Appendix F – Transport Impact Assessment

Morley-Ellenbrook Line

Whiteman Park Station Transport Impact Assessment

MEL-MLCX-MO-RPT-00007

Rev	Date	Purpose of Issue	Prepared	Reviewed	Approved
B	23/09/2021	Issued for Review	Timothy Dawson Joshua Bandi	Scott Arbon (JAJV SRE)	Manoj Aravind (SEM)

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Glossary

Phrase	Meaning	Notes
ACROD	*Australian Council for Rehabilitation of Disabled*	*ACROD bays are specifically designated bays for those with disabilities who qualify for the ACROD parking program*
DA	*Development Application*	*The required statutory application for individual developments on a parcel of land that go beyond the remit of a simple building application to the local government*
DOS	*Degree of saturation*	*A percentage measure of demand/capacity for an intersection, approach or lane*
DPLH	*Department of Planning, Lands and Heritage*	*The WA state government department responsible for land-use planning*
KnR	*Kiss and Ride*	*Pick-up/drop-off facility for the train station*
LOS	*Level of service*	*A categorisation of the delay vehicles experience at a particular intersection, approach or lane*
MEL	*Morley-Ellenbrook Line*	*The proposed train line connecting from Bayswater to Ellenbrook as a spur line from the existing Midland line*
PCU	*Passenger Car Unit*	*A unit to measure the equivalent number of passenger cars represented by vehicles larger than a passenger car*
PDO	*Property Damage Only*	*A crash that causes damage only to property (built form or vehicles for example), with no harm caused to people*
PDP	*Project Definition Phase*	*The concept design phase of the Morley Ellenbrook Line*
PnR	*Park and Ride*	*All-day parking facility for the train station*
PUDO	*Pick-up/drop-off*	*Pick-up/drop-off parking bays typically have a maximum 5 minute parking time*
PSP	*Principal Shared Path*	*A wide (>3 metre) shared path, usually with lighting and priority or signalised crossings at road crossings*
SCATS	*Sydney Coordinated Adaptive Traffic System*	*The control system used for all traffic lights within Western Australia*
STEM	*Strategic Transport Evaluation Model*	*The Department of Transport's multi-modal strategic transport model, used to forecast and assess transport demands in the Perth Metropolitan area*
SWTC	*Scope of Works and Technical Criteria*	*The documentation outlining the scope and criteria for the design and construction of the MEL project*
TIA	*Transport/Traffic Impact Assessment*	*An assessment report of the impact that a development or subdivision has on the surrounding transport network*
WAPC	*Western Australian Planning Commission*	*The section of the DPLH responsible for assessing statutory planning applications such as Development Applications*

Summary

As Perth grows, so does the need for rail infrastructure and METRONET is a critical element of the State Government's infrastructure agenda. The Morley-Ellenbrook Line (MEL) Project will improve connectivity between the north east metropolitan area and the rest of the city and unlock economic development in these local community areas.

Whiteman Park Station has been identified by METRONET and key stakeholders as a significant transit hub connecting the North-Eastern Urban Growth Corridor by mass rapid transit to Bayswater, and the Perth CBD and wider public transport network via the Midland Line. The station will provide an important point of transport access for a locality which is expected to have continuous and sustained future urban growth.

In accordance with the *WAPC Transport Impact Assessment Guidelines*, this report provides an overview of the Transport Impact for the proposed Whiteman Park Station, comprising an assessment of the site's existing and future transport context, covering changes to the network, integration with surrounding land uses and an analysis of the development's traffic impact. This station is assessed to generate over 100 vehicles per hour during the peak hour, and as such is classified as 'high impact' under the guidelines, necessitating a Transport Impact Assessment.

Whiteman Park Station is proposed to be located above grade on a viaduct, directly west of Drumpellier Drive, in close proximity to the Youle-Dean Road intersection.

At opening day (proposed by year 2026). Whiteman Park Station is proposed to consist of:

- One island platform
- A 10-stand bus interchange comprising of:
  - 8 standard bus bays
  - 2 articulated bus bays
  - Plus 6 layover bays (4 standard, 2 articulated
- A 886 bay Park and Ride (PnR) facility comprising:
  - 846 standard all-day bays
  - 13 standard short-term bays
  - 1 tenant bay
  - 2 EV charging bays
  - 17 ACROD bays
  - 2 service/loading bays
  - 4 staff bays
  - 1 taxi bay
- A 14 bay Kiss and Ride (KnR) facility comprising:
  - 13 standard pick-up/ drop-off (PUDO) bays
  - 1 accessible PUDO bays
- 20 sheltered motorcycle bays
- Secure bicycle storage shelter, with storage for up to 50 bicycles
- 10 U-rail bicycle stands within the station precinct

The site is partially situated within Regional Reserve zoned land - "Primary Regional Road" (Drumpellier Drive) and "Parks and Recreation" (Whiteman Park), the latter of which is designated Bush Forever. This land is currently an at-grade carpark, with low intensity land-use including an environmental consultancy. Currently, there is a low provision of infrastructure to enable sufficient access for pedestrians and cyclists immediately surrounding the proposed Whiteman Park Station, particular within Whiteman Park and throughout the residential catchment area east of Drumpellier Drive. The site is currently serviced by two bus services, the 353 and 955 services.

Given the existing site is largely undeveloped, the introduction of a transit node connecting the surrounding area to high capacity public transport creates the need for significant transport infrastructure upgrades. In order to facilitate safe and efficient access to support the station, a comprehensive upgrade to the existing active and public transport and road network, including feeder public transport services, is required.

The proposed station precinct design will introduce significant modifications and new infrastructure to the surrounding transport network to facilitate access for all modes. This includes the realignment of the Principal Shared Path running parallel east of Drumpellier Drive, provision of secure bicycle parking adjacent to the station forecourt (Welcome Place), a bus interchange and associated feeder bus services to the station, and a PnR / KnR facility with associated access points from a realigned Whiteman Drive East.

Table S1: Generated traffic demand – PnR and KnR facilities

	PnR demand (veh/ %)		KnR demand (veh/ %)		Total (veh)	
Peak	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM peak hour	660 (66%)	0	220 (22%)	220 (22%)	880	220
PM peak hour	0	450 (45%)	160 (16%)	160 (16%)	160	610

Table S2: PnR and KnR traffic distribution

	Distribution of Inbound traffic			Distribution of Outbound traffic		
Associated STEM year	From North	From East	From South	To the North	To the East	To the South
2026 - 2041	*50%*	*40%*	*10%*	*50%*	*40%*	*10%*
2041 onwards	*27%*	*55%*	*18%*	*36%*	*46%*	*18%*

The trips generated by the station and the surrounding development have been estimated respectively based on benchmarking exercises of existing stations and STEM all-day link volume growth as provided by METRONET. Table S1 and S2 summarise the estimated trips generated by the station PnR/ KnR facilities and development.

An assessment of the impacts of the generated trips on the surrounding road network has been based on the combined traffic generated by the PnR / KnR facilities and background traffic growth in the area using SIDRA intersection software. The following intersections were assessed:

- Drumpellier Drive/ Youle-Dean Road-Whiteman Drive
- Whiteman Drive/ Bus interchange access
- Whiteman Drive/ PnR access

Based on the analysis completed, all intersections as part of the surrounding Whiteman Park Station precinct will operate with good performance (LOS C or better) up to 10-years post opening of the station.

The Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection is forecast to perform within capacity up to and including 10-years post station opening, with the critical AM peak operating with a degree of saturation of 80.3%.

The performance of the two station access intersections operate within capacity up to and including 10-years post station opening. Critically, the eastern approach of the Whiteman Drive/ Bus Interchange access is forecast to approach capacity 10-year post station opening with a DoS of 87.3% during the critical AM peak attributed to the large demand entering Whiteman Park Station.

In addition to the operational requirement, an access strategy was also undertaken for all modes accessing the precinct. The assessment of the proposed design has highlighted a number of minor recommendations to be considered before finalising the design of the access arrangement for the site and the provision of car parking.

Overall, the station is demonstrated to be well serviced by the proposed surrounding transport network, facilitating safe and adequate access for pedestrians, cyclists, buses and general vehicles.

1 Introduction and background

1.1 Overview

Acknowledgement of Country

MELConnx acknowledges the Whadjuk People of the Noongar Nation as the Traditional Custodians of the land and waters on which the Morley-Ellenbrook Line Project is located. We pay our respects to their Elders, both past and present and thank them for their continuing connection to the country, culture and community

1.1.1 METRONET vision and objectives

As Perth's single largest investment in public transport, METRONET will transform the way people commute and connect. It will create jobs and business opportunities and stimulate local communities and economic development to assist communities to thrive. The METRONET vision is for a well-connected Perth with more transport, housing, and employment choices.

In delivering METRONET, the WA Government has considered peoples' requirements for work, living and recreation within future urban centres, with a train station at the heart.

The objectives are to:

- Support economic growth with better connected businesses and greater access to jobs
- Deliver infrastructure that promotes easy and accessible travel and lifestyle options
- Create communities that have a sense of belonging and support Perth's growth and prosperity
- Plan for Perth's future growth by making the best use of our resources and funding
- Lead a cultural shift in the way government, private sector, and industry work together to achieve integrated land use and transport solutions for the future of Perth.

1.1.2 Morley-Ellenbrook Line overview

As Perth grows, so does the need for rail infrastructure and METRONET is a critical element of the State Government's infrastructure agenda. The Morley-Ellenbrook Line (MEL) Project will improve connectivity between the north-east metropolitan area and the rest of the city, and will unlock economic development in these local community areas.

The Public Transport Authority (PTA) is the lead agency delivering the MEL Project, with Main Roads WA (MRWA) undertaking some enabling works.

1.1.2.1 Project features

Transport infrastructure works for the Project include:

- A 21km rail line spurring from the Midland Line east of Bayswater Station, travelling north in the Tonkin Highway median, east through land north of Marshall Road and north on the western side of New Lord Street into Ellenbrook
- Stations at Morley, Noranda, Malaga, Whiteman Park and Ellenbrook with future-proofing for a station at Bennett Springs East
- Parking and bus interchanges/ facilities at stations
- Significant grade separations at key road crossings
- Underpasses to allow the rail line to enter and exit the Tonkin Highway median
- Principal Shared Paths (PSP) for walking and cycling access the length of the rail line
- Track and associated infrastructure to connect to the existing Midland Line
- Road and bridge reconfiguration works
- Integration across the packages of works and other nearby projects.

1.1.2.2 General scope of works

The Project's general scope of works includes the design and delivery of rail infrastructure and ancillary works to support operational passenger rail between Bayswater and Ellenbrook, including stations with inter-modal bus and rail with parking and associated road works at Bayswater, Morley, Noranda, Malaga, Whiteman Park and Ellenbrook stations.

Figure 1: Morley-Ellenