives of the study

The issues relative to the proposal are:

- Assess the additional parking requirements generated by the proposed development;
- Review the access arrangements for the development;
- Review the service arrangement for the development;
- Assess any other transport impacts associated with the development; and
- Consider the impacts of the daily operations whilst taking into account local major events

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required as part of the development.

1.3 Planning Context

In preparing this document, the following guides and publications were used:

- Guide to Traffic Management Part 12, Austroads 2020
- The Guide to Traffic Generating Developments published by TfNSW, Version 2.2 Dated October 2002;
- RMS TDT 2013/04 “Update Traffic surveys August 2013”.
- SEPP Transport and Infrastructure 2021
- Newcastle City Council Development Control Plan 2023 (Dated 1/3/2024)

- Australian / New Zealand Standard – Parking Facilities Part 1 : off-street car parking (AS2890.1:2004);

1.4 SEARs

The following SEARs have been addressed in this report.

SEARS Requirement	Section
an analysis of the existing transport network, including the road hierarchy and any pedestrian, bicycle or public transport infrastructure, current daily and peak hour vehicle movements, and existing performance levels of nearby intersections.	Existing Situation Sec 2.3-2.6 Plus Bitzios Modelling Report (Appendix D)
details of the proposed development, including pedestrian and vehicular access arrangements (including swept path analysis of the largest vehicle and height clearances), parking arrangements and rates (including bicycle and end-of-trip facilities), drop-off/pick-upzone(s) and bus bays (if applicable), and provisions for servicing and loading/unloading	Chapter 3 The Development Chapter 5 Transportation Analysis
consideration of the traffic impacts on existing and proposed intersections including Turton Road/Griffiths Road, Turton Road/Young Road and Turton Road/Lambton Road	Sec 5.2 Traffic Impact Plus Bitzios Modelling Report (Appendix D)
analysis of the impacts of the proposed development (including justification for the methodology used), including predicted modal split, a forecast of additional daily and peak hour multimodal network flows as a result of the development (using industry standard modelling) and peak movements during events (if relevant), identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cyclist conflict) and any cumulative impact from surrounding approved developments.	Chapter 5 Transportation Analysis Plus Bitzios Modelling Report (Appendix D)
measures to mitigate any traffic impacts, including details of any new or upgraded infrastructure to achieve acceptable performance and safety, and the timing, viability and mechanisms of delivery (including proposed arrangements with local councils or government agencies) of any infrastructure improvements in accordance with relevant standards. explanation and justification of all inputs informing the proposed mitigation measures and conclusions	Appendix D Bitzios Modelling Report Chapter 6 Improvement Analysis
measures to promote sustainable travel choices for residents and employees such as connections into existing walking and cycling networks, minimising car parking provision, encouraging car share and public transport, providing adequate bicycle parking and high quality end-of-trip facilities, and implementing a Green Travel Plan	Green Travel Plan
include an Operation Management Plan inclusive of an Events Management Plan that details measures to be implemented during large events to mitigate traffic impacts, including parking and traffic controls. The plan should have regard to the existing Operational Management Plan for McDonald Jones Stadium and comprise measures to ensure large scale events do not coincide.	Event Traffic Management Plan
Matters raised by Transport for NSW at Appendix B	Refer Appendix B
Matters raised by Council at Appendix B	Refer Appendix C

1.5 Authority Requests for Information

The following requests for information have been addressed in this report. These matters were issued by DPHI following the exhibition of the Amended Project Report.

<table>
<tr><th>Agency</th><th>Matter</th><th>Item</th><th>Description</th><th>Response</th><th>Report Update</th></tr>
<tr><td>DPHI</td><td>Traffic</td><td>h)</td><td>Clarify how the parking rate of 3-4 patrons per vehicle for events was arrived at. Note that Council has used a lower per vehicle occupation rate in their assessment.</td><td>The car occupancy was provided as a range of 3 -4 people per vehicle based on our professional judgement. This was applied in the Hillsborough Basketball site TIA.

The Newcastle DCP nominates a rate of 1 space per 3 visitors/seats for entertainment and community centres, 1 space per 4 seats for Places of Worship, 1 space per 5 seats for a restaurant or café and merit based assessment for recreation facility.

The rate of 1 space per 3 patrons would represent a conservative rate with no site specific consideration including access to public transport, uber/taxi drop off, being dropped off by families or friends given the convenience of the facility within the centre of the Newcastle area and again for these larger events shared travel with groups including families attending together.

Car occupancy rates increase when parking is constrained as we would expect during these larger events, as does the use of alternate travel options. Similarly higher car occupancy occurs when events are licensed eg horse racing events and concerts.</td><td>To provide a robust assessment the updated Traffic Event Management Plan (EMP) and subsequent TMP have been developed applying a car occupancy rate of 1 space per 3 patrons.

This is included in the TIA Table 1-1 HISC Event Parking Demands and Supply</td></tr>
<tr><td>DPHI</td><td>Traffic</td><td>k)</td><td>Clearly articulate anticipated parking requirements for each event.</td><td></td><td>
<table>
<tr><th>Event</th><th>Attendees</th><th>Frequency</th></tr>
<tr><td>Friday Night</td><td><600 pax</td><td>Weekly</td></tr>
<tr><td>Waratah League</td><td>500-800 pax</td><td>Competition March – September.
Weekly games (Sat afternoon/Sunday)</td></tr>
<tr><td>NBL 1</td><td>690-1100 pax</td><td>April - August - majority of matches (approx. 14 per year)</td></tr>
<tr><td></td><td>1100-1700 pax*</td><td>April- August - infrequent (e.g. rival clashes or finals)</td></tr>
<tr><td>Full House Events</td><td>2500</td><td>Occasional – 1 or 2 per annum</td></tr>
</table>
* NSWBA Utilisation Model

<table>
<tr><th>Attendance</th><th>Parking Demands</th><th>On-site Parking</th><th>Monash Road</th><th>Other</th></tr>
<tr><td>1100</td><td>367</td><td>231</td><td>80+60</td><td>Nil</td></tr>
<tr><td>1700</td><td>567</td><td>231</td><td>80+60</td><td>196</td></tr>
<tr><td>2500</td><td>833</td><td>231</td><td>80+60</td><td>462</td></tr>
</table>
</td></tr>
</table>

Agency	Matter	Item	Description	Response	Report Updated
DPHI	Traffic	l)	For events, the TIA relies on access to informal public parking along Monash Road. Provide evidence of parking availability during peak periods, having regard to other events at McDonald Jones Stadium, the Newcastle Hockey Centre and regular local club events such as cricket or soccer in the vicinity of the site.	Events at HISC would consider the schedule of other major events in the precinct. Local cricket & soccer do not typically occur during the same time of the year and will be on weekends.	The EMP and TMP have determined that there are 6510 parking spaces available throughout the precinct which can allow for 19,530 pax across the various stadiums (allowing conservative car occupancy of 3 per vehicle).
DPHI	Traffic	m)	Following comments received from Venues NSW, update all documentation including the TIA and the Traffic Management Plan to remove references to the use of parking at McDonald Jones Stadium and provide an alternative solution for this loss.	Noted	TIA and EMP/TMP updated to suit
DPHI	Traffic	n)	During a large or high-impact event, the Traffic Management Plan also relies on parking at Richardson Park, Wanderers Oval and Newcastle Entertainment Centre. It is noted these areas cannot be used for parking in wet weather. How would this be managed? Department of Planning, Housing and Infrastructure		The EMP and TMP have been updated to include a map of identified alternative parking zones within a 1.5km walk of the HISC site. This map excludes the McDonald Jones Stadium carpark. The nearby on-street parking has been assessed as sufficient for events occurring at HISC with these spaces not weather-dependent.
TfNSW	Green Travel Plan	6	6. Green Travel Plan (GTP) a. Any GTP should include a Travel Access Guide (TAG) to promote implementation and encourage the use of the services and facilities provided. Reference can be made to the document – How To Create A Travel Access Guide. b. The reviewed GTP does not me include wayfinding signage for existing public transport hubs and distance/routes to those hubs.	It is recommended this be online on the HISC website. Further information on this can be included in the GTP	GTP updated Chapter 4. Given ongoing changes to wayfinding tools eg google maps, AI etc the development of a TAG at this point in time is considered premature. Instead a suitable online TAG will be developed as a condition of consent for OC.
Venues NSW		Item 4	Neither the Traffic and Accessibility Impact Assessment or Traffic Management Plan reference the number of overflow parking required in medium and high impact events. Recommendation: These reports be updated with required number of overflow parking for events.	19,530 pax across the various stadiums (allowing conservative car occupancy of 3 per vehicle).	A matrix of events that considers single use and simultaneous use event scenarios and identifies what traffic management controls are triggered in each instance. Traffic Plan Professionals (TPP) reviewed parking availability further afield outside of the immediate precinct. Street parking within the precinct is available for all users and cannot be quarantined for one operator. The TMPs address parking strategies to be deployed for different scenarios and involves collaboration with MJS to implement management controls for different sized events. Refer EMP and TIA Table 5-6

Agency	Matter	Item	Description	Response	Report Updated
Venues NSW		Item 5	While the updated Traffic and Accessibility Impact Assessment does mention the Broadmeadow Strategy, it does not include any specific road changes as a result of the adjacent planned Hunter Park Redevelopment works or changes in traffic levels resulting from that development. Recommendation: Reports specifically address increase in traffic volume as a result of the Broadmeadow Place Strategy and redevelopment of Hunter Park.	Advice from TfNSW informed the level of background growth for the future design year that was to be applied in the modelling undertaken by Bitzios. This Place Strategy is a matter for the government to undertake suitable strategic modelling for this precinct, updating as the strategy develops to mitigate impacts where appropriate. The future infrastructure currently identified is at concept level only at present with an extended design horizon (20+ years).	TIA (Sec 3.1) updated to provide comments regarding the future demands associated with the Broadmeadow Strategy.
Venues NSW			As a part of the construction works, lane closures and temporary construction methods are likely which will impact current Venues NSW operations. Recommendation: The Preliminary Construction Management Plan and Operational and Construction Staging Plan consider mitigations and scheduling to prevent impact to existing MJS operations and events.	It is noted this document is preliminary only and shall be documented by the contractor once appointed and approved by the road authority. It is expected as part of this that suitable mitigations with regard to the MJS events shall be considered at this point in time.	Sec 3.8 Commercial Business including McDonald Jones Stadium in the preliminary CTMP notes “The Principal Contractor will liaise with the venue management regarding scheduled fixtures and upcoming events.”
Council	Parking		The amended development proposes a total of 240 parking spaces across two stages of development. Stage 1 comprises 185 space car park, nine space pickup/drop off facility and two bus/coach parking spaces. Stage 2 provides an additional 55 spaces in a separate car park. The abovementioned TIA and Traffic Management Plan (Version 02.2025) of Drew Ferguson-Tait indicates parking for the HISC will be accommodated through utilising a combination of both on and off-site parking comprising 240 spaces on-site, approximately 80 informal spaces in Monash Road adjacent to the Hunter Water stormwater channel and 920 spaces in the McDonald Jones Stadium (MJS) car park.	Comment noted	The parking for events has been recalculated applying the conservative rate of 1 space per 3 attendees. The EMP and TMP have been updated with no reliance on MJS for HISC parking demands.

Agency	Matter	Item	Description	Response	Report Updated
Council	Parking		The parking demand for normal week day events can be accommodated on-site, while events with a capacity exceeding 1100 persons would necessitate overflow parking being accommodated in Monash Road and in excess of 1700 persons in Monash Road and the MJS car park.	Comment noted	TIA and EMP/TMPs have been updated to remove reliance on MJS parking. Traffic Plan Professionals (TPP) reviewed parking availability further afield outside of the immediate precinct. Street parking within the precinct is available for all users and cannot be quarantined for one operator. The TMPs address parking strategies to be deployed for different scenarios and involves collaboration with MJS to implement management controls for different sized events.
Council	Preliminary Construction Traffic Management Plan		The Response to Submissions and Amendment Report (RSAR) is supported by an updated Preliminary Construction Traffic Management Plan (June 2025) of the APP Group. Designated heavy vehicle access routes are not specifically addressed under this plan. CN re-affirms our previous advice that heavy vehicle construction traffic is not permitted to utilise local roads to access the site and is to be confined to the State road network.	Comment noted	Sec 5.2.5 Impact of Construction Traffic - Noted
Council	Green Travel Plan		The RSAR is supported by a Green Travel Plan (May 2025) of SECA Solution to actively promote increased use of sustainable transport modes with targets of around 10% cycle trips for normal weekday operations. CN notes the development however only nominates the provision of 22 secure bicycle parking comprising eight staff and 14 visitors. This provision is considered insufficient and not consistent with the above plan. We therefore recommend the applicant be required to amend the development to provide a minimum of 50 secure visitor bicycle parking spaces. We provide an appropriate condition in our schedule of recommended conditions.		Plans and TIA have been updated to provide additional bike parking with a total of 50 on site.

2 Existing Situation

2.1 Site Description and Proposed Activity

The subject site is a sports ground located within the Newcastle LGA. To the west are additional sports grounds with Lambton High School to the north; to the south there is a stormwater channel with residential development. To the east is Turton Road and various sports grounds including the Newcastle International Hockey Centre, McDonald Jones Stadium, Newcastle Harness Racing Club and several commercial sites. This area forms part of a larger precinct which incorporates the Newcastle Showground, Knights Centre of Excellence, the Newcastle Entertainment Centre as well as the existing Newcastle Basketball site and Broadmeadow Railway Station.

The proposed development is to provide for an indoor sports centre with 12 courts and various ancillary facilities.

2.2 Site Location

The site is located within the Newcastle LGA in the suburb of New Lambton.

The location of the site is shown below in Figure 2-1.

Figure 2-1 Site Location (Source Nearmap)

The site is on the western side of Turton Road and has street frontage to Turton Road (eastern frontage) and Monash Road (southern frontage). There is pedestrian access only from Monash Road with the only road frontage for the site for vehicles being to Turton Road. There is no existing vehicle access to the site.

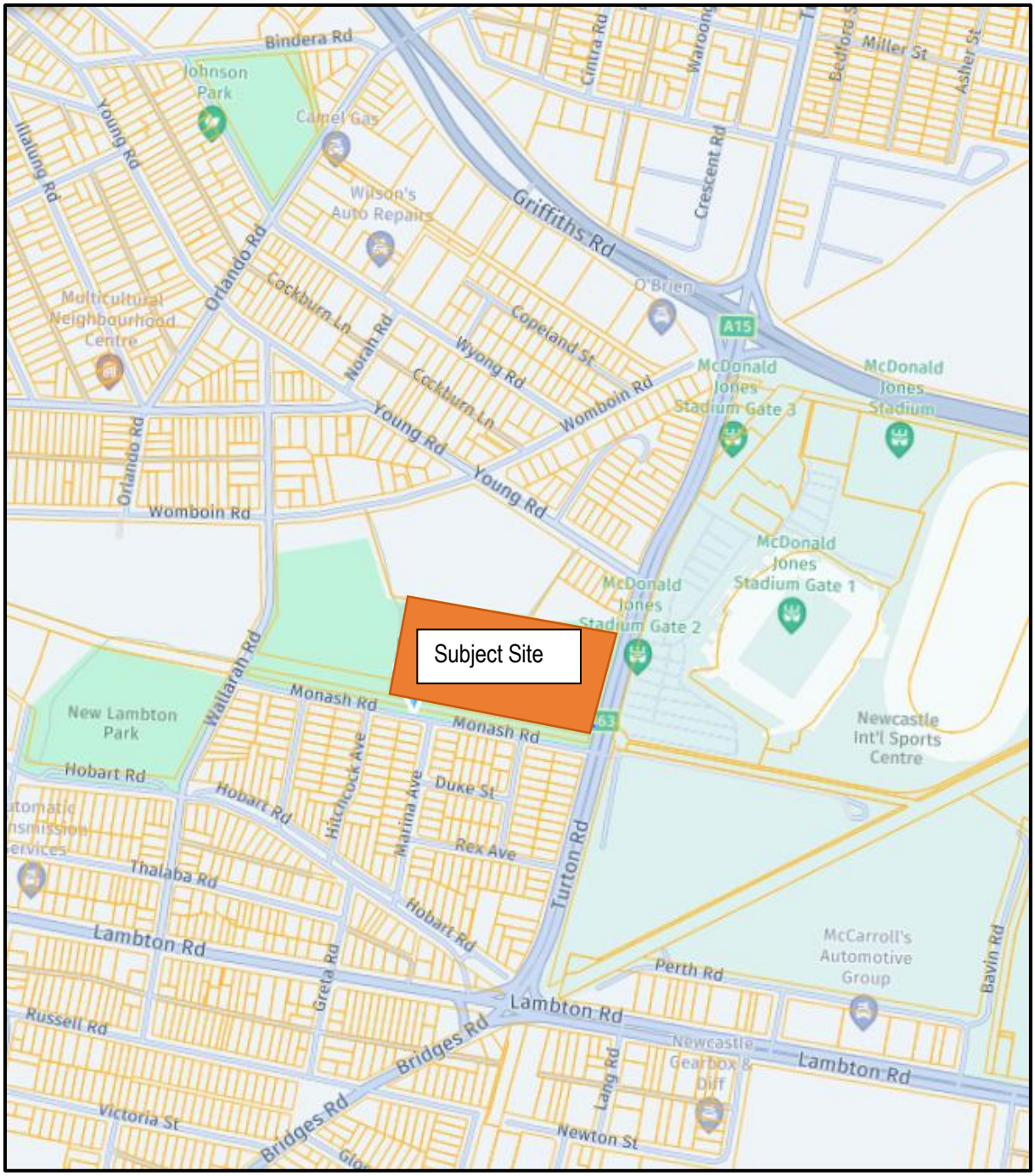
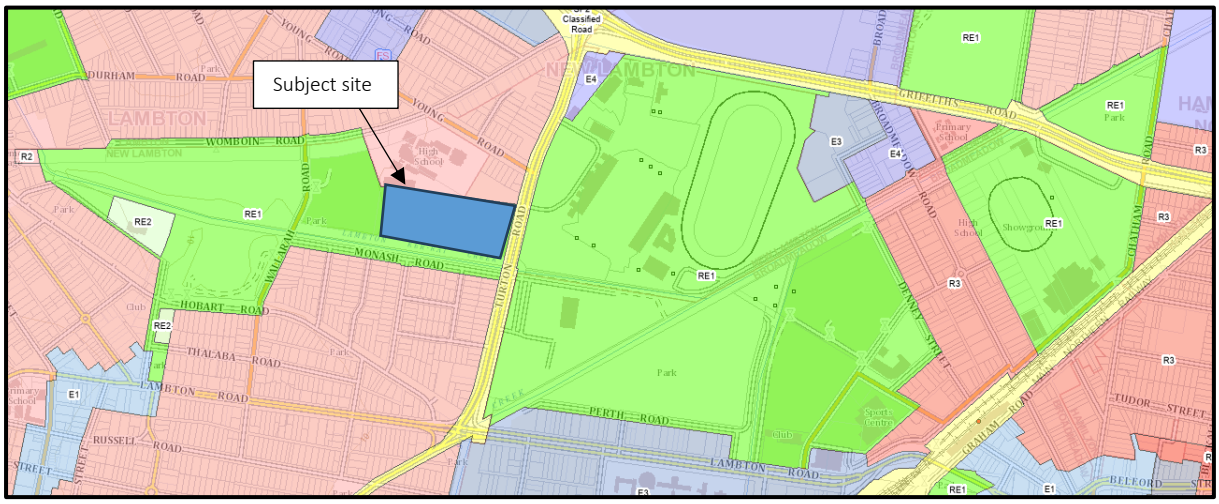


Figure 2-2 Study Area within context of local road network (Source: Nearmap)

2.2.1 Zoning and Adjacent Land Use

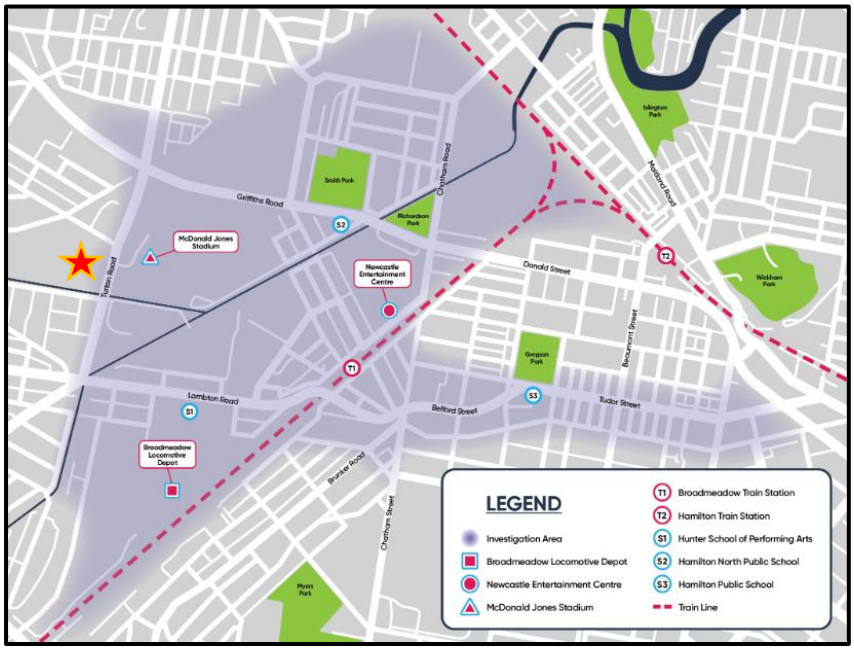
Zoning for the land is RE1 being part of a recreational precinct surrounded primarily by a mix of residential (R2) lands.



■ *Figure 2-3 –Subject site within context of adjoining land uses*

2.2.2 Anticipated Future Development

The site is located on the western edge of an area known as the Broadmeadow Regionally Significant Growth Area identified in the Hunter Regional Plan 2041. The area to the immediate east is referred to as the Hunter Park Precinct, a proposed "entertainment, sporting and lifestyle precinct". This area has been identified to provide future mixed use development opportunities under the Broadmeadow Place Strategy prepared by the City of Newcastle.



■ *Figure 2-4 –Broadmeadow Regionally Significant Growth Area (Subject site ★)*

2.3 Site Accessibility and Traffic Conditions

2.3.1 Road Hierarchy

The main road through the locality is **Turton Road** which forms part of the regional road network (B63). It provides a major north-south connection between Mayfield and Industrial Drive to the north and Kotara through to the Pacific

Highway to the south. In the vicinity of the site, it provides two lanes of travel northbound and three lanes of travel southbound separated by a raised central median. Additional lanes are provided at key intersections to maintain capacity. There is kerbside parking provided within the sealed shoulder on the northbound side of the road with no parking along the southbound lanes. Street lighting is provided to both sides of the road, and it operates under the posted speed limit of 60 km/hr. The majority of the intersections along its length are controlled by traffic signals. It carries a high volume of traffic especially during traditional commuter peaks, reflecting its role and function within the road network.

Photo 1 Turton Road looking north along site frontage

North of the site Turton Road intersects with **Griffiths Road**, a classified state road (MR 82) which provides an important east-west connection between the centre of Newcastle (via Donald Street) and Wallsend (via Newcastle Road) with links to the M1 Pacific Motorway and M15 Hunter Expressway to the west. In the locality of the subject site, it provides a dual carriageway with two or three lanes of travel east and west, separated by a raised central median. Additional turn lanes are also provided at intersections to maintain capacity.

To the south of the site Turton Road intersects with **Lambton Road**, an arterial road which forms part of the regional road network providing an east-west connection between Lookout Road at New Lambton Heights to the west and through to Tudor Street at Hamilton in the east. It carries high volumes of traffic, forming part of a major connection between the Newcastle CBD and surrounding suburbs including Hamilton, Broadmeadow and Lambton. Street lighting is provided and there are pedestrian footpaths to both sides. The posted speed limit on Lambton Road is 60 km/hr, with a number of school zone reducing traffic to 40km/hr between 8-9:30am and 2:30-4pm on school days. Kerbside parking is permitted along the majority of its length, controlled with timed parking throughout the working day and further restrictions during traditional school pick up and drop off times.

Young Road is a local street providing access to a school (Lambton High School) as well as existing residential development, together with light industrial users. It provides a single lane of travel in both directions with footpaths to both sides. It generally provides a straight alignment and connects with other roads in the locality via simple give

way controls. Parking is permitted along Young Road, with 90 degree angle parking on the north side of the road adjacent to the school and parallel parking with controls during the school period.

Turton Road connects with Young Road via a 3-way set of traffic signals which allows for all turning movements and provides for pedestrians on all legs.

Monash Road is a local road with a single lane of traffic in each direction. Parking is allowed along both sides of Monash Road with 90 degree parking provided along the north side (site frontage). Monash Road connects with Turton Road at a Give Way controlled T-intersection with a Keep Clear zone on the northbound side of Turton Road allowing for all turning movements. The right turn out of Monash Road in particular is difficult at peak times due to the high through traffic movements. There is a sheltered right turn lane into Monash Road off Turton Road however the high northbound traffic movement during the peak periods can limit turn capacity. Outside the peak times this intersection operates satisfactorily.

Photo 2 Monash Road looking west with site to right of photo

Wallarah Road and Womboin Road are local roads to the west and north of the site. Wallarah Road connects Lambton Road to the south with Young Road to the north. It intersects with Monash Road at a simple T-intersection with Wallarah Road having priority. It in turn connects with Womboin Road at a 4 way Stop-sign controlled intersection. Womboin Road connects with Young Road at a 4 way intersection with Stop signs on all approaches. These roads have frontages to various sports grounds and residential dwellings along the north side of Womboin Road. Parking is permitted along their lengths.

Photo 3 Wallarah Road looking south showing typical cross section

2.3.2 Roadworks and Traffic Management Works

There are no roadworks currently being undertaken in the vicinity of the subject site.

The extension of the Newcastle Inner City Bypass to the west of the site will remove significant through traffic from Lookout Road/Croudace Street with a grade separated interchange being constructed on Newcastle Road to allow for all turn movements.

There are some local traffic management controls within the vicinity of the site, primarily associated with the management of parking and access to buses during significant events.

2.4 Traffic Volumes and Conditions

2.4.1 Peak Hour Flows

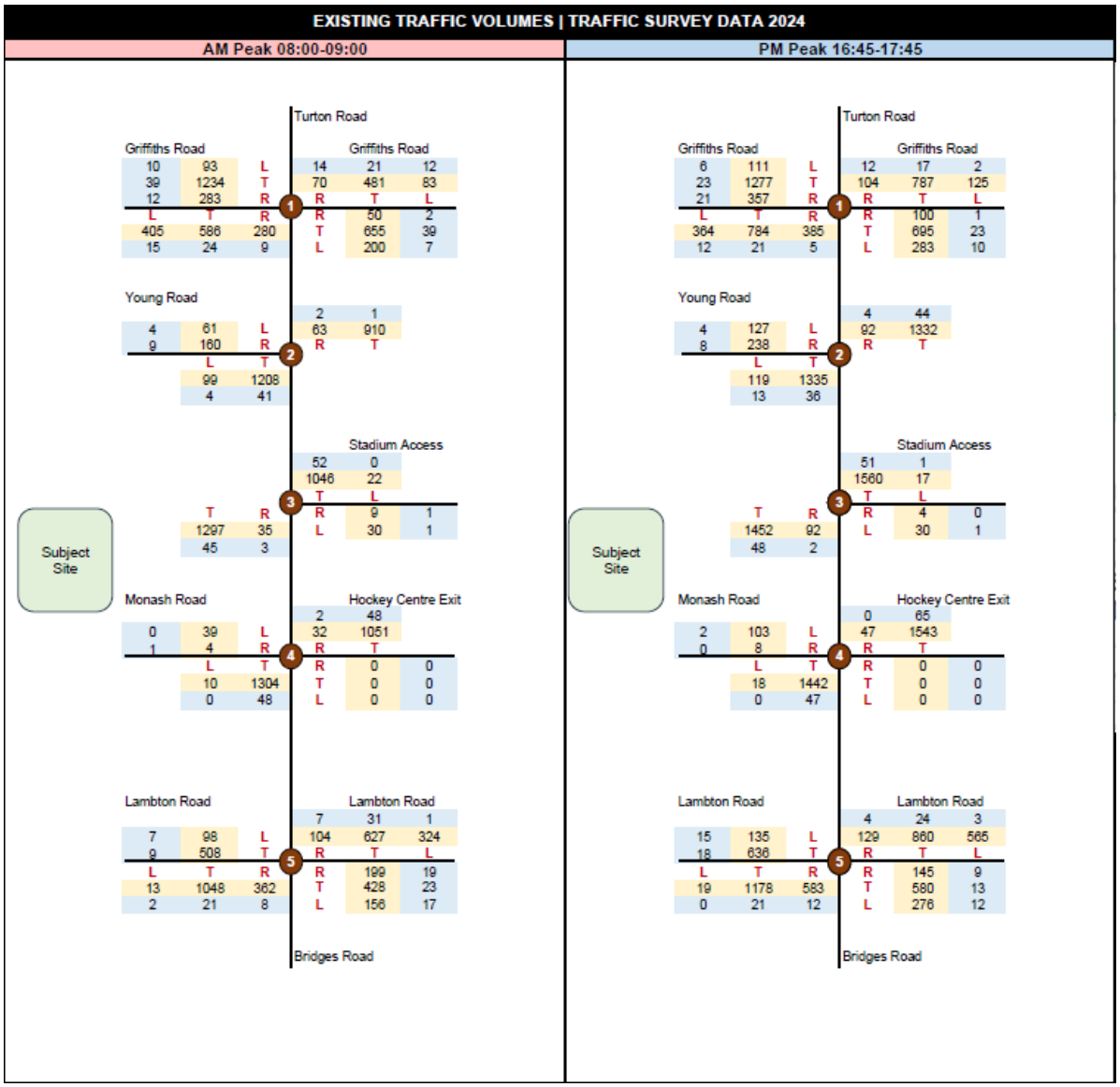
Traffic surveys have been completed to determine the current traffic demands at the key intersections along Turton Road to support the traffic modelling undertaken (Bitzios Consulting). A summary of the traffic flows is provided over.

This data shows that in the morning and afternoon peak hours, associated with commuter demands, the traffic flows northbound past the site are 1,390vph and 1,595 vph respectively whilst traffic flows on a Saturday are lower being 1,086vph. Southbound flows are generally higher with Saturday flows still lower than mid-week peak demands. The two way flows however see Saturday flows generally consistent with AM peaks due to the higher demand for southbound traffic on a Saturday.

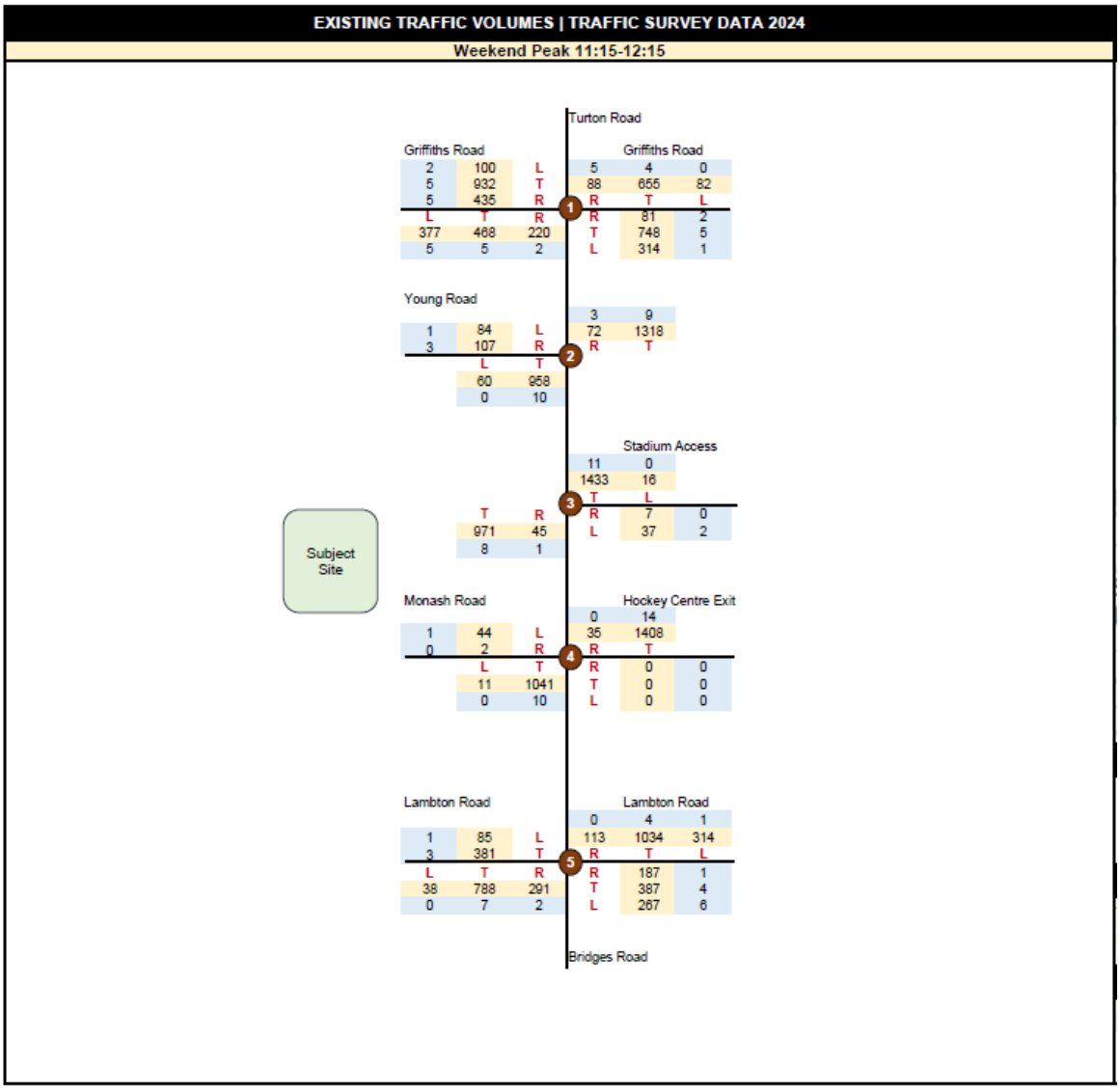
Traffic flows on the local roads are significantly lower, characteristic of their local road function.

Table 2-1 Two way traffic flows on local streets

		PM Peak	Saturday AM
Young Road	Eastbound	377	195
	Westbound	228	135
Monash Road	Eastbound	113	47
	Westbound	65	46



■ *Figure 2-5 – AM/PM Peak Hour traffic/turn volumes (Source: Bitzios Consulting)*



■ *Figure 2-6 – Saturday Peak Hour traffic/turn volumes (Source: Bitzios Consulting)*

2.4.2 Daily Traffic Flows

Traffic data provided by TfNSW for daily traffic flows on Turton Road north of the site (Count Station 05984) showed flows in 2010 of 35,500 vehicles per day (vpd) two way with a slight bias southbound. This is consistent with current flows allowing for peak hour flows to typically represent 10% of the daily flows.

This reflects Turton Road carrying high traffic demands during peak periods with peak hour spread rather than increases in hourly traffic flows.

2.4.3 Daily Traffic Flow Distribution

The daily traffic volumes are reasonably balanced in both directions, with the above data indicating a slight bias in movements southbound.

2.4.4 Vehicle Speeds

No speed surveys were completed as part of the study work. It is considered however that traffic does not speed in this location due to its interaction with the various intersections etc.

2.4.5 Existing Site Flows

The site is currently a sports field which, particularly in the winter, sees junior football games of a weekend and training during the week. Cricket also is played at this location during the summer.

Whilst there have been no traffic counts coinciding with this it is anticipated that allowing 20 vph per junior pitch and four games played on this field could see Saturday flows in the order of 80 vph.

Mid-week flows associated with training are likely to be less than this. Parking for this occurs along Monash Road.

2.4.6 Heavy Vehicle Flows

Survey data indicates approximately 2% heavy vehicle flows on Turton Road in the afternoon peak and less than 1% of a Saturday. These flows include bus services and typical through delivery vehicles etc.

2.4.7 Current Road Network Operation

Observations on site indicate that the local road network in this location operates to a satisfactory standard with some delays and congestion observed in the morning and afternoon peak periods. The signalised intersections control the movement of vehicles along the Turton Road corridors create large delays during the peak periods, with heavy delays northbound in the morning peak period in particular. Outside of the peak periods, the length of Turton Road operates well with low delays and congestion.

The Guide to Traffic Generating Developments provides a framework for assessing the mid-block capacity of an urban road applying a Level of Service criteria.

Allowing for the northbound flows on Turton Road to be in the order of 1,600 vph with two lanes of travel, the level of service per Table 4.4 of the Guide to Traffic Generating Developments would be LoS C being less than 1,800vph but more than 1,400 vph.

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

This indicates a level of service which is *"in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level."*

During the weekend flows are lower and Turton Road operates at LoS B being < 1400vph northbound.

For Monash Road the two way flows mid-week are 178 vph, on a Saturday 93 vph. Flows during the winter sports season are expected to be higher. The GtTGDs provides guidance on the environmental capacity of minor roads with a collector road being the road which connects the sub-arterial roads to the local road system in developed areas. For a collector road such as this, providing access to the various playing fields and connecting to an arterial road would be a maximum of 500 vph, 300 vph desirable. Monash Road is operating within its environmental capacity.

2.5 Traffic Safety and Accident History

Crash data provided by TfNSW (Centre for Road Safety) for the five years 2018-2022 shows that there have been two accidents northbound on Turton Road between Monash Road and Young Road. Each has been non-casualty (tow-away) incidents. There have also been four incidents involving right turning vehicles at the access to the carpark on the east side of Turton Road, (right and through). One resulted in moderate injury and one resulted in a minor injury. Given the high volume of traffic northbound these represent a low number of crashes over the five year period.

In 2019 there was an accident at the intersection of Young Road and Womboin Road resulting in a moderate injury. No accidents have been reported at the intersections of Wallarah Road and Womboin Road or Wallarah Road and Monash Road.

The local road network in this location provides a safe road environment, with no notable safety concerns. The roads and intersections surrounding the site are typically well laid out, with suitable line marking provided to guide drivers and adequate sight lines available approaching intersections.

There is a signalised mid-block crossing of Turton Road, located along the site frontage, to allow for safe and controlled pedestrian and cyclist movements in this location. The various signalised intersections along this corridor also have pedestrian phases.

2.6 Parking Supply and Demand

2.6.1 On-street Parking Provision

Vehicles can be parked on both sides of the local roads in the vicinity of the site.

90 degree angle parking is provided on the northern side of Monash Road and Young Road and along the sports fields on the southern side of Womboin Road west of Wallarah Road. Monash Road has a length in excess of 430 meters which, allowing 3 metres per space per the marking on street, and allowing for the length along the northern side of the road along the site frontage alone provides parking for 80 odd vehicles (248 metres).

Figure 2-7 On-street parking in the vicinity of the subject site (approx. 300m) NB not adjusted for bus stops

A further assessment of on-street parking is shown below allowing for a distance of 1500mm from HISC.

This sees in the order of 1569 on street parking spaces.

Figure 2-8 On-street parking in the broader surrounds of the subject site

2.6.2 Off-Street Parking Provision

There is a large off-street parking area associated with the operation of McDonald Jones Stadium on Turton Road opposite the subject site.

To the west of the site (400m) past the various sports pitches there is a public carpark adjacent to Harker Oval off Tauranga Road.

Figure 2-9 Off-street parking adjacent to Harker Oval Stadium

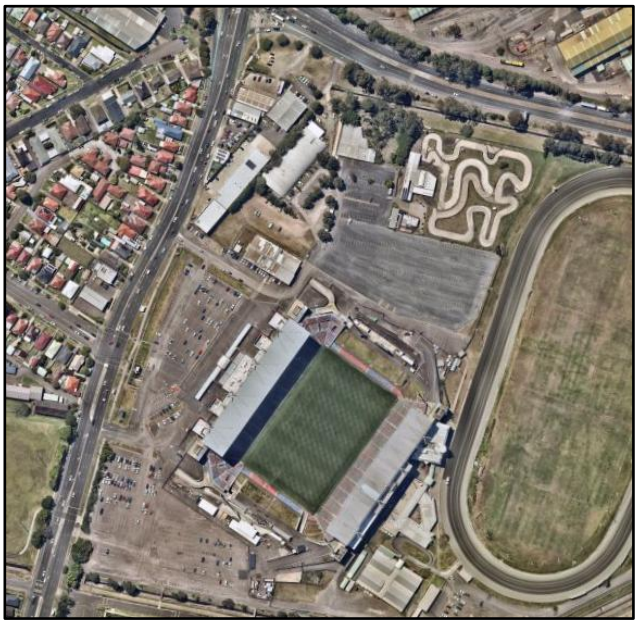


Figure 2-10 Off-street parking surrounding McDonald Jones

There is also the potential for off-street parking out of hours and by arrangement at the Council depots off Turton Road to the north of the site. These two lots provide a total of 151 parking spaces.

2.6.3 Parking Demand and Utilisation

Parking demands on Monash Road and Wallarah Road are low except during times when there is sport being played on the playing fields, including the subject site.

On Young Road and Womboin Road, parking demands associated with the high school occur during the week. This includes senior students (P-plate drivers) parked on Womboin Road both in the vicinity of the school entry and on the southern side of the road past the intersection with Wallarah Road.

This area is also a popular area for vehicles to be parked when events are on at the McDonald Jones Stadium. During this time parking is managed in conjunction with an Event Management Plan for the broader area.

2.6.4 Short term Set down or pick up areas

There are no set down or pick up areas in the locality of the site. Coaches use the parking area within the McDonalds Jones stadium during major events. Temporary bus stops are also provided along Turton Road for some special events involving bus travel.

2.7 Public Transport

2.7.1 Rail Station Locations

Broadmeadow railway station is approximately 1 kilometre east of the site and provides regular train services on the Central Coast Newcastle Line between Newcastle and Sydney. It is also a stop on the XPT Regional Train service between Sydney and Brisbane.

The station also acts as a hub for bus services operating throughout the area.

2.7.2 Bus Routes and Associated Facilities

Bus stops are located on Turton Road to the north of the site and are serviced by:

Route 27 – Wallsend

Route 138 – Lemon Tree Passage (Monday to Friday)

Route 266 – West Wallsend (Monday to Friday)

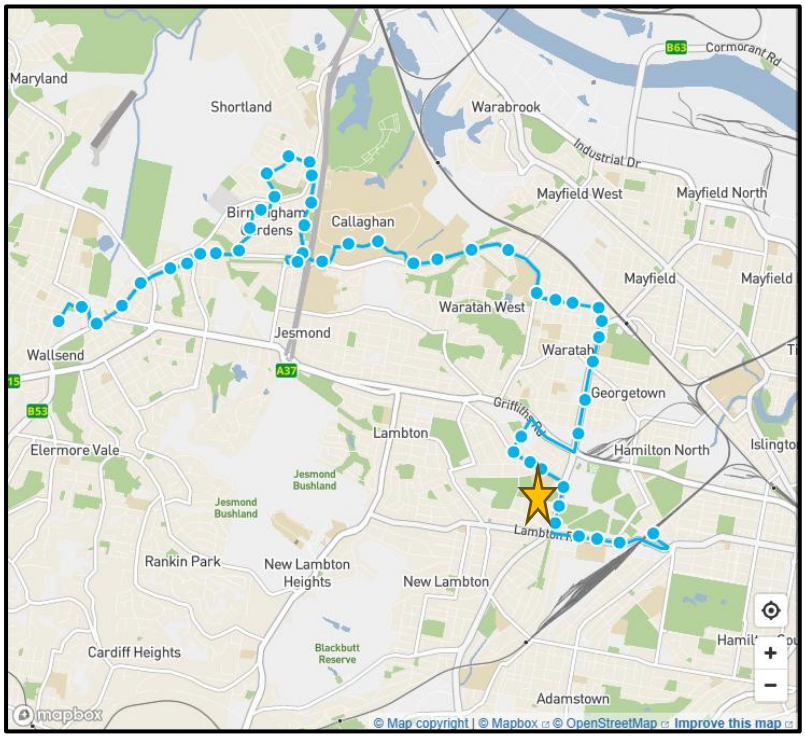


Figure 2-11 Bus service 27 to Wallsend (Subject site ★)

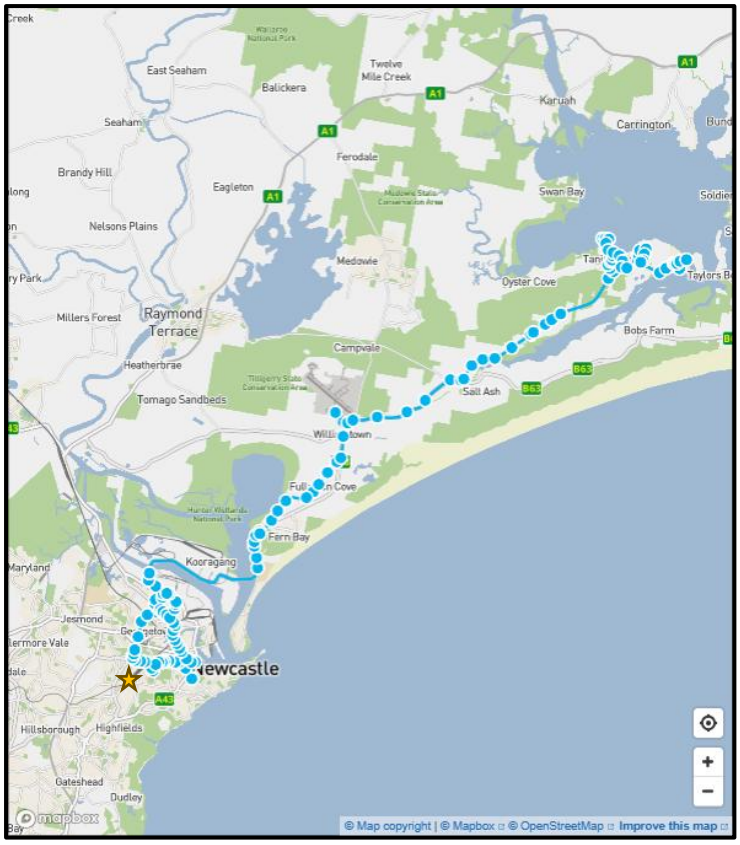


Figure 2-12 Bus service 138 Lemon Tree Passage to Newcastle (Subject site ★)

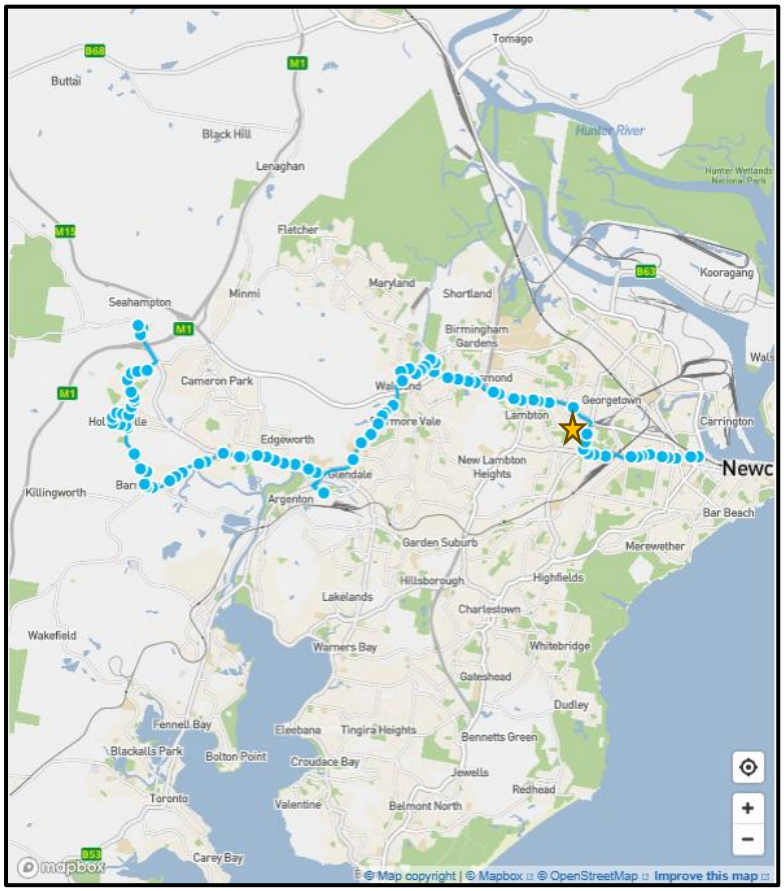


Figure 2-13 Bus service 266 Newcastle to West Wallsend (Subject site ★)

Southbound stops have shelters and seating. Northbound, the stop before Monash Road is signal only however north of the site near Young Road there is a shelter and seating.

2.7.3 Rail and Bus Service Frequencies

Both bus and rail services operate a high frequency in this area.

Broadmeadow is a major stop on the main Central Coast Newcastle line with all trains stopping at this station. A number of bus services also connect at this station.

On Turton Road service 27 runs daily whilst routes 138 and 266 operate Monday to Friday.

Northbound Bus Services

Turton Rd at Monash Rd

B 27	Wallsend	10:09 AM
B 27	Wallsend	10:55 AM
B 27	Wallsend	11:55 AM
B 27	Wallsend	12:55 PM
B 27	Wallsend	1:55 PM
B 27	Wallsend	2:55 PM
B 27	Wallsend	3:30 PM
B 138	Lemon Tree Passage	3:36 PM
B 266	Seahampton	3:38 PM
B 27	Wallsend	4:10 PM
B 27	Wallsend	4:50 PM
B 27	Wallsend	5:20 PM
B 266	West Wallsend	5:36 PM
B 27	Wallsend	5:54 PM
B 27	Wallsend	6:24 PM
B 27	Wallsend	7:39 PM
B 27	Wallsend	8:34 PM
B 27	Wallsend	9:14 PM
B 27	Wallsend	10:06 PM
B 27	Wallsend	5:50 AM
B 27	Wallsend	6:45 AM
B 27	Wallsend	7:17 AM
B 27	Wallsend	7:55 AM
B 27	Wallsend	8:20 AM
B 27	Wallsend	8:45 AM

Southbound Bus Services

Turton Rd opp Young Rd

B 27	Broadmeadow Station	10:17 AM
B 27	Broadmeadow Station	11:13 AM
B 27	Broadmeadow Station	12:13 PM
B 27	Broadmeadow Station	1:13 PM
B 27	Broadmeadow Station	2:10 PM
B 27	Broadmeadow Station	3:03 PM
B 27	Broadmeadow Station	4:13 PM
B 27	Broadmeadow Station	4:43 PM
B 27	Broadmeadow Station	5:11 PM
B 27	Broadmeadow Station	5:51 PM
B 27	Broadmeadow Station	6:15 PM
B 27	Broadmeadow Station	7:16 PM
B 27	Broadmeadow Station	8:26 PM
B 27	Broadmeadow Station	9:26 PM
B 27	Broadmeadow Station	10:26 PM
B 27	Broadmeadow Station	5:13 AM
B 27	Broadmeadow Station	6:10 AM
B 27	Broadmeadow Station	7:10 AM
B 27	Broadmeadow Station	7:46 AM
B 266	Newcastle Interchange	7:51 AM
B 138	Newcastle Interchange	8:12 AM
B 27	Broadmeadow Station	8:14 AM
B 266	Newcastle Interchange	8:17 AM
B 27	Broadmeadow Station	8:50 AM
B 27	Broadmeadow Station	9:13 AM

Figure 2-14 Bus schedules at Turton Road near Monash Road

2.7.4 Event Bus Parking on Turton Road

On Turton Road, along the site frontage there are signs allowing for event bus stops during certain activities at McDonald Jones Stadium (Figure 2-15). Some space to the north of the pedestrian crossing shall be impacted by the project and shall be relocated to the north in consultation with McDonald Jones Stadium and Keolis Downer.

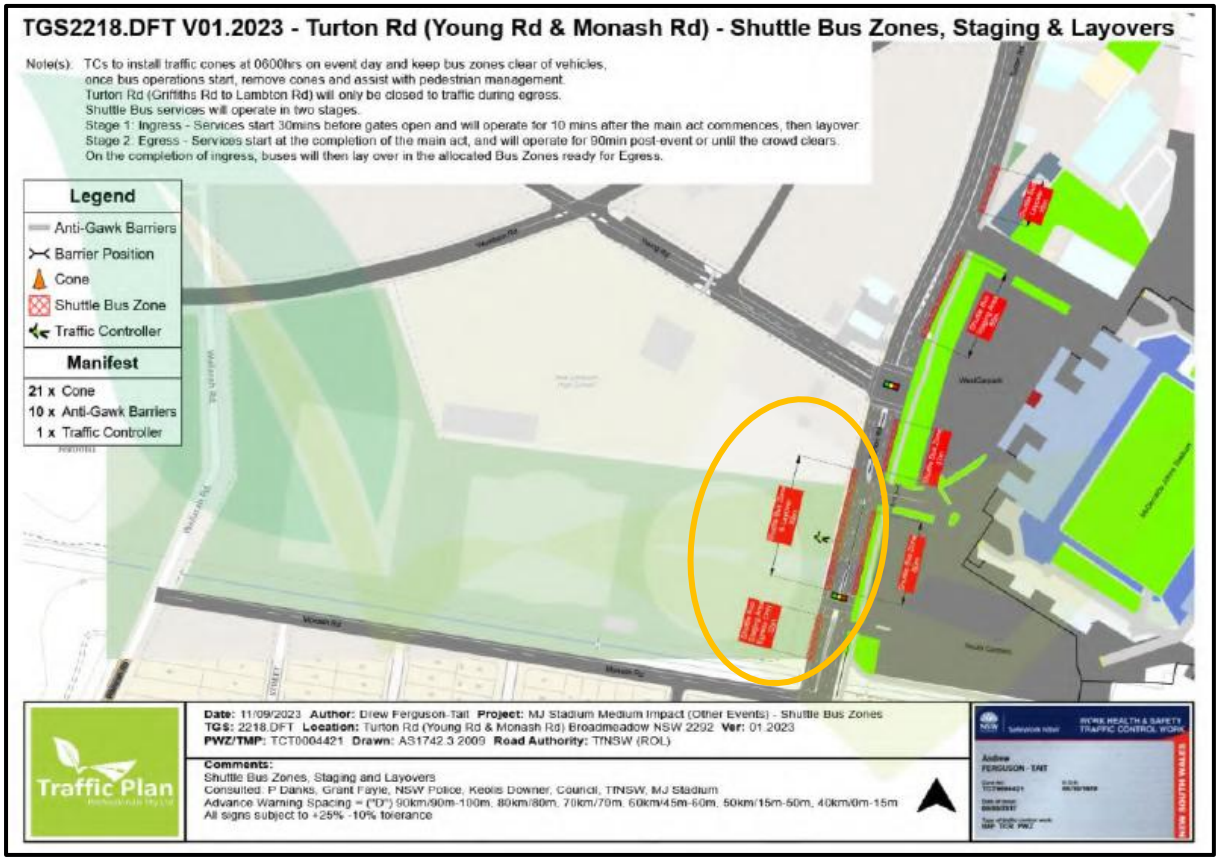


Figure 2-15 Turton Road Shuttle Bus Zones along site frontage (MJ Stadium EMP TTP 2023)

2.8 Pedestrian and Cycling Network

There is a wide network of pedestrian paths in the locality, reflecting the high demand for pedestrian movements in the area, in particular for students accessing the schools (Hunter School of Performing Arts and Lambton Road) and the sports facilities. This includes footpaths along both sides of Lambton Road and Turton Road.

There is a signalised mid-block crossing of Turton Road, located along the site frontage to allow for safe and controlled pedestrian and cyclist movements in this location.

The site sits adjacent to the intersection of two main cycling routes (R4 and R5) which connect east and west with a mix of primarily shared paths and low difficulty on road cycle routes.

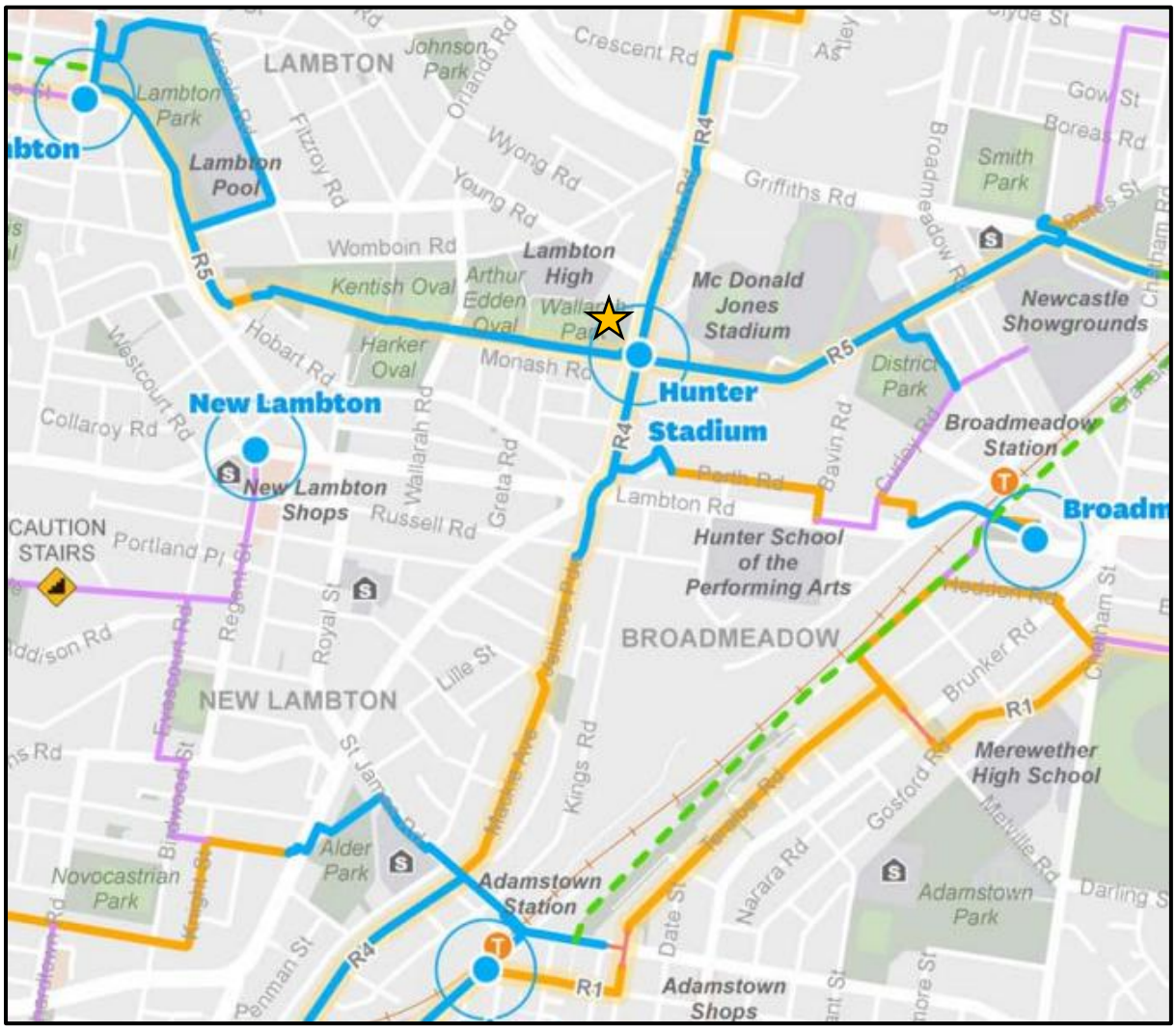


Figure 2-16 Kotara South to Mayfield, TAFE and University (Source: CN Cycleways Map) (Site ★)

3 Proposed Development

3.1 Offsite or Background Developments

Future development to the east of the site (Hunter Park Precinct) has been included in the Broadmeadow Place Strategy, adopted by City of Newcastle Council. Whilst this long term planning framework identifies potential network changes these are only at a conceptual level, including new or reconfigured local streets, upgraded walking and cycling crossings, public transport priority measures and changes to access arrangements around major venues. The focus on the strategy is to promote active transport and contained trips with the HISC providing local sporting facilities to compliment the future development.

A Woolworths Supermarket development has been approved to the south of the site on Lambton Road east of Turton Road. The impact of this has been reviewed by Bitzios in conjunction with their modelling assessment with the conclusion that the additional traffic traffic in the vicinity of HISC would see no impact on the level of service or materially changing queue lengths for the Turton Road through movements.

There is no other significant development identified in the immediate vicinity.

3.2 The Development

The plans for the development are shown in **Appendix A**.

The Indoor Sports Centre includes 12 indoor courts including a 2,500 seat show court, offices, ancillary/players facilities, allied health hub, café, corporate lounge, multi-use space along with car parking on-site.

The facility will provide for the week by week demands of the local community as well as providing a high-class facility to allow for professional/semi-professional competition games.

Table 3-1 Various components

Use	Area/number
Courts	12
Training & Performance Hub	797.5m2
Café	51.6m2 + 427.7m2
Allied Health Hub	357.8m2
Gym-Movement Studio-Functional Testing	717.1m2
Multi-purpose rooms	394.5m2
Office/administration	303.5m2 + 351.1m2
Players Lounge/ Corporate Lounge	150.1m2 + 262.4m2

Access will be provided via a new access connection to Turton Road allowing for a left in left out only.

A permanent sealed car park with 240 formal spaces, which includes 8 disabled parking spaces and 9 drop off spaces, will be provided on site for car parking, with additional space for bus drop off. Two dedicated bus parking spaces are provided.

There is a loading/service bay along with a port cochere and adjacent area providing for the 9 drop off spaces.

3.2.1 Location

The location of the site is shown above in Figure 2-1 and Figure 2-2 above.

3.2.2 Projected number of employees/users

The facility will allow for daily demands associated with local use of the courts for training mid-week and for competitions at the weekend along with school groups and the community using the courts.

From this it can be seen that the mid-week daytime demands for the site are much lower than the peak demands generated between 4pm-8pm mid-week. Saturday use is high but not as high as the mid-week uses.

		Visits/hr	Av Visits/hr	Av Visits/hr	Av Visits/hr	Av Visits/hr	Av Visits/hr	Visit/period	Total
Typical Weekday	Hrs/Period	**Sport**	**Function/Program**	**Schools/Groups**	**Services**	**Staff/Admin**	**Total**		
6am - 9am	3	6	30		20	15	71	213	
9am-4pm	7	10	30	60	40	30	170	1190	
4pm-8pm	4	480	20		10	5	515	2060	
8pm-11pm	3	345	5			2	352	1056	
							Av/hr	**Total**	
							121	1403	Off peak
							434	3116	Peak
								4519	**Total**
		Visits/hr	Visits/hr	Visits/hr	Visits/hr	Visits/hr	Visits/hr	Visit/period	Total
Typical Weekend Day	Hrs/Period	**Sport**	**Function/Program**	**Schools/Groups**	**Services**	**Staff/Admin**	**Total**		
6am - 9am	3	100	20	0	0	0	120	360	
9am-4pm	7	100	0	0	20	0	120	840	
4pm-8pm	4	50	100	0	0	0	150	600	
8pm-11pm	3	0	100	0	0	0	100	300	
							Av/hr	Total	
							125	900	Off peak
							120	1200	Peak
								2100	Total

Figure 3-1 Site utilisation model (Source: Basketball NSW)

Small to medium spectator based events

- Visitation - 500 up to 1,000 people onsite at anyone time
- Frequency - 12-16 per year (weekends)
- Examples
    - NBL1 round games
    - Netball state league

Medium and Large spectator based events, created by major tournaments at the site will be infrequent and will be controlled under a site-specific Event Management Plan.

Medium spectator events -

- Visitation - circa 1,100 to 1,700 onsite at anyone time
- Frequency - 2-3 per year (weekends)
- Examples
    - NBL1 finals and/or significant derby game
    - WNBL (future)
    - National basketball age championships

Large spectator based events

- Visitation - 1,700 - 2,500+ people onsite at anyone time
- Frequency - on average 1-2 per year (2-3 in some years, 0 or 1 in others)
- Examples
    - Pre-season professional match
    - Final of NBL1
    - WNBL finals (future)

3.2.3 Hours and days of operations

The facility may be open from 6:00 AM through to 11:00 PM daily.

3.2.4 Phasing and Timing

The proposal has been designed so that the project can be delivered in two stages as described below:

Stage 1A

A single storey building with total GFA of approximately 10,037m2 comprising:

- Ground floor: 8 x basketball courts, amenities to support the functioning of the complex including bathrooms, change rooms, lobby and foyer, retail tenancy and café.
- Mezzanine level: multi-purpose rooms and administration spaces.
- Car park with 185 spaces includin drop off spaces and bus parking

Stage 2

Extension to the building with total additional GFA of approximately 7,486m2 comprising:

- Ground floor 3 x courts including Show court with retractable grandstand seating for 2,500 people over the 2 adjacent courts
- Extension to the southern side of the building to provide 1 x court plus high performance training area.
- Mezzanine level: extension of mezzanine to provide function rooms, administation space and training space/gymnasium
- Expansion of existing carpark to provide 240 spaces

The staging approach will be dependent on available funding. BANL is committed to delivery of the full proposal.

The project shall be developed in these stages consent for the whole project is sought under this SSDA.

Estimated construction start date for construction of the first stage is late 2025 subject to approval.

3.2.5 Selection of appropriate design vehicles for access and circulation requirements

The development will generally need to accommodate light vehicles with occasional heavy vehicles associated with waste collection and site servicing. 12 seater people movers or 22 seater mini-buses will typically be used by teams to travel to the site, particularly those associated with regional competitions whilst some buses/coaches shall be used in association with dropping off players and school children using the courts.

The demand for larger buses (ie 14.5m coaches) will be infrequent, primarily being associated with visiting teams in the national competition. Games associated with this competition would be of a weekend or Friday night and so access and egress of these coaches would occur outside of the local road peak.

- B99 – vehicles access
- 8.8m MRV – deliveries and site servicing
- 10.8m garbage truck – waste collection
- 14.5m – allowing for buses and coaches

4 Projected Traffic

4.1 Traffic Generation

The Guide to Traffic Generating Developments does not provide any specific advice for this type of development. As part of previous discussions between the applicant, TfNSW and Council the projected traffic movements for the project have been based on surveys of a similar facility and adjusted to suit the number of courts on site (being 12). The projected peak hour traffic flows associated with the project are shown below and have been adopted in the network traffic modelling for the project.

Table 4-1 Estimated site traffic generation

Time	Arrival	Departure
4.00-4.15	54	41
4.15-4.30	50	44
4.30-4.45	48	49
4.45-5.00	48	53
5.00-5.15	48	54
5.15-5.30	49	54
5.30-5.45	53	54
5.45-6.00	52	53
Total PM peak two hours (4pm to 6pm)	402	402

Allowing for the various ancillary services operating on site, there shall be less demands for vehicles to access and exit the site during the balance of the day. Ancillary traffic in the afternoon is primarily office staff who will leave between 4PM and 5PM.

Peak AM demands that coincide with the local road peak would be associated primarily with staff arrivals as well as some demands for the ancillary services provided on site for players eg attendance at the allied health service or gym/training sessions.

Table 4-2 AM Trip Generation for additional uses on site

Use	Traffic Rate	Area for assessment	Peak Trips
Courts	20 spaces per court	12	As above
Café or Restaurant	Ancillary		5 in AM / 5 out PM
Health Consulting Rooms (9AM-6PM)	No rate – first principles Primarily ancillary	357.8m2 Assume 3 practitioners + 2 staff	8 in prior to 9am/out post 6pm 3 in /3 out per hour (assume 60 minute consultation)
Gym	Peak 9 / 100m2 GFA Daily 45 / 100m2 GFA	717.1m2	16 in / 15 out (assume AM)
Office-High Performance	Daily vehicle trips = 10 per 100 m2 gross floor area Evening peak hour vehicle trips = 2 per 100 m2 gross floor area.	351.1m2	AM 7 in/PM 7 out
Office	Daily vehicle trips = 10 per 100 m2 gross floor area Evening peak hour vehicle trips = 2 per 100 m2 gross floor area.	303.5m2	AM 6 in/ PM 6 out
TOTAL			AM Arrival 42 / Departure 18

On a weekend, the site could generate in the order of 240 vehicle movements per hour (120 inbound and 120 outbound).

Major events

Major events for the site are not yet confirmed and scheduling will be coordinated with all stakeholders within the site area.

A draft Event Management Plan with draft traffic management plans has been prepared to demonstrate the management of parking, traffic and access to public transport.

Such events typically occur of a weekend along with the potential for occasional school gala type events which would occur mid-week but during school hours. For these events, there will be buses to carry people to and from the site which will help to reduce the overall traffic demands. Parking for two buses is provided on site.

4.1.1 Daily and Seasonal Factors

The traffic flows associated with the site will vary between weekday use, weekend use and occasional major events as described above.

4.1.2 Pedestrian Movements

The site will generate some pedestrian movements towards Turton Road to connect to the public buses in this location. A path will be provided through the site (Forecourt Promenade) to connect with the existing pathway along the site frontage which in turn allows connection to the signalised pedestrian/cycling crossing in this location. This pathway along Turton Road shall be widened to the south to Monash Road.

A separate footpath within the site will connect with the pedestrian footbridge joining to Monash Road to the south of the site.

4.1.3 Traffic Distribution and Assignment

The site is located central to the Newcastle LGA as well as within travel distance from Lake Macquarie and parts of Port Stephens and Maitland LGAs. This wider catchment area would be relevant for representative training and the more elite levels of basketball or where there are no local basketball competitions available. The centre is therefore expected to draw attendees equally from all directions.

All trips shall be left in and left out from Turton Road.

Traffic approaching and departing the site will use a range of routes with Turton Road providing a north-south spine connecting with the Pacific Highway to the south (Highfields) along with sub-arterial roads with an east-west orientation being Lambton Road to the south and Griffiths Road to the north.

4.1.4 Hourly Distribution of Trips

Traffic movements will be as assumed above.

The facility will generate minor traffic demands during the morning peak period, potentially associated with staff and servicing requirements.

On a weekend, the site could generate in the order of 240 vehicle movements per hour (120 inbound and 120 outbound).

4.1.5 Modal Split

As the site is located adjacent to two main regional cycling routes, it is likely to see players and staff riding to and from the site daily.

Similarly, the site is located within walking distance of two high schools which would enable students to walk to the courts for afternoon training and games.

The location of the site within walking distance of bus stops on Turton Road also provides for players, particularly students of an afternoon, to catch a bus to the venue after school to then be picked up by parents afterwards.

These travel patterns involving students has been observed at other venues eg Coffs Harbour Indoor Sports Centre where children arrived for afternoon competitions.

The site is also within 1 kilometre of the Broadmeadow Railway Station and so is likely to see a high number of patrons travel by train or by various bus routes when there are main events, consistent with attendance at various events at the adjacent stadiums.

Whilst these numbers have not been quantified, they do support opportunities for discounted trips and reduced parking demands for the site.

4.1.6 Trip assignment

Whilst all traffic arriving and leaving the site shall approach from the south on Turton Road and depart to the north due to the left in, left out access the assignment of trips to the broader network has been further considered.

There are multiple routes available to approach the site allowing for the distribution of traffic across numerous roads and via various intersection.

Table 4-3 Trip Assignment

		Approaching	Departing
East	Newcastle/Hamilton	Lambton Road/Turton Rd	Right at Griffiths Rd
North-East	Tighes Hill/Wickham	Griffiths Rd/Lambton Rd	Right at Griffiths Rd
North	Mayfield/Waratah/Stockton	Turton Rd/Young Rd	Turton Road northbound
North-West	Wallsend/Minmi/Callaghan	Griffiths Rd/Croudace Rd/Russell Rd/Turton Rd	Left at Griffiths Rd
West	Cameron Park/Elermore Vale	Lookout Rd/Russell Rd/Turton Rd	Left at Griffiths Rd/left at Croudace Rd
South-West	Cardiff/west Lake Macquarie	Lookout Rd/Russell Rd/Turton Rd	Left at Griffiths Rd to Newcastle Rd or then left at Croudace Rd
South	East Lake Macquarie/Kotara	Bridges Rd/Turton Rd	Left at Griffiths Rd then left at Croudace Rd
South-East	Charlestown/Dudley/Adamstown/Merewether	Glebe Rd or Pacific Hwy/Bridges Rd /Turton Rd	Right at Griffiths Rd

Given the network of roads throughout this area there are numerous alternate routes available for drivers in addition to these. For example, a driver approaching from west Lake Macquarie could approach turning right at Carnley Avenue or Russell Road whilst a driver approaching east along Griffiths Road may turn right at Croudace Road, at Lloyd Road or at Turton Road, all signalised intersections. This filtering of traffic will reduce the impact on any single route.

4.2 Total Traffic

As detailed in the Bitzios Consulting modelling assessment (Appendix D).

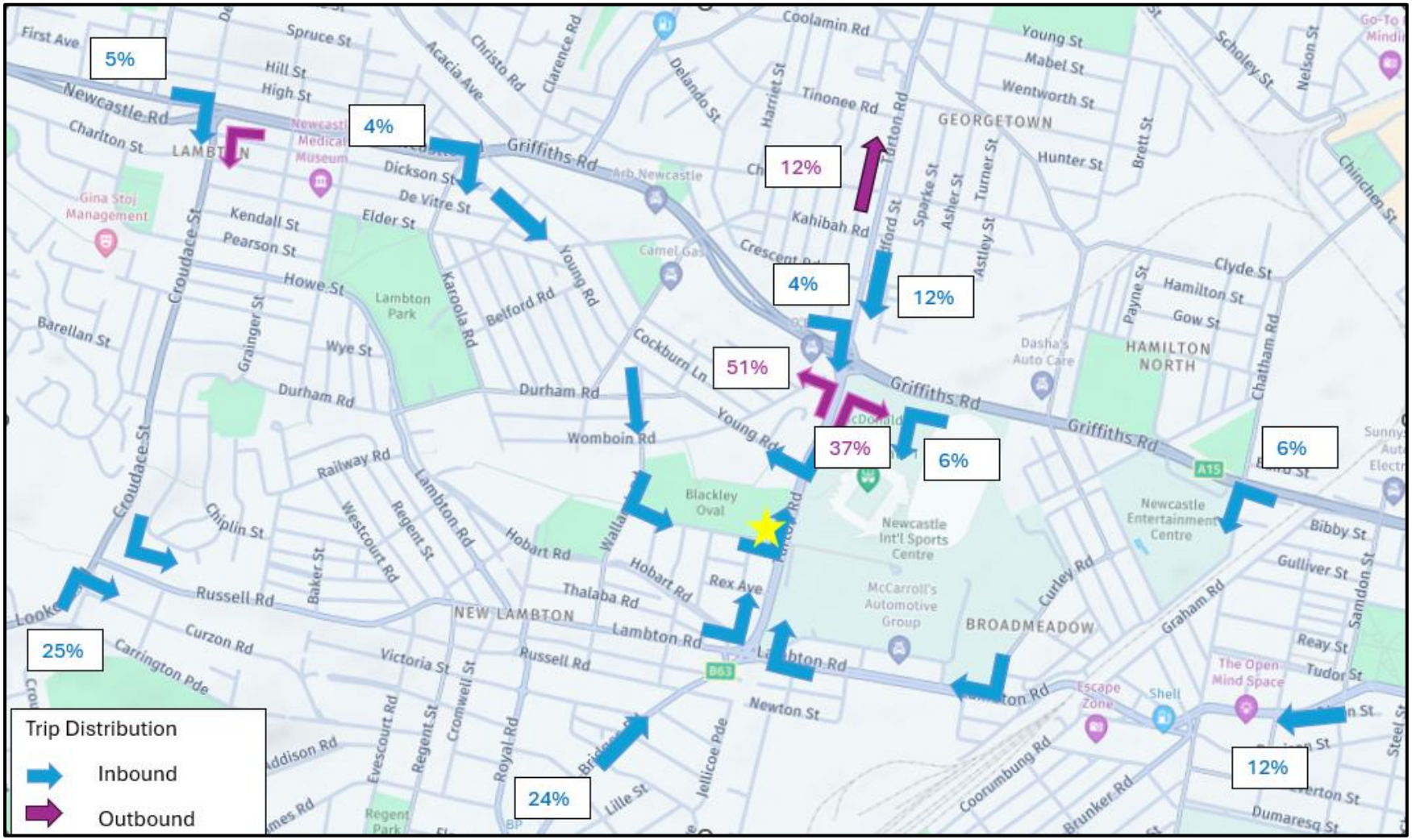


Figure 4-1 Estimated Site Traffic Distribution

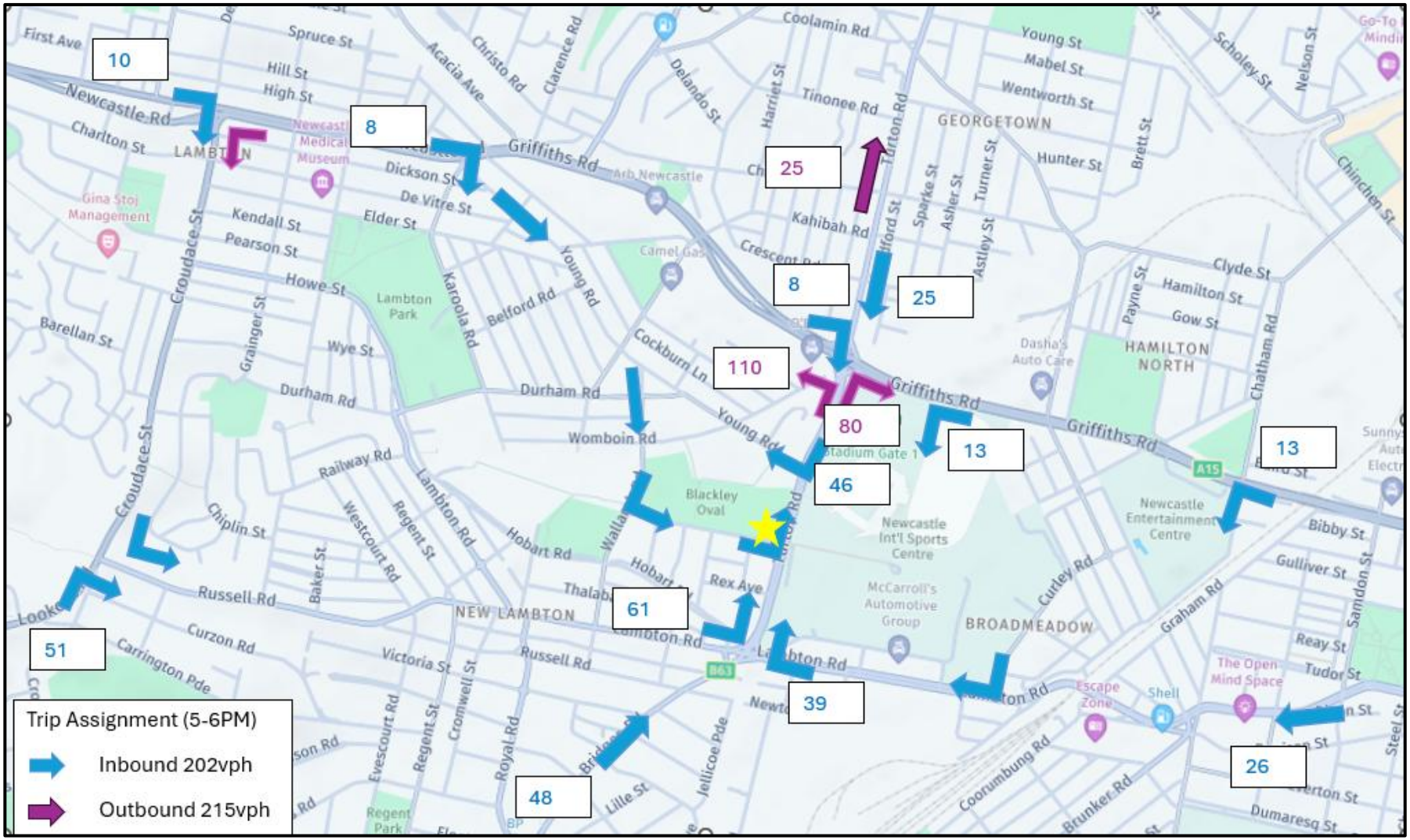


Figure 4-2 PM Traffic Assignment

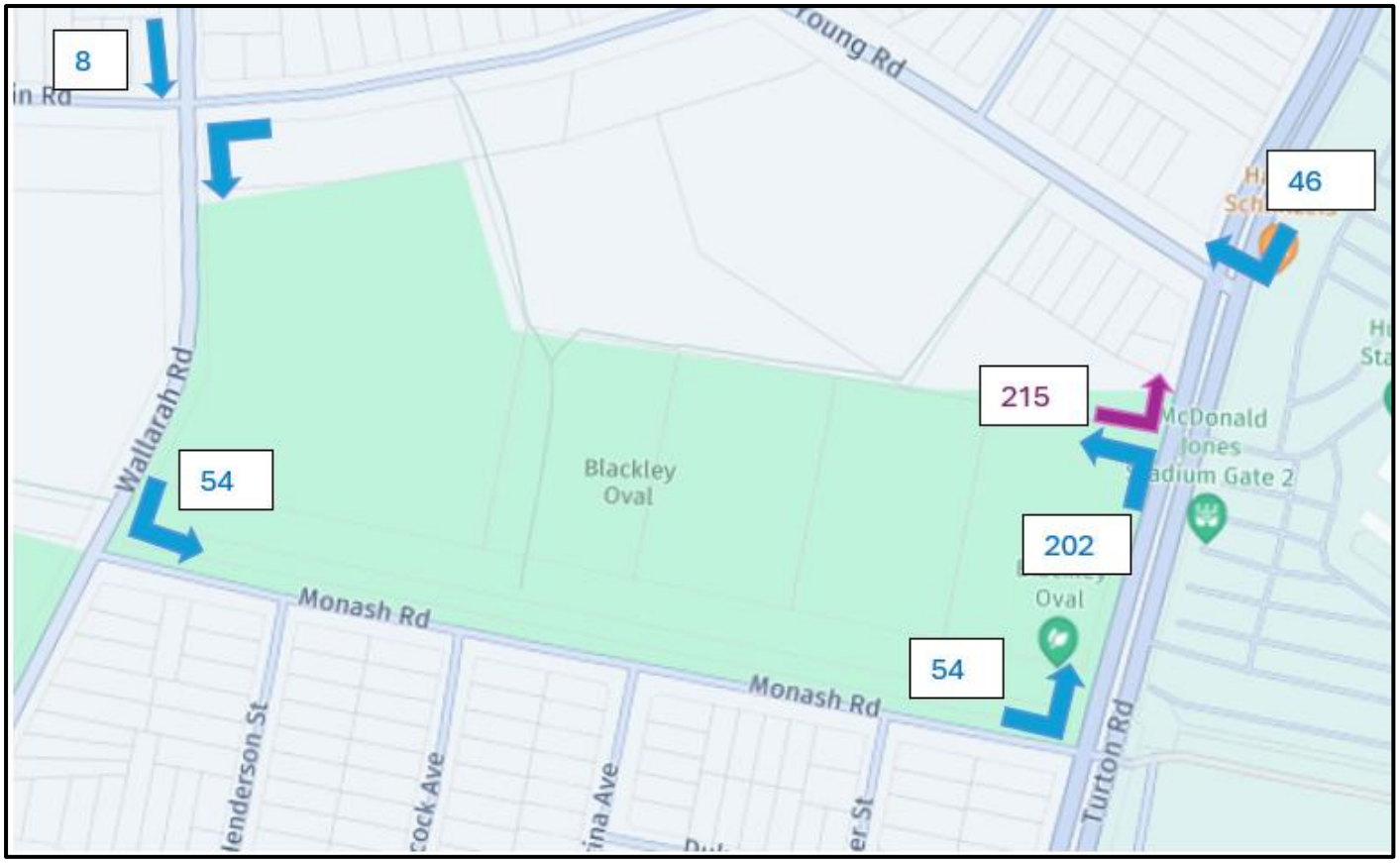


Figure 4-3 Traffic Assignment at site access

5 Transportation Analysis

5.1 Access

5.1.1 Driveway Location

Direct access to **Turton Road** is proposed, allowing for a left in and left out only, similar to other similar users on the opposite side of Turton Road e.g. the hockey centre. Users of this sporting facility accept this constraint and adjust their approach and departure routes accordingly.

The driveway has been located in consultation with TfNSW, on the northern side of the site taking into consideration the pedestrian crossing and cycling pathway to the south and the layout of the adjacent roadway. This consultation has included consideration of the access to the stadium opposite and positioning the driveway to benefit from the existing median on Turton Road.

The removal of 8 parking spaces north of the signalised pedestrian crossing approaching the driveway shall allow for motorists to slow and enter the site from the kerb side lane.

This space to the north of the pedestrian crossing currently provides shuttle bus parking during larger events in the precinct and shall continue to allow for this with some space to be relocated in consultation with the stakeholders including McDonald Jones Stadium and Keolis Downer.

5.1.2 Sight Distances

Turton Road in this location provides a straight and level alignment allowing for visibility to the right for exiting vehicles and good forward visibility for drivers approaching the access. The access provides a left turn deceleration lane. Exiting vehicles benefit from gaps in the traffic movement created by the signals at Lambton Road to the south.

Allowing for the frontage speed of 60km/hr Austroads requires a minimum sight distance of 114 metres and a desirable distance of 123 metres. The visibility has been checked on site and it exceeds 127 metres to the south (right) being to Monash Road. As the driveway is left out only, visibility to the north (left) does not require review.

■ *Photo 4 View to right for drivers exiting the proposed site access on Turton Road*

5.1.3 Service Vehicle Access

Vehicle entry and exit movements shall be via a new driveway connection to Turton Road which shall cater for all large vehicles including bus and delivery vehicles in and out of the site.

All vehicles shall be able to enter and exit the site in a forward direction. Adequate provision shall be made for the manoeuvring, loading and unloading of vehicles associated with the servicing of the site. All vehicular crossings are to be designed and located in accordance with the relevant Australian Standards (AS/NZS 2890 - Parking Facilities).

The development will require minimal service vehicle access. The largest service vehicle would be the occasional delivery van and garbage truck. The refuse will be collected by a private contractor with vehicles typically 10.8metres long.

5.1.4 Queuing at entrances

Minimal queuing is expected at the entry point as there is no conflict within the site so that traffic entering can move easily within the site and away from this entry point. There is free flow into the site with the car park located 102 metres from the entry point on Turton Road.

During ticketed events, traffic marshals reviewing tickets will be located some 96 metres within the site allowing adequate space for at least 15 vehicles within the site prior to this checkpoint.

5.1.5 Current access compared with proposed access

There is no vehicle access to the site.

5.1.6 Turn lane warrant analysis and access assessment

To assess the potential capacity for a left in and left out access to Turton Road, Seca Solution collected traffic data at the signal controlled intersection of Turton Road and Young Road as well as at the intersection of Monash Road and Turton Road. There traffic surveys were completed on the following day / time:

- Tuesday 21st November 2023 between 3-6 PM
- Saturday 25th November 2023 between 10.30AM and 1.30 PM

These times were selected to represent the peak use mid week, which would be afterschool use coinciding with peak commuter demands along Turton Road and on a Saturday midday with peak use at the stadium and peak traffic demands along Turton Road.

Note the surveys were completed at a time when there was no major event occurring at the stadium opposite e.g. Jets game as at these times there is an Event Management Plan in place and normal traffic conditions do not apply.

To assess the potential impact of the proposed left in and left out for access to the stadium site, Sidra modelling has been completed. The assessment allowed for the following:

- NO left turn acceleration lane provided. Observations on site show that the adjacent downstream intersection at Monash Road allows drivers to enter the through traffic stream generally in gaps created by the traffic signals at the Lambton Road traffic signals.
- Left turn deceleration lane for the access was modelled. This has been provided through design refinement in consultation with TfNSW which allows this to occur within the kerbside No Parking lane/shoulder.
- A generation value of 300 vehicles per hour has been assumed for the site, giving 150 inbound and 150 outbound traffic movements per hour for the general day to day use of the stadium. This is significantly higher than predicted demands to provide for the worst case scenario either of a Saturday or of an afternoon.

- A sensitivity test with 600 vehicles per hour for the Sports Centre site, with 300 inbound and outbound per hour.

A summary of the results of the Sidra modelling are provided below.

Table 5-1– Results for 2023 with 300 vehicles per hour for HISC

Approach	Degree of saturation	Average delay	Level of service	Queue distance (metres)
Turton Road south	0.406 / 0.366	0.6 / 0.7	A / A	0.0 / 0.0
Turton Road north	0.498 / 0.451	0.2 / 0.2	A / A	0.0 / 0.0
Site access	0.315 / 0.276	12.6 / 11.1	A / A	8.9 / 7.7

- Note: Tuesday PM / Saturday peak

Table 5-2 Results for 2023 with 600 vehicles per hour for HISC

Approach	Degree of saturation	Average delay	Level of service	Queue distance (metres)
Turton Road south	0.406 / 0.366	1.1 / 1.1	A / A	0.0 / 0.0
Turton Road north	0.498 / 0.451	0.2 / 0.2	A / A	0.0 / 0.0
Site access	0.630 / 0.552	16.5 / 13.8	B / A	26.1 / 22.0

- Note: Tuesday PM / Saturday peak

The above results show that the impact of the potential access to HISC via a left in and left out on Turton Road is negligible.

5.1.7 Access to Public Transport

The nearest bus stops are located on Turton Road, a 100m metre walk from the main entry point to the facility. Pedestrians can walk along the existing footpaths on Turton Road and use the signalised crossing for southbound services.

The site will accommodate bus entry and exit movements which will allow for chartered team bus access for major sporting events when held at the facility.

5.2 Impact of Generated Traffic

5.2.1 Impact on daily Traffic Flows

The capacity of urban roads is generally determined by the capacity of the intersections. The Bitzios Consulting Modelling Report modelled the Turton Road corridor between Griffiths Road and Lambton Road assessing the impact on the various intersections. It was observed that for most intersections, the impact upon additional development traffic would be negligible for which no particular upgrades would be required.

As the impact of the development traffic is acceptable in the peak periods it can be concluded that it is acceptable on daily traffic flows.

5.2.1.1 Local Roads

PM arrivals 200-202vph, Saturday 120vph arriving disbursed across various routes, some of which rely upon local roads.

Outside the afternoon peak, daytime demands across the road network are much lower being 1/3 of afternoon demands.

Young Road – 22% of inbound development traffic turning right at Turton Road and Young Road - 46 vph

Wallarah Road and Monash Road – 26% of inbound traffic – 54 vph

Table 5-3 Future flows on local roads

		Mid-weekPM Peak	Including Development	Saturday AM	Including Development
Young Road	Eastbound	377	377	195	195
	Westbound	228	274	135	164
Monash Road	Eastbound	113	167	47	79
	Westbound	65	65	46	46

Allowing for the above Young Road would see two way flows increasing to 651 vph (377+274) with Monash Road increasing to 232 vph (167+65).

Young Road operates as an urban road with a mid-block capacity of 900 vph per direction. The additional flows would see no change to the existing level of service which would remain as LoS B westbound (< 380vph). This demonstrates significant capacity for background growth on this road.

For Monash Road the future traffic movements are within the environmental capacity of this road being well within the maximum capacity of 500 vph and below the desirable level of 300vph. Flows on the surrounding secondary roads are similar, and the development shall therefore have an acceptable impact based on the Guide to Traffic Generating Developments.

5.2.2 Peak Hour Impacts on Intersections

As part of the assessment for the proposed development, the impact of the development traffic on the road network, including intersection capacity, has been assessed by Bitzios Consulting (**Appendix D**).

Whilst data was not collected at the intersections of Young and Womboin Road or at Wallarah and Monash Roads the left turns at these intersections are efficient with minimal impacts on the operations of these intersections. Development traffic approaching these intersections from Young Road equates to up to 54 vehicle trips being turns from Turton Road which is managed by signals. This allows an even distribution of these vehicle trips over the afternoon sporting period.

5.2.3 Background traffic and other developments

As advised by Transport for NSW, growth on this corridor is minimal in the peak period with peak hour spread accommodating any overall increases in background traffic.

It is notable that both the 'Project Case' and 'Project Case with Upgrades' account for zero-growth for the 10-year horizon/future year scenarios, as per advice and confirmation from TfNSW.

5.2.4 Summary of Modelling (Bitzios Consulting)

Bitzios Consulting was engaged by the Basketball Association of Newcastle Limited to undertake SIDRA intersection modelling as requested by Transport for NSW. The modelling was updated in consultation with TfNSW however no changes to traffic volumes or trip distribution were required.

The study area encompasses the following five (5) intersections:
- **Intersection 1**: Turton Road / Griffiths Road
- **Intersection 2**: Turton Road / Young Road
- **Intersection 3**: Turton Road / MacDonald Jones Stadium Site Access
- **Intersection 4**: Turton Road / Monash Road
- **Intersection 5**: Turton Road / Lambton Road.

The purpose of the modelling is to assess the potential traffic impacts at the subject intersections and identify any potential upgrades required to mitigate the significant and detrimental traffic impacts.

The report is provided in **Appendix D** and summarised below:

After analysing and comparing the intersection performances between the Base Case and the Project Case, it was observed that for most intersections, the impact upon additional development traffic would be negligible for which no particular upgrades would be required.

For Turton Road / Griffiths Road, the average delay denotes that the performance deteriorated in considerable amount at Turton Road right turn bay during the PM peak, which required necessary mitigation. This was resolved by optimising signal timing. No other geometric upgrades were adopted.

For some intersections, for instance Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit, the delay appears excessively high for SIDRA having at least one vehicle in the model where in reality there isn't any vehicle waiting.

It is well understood that the modelling results, even with the signal optimisation, reflect the outputs of the 'Project Case' in most of the cases except for the boosted improvement in Delay and Queue at Turton Road / Griffiths Road intersection performance in Weekday PM peak. The weekend results in the project case would remain unchanged due to similarity of intersections performance in both scenarios.

Findings of the modelling are summarised below:

- *SCAT Optimisation of traffic lights phase times is mainly required for Turton Road / Griffiths Road due to the development traffic assigned to the northbound right turn lane at this intersection causing extra 24.6 seconds of delay at this approach during the PM peak*
- *No geometrical upgrades are seemingly required across any of the intersections due to the development*
- *Pedestrian movements are quite nominal/insignificant and hence unlikely to impact any of the signalised intersection phase times in a larger scale.*

Upon undertaking SIDRA analysis, it can be confirmed that no to minor extra delays would be expected across most surrounding intersections after construction of the proposed Indoor Sports Centre.

A sensitivity test was conducted for the Saturday traffic data as it was collected during wet conditions. The outcomes of this is included in Appendix E with the conclusion being "*that the SIDRA modelling used for the TIA/RTS remains fit-for-purpose, and there is no basis for requiring a re-survey of traffic volumes or the re-running of SIDRA network models.*"

5.2.5 Impact of Construction Traffic

As part of the SEARs requirement a Preliminary Construction Traffic Management Plan has been prepared to document the traffic routes in and out of the site and controls for heavy vehicles etc.

During construction there will be a demand for heavy lifting machinery as well as some earthwork equipment. The construction work will all be located on site and as such will have a minimal impact upon the local road network.

The size of the site will allow for construction traffic to be parked on site subject to a construction access being created (anticipated to be to Turton Road) in a location similar to the final access and north of the signalised crossing.

Staff numbers for the construction phase will typically be in the order of 20 people on site, with higher numbers during peak periods such as concrete pours and final fit outs. The operational demands for the site has been assessed to allow for 48 arrivals in the AM peak, more than twice the construction traffic anticipated. Construction traffic will arrive to site before the local road peak (8AM-9AM) during which time there is more available capacity to accommodate these extra short term demands. The impacts are therefore acceptable.

Suitable signage per the Traffic Guidance Scheme will advise motorists of inbound and outbound traffic based on the provision of a temporary construction access onto Turton Road.

Heavy vehicles will be directed to use State roads when approaching and departing the site.

The shared path on the southern side of the site and the signalised crossing on Turton Road shall continue to be available for pedestrians and cyclists through the majority of the construction. Some minor detours may be required during any public domain works.

Some parking on Turton Road may be temporarily removed along the site frontage on the approach to the construction entry to allow for vehicle access.

Construction is unlikely to impact the operation of shuttle buses associated with events at McDonald Jones Stadium given these services typically run of an evening or weekend (Saturday afternoon/evening or Sunday) outside construction hours. Consultation will be undertaken with local businesses and residents, including the management of McDonald Jones Stadiu,

The later stage of the development shall be undertaken maintaining vehicles access to the carpark and pathways within the site. This may require internal detours for pedestrians or on site management which shall be subject to appropriate signage/controls determined in conjunction with the construction methodology once determined.

A separate Traffic Guidance Scheme (TGS) will be required to allow for the work directly impacting Turton Road which may be the subject of a Works Authorisation Deed (WAD) with Transport for NSW.

5.3 Impact on Road Safety

The entry point on Turton Road shall be located on a straight section of road providing good visibility for drivers entering and exiting the site. The kerb side lane shall allow for the deceleration of vehicles turning left into the site and allow for the safe entry of vehicles. All outbound vehicles shall have good visibility and will benefit from gaps in the traffic movements created by the traffic signals south of the site. The layout of this access has been discussed with Council and Transport for NSW and will allow for a simple driveway type entry.

The sight lines available meet with the requirements with all traffic turning left out of the site.

The road network in the vicinity of the site operates well and there are no significant road safety issues noted on the road network in the vicinity of the subject site. Overall, it is considered that the traffic movements associated with the project shall have an acceptable impact upon road safety in the vicinity of the subject site.

No Right Turn signs are recommended at the site exit as well as on the median on Turton Road to reinforce the Left In/Left Out only access. A No U Turn sign at Monash Road is also recommended, consistent with the existing one for northbound traffic in this location. Any southbound traffic passing this point can turn right at Lambton Road and use various routes to approach the site.

5.4 Traffic Signals

Assessed by Bitzios Consulting and summarised below (Appendix D)

- *SCATS Optimisation of traffic lights phase times is mainly required for Turton Road / Griffiths Road due to the development traffic assigned to the northbound right turn lane at this intersection causing extra 24.6 seconds of delay at this approach*

- *Pedestrian movements are quite nominal/insignificant and hence unlikely to impact any of the signalised intersection phase times in a larger scale.*

5.5 Circulation and Parking

5.5.1 Pattern of circulation

All vehicles will be able to enter and exit the site in a forward direction, with the proposed entry and internal site layout providing for two-way movements throughout. The drop off zone along the site frontage will be one way (clockwise).

5.5.2 Internal Road width

The main internal roads will provide sufficient width to support two-way movements, including light and heavy vehicles as described above with these two-way roads providing a minimum width of 6.5 metres along the spine and 6.0 metres elsewhere.

5.5.3 Internal Bus Movements

Private buses/coaches will be used during larger events to transport teams and some spectators to the site with all entry and exit movements via the new access on Turton Road. These events are not regular and will typically occur of a weekend or evening, outside of local road peaks.

Parking for two buses is provided on site which has been determined as suitable to accommodate this demand.

At other times demands for buses to the site will be low, for example a school sports activity. These times do not coincide with after school operational peak demands for the site but rather occur mid-week when the centre is much quieter. As well as the two bus/coach parking spaces, there is parking available on site to accommodate demands for smaller people-mover (ie 12 seater) vehicles as well as space for Coaster style 22 seater if required.

5.5.4 Service Area Layout

A dedicated service bay is provided. This is located to the side of the building with direct access from the internal site road. The garbage collection will be managed to avoid the busy periods associated with the use on the site.

Swept paths have been undertaken by others.

5.5.5 Proposed Parking Supply

Formal parking is provided throughout the site with 240 spaces, including eight accessible spaces and nine spaces for drop offs.

Parking shall be developed per the following stages:

- Stage 1 185 spaces
- Stage 2 55 spaces

There are also 12 motorbike parking spaces as well as parking for bicycles.

During peak events, (Medium and Large spectator-based events) overflow parking is available in a manner consistent with other uses in the precinct with public parking provided along Monash Road or on other local streets abutting the playing fields and park areas. Further afield parking is available as demonstrated in Figure 2-7.

5.5.6 Parking provision per Stage Government policy

The Guide to Traffic Generating Developments provides the following parking provisions:

Table 5-4 Parking Rates per GtTGDs

Use	Car Parking
Indoor Sports Centre	No rate provided
Commercial parking – Office	Unrestrained situation: 1 space per 40m2 GFA
Café or Restaurant	whichever is greater of: 15 spaces per 100m2 GFA, or 1 space per 3 seats
Gym	Metropolitan regional centres 3 spaces per 100m$_2$ GFA Metropolitan sub-regional centres 7.5 spaces per 100m$_2$ GFA (desirable) 4.5 spaces per 100m$_2$ GFA (minimum)

5.5.7 Council code and local parking policies and plans

Under the Council DCP there is no rate for Indoor Sports Centres. For squash courts, tennis courts etc the parking shall be assessed as a merit-based assessment.

For this reason, guidance was sought from other sources to provide a suitable parking rate. The Guide to Traffic Generating Developments (GtTGD) does not nominate parking rates for basketball or similar sports centres. The Lake Macquarie DCP does provide for "indoor cricket and other court games" at the rate of 20 spaces per court. The Cessnock DCP allows a rate of 16 spaces per court plus 1 space per 2 employees, plus 3 spaces per spectators. Port Stephens DCP allows 15 spaces per indoor soccer/cricket/netball pitch or court.

This is also consistent with the existing 6 court stadium at Broadmeadow which provides 114 marked spaces on site, a rate of 19 spaces per court.

Allowing for this existing court rate of 19 spaces per court has been applied to this development.

Table 5-5 Parking Rates per Newcastle DCP (March 2024)

Use	Car Parking	Bike Parking	Motorbike Parking
Commercial parking – Office	1 space per 50m2 GFA	1 space per 200m2 GFA (Security Level B) 1 space per 400m2 GFA (Security level C)	1 space per 20 car spaces
Commercial parking – Shop	1 space per 40m² GLFA	2 spaces per 200m2 GFA (50% Security Level B, 50% Security Level C)	
Café or Restaurant	1 space per 10m2 GFA or 1 space per 5 seats	1 space per 100m2 GFA (Security Level B) 1 space per 100m2 GFA (Security Level C)	
Health Consulting Rooms	1 space per practitioner plus 1 space per 2 other staff 2 spaces per practitioner for visitors		
Gym	Minimum 4.5 spaces per 100m²	1 space per 15 staff (Security Level B) 1 space per 7 staff (Security Level C)	

Accessible parking - e. class 5, 6, 7, 8, 9b or 9c buildings — at least 1 space every 33 spaces

5.5.8 Parking Layout

Car parking will be provided in accordance with AS/NZS 2890.1:2004 and AS/NZS 2890.6:2009.

For a Class 2 Parking Facility (which is the recommended classification for sports facilities being Full opening, all doors being generally medium term parking) the minimum dimensions for a car parking space are 2.5 metres wide by 5.4 metres long. Car parking aisles shall be at least 5.8 metres wide.

5.5.9 Projected peak parking demand

Use	Car Parking	Area for assessment	
Courts	19 spaces per court	12	228 spaces
Café or Restaurant	1 space per 10m2 GFA or 1 space per 5 seats		Ancillary 5 staff spaces
Health Consulting Rooms	1 space per practitioner plus 1 space per 2 other staff 2 spaces per practitioner for visitors	Assume 3 practitioners + 2 staff	10 spaces
Gym	Minimum 4.5 spaces per 100m²	717.1m2	32.3 spaces
High Performance Office	1 space per 50m2 GFA	351.1m2	7 spaces
Office	1 space per 50m2 GFA	303.5m2	6 spaces

Ancillary services to players and teams as well as staff, referees and officials on site shall primarily occur during the day when the courts are operating at significantly lower capacity and often by school groups who arrive by bus.

The café is ancillary, designed to provide food and drink services during games and for workers on site. Parking has been provided for staff only.

On this basis, during the week (9-4pm) the typical parking demands would be 175 spaces (61 + 114 being 50% of the court use). It can be seen that the project will cater for these typical everyday parking demands on site.

After 4pm, the staff associated with the administrative functions operating from the site will be generally leaving and the ancillary services will be primarily associated with those already on site. Café staff would be minimal (typically 2 of an afternoon/evening) and gym attendance (not open to the public) would be associated with team training and not include staff. Initial arrivals at 4pm, associated with junior players, would coincide with staff and allied service personnel leaving. There would be two operational staff on site and possibly 1 or 2 allied health staff attending late appointments. This makes no provision for staff who choose active transport to travel to and from the facility. Parking demands would therefore be in the order of 238 spaces (228 + up to 10 for staff on site). Allowing for players to be dropped off by parents and higher car occupancy associated with players travelling together it is considered that the parking provision on site can accommodate this demand. This also makes no concession for mode share nor for those who may travel to the site by motorbike.

It can be seen therefore that the peak afternoon parking demands can also be accommodated on-site with no reliance on on-street parking. It is noted however that some attendees may choose to park off-site including on Monash Road in a manner consistent with the prior use of the site as playing fields.

Stage 1

The parking demands for Stage 1 will require parking for 8 courts (8x19=152) plus 5 spaces for the ancillary café and 6 for the office. The provision of 185 spaces, including 9 drop off spaces exceeds this requirement of 163 spaces.

Use	Car Parking	Area for assessment	
Courts	19 spaces per court	8	152 spaces
Café or Restaurant	1 space per 10m2 GFA or 1 space per 5 seats		Ancillary 5 staff spaces
Office	1 space per 50m2 GFA	303.5m2	6 spaces

The provision of 12 motorbike parking spaces is consistent with the DCP rate of 1 space per 20 vehicle parking spaces.

Event Parking

Separate to the day to day, week by week operations of the site which as detailed above can be accommodated within the parking on site, parking associated with small and medium events can be accommodated both on site and in conjunction with on street parking, for example along Monash Road.

Allowing a conservative car occupancy rate of 3 patrons per vehicle provides the following parking requirements for small and medium events.

	On site Parking 231 spaces	Along Monash Frontage (80 spaces)	Sub-Total	Additional along Monash Rd west of site (60 spaces)	Total
Car occupancy 3 per vehicles	693 pax	240 pax	933 pax	180 pax	1113 pax

The larger events detailed in the Event Management Plan prepared for the development outlines the parking and traffic management requirements for larger spectator-based events. These will be scheduled to avoid conflict with other large events in the precinct. Overflow parking will be available along the local streets that front the playing fields and parklands as is presently seen during larger events at McDonald Jones Stadium with additional parking opportunities identified in the EMP and TMP.

A summary of the parking demands for HISC events, based on the car occupancy rate of 3 passengers per car, is shown below.

Table 5-6 HISC Event Parking Demands and Supply

Attendance	Parking Demands	On-site Parking	Monash Road	Other
1100	367	231	80+60	Nil
1700	567	231	80+60	196
2500	833	231	80+60	462

5.5.10 Service Vehicle Parking

A dedicated service bay is provided adjacent to the building.

Buses associated with school sports during the day can stand on site using the two bus parking spaces or vehicle spaces for people movers.

5.5.11 Pedestrian and Bicycle Facilities

Suitable bicycle parking is to be provided within the site to accommodate the potential demands associated with staff and patrons. Secure bike parking will be provided to support and encourage cycling to the site and reduce the dependency on private motor vehicle access to the site.

Whilst parking rates are not provided for facilities such as this the following rates have been provided to the ancillary areas (1250m^2 being office, health and gym) to allow for a suitable number of bike parking spaces:

- 1 space per 200m2 GFA (Security Level B) consistent with staff parking for office - 7 spaces
- Visitor parking consistent with a rate of 1 space per 100m2 of ancillary area allows for 13 spaces which also equates to 1 space per court.

8 staff spaces and 42 visitor bicycle spaces have been provided. End of trip facilities are available given the provision of showers etc on site with lockers suitable for use by staff available within the change rooms.

The majority of the pedestrian demands will be contained movements within the site.

A footpath connects the building frontage to the two internal bus parking spaces.

The pedestrian promenade shall be marked as a pedestrian crossing across the driveway within the site ensuring priority for pedestrians whilst cyclists in this location can dismount to cross. The carpark shall be sign posted as a shared zone at the entry to reinforce that this area is a driveway and that the site is shared with pedestrians.

During larger events traffic/pedestrian control on the crossing within the site shall manage the movement of inbound pedestrians to ensure there is no queuing of vehicles back towards Turton Road. At other times these movements would be minimal and have no significant impact on vehicle movements entering the site.

External to the site pedestrians can use existing facilities to connect with the broader pedestrian network including to bus stops and the Broadmeadow Station.

Signalised crossings on Turton Road allow for the safe movement of pedestrians between the site and the opposite side of Turton Road.

5.6 Public Transport

5.6.1 Options for improving services

No improvements required. Regular bus services along Turton Road have sufficient capacity to accommodate the day to day demands of the centre.

5.6.2 Pedestrian Access to Bus Stops

The internal footpath shall connect with the pedestrian pathway on Turton Road to access northbound services. Signalised pedestrian crossings across Turton Road provide connection to southbound services.

5.6.3 McDonald Jones Stadium Event Bus Parking

The Event Management Plans for the McDonald Jones Stadium provide event bus stops along the site frontage. Whilst the stops south of the pedestrian crossing shall be maintained, the stops north of the pedestrian crossing shall be reduced, with the bus parking either relocated or bus schedules reviewed in consultation with stakeholders including Keolis Downer and McDonald Jones Stadium.

The operation of these services typically occur of an evening or weekend (Saturday afternoon/evening or Sunday) and so are unlikely to be impacted by construction associated with the development.

5.7 Pedestrian and Cyclists

The footpath across the site between the signalised crossing and Monash Road, outside the site boundary, shall be widened to allow for the full development.

6 Improvement Analysis

6.1 Improvements to Accommodate Existing Traffic

There is no improvement required to accommodate existing traffic.

It is considered that the proposed site access and circulation will provide a safe and appropriate access arrangement for the proposal. The access arrangements will be designed and constructed in accordance with Council Design Standards.

6.2 Improvements to Accommodate Background Traffic

No improvements are required. The extension of the Newcastle Inner City Bypass will see significant reduction in through traffic on parts of Newcastle Road, Croudace Road and Lookout Road providing increased capacity for traffic along these routes.

6.3 Additional Improvements to Accommodate Development Traffic

It is considered that there are no additional requirements to upgrade pedestrian or cycling facilities in the general locality of the site.

Per the Bitzios Consulting Report (Appendix D).

- *SCATS optimisation of traffic lights phase times is mainly required for Turton Road / Griffiths Road due to the development traffic assigned to the northbound right turn lane at this intersection causing extra 24.6 seconds of delay at this approach*
- *No geometrical upgrades are seemingly required across any of the intersections due to the development*
- *Pedestrian movements are quite nominal/insignificant and hence unlikely to impact any of the signalised intersection phase times in a larger scale.*

Upon undertaking SIDRA analysis, it can be confirmed that no to minor extra delays would be expected across most surrounding intersections after construction of the proposed Indoor Sports Centre.

6.4 Alternative Improvements

It is considered that the proposed works are acceptable, and no alternate improvements are required.

6.5 Status of Improvements Already Funded, Programmed or Planned

The planning for the Broadmeadow Precinct is in its early stages only at this time.

6.6 Evaluation

Based on the traffic modelling undertaken by Bitzios Consulting, in consultation with Transport for NSW, and allowing for the assessment above the proposed development can be accommodated as proposed.

7 Summary and Recommendations

7.1 Summary

Access to the site is proposed via a new driveway on Turton Road that will allow for left turn movements in and left out consistent with the International Hockey Centre opposite. Given the network of roads available trips will disperse across various routes to access the site being able to use a number of signalised intersections where required. This access will allow for all heavy vehicle movements in and out of the site.

Traffic modelling completed by Bitzios Consulting has been undertaken and is to be reviewed in conjunction with this report (Appendix D).

Allowing for SCATS optimisation of traffic signals at the intersection of Turton Road / Griffiths Road, the impact of the traffic associated with the project shall have an acceptable impact upon the local road network with no to minor extra delays expected across most surrounding intersections. Local roads will remain within their mid-block or environmental capacity.

Parking for the typical peak use Monday to Friday and of a weekend is provided on site in a permanent car park providing 240 parking spaces including 9 drop off spaces and accessible parking. The on-site parking for the normal use through the week and the weekend is provided in accordance with the Council DCP allowing for the complimentary nature of the uses on site and allows for the staged development of the project. The parking has been designed to ensure that there is sufficient parking for each stage with 185 spaces to be built in conjunction with Stage 1.

During some Medium and Large spectator events, the parking shall be as detailed in the Event Management Plan. Separate Event Management Plans has been prepared for the project and will be developed further in consultation with the road authorities.

The site layout provides for the efficient movement of vehicles throughout the site with parking provided within a dedicated sealed parking area to the front of the main entry to the building. This will also allow for a service vehicle accessing the site.

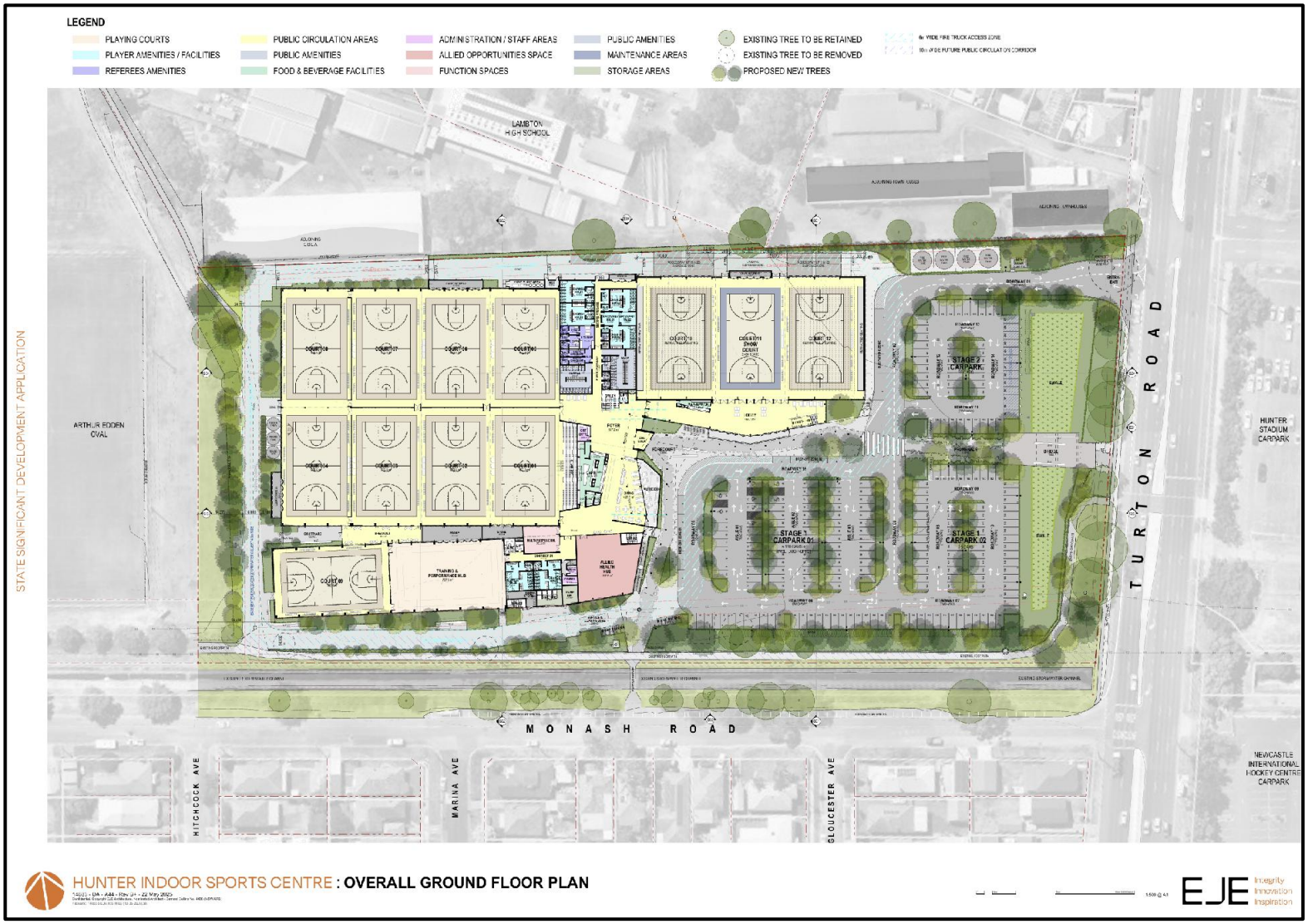
7.2 Recommendations

From the site work undertaken and the review of the development proposal and associated plans against the requirements of the Guide to Traffic Generating Developments and Austroads Guide to Traffic Management, it is concluded that the proposed development should be approved on traffic, access and car parking grounds.

To maintain safety in the vicinity of the site the following is recommended:

1. No Right Turns signs be included at the exit as well as on the median on Turton Road adjacent to the site
2. Include a No U Turn sign on the median on Turton Road at Monash Road consistent with the current one for northbound traffic
3. SCATS optimisation of traffic lights phase times is mainly required for Turton Road / Griffiths Road due to the development traffic assigned to the northbound right turn lane at this intersection causing extra 24.6 seconds of delay at this approach (per Bitzios Report)

Appendix A – Site Plans




LEGEND
STAGE 1 WORKS
FUTURE STAGE 2 WORKS
6m WIDE FIRE TRUCK ACCESS ZONE
10m WIDE FUTURE PUBLIC CIRCULATION CORRIDOR
EXISTING TREE TO BE RETAINED
EXISTING TREE TO BE REMOVED
PROPOSED NEW TREES
STATE SIGNIFICANT DEVELOPMENT APPLICATION
LAMBTON HIGH SCHOOL
ARTHUR EDDEN OVAL
PROPOSED INDOOR SPORTS CENTRE
STAGE 1
FUTURE STAGE 2 BUILDING
FUTURE STAGE 2 CARPARK
STAGE 1 CARPARK 01
STAGE 1 CARPARK 02
SWALE
HUNTER STADIUM CARPARK
TURTON ROAD
MONASH ROAD
HITCHCOCK AVE
MARINA AVE
GLOUCESTER AVE
NEWCASTLE INTERNATIONAL HOCKEY CENTRE CARPARK
HUNTER INDOOR SPORTS CENTRE : STAGE 1 SITE PLAN
14683 - DA - A64 - Rev B+ - 22 May 2025
EJE Integrity Innovation Inspiration

Appendix B – Transport for NSW

The TIA should be tailored to the scope of the proposed development and include, but not necessarily be limited to, consideration of the following; • A map of the surrounding road network identifying the site access, nearby accesses, intersections and transport related facilities. • A map of the proposed transport route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site.	Figure 2-2 Figure 4-1 – Figure 4-3
• The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include; Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections. Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon. Due to the impact of COVID- 19 on travel patterns, traffic counts undertaken at this time may not be representative of normal volumes. Alternative approaches to understanding the impact of COVID-19 on traffic patterns should be discussed with TfNSW. The volume and distribution of existing and proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.	Chapter 2 Existing Situation Chapter 4 Projected Traffic Chapter 5 Transport Analysis Appendix D – Bitzios Modelling Report
The type and frequency of design vehicles accessing the development site.	Sec 3.2.5
Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include; Available sight distances at the site access and nearby intersections and any constraint to achieving the required sight distance for the posted speed limit.	Turton Road is a State Road with intersections and alignment in accordance with Austroads Guidelines. 5.1.2 Sight line
An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments.	5.1.6 Turn lane warrant analysis and access assessment
Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s.	Refer Civil Package
Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s**. Intersections are to include Turton Road/Griffiths Road, Turton Road/Young Road, Turton Road/Lambton Road.**	Appendix D – Bitzios Consulting Modelling Report
A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.	2.5 Traffic Safety and Accident History

• Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.	Refer Civil Package
• Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.	Appendix A – Site Plan Refer architectural package
• Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling.	Sec 2.7 and Sec 5.6 Green Travel Plan
• Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s.	Refer CTMP and Drivers Code of Conduct
• Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with *Australian Standard 1742.3* and the *Work Health and Safety Regulation 2017.* It is recommended that any TMP include, but not necessarily limited to, the following; A map of the primary transport route/s highlighting critical locations. An induction process for vehicle operators and regular toolbox meetings. Procedures for travel through residential areas, school zones and/or bus route/s. Any proposed temporary measures such a Traffic Guidance Scheme (TGS) A Driver Code of Conduct for heavy vehicle operators. A complaint resolution and disciplinary procedure.	Refer CTMP and Drivers Code of Conduct
Community consultation measures proposed for peak periods.	

Appendix C – City of Newcastle Council

Consultation with Transport for New South Wales (TfNSW)	Undertaken by Bitzios Consulting with regard to modelling requirements
It is recommended the applicant consult with TfNSW during preparation of the Environmental Impact Statement (EIS) to obtain support for the proposed vehicle accesses on Turton Road. It is also noted that the proposal is likely to require referral to (TfNSW) pursuant to State Environmental Planning Policy (Transport and Infrastructure) 2021 Clause 2.122 – Traffic Generating Development based on size, capacity, and location of vehicle access.	Consultation with TfNSW has been undertaken. Requirement for referral is noted.
Vehicle accesses	
The proposed vehicle accesses in Turton Road are required to conform with AS 2890.1 – Off Street Parking with particular attention given to the following: • Width of the access • Provision of a relatively level landing for a minimum 5.0m inside property • Driver sight lines for an existing vehicle being maintained in accordance with AS 2890.1 Figure 3.2 Sight Requirements at Access Driveways • Driver sight lines to a pedestrian being maintained for vehicles exiting the site in accordance with AS 2890.1 – Off-street Parking Facilities Figure 3.3. • Any proposed entry/exit security gates being offset from the property frontage to adequately cater for the largest vehicle expected to access the site, such to ensure all vehicles do not obstruct the public pedestrian footway. Furthermore, adequate provision should be made for tourist coach and service vehicle access with all vehicles entering and exiting the site in a forward direction. Vehicle turning paths for all relevant vehicle sizes (i.e. car, bus, service truck) are required to be displayed on plans submitted in support of the application to confirm accessibility.	Refer Civil Package
On-site parking	
A comprehensive assessment of parking will be required to be undertaken to determine the adequacy of the proposed on-site parking. Comparisons should be made with facilities of a similar nature and size and as appropriate the existing Broadmeadow Basketball site. In this regard, opportunities to reduce the amount of on-site car parking by investigating the option of utilising the adjacent McDonald Jones Stadium car park to cater for car parking demands of this development, including possible fluctuations, need to be explored.	Refer Sec 5.5-5.9
The applicant is also requested to address the following matters: • The proposal should incorporate the provision of an appropriate 'kiss and ride' facility to allow vehicles to pick up and drop off patrons. • Adequate parking provision should be made for electric vehicle charging in accordance with NDCP 2012 Section 7.03 Traffic, Parking & Access. • Adequate servicing facilities are required to be provided to cater for the projected demand likely to be generated by the proposed development. Refer to NDCP 2012 Section 7.03 Traffic, Parking and Access and the NSW Government's 'Freight and Servicing Last Mile Tool Kit '.	Allows for 9 vehicles Sec 5.4
Service vehicle parking and associated loading and unloading facilities are provided on site in a manner that is conveniently accessible.	Sec 5.4

Pedestrian access	
Defined pedestrian pathways and crossing facilities are to be provided throughout the proposed car park to building entry /exits, such assisting to minimise the potential for pedestrian /vehicle conflict. Full details should be provided on the plans submitted in support of the application. This proposal will form part of the cluster of sporting and entertainment venues referred to as Hunter Park. It is important that the site has an obvious and pedestrian friendly entrance to accommodate way-finding and pedestrian movement between the Basketball stadium and wider Hunter Park and Broadmeadow precinct.	Noted
The current plans indicate the frontage to Turton Road being dominated by vehicle entrances and car parking. Consultation with Venues NSW on their masterplan for McDonald Jones Stadium and public domain should be undertaken to ensure the two sites can connect. It is recommended that proper consideration be given to reducing carparking onsite, and demands addressed through a shared arrangement with McDonald Jones, to improve the overall outcome of the development.	Noted – consultation undertaken by others
Cycleways	
There is an existing regional cycleway running along the southern and south-east edge of the site. The proposed development, including service driveway, must not conflict with this cycleway which is an important spine in the existing network and future active transport network proposed in Broadmeadow. Additionally, the cycleway is adjacent to Lambton Ker-Rai Creek and adequate allowance for landscaping should be provided to allow for the riparian corridor to be re-established in the future.	Noted
Green travel plan	
A Green travel plan is required to be submitted in support of application – refer to NDCP 2012 Section 7.03 – Traffic Parking and Access.	Refer Green Travel Plan
Draft Operational Management Plan (OMP)	
A draft OMP inclusive of an Events Traffic Management Plan should form part of the documentation submitted in support of the application. The draft OMP should have regard to the existing OMP for McDonald Jones Stadium and comprise measures to ensure large scale events do not coincide.	Refer Event Traffic Management Plan
Traffic Impact Study	
The Traffic Impact Study should investigate public transport services and stops, and measures proposed to increase mode share to public transport and improve access to services. Evidence of liaison with public transport service providers and TfNSW is required within documentation submitted in support of the application.	A Green Travel Plan has been prepared for the project.

Appendix D – Authority Requests for Information

The following requests for information have been addressed in the past edition of this report.

TfNSW	
Access	
The proposed left in/left out (LILO) driveway on Turton Road is located at the break in the median for channelised right turn into Hunter Stadium car park, with a traversable seagull and no physical barrier to prevent vehicles attempting to turn right out of the proposed access. Vehicles can currently turn right from Hunter Stadium car park opposite this location and this would introduce the risk of vehicle conflict with vehicles exiting from the proposed stadium and vehicles exiting from Hunter Stadium, in a northbound direction, compounding the existing crash history at this location.	Being considered in consultation with TfNSW and Northrop to update access design **Appendix A – Site Plan**
Swept Path analysis for a 14.6m bus requires all lanes of Turton Road to exit the site. During peak traffic this will be difficult to accomplish resulting in increased delay for other vehicles exiting the site and/ or disruption of the traffic network.	Refer updated swept paths in conjunction with widened driveway. The demands for 14.6m buses would only be exiting the site outside of peak traffic times and therefore, minimal impact onto Turton Rd. **Sec 3.2.5 and 5.5.3**
Design of access does not show if a 2.5% crossfall can be achieved for footpath.	Refer Civil Package
Improved lighting to be provided at the entry points to the proposed stadium.	Refer Architectural Package
Deceleration Lane	
Investigation of an auxiliary left turning lane in accordance with Austroads requirements outside of the current lanes is requested to access the site instead of the proposed line marking of the current parking lane.	Being considered in consultation with TfNSW and Northrop to update access design **Appendix A – Site Plan**
The proposed deceleration lane occupies the current parking lane and will remove a section of parking, this is also event parking for buses during large Stadium events.	Refer Event Management Plan
On road cyclist facilities have not been provided on Turton Road through turn lane and should be accommodated.	TfNSW - As an interim solution, bike symbols are to be provided in the shoulder to provide visual guidance to road users on the presence of cyclists. Depending on the final arrangements of the shared path discussion, a transition ramp to the north of Monash Road might be required to provide connectivity to the shared path network
Ensure the deceleration lane meets required length for design speed of Turton Road.	Being considered in consultation with TfNSW and Northrop to update access design

While not specifically outlined in the Broadmeadow Strategy, there are a range of initiatives identified as needed along Turton Road. The proposed use of existing infrastructure as an exclusive left turn lane into the proposed stadium effectively precludes the opportunity for a third lane in the future.	Being considered in consultation with TfNSW and Northrop to update access design
A pavement investigation should be undertaken in the proposed deceleration lane on Turton Road to confirm existing shoulder pavement is sound to support changes.	TfNSW have acknowledged that should pavement investigation be required, it can be completed as part of the Works Authorisation Deed (WAD).
Shared Path	
Consider increasing the width of the footpath along the full frontage of Turton Road to a shared path to cater for increased foot traffic during events. Pedestrian fencing between proposed vehicle access and mid-block crossing to improve pedestrian safety.	Being considered in consultation with TfNSW and Northrop to update access design and provision of fencing as appropriate.
The development's proposed Stage 2B carpark appears to significantly impact the existing pedestrian and bicycle Shared Use Path along the southern and eastern edges of the site. This path is identified as an Active Connection in the NSW Government and Newcastle City Council Broadmeadow Place Strategy and has potential to align with the Strategic Cycleway Corridor between Broadmeadow and Lambton which is one of five connections identified as an opportunity for investigation. 1. The development should provide an upgrade to the existing shared path along the southern and eastern boundary of the site to an offroad separated bicycle path and separate pedestrian footpath, including connections to the facility itself, in the first stage of the development that impacts the existing path. 2. Consider relocation of the existing signalised pedestrian and bicycle crossing on Turton Road to provide a direct path and avoid the need for sharp turns on the bicycle path to be considered. Any design is to include provision of suitable curve radius to allow for bicycle travel, path width, clearances, sight lines, management of anticipated pedestrian and bicycle conflicts, separation from vehicle traffic as may be required. Design to be in accordance with the principles set out for Priority routes in the TfNSW Cycleway Design Toolbox.	It is noted that the amended plan no longer has a Stage 2B carpark but rather just Stage 1 and Stage 2. At the meeting, a number of safety, traffic and design issues were discussed about the impact of relocation. TfNSW supports the discussed plans for connection to the existing location of the signalised pedestrian and bicycle crossing on Turton Road.
Consider improved pedestrian access to the development including priority pedestrian crossings and footpaths, as recommended by the Walking Space Guide.	Noted
Ensure that supporting active transport infrastructure, such as adequate lighting (CPTED), trees (green infrastructure/amenity) and secure bike parking, are included in the designs for the active transport routes to the facility.	This is a matter for Council to consider in the management and design of their assets. The proposal includes lighting to footpaths and entrance points compliant with Australian Standards. Secure bike parking shall be included in the design.
Given the desire to see more users of the stadium arrive/leave by walking or cycling, a better outcome would be	

to increase the width of the path between Wallarah Road and Turton Road to provide separate walking and cycling facilities along with fencing and lighting to provide a safe and attractive environment. Ensure it can be designed and constructed in accordance with the Austroads Guidelines, Australian Standards, TfNSW Supplements and to Council's specifications.	The design provides room for future expansion of the footpath.
Modelling	Refer to Bitzios updated modelling
Trip Assignment	
Simulation undertaken from locations listed in table in TIA with Google maps provides the quickest route has nearly 60% of routes different to stated in TIA. It is assumed south bound vehicles will take a less direct route on Griffiths Road /Croudace Street. There is an opportunity for vehicles to enter Young Road and U turn legally in Young Road exiting back to Turton Road through TCS. These vehicles movements do not appear to be considered.	TfNSW has reviewed the trip assignment again and is satisfied that no further consideration of this matter is required.
Construction TMP	
Number of construction vehicles entering/exiting site per day not stated.	This is a Preliminary CTMP. This level of detail is not known at this stage of the development. The CTMP shall be updated and submitted for approval once the contractor is appointed and construction methodology is determined.
Long term lane closures on Turton Road during driveway construction to be avoided.	Noted
Between funding approval and construction of subsequent stages access should be equal or better than existing in between stages, including patron to park ratio adequate for each stage.	Parking for each stage has been provided to a suitable level.
Site Access in Staging Plan differs from access point in erosion and sediment control plan.	Final site access is being considered in consultation with TfNSW and Northrop.
Traffic guidance scheme (TGS) not provided. Consultation with TfNSW requested for any access/VMP/TGS/TMP that are developed for construction.	Noted The Preliminary CTMP includes an indicative TGS however site specific TGS shall be prepared by the contractor for approval prior to CC.
Events	
Hunter Stadium event shuttles information not included in Construction TMP or Traffic Impact Assessment (TIA).	The operation of the Hunter Stadium event shuttles has been considered in the preparation of the draft traffic management plans. The need for these is typically during large events of an evening or weekend which shall not impact the typical operation of the HISC nor coincide with Large spectator events at the HISC.
The TIA is unclear how car park will be managed during event clashes with Hunter Stadium.	Parking demands for the day to day operation can be contained within the subject site and

	so will not require management during event clashes. Draft TMPs are being prepared in consultation with the various stakeholders to address larger events, including the management of parking,
Boom gates or manned entry would likely create queuing onto Turton Road and would not be supported.	The gates at the site entry are for security after hours.
Event TMP mentions access via ticket parking this should show how this does not create queuing onto Turton Road.	Manned entry by parking attendants during certain events occurs some 96 metres within the carpark ensuring significant vehicle capacity (15 vehicles @ 6 metres per AS2890.1) within the site and the parking design allows for the re-direction of non-ticket holders to exit the site with minimal impact within the site.
It is unclear how the impact of events at Hunter Stadium and the Hockey Centre will be managed. Frequency of consultation with other venues to be provided.	Draft TMPs being prepared in consultation with the various stakeholders will address this.
Green Travel Plan	
This plan makes no mention of wayfinding signage for existing public transport hubs and distance/routes to those hubs.	GTP to be updated to address this
Plans	
A detailed signage or line marking plan must be provided	Not usually provided at DA stage. TfNSW has confirmed that the strategic plan will be sufficient at this stage.
A detailed pavement plan must be provided.	Not usually provided at DA stage.
City of Newcastle	
It appears from the proposed site plan that direct pedestrian access is proposed through the site from the forecourt area to this active transport connection (along the southern boundary of the subject site), to the footbridge over Lambton Ker-rai Creek to Monash Road. CN supports this important connection for visitors entering the development from the west and south, via active transport (walking and cycling). However, the proposed width of the footpath between the proposed retail space and service/loading zone is not commensurate with that of the remaining promenade through the site. CN is concerned about potential conflicts between service and delivery vehicles and pedestrians.	Refer updated architectural plans
CN is supportive of shared parking arrangements between facilities and promotes mode shift from private vehicles to public transport use, the application should clearly identify any short-term or temporary needs for the proposal, including the provision of pedestrian connections between the subject site and the stadium site.	The extent of shared parking is unclear however the existing signalised footpaths and pedestrian crossing across Turton Road will provide an effective connection between the two sites.
Traffic and Parking	
Turton Road - The application proposes a kerbside left turn deceleration lane for access to the site and vehicle entry/exit in Tuton Road. CN supports the proposed location for vehicular access to the site but acknowledges that Turton	Noted – addressed by TfNSW

Road is a 'classified road' and therefore the concurrence of Transport for New South Wales (TfNSW) is required pursuant to Section138 of the *Roads Act 1993*.	
b. *Monash Road* - The Traffic Impact Assessment (TIA) (p14) (Appendix P) has identified the northern side of Monash Road adjacent to the site as having the potential to cater for parking in the order of approximately 80 vehicles for larger events at the sporting centre. Due to the proximity of Monash Road to the site and the pedestrian footbridge connection, CN recommends the Applicant be required to formalise this northern road shoulder adjacent to the stormwater channel, comprising road pavement, kerb and gutter, stormwater drainage, vehicular barriers and lighting. In addition, the existing pedestrian footbridge linking the site to Monash Road should be upgraded to provide a minimum 3.0m wide pedestrian bridge incorporating pedestrian safety fencing. Monash Road is a Crown road and therefore any works proposed to be undertaken by the Applicant within the road reserve as part of this application will require the prior approval of Crown Lands.	Demands for this parking would be during Medium or Large events such as when the Show Court is in use. This existing parking provides for the recreational use of the grounds and would provide a similar role in the future being available for public parking whether associated with the HISC or by others at other times.
Bus swept paths - The modelled 14.5m long rigid bus vehicle swept path clashes with the designated pick-up / drop-off and bus parking areas. The Applicant proposes to manage this issue on-site utilising an events management plan. This approach is not supported and to ensure traffic safety and minimising congestion it is recommended that the car park layout be amended to remove this conflict. *Pedestrian Pathway* - CN recommends the proposed east/west pedestrian pathway linkage to Turton Road is implemented as part of Stage 1A to adequately cater for pedestrians, inclusive of a marked foot crossing across the internal driveway access road.	The plans were incorrectly labelled as needing management however the swept paths demonstrated the bus clearing the drop-off bays.
Pedestrian/Cycle Network	
The application impacts on the alignment of the existing major east/west cycleway at Turton Road with the proposed installation of the Stage 1B carpark. This is not supported as it results in the removal of the direct cycleway connection to the existing Turton Road traffic signal crossing.	Refer updated plans. Also note Stage 1B is no longer applicable with Stage 1 and Stage 2 only.
CN's concept plans for the future upgrade of the above cycleway require a minimum 10.0m wide corridor to be provided along the southern boundary of the site from the top of the existing stormwater channel. The proposed development encroaches into this corridor. CN recommends the design of the development is amended to remove these encroachments.	Refer updated plans which allow for a 10m corridor (for the future delivery of the upgraded cycleway by others).

Future transport planning by TfNSW in association with the BPS proposes a grade separated cycle /pedestrian bridge crossing for Turton Road. While planning is in the early stages, an adequate area will be required for the bridge landing in the south/western corner of the site. CN recommends the design of the development is changed to accommodate the above facility.	Consultation with TfNSW has indicated the ongoing use of the signalised pedestrian crossing.
a. The existing 1.2m wide concrete pedestrian path located on the western side of Turton Road between Monash Road and the proposed internal site pedestrian pathway is upgraded to a combined 3.0m wide pedestrian/cycle pathway incorporating pedestrian fencing.	Space has been allowed for to accommodate the future widening of the pathway during Stage 2 of the development.
The existing pedestrian footbridge linking the site to Monash Road be upgraded to provide a minimum 3.0m wide pedestrian bridge incorporating pedestrian safety fencing.	
The existing major east/west cycleway be upgraded between Turton and Wallarah Roads to provide a 3.0m wide cycleway / 1.0m separation / 2.5m pedestrian path.	A 10m corridor has been provided.
CN supports the use of the McDonald Jones Stadium car park for additional overflow parking in larger events, however, as mentioned previously the BPS identifies this car park, excluding the car park area to the north of the stadium, as future commercial in the short term. Notwithstanding, CN recommends that the Applicant be required to upgrade the northern side of Monash Road as additional overflow parking to ensure adequate parking is available. As advised above, the use of Monash Road for additional parking would be acceptable on the basis the Applicant includes this area as part of the proposed development and upgrades the existing pedestrian footbridge.	The subject site does not require the parking on Monash Road to allow for the day to day operation of the facility. The spaces will continue to be used by people accessing other uses within the precinct. These spaces are not relied upon by the project and upgrade to these spaces is not part of the proposed works. During medium and large spectator events, patrons may choose to arrive by public transport, be dropped off or may drive and use public parking available in various locations, including Monash Road.
Traffic Events Management Plan	
CN recommends the Applicant is required to prepare a Traffic Events Management Plan (TEMP) in consultation with TfNSW, CN, and NSW Police to address traffic management during events held at the proposed sports centre, such being prepared in accordance with 'NSW Guide to Traffic and Transport Management for Special Events, July 2018'. The TEMP is to be approved by TfNSW, CN and NSW Police prior to the occupation (part or whole) of the premise.	TMP and TGSs have been prepared by TPP in consultation with these stakeholders which would be subject to approval as a condition of consent.

CTMP	
The application is supported by a Preliminary Construction Traffic Management Plan (Appendix R). CN recommends that heavy vehicle construction traffic is not permitted to utilise local roads to access the site and are confined to the State road network as shown in Figure 3.1 of the plan.	Noted

Appendix E - Bitzios Consulting Traffic Modelling Technical Notes

Issue History

File Name	Prepared	Reviewed	Issued by	Date	Issued to
P6458.001T Newcastle Indoor Sports Facility SIDRA Intersection Modelling Technical Note	R. Jain T. Islam	A. Grey	A. Grey	04/05/2024	Simone.Larsen@app.com.au
P6458.002T Newcastle Indoor Sports Facility SIDRA Intersection Modelling Technical Note	T. Islam	A. Grey	A. Grey	20/05/2024	Simone.Larsen@app.com.au
P6458.003T Newcastle Indoor Sports Facility SIDRA Intersection Modelling Technical Note	T. Islam	A. Grey	A. Grey	28/05/2024	Simone.Larsen@app.com.au
P6458.003T Newcastle Indoor Sports Facility SIDRA Intersection Modelling Technical Note	A. Hu	A. Grey	A. Grey	30/04/2025	Simone.Larsen@app.com.au

Newcastle Indoor Sports Facility

SIDRA Intersection Modelling Technical Note

1. Introduction

1.1 Background

The Basketball Association of Newcastle Limited has engaged Bitzios Consulting to undertake SIDRA intersection modelling to inform a Traffic and Transport Impact Assessment prepared by SECAsolution for the proposed Hunter Basketball Stadium (subject site) located at the corner of Turton Road / Monash Road. The study area encompasses the following five (5) intersections:

- **Intersection 1**: Turton Road / Griffiths Road
- **Intersection 2**: Turton Road / Young Road
- **Intersection 3**: Turton Road / MacDonald Jones Stadium Site Access
- **Intersection 4**: Turton Road / Monash Road
- **Intersection 5**: Turton Road / Lambton Road.

The locations of the subject sites and intersections are shown below. Figure 1.1.

Adapted from Google Maps

Figure 1.1: Subject Site and Intersections

The purpose of the modelling is to assess the potential traffic impacts at the subject intersections and identify any potential upgrades required to mitigate the significant and detrimental traffic impacts. The subject intersections were modelled in SIDRA 9.1 Plus to understand these impacts. This technical note outlines the model development process and modelling results of the Base and Project Case scenarios.

2. Modelling Methodology

2.1 Modelling Scenarios

The following scenarios were modelled:

- **Base Case**: Existing conditions of the subject intersection
- **Project Case**: Similar to **Base Case**, with additional traffic generated from the proposed development of Hunter Basketball Stadium
- **Project Case with Upgrades**: Similar to **Project Case**, with SIDRA-optimised signal phasing time.

Notably, both the 'Project Case' and 'Project Case with Upgrades' account for zero growth for the 10-year horizon/future year scenarios, per advice and confirmation from TfNSW. The summary of the traffic input for each scenario is provided in Table 2.1.

Table 2.1: Traffic Demand for Modelling Scenarios

Scenario	Applied Traffic Demand
Base Case	Intersection Turn Count 2024 only
Project Case	Intersection Turn Count 2024 + Development Traffic from the subject site*
Project Case with Upgrades	Same as Project Case.

**Development Traffic is determined according to Report P2614 Newcastle Indoor Sports Centre Traffic Generation and Assignment by SECAsolution for Weekdays and Weekends.*

All the scenarios were modelled for the following peak hours:

- **Weekday:**
  - AM Peak: 08:00 – 09:00
  - PM Peak: 16:45 – 17:45
- **Weekend:**
  - Peak: 11:15 AM -12:15 PM.

3. Base Model Development

3.1 Geometrical Layout

The geometric layouts have been coded in SIDRA in accordance with the existing arrangements using Google Maps. The geometric layouts for all the subject intersections are attached in **Attachment B.**

3.2 Traffic Surveys

Bitzios Consulting commissioned TDC to undertake the Intersection Counts Survey for all modelled intersections. For different scenarios of the model, the following days and times of the same week were nominated for data collection:

- **Weekday: Thursday, 4th April 2024**
  - AM: 07:00 – 10:00 (3-hour survey)
  - PM: 15:00 – 18:00 (3-hour survey)
- **Weekend: Saturday, 6th April 2024**
  - Time: 10:00 – 14:00 (4-hour survey).

Traffic flow diagrams with the collected survey data for Weekday AM, PM and Weekend have been provided in **Attachment A.**

3.3 Bus Movements

Bus movements were accounted for at the intersections during the nominated peak hours. The following measures were implemented for bus movements:

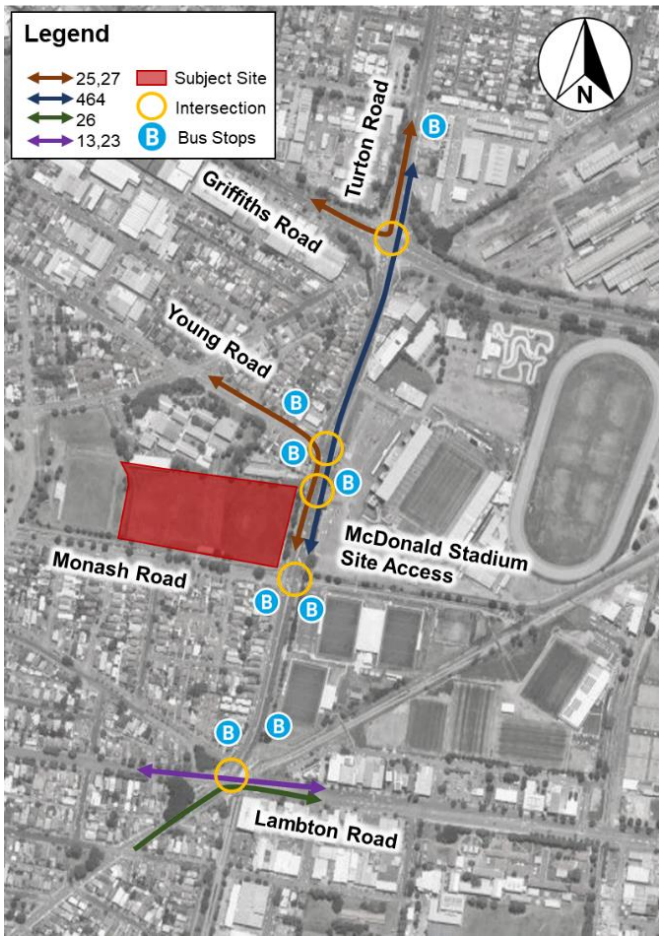
- Buses were treated as Heavy Vehicles, so the volumes for Heavy Vehicles included the identified Buses for all scenarios. An exception applies to Turton Road / Lambton Road. Due to having a bus queue jump lane at the intersection, buses were exclusively classified in terms of volume and vehicle class
- For Turton Road / Lambton Road, buses are configured to pass through the bus queue jump lane in every cycle of the traffic lights.

The classified bus movement for Weekday AM, PM and Weekend peaks at Turton Road / Lambton Road are provided in Table 3.1.

Table 3.1: Bus Services and Volumes (AM Peak)

West Approach (Weekday: AM Peak)	
Service/Route No.	**Number of Services (Through)**
13	4
23	2
761	1
830	1
832	1
833	1
Total	**10**
West Approach (Weekday: PM Peak)	
13	4
23	3
Total	**7**
West Approach (Weekend Peak)	
13	2
23	1
Total	**3**

The bus movements, along with adjacent stops at the subject intersections, have been depicted in Figure 3.1.



Adapted from TfNSW Bus Routes

Figure 3.1: Bus Services at the Subject Intersections

The classified bus movement routes for Weekday AM, PM, and Weekend peak at Turton Road / Lambton Road bus lane are shown in Figure 3.2.

Adapted from SIX Maps

Figure 3.2: Eastbound Bus Services at Turton Road / Lambton Road / Bridges Road

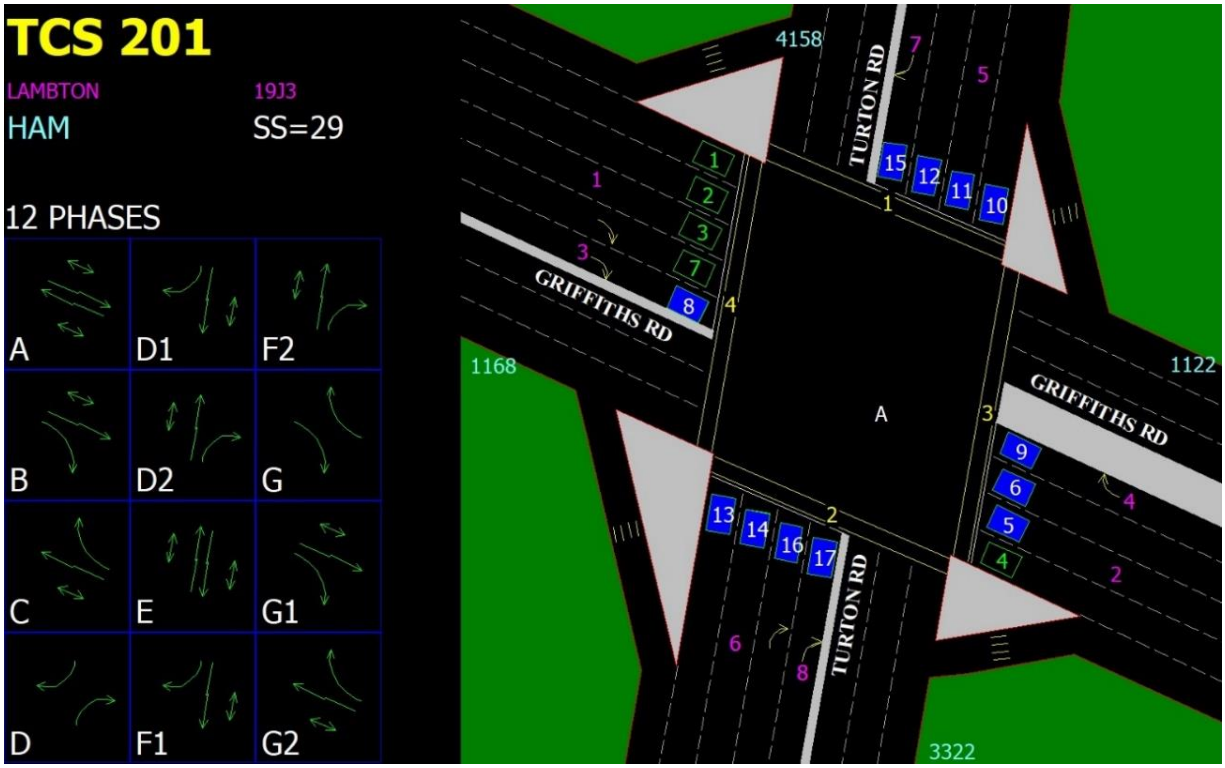
3.4 SCATS Data

For the three signalised intersections, SCATS data were acquired from Transport for New South Wales (TfNSW) for the same survey days (Weekday: Thursday, 4th April and Weekend: Saturday, 6th April) as the Intersection Counts survey. The phase time data was analysed for every 15 minutes of the peak hour to determine the phase sequences, average phases and cycle times for each peak period of the different days for the following intersections:

- Turton Road / Griffiths Road - TCS 201
- Turton Road / Young Road - TCS 3322
- Turton Road / Lambton Road / Bridges Road - TCS 350.

In addition, the LX file was also acquired for the relevant region (HAM = Hamilton) to check the signal coordination direction between the signalised intersections.

The provided TCS graphics and all the phases for the abovementioned intersections are shown in **Error! Reference source not found.**, Figure 3.4 and Figure 3.5 respectively.

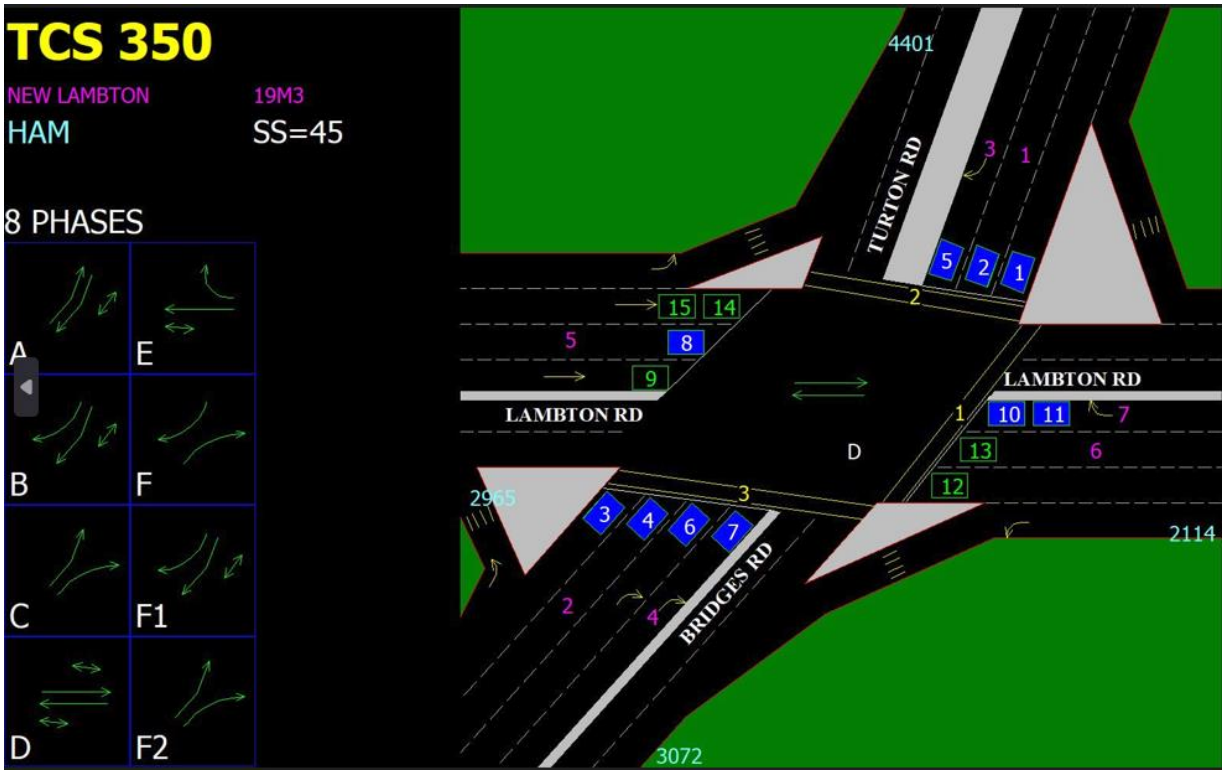


Adapted from TfNSW

Figure 3.3: Turton Road / Griffiths Road - TCS 201 Signal Phasing

Adapted from TfNSW

Figure 3.4: Turton Road / Young Road - TCS 3322 Signal Phasing



Adapted from TfNSW

Figure 3.5: Turton Road / Lambton Road / Bridges Road - TCS 350 Signal Phasing

3.5 Calibration and Validation

Initially, the 95th percentile back of queue lengths were recorded from the video footage of traffic surveys on Thursday, 4th April and Friday, 6th April, for each approach. Due to limitations in the camera coverage and quality of the videos, the back of queue lengths were estimated based on logical judgement and visual queueing where required.

A detailed comparison between modelled queues and observed queues for the critical (signalised) intersections is summarised in Table 3.2.

Table 3.2: Weekday Peaks Comparison of Back of Queue Lengths

Approach	Turn	AM Peak			PM Peak		
		Observed (Length)	Modelled (Length)	Difference (Length)	Observed (Length)	Modelled (Length)	Difference (Length)
Turton Road / Griffiths Road							
Turton Road (N)	T	90	91	1	126	175	49
	R	NA	47	NA	NA	61	NA
Griffiths Road (E)	T	96	113	17	114	123	9
	R	42	27	-15	24	57	33
Turton Road (S)	T	NA	97	NA	NA	291	NA
	R	66	75	9	132	111	-21
Griffiths Road (W)	T	126	149	23	138	164	33
	R	78	65	-13	108	85	-23
Turton Road / Young Road							
Turton Road (N)	T	48	22	-26	120	24	-96
	R	18	5	-13	18	42	24
Turton Road (S)	L/T	66	63	-3	66	82	16
Young Road (W)	L	NA	23	NA	NA	51	NA
	R	NA	78	NA	NA	177	NA
Turton Road / Lambton Road / Bridges Road							
Turton Road (N)	T	126	136	10	150	182	32
	R	48	57	9	48	54	6
Lambton Road (E)	T	66	81	15	60	104	44
	R	NA	115	NA	NA	56	NA
Bridges Road (S)	T	NA	254	NA	NA	411	NA
	R	NA	44	NA	NA	206	NA
Lambton Road (W)	T	NA	151	NA	NA	205	NA

A detailed comparison between modelled queues and observed queues for the critical (signalised) intersections for a Weekend peak is summarised in Table 3.3.

Table 3.3: Weekend Peak Comparison of Back of Queue Lengths

Approach	Turn	Weekend Peak		
		Observed (veh)	Modelled (veh)	Difference (veh)
Turton Road / Bridges Road				
Turton Road (N)	T	84	113	29
	R	NA	43	NA
Griffiths Road (E)	T	114	117	3
	R	30	39	9
Turton Road (S)	T	NA	54	NA
	R	36	50	14
Griffiths Road (W)	T	108	97	-11
	R	90	85	-5
Turton Road / Young Road				
Turton Road (N)	T	126	28	-98
	R	12	3	-9
Turton Road (S)	L/T	72	82	10
Young Road (W)	L	NA	28	NA
	R	NA	46	NA
Turton Road / Lambton Road / Bridges Road				
Turton Road (N)	T	138	151	13
	R	42	50	8
Lambton Road (E)	T	54	61	7
	R	NA	62	NA
Bridges Road (S)	T	NA	159	NA
	R	NA	62	NA
Lambton Road (W)	T	NA	79	NA

In some scenarios, the modelled queue lengths or their differences (highlighted in red or marked as NA) did not meet the acceptable queue range. The following section investigates these unacceptable queue lengths:

Turton Road / Griffiths Road

- **Turton Road North RT:** Queue in right turn cannot be verified due to camera coverage limitations
- **Turton Road South:** Queue in through turn cannot be verified due to limitations of camera set-up
- **PM Peak:** Queues for this peak may not be validated due to the Degree of Saturation constraints, as if these are not met, modelled flows do not match those observed.

Turton Road / Young Road

- **Young Road West:** The queues could not be verified due to camera setup angle camera set-up.
- **Tuton Road North:** This queue discrepancy during all peaks may be attributed to the unmodelled midblock traffic signals (TCS 4401) to the south of this intersection.

Turton Road / Lambton Road / Bridges Road

- **Lambton Road East:** The right turn queues could not be verified due to camera setup angle camera set-up.

- **Bridges Road South:** Queue in through and right turn cannot be verified due to limitations of camera set-up
- **Lambton Road West:** Queues cannot be observed entirely from the camera

To further satisfy the validation requirements, the following parameters were adjusted in SIDRA:

- Shifting allocated times in given phase times of SCATS
- Change in signal coordination using LX data
- Change in default Area Type Factor.

Priority Intersections:

- DoS and delays on sideroads are unrealistic as drivers are likely to become impatient or merging cooperation occurs. Gap acceptance or other variables may be modified to simulate these effects; however, these are minor accesses with negligible impacts on network performance. Relevant variables have thus been left as default.
- **McDonald Stadium Site Access:** Right turners in the model cannot find acceptable gaps to turn out onto Turton Road. As this is a one-lane approach, this right-turn movement blocks all left-turners. Flows are too high during the A phase of the Turton Road / Young Road intersection. During the interphases between phases B to C and C to A, there is an acceptable merge gap; however, the northbound queue has no space to merge into. In reality, a one-vehicle storage space exists in the median, allowing the right-turner to exit. This may be modelled as a short exit lane in SIDRA. However, no road markings indicate its existence, and thus, we have opted not to include it. DoS and other performance issues are expected due to the limitations of the model.
- **Monash Road:** A "Keep Clear" area is marked at this intersection, allowing vehicles to readily turn in and out of Monash Road during the pedestrian phase of the unmodelled midblock crossing. This "Keep Clear" area cannot be modelled without signalising the Monash Road / Turton Road intersection and modelling the midblock crossing. Due to the complex and inaccurate nature of this method and the fact that Monash Road is a minor road with no implications to network performance, this modelling approach has not been taken.
- **Newcastle Hockey Centre Northern Exit:** No vehicles have been recorded to exit this carpark during the survey. Volumes here are the minimum SIDRA requires to run. For scenarios where vehicles will exit this intersection, the pedestrian phase of the unmodelled midblock crossing and the "Keep Clear" area will allow vehicles to exit this approach readily. For similar reasoning to the model issue at Monash Road, these have not been addressed.

A detailed comparison of the acceptable range of Queue Lengths between observation and model has been tabulated in **Attachment D.**

3.6 Modelling Results

The modelled performance of the Base Case intersections in the AM and PM peaks are provided in Table 3.4, Table 3.5 and Table 3.6.

Table 3.4: Base Case Weekday AM Intersection Performance

Intersection	Weekday: AM Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	0.853	35.4	LOS C	148.9
Turton Road / Young Road	0.581	7.3	LOS A	78.4
Turton Road / McDonald Stadium Site Access	1.791	766.2	LOS F	102.9
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	1.065	263.4	LOS F	32.1
Turton Road / Lambton Road / Bridges Road	0.931	44.9	LOS D	253.7

[1]*Though the Newcastle International Hockey Centre Northern Exit shows worse performance, volumes here are minimal (1 vehicle). The next worst movement has instead been used.*

Table 3.5: Base Case Weekday PM Intersection Performance

Intersection	Weekday: PM Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	1.035	61.9	LOS E	291.3
Turton Road / Young Road	1.036	27.4	LOS B	177.3
Turton Road / McDonald Stadium Site Access	1.111	211.5	LOS F	75.3
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	3.077	1893.1	LOS F	363.8
Turton Road / Lambton Road / Bridges Road	1.048	69.2	LOS E	57.8

[1]Though the Newcastle International Hockey Centre Northern Exit shows worse performance, volumes here are minimal (1 vehicle). The next worst movement has instead been used.

Table 3.6: Base Case Weekend Intersection Performance

Intersection	Weekend Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	0.709	36.2	LOS C	116.7
Turton Road / Young Road	0.453	12.8	LOS A	81.6
Turton Road / McDonald Stadium Site Access	1.477	638.7	LOS F	86.4
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	1.062	424.6	LOS F	32.8
Turton Road / Lambton Road / Bridges Road	0.724	32.7	LOS C	159.1

[1]Though the Newcastle International Hockey Centre Northern Exit shows worse performance; volumes here are minimal (1 vehicle). The next worst movement has instead been used.

Detailed SIDRA results are supplemented in **Attachment B.**

4. Project Case Development

4.1 Site Access

There are two main ways to access the site:

- **From North:** Vehicles proceed south on Turton Road and then turn right at Young Road. Drivers would have to turn right and loop around until they get onto Turton Road again via Monash Road before making a final left turn to the site access from Turton Road
- **From South:** Vehicles can drive north along Turton Road and then turn left to access the site entrance.

Traffic travelling from the west can access the site from Monash Road or Lambton Road.

The travel paths to access the site for both northbound and southbound vehicles are illustrated in Figure 4.1.

Figure 4.1: Travel Paths to Site Access

4.2 Development Traffic Generation and Distribution

For modelling the Project Case, development traffic was added to the Base Case existing traffic volumes. This additional demand is considered to make trips in and out of the proposed development.

The forecast trip generation from the development traffic was distributed as per Report *P2614 Newcastle Indoor Sports Centre Traffic Generation and Assignment by* SECAsolution for Weekday and Weekend. The forecast trip distribution from the traffic report was utilised to form the final volumes of the Project Case in addition to the existing surveys.

The Total inbound and outbound trips are summarised in Table 4.1.

Table 4.1: Inbound and Outbound Trips

	Scenarios		
Trips	**Weekday: AM Peak**	**Weekday: PM Peak**	**Weekend Peak**
Inbound	42	202	120
Outbound	18	215	120
Total	**60**	**417**	**240**

4.2.1 Trip Distribution Diagrams

The traffic flow distribution diagram of the Development, as well as Project Traffic (Base Traffic + Development Traffic), are illustrated in **Attachment A.**

4.3 Modelling Results

The modelled performance of the Project Case in AM and PM peaks are enlisted in Table 4.2 and Table 4.3.

Table 4.2: Project Case Weekday AM Intersection Performance

Intersection	Weekday: AM Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	0.872	35.7	LOS C	148.9
Turton Road / Young Road	0.588	7.2	LOS A	78.5
Turton Road / McDonald Stadium Site Access	1.791	894.8	LOS F	102.7
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	1.085	253.0	LOS F	39.8
Turton Road / Lambton Road / Bridges Road	0.931	45.1	LOS D	257.0

[1]*Though the Newcastle International Hockey Centre Northern Exit shows worse performance, volumes here are minimal (1 vehicle). The next worst movement has instead been used.*

Table 4.3: Project Case Weekday PM Intersection Performance

Intersection	Weekday: PM Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	1.148	73.3	LOS F	301.2
Turton Road / Young Road	1.036	33.3	LOS C	177.3
Turton Road / McDonald Stadium Site Access	1.165	187.7	LOS F	36.8
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	3.347	2116.6	LOS F	551.5
Turton Road / Lambton Road / Bridges Road	1.048	74.2	LOS F	490.8

[1]Though the Newcastle International Hockey Centre Northern Exit shows worse performance, volumes here are minimal (1 vehicle). The next worst movement has instead been used.

The modelled performance of the Project Case Weekend peak is presented in Table 4.4.

Table 4.4: Project Case Weekend Intersection Performance

Intersection	Weekend Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	0.709	36.2	LOS C	116.7
Turton Road / Young Road	0.453	12.8	LOS A	81.6
Turton Road / McDonald Stadium Site Access	1.477	638.7	LOS F	86.4
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	1.062	424.6	LOS F	32.8
Turton Road / Lambton Road / Bridges Road	0.724	32.7	LOS C	159.1

[1]Though the Newcastle International Hockey Centre Northern Exit shows worse performance, volumes here are minimal (1 vehicle). The next worst movement has instead been used.

Detailed SIDRA intersection results are supplemented in **Attachment C.**

4.4 Base Case vs Project Case Performance

A comparison of the intersection performance results is illustrated in Table 4.5. Most intersection performance results show improvements or negligible additional delay times at some approaches. The only anomalies are observed at Newcastle Hockey Centre Northern Exit approach's movements. This approach has no vehicle recorded for any turns per the 2024 peak hour surveys for weekdays or weekends. However, due to SIDRA software's inability to model with zero vehicle volume for a specific approach, the technical assumption of one vehicle each turn for that very approach has been made in the model. Thus, the delay issue of crossing five lanes of Turton Road for the through movement or turning left or right onto Turton Road is observed in the Base Case and has only deteriorated in the Project Case. In contrast to the model, there is no demand in reality, leading to no delays. Therefore, the modelled LoS for this approach should not be interpreted as part of the intersection performance. This issue persists in the AM, PM and Weekend SIDRA models. No particular action would be required to address this delay as it is a minor and unsafe movement for a priority-controlled driveway.

The other delay increase occurs at the intersection of Turton Road/Griffith Road during the PM peak. The delay increase is attributed to additional distributed traffic at Turton Road northbound right turn bay with 25 seconds additional delay during the PM peak. The performance comparison between Base Case and Project Case is provided in Table 4.5.

Table 4.5: Base Case vs Project Case SIDRA Results Comparison

Intersection	2024 Base					2024 Project					
	Traffic Volume (veh/h)	DoS (v/c)	Average Delay (s)	LoS	95th Percentile Queue (m)	Traffic Volume (veh/h)	DoS (v/c)	Average Delay (s)	LoS	95th Percentile Queue (m)	Average Delay Difference
AM Peak											**Project - Base**
Turton Road / Griffiths Road	4,869	0.85	35.4	LOS C	149	4,897	0.87	35.7	LOS C	149	0.3
Turton Road / Young Road	2,697	0.58	7.3	LOS A	78	2,726	0.59	7.2	LOS A	78	-0.1
Turton Road / McDonald's Jones Stadium	2,675	1.79	902.8	LOS F	103	2,719	1.79	894.8	LOS F	103	-8.0
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit	2,676	1.07	1,128.7	LOS F	32	2,720	1.09	1,311.1	LOS F	40	182.4
Turton Road / Lambton Road / Bridges Road	4,234	0.93	44.9	LOS D	254	4,269	0.93	45.1	LOS D	257	0.2
PM Peak											
Turton Road / Griffiths Road	5,816	1.04	61.9	LOS E	291	6,091	1.15	73.3	LOS F	301	11.4
Turton Road / Young Road	3,528	1.04	27.4	LOS B	177	3,803	1.04	33.3	LOS C	177	5.9
Turton Road / McDonald's Jones Stadium	3,429	1.17	211.5	LOS F	113	3,642	1.17	187.7	LOS F	113	-23.8
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit	3,451	3.08	1,893.1	LOS F	364	3,663	3.35	2,130.5	LOS F	552	237.4
Turton Road / Lambton Road / Bridges Road	5,509	1.05	69.2	LOS E	411	5,665	1.05	74.2	LOS F	491	5.0
Weekend Peak											
Turton Road / Griffiths Road	4,780	0.71	36.2	LOS C	17	4,934	1.42	80.8	LOS F	517	44.6
Turton Road / Young Road	2,763	0.45	12.8	LOS A	12	2,917	0.59	13.9	LOS A	82	1.1
Turton Road / McDonald's Jones Stadium	2,664	1.48	638.7	LOS F	12	2,791	1.48	595.7	LOS F	113	-43.0
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit	2,704	1.06	1,043.6	LOS F	5	2,831	1.33	1,677.2	LOS F	64	633.6
Turton Road / Lambton Road / Bridges Road	4,123	0.72	32.7	LOS C	23	4,215	0.70	37.4	LOS C	177	4.7

5. Project Case Upgrade

Upgrades or signal optimisations have been introduced to resolve the limitations of accommodating the development traffic and improve the performance of the critical intersections as much as possible. It should be noted that the SCATS system is expected to implement proposed signal optimisations automatically.

5.1 Development Traffic

The same traffic demand and distribution were applied in the Project Case.

5.2 Upgrade Measures

After analysing and comparing the intersection performances between the Base Case and the Project Case, it was observed that the impact upon additional development traffic would be negligible for most intersections, for which no particular upgrades would be required.

For Turton Road / Griffiths Road, the average delay denotes that the performance deteriorated considerably at the Turton Road right turn bay, which required mitigation. This was resolved by optimising signal timing. No other geometric upgrades were adopted.

For some intersections, for instance, Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit, the delay appears excessively high for SIDRA having at least one vehicle in the model, when in reality, there isn't any vehicle waiting, and the single vehicle coded for the approach is due to SIDRA limitations.

The comparison of intersection performances is detailed in **Attachment E.**

5.3 Modelling Results

The modelled performance of the Project Case Upgrades/Signal Optimisation for Weekday PM peak is provided in Table 5.1. The AM signal coding was retained due to similar performance in the Base Case and the Project Case.

Table 5.1: Project Case Upgrades Weekday PM Intersection Performance

Intersection	Weekday: PM Peak			
	DoS	Delay (s)	LoS	95% Queue (m)
Turton Road / Griffiths Road	1.062	63.6	LOS E	263.0
Turton Road / Young Road	0.737	28.1	LOS B	121.3
Turton Road / McDonald Stadium Site Access	1.165	188.9	LOS F	37.2
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit[1]	1.711	659.9	LOS F	340.8
Turton Road / Lambton Road / Bridges Road	1.047	80.9	LOS F	503.2

[1]*Though the Newcastle International Hockey Centre Northern Exit shows worse performance, volumes here are minimal (1 vehicle). The next worst movement has instead been used.*

It is well understood that the modelling results, even with the upgrades, reflect the outputs of the 'Project Case' in most cases except for the boosted improvement in Delay and Queue (highlighted in green) at the Turton Road / Griffiths Road intersection performance in the Weekday PM peak. The weekend results in the project case would remain unchanged due to the similarity of intersection performance in both scenarios and, as explained for the AM peak.

Detailed SIDRA intersection results are supplemented in **Attachment B.**

6. Conclusion

The findings of the modelling are summarised below:

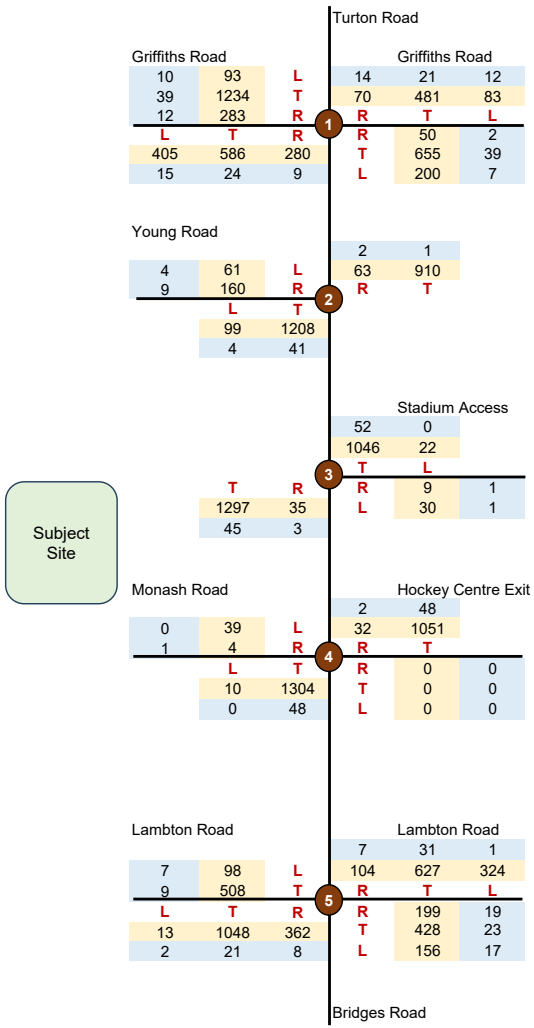
- SCATS traffic lights optimisation is mainly required for Turton Road / Griffiths Road due to the development traffic assigned to the northbound right turn lane at this intersection, causing an extra 24.6 seconds of delay at this approach
- No geometrical upgrades are seemingly required across any of the intersections due to the development
- Pedestrian movements are quite nominal/insignificant and, hence, unlikely to impact any of the signalised intersection phase times on a larger scale.

Upon undertaking SIDRA analysis, it can be confirmed that no to minor extra delays would be expected across most surrounding intersections after the construction of the proposed Hunter Basketball Stadium.

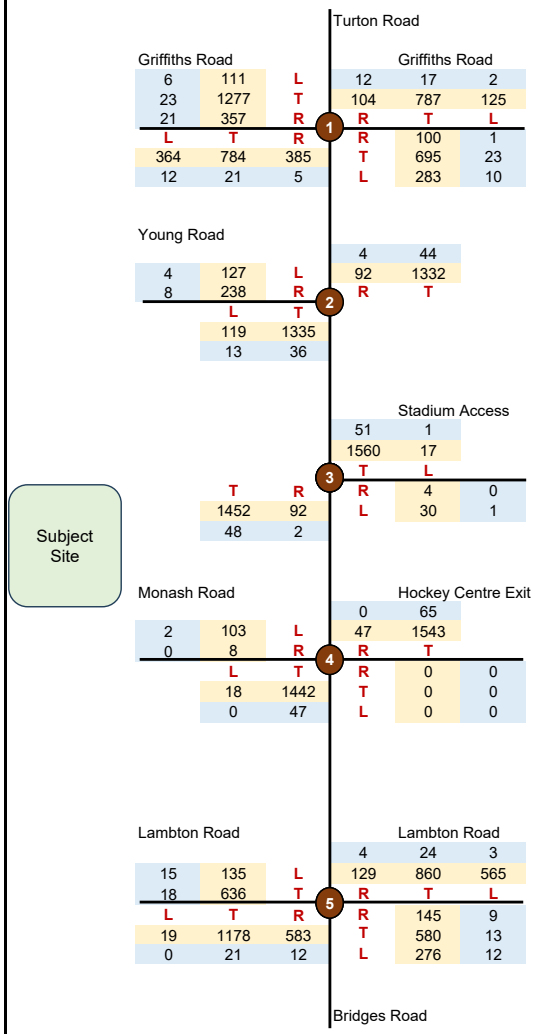
Attachment A: Traffic Flow Diagrams & Trip Generation

EXISTING TRAFFIC VOLUMES | TRAFFIC SURVEY DATA 2024

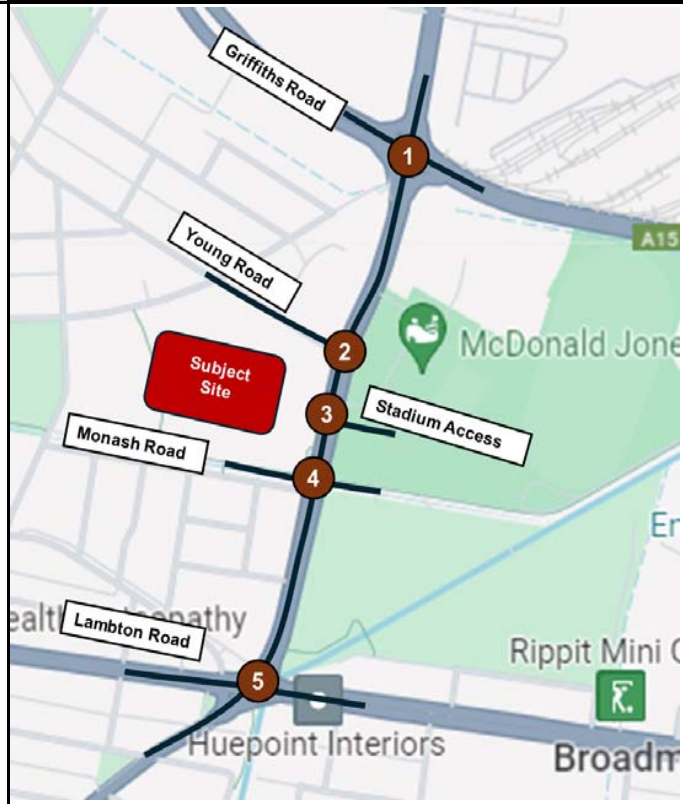
AM Peak 08:00-09:00



PM Peak 16:45-17:45



Locality Plan



Details

Date of Surveys:	Thu 4/04/2024
AM Peak:	8:00-9:00am
PM Peak:	4:45-5:45pm
Base Year:	2024

Document Control

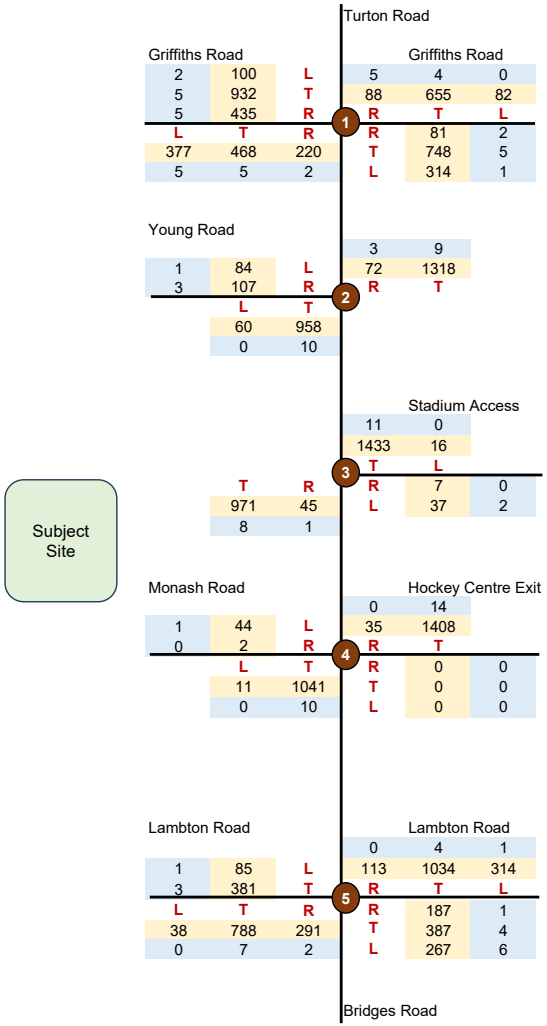
Job Number:	P6458	Job Name:	Newcastle Indoor Sports Facility TIA Modelling
Prepared By:	Tahmim Islam		
Reviewed By:	Alex Grey		

Legend

XX	Light Vehicle (LV) Volumes	L	Left Turn Movement
XX	Heavy Vehicle (HV) Volumes	T	Through Turn Movement
X	Intersection ID	R	Right Turn Movement

EXISTING TRAFFIC VOLUMES | TRAFFIC SURVEY DATA 2024

Weekend Peak 11:15-12:15



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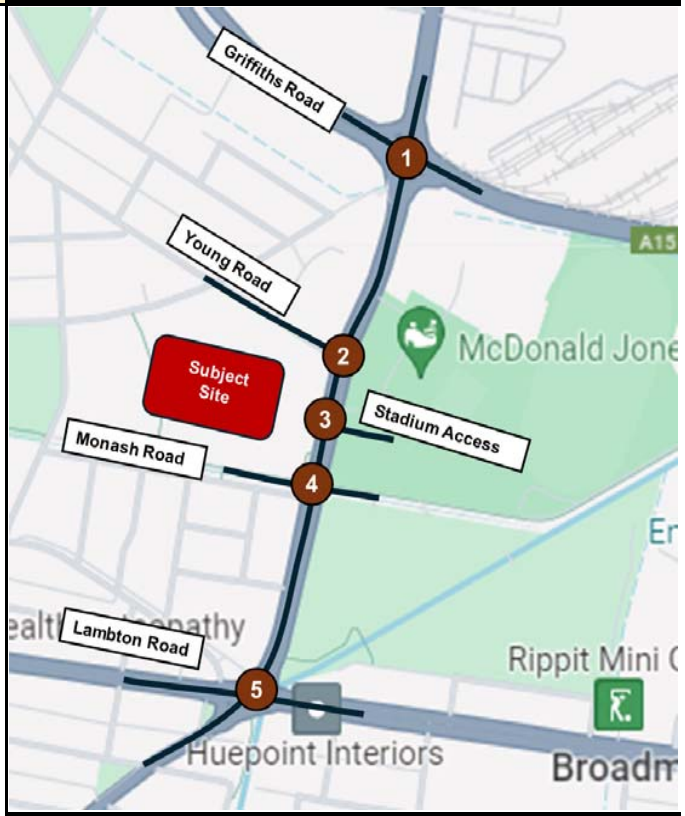

Details

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Weekend Peak:	11:15am-12:15pm
Base Year:	2024

Document Control

Job Number:	P6458	Job Name:	Newcastle Indoor Sports Facility TIA Modelling
Prepared By:	Tahmim Islam		
Reviewed By:	Alex Grey		

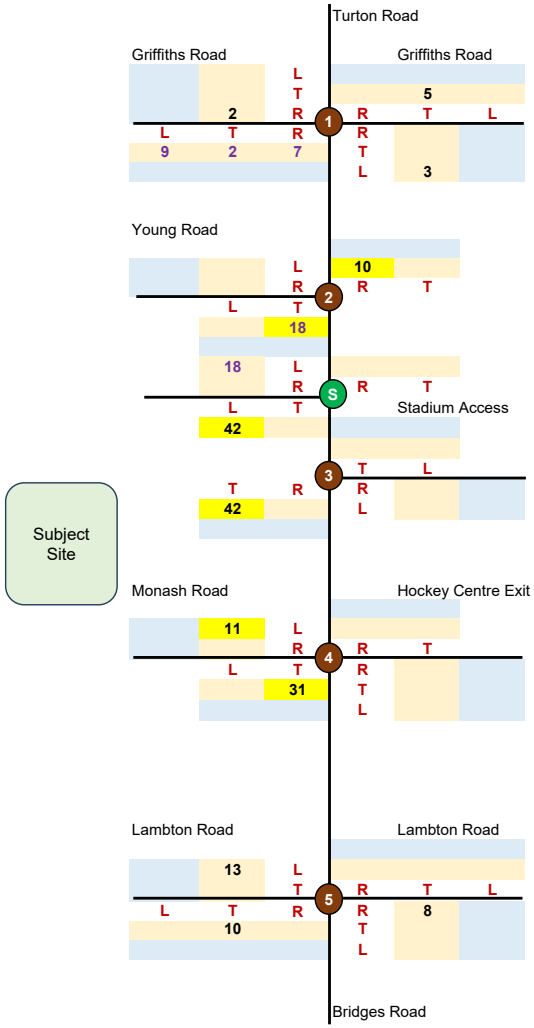
Legend

XX	Light Vehicle (LV) Volumes	L	Left Turn Movement
XX	Heavy Vehicle (HV) Volumes	T	Through Turn Movement
X	Intersection ID	R	Right Turn Movement

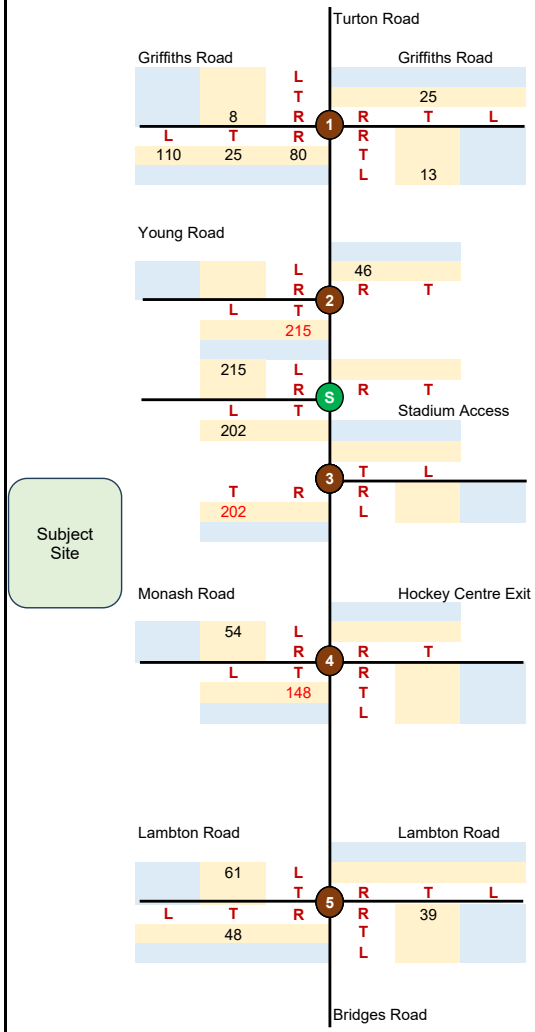
DEVELOPMENT TRAFFIC VOLUMES | TRAFFIC SURVEY DATA 2024

AM Peak 08:00-09:00

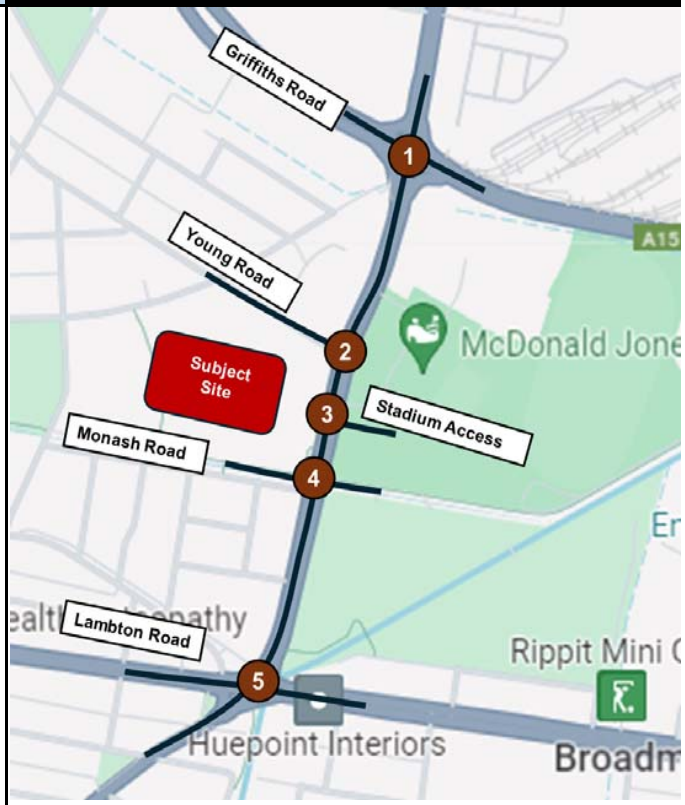
Inbound 42
Outboun 18



PM Peak 16:45-17:45



Locality Plan



Details

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AM Peak:	8:00-9:00am
PM Peak:	4:45-5:45pm
Base Year:	2024

Document Control

Job Number:	P6458	Job Name:	Newcastle Indoor Sports Facility TIA Modelling
Prepared By:	Tahmim Islam		
Reviewed By:	Alex Grey		

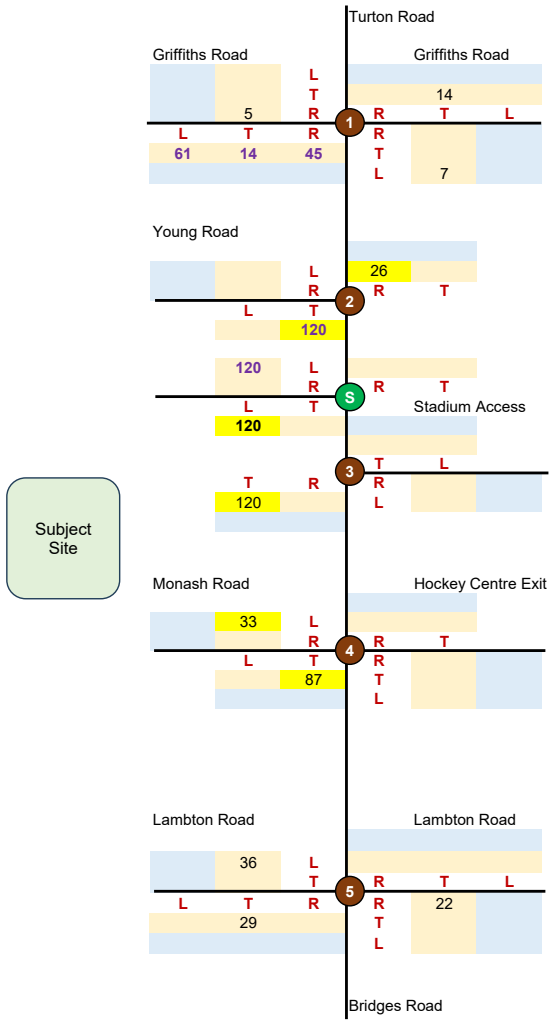
Legend

XX	Light Vehicle (LV) Volumes	L	Left Turn Movement
XX	Heavy Vehicle (HV) Volumes	T	Through Turn Movement
X	Intersection ID	R	Right Turn Movement

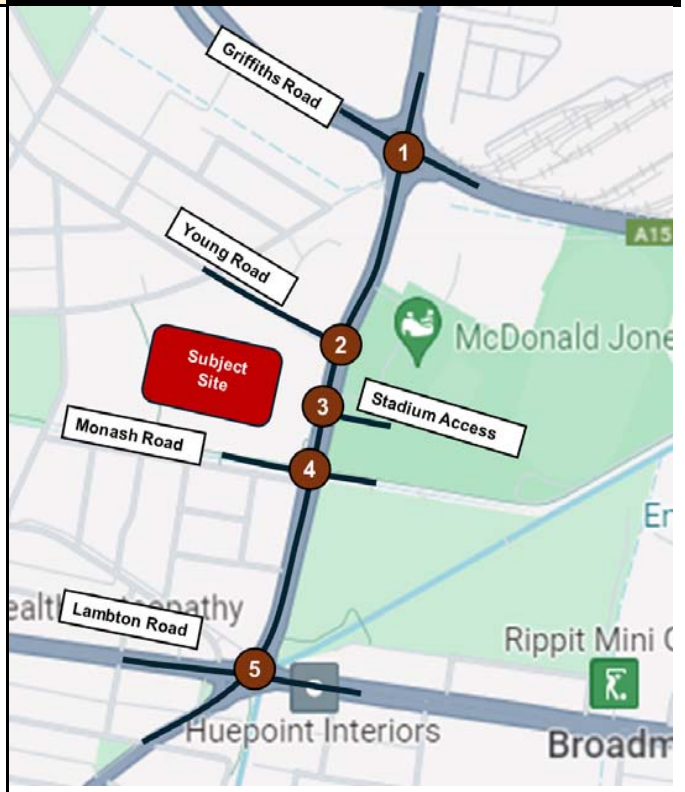
DEVELOPMENT TRAFFIC VOLUMES | TRAFFIC SURVEY DATA 2024

Weekend Peak 11:15-12:15

Inbound	120
Outbound	120



Locality Plan



Details

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Weekend Peak:	11:15am-12:15pm
Base Year:	2024

Document Control

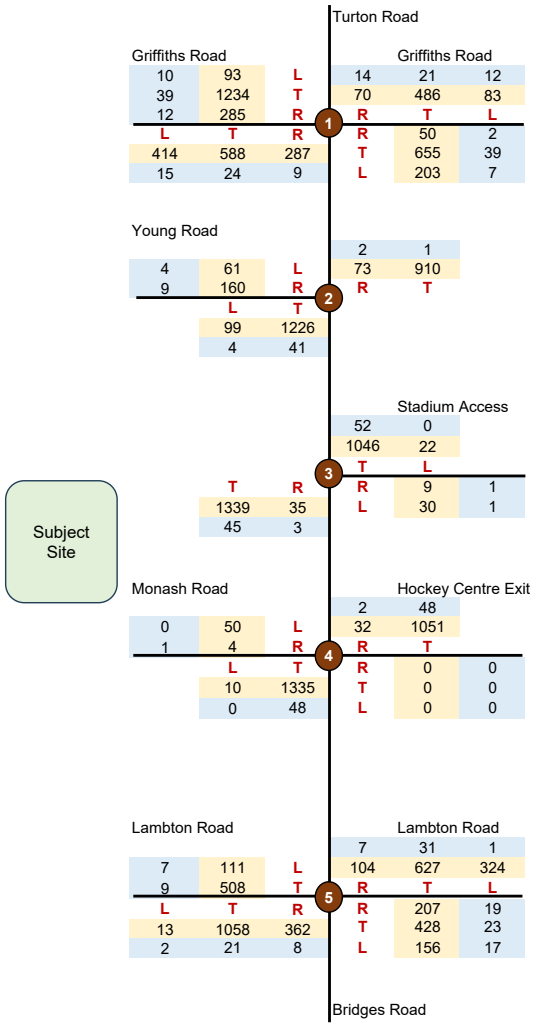
Job Number:	P6458	Job Name:	Newcastle Indoor Sports Facility TIA Modelling
Prepared By:	Tahmim Islam		
Reviewed By:	Alex Grey		

Legend

XX	Light Vehicle (LV) Volumes	L	Left Turn Movement
XX	Heavy Vehicle (HV) Volumes	T	Through Turn Movement
X	Intersection ID	R	Right Turn Movement

PROJECT TRAFFIC VOLUMES | TRAFFIC SURVEY DATA 2024

AM Peak 08:00-09:00



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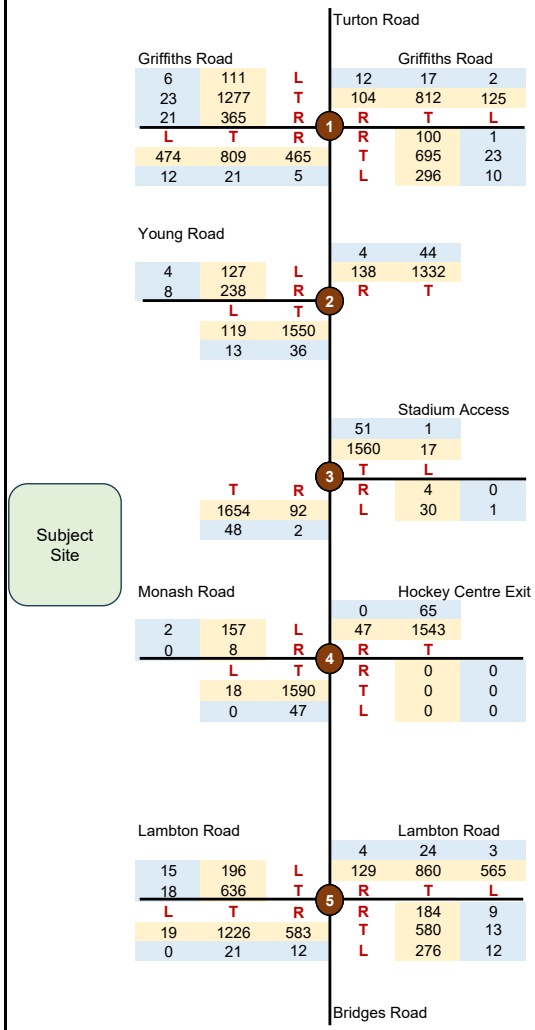
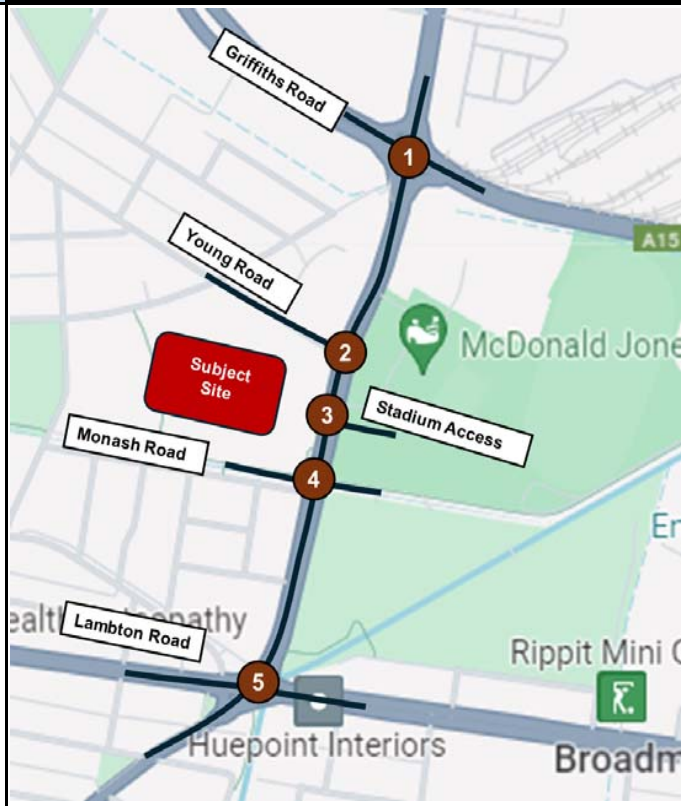


Locality Plan



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Base Year:	2024

Document Control

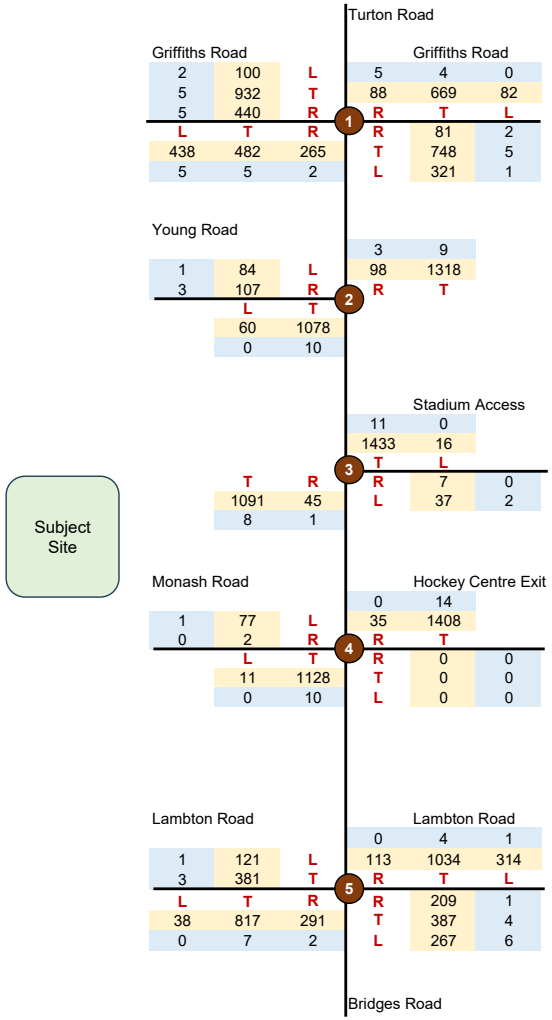
Job Number:	P6458	Job Name:	Newcastle Indoor Sports Facility TIA Modelling
Prepared By:	Tahmim Islam		
Reviewed By:	Alex Grey		

Legend

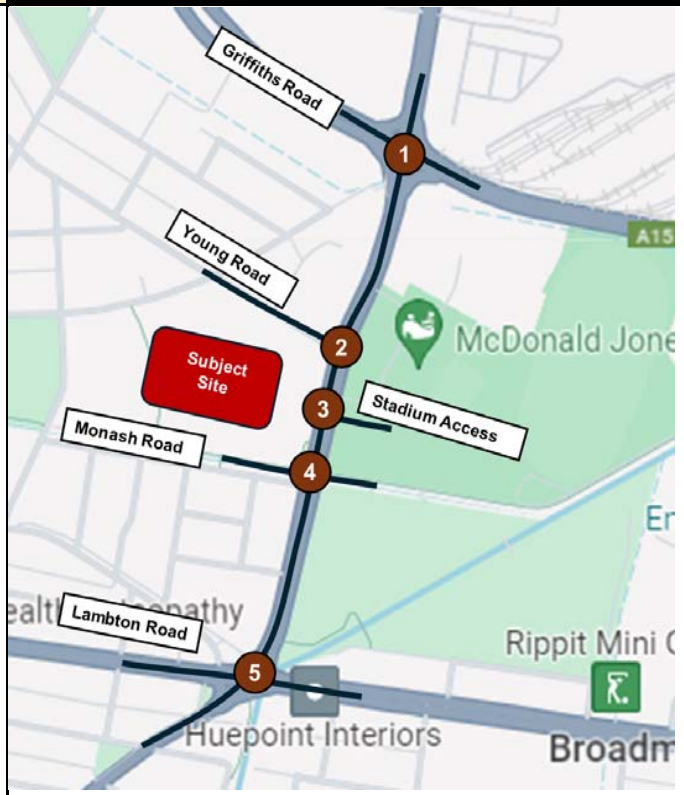
XX	Light Vehicle (LV) Volumes	L	Left Turn Movement
XX	Heavy Vehicle (HV) Volumes	T	Through Turn Movement
X	Intersection ID	R	Right Turn Movement

PROJECT TRAFFIC VOLUMES | TRAFFIC SURVEY DATA 2024

Weekend Peak 11:15-12:15



Locality Plan



Details

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Weekend Peak:	11:15am-12:15pm
Base Year:	2024

Document Control

Job Number:	P6458	Job Name:	Newcastle Indoor Sports Facility TIA Modelling
Prepared By:	Tahmim Islam		
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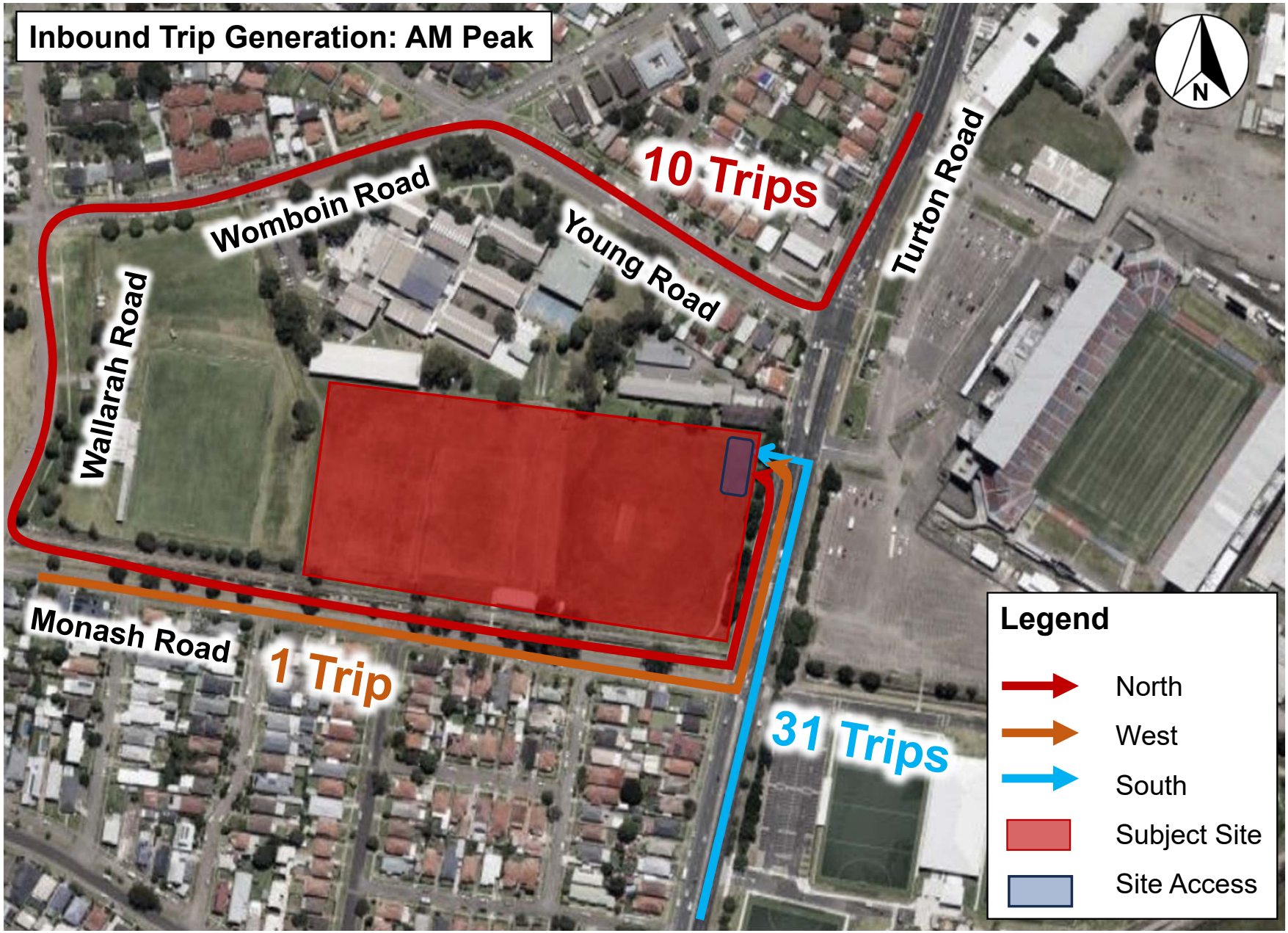
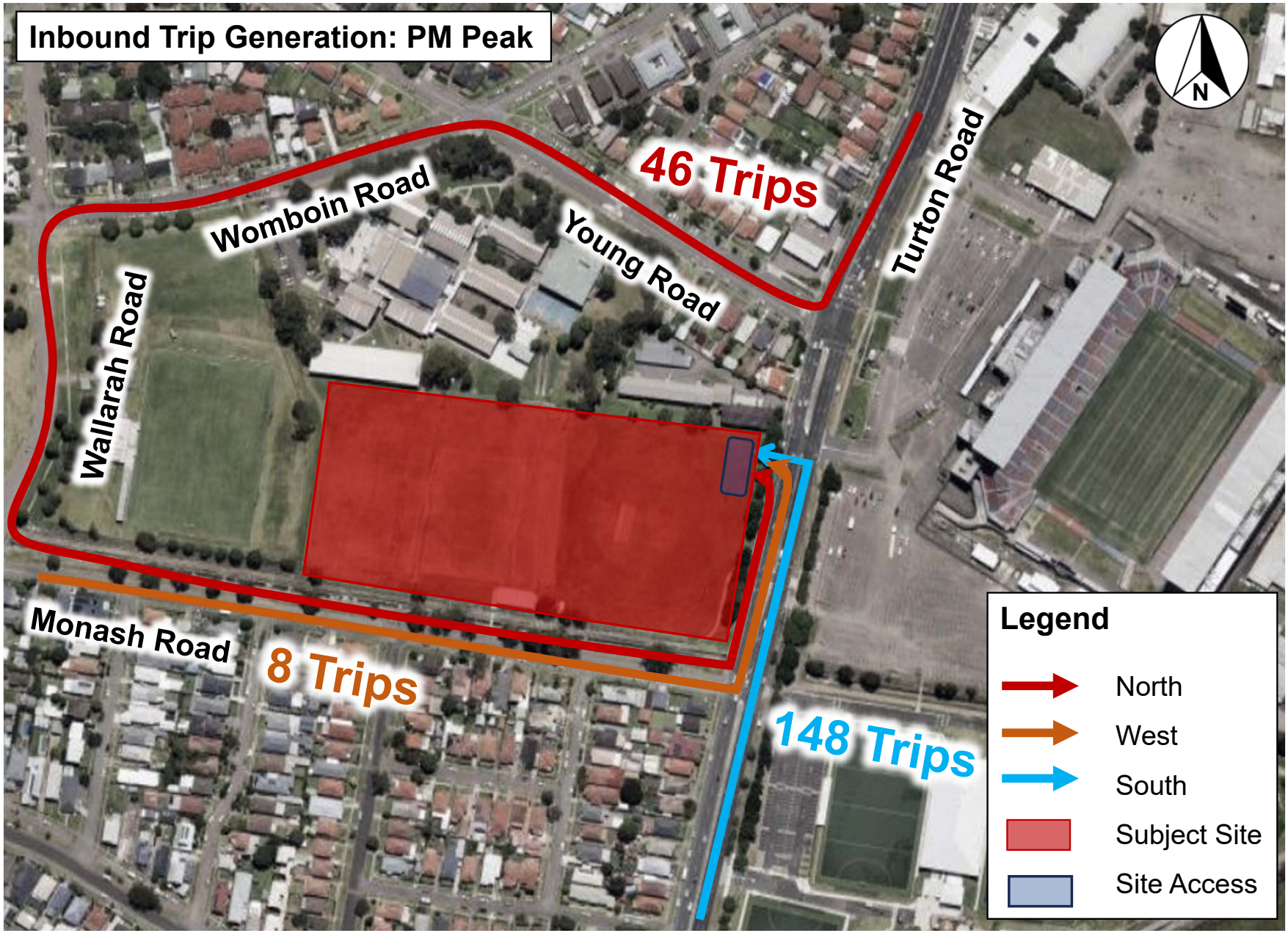
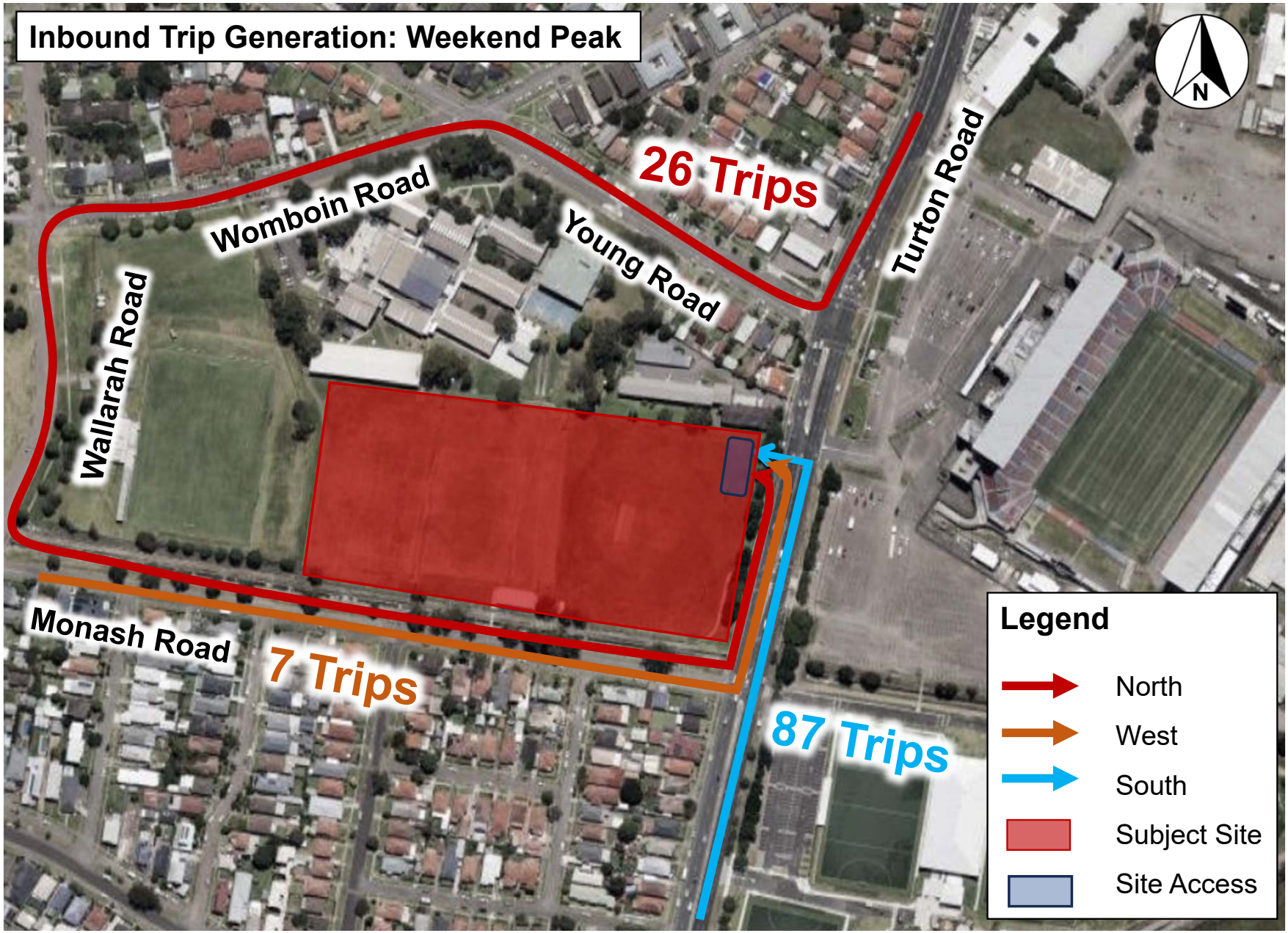
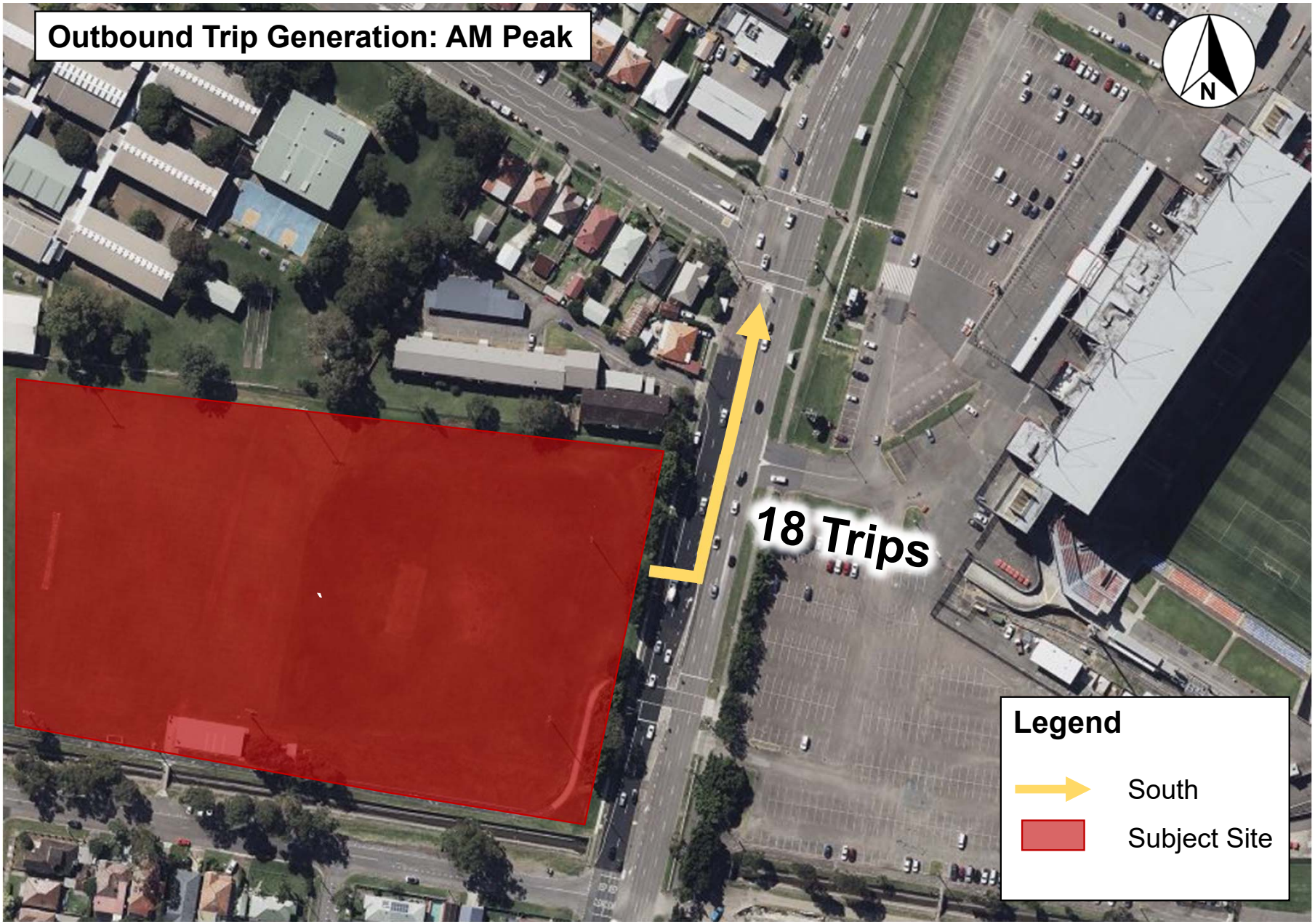
Legend

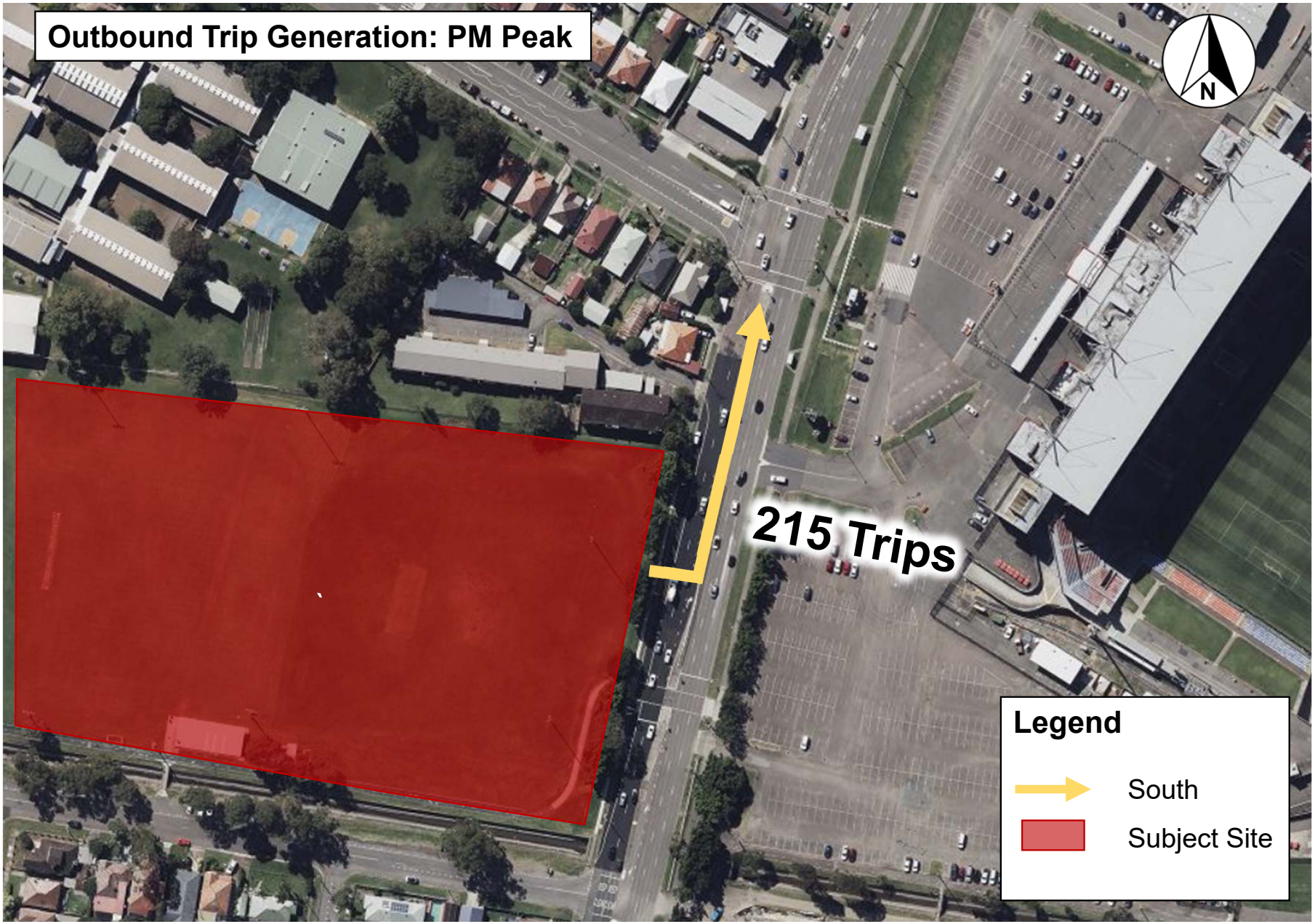
XX	Light Vehicle (LV) Volumes	L	Left Turn Movement
XX	Heavy Vehicle (HV) Volumes	T	Through Turn Movement
X	Intersection ID	R	Right Turn Movement

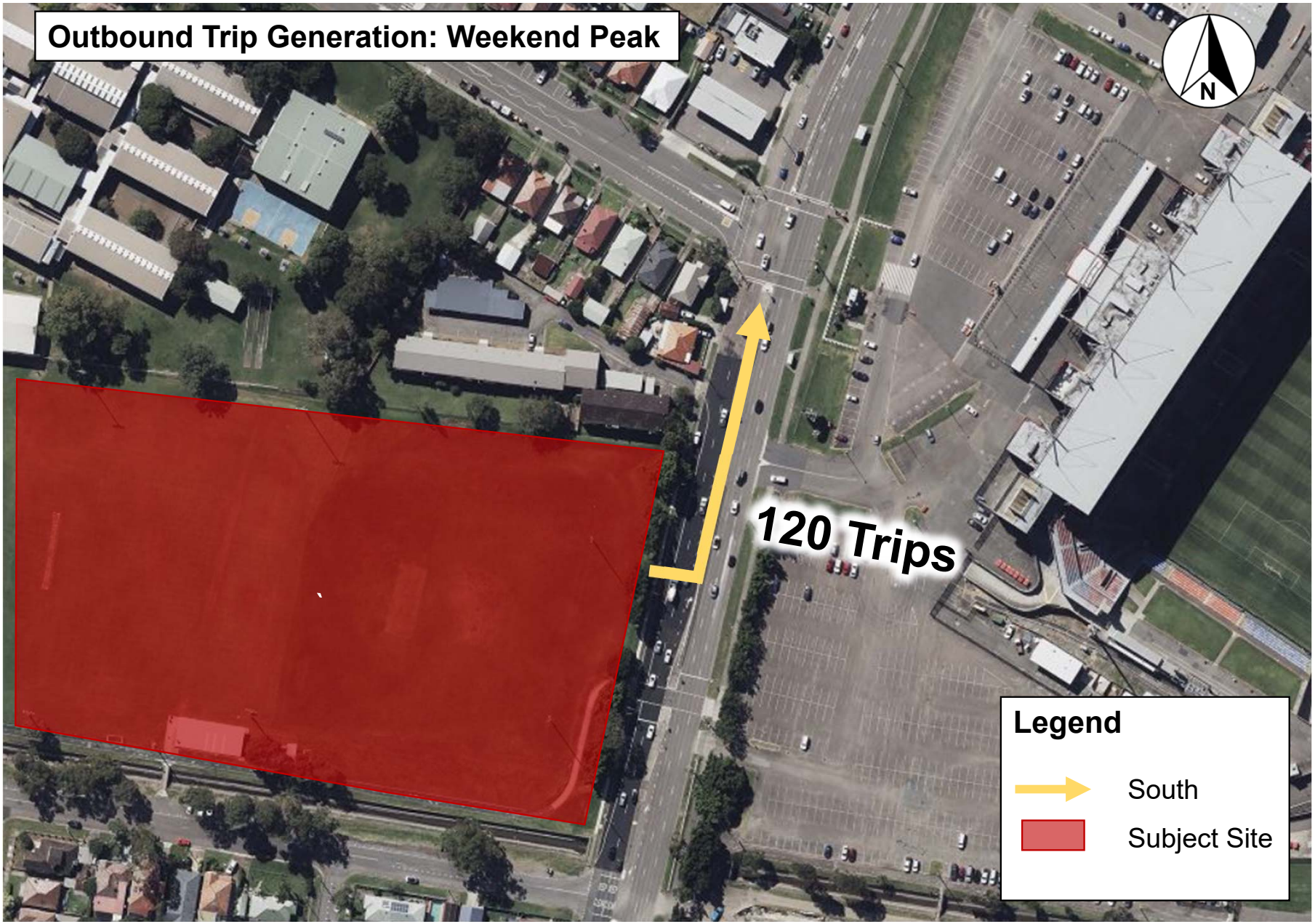

Inbound Trip Generation: AM Peak
N
10 Trips
Womboin Road
Young Road
Turton Road
Wallarah Road
Monash Road
1 Trip
31 Trips
Legend
North
West
South
Subject Site
Site Access


Inbound Trip Generation: PM Peak
N
46 Trips
Womboin Road
Young Road
Turton Road
Wallarah Road
Monash Road
8 Trips
148 Trips
Legend
North
West
South
Subject Site
Site Access


Inbound Trip Generation: Weekend Peak
N
26 Trips
Womboin Road
Young Road
Turton Road
Wallarah Road
Monash Road
7 Trips
87 Trips
Legend
North
West
South
Subject Site
Site Access


Outbound Trip Generation: AM Peak
N
18 Trips
Legend
South
Subject Site


Outbound Trip Generation: PM Peak
N
215 Trips
Legend
South
Subject Site


Outbound Trip Generation: Weekend Peak
N
120 Trips
Legend
South
Subject Site

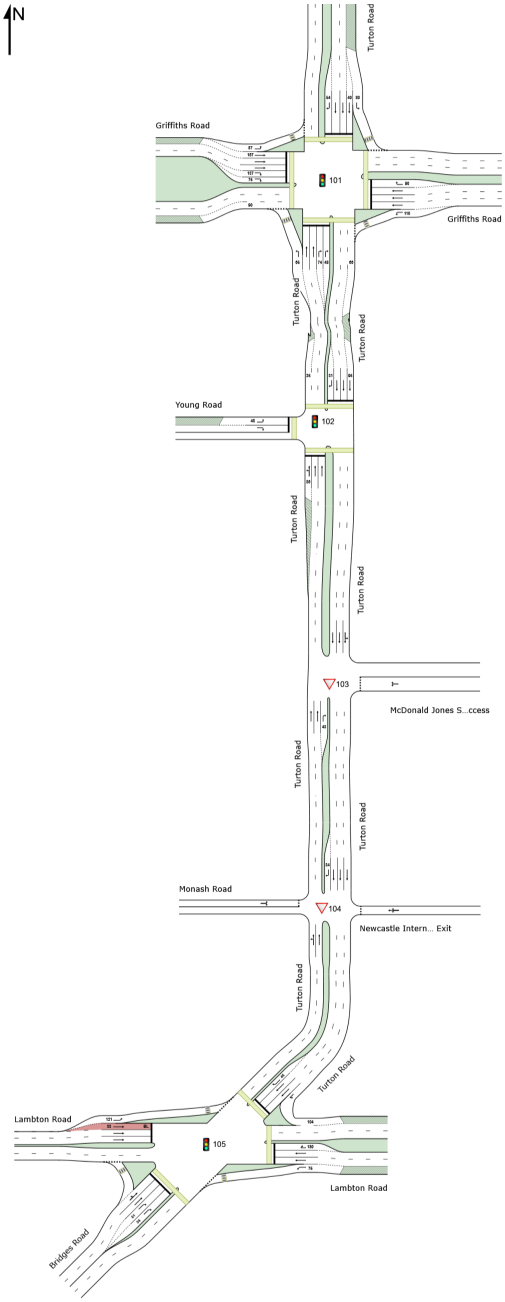
Attachment B: SIDRA Geometric Layouts

NETWORK LAYOUT

Network: N101 [Newcastle Indoor Sports Facility - AM Peak (Network Folder: 2024 Base)]

New Network
Network Category: (None)

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



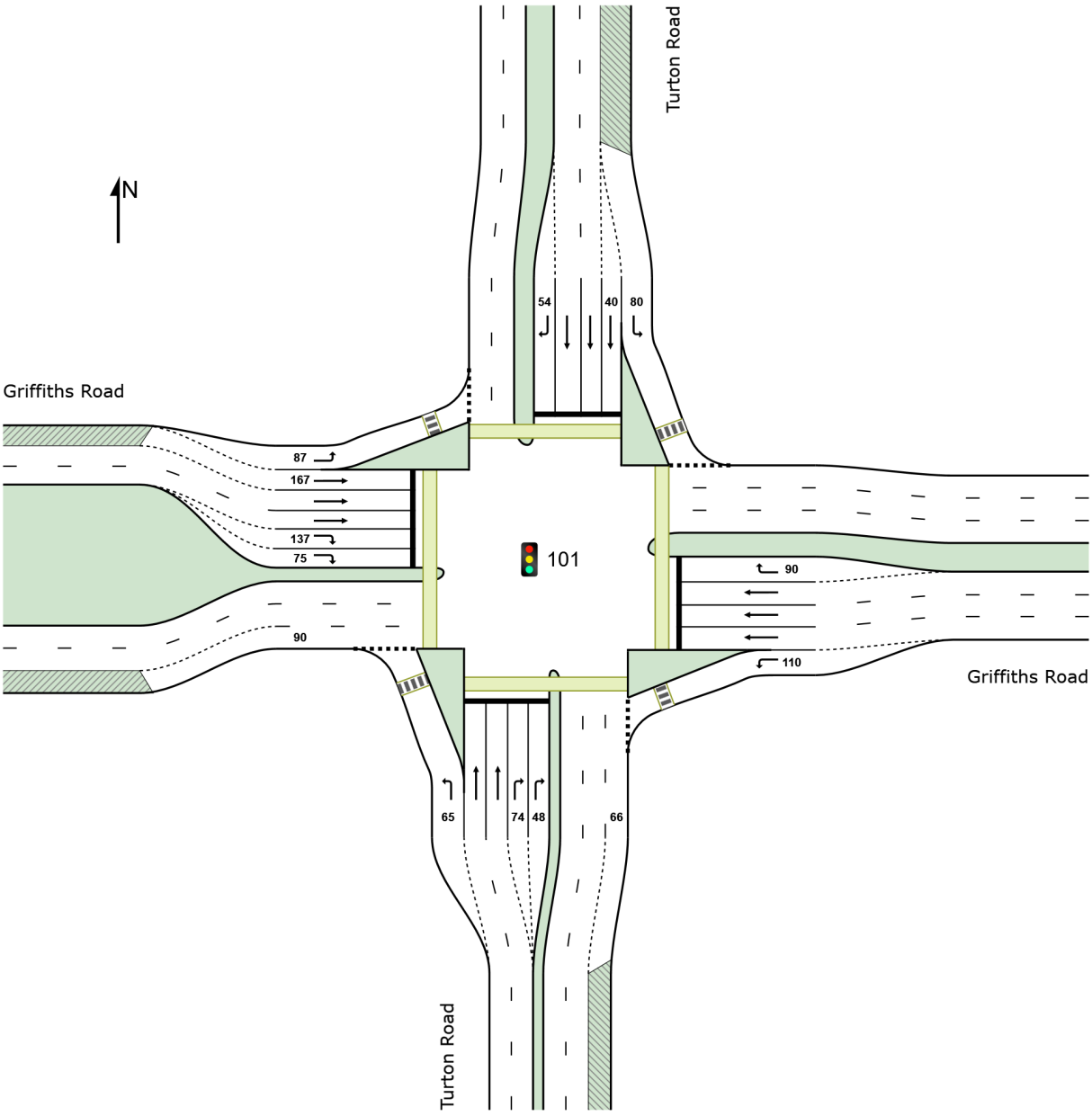
SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Turton Road / Griffiths Road - TCS 201
102	NA	Turton Road / Young Road - TCS 3322
▽103	NA	Turton Road / McDonald Jones Stadium Southern Access
▽104	NA	Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit
105	NA	Turton Road / Lambton Road / Bridges Road - TCS 350

SITE LAYOUT

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Base AM Peak)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



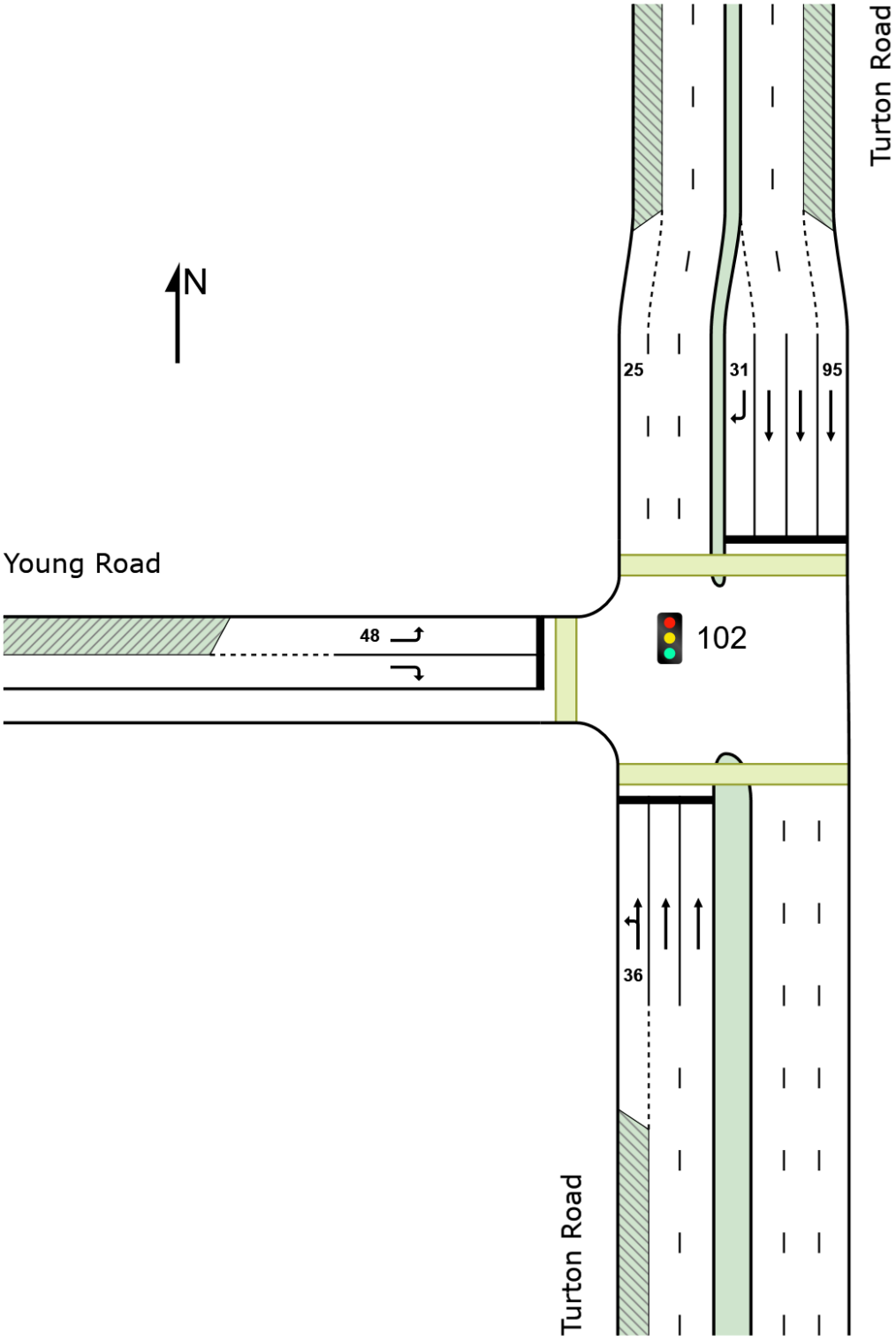
Organisation: BITZIOS CONSULTING | Licence: NETWORK / 1PC | Created: Wednesday, 23 April 2025 3:02:17 PM
Project: P:\P6458 Newcastle Indoor Sports Facility TIA Modelling\Technical\Models\P6458.004M Newcastle Indoor Sports Facility TIA SIDRA Models.sip9

SITE LAYOUT

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Base AM Peak)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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

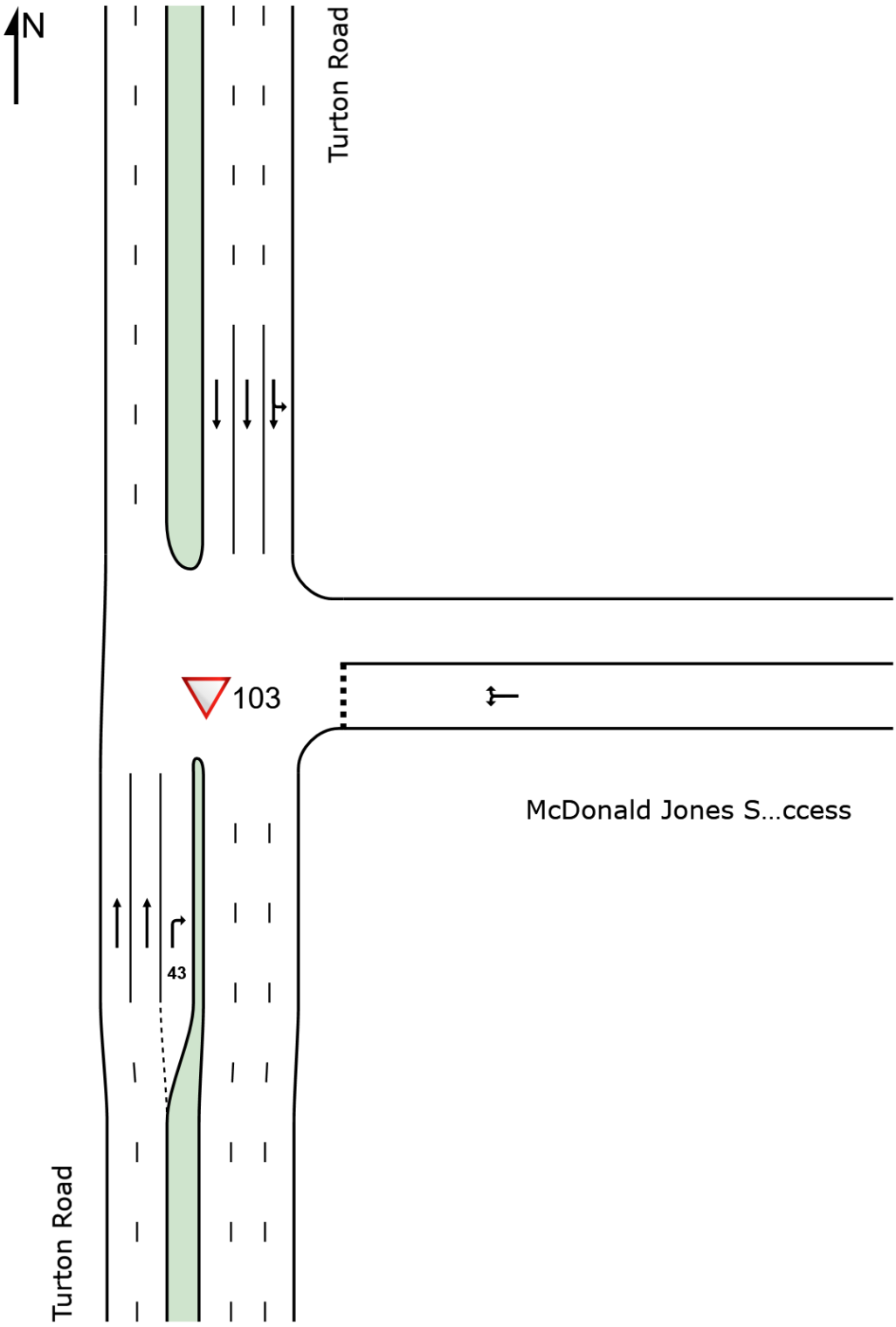


SITE LAYOUT

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Base AM Peak)]

0800-0900
Site Category: Base Year
Give-Way (Two-Way)

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

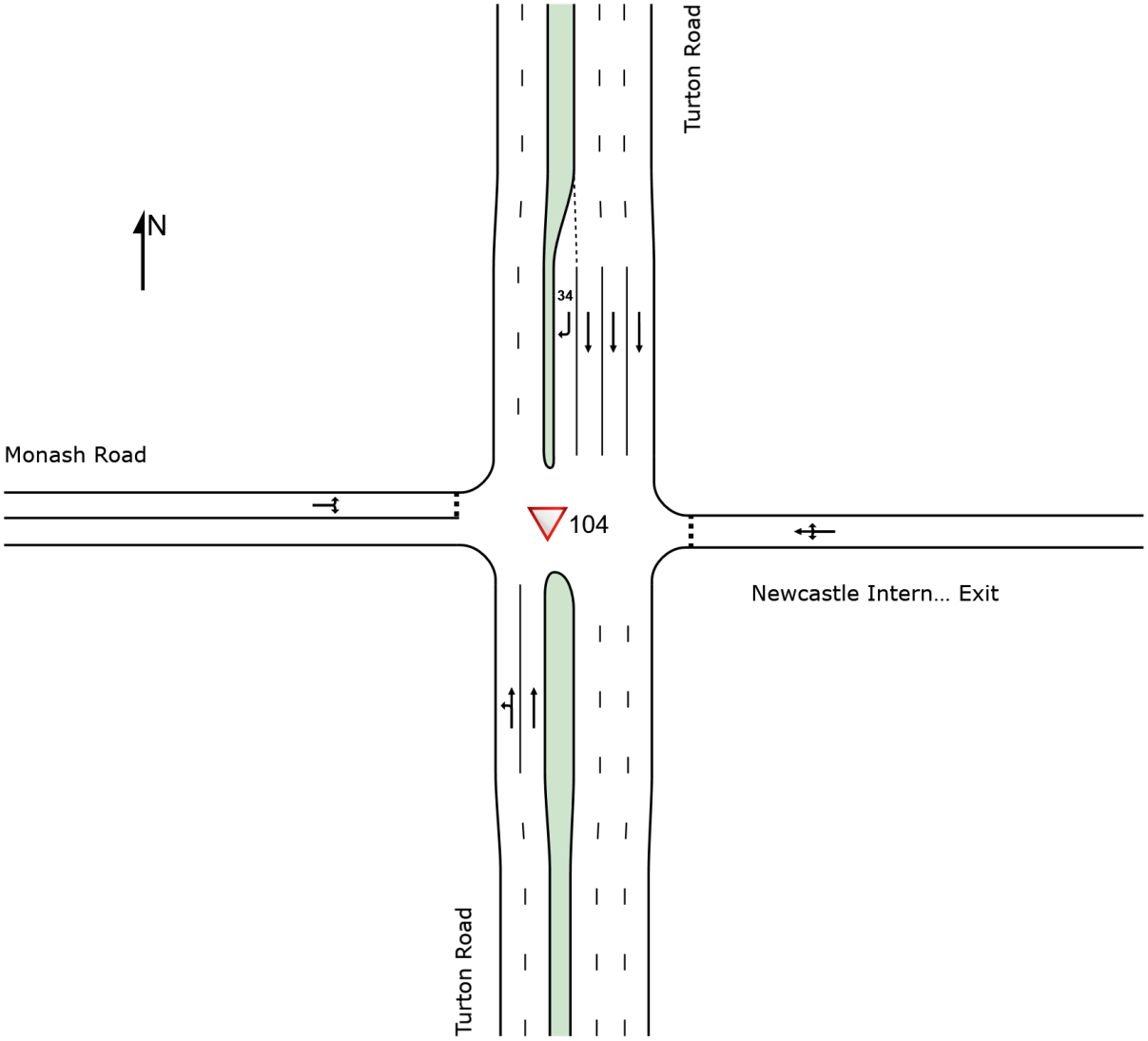


SITE LAYOUT

Site: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Base AM Peak)]

0800-0900
Site Category: Base Year
Give-Way (Two-Way)

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



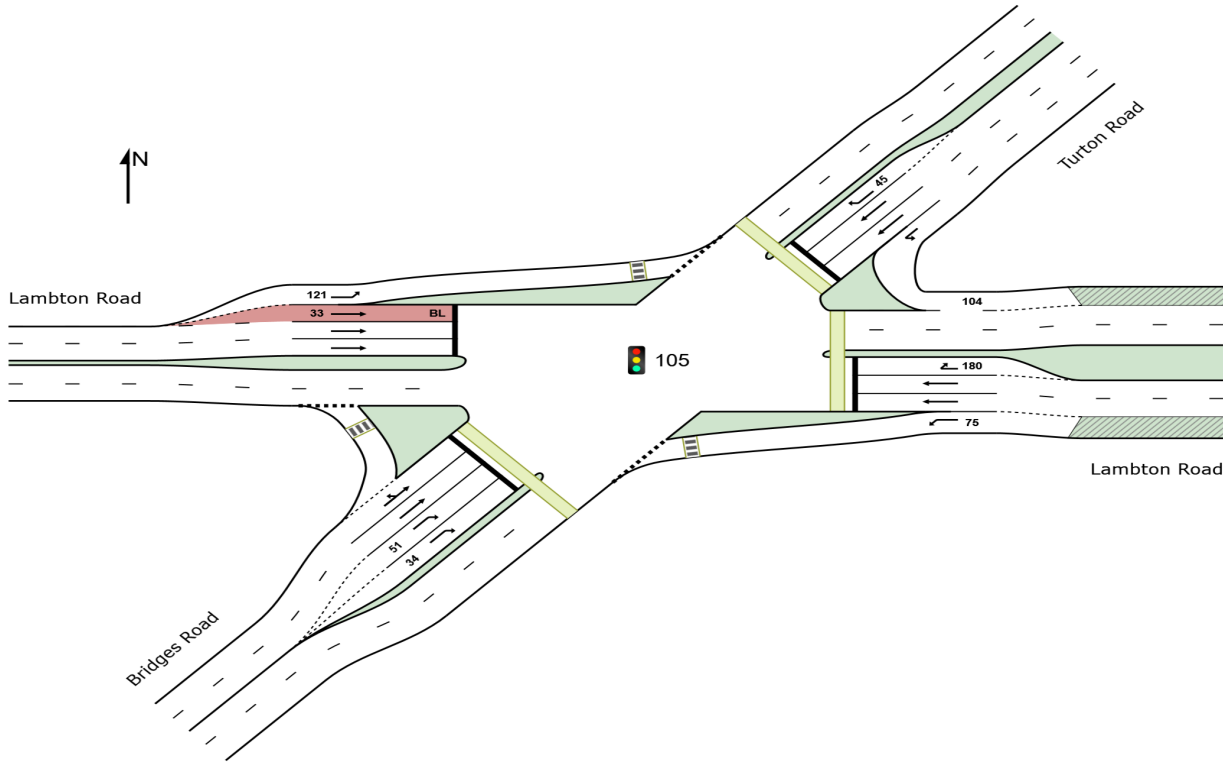
Organisation: BITZIOS CONSULTING | Licence: NETWORK / 1PC | Created: Wednesday, 23 April 2025 3:02:21 PM
Project: P:\P6458 Newcastle Indoor Sports Facility TIA Modelling\Technical\Models\P6458.004M Newcastle Indoor Sports Facility TIA SIDRA Models.sip9

SITE LAYOUT

Site: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Base AM Peak)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



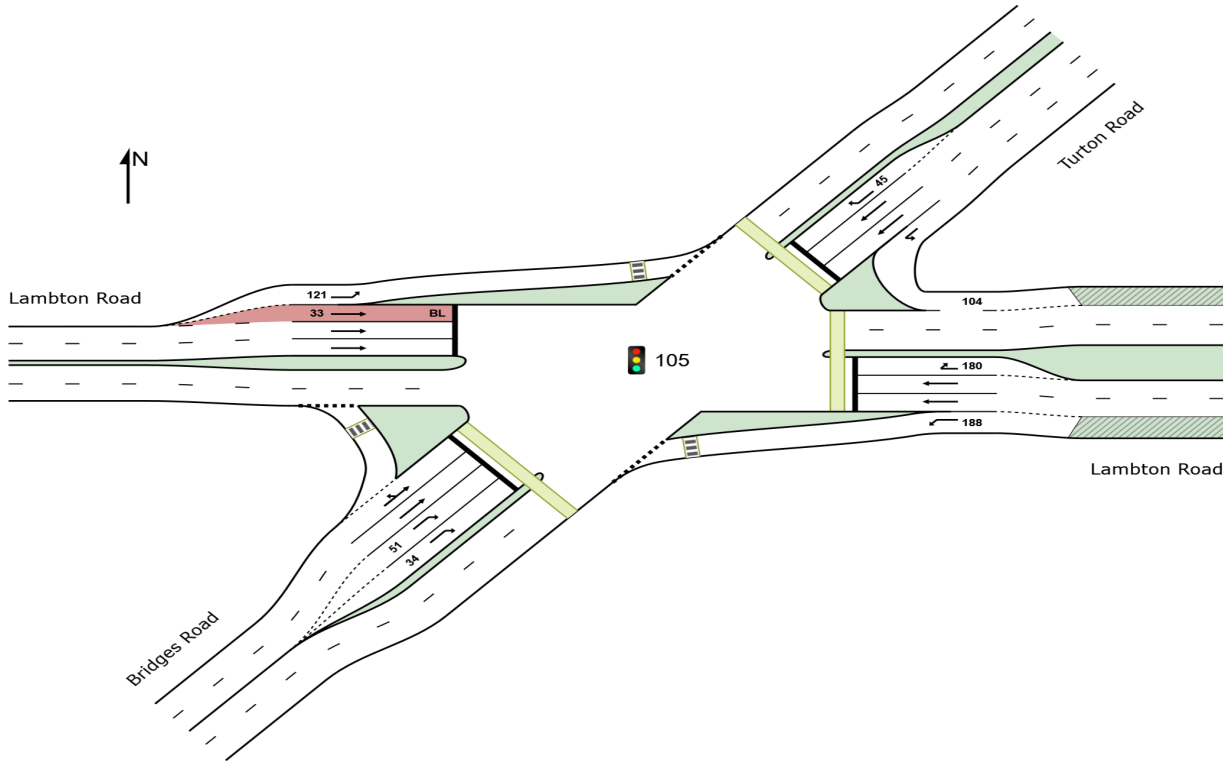
Organisation: BITZIOS CONSULTING | Licence: NETWORK / 1PC | Created: Wednesday, 23 April 2025 3:02:22 PM
Project: P:\P6458 Newcastle Indoor Sports Facility TIA Modelling\Technical\Models\P6458.004M Newcastle Indoor Sports Facility TIA SIDRA Models.sip9

SITE LAYOUT

Site: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Base PM Peak)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



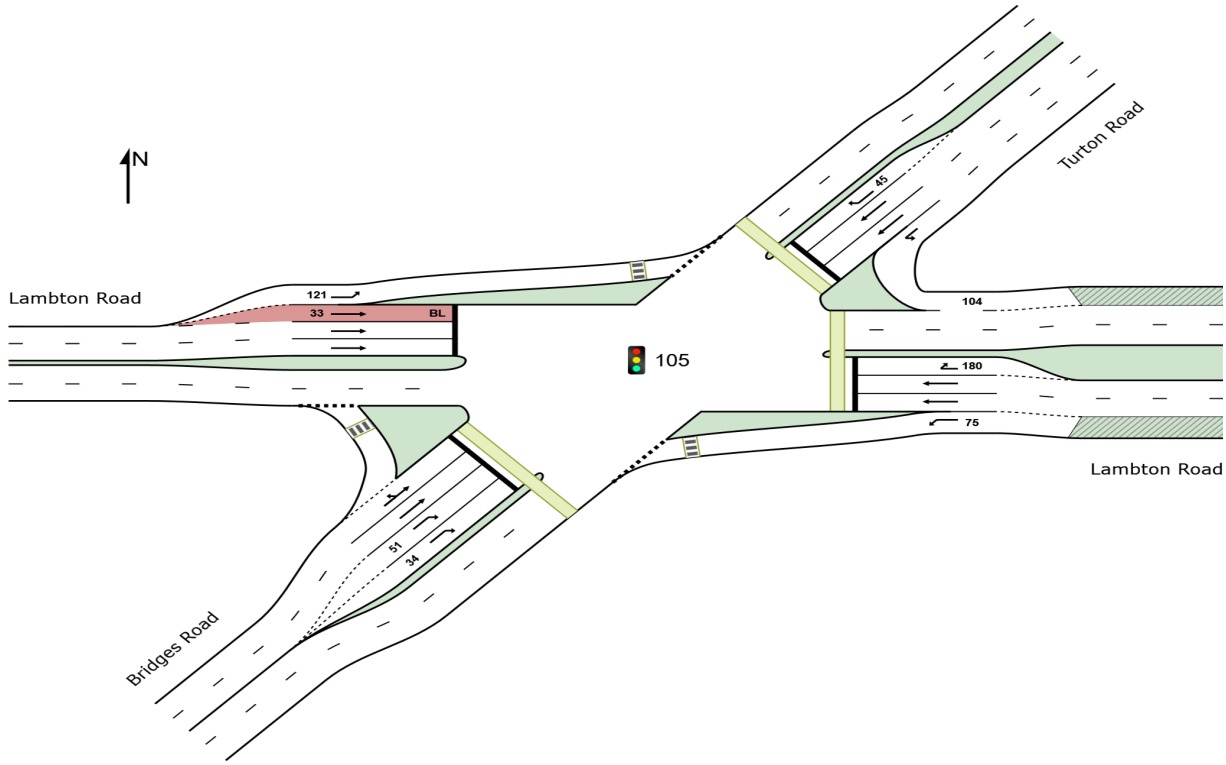
Organisation: BITZIOS CONSULTING | Licence: NETWORK / 1PC | Created: Wednesday, 23 April 2025 3:02:25 PM
Project: P:\P6458 Newcastle Indoor Sports Facility TIA Modelling\Technical\Models\P6458.004M Newcastle Indoor Sports Facility TIA SIDRA Models.sip9

SITE LAYOUT

Site: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Base Weekend Peak)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



Organisation: BITZIOS CONSULTING | Licence: NETWORK / 1PC | Created: Wednesday, 23 April 2025 3:02:26 PM
Project: P:\P6458 Newcastle Indoor Sports Facility TIA Modelling\Technical\Models\P6458.004M Newcastle Indoor Sports Facility TIA SIDRA Models.sip9

Attachment C: SIDRA Model Outputs

MOVEMENT SUMMARY

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Base AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - AM Peak (Network Folder: 2024 Base)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	442	3.6	440	3.6	0.397	9.2	LOS A	5.6	40.6	0.27	0.64	0.27	49.9
2	T1	All MCs	642	3.9	639	3.9	* 0.662	23.1	LOS B	13.3	96.5	0.68	0.58	0.68	35.2
3	R2	All MCs	304	3.1	303	3.1	* 0.853	80.3	LOS F	10.5	75.3	1.00	0.92	1.15	24.6
Approach			1388	3.6	1381	3.6	0.853	31.2	LOS C	13.3	96.5	0.62	0.67	0.65	34.8
East: Griffiths Road															
4	L2	All MCs	220	3.3	220	3.3	0.171	10.9	LOS A	3.8	27.4	0.31	0.64	0.31	47.3
5	T1	All MCs	731	5.6	731	5.6	* 0.532	42.0	LOS C	15.4	112.7	0.88	0.75	0.88	37.7
6	R2	All MCs	55	3.8	55	3.8	* 0.662	78.5	LOS F	3.8	27.3	1.00	0.81	1.12	22.9
Approach			1005	5.0	1005	5.0	0.662	37.2	LOS C	15.4	112.7	0.76	0.73	0.77	37.6
North: Turton Road															
7	L2	All MCs	100	12.6	100	12.6	0.145	14.6	LOS B	2.6	19.9	0.43	0.67	0.43	44.3
8	T1	All MCs	528	4.2	528	4.2	0.498	50.1	LOS D	12.6	91.2	0.91	0.75	0.91	13.7
9	R2	All MCs	88	16.7	88	16.7	0.624	71.7	LOS F	5.8	46.5	1.00	0.81	1.05	22.9
Approach			717	6.9	717	6.9	0.624	47.8	LOS D	12.6	91.2	0.85	0.75	0.86	19.1
West: Griffiths Road															
10	L2	All MCs	108	9.7	108	9.7	0.092	7.7	LOS A	1.2	8.8	0.23	0.61	0.23	48.4
11	T1	All MCs	1340	3.1	1340	3.1	0.508	28.9	LOS C	20.7	148.9	0.78	0.69	0.78	42.6
12	R2	All MCs	311	4.1	311	4.1	0.447	57.9	LOS E	9.0	65.3	0.94	0.80	0.94	22.3
Approach			1759	3.7	1759	3.7	0.508	32.8	LOS C	20.7	148.9	0.78	0.70	0.78	39.3
All Vehicles			4869	4.4	4862	4.4	0.853	35.4	LOS C	20.7	148.9	0.74	0.71	0.75	35.4

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											

P1 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
East: Griffiths Road										
P2 Full	9	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road										
P3 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Griffiths Road										
P4 Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	19	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Base AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - AM Peak (Network Folder: 2024 Base)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	108	3.9	108	3.9	0.129	6.9	LOS A	1.0	7.0	0.12	0.51	0.12	33.4
2	T1	All MCs	1315	3.3	1307	3.3	* 0.580	2.6	LOS A	8.7	62.5	0.18	0.17	0.18	35.4
Approach			1423	3.3	1415	3.3	0.580	3.0	LOS A	8.7	62.5	0.18	0.20	0.18	34.8
North: Turton Road															
8	T1	All MCs	959	0.1	959	0.1	0.295	1.9	LOS A	3.1	22.0	0.13	0.12	0.13	54.7
9	R2	All MCs	68	3.1	68	3.1	* 0.248	8.8	LOS A	0.7	4.8	0.17	0.61	0.17	40.3
Approach			1027	0.3	1027	0.3	0.295	2.4	LOS A	3.1	22.0	0.13	0.15	0.13	52.6
West: Young Road															
10	L2	All MCs	68	6.2	68	6.2	0.127	40.6	LOS C	3.2	23.3	0.76	0.71	0.76	14.6
12	R2	All MCs	178	5.3	178	5.3	* 0.581	58.2	LOS E	10.7	78.4	0.97	0.81	0.97	11.3
Approach			246	5.6	246	5.6	0.581	53.3	LOS D	10.7	78.4	0.91	0.78	0.91	12.0
All Vehicles			2697	2.4	2689	2.4	0.581	7.3	LOS A	10.7	78.4	0.23	0.23	0.23	35.0

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	5	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road											
P3	Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Young Road											
P4	Full	4	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians		17	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Base AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - AM Peak (Network Folder: 2024 Base)]

0800-0900
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1413	3.4	1409	3.4	0.434	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
3	R2	All MCs	40	7.9	40	7.9	0.205	23.4	LOS B	0.6	4.6	0.82	0.94	0.88	12.7
Approach			1453	3.5	1449	3.5	0.434	0.7	NA	0.6	4.6	0.02	0.03	0.02	52.1
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	33	3.2	33	3.2	1.791	722.2	LOS F	14.1	102.9	1.00	4.08	4.55	0.2
6	R2	All MCs	11	10.0	11	10.0	1.791	902.8	LOS F	14.1	102.9	1.00	4.08	4.55	0.2
Approach			43	4.9	43	4.9	1.791	766.2	LOS F	14.1	102.9	1.00	4.08	4.55	0.2
North: Turton Road															
7	L2	All MCs	23	0.0	23	0.0	0.214	4.0	LOS A	0.0	0.0	0.00	0.03	0.00	28.9
8	T1	All MCs	1156	4.7	1156	4.7	0.214	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	58.7
Approach			1179	4.6	1179	4.6	0.214	0.1	NA	0.0	0.0	0.00	0.01	0.00	57.0
All Vehicles			2675	4.0	2671	4.0	1.791	12.8	NA	14.1	102.9	0.03	0.09	0.09	15.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Base AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - AM Peak (Network Folder: 2024 Base)]

0800-0900
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	11	0.0	11	0.0	0.387	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	56.5
2	T1	All MCs	1423	3.6	1423	3.6	0.387	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach			1434	3.5	1434	3.5	0.387	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.6
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.000	203.6	LOS F	2.6	18.0	1.00	1.04	1.06	0.3
5	T1	All MCs	1	0.0	1	0.0	1.000	1128.7	LOS F	2.6	18.0	1.00	1.04	1.06	2.6
6	R2	All MCs	1	0.0	1	0.0	1.000	658.8	LOS F	2.6	18.0	1.00	1.04	1.06	0.3
Approach			3	0.0	3	0.0	1.000	663.7	LOS F	2.6	18.0	1.00	1.04	1.06	1.1
North: Turton Road															
8	T1	All MCs	1157	4.4	1143	4.4	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	36	5.9	35	5.9	0.134	18.4	LOS B	0.4	3.2	0.82	0.92	0.82	29.6
Approach			1193	4.4	1178	4.4	0.206	0.6	NA	0.4	3.2	0.02	0.03	0.02	50.8
West: Monash Road															
10	L2	All MCs	41	0.0	41	0.0	1.065	99.4	LOS F	4.5	32.1	1.00	1.49	2.16	10.6
12	R2	All MCs	5	20.0	5	20.0	1.065	263.4	LOS F	4.5	32.1	1.00	1.49	2.16	10.6
Approach			46	2.3	46	2.3	1.065	118.0	LOS F	4.5	32.1	1.00	1.49	2.16	10.6
All Vehicles			2676	3.9	2661	3.9	1.065	3.2	NA	4.5	32.1	0.03	0.04	0.05	47.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Base AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - AM Peak (Network Folder: 2024 Base)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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: Lambton Road															
4a	L1	All MCs	182	9.8	182	9.8	0.184	8.8	LOS A	3.0	22.9	0.34	0.62	0.34	50.5
5	T1	All MCs	475	5.1	475	5.1	0.263	34.6	LOS C	11.0	80.7	0.78	0.65	0.78	40.3
6b	R3	All MCs	229	8.7	229	8.7	* 0.799	71.2	LOS F	15.2	114.5	1.00	0.90	1.12	17.8
Approach			886	7.0	886	7.0	0.799	38.8	LOS C	15.2	114.5	0.75	0.71	0.78	35.7
NorthEast: Turton Road															
24b	L3	All MCs	342	0.3	338	0.3	0.219	8.0	LOS A	0.0	0.0	0.00	0.58	0.00	51.0
25	T1	All MCs	693	4.7	684	4.7	0.610	42.3	LOS C	18.6	135.6	0.86	0.74	0.86	34.8
26a	R1	All MCs	117	6.3	115	6.3	* 0.873	77.0	LOS F	7.8	57.3	1.00	0.85	1.12	29.1
Approach			1152	3.6	1137	3.6	0.873	35.7	LOS C	18.6	135.6	0.62	0.70	0.63	35.3
West: Lambton Road															
10a	L1	All MCs	111	6.7	111	6.7	0.172	19.4	LOS B	3.5	26.2	0.55	0.69	0.55	41.1
11	T1	All MCs	555	3.6	555	3.6	* 0.931	77.7	LOS F	21.3	151.2	1.00	1.09	1.34	28.6
Approach			665	4.1	665	4.1	0.931	68.0	LOS E	21.3	151.2	0.92	1.02	1.21	29.5
SouthWest: Bridges Road															
30b	L3	All MCs	16	13.3	16	13.3	0.683	11.0	LOS A	22.6	161.3	0.87	0.81	0.87	38.9
31	T1	All MCs	1125	2.0	1125	2.0	* 0.683	46.3	LOS D	35.6	253.7	0.87	0.79	0.87	28.7
32a	R1	All MCs	389	2.2	389	2.2	0.538	43.9	LOS D	6.1	43.7	0.98	0.79	0.98	37.7
Approach			1531	2.1	1531	2.1	0.683	45.3	LOS D	35.6	253.7	0.90	0.79	0.90	27.5
All Vehicles			4234	3.9	4220	3.9	0.931	44.9	LOS D	35.6	253.7	0.80	0.79	0.85	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	23	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88

NorthEast: Turton Road										
P6 Full	6	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
SouthWest: Bridges Road										
P8 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	31	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Base PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - PM Peak (Network Folder: 2024 Base)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	396	3.2	381	3.2	0.348	22.2	LOS B	5.3	38.4	0.29	0.69	0.29	49.4
2	T1	All MCs	847	2.6	815	2.6	* 1.035	131.2	LOS F	40.7	291.3	1.00	1.34	1.50	13.0
3	R2	All MCs	411	1.3	395	1.3	* 0.993	96.4	LOS F	15.7	110.9	1.00	1.07	1.42	23.1
Approach			1654	2.4	1590	2.5	1.035	96.5	LOS F	40.7	291.3	0.83	1.11	1.19	18.6
East: Griffiths Road															
4	L2	All MCs	308	3.4	308	3.4	0.283	18.8	LOS B	9.0	65.0	0.50	0.70	0.50	41.3
5	T1	All MCs	756	3.2	756	3.2	* 0.638	47.8	LOS D	17.0	122.5	0.94	0.79	0.94	35.8
6	R2	All MCs	106	1.0	106	1.0	* 0.935	90.3	LOS F	8.1	57.3	1.00	1.03	1.51	21.0
Approach			1171	3.1	1171	3.1	0.935	44.0	LOS D	17.0	122.5	0.83	0.79	0.87	34.7
North: Turton Road															
7	L2	All MCs	134	1.6	134	1.6	0.182	17.8	LOS B	4.1	29.4	0.51	0.70	0.51	42.5
8	T1	All MCs	846	2.1	846	2.1	0.866	78.3	LOS F	24.5	174.5	0.98	0.95	1.12	11.5
9	R2	All MCs	122	10.3	122	10.3	0.696	88.8	LOS F	8.0	61.3	1.00	0.85	1.08	23.2
Approach			1102	3.0	1102	3.0	0.866	72.1	LOS F	24.5	174.5	0.92	0.91	1.04	13.8
West: Griffiths Road															
10	L2	All MCs	123	5.1	123	5.1	0.125	16.0	LOS B	2.8	20.5	0.42	0.65	0.42	43.9
11	T1	All MCs	1368	1.8	1368	1.8	0.575	34.7	LOS C	23.1	164.3	0.85	0.74	0.85	40.5
12	R2	All MCs	398	5.6	398	5.6	0.517	56.3	LOS D	11.5	84.5	0.94	0.81	0.94	22.7
Approach			1889	2.8	1889	2.8	0.575	38.0	LOS C	23.1	164.3	0.84	0.75	0.84	37.0
All Vehicles			5816	2.8	5752	2.8	1.035	61.9	LOS E	40.7	291.3	0.85	0.89	0.98	26.3

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

East: Griffiths Road										
P2 Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road										
P3 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Griffiths Road										
P4 Full	4	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	14	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Base PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - PM Peak (Network Folder: 2024 Base)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	139	9.8	133	10.0	0.136	31.7	LOS C	5.5	41.4	0.64	0.57	0.64	25.8
2	T1	All MCs	1443	2.6	1379	2.7	* 0.612	27.5	LOS B	11.4	81.6	0.83	0.59	0.83	8.9
Approach			1582	3.3	1512	3.3	0.612	27.9	LOS B	11.4	81.6	0.81	0.59	0.81	9.1
North: Turton Road															
8	T1	All MCs	1448	3.2	1448	3.2	0.438	1.0	LOS A	3.4	24.4	0.09	0.08	0.09	57.1
9	R2	All MCs	101	4.2	101	4.2	* 0.574	42.4	LOS C	5.8	42.3	0.93	0.84	0.93	25.3
Approach			1549	3.3	1549	3.3	0.574	3.7	LOS A	5.8	42.3	0.15	0.13	0.15	50.3
West: Young Road															
10	L2	All MCs	138	3.1	138	3.1	0.292	64.2	LOS E	7.1	51.1	0.85	0.77	0.85	13.9
12	R2	All MCs	259	3.3	259	3.3	* 1.036	146.2	LOS F	24.6	177.3	1.00	1.25	1.71	6.1
Approach			397	3.2	397	3.2	1.036	117.7	LOS F	24.6	177.3	0.95	1.08	1.41	6.7
All Vehicles			3528	3.3	3459	3.3	1.036	27.4	LOS B	24.6	177.3	0.53	0.44	0.58	19.3

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	21	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88
North: Turton Road											
P3	Full	17	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88
West: Young Road											
P4	Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians		45	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Base PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - PM Peak (Network Folder: 2024 Base)]

1645 - 1745
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1579	3.2	1509	3.3	0.677	5.8	LOS A	15.6	112.6	0.17	0.15	0.26	28.2
3	R2	All MCs	99	2.1	95	2.2	1.111	211.5	LOS F	10.6	75.3	1.00	1.79	4.42	2.0
Approach			1678	3.1	1604	3.2	1.111	17.9	NA	15.6	112.6	0.22	0.25	0.51	13.5
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	33	3.2	33	3.2	1.165	188.4	LOS F	5.2	37.0	1.00	2.42	2.79	0.9
6	R2	All MCs	4	0.0	4	0.0	1.165	151.2	LOS F	5.2	37.0	1.00	2.42	2.79	0.9
Approach			37	2.9	37	2.9	1.165	184.2	LOS F	5.2	37.0	1.00	2.42	2.79	0.9
North: Turton Road															
7	L2	All MCs	19	5.6	19	5.6	0.306	4.0	LOS A	0.0	0.0	0.00	0.02	0.00	29.0
8	T1	All MCs	1696	3.2	1687	3.2	0.306	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach			1715	3.2	1706	3.2	0.306	0.1	NA	0.0	0.0	0.00	0.01	0.00	58.2
All Vehicles			3429	3.2	3347	3.2	1.165	10.6	NA	15.6	112.6	0.11	0.15	0.27	17.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Base PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - PM Peak (Network Folder: 2024 Base)]

1645 - 1745
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	19	0.0	19	0.0	0.426	5.6	LOS A	6.7	47.8	0.00	0.01	0.00	56.4
2	T1	All MCs	1567	3.2	1567	3.2	0.426	0.1	LOS A	10.5	75.3	0.00	0.01	0.00	59.5
Approach			1586	3.1	1586	3.1	0.426	0.2	NA	10.5	75.3	0.00	0.01	0.00	59.4
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.333	1164.0	LOS F	3.5	24.2	1.00	0.98	1.15	0.2
5	T1	All MCs	1	0.0	1	0.0	1.333	1718.9	LOS F	3.5	24.2	1.00	0.98	1.15	1.7
6	R2	All MCs	1	0.0	1	0.0	1.333	309.3	LOS F	3.5	24.2	1.00	0.98	1.15	0.2
Approach			3	0.0	3	0.0	1.333	1064.1	LOS F	3.5	24.2	1.00	0.98	1.15	0.7
North: Turton Road															
8	T1	All MCs	1693	4.0	1680	4.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	All MCs	49	0.0	49	0.0	0.195	20.1	LOS B	0.7	4.8	0.85	0.95	0.89	32.5
Approach			1742	3.9	1729	3.9	0.301	0.6	NA	0.7	4.8	0.02	0.03	0.03	52.4
West: Monash Road															
10	L2	All MCs	111	1.9	111	1.9	3.077	1893.1	LOS F	51.2	363.8	1.00	6.43	15.86	0.9
12	R2	All MCs	8	0.0	8	0.0	3.077	1874.3	LOS F	51.2	363.8	1.00	6.43	15.86	0.9
Approach			119	1.8	119	1.8	3.077	1891.8	LOS F	51.2	363.8	1.00	6.43	15.86	0.9
All Vehicles			3451	3.5	3437	3.5	3.077	66.8	NA	51.2	363.8	0.05	0.24	0.56	9.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Base PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - PM Peak (Network Folder: 2024 Base)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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: Lambton Road															
4a	L1	All MCs	303	4.2	303	4.2	0.315	13.6	LOS A	8.4	60.7	0.49	0.69	0.49	47.4
5	T1	All MCs	624	2.2	624	2.2	0.322	33.9	LOS C	14.6	103.9	0.79	0.67	0.79	40.5
6b	R3	All MCs	162	5.8	162	5.8	* 0.509	44.1	LOS D	7.6	55.6	0.97	0.79	0.97	24.3
Approach			1089	3.3	1089	3.3	0.509	29.8	LOS C	14.6	103.9	0.73	0.69	0.73	40.1
NorthEast: Turton Road															
24b	L3	All MCs	598	0.5	591	0.5	0.365	9.9	LOS A	0.0	0.0	0.00	0.58	0.00	50.9
25	T1	All MCs	931	2.7	920	2.7	0.783	41.7	LOS C	25.4	181.8	0.87	0.79	0.90	36.4
26a	R1	All MCs	140	3.0	138	3.0	0.482	70.0	LOS E	7.5	53.8	0.87	0.76	0.87	32.8
Approach			1668	2.0	1650	2.0	0.783	32.7	LOS C	25.4	181.8	0.56	0.71	0.57	36.8
West: Lambton Road															
10a	L1	All MCs	158	10.0	158	10.0	0.204	19.9	LOS B	5.0	38.3	0.56	0.68	0.56	40.8
11	T1	All MCs	696	3.8	696	3.8	* 0.973	88.7	LOS F	28.6	204.9	1.00	1.19	1.43	26.6
Approach			854	4.9	854	4.9	0.973	76.0	LOS F	28.6	204.9	0.92	1.10	1.27	27.7
SouthWest: Bridges Road															
30b	L3	All MCs	20	0.0	20	0.0	0.977	51.6	LOS D	49.4	350.5	1.00	1.26	1.37	26.3
31	T1	All MCs	1262	1.8	1262	1.8	* 0.977	100.1	LOS F	57.8	410.8	1.00	1.22	1.34	16.4
32a	R1	All MCs	616	0.3	616	0.3	* 1.048	164.6	LOS F	29.4	206.1	1.00	1.35	1.72	18.4
Approach			1898	1.3	1898	1.3	1.048	120.5	LOS F	57.8	410.8	1.00	1.27	1.46	15.1
All Vehicles			5509	2.4	5491	2.5	1.048	69.2	LOS E	57.8	410.8	0.80	0.96	1.02	25.7

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	28	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88
NorthEast: Turton Road											

P6 Full	15	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88
SouthWest: Bridges Road										
P8 Full	5	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	48	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Base Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - WE Peak (Network Folder: 2024 Base)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	402	1.3	401	1.3	0.355	8.6	LOS A	3.9	27.4	0.22	0.62	0.22	50.4
2	T1	All MCs	498	1.1	496	1.1	0.522	17.7	LOS B	7.7	54.1	0.54	0.45	0.54	38.9
3	R2	All MCs	234	0.9	233	0.9	* 0.636	69.5	LOS E	7.1	50.0	1.00	0.83	1.02	26.6
Approach			1134	1.1	1129	1.1	0.636	25.2	LOS B	7.7	54.1	0.52	0.59	0.53	38.0
East: Griffiths Road															
4	L2	All MCs	332	0.3	332	0.3	0.284	15.3	LOS B	7.9	55.4	0.46	0.69	0.46	43.8
5	T1	All MCs	793	0.7	793	0.7	* 0.678	44.9	LOS D	16.6	116.7	0.95	0.80	0.95	36.7
6	R2	All MCs	87	2.4	87	2.4	* 0.709	69.8	LOS E	5.4	38.8	1.00	0.85	1.14	24.5
Approach			1212	0.7	1212	0.7	0.709	38.6	LOS C	16.6	116.7	0.82	0.78	0.83	36.7
North: Turton Road															
7	L2	All MCs	86	0.0	86	0.0	0.100	10.6	LOS A	1.5	10.5	0.33	0.64	0.33	47.5
8	T1	All MCs	694	0.6	694	0.6	* 0.692	55.1	LOS D	16.1	113.0	0.96	0.81	0.97	13.9
9	R2	All MCs	98	5.4	98	5.4	0.615	71.4	LOS F	5.8	42.7	1.00	0.81	1.04	24.3
Approach			878	1.1	878	1.1	0.692	52.5	LOS D	16.1	113.0	0.90	0.79	0.91	17.0
West: Griffiths Road															
10	L2	All MCs	107	2.0	107	2.0	0.086	7.0	LOS A	0.9	6.1	0.22	0.61	0.22	49.7
11	T1	All MCs	986	0.5	986	0.5	0.402	28.0	LOS B	13.8	97.1	0.77	0.66	0.77	43.0
12	R2	All MCs	463	1.1	463	1.1	0.522	49.9	LOS D	12.0	85.0	0.93	0.81	0.93	24.5
Approach			1557	0.8	1557	0.8	0.522	33.1	LOS C	13.8	97.1	0.78	0.70	0.78	38.2
All Vehicles			4780	0.9	4776	0.9	0.709	36.2	LOS C	16.6	116.7	0.75	0.71	0.76	34.3

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											

P1 Full	1	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
East: Griffiths Road										
P2 Full	9	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
North: Turton Road										
P3 Full	1	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
West: Griffiths Road										
P4 Full	1	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
All Pedestrians	13	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Base Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - WE Peak (Network Folder: 2024 Base)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

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
South: Turton Road															
1	L2	All MCs	63	0.0	63	0.0	0.099	25.5	LOS B	3.4	23.9	0.57	0.56	0.57	27.8
2	T1	All MCs	1019	1.0	1014	1.0	* 0.445	20.8	LOS B	11.6	81.6	0.68	0.55	0.68	11.0
Approach			1082	1.0	1077	1.0	0.445	21.1	LOS B	11.6	81.6	0.68	0.55	0.68	10.7
North: Turton Road															
8	T1	All MCs	1397	0.7	1397	0.7	0.390	1.3	LOS A	4.0	28.2	0.13	0.12	0.13	56.3
9	R2	All MCs	79	4.0	79	4.0	* 0.202	7.7	LOS A	0.4	3.2	0.11	0.59	0.11	44.1
Approach			1476	0.9	1476	0.9	0.390	1.6	LOS A	4.0	28.2	0.13	0.14	0.13	55.0
West: Young Road															
10	L2	All MCs	89	1.2	89	1.2	0.169	40.2	LOS C	3.9	27.7	0.79	0.74	0.79	15.7
12	R2	All MCs	116	2.7	116	2.7	* 0.453	56.7	LOS E	6.4	45.7	0.96	0.79	0.96	12.2
Approach			205	2.1	205	2.1	0.453	49.5	LOS D	6.4	45.7	0.89	0.77	0.89	13.5
All Vehicles			2763	1.0	2758	1.0	0.453	12.8	LOS A	11.6	81.6	0.40	0.35	0.40	30.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	8	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
North: Turton Road											
P3	Full	16	54.2	LOS E	0.1	0.1	0.95	0.95	220.9	200.0	0.91
West: Young Road											
P4	Full	1	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
All Pedestrians		25	54.2	LOS E	0.1	0.1	0.95	0.95	220.8	200.0	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Base Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - WE Peak (Network Folder: 2024 Base)]

1115 - 1215
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1031	0.8	1028	0.8	0.270	0.0	LOS A	6.7	47.2	0.00	0.00	0.00	59.8
3	R2	All MCs	48	2.2	48	2.2	0.407	41.8	LOS C	1.3	9.1	0.92	1.02	1.14	8.3
Approach			1079	0.9	1076	0.9	0.407	1.9	NA	6.7	47.2	0.04	0.05	0.05	43.0
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	41	5.1	41	5.1	1.477	441.0	LOS F	11.9	86.4	1.00	4.12	4.79	0.4
6	R2	All MCs	7	0.0	7	0.0	1.477	638.7	LOS F	11.9	86.4	1.00	4.12	4.79	0.4
Approach			48	4.3	48	4.3	1.477	471.1	LOS F	11.9	86.4	1.00	4.12	4.79	0.4
North: Turton Road															
7	L2	All MCs	17	0.0	17	0.0	0.269	4.0	LOS A	0.0	0.0	0.00	0.02	0.00	29.1
8	T1	All MCs	1520	0.8	1520	0.8	0.269	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach			1537	0.8	1537	0.8	0.269	0.1	NA	0.0	0.0	0.00	0.01	0.00	58.2
All Vehicles			2664	0.9	2662	0.9	1.477	9.4	NA	11.9	86.4	0.03	0.10	0.11	19.1

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Base Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - WE Peak (Network Folder: 2024 Base)]

1115 - 1215
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	12	0.0	12	0.0	0.294	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	56.6
2	T1	All MCs	1106	1.0	1106	1.0	0.294	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach			1118	0.9	1118	0.9	0.294	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.6
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.000	190.7	LOS F	2.4	16.7	1.00	1.03	1.05	0.4
5	T1	All MCs	1	0.0	1	0.0	1.000	1043.6	LOS F	2.4	16.7	1.00	1.03	1.05	2.9
6	R2	All MCs	1	0.0	1	0.0	1.000	596.3	LOS F	2.4	16.7	1.00	1.03	1.05	0.4
Approach			3	0.0	3	0.0	1.000	610.2	LOS F	2.4	16.7	1.00	1.03	1.05	1.2
North: Turton Road															
8	T1	All MCs	1497	1.0	1484	0.9	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	37	0.0	37	0.0	0.079	11.6	LOS A	0.3	2.0	0.70	0.87	0.70	37.8
Approach			1534	1.0	1521	0.9	0.258	0.3	NA	0.3	2.0	0.02	0.02	0.02	55.2
West: Monash Road															
10	L2	All MCs	47	2.2	47	2.2	1.062	90.7	LOS F	4.6	32.8	1.00	1.43	2.03	12.3
12	R2	All MCs	2	0.0	2	0.0	1.062	424.6	LOS F	4.6	32.8	1.00	1.43	2.03	12.3
Approach			49	2.1	49	2.1	1.062	104.9	LOS F	4.6	32.8	1.00	1.43	2.03	12.3
All Vehicles			2704	1.0	2691	1.0	1.062	2.9	NA	4.6	32.8	0.03	0.04	0.05	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Base Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Newcastle Indoor Sports Facility - WE Peak (Network Folder: 2024 Base)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

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: Lambton Road															
4a	L1	All MCs	287	2.2	287	2.2	0.318	11.9	LOS A	7.4	52.6	0.51	0.70	0.51	48.5
5	T1	All MCs	412	1.0	412	1.0	0.226	31.9	LOS C	8.7	61.4	0.78	0.64	0.78	41.3
6b	R3	All MCs	198	0.5	198	0.5	* 0.528	41.6	LOS C	8.9	62.3	0.94	0.80	0.94	25.1
Approach			897	1.3	897	1.3	0.528	27.6	LOS B	8.9	62.3	0.73	0.69	0.73	40.3
NorthEast: Turton Road															
24b	L3	All MCs	332	0.3	329	0.3	0.202	7.7	LOS A	0.0	0.0	0.00	0.58	0.00	51.0
25	T1	All MCs	1093	0.4	1084	0.4	* 0.724	22.9	LOS B	21.5	150.7	0.71	0.63	0.71	44.1
26a	R1	All MCs	119	0.0	118	0.0	* 0.634	77.6	LOS F	7.2	50.2	1.00	0.83	1.02	28.5
Approach			1543	0.3	1531	0.3	0.724	23.8	LOS B	21.5	150.7	0.58	0.63	0.58	40.8
West: Lambton Road															
10a	L1	All MCs	91	1.2	91	1.2	0.117	12.4	LOS A	2.0	13.8	0.44	0.65	0.44	46.3
11	T1	All MCs	407	1.6	407	1.6	* 0.610	50.1	LOS D	11.2	78.9	0.98	0.80	0.98	35.1
Approach			498	1.5	498	1.5	0.610	43.2	LOS D	11.2	78.9	0.88	0.78	0.88	36.1
SouthWest: Bridges Road															
30b	L3	All MCs	40	0.0	40	0.0	0.512	9.5	LOS A	14.5	101.9	0.80	0.75	0.80	42.2
31	T1	All MCs	837	0.9	837	0.9	0.512	36.7	LOS C	22.6	159.1	0.80	0.72	0.80	31.3
32a	R1	All MCs	308	0.7	308	0.7	0.547	66.6	LOS E	8.8	61.8	1.00	0.79	1.00	29.5
Approach			1185	0.8	1185	0.8	0.547	43.5	LOS D	22.6	159.1	0.86	0.74	0.86	28.5
All Vehicles			4123	0.8	4111	0.8	0.724	32.7	LOS C	22.6	159.1	0.73	0.69	0.73	36.4

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	40	54.2	LOS E	0.1	0.1	0.95	0.95	220.9	200.0	0.91

NorthEast: Turton Road										
P6 Full	17	54.2	LOS E	0.1	0.1	0.95	0.95	220.9	200.0	0.91
SouthWest: Bridges Road										
P8 Full	7	54.2	LOS E	0.0	0.0	0.95	0.95	220.8	200.0	0.91
All Pedestrians	64	54.2	LOS E	0.1	0.1	0.95	0.95	220.9	200.0	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Project AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - AM Peak (Network Folder: 2024 Project)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	452	3.5	449	3.5	0.405	9.4	LOS A	6.0	43.5	0.28	0.64	0.28	49.7
2	T1	All MCs	644	3.9	640	3.9	* 0.664	23.6	LOS B	13.5	97.9	0.69	0.59	0.69	34.9
3	R2	All MCs	312	3.0	310	3.0	* 0.872	81.2	LOS F	10.8	77.5	1.00	0.93	1.17	24.4
Approach			1407	3.6	1398	3.6	0.872	31.8	LOS C	13.5	97.9	0.63	0.68	0.67	34.6
East: Griffiths Road															
4	L2	All MCs	221	3.3	221	3.3	0.173	11.2	LOS A	3.9	28.4	0.32	0.64	0.32	47.0
5	T1	All MCs	731	5.6	731	5.6	* 0.532	42.0	LOS C	15.4	112.7	0.88	0.75	0.88	37.7
6	R2	All MCs	55	3.8	55	3.8	* 0.662	78.5	LOS F	3.8	27.3	1.00	0.81	1.12	22.9
Approach			1006	5.0	1006	5.0	0.662	37.2	LOS C	15.4	112.7	0.76	0.73	0.77	37.6
North: Turton Road															
7	L2	All MCs	100	12.6	100	12.6	0.145	14.6	LOS B	2.6	20.0	0.43	0.67	0.43	44.3
8	T1	All MCs	534	4.1	534	4.1	0.504	50.3	LOS D	12.7	92.4	0.91	0.75	0.91	13.6
9	R2	All MCs	88	16.7	88	16.7	0.624	71.7	LOS F	5.8	46.5	1.00	0.81	1.05	22.9
Approach			722	6.9	722	6.9	0.624	48.0	LOS D	12.7	92.4	0.85	0.75	0.86	19.1
West: Griffiths Road															
10	L2	All MCs	108	9.7	108	9.7	0.092	7.7	LOS A	1.2	8.8	0.23	0.61	0.23	48.4
11	T1	All MCs	1340	3.1	1340	3.1	0.508	28.9	LOS C	20.7	148.9	0.78	0.69	0.78	42.6
12	R2	All MCs	313	4.0	313	4.0	0.450	58.0	LOS E	9.1	65.8	0.94	0.80	0.94	22.3
Approach			1761	3.6	1761	3.6	0.508	32.8	LOS C	20.7	148.9	0.78	0.70	0.78	39.3
All Vehicles			4897	4.4	4888	4.4	0.872	35.7	LOS C	20.7	148.9	0.74	0.71	0.76	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

East: Griffiths Road										
P2 Full	9	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road										
P3 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Griffiths Road										
P4 Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	19	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Project AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - AM Peak (Network Folder: 2024 Project)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	108	3.9	108	3.9	0.131	6.9	LOS A	1.0	7.0	0.12	0.50	0.12	33.4
2	T1	All MCs	1334	3.2	1325	3.2	* 0.588	2.4	LOS A	8.8	63.1	0.17	0.16	0.17	36.8
Approach			1442	3.3	1432	3.3	0.588	2.7	LOS A	8.8	63.1	0.16	0.18	0.16	35.7
North: Turton Road															
8	T1	All MCs	959	0.1	959	0.1	0.295	1.9	LOS A	3.1	22.0	0.13	0.12	0.13	54.7
9	R2	All MCs	79	2.7	79	2.7	* 0.288	8.9	LOS A	0.8	5.9	0.18	0.62	0.18	40.2
Approach			1038	0.3	1038	0.3	0.295	2.5	LOS A	3.1	22.0	0.14	0.15	0.14	52.3
West: Young Road															
10	L2	All MCs	68	6.2	68	6.2	0.127	40.6	LOS C	3.2	23.3	0.76	0.71	0.76	14.6
12	R2	All MCs	178	5.3	178	5.3	* 0.581	58.2	LOS E	10.7	78.4	0.97	0.81	0.97	11.3
Approach			246	5.6	246	5.6	0.581	53.3	LOS D	10.7	78.4	0.91	0.78	0.91	12.0
All Vehicles			2726	2.4	2717	2.4	0.588	7.2	LOS A	10.7	78.4	0.22	0.23	0.22	35.2

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	5	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road											
P3	Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Young Road											
P4	Full	4	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians		17	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Project AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - AM Peak (Network Folder: 2024 Project)]

0800-0900
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1457	3.3	1452	3.3	0.449	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
3	R2	All MCs	40	7.9	40	7.9	0.205	23.4	LOS B	0.6	4.6	0.82	0.94	0.88	12.7
Approach			1497	3.4	1492	3.4	0.449	0.7	NA	0.6	4.6	0.02	0.03	0.02	52.3
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	33	3.2	33	3.2	1.791	723.4	LOS F	14.1	102.7	1.00	4.10	4.57	0.2
6	R2	All MCs	11	10.0	11	10.0	1.791	894.8	LOS F	14.1	102.7	1.00	4.10	4.57	0.2
Approach			43	4.9	43	4.9	1.791	765.2	LOS F	14.1	102.7	1.00	4.10	4.57	0.2
North: Turton Road															
7	L2	All MCs	23	0.0	23	0.0	0.214	4.0	LOS A	0.0	0.0	0.00	0.03	0.00	28.9
8	T1	All MCs	1156	4.7	1156	4.7	0.214	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	58.7
Approach			1179	4.6	1179	4.6	0.214	0.1	NA	0.0	0.0	0.00	0.01	0.00	57.0
All Vehicles			2719	3.9	2714	4.0	1.791	12.6	NA	14.1	102.7	0.03	0.08	0.09	16.0

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Project AM Peak)]

Network: N101 [Project - AM Peak (Network Folder: 2024 Project)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

0800-0900
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	11	0.0	11	0.0	0.395	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	56.5
2	T1	All MCs	1456	3.5	1456	3.5	0.395	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach			1466	3.4	1466	3.4	0.395	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.5
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.000	217.6	LOS F	3.0	20.8	1.00	1.03	1.05	0.3
5	T1	All MCs	1	0.0	1	0.0	1.000	1311.1	LOS F	3.0	20.8	1.00	1.03	1.05	2.3
6	R2	All MCs	1	0.0	1	0.0	1.000	714.8	LOS F	3.0	20.8	1.00	1.03	1.05	0.3
Approach			3	0.0	3	0.0	1.000	747.8	LOS F	3.0	20.8	1.00	1.03	1.05	1.0
North: Turton Road															
8	T1	All MCs	1157	4.4	1143	4.4	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	36	5.9	35	5.9	0.141	19.3	LOS B	0.5	3.4	0.83	0.93	0.83	29.2
Approach			1193	4.4	1178	4.4	0.206	0.6	NA	0.5	3.4	0.02	0.03	0.02	50.6
West: Monash Road															
10	L2	All MCs	53	0.0	53	0.0	1.085	110.3	LOS F	5.6	39.8	1.00	1.69	2.58	10.3
12	R2	All MCs	5	20.0	5	20.0	1.085	253.0	LOS F	5.6	39.8	1.00	1.69	2.58	10.3
Approach			58	1.8	58	1.8	1.085	123.3	LOS F	5.6	39.8	1.00	1.69	2.58	10.3
All Vehicles			2720	3.8	2706	3.9	1.085	3.8	NA	5.6	39.8	0.03	0.05	0.07	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Project AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - AM Peak (Network Folder: 2024 Project)]

0800-0900
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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: Lambton Road															
4a	L1	All MCs	182	9.8	182	9.8	0.184	8.8	LOS A	3.0	23.0	0.34	0.62	0.34	50.5
5	T1	All MCs	475	5.1	475	5.1	0.263	34.6	LOS C	11.0	80.7	0.78	0.65	0.78	40.3
6b	R3	All MCs	238	8.4	238	8.4	* 0.826	72.6	LOS F	16.0	120.3	1.00	0.92	1.16	17.6
Approach			895	6.9	895	6.9	0.826	39.4	LOS C	16.0	120.3	0.75	0.72	0.79	35.4
NorthEast: Turton Road															
24b	L3	All MCs	342	0.3	338	0.3	0.219	8.1	LOS A	0.0	0.0	0.00	0.58	0.00	51.0
25	T1	All MCs	693	4.7	684	4.7	0.610	42.5	LOS D	18.7	136.0	0.86	0.74	0.86	34.7
26a	R1	All MCs	117	6.3	115	6.3	* 0.873	77.0	LOS F	7.8	57.2	1.00	0.85	1.12	29.1
Approach			1152	3.6	1137	3.6	0.873	35.8	LOS C	18.7	136.0	0.62	0.70	0.63	35.3
West: Lambton Road															
10a	L1	All MCs	124	5.9	124	5.9	0.194	19.7	LOS B	4.1	30.0	0.56	0.69	0.56	40.9
11	T1	All MCs	558	4.2	558	4.2	* 0.931	77.5	LOS F	21.3	151.2	1.00	1.09	1.34	28.6
Approach			682	4.5	682	4.5	0.931	67.0	LOS E	21.3	151.2	0.92	1.02	1.20	29.6
SouthWest: Bridges Road															
30b	L3	All MCs	16	13.3	16	13.3	0.689	11.0	LOS A	22.9	163.3	0.87	0.81	0.87	38.9
31	T1	All MCs	1136	1.9	1136	1.9	* 0.689	46.6	LOS D	36.1	257.0	0.88	0.79	0.88	28.6
32a	R1	All MCs	389	2.2	389	2.2	0.538	44.0	LOS D	6.1	43.7	0.98	0.79	0.98	37.7
Approach			1541	2.1	1541	2.1	0.689	45.5	LOS D	36.1	257.0	0.90	0.79	0.90	27.4
All Vehicles			4269	3.9	4255	3.9	0.931	45.1	LOS D	36.1	257.0	0.80	0.79	0.85	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	23	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88
NorthEast: Turton Road											

P6 Full	6	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
SouthWest: Bridges Road										
P8 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	31	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	512	2.5	471	2.6	0.429	22.5	LOS B	9.0	64.1	0.39	0.94	0.39	48.3
2	T1	All MCs	874	2.5	805	2.6	* 1.050	142.0	LOS F	42.1	301.2	1.00	1.39	1.57	12.1
3	R2	All MCs	495	1.1	455	1.1	* 1.148	217.5	LOS F	26.1	184.1	1.00	1.40	2.05	12.9
Approach			1880	2.1	1731	2.2	1.148	129.3	LOS F	42.1	301.2	0.83	1.27	1.37	15.3
East: Griffiths Road															
4	L2	All MCs	322	3.3	322	3.3	0.300	20.0	LOS B	9.9	71.4	0.53	0.71	0.53	40.5
5	T1	All MCs	756	3.2	756	3.2	* 0.638	47.8	LOS D	17.0	122.5	0.94	0.79	0.94	35.8
6	R2	All MCs	106	1.0	106	1.0	* 0.935	90.3	LOS F	8.1	57.3	1.00	1.03	1.51	21.0
Approach			1184	3.0	1184	3.0	0.935	44.1	LOS D	17.0	122.5	0.83	0.79	0.88	34.7
North: Turton Road															
7	L2	All MCs	134	1.6	134	1.6	0.183	18.4	LOS B	4.3	30.2	0.52	0.70	0.52	42.2
8	T1	All MCs	873	2.1	873	2.1	0.901	84.3	LOS F	26.7	190.4	0.98	0.99	1.17	10.8
9	R2	All MCs	122	10.3	122	10.3	0.696	90.3	LOS F	8.0	61.3	1.00	0.85	1.08	23.2
Approach			1128	2.9	1128	2.9	0.901	77.1	LOS F	26.7	190.4	0.93	0.94	1.08	13.0
West: Griffiths Road															
10	L2	All MCs	123	5.1	123	5.1	0.125	16.0	LOS B	2.8	20.5	0.42	0.65	0.42	43.9
11	T1	All MCs	1368	1.8	1368	1.8	0.575	34.7	LOS C	23.1	164.3	0.85	0.74	0.85	40.5
12	R2	All MCs	406	5.4	406	5.4	0.527	56.5	LOS D	11.8	86.4	0.94	0.81	0.94	22.7
Approach			1898	2.8	1898	2.8	0.575	38.1	LOS C	23.1	164.3	0.84	0.75	0.84	36.9
All Vehicles			6091	2.6	5942	2.7	1.148	73.3	LOS F	42.1	301.2	0.85	0.95	1.05	23.9

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

East: Griffiths Road										
P2 Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road										
P3 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Griffiths Road										
P4 Full	4	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	14	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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
South: Turton Road															
1	L2	All MCs	139	9.8	127	10.3	0.148	32.7	LOS C	6.1	46.2	0.65	0.55	0.65	25.9
2	T1	All MCs	1669	2.3	1521	2.4	* 0.668	29.5	LOS C	11.4	81.6	0.86	0.62	0.86	8.4
Approach			1808	2.9	1648	3.0	0.668	29.7	LOS C	11.4	81.6	0.85	0.62	0.85	8.4
North: Turton Road															
8	T1	All MCs	1448	3.2	1448	3.2	0.438	5.7	LOS A	3.4	24.7	0.09	0.08	0.09	57.0
9	R2	All MCs	149	2.8	149	2.8	* 0.937	116.5	LOS F	12.8	91.5	1.00	1.12	1.46	14.5
Approach			1598	3.2	1598	3.2	0.937	16.1	LOS B	12.8	91.5	0.18	0.18	0.22	33.7
West: Young Road															
10	L2	All MCs	138	3.1	138	3.1	0.292	64.5	LOS E	7.1	51.1	0.85	0.77	0.85	13.9
12	R2	All MCs	259	3.3	259	3.3	* 1.036	146.2	LOS F	24.6	177.3	1.00	1.25	1.71	6.1
Approach			397	3.2	397	3.2	1.036	117.8	LOS F	24.6	177.3	0.95	1.08	1.41	6.7
All Vehicles			3803	3.0	3643	3.1	1.036	33.3	LOS C	24.6	177.3	0.56	0.48	0.63	16.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	21	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88
North: Turton Road											
P3	Full	17	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88
West: Young Road											
P4	Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians		45	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1792	2.8	1633	3.0	0.713	5.6	LOS A	15.7	112.6	0.19	0.17	0.28	28.5
3	R2	All MCs	99	2.1	90	2.2	1.061	180.8	LOS F	8.5	60.6	1.00	1.65	3.81	2.3
Approach			1891	2.8	1723	2.9	1.061	14.8	NA	15.7	112.6	0.23	0.25	0.46	15.5
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	33	3.2	33	3.2	1.165	187.7	LOS F	5.1	36.8	1.00	2.44	2.82	0.9
6	R2	All MCs	4	0.0	4	0.0	1.165	151.1	LOS F	5.1	36.8	1.00	2.44	2.82	0.9
Approach			37	2.9	37	2.9	1.165	183.5	LOS F	5.1	36.8	1.00	2.44	2.82	0.9
North: Turton Road															
7	L2	All MCs	19	5.6	19	5.6	0.306	4.0	LOS A	0.0	0.0	0.00	0.02	0.00	29.0
8	T1	All MCs	1696	3.2	1687	3.2	0.306	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach			1715	3.2	1706	3.2	0.306	0.1	NA	0.0	0.0	0.00	0.01	0.00	58.2
All Vehicles			3642	3.0	3466	3.1	1.165	9.3	NA	15.7	112.6	0.12	0.15	0.26	19.5

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Project PM Peak)]

Network: N101 [Project - PM Peak (Network Folder: 2024 Project)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

1645 - 1745
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	19	0.0	18	0.0	0.453	5.6	LOS A	13.6	97.6	0.00	0.01	0.00	56.4
2	T1	All MCs	1723	2.9	1673	2.9	0.453	0.1	LOS A	17.0	121.7	0.00	0.01	0.00	59.5
Approach			1742	2.8	1691	2.9	0.453	0.2	NA	17.0	121.7	0.00	0.01	0.00	59.4
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.333	2113.8	LOS F	3.4	23.9	1.00	0.99	1.15	0.2
5	T1	All MCs	1	0.0	1	0.0	1.333	724.7	LOS F	3.4	23.9	1.00	0.99	1.15	1.7
6	R2	All MCs	1	0.0	1	0.0	1.333	304.3	LOS F	3.4	23.9	1.00	0.99	1.15	0.2
Approach			3	0.0	3	0.0	1.333	1047.6	LOS F	3.4	23.9	1.00	0.99	1.15	0.7
North: Turton Road															
8	T1	All MCs	1693	4.0	1680	4.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	All MCs	49	0.0	49	0.0	0.231	23.9	LOS B	0.8	5.7	0.88	0.97	0.96	30.5
Approach			1742	3.9	1729	3.9	0.301	0.7	NA	0.8	5.7	0.03	0.03	0.03	51.5
West: Monash Road															
10	L2	All MCs	167	1.3	167	1.3	3.347	2130.5	LOS F	78.0	551.5	1.00	8.06	20.69	0.8
12	R2	All MCs	8	0.0	8	0.0	3.347	2116.6	LOS F	78.0	551.5	1.00	8.06	20.69	0.8
Approach			176	1.2	176	1.2	3.347	2129.9	LOS F	78.0	551.5	1.00	8.06	20.69	0.8
All Vehicles			3663	3.3	3599	3.3	3.347	105.4	NA	78.0	551.5	0.06	0.41	1.02	6.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network Site User-Given Phase Times)

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: Lambton Road															
4a	L1	All MCs	303	4.2	303	4.2	0.314	13.2	LOS A	8.4	60.6	0.49	0.68	0.49	47.7
5	T1	All MCs	624	2.2	624	2.2	0.322	33.9	LOS C	14.6	103.9	0.79	0.67	0.79	40.5
6b	R3	All MCs	203	4.7	203	4.7	* 0.653	45.1	LOS D	9.7	70.8	1.00	0.81	1.00	24.0
Approach			1131	3.2	1131	3.2	0.653	30.4	LOS C	14.6	103.9	0.75	0.70	0.75	39.6
NorthEast: Turton Road															
24b	L3	All MCs	598	0.5	591	0.5	0.365	9.9	LOS A	0.0	0.0	0.00	0.58	0.00	50.9
25	T1	All MCs	931	2.7	920	2.7	0.782	40.6	LOS C	25.4	181.9	0.87	0.78	0.88	36.8
26a	R1	All MCs	140	3.0	138	3.0	0.482	69.4	LOS E	7.5	53.8	0.87	0.76	0.87	32.8
Approach			1668	2.0	1649	2.0	0.782	32.0	LOS C	25.4	181.9	0.56	0.70	0.57	37.1
West: Lambton Road															
10a	L1	All MCs	222	7.1	222	7.1	0.298	22.3	LOS B	7.7	57.5	0.61	0.71	0.61	39.3
11	T1	All MCs	696	3.8	696	3.8	* 0.973	88.7	LOS F	28.6	204.9	1.00	1.19	1.43	26.6
Approach			918	4.6	918	4.6	0.973	72.6	LOS F	28.6	204.9	0.91	1.08	1.23	28.0
SouthWest: Bridges Road															
30b	L3	All MCs	20	0.0	20	0.0	1.036	82.2	LOS F	58.4	414.2	1.00	1.26	1.58	22.1
31	T1	All MCs	1313	1.7	1313	1.7	* 1.036	123.5	LOS F	69.1	490.8	1.00	1.34	1.55	12.7
32a	R1	All MCs	616	0.3	616	0.3	* 1.048	165.1	LOS F	29.4	206.1	1.00	1.35	1.72	18.4
Approach			1948	1.2	1948	1.2	1.048	136.2	LOS F	69.1	490.8	1.00	1.34	1.61	13.2
All Vehicles			5665	2.4	5646	2.4	1.048	74.2	LOS F	69.1	490.8	0.80	0.98	1.07	24.1

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	28	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88
NorthEast: Turton Road											

P6 Full	15	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88
SouthWest: Bridges Road										
P8 Full	5	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	48	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Project Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - WE Peak (Network Folder: 2024 Project)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network User-Given Cycle Time)

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
South: Turton Road															
1	L2	All MCs	466	1.1	463	1.1	1.420	422.9	LOS F	73.2	517.3	1.00	1.83	3.06	6.2
2	T1	All MCs	513	1.0	509	1.0	0.419	20.9	LOS B	7.8	54.8	0.45	0.38	0.45	40.2
3	R2	All MCs	281	0.7	279	0.8	* 0.767	77.5	LOS F	9.4	66.6	1.00	0.87	1.08	25.1
Approach			1260	1.0	1250	1.0	1.420	182.3	LOS F	73.2	517.3	0.78	1.02	1.56	11.1
East: Griffiths Road															
4	L2	All MCs	339	0.3	339	0.3	0.223	7.7	LOS A	1.8	12.8	0.09	0.58	0.09	51.7
5	T1	All MCs	793	0.7	793	0.7	* 0.803	57.1	LOS E	20.1	141.2	0.99	0.89	1.06	33.2
6	R2	All MCs	87	2.4	87	2.4	0.390	64.6	LOS E	5.3	38.0	0.97	0.77	0.97	25.6
Approach			1219	0.7	1219	0.7	0.803	43.9	LOS D	20.1	141.2	0.74	0.80	0.79	34.8
North: Turton Road															
7	L2	All MCs	86	0.0	86	0.0	0.099	14.7	LOS B	2.1	14.9	0.45	0.66	0.45	44.6
8	T1	All MCs	708	0.6	708	0.6	* 0.557	51.7	LOS D	16.4	115.4	0.88	0.75	0.88	14.8
9	R2	All MCs	98	5.4	98	5.4	0.620	77.9	LOS F	6.4	46.7	1.00	0.81	1.03	23.2
Approach			893	1.1	893	1.1	0.620	51.0	LOS D	16.4	115.4	0.85	0.75	0.86	17.3
West: Griffiths Road															
10	L2	All MCs	107	2.0	107	2.0	0.091	7.8	LOS A	1.2	8.4	0.25	0.62	0.25	48.9
11	T1	All MCs	986	0.5	986	0.5	0.611	46.4	LOS D	18.7	131.7	0.94	0.80	0.94	36.2
12	R2	All MCs	468	1.1	468	1.1	* 0.490	51.9	LOS D	13.0	92.0	0.91	0.81	0.91	23.9
Approach			1562	0.8	1562	0.8	0.611	45.4	LOS D	18.7	131.7	0.88	0.79	0.88	33.6
All Vehicles			4934	0.9	4924	0.9	1.420	80.8	LOS F	73.2	517.3	0.81	0.84	1.03	21.7

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

East: Griffiths Road										
P2 Full	9	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road										
P3 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
West: Griffiths Road										
P4 Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	13	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Project Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - WE Peak (Network Folder: 2024 Project)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network User-Given Cycle Time)

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
South: Turton Road															
1	L2	All MCs	63	0.0	63	0.0	0.132	18.9	LOS B	5.5	38.9	0.61	0.50	0.61	27.5
2	T1	All MCs	1145	0.9	1136	0.9	* 0.594	22.0	LOS B	11.6	81.6	0.80	0.58	0.80	8.8
Approach			1208	0.9	1198	0.9	0.594	21.8	LOS B	11.6	81.6	0.79	0.58	0.79	10.3
North: Turton Road															
8	T1	All MCs	1397	0.7	1397	0.7	0.377	1.2	LOS A	4.1	28.6	0.13	0.12	0.13	56.5
9	R2	All MCs	106	3.0	106	3.0	* 0.312	8.8	LOS A	0.9	6.3	0.14	0.60	0.14	43.1
Approach			1503	0.8	1503	0.8	0.377	1.8	LOS A	4.1	28.6	0.13	0.15	0.13	54.6
West: Young Road															
10	L2	All MCs	89	1.2	89	1.2	0.180	45.2	LOS D	4.4	31.2	0.81	0.74	0.81	14.4
12	R2	All MCs	116	2.7	116	2.7	* 0.529	64.9	LOS E	7.2	51.6	0.99	0.79	0.99	11.0
Approach			205	2.1	205	2.1	0.529	56.3	LOS D	7.2	51.6	0.91	0.77	0.91	12.2
All Vehicles			2917	0.9	2907	0.9	0.594	13.9	LOS A	11.6	81.6	0.45	0.37	0.45	29.4

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	8	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
North: Turton Road											
P3	Full	16	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88
West: Young Road											
P4	Full	1	60.1	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians		25	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Project Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - WE Peak (Network Folder: 2024 Project)]

1115 - 1215
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1157	0.7	1149	0.7	0.402	0.0	LOS A	16.0	112.6	0.00	0.00	0.00	59.6
3	R2	All MCs	48	2.2	48	2.2	0.406	41.8	LOS C	1.3	9.1	0.92	1.02	1.14	8.3
Approach			1205	0.8	1197	0.8	0.406	1.7	NA	16.0	112.6	0.04	0.04	0.05	44.2
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	41	5.1	41	5.1	1.477	443.0	LOS F	11.8	85.6	1.00	4.21	4.90	0.4
6	R2	All MCs	7	0.0	7	0.0	1.477	595.7	LOS F	11.8	85.6	1.00	4.21	4.90	0.4
Approach			48	4.3	48	4.3	1.477	466.3	LOS F	11.8	85.6	1.00	4.21	4.90	0.4
North: Turton Road															
7	L2	All MCs	17	0.0	17	0.0	0.269	4.0	LOS A	0.0	0.0	0.00	0.02	0.00	29.1
8	T1	All MCs	1520	0.8	1520	0.8	0.269	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach			1537	0.8	1537	0.8	0.269	0.1	NA	0.0	0.0	0.00	0.01	0.00	58.2
All Vehicles			2791	0.8	2782	0.8	1.477	8.9	NA	16.0	112.6	0.03	0.09	0.11	19.9

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Project Weekend Peak)]

Network: N101 [Project - WE Peak (Network Folder: 2024 Project)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

1115 - 1215
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	12	0.0	12	0.0	0.318	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	56.6
2	T1	All MCs	1198	0.9	1198	0.9	0.318	0.1	LOS A	9.1	64.1	0.00	0.01	0.00	59.7
Approach			1209	0.9	1209	0.9	0.318	0.1	NA	9.1	64.1	0.00	0.01	0.00	59.6
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.333	407.7	LOS F	2.9	20.4	1.00	1.00	1.19	0.2
5	T1	All MCs	1	0.0	1	0.0	1.333	1677.2	LOS F	2.9	20.4	1.00	1.00	1.19	1.8
6	R2	All MCs	1	0.0	1	0.0	1.333	856.5	LOS F	2.9	20.4	1.00	1.00	1.19	0.2
Approach			3	0.0	3	0.0	1.333	980.5	LOS F	2.9	20.4	1.00	1.00	1.19	0.8
North: Turton Road															
8	T1	All MCs	1497	1.0	1484	0.9	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	37	0.0	37	0.0	0.090	12.9	LOS A	0.3	2.2	0.74	0.89	0.74	36.9
Approach			1534	1.0	1521	0.9	0.258	0.3	NA	0.3	2.2	0.02	0.02	0.02	54.9
West: Monash Road															
10	L2	All MCs	82	1.3	82	1.3	1.113	127.2	LOS F	8.3	58.7	1.00	1.94	3.31	10.3
12	R2	All MCs	2	0.0	2	0.0	1.113	304.4	LOS F	8.3	58.7	1.00	1.94	3.31	10.3
Approach			84	1.3	84	1.3	1.113	131.6	LOS F	8.3	58.7	1.00	1.94	3.31	10.3
All Vehicles			2831	0.9	2817	0.9	1.333	5.3	NA	9.1	64.1	0.04	0.07	0.11	41.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Project Weekend Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Project - WE Peak (Network Folder: 2024 Project)]

1115 - 1215
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 132 seconds (Network User-Given Cycle Time)

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: Lambton Road															
4a	L1	All MCs	287	2.2	287	2.2	0.328	13.7	LOS A	8.8	62.5	0.54	0.71	0.54	47.3
5	T1	All MCs	412	1.0	412	1.0	0.225	34.8	LOS C	9.5	67.2	0.78	0.64	0.78	40.2
6b	R3	All MCs	221	0.5	221	0.5	* 0.634	45.9	LOS D	10.9	77.0	0.98	0.81	0.98	23.7
Approach			920	1.3	920	1.3	0.634	30.9	LOS C	10.9	77.0	0.75	0.70	0.75	38.7
NorthEast: Turton Road															
24b	L3	All MCs	332	0.3	329	0.3	0.202	7.7	LOS A	0.0	0.0	0.00	0.58	0.00	51.0
25	T1	All MCs	1093	0.4	1084	0.4	* 0.691	30.2	LOS C	25.2	177.3	0.75	0.67	0.75	40.9
26a	R1	All MCs	119	0.0	118	0.0	* 0.697	89.2	LOS F	7.9	55.5	1.00	0.85	1.05	27.0
Approach			1543	0.3	1530	0.3	0.697	29.9	LOS C	25.2	177.3	0.61	0.67	0.61	37.7
West: Lambton Road															
10a	L1	All MCs	128	0.8	128	0.8	0.166	11.6	LOS A	2.8	19.6	0.44	0.65	0.44	47.1
11	T1	All MCs	407	1.6	407	1.6	* 0.671	57.5	LOS E	12.6	88.9	0.99	0.83	1.01	33.1
Approach			536	1.4	536	1.4	0.671	46.5	LOS D	12.6	88.9	0.86	0.79	0.87	34.7
SouthWest: Bridges Road															
30b	L3	All MCs	40	0.0	40	0.0	0.508	9.7	LOS A	15.9	112.1	0.78	0.74	0.78	41.8
31	T1	All MCs	867	0.8	867	0.8	0.508	38.7	LOS C	25.0	176.5	0.78	0.71	0.78	30.9
32a	R1	All MCs	308	0.7	308	0.7	0.664	78.1	LOS F	9.9	69.4	1.00	0.82	1.03	27.8
Approach			1216	0.8	1216	0.8	0.664	47.7	LOS D	25.0	176.5	0.84	0.74	0.85	27.1
All Vehicles			4215	0.8	4202	0.8	0.697	37.4	LOS C	25.2	177.3	0.74	0.71	0.74	34.4

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	40	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88
NorthEast: Turton Road											

P6 Full	17	60.2	LOS F	0.1	0.1	0.96	0.96	226.8	200.0	0.88
SouthWest: Bridges Road										
P8 Full	7	60.2	LOS F	0.0	0.0	0.95	0.95	226.8	200.0	0.88
All Pedestrians	64	60.2	LOS F	0.1	0.1	0.96	0.96	226.9	200.0	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Turton Road / Young Road - TCS 3322 (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Upgrades - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Practical Cycle Time)

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
South: Turton Road															
1	L2	All MCs	139	9.8	101	10.2	0.161	46.5	LOS D	4.8	36.0	0.61	0.68	0.61	22.3
2	T1	All MCs	1669	2.3	1214	2.4	* 0.724	40.6	LOS C	11.4	81.6	0.86	0.78	0.86	6.5
Approach			1808	2.9	1315	3.0	0.724	41.1	LOS C	11.4	81.6	0.84	0.77	0.84	6.4
North: Turton Road															
8	T1	All MCs	1448	3.2	1448	3.2	0.489	3.8	LOS A	5.4	38.5	0.13	0.12	0.13	54.7
9	R2	All MCs	149	2.8	149	2.8	* 0.493	54.7	LOS D	9.0	64.3	0.93	0.88	0.93	23.3
Approach			1598	3.2	1598	3.2	0.493	8.6	LOS A	9.0	64.3	0.21	0.19	0.21	42.1
West: Young Road															
10	L2	All MCs	138	3.1	138	3.1	0.175	45.2	LOS D	5.7	41.0	0.65	0.72	0.65	18.5
12	R2	All MCs	259	3.3	259	3.3	* 0.737	73.6	LOS F	16.9	121.3	0.99	0.86	1.03	11.6
Approach			397	3.2	397	3.2	0.737	63.8	LOS E	16.9	121.3	0.87	0.81	0.90	11.1
All Vehicles			3803	3.0	3310	3.5	0.737	28.1	LOS B	16.9	121.3	0.54	0.50	0.54	19.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	21	64.2	LOS F	0.1	0.1	0.96	0.96	230.9	200.0	0.87
North: Turton Road											
P3	Full	17	64.2	LOS F	0.1	0.1	0.96	0.96	230.8	200.0	0.87
West: Young Road											
P4	Full	7	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87
All Pedestrians		45	64.2	LOS F	0.1	0.1	0.96	0.96	230.8	200.0	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Turton Road / McDonald Jones Stadium Southern Access (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Upgrades - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
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
South: Turton Road															
2	T1	All MCs	1792	2.8	1666	2.9	0.960	34.2	LOS C	15.7	112.6	0.46	0.45	1.42	7.8
3	R2	All MCs	99	2.1	92	2.2	1.062	182.6	LOS F	8.7	61.7	1.00	1.66	3.86	2.3
Approach			1891	2.8	1758	2.9	1.062	43.1	NA	15.7	112.6	0.49	0.51	1.55	6.5
East: McDonald Jones Stadium Southern Access															
4	L2	All MCs	33	3.2	33	3.2	1.165	188.9	LOS F	5.2	37.2	1.00	2.40	2.77	0.9
6	R2	All MCs	4	0.0	4	0.0	1.165	151.2	LOS F	5.2	37.2	1.00	2.40	2.77	0.9
Approach			37	2.9	37	2.9	1.165	184.6	LOS F	5.2	37.2	1.00	2.40	2.77	0.9
North: Turton Road															
7	L2	All MCs	19	5.6	19	5.6	0.307	4.0	LOS A	0.0	0.0	0.00	0.02	0.00	29.0
8	T1	All MCs	1696	3.2	1696	3.2	0.307	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
Approach			1715	3.2	1715	3.2	0.307	0.1	NA	0.0	0.0	0.00	0.01	0.00	58.2
All Vehicles			3642	3.0	3509	3.1	1.165	23.0	NA	15.7	112.6	0.26	0.28	0.80	9.7

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 104 [Turton Road / Monash Road / Newcastle International Hockey Centre Northern Exit (Site Folder: 2024 Project PM Peak)]

Network: N101 [Upgrades - PM Peak (Network Folder: 2024 Project)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

1645 - 1745
Site Category: Base Year
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
South: Turton Road															
1	L2	All MCs	19	0.0	18	0.0	0.450	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	56.4
2	T1	All MCs	1723	2.9	1661	2.9	0.450	0.1	LOS A	41.3	296.0	0.00	0.01	0.00	59.5
Approach			1742	2.8	1679	2.9	0.450	0.2	NA	41.3	296.0	0.00	0.01	0.00	59.4
East: Newcastle International Hockey Centre Northern Exit															
4	L2	All MCs	1	0.0	1	0.0	1.333	2021.0	LOS F	3.4	23.9	1.00	0.99	1.15	0.2
5	T1	All MCs	1	0.0	1	0.0	1.333	819.8	LOS F	3.4	23.9	1.00	0.99	1.15	1.7
6	R2	All MCs	1	0.0	1	0.0	1.333	304.6	LOS F	3.4	23.9	1.00	0.99	1.15	0.2
Approach			3	0.0	3	0.0	1.333	1048.5	LOS F	3.4	23.9	1.00	0.99	1.15	0.7
North: Turton Road															
8	T1	All MCs	1693	4.0	1688	4.0	0.303	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	All MCs	49	0.0	49	0.0	0.227	23.4	LOS B	0.8	5.6	0.88	0.97	0.95	30.8
Approach			1742	3.9	1737	3.9	0.303	0.7	NA	0.8	5.6	0.02	0.03	0.03	51.7
West: Monash Road															
10	L2	All MCs	167	1.3	167	1.3	1.711	659.9	LOS F	48.2	340.8	1.00	5.22	12.72	2.5
12	R2	All MCs	8	0.0	8	0.0	1.711	646.1	LOS F	48.2	340.8	1.00	5.22	12.72	2.5
Approach			176	1.2	176	1.2	1.711	659.3	LOS F	48.2	340.8	1.00	5.22	12.72	2.5
All Vehicles			3663	3.3	3596	3.3	1.711	33.6	NA	48.2	340.8	0.06	0.27	0.64	17.1

Site Level of Service (LOS) Method: Delay (RTA NSW). 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: 105 [Turton Road / Lambton Road / Bridges Road - TCS 350 (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Upgrades - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Practical Cycle Time)

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: Lambton Road															
4a	L1	All MCs	303	4.2	303	4.2	0.318	13.8	LOS A	9.1	65.8	0.50	0.69	0.50	47.3
5	T1	All MCs	624	2.2	624	2.2	0.334	37.3	LOS C	15.7	112.2	0.80	0.68	0.80	39.2
6b	R3	All MCs	203	4.7	203	4.7	* 0.827	54.7	LOS D	11.5	83.6	1.00	0.88	1.17	21.3
Approach			1131	3.2	1131	3.2	0.827	34.1	LOS C	15.7	112.2	0.76	0.72	0.79	38.1
NorthEast: Turton Road															
24b	L3	All MCs	598	0.5	595	0.5	0.367	9.8	LOS A	0.0	0.0	0.00	0.58	0.00	50.9
25	T1	All MCs	931	2.7	926	2.7	0.752	40.0	LOS C	24.9	178.1	0.83	0.73	0.83	37.3
26a	R1	All MCs	140	3.0	139	3.0	0.470	79.2	LOS F	8.5	61.0	0.93	0.78	0.93	30.5
Approach			1668	2.0	1660	2.0	0.752	32.5	LOS C	24.9	178.1	0.54	0.68	0.54	36.9
West: Lambton Road															
10a	L1	All MCs	222	7.1	222	7.1	0.328	27.1	LOS B	8.6	64.2	0.65	0.72	0.65	37.4
11	T1	All MCs	696	3.8	696	3.8	* 1.032	123.3	LOS F	33.7	241.1	1.00	1.32	1.60	21.8
Approach			918	4.6	918	4.6	1.032	100.0	LOS F	33.7	241.1	0.91	1.17	1.37	23.3
SouthWest: Bridges Road															
30b	L3	All MCs	20	0.0	20	0.0	1.047	89.9	LOS F	65.4	463.9	1.00	1.27	1.58	21.2
31	T1	All MCs	1313	1.7	1313	1.7	* 1.047	130.4	LOS F	70.9	503.2	1.00	1.35	1.57	11.9
32a	R1	All MCs	616	0.3	616	0.3	* 1.035	163.0	LOS F	29.9	209.7	1.00	1.31	1.63	18.8
Approach			1948	1.2	1948	1.2	1.047	140.3	LOS F	70.9	503.2	1.00	1.33	1.59	12.9
All Vehicles			5665	2.4	5657	2.4	1.047	80.9	LOS F	70.9	503.2	0.80	0.99	1.09	22.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Lambton Road											
P2	Full	28	64.2	LOS F	0.1	0.1	0.96	0.96	230.9	200.0	0.87
NorthEast: Turton Road											

P6 Full	15	64.2	LOS F	0.1	0.1	0.96	0.96	230.8	200.0	0.87
SouthWest: Bridges Road										
P8 Full	5	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87
All Pedestrians	48	64.2	LOS F	0.1	0.1	0.96	0.96	230.9	200.0	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Sig Opt: Turton Road / Griffiths Road - TCS 201 (Site Folder: 2024 Project PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Upgrades - PM Peak (Network Folder: 2024 Project)]

1645 - 1745
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Practical Cycle Time)

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
South: Turton Road															
1	L2	All MCs	512	2.5	388	2.5	1.062	121.0	LOS F	36.8	263.0	1.00	1.29	1.71	15.1
2	T1	All MCs	874	2.5	662	2.6	0.739	75.0	LOS F	26.1	186.5	1.00	0.96	1.01	19.9
3	R2	All MCs	495	1.1	375	1.1	* 0.778	87.5	LOS F	13.3	94.3	1.00	0.90	1.06	24.6
Approach			1880	2.1	1425	2.2	1.062	90.8	LOS F	36.8	263.0	1.00	1.03	1.21	18.1
East: Griffiths Road															
4	L2	All MCs	322	3.3	322	3.3	0.215	8.0	LOS A	1.7	12.4	0.09	0.58	0.09	51.7
5	T1	All MCs	756	3.2	756	3.2	0.637	50.5	LOS D	18.0	129.5	0.94	0.79	0.94	35.0
6	R2	All MCs	106	1.0	106	1.0	* 0.721	78.1	LOS F	7.5	53.3	1.00	0.86	1.11	23.0
Approach			1184	3.0	1184	3.0	0.721	41.4	LOS C	18.0	129.5	0.71	0.74	0.72	35.6
North: Turton Road															
7	L2	All MCs	134	1.6	134	1.6	0.178	22.8	LOS B	4.9	34.5	0.58	0.71	0.58	39.7
8	T1	All MCs	873	2.1	873	2.1	* 0.788	72.3	LOS F	24.2	172.1	0.96	0.86	1.01	12.7
9	R2	All MCs	122	10.3	122	10.3	0.574	88.0	LOS F	8.1	61.5	0.99	0.80	0.99	23.5
Approach			1128	2.9	1128	2.9	0.788	68.1	LOS E	24.2	172.1	0.92	0.84	0.96	14.3
West: Griffiths Road															
10	L2	All MCs	123	5.1	123	5.1	0.128	24.6	LOS B	3.0	22.2	0.44	0.66	0.44	43.3
11	T1	All MCs	1368	1.8	1368	1.8	* 0.790	54.2	LOS D	30.0	213.3	0.99	0.89	1.02	34.8
12	R2	All MCs	406	5.4	406	5.4	0.604	63.3	LOS E	13.0	94.9	0.97	0.82	0.97	21.1
Approach			1898	2.8	1898	2.8	0.790	54.2	LOS D	30.0	213.3	0.95	0.86	0.97	31.8
All Vehicles			6091	2.6	5635	2.9	1.062	63.6	LOS E	36.8	263.0	0.91	0.87	0.98	25.4

Site Level of Service (LOS) Method: Delay (RTA NSW). 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 ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Turton Road											
P1	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87

East: Griffiths Road										
P2 Full	7	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87
North: Turton Road										
P3 Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87
West: Griffiths Road										
P4 Full	4	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87
All Pedestrians	14	64.1	LOS F	0.0	0.0	0.96	0.96	230.8	200.0	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Attachment D: SIDRA Model Validation

Approach	Turn/s	Observed (veh)	Observed (m)	Acceptable Queue Range (m)	Modelled (m)	Within Acceptable Range?	Difference if Outside Acceptable Range (m)
AM Peak							
Turton Road / Griffiths Road							
Turton Road (N)	T	15	90	70-110	91	Yes	-
	R	7	42	27-57	47	Yes	-
Griffiths Road (E)	T	16	96	76-116	113	Yes	-
	R	7	42	27-57	27	Yes	-
Turton Road (S)	T	22	132	107-157	97	No	11
	R	11	66	46-86	75	Yes	-
Griffiths Road (W)	T	21	126	101-151	149	Yes	-
	R	13	78	58-98	65	Yes	-
Turton Road / Young Road							
Turton Road (N)	T	8	48	33-63	22	No	11
	R	3	18	8-28	5	No	3
Turton Road (S)	L/T	11	66	46-86	63	Yes	-
Young Road (W)	L	5	30	15-45	23	Yes	-
	R	10	60	40-80	78	Yes	-
Turton Road / Lambton Road / Bridges Road							
Turton Road (N)	T	21	126	101-151	136	Yes	-
	R	8	48	33-63	57	Yes	-
Lambton Road (E)	T	11	66	46-86	81	Yes	-
	R	10	60	40-80	115	No	35
Bridges Road (S)	T	29	174	144-204	254	No	50
	R	10	60	40-80	44	Yes	-
Lambton Road (W)	T	19	114	89-139	151	No	12
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit							
Turton Road (N)	T						
	R						
Hockey Centre (E)	R/L/T						
Turton Road (S)	L/T						
	T						
Monash Road (W)	R						
	L						
PM Peak							
Turton Road / Griffiths Road							
Turton Road (N)	T	21	126	101-151	175	No	24
	R	4	24	9-39	61	No	22
Griffiths Road (E)	T	19	114	89-139	123	Yes	-
	R	4	24	9-39	57	No	18
Turton Road (S)	T	18	108	83-133	291	No	158
	R	22	132	107-157	111	Yes	-
Griffiths Road (W)	T	23	138	113-163	164	No	1
	R	18	108	83-133	85	Yes	-
Turton Road / Young Road							
Turton Road (N)	T	20	120	95-145	24	No	71
	R	3	18	8-28	42	No	14
Turton Road (S)	L/T	11	66	46-86	81.60	Yes	-
Young Road (W)	L	2	12	2-22	51	No	29
	R	11	66	46-86	177	No	91
Turton Road / Lambton Road / Bridges Road							
Turton Road (N)	T	25	150	125-175	182	No	7
	R	8	48	33-63	54	Yes	-
Lambton Road (E)	T	10	60	40-80	104	No	24
	R	11	66	46-86	56	Yes	-
Bridges Road (S)	T	23	138	113-163	411	No	248
	R	10	60	40-80	206	No	126
Lambton Road (W)	T	12	86.16	66.16-106.16	205	No	99
Weekend Peak							
Turton Road / Griffiths Road							
Turton Road (N)	T	14	84	64-104	113	No	9
	R	5	30	15-45	43	Yes	-
Griffiths Road (E)	T	19	114	89-139	117	Yes	-
	R	5	30	15-45	39	Yes	-
Turton Road (S)	T	18	108	83-133	54	No	29
	R	6	36	21-51	50	Yes	-
Griffiths Road (W)	T	18	108	83-133	97	Yes	-
	R	15	90	70-110	85	Yes	-
Turton Road / Young Road							
Turton Road (N)	T	21	126	101-151	28	No	73
	R	2	12	2-22	3	Yes	-
Turton Road (S)	L/T	12	72	52-92	82	Yes	-
Young Road (W)	L	4	24	9-39	28	Yes	-
	R	6	36	21-51	46	Yes	-
Turton Road / Lambton Road / Bridges Road							
Turton Road (N)	T	23	138	113-163	151	Yes	-
	R	7	42	27-57	50	Yes	-
Lambton Road (E)	T	9	54	34-74	61	Yes	-
	R	10	60	40-80	62	Yes	-
Bridges Road (S)	T	19	114	89-139	159	No	20
	R	11	66	46-86	62	Yes	-
Lambton Road (W)	T	8	48	33-63	79	No	16

Attachment E: SIDRA Model Intersection Performance

	2024 Base					2024 Project					2024 Project Upgrades					
Intersection	**Traffic Volume (veh/h)**	**DoS (v/c)**	**Average Delay (s)**	**LoS**	**95th Percentile Queue (m)**	**Traffic Volume (veh/h)**	**DoS (v/c)**	**Average Delay (s)**	**LoS**	**95th Percentile Queue (m)**	**Traffic Volume (veh/h)**	**DoS (v/c)**	**Average Delay (s)**	**LoS**	**95th Percentile Queue (m)**	**Average Delay Difference**
AM Peak																**Project - Base**
Turton Road / Griffiths Road	4,869	0.85	35.4	LOS C	149	4,897	0.87	35.7	LOS C	149						0.3
Turton Road / Young Road	2,697	0.58	7.3	LOS A	78	2,726	0.59	7.2	LOS A	78						-0.1
Turton Road / McDonald's Jones Stadium	2,675	1.79	902.8	LOS F	103	2,719	1.79	894.8	LOS F	103						-8.0
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit	2,676	1.07	1,128.7	LOS F	32	2,720	1.09	1,311.1	LOS F	40						182.4
Turton Road / Lambton Road / Bridges Road	4,234	0.93	44.9	LOS D	254	4,269	0.93	45.1	LOS D	257						0.2
PM Peak																
Turton Road / Griffiths Road	5,816	1.04	61.9	LOS E	291	6,091	1.15	73.3	LOS F	301	6,091	1.06	63.6	LOS E	263	11.4
Turton Road / Young Road	3,528	1.04	27.4	LOS B	177	3,803	1.04	33.3	LOS C	177						5.9
Turton Road / McDonald's Jones Stadium	3,429	1.17	211.5	LOS F	113	3,642	1.17	187.7	LOS F	113						-23.8
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit	3,451	3.08	1,893.1	LOS F	364	3,663	3.35	2,130.5	LOS F	552						237.4
Turton Road / Lambton Road / Bridges Road	5,509	1.05	69.2	LOS E	411	5,665	1.05	74.2	LOS F	491						5.0
Weekend Peak																
Turton Road / Griffiths Road	4,780	0.71	36.2	LOS C	17	4,934	1.42	80.8	LOS F	517						44.6
Turton Road / Young Road	2,763	0.45	12.8	LOS A	12	2,917	0.59	13.9	LOS A	82						1.1
Turton Road / McDonald's Jones Stadium	2,664	1.48	638.7	LOS F	12	2,791	1.48	595.7	LOS F	113						-43.0
Turton Road / Monash Road / Newcastle Hockey Centre Northern Exit	2,704	1.06	1,043.6	LOS F	5	2,831	1.33	1,677.2	LOS F	64						633.6
Turton Road / Lambton Road / Bridges Road	4,123	0.72	32.7	LOS C	23	4,215	0.70	37.4	LOS C	177						4.7

Issue History

File Name	Prepared	Reviewed	Issued	Date	Issued to
P6458.001T HISC – Saturday SCATS Verification SIDRA Sensitivity Response to Resident.docx	A. Grey	D. Bitzios	A. Grey	06/03/26	Dain Greentree<dain.greentree@app.com.au>

Hunter Indoor Sports Centre (SSD-65595459)

Saturday Traffic Volumes Verification

1. Introduction

This Technical Note provides a response to the SIDRA-modelling matters raised in Chris Flower's submission dated 2 October 2025, which referenced the Version 004 SIDRA Modelling Technical Note. It confirms the status of the corrected Version 005 Technical Note and clarifies the use of data, whether the Saturday survey day (6 April 2024) is materially different from a representative "typical" Saturday (31 August 2024) based on SCATS detector data at Turton Road / Young Road.

The scope of this Technical Note is limited to:

(i) Confirming the table consistency correction between Version 004 and Version 005 of the modelling Technical Notes

(ii) Clarifying the data chain for turning-movement counts versus camera usage; and

(iii) Applying SCATS-derived 'uplift' factors to Turton Road through movements only within the existing Saturday SIDRA model to understand whether any change in DoS, delay, or LOS is significant.

Matters relating to trip distribution, parking or broader TIA assumptions sit with SECA as the TIA author and are not addressed here.

2. Consistency between Version 004 and Version 005

Chris Flower's submission referenced the Version 004 SIDRA modelling Technical Note and questioned the consistency between its consolidated comparison table and the underlying peak-period tables. This inconsistency occurred because the Technical Note was updated several times following Transport for NSW review comments. Although the underlying SIDRA outputs were updated correctly, one consolidated summary table was inadvertently not revised to match the final set of peak-period tables.

Version 005 supersedes Version 004 and addresses this oversight to ensure the consolidated *Base vs Project* comparisons match the underlying peak-period outputs. The correction affects only the reported tables. The SIDRA model inputs remain unchanged, and the modelling conclusions are unaffected.

3. Data sources – turning counts and camera footage

Turning-movement volumes used in the SIDRA models are based on the intersection traffic counts. Camera footage was used only as supporting evidence to validate observed back-of-queue conditions where available. Limitations in camera coverage or video quality may affect the completeness of queue observations in some locations, but they do not affect the integrity of the turning-movement counts used for the SIDRA demand inputs.

4. Turton Road/Young Road intersection – PM peak outbound traffic and modelled impacts

This section responds to the submission query questioning how "negligible delays" could occur at Turton Road / Young Road, given the HISC PM peak outbound demand (of ≈200+ vehicles/hour) and the fact that Turton Road / Young Road forms part of the access route for some trips to and from the site.

4.1 PM peak outbound routing

The site access is on Turton Road. During the weekday PM peak, the forecast left-turn traffic out of the site is 215 vehicles per hour, departing northbound on Turton Road, consistent with the adopted trip distribution for the project case. This means that this project traffic primarily adds to the Turton Road northbound through traffic north of Turton Road / Young Road, as shown in Figure 4.1.

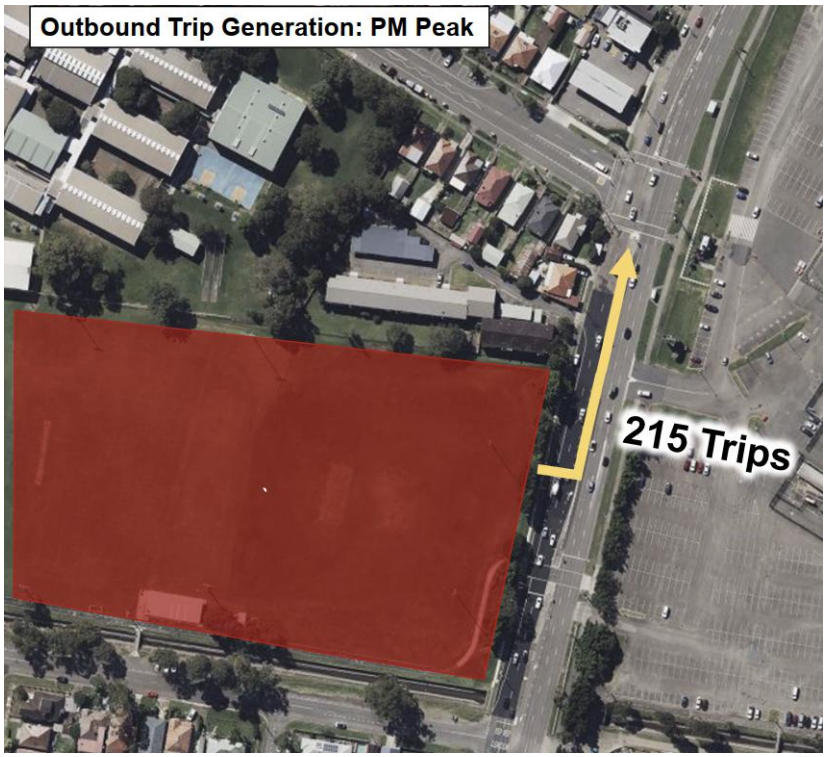


Figure 4.1: PM outbound distribution diagram showing northbound egress

4.2 SIDRA PM peak results at Turton Road / Young Road (Base vs Project)

SIDRA outputs for the weekday PM peak (16:45–17:45) at Turton Road / Young Road show a slight but clear change in performance between the Base and Project cases, consistent with the additional HISC outbound traffic during this period.

At the intersection level, the total demand (All Vehicles – Demand Flows) rises from 3,528 veh/h (Base) to 3,803 veh/h (Project), which is an increase of about 8%. This leads to an increase in average delay from 27.4 s/veh to 33.3 s/veh, with the overall intersection LOS changing from LOS B to LOS C, which is minimal.

The additional PM outbound demand appears where expected, specifically on the Turton Road northbound approach, labelled as “South: Turton Road” in SIDRA, which signifies vehicles heading northbound into the intersection from the south. The flow increases from 1,582 vehicles per hour (Base) to 1,808 vehicles per hour (Project). This results in a marginal increase in average approach delay from 27.9 seconds to 29.7 seconds, with the Level of Service (LOS) changing from LOS B to LOS C.

Note that whilst the PM peak traffic turning left is input into SIDRA 215 vph, it may appear in the SIDRA model as a higher value due to SIDRA’s demand peaking factor.

This demonstrates that the model accurately reflects the increased northbound corridor traffic during the PM peak, and the operational impact is minimal. The key weekday PM peak SIDRA outputs for the Turton Road / Young Road intersection, comparing the Base and Project cases, are summarised in Table 4.1.

Table 4.1: Turton Road / Young Road – PM peak performance (Base vs Project)

Metric	Base PM	Project PM	Change
Total intersection demand (All Vehicles – Demand flows)	3528 veh/h	3803 veh/h	+275 veh/h
All Vehicles – average delay	27.4 s/veh	33.3 s/veh	+5.9 s/veh
All Vehicles – LOS	LOS B	LOS C	One level
Turton Rd NB approach (South: Turton Rd – Approach Demand)	1582 veh/h	1808 veh/h	+226 veh/h[1]
Turton Rd NB approach – delay / LOS	27.9 s / LOS B	29.7 s / LOS C	+1.8 s / one level

[1] *Higher than the input turn flow of 215 vph due to SIDRA demand peaking factor*

4.3 SIDRA outputs logic check

The project's PM peak outbound traffic of approximately 215 vehicles per hour is at a level that can be readily absorbed into Turton Road without significant implications. That is, this volume increase equates to 70 vehicles per lane per hour on a three-lane approach, which is about 1 additional vehicle per lane per minute. With a coordinated cycle length of approximately 132 seconds, this means that there are about 2–3 extra vehicles per lane per green phase at the Turton Road approach to the intersection, and in the predominant green phase of the intersection. This should logically reflect a minimal change in average intersection delay, consistent with the SIDRA results, with an average delay increase of less than 10% in the peak hour.

5. Saturday SCATS data verification

5.1 SCATS site and detector groupings

SCATS detector data was obtained for TCS 3322 (Turton Road / Young Road) as a representative mid-corridor location to test whether the Saturday survey day is materially different to a typical Saturday in terms of Turton Road through volumes. The SCATS detector layout and the detector groups adopted for the Turton Road / Young Road comparison are shown in Figure 5.1.

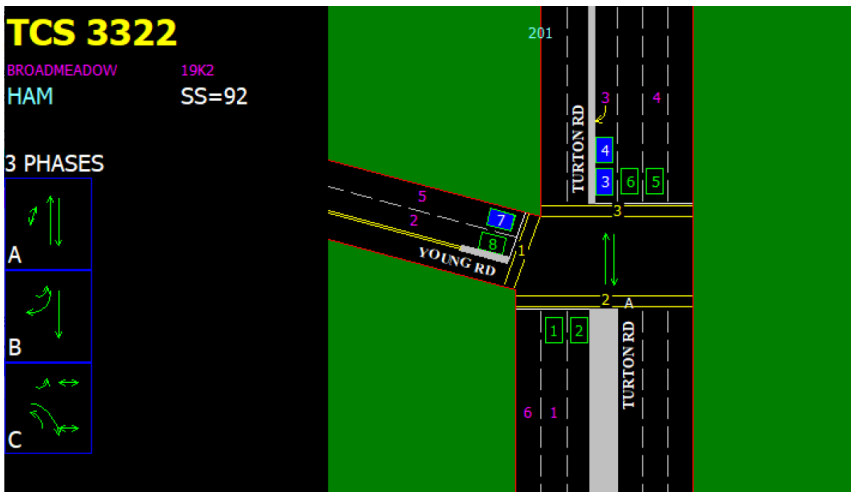


Figure 5.1: SCATS detector layout (TCS 3322)

For the purpose of this check, detector groups were defined as follows:

- Turton Road northbound through: Detectors 1 + 2
- Turton Road southbound through: Detectors 5 + 6
- Young Road (context only): Detector 3 and Detectors 7 + 8 (used to observe side-road variability; not used to synthesise corridor through movements)

5.2 Peak hour and comparison days

The comparison is based on the Saturday peak hour used in the SIDRA weekend assessment, namely 11:15–12:15. Two Saturdays were assessed:

- 6 April 2024 (survey day; wet weather), and
- 31 August 2024 (selected "typical" fine-weather Saturday).

5.3 SCATS detector comparison results

The SCATS comparison indicates higher Turton Road through volumes on the fine-weather Saturday relative to the surveyed Saturday. The side-road detector groups do not show the same increase, supporting our approach of adjusting Turton Road through movements only for the SIDRA input. The SCATS detector totals for the assessed peak hour on the survey Saturday, and the selected typical Saturday are summarised in Table 5.1.

Table 5.1: SCATS detector comparison (11:15–12:15) – survey Saturday vs typical Saturday

Detector group	6 Apr 2024 (survey - wet)	31 Aug 2024 (typical - fine)	Change (veh/h)	Change (%)	Applied in SIDRA
Turton Rd NB (Det 1+2)	1,218	1,307	+89	+7.3%	Yes
Turton Rd SB (Det 5+6)	1,104	1,278	+174	+15.8%	Yes
Turton Rd (Det 3)	55	62	+7	+12.7%	No
Young Rd (Det 7+8)	175	161	−14	−8.0%	No

5.4 Traffic increase factors used for SIDRA

Based on the SCATS comparison, traffic increase factors were used to synthesise a 'typical fine Saturday' condition from the 'wet (survey-day) Saturday' condition used in the original SIDRA model. These factors were only applied to Turton Road through movements (northbound and southbound) and are shown in Table 5.2.

Table 5.2: Traffic increase factors applied to Saturday SIDRA – Turton Road through traffic

Direction	Increase factor (31 Aug / 6 Apr)
Turton Rd northbound through	1.073 (+7.3%)
Turton Rd southbound through	1.158 (+15.8%)

6. SIDRA sensitivity test

6.1 Methodology

The "fine weather" traffic increase factors in Table 5.2 were applied to the SIDRA input volumes for the Turton Road through movements, with key considerations as follows:

- **Adjusted movements**: Turton Road northbound through and southbound through movements were increased at the internal corridor intersections, but not at the corridor-end intersections (Turton Road / Griffiths Road and Turton Road / Lambton Road / Bridges Road), where the SCATS-derived increases are not relevant
- **Unchanged movements**: All side-road and access-leg traffic volumes (including Young Road, Stadium access, Monash Road and Bridges Road movements) were left unchanged
- **Unchanged model parameters**: Intersection geometry, control type, phasing and timing inputs, saturation flows, heavy vehicle proportions and all calibration settings were retained as per existing model settings.

The Saturday peak hour SIDRA model outputs were then compared for:

- The original (wet-survey) Saturday (6 April 2024 demand set)
- The higher volume (fine-weather) Saturday (31 August 2024)

6.2 SIDRA results comparison

Across the assessed internal intersections, the northbound and southbound through movements retain the same level of service classifications both before and after the correction or fine weather was applied. The dominant Turton Road / Young Road signalised intersection determines the overall corridor performance, while the priority-controlled intersections at the stadium access and the hockey centre exit remain unchanged in their through-movement performance.

The through-movement comparison is summarised in Table 6.1.

Table 6.1: Turton Rd 'wet-day Saturday' vs 'fine-day Saturday' outputs summary

Intersection	Northbound **through traffic**		Southbound **through traffic**	
	Wet (survey) Day (DoS / Delay / LOS)	**Fine (test) Day (DoS / Delay / LOS)**	**Wet (survey) Day (DoS / Delay / LOS)**	**Fine (test) Day (DoS / Delay / LOS)**
Turton Rd / Young Rd	0.390 / 1.3s / LOS A	0.437 / 1.1s / LOS A	0.445 / 20.8s / LOS B	0.471 / 19.0s / LOS B
Turton Rd/ McDonald Jones Stadium Southern Access	0.269 / 0.0s / LOS A	0.301 / 0.0s / LOS A	0.270 / 0.0s / LOS A	0.295 / 0.0s / LOS A
Turton Rd / Monash Rd / Hockey Centre Northern Exit	0.258 / 0.0s / LOS A	0.290 / 0.0s / LOS A	0.294 / 0.1s / LOS A	0.319 / 0.1s / LOS A

6.3 Results interpretation

The results in Table 6.1 indicate that applying the SCATS-derived traffic increase factors to account for fine weather does not significantly change the operating performance of Turton Road through traffic in the Saturday peak hour. The DoS increases marginally, well below the capacity threshold, and average delays and LOS are essentially unaffected.

At the priority-controlled intersections (stadium access and hockey centre exit), Turton Road movements are unimpeded with negligible delays, as expected.

At the Turton Road / Young Road signalised intersection, the small reduction in reported delay for the southbound through movement despite a minor volume increase is not unusual in SIDRA modelling and reflects minor variations in platoon arrival patterns and rounding of delay outputs in network mode under coordinated signal operation. These results essentially identify no noticeable change to operations experienced by drivers on Turton Road, reflected in movement LOS classifications that remain unchanged.

The current survey-based Saturday SIDRA assessment is therefore considered reliable for the TIA/RTS response, and there is no warrant for re-survey work or a revised network model as a consequence of the original data being collected under wet-weather conditions.

7. Conclusions

Key conclusions of the assessments undertaken for this Technical Note are:

- Version 005 of the SIDRA Modelling Technical Note supersedes Version 004 and corrects the content transcription error in the table found in Version 004. The SIDRA inputs and the modelling conclusions remain unchanged from version 004 to version 005
- Camera footage was used only to support back-of-queue observations, where they were available, not for the turning-movement count data
- The Turton Road / Young Road (weekday PM peak) does not “fail” under the project case. The project adds northbound demand consistent with approximately 215 outbound trips, and SIDRA shows a minimal increase in delay due to this additional traffic (equivalent to 1-2 extra vehicles per lane per signal cycle), with a one-band change from average LOS B to LOS C at the intersection. This impact is minimal to negligible
- The current survey-based Saturday SIDRA assessment is reliable for the TIA/RTS response, and there is no warrant for re-survey work or a revised network model as a consequence of the original data being collected during wet-weather conditions, as evidenced by the SCATS data comparison and sensitivity test modelling
- Overall, the SIDRA modelling used for the TIA/RTS remains fit-for-purpose, and there is no basis for requiring a re-survey of traffic volumes or the re-running of SIDRA network models.

Hunter Indoor Sports Centre
Turton Road, New Lambton, NSW
Traffic Event Management Plan

Author: Cathy Thomas/Sean Morgan

Client: Newcastle Basketball Association

Issue: Ver05

Reference: P2614

14 May 2026

Quality Review and Document History

Version	Date	Description	Prepared By	Reviewed and Approved By
Ver01	15/4/24	Draft	C. Thomas	S.Morgan
Ver02	19/5/24	Final	C. Thomas	S.Morgan
Ver04	15/3/2026	Final updated	C.Thomas	M.Palamara
Ver05	14/5/2026	Updated in response to RFIs	C.Thomas	M.Palamara

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Contents

1 Executive Summary

This preliminary Traffic Event Management Plan (EMP) has been prepared to inform opportunities to provide for events run in conjunction with the Hunter Indoor Sports Centre (HISC), Turton Road, New Lambton. It has been prepared to provide initial advice and should be read in conjunction with the more detailed Traffic Management Plan (TMP) subsequently prepared by Traffic Plan Professionals Pty Ltd (**Appendix B**).

The facility provides on-site parking with 240 spaces providing a mix of parking demands including drop off (9) and disabled parking (8). This parking allows for the normal day to day activities as well as the larger, typically weekend events for the facility. Peak demands associated with peak afternoon games can see a turnover of 500 people per hour.

Separate to these demands there are opportunities throughout the year for larger (major) events. These primarily are associated with the Show Court which allows for the inclusion of the venue in the National Basketball League (NBL1). Such games would typically see up to 1100 attendees to the venue with 14 of these anticipated annually. Once established higher attendance (up to 1700 patrons) could occur for rival clashes or finals. Opportunities for three of these are anticipated annually.

The venue may also be included in representative tournaments such as Combined High School and state-based events which may occur several times in a calendar year and use the full complement of courts.

It is these larger events that are the basis of this plan.

Public Transport and Overflow Parking

The site is located within the Broadmeadow Sports and Entertainment Precinct (Hunter Park), opposite the Newcastle International Sports Stadium (McDonald Jones Stadium) and the Newcastle International Hockey Centre. The preparation of this EMP has taken into consideration the Traffic Management Plans (2023) prepared by Traffic Plan Professionals Pty Ltd for McDonald Jones Stadium allowing for events in excess of 25,000 patrons with the EMP providing a preliminary assessment of the impacts of combined events in the precinct.

This has been subsequently expanded with more detailed assessment and mitigation measures outlined in the Traffic Management Plan Ver02.03 2026 prepared for HISC by Traffic Plan Professionals (**Appendix B**).

The site is well located to be accessed by public transport with Broadmeadow Station providing for both train and bus services. The station is within walking distance of the HISC allowing for attendees to make use of existing public transport services, reducing the reliance on car travel and subsequent parking demands.

As part of the project development, discussions were undertaken with representative from Venues NSW, who manage McDonald Jones Stadium (MJS). This was in response to recommendations by the City of Newcastle that opportunities to reduce on-site parking be investigated through the utilisation of the McDonald Jones Stadium carpark to cater for car parking demands, including fluctuations associated with peak events. From these discussions it was agreed that HISC would not rely on MJS parking.

The scheduling of NBL1 dates and tournament dates shall generally be planned to avoid key commitments at MJS. This will reduce the cumulative impacts of the venues however the EMP has considered such situations and found that the impact of HISC is minimal in comparison to events held at MJS.

Requirements of Traffic Management

Traffic Plan Professionals Pty Ltd (TPP) have liaised with key stakeholders and undertaken detailed consultation with Events NSW with regard to concurrent events being held in the Turton Road sport precinct, particularly for both the HISC and MJS.

In reviewing the existing event management plans associated with MJS it has been concluded that the day to day operation of HISC can occur alongside other events in the precinct with access to the HISC site and carpark being maintained.

There may be rare times when significantly sized concerts may restrict this for short periods however such events at MJS would be covered by their own specific TMPs and would take into consideration HISC, allowing for consultation and forward planning by HISC.

The various sized events associated with HISC have then been analysed to consider appropriate mitigation and suitable Traffic Guidance Schemes (TMP/TGS). As a conservative approach the parking demands have been based on a car occupancy rate of 3 people per vehicle with no extra concessions for active or public transport accept as detailed in the EMP.

The size and frequency of events is shown below along with a summary of the parking demands for the various activities/attendance levels to be held at HISC throughout the year.

Figure 1 - Scenario 1 – HISC Stand Alone Events

Event	Attendees	Frequency
Friday Night	<600 pax	Weekly
Waratah League	500-800 pax	Competition March – September. Weekly games (Sat afternoon/Sunday)
NBL 1	690-1100 pax	April - August - majority of matches (approx. 14 per year)
	1100-1700 pax*	April- August - infrequent (e.g. rival clashes or finals)
Full House Events	2500	Occasional – 1 or 2 per annum

** NSWBA Utilisation Model*

Attendance	Parking Demands	On-site Parking	Monash Road	Other
1100	367	231	80+60	Nil
1700	567	231	80+60	196
2500	833	231	80+60	462

In conjunction with this TPP have determined the extent of on-street carparking along non-residential road frontages within 1.5km of the Turton Road precinct (Figure 2 below). This parking, along with on-site parking at HISC for HISC events, and MJS for their own stadium events, and off-street parking at various locations including the Council depot north of the precinct on Turton Road provides the potential for 6,510 spaces to be available for use by the community when events are held in the precinct. This allows for 19,530 patrons to travel by car and park.

From this it can be seen that events at HISC will generate a low demand for parking being less than 10% of this available parking supply.

Figure 2 – Surrounding on-street parking supply

The TPP TMP (**Appendix B**) has then been developed to consider the site-specific requirements for stand along events at HISC as well as concurrent events including HISC.

Whilst it is acknowledged that events at HISC, with the potential for up to 2500 attendees at an occasional Show Court event, is significantly less than events held at MJS, the potential for an event to occur concurrently would contribute to the demands placed on the precinct. The development of the TMP to provide guidance for this situation can therefore allow for the efficient use of resources including shuttle buses and parking, the safe management of infrastructure for all road users, provide consistent communication with local residents and reduce confusion for patrons.

These scenarios are detailed in the TMP and are described as:

Scenario 1 - being a stand along HISC event and details at what level what mitigation measures are required. These have been identified as being an Insignificant, Minor, Low or Medium impact event. It is noted that activities assessed as Insignificant are consistent with typical weekly operations being the day-to-day operations of the HISC.

Scenario 2 - details multi-venue activities and outlines the mitigation measures appropriate to manage combined patronage as shown below being Insignificant, Minor, Low, Medium, High, Very High and Major impact events.

Scenario 1- HISC Attendance only

ASSESSMENT				CONSIDERATIONS				APPROVALS	
Scenario	Impact	RMS Rating	Venue PAX	Road Closures	HISC Parking 231 Carparks 1:3 car/pax	Drop Off Zone	Shuttle Bus Services	Applications	TMP/ TGS
1a	Insignificant	NA	<690	No	Parking on site	No	No	N/A	N/A
1b	Minor	NA	>690-1100	No	Parking on site and off site	No	No	N/A	N/A
1c	Low	4	>1100-1700	No	Onsite managed & On-Street	Yes	No	TfNSW (ROL)	TMP01 TGS4003.DFT & CONSIDER TGS4002.DFT
1d	Medium	3	>1700-2500+	No	Onsite managed & On-Street	Yes	No	TfNSW (ROL) Council (ROL & EA)	TMP01 TGS4003.DFT 4002.DFT CONSIDER TGS4005.DFT

Scenario 2- Multi-Venue attendance (Addresses the potential for combined patrons of HISC, MJS, Hockey Centre and external sports fields)

ASSESSMENT			CONSIDERATIONS						APPLICATIONS	HISC CONTROLS
Scenario	Impact	RMS rating	Pax/Event	Road Closures	HISC Parking 231 Carparks 1:3 car/pax	MJS Parking 900 Carparks 1:3 car/pax	Drop Off Zone	Shuttle Bus Services	Approvals	TMP/TGS
2a	Insignificant	NA	<1100	No	Onsite & On-Street	Onsite	No	No	N/A	N/A
2b	Minor	4	1100-1700	No	Onsite managed & On-Street	Onsite	Yes	No	N/A	TGS4003.DFT & CONSIDER TGS4002.DFT
2c	Low	3	1700- 2500	No	Onsite managed & On-street	Onsite	Yes	No	TfNSW (ROL) Council (ROL)	TGS4003.DFT TGS4002.DFT CONSIDER TGS4005.DFT
2d	Medium	2	2500-5000	No	Onsite managed	Onsite & On-street	Yes	No	TfNSW (ROL) Council (ROL & EA)	TGS4003.DFT TGS4002.DFT CONSIDER TGS4004.DFT
2e	High	1	5K- 15K	No	Onsite managed	Onsite managed & On-street	Yes	Yes*	TfNSW (ROL) Council (ROL & EA)	TGS4002.DFT TGS4003.DFT TGS4004.DFT TMP01.DFT - MJS 2025 LOW IMPACT
2f	Very High	1	15K-25K	Yes Young Rd, Turton Rd	Onsite managed	Onsite managed & On-street	Yes	Yes*	TfNSW (ROL) Council (ROL) Police (User Pay)	TMP02.DFT – Or TMP03.DFT MJS 2025 MEDIUM IMPACT
2g	Major	1	25K+	Yes Young Rd, Turton Rd	Onsite managed	Onsite managed & On-street	Offsite Young Rd	Yes* Park n Ride	TfNSW (ROL) Council (ROL) Police (User Pay)	TMP04.DFT - MJS 2025 HIGH IMPACT

refer section 17.8 for parking thresholds.

IMPACT SUMMARY

PAX Range	Scenario 1 - HISC Impact Only *(No reliance on MJS Parking)*	Scenario 2 - Multi-Venue Impact (HISC, MJS, Hockey Centre and external sports fields)
<690	Scenario 1a	*N/A*
690 - 1,100	Scenario 1b	Scenario 2a
1,100 – 1,700	Scenario 1c	Scenario 2b
1,700 – 2,500	Scenario 1d	Scenario 2c
2,500 – 5,000	*N/A*	Scenario 2d
5,000 – 15,000	*N/A*	Scenario 2e
15,000 – 25,000	*N/A*	Scenario 2f
25,000+	*N/A*	Scenario 2g

From this the TMP has provided guidance on the various measures and controls applicable to mitigate the impact of not only stand alone HISC events, but also to demonstrate how such events coupled with others in the precinct can occur in a manageable way, similar to large events currently hosted by MJS.

2 Introduction

Background

Seca Solution Pty Ltd has been commissioned by EJE Architecture on behalf of the Newcastle Basketball Association to prepare the following preliminary Traffic Event Management Plan (EMP) to support the Hunter Indoor Sports Centre (HISC) at New Lambton. This is to meet the requirements of Department of Planning, Industry and Environment in their SEARs for the project.

The purpose of this is to provide for the safe and efficient movement of traffic and pedestrians both within the road reserve and within the site. It should be read in conjunction with the TMP prepared by Traffic Plan Professionals Pty Ltd (Appendix B) to provide for various events at HISC as well as combined events including those at McDonald Jones Stadium (MJS).

Seca Solution has assessed the impacts of traffic, access and parking documented in a Traffic Impact Assessment and included appropriate mitigations for the day-to-day operations of the subject site.

The requirement of the EMP and subsequent TMP is to document how the demands for larger, non-everyday events with up to 1,700 spectators and players and staff proposed for the site can be accommodated as well as demonstrating the management of the vehicle demands in and out of the site, providing any necessary control mechanisms to minimise the disruption for existing road users and to allow for the safe and efficient entry and exit to the site.

Such events shall primarily be associated with the operation of the show court and are proposed to occur 16 times per year with a range of attendee numbers.

Events such as combined high school carnivals may occur when the whole venue is used. This is consistent with normal operations however may see the arrival of players by buses which require consideration.

There may also be the occasional demand for larger events (Full House) events up to 2500 people, for example an international touring side.

2.1 Scope of Report

The following Preliminary Traffic Event Management Plan (EMP) details:

- how the site will operate, including varying access arrangements at varying times,
- details on all sized events outside of everyday usage, including anticipated length of events and operating hours,
- availability of public transport options,
- analysis of the traffic and parking impacts on the amenity of the surrounding neighbourhood.
- details of the extent of potential parking within the surrounding street network arising from the development and how it is to be managed to:
    - minimise the impact on local residents and traffic flows,
    - identification of proposed parking restrictions,
    - details of how pedestrians will be managed on route to the site,
    - details of how pedestrian safety will be maintained,
    - detail of when the event traffic management plan will be triggered,
    - details of the schedule and process for review of measures implemented, and
    - actual location and general potential arrangements for event parking off site.

Appendix B provides the Traffic Management Plan and TGS plans prepared by Traffic Plan Professionals Pty Ltd which details the proposed controls and relevant mitigations for various scenarios.

2.2 Issues and Objectives of the study

The objectives of this preliminary Traffic Event Management Plan (EMP) are to determine the traffic management requirements for events held at the Hunter Indoor Sport Centre taking into consideration:

- the requirements of the Occupational Health& Safety Act 2000
- the location of the event space and its interface with traffic
- any reduced capacity of the road system
- the traffic impact on the non-event community & emergency services
- costs to the event organiser and the agencies.

It is to be read in conjunction with the TMP prepared for HISC by TPP.

2.3 Planning Context

In preparing this document, the following guides and publications were used:

- NSW Guide to Traffic and Transport Management for Special Events, July 2018 (current at time of preparation)
- Traffic Control at Work Sites (TCAWS) Ver 6.1
- Guidelines for the Planning of Bus Layover Parking – August 2018
- Australian / New Zealand Standard – Parking Facilities Part 1 : off-street car parking (AS2890.1:2004);

3 Proposed Events

3.1 Size and Frequency of Events

Newcastle Basketball Association operate various activities throughout the week which have been assessed as part of the operational (day to day) demands for the HISC (Traffic Impact Assessment *Seca Solution 2024-26*).

The Waratah League, a semi-professional basketball league in New South Wales and the Australian Capital Territory, is played in Newcastle with typical spectator numbers of 500 to 800. The League has two professional divisions being the men's and women's Championship divisions. The strategic plan for the NBA is to have a team in the Women's division. To date this has not happened however consideration has been given to this in the planning for the HISC.

Allowing for the growth of basketball in the Hunter, spectator numbers are expected to grow with average attendance reaching 1100 spectators for NBL1 home games (Source: NSWBA utilisation model for the HISC). The number of such events could see 14 per annum.

Once such a competition is fully operational here in the Hunter, larger events such as rival clashes and finals may see spectator numbers between 1100-1700 pax with these being potentially 3 per annum.

Event	Attendees	Frequency
Friday Night	<600 pax	Weekly
Waratah League	500-800 pax	Competition March – September. Weekly games (Sat afternoon/Sunday)
NBL 1	690-1100 pax	April - August - majority of matches (approx. 14 per year)
	1100-1700 pax*	April- August - infrequent (e.g. rival clashes or finals)
Full House Events	2500	Occasional – 1 or 2 per annum

** NSWBA Utilisation Model*

There is the occasional opportunity for a "full house" event with 2,500 seats. Such an event may be associated with a touring side but otherwise is unlikely to occur until the Waratah League is fully operational with a women's team seeing finals here in the Hunter. This is not anticipated for some time. Such an event does not change the measures outlined in this plan.

It is these special events that forms the basis of this EMP and the TMP included in **Appendix B.**

3.2 Classification of Events

For traffic and transport management purposes there are four distinct classes of special event (*NSW Guide to Traffic and Transport Management for Special Events, July 2018)* which is consistent with the updated *Guide to Traffic and Transport Management for Special Events (TfNSW Nov 2025 2.1 Event Classes).*

This classification system focuses on:

- disruption to traffic and transport systems, and
- disruption to the non-event community.

Class 1: is an event that impacts major traffic & transport systems and there is significant disruption to the non-event community. For example: an event that affects a principal transport route in Sydney, or one that reduces the capacity of the main highway through a country town.

Class 2: is an event that impacts local traffic and transport systems and there is low scale disruption to the non-event community.

For example: an event that blocks off the main street of a town or shopping centre but does not impact a principal transport route or a highway.

Class 3: is an event with minimal impact on local roads and negligible impact on the non-event community. For example: an on-street neighbourhood Christmas party.

Class 4: is an event that is conducted entirely under Police control (but is not a protest or demonstration). For example: a small march conducted with a Police escort

3.3 Scenarios Relevant to HISC

The types of scenarios and thresholds for HISC have been assessed allowing for two scenarios, being stand alone HISC events and those combined with others in the precinct. These have been identified with the impacts determined as outlined in the matrix below.

Scenario 1- HISC Attendance only

ASSESSMENT				CONSIDERATIONS				APPROVALS	
Scenario	Impact	RMS Rating	Venue PAX	Road Closures	HISC Parking 231 Carparks 1:3 car/pax	Drop Off Zone	Shuttle Bus Services	Applications	TMP/ TGS
1a	Insignificant	NA	<690	No	Parking on site	No	No	N/A	N/A
1b	Minor	NA	>690-1100	No	Parking on site and off site	No	No	N/A	N/A
1c	Low	4	>1100-1700	No	Onsite managed & On-Street	Yes	No	TfNSW (ROL)	TMP01 TGS4003.DFT & CONSIDER TGS4002.DFT
1d	Medium	3	>1700-2500+	No	Onsite managed & On-Street	Yes	No	TfNSW (ROL) Council (ROL & EA)	TMP01 TGS4003.DFT 4002.DFT CONSIDER TGS4005.DFT

Scenario 2- Multi-Venue attendance (Addresses the potential for combined patrons of HISC, MJS, Hockey Centre and external sports fields)

ASSESSMENT			CONSIDERATIONS						APPLICATIONS	HISC CONTROLS
Scenario	Impact	RMS rating	Pax/Event	Road Closures	HISC Parking 231 Carparks 1:3 car/pax	MJS Parking 900 Carparks 1:3 car/pax	Drop Off Zone	Shuttle Bus Services	Approvals	TMP/TGS
2a	**Insignificant**	NA	<1100	No	Onsite & On-Street	Onsite	No	No	N/A	N/A
2b	**Minor**	4	1100-1700	No	Onsite managed & On-Street	Onsite	Yes	No	N/A	TGS4003.DFT & CONSIDER TGS4002.DFT
2c	**Low**	3	1700- 2500	No	Onsite managed & On-street	Onsite	Yes	No	TfNSW (ROL) Council (ROL)	TGS4003.DFT TGS4002.DFT CONSIDER TGS4005.DFT
2d	**Medium**	2	2500-5000	No	Onsite managed	Onsite & On-street	Yes	No	TfNSW (ROL) Council (ROL & EA)	TGS4003.DFT TGS4002.DFT CONSIDER TGS4004.DFT
2e	**High**	1	5K- 15K	No	Onsite managed	Onsite managed & On-street	Yes	Yes*	TfNSW (ROL) Council (ROL & EA)	TGS4002.DFT TGS4003.DFT TGS4004.DFT TMP01.DFT - MJS 2025 LOW IMPACT
2f	**Very High**	1	15K-25K	Yes Young Rd, Turton Rd	Onsite managed	Onsite managed & On-street	Yes	Yes*	TfNSW (ROL) Council (ROL) Police (User Pay)	TMP02.DFT – Or TMP03.DFT MJS 2025 MEDIUM IMPACT
2g	**Major**	1	25K+	Yes Young Rd, Turton Rd	Onsite managed	Onsite managed & On-street	Offsite Young Rd	Yes* Park n Ride	TfNSW (ROL) Council (ROL) Police (User Pay)	TMP04.DFT - MJS 2025 HIGH IMPACT

*refer section 17.8 for parking thresholds

Figure 3-1 Scenario 2 – Combined Events.

In the impact categories detailed in the Scenario 2 matrix, should HISC have a capacity patronage of 2500, and the additional number of attendees across the multiple venues fall into Scenarios 2e, 2f or 2g, the HISC traffic management strategy would implement the controls outlined in this TMP under Scenario 1d while also deferring to the controls activated per the applicable McDonald Jones Stadium Traffic Management Plans- Low, Medium or High Impact Events.

4 Event Mitigation Measures

4.1 Site Description and Proposed Activity

The HISC will include provision for 12 indoor basketball courts including a 2,500 seat show court, offices, car parking and café spaces as well as ancillary gym and health facilities.

A permanent sealed car park with 240 parking spaces, including 8 disabled parking spaces, 9 drop off spaces and parking for 12 motorbikes will be provided on site, along with bicycle storage.

The parking spaces have been determined as being sufficient to accommodate the day to day, week in week out operational demands of the subject site which sees peak demands in the afternoon period (4-8pm).

4.2 Site Location

The site is on the western side of Turton Road and has street frontage to Turton Road (eastern frontage) and Monash Road (southern frontage). There is pedestrian access only from Monash Road with the only road frontage for the site for vehicles being to Turton Road. The location of the site is shown below in Figure 4-1 below.

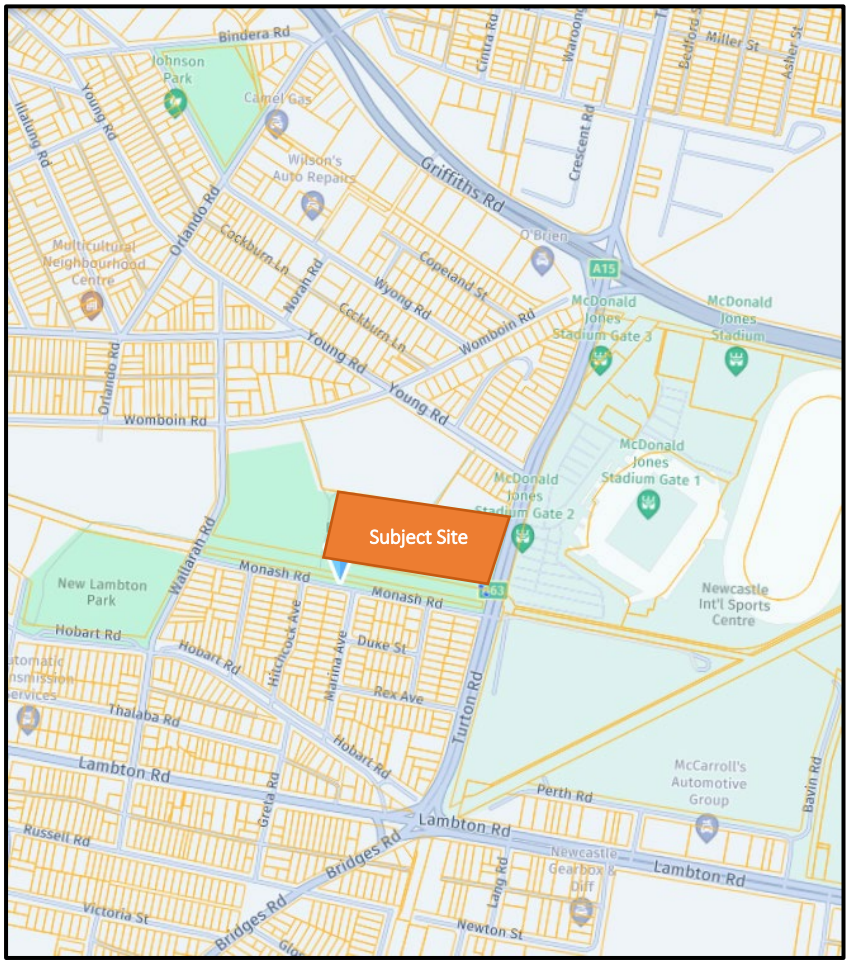


Figure 4-1 Study Area within context of local road network (Source: Nearmap)

4.3 Site Access

Access to the site is provided via a new access to Turton Road allowing left in left out only. These are managed by a central median and signage on Turton Road and shall operate in a manner consistent with the Hockey Stadium opposite.

Due to this arrangement all vehicles accessing the site shall approach from the south along Turton Road.

The design of the access and the carpark enable vehicles to enter with no delays ensuring no queuing on Turton Road. Manned entry by parking attendants during certain events occurs some 96 metres within the carpark ensuring significant vehicle capacity (15 vehicles @ 6 metres per AS2890.1) within the site and the parking design allows for the re-direction of non-ticket holders to exit the site with minimal impact within the site.

Vehicles exiting benefit from the signals to the south on Lambton Road providing gaps in the traffic flows.

The access has been designed to allow buses to also use this access to enter and exit the site.

4.4 Public Transport

4.4.1 Rail Station Locations

Broadmeadow railway station is approximately 1 kilometre east of the site and provides regular train services on the Central Coast Newcastle Line between Newcastle and Sydney. It is also a stop on the XPT Regional Train service between Sydney and Brisbane.

The station also acts as a hub for bus services operating throughout the area.

4.4.2 Bus Routes and Associated Facilities

Bus stops are located on Turton Road to the north of the site and are serviced by:

- Route 27 – Wallsend
- Route 138 – Lemon Tree Passage (Monday to Friday)
- Route 266 – West Wallsend (Monday to Friday)

Southbound stops have shelters and seating. Northbound the stop before Monash Road is signal only however north of the site near Young Road there is a shelter and seating.

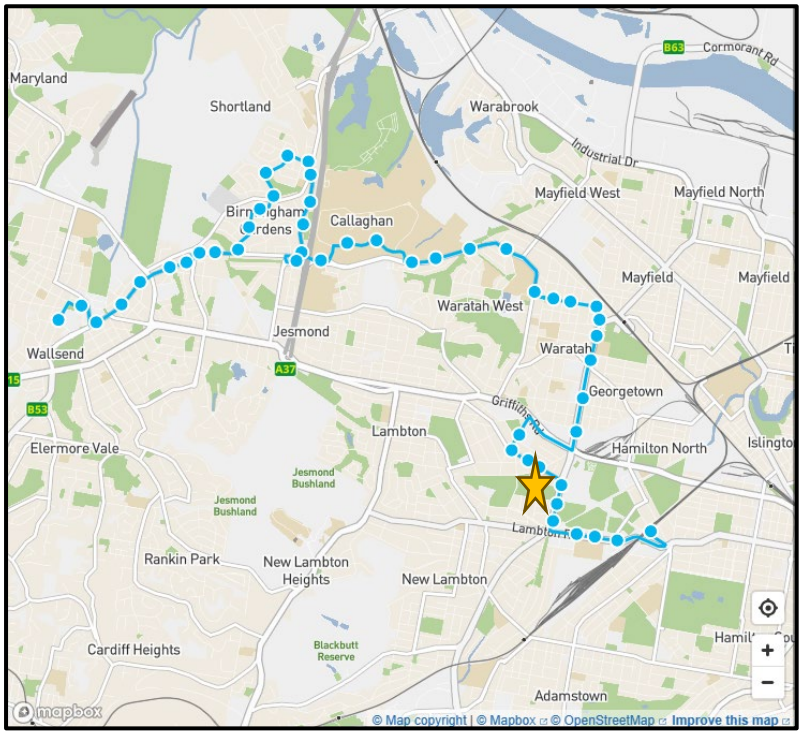


Figure 4-2 Bus service 27 to Wallsend (Subject site ★)

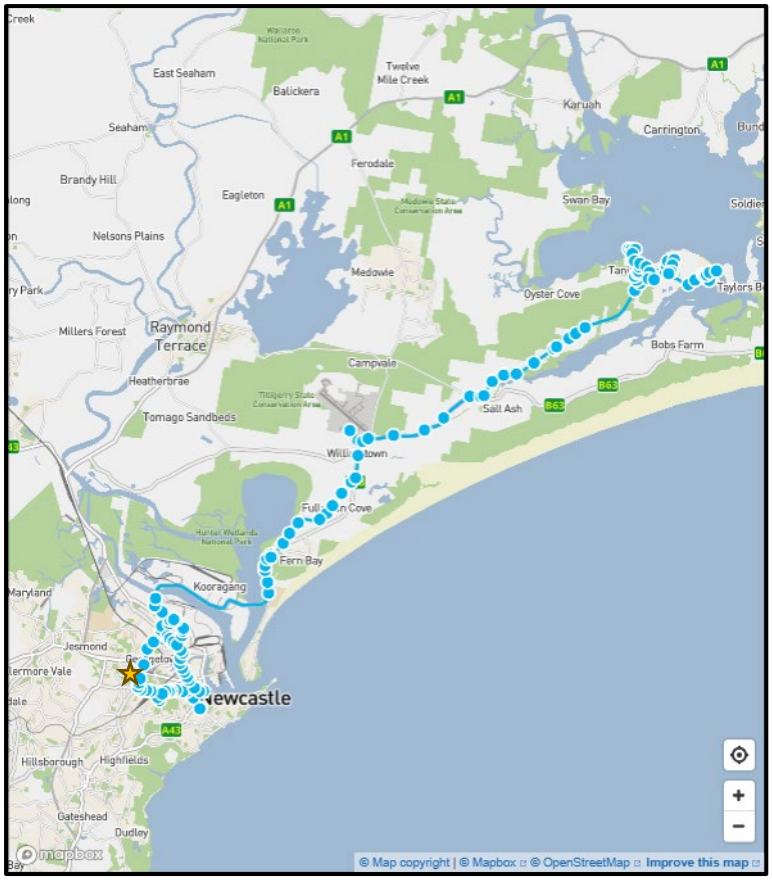


Figure 4-3 Bus service 138 Lemon Tree Passage to Newcastle (Subject site ★)

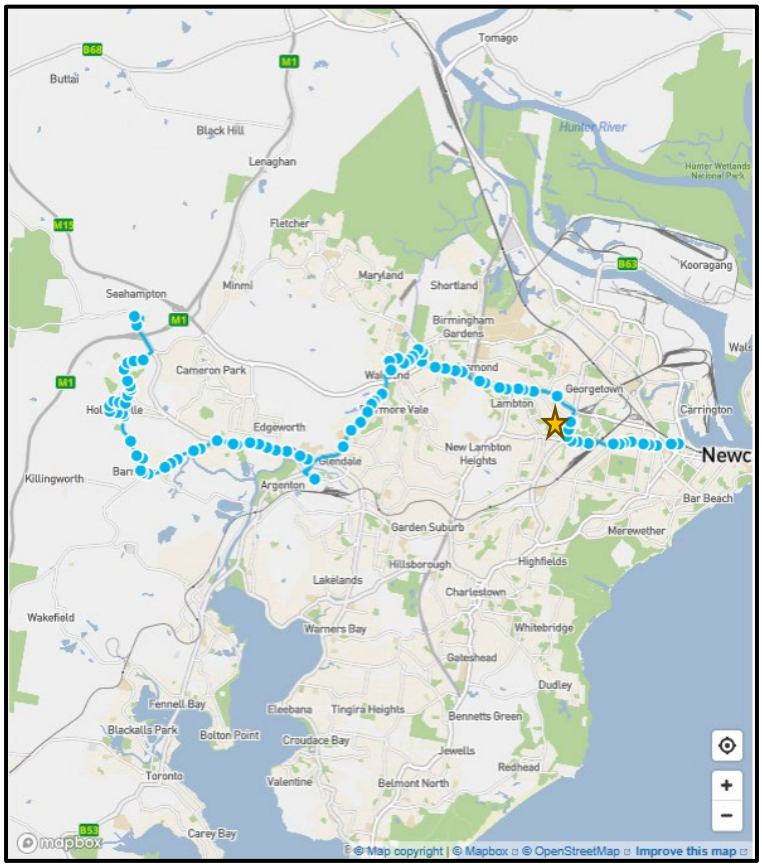


Figure 4-4 Bus service 266 Newcastle to West Wallsend (Subject site ★)

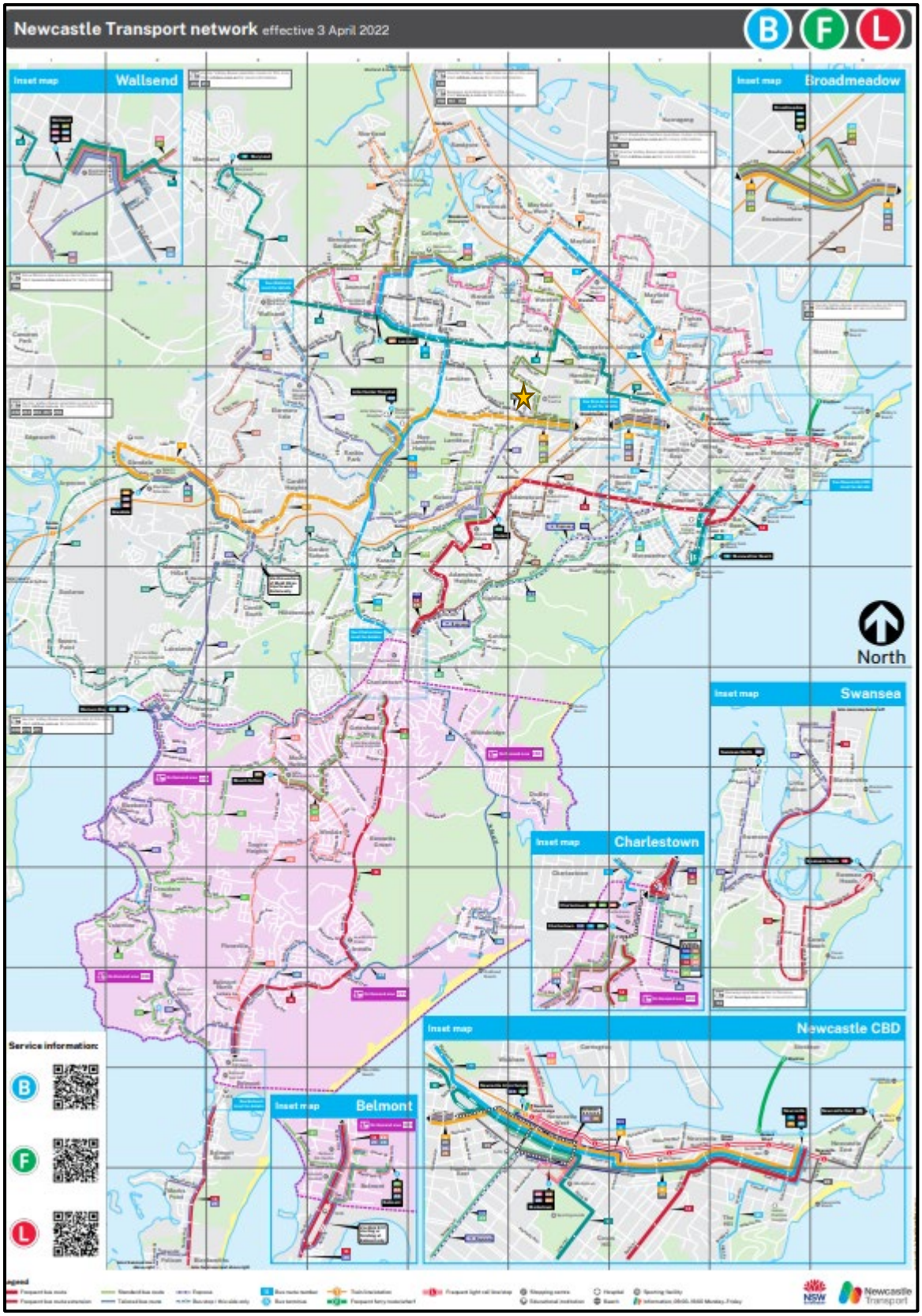


Figure 4-5 Newcastle Bus Network

4.5 Rail and Bus Service Frequencies

Both bus and rail services operate a high frequency in this area.

Broadmeadow is a major stop on the main Central Coast Newcastle line with all trains stopping at this station. A number of bus services also connect at this station.

On Turton Road service 27 runs daily whilst routes 138 and 266 operate Monday to Friday.

Northbound Bus Services

Turton Rd at Monash Rd

27 Wallsend	10:09 AM
27 Wallsend	10:55 AM
27 Wallsend	11:55 AM
27 Wallsend	12:55 PM
27 Wallsend	1:55 PM
27 Wallsend	2:55 PM
27 Wallsend	3:30 PM
138 Lemon Tree Passage	3:36 PM
266 Seahampton	3:38 PM
27 Wallsend	4:10 PM
27 Wallsend	4:50 PM
27 Wallsend	5:20 PM
266 West Wallsend	5:36 PM
27 Wallsend	5:54 PM
27 Wallsend	6:24 PM
27 Wallsend	7:39 PM
27 Wallsend	8:34 PM
27 Wallsend	9:14 PM
27 Wallsend	10:06 PM
27 Wallsend	5:50 AM
27 Wallsend	6:45 AM
27 Wallsend	7:17 AM
27 Wallsend	7:55 AM
27 Wallsend	8:20 AM
27 Wallsend	8:45 AM

Southbound Bus Services

Turton Rd opp Young Rd

27 Broadmeadow Station	10:17 AM
27 Broadmeadow Station	11:13 AM
27 Broadmeadow Station	12:13 PM
27 Broadmeadow Station	1:13 PM
27 Broadmeadow Station	2:10 PM
27 Broadmeadow Station	3:03 PM
27 Broadmeadow Station	4:13 PM
27 Broadmeadow Station	4:43 PM
27 Broadmeadow Station	5:11 PM
27 Broadmeadow Station	5:51 PM
27 Broadmeadow Station	6:15 PM
27 Broadmeadow Station	7:16 PM
27 Broadmeadow Station	8:26 PM
27 Broadmeadow Station	9:26 PM
27 Broadmeadow Station	10:26 PM
27 Broadmeadow Station	5:13 AM
27 Broadmeadow Station	6:10 AM
27 Broadmeadow Station	7:10 AM
27 Broadmeadow Station	7:46 AM
266 Newcastle Interchange	7:51 AM
138 Newcastle Interchange	8:12 AM
27 Broadmeadow Station	8:14 AM
266 Newcastle Interchange	8:17 AM
27 Broadmeadow Station	8:50 AM
27 Broadmeadow Station	9:13 AM

Figure 4-6 Bus schedules at Turton Road near Monash Road

Event Management Measures

Ticket holders will be encouraged to use public transport with Broadmeadow Station within walking distance of the stadium.

Advice on "How to Get Here" shall be included on the Newcastle Basketball web site.

4.6 Parking

The HISC has on-site capacity to park 240 vehicles including 9 drop off spaces allowing for the drop off of attendees by taxi etc.

The capacity of the parking has been considered allowing a conservative average car occupancy of 3 people which would provide parking for 693 patrons on site.

Attendance	Parking Demands	On-site Parking	Monash Road	Other
1100	367	231	80+60	Nil
1700	567	231	80+60	196
2500	833	231	80+60	462

On-street parking is also available along the Monash Road frontage. There is in the order of 140 (90-degree) parking spaces on the northern side of Monash Road, 80 of which are along the site. This parking will provide overflow parking during NBA1 Events in a manner consistent with other events held in the precinct.

TPP have determined the extent of on-street carparking along non-residential road frontages within 1.5km of the Turton Road precinct which combined with on-site parking at HISC for HISC events, and MJS for stadium events, and off-street parking at various locations including the Council depot north of the precinct on Turton Road provides the potential for 6,510 spaces to be available for use by the community when events are held in the precinct. This allows for 19,530 patrons to travel by car and park.

From this it can be seen that events at HISC will generate a low demand for parking being less than 10% of the available parking supply.

Event Management Measures

Access to the on-site parking will allow for those associated with nominated events (>1100 pax) including players, officials, caterers, first aid staff and teams arriving in buses etc along with spectators who will require a valid parking ticket.

Provide parking information in conjunction with ticket purchases and via the event web pages etc.

Variable Message Boards will provide advanced notice of larger events and advise that carparking on site is subject to a valid pre-purchased parking ticket.

Spectators arriving by public transport or parking to the east of Turton Road can then cross Turton Road at the signalised crossing allowing for the safe and controlled movement of pedestrians at this location.

<u>Parking Attendants</u>

Any parking attendants should have the requisite training, PPE and identification.

They will be responsible for directing the entry and exit of vehicles with parking permits, the redirection for those without, as well as the safe movement of pedestrians within the HISC site.

In addition, the parking attendants will be responsible for reporting any issues arising in regard to entry, exit, parking and pedestrian safety so that the plan can be effectively reviewed and improved for future events.

4.7 Local Road Network

The traffic modelling report for the sports centre determined that *"upon undertaking SIDRA analysis, it can be confirmed that no to minor extra delays would be expected across most surrounding intersections after construction of the proposed Indoor Sports Centre.*

During events at HISC, traffic will be able to access the site as assessed for everyday operations.

When events are being held at MJS, access to HISC would continue to be available allowing for day-to-day operations as well as some events.

4.8 Pedestrian Access

There is a wide network of pedestrian paths in the locality, reflecting the high demand for pedestrian movements in the area. This includes footpaths along both sides of Lambton Road and Turton Road.

There are pedestrian phases on all legs at the signalised intersections of Turton Road and Lambton Road and Turton Road and Griffith Road. There is also a signalised mid-block crossing of Turton Road, along the site frontage to allow for safe and controlled pedestrian movements in this location.

Event Management Measures

A designated pedestrian route shall be provided through the site between the HISC and Turton Road.

Larger events at HISC shall include a marshal at the exit onto Monash Road to support the safe movement of pedestrians across the regional footway/cycleway at the conclusion of events.

4.9 Bus Access

The site has been designed to accommodate the movement of buses up to 14.5m.

On-site parking is available for two buses as well as additional parking for 22 seater buses during typical school type activities and events.

Event Management Measures

Parking for 22 seater buses associated with school type activities shall be pre-booked with HISC management. These areas shall be nominated and secured with bollards or similar to be kept available for such buses to park once passengers have alighted.

The exiting of buses during larger events will be managed to provide a suitable gap between bus departures.

4.10 Monitoring and Review

This plan is a living document which to ensure a successful outcome needs to be monitored and the actions reviewed and modified to support changing circumstances.

Actions implemented should be monitored to ensure they are having a positive impact in achieving the goals of reducing the impact of private car usage on the amenity of the neighbourhood surrounding the Sports Centre and addressing any significant impacts on road operation or safety.

5 Summary and Recommendations

5.1 Recommendations

The attached Traffic Management Plan considered the impact where parking demands above 693 attendees occurred. The assessment determined that mitigation was only required when attendance would be greater than 1100 patrons.

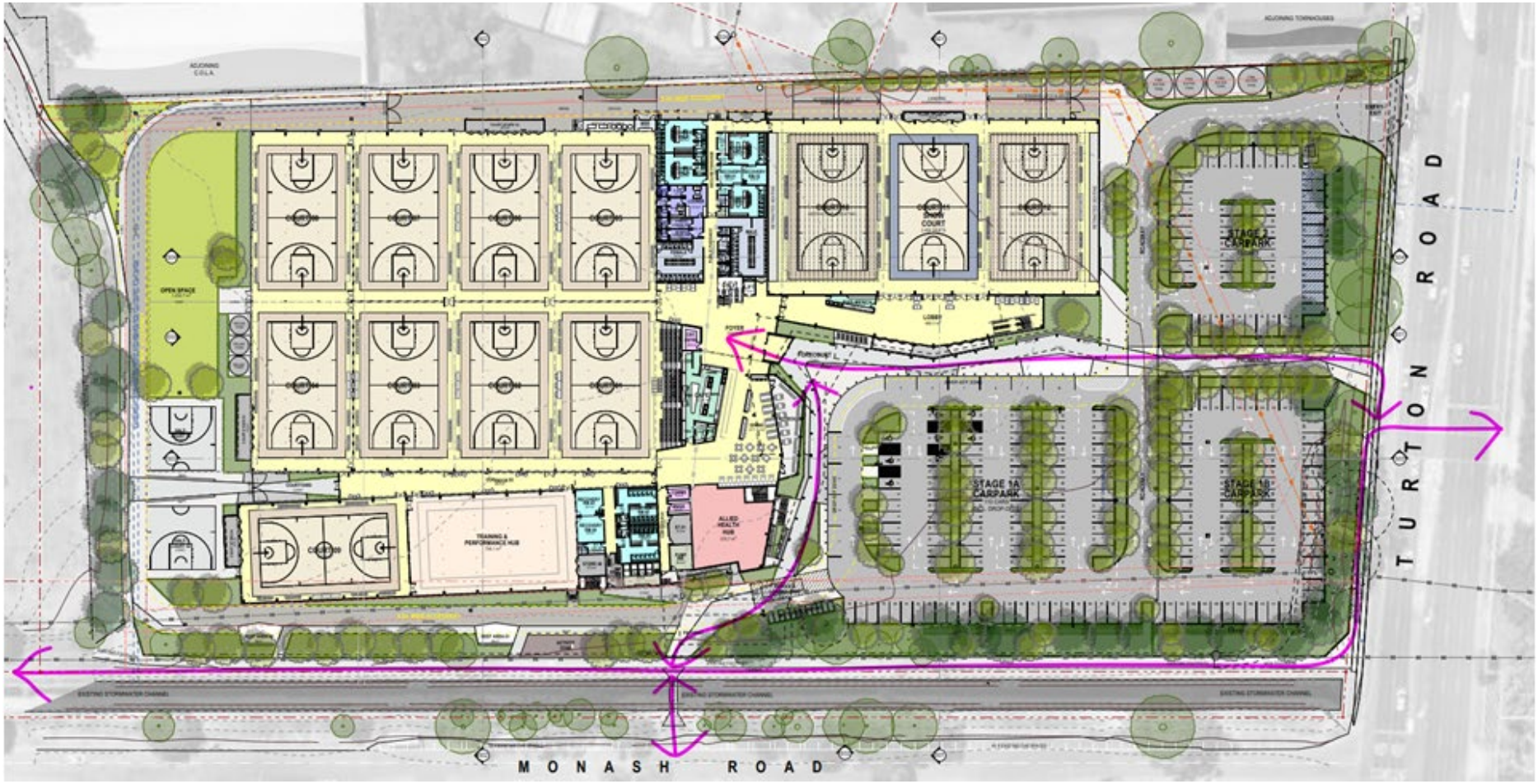
The overall conclusion from these investigations is that traffic and parking arrangements for Scenario 1 (HISC only) events can be managed with minor impacts and no requirements for road closures or on street traffic controls.

Combined (Scenario 2) events may trigger higher levels of control depending upon the total number of participants anticipated.

In conclusion, allowing for the management measures outlined in the EMP and TMP, the HISC can provide the following:

- events anticipated allowing for the use of the Show Court with up to 2,500 attendees plus players and officials;
- can operate its daily operations when other events are occurring in the precinct; and
- can operate events in conjunction with other events subject to the relevant controls and measures being implemented across the precinct.

Appendix A – Internal pedestrian route



Appendix B –Traffic Management Plan (Traffic Plan Professionals)

NB - Appendix B is this document and has not been duplicated here

Hunter Indoor Sports Stadium: Event-Day Communications Plan

Location: Newcastle, NSW

Objective

To manage communication effectively during event days where simultaneous events at Hunter Indoor Sports Stadium and McDonald Jones Stadium may result in traffic congestion, limited parking, and crowd management challenges. The aim is to ensure public safety, community awareness, smooth operations, and a positive patron experience.

1. Key Communication Goals

- Proactively inform all affected stakeholders about overlapping events.
- Promote alternative transport options, potentially free shuttle services.
- Coordinate traffic, parking, and pedestrian access information to reduce congestion and confusion.
- Provide real-time updates across channels on event day.

2. Stakeholders

- Event Patrons (for both venues)
- McDonald Jones Stadium
- Local Residents and Businesses
- Motorists and Public Transport Users
- Local Government (Newcastle City Council)
- Emergency Services and Traffic Management Authorities

3. Communication Strategy by Timeline

Time Frame	Media Channels	Message	Target Audience
28 Days Pre-Event	TV, Radio, Newspapers, Website, Social Media, Ticketing Platforms	Event Announcement, Headline Acts, Dates/Times, Seating Allocation, Parking Advisory	General Public, Event Patrons, Ticket Buyers
14 Days Pre-Event	TV, Radio, Website, Social Media, Ticketing, Local Print	Event Clash Notification, Ticket Sales, Shuttle Bus Info, Shared Parking and Road Use Notices	Community, Patrons, Residents
7 Days Pre-Event	VMS Boards, Letterbox Drop, Local Paper, Website, Social Media	Event Reminders, Confirmed Traffic Restrictions, Road Closures, Resident Access Details	Local Residents, Businesses, Motorists, Patrons

	Ticketing Portals	Final Event Info, Last-Minute Ticket Sales, Shuttle Bus and Parking Tips	Ticket Holders
Event Day	VMS Boards	Live Traffic and Speed Zone Alerts, Parking Guidance, Pedestrian Movement Zones	Residents, Patrons, Motorists
	Social Media, Website	Real-Time Updates, Accessibility Parking, Shuttle Bus Tracking, Weather/Disruption Alerts	Event Patrons, Volunteers, Media

4. Communication Actions in the Event of a Clash

Action	Responsible Party	Timing
Issue media release with McDonald Jones Stadium	HISC Comms Team and MJS	28 days prior
Develop joint shuttle bus and pedestrian access plan	Newcastle Transport + Traffic Authority + Council	21 days prior
Launch "What You Need to Know" microsite	HISC + MJS + Event Coordinators	14 days prior
Coordinate letterbox drop with local access maps (if required)	HISC + MJS + Local Council	7 days prior
Run social media live updates	HISC Social Media Manager + MJS + Council	Event Day
Deploy trained event staff at traffic pinch points	Traffic Control Partner	Event Day

5. Key Messages

"Plan Ahead: Two Major Events in Town – Travel Smart, Arrive Early."

"Free Shuttle Buses Every 15 Minutes From Key Park-and-Ride Locations."

"Stay Informed: Check Social Media for Live Travel Updates."

"Respect Our Neighbours: Use Designated Drop-Off and Parking Zones."

"Accessible Parking is Limited – Register Early for a Spot."

6. Monitoring & Feedback

- Use social media sentiment tracking and local traffic data to monitor community response.
- Post-event survey for patrons and residents to gather feedback and identify improvement areas.
- Debrief with Newcastle City Council, emergency services, and stadium staff to assess performance and update the plan.

7. Disclaimer

This communications plan is a draft only. The Hunter Indoor Sports Stadium will work with stakeholders through the details design phase, construction and prior to occupation to ensure event management is coordinated and communicated effectively. The project team has and will continue to meet with all stakeholders to ensure impacts are kept to a minimums and managed appropriately.

Appendix 10- Identified on-street and public car parks in surrounding area

Appendix 11- Parking areas and vehicle calculations

This data outlines the approximate length of a stretch of road for street parking, calculates an estimated number of car spaces this space would provide, and the number of patrons that could come from this parking area based on a 3 pax per vehicle.

Includes the McDonald Jones Stadium carpark, Newcastle Entertainment centre carpark, and Wanderers Oval and Richardson Park council-owned carparks to provide the additional data for consideration during High-Impact events at the stadium requiring overflow or park n ride facilities.

Location	Spaces	Est. pax @ 3 per vehicle	Walking Dist to HISC at furthest point (m)	parallel or 90 degree	Notes
Onsite	231	720	onsite	both	does not incl. motorcycle parking and drop off facilities
Council carpark Turton Rd sth	88	264	850	90 degree	existing paved carpark
Council carpark Turton Rd nth	63	189	700	90 degree	existing paved carpark
Womboin Rd sth east side	33	99	650	parallel	estimated 200m on street parking
Womboin Rd sth west side	109	327	1000	90 degree	estimated 350m unpaved
Wallarah Rd east side	30	90	600	parallel	estimated 180m on street
Wallarah Rd West side	45	135	650	parallel	estimated 280m on street
Monash Rd nth side	140	420	500	90 degree	estimated 440m unpaved
Perth Rd nth west side	30	90	800	parallel	est 180m on street
Perth Rd Nth east side	80	240	950	parallel	existing marked spaces
Perth Rd football carpark	68	204	700	parallel	existing paved carpark
Harker Oval Carpark	100	300	750	90 degree	existing paved carpark
Broadmeadow Station	40	120	1400	both	existing paved carpark
Curley Rd	41	123	1100	parallel	estimated 248m on street
Young Rd	42	126	1300	parallel	estimated 250m on street
Denney St N	50	150	1100	90 degree	estimated 160m on street
Denney St S	17	51	1200	parallel	estimated 100m on street
Australia Rd	31	93	1100	90 degree	estimated 100m on street
Jackson St	50	150	1100	parallel	estimated 300m on street
Brown Rd W	50	150	1400	parallel	estimated 300m on street
Brown Rd SE	55	165	1600	parallel	estimated 330m on street
Brown Rd NE	50	150	1600	parallel	estimated 300m on street
Chatham Rd S	28	84	1700	parallel	estimated 170m on street
Chatham Rd N	33	99	1700	parallel	estimated 200m on street

Griffiths Rd btw Turton Rd and Broadmeadow Rd	175	525	1000	parallel	estimated 1050m on street
Griffiths Rd btw Turton Rd and Orlando Rd	108	324	950	parallel	estimated 650m on street
Griffiths Rd btw Broadmeadow Rd and Thorn Rd	36	108	1300	parallel	estimated 220m on street
Bindera Rd	20	60	1100	parallel	estimated 120m on street
Wyong Rd	32	96	1100	parallel	estimated 195m on street
Orlando Rd	15	45	1000	parallel	estimated 90m on street
Boreas Rd	21	63	1500	parallel	estimated 130m on street
Thorn Rd	40	120	1500	parallel	estimated 240m on street
McDonald Jones Stadium	900	2700	100	both	existing paved carpark
Newcastle Showground	1803	5409	1500	both	Large MJS event only- park n ride
Wanderers Oval	848	2544	1100	both	Local park- large event overflow parking only
Richardson Park	908	2724	1500	both	Local park – large event overflow parking only
	Spaces	**Pax**			
Total	**6510**	**19557**			


Traffic Plan
Professionals Pty Ltd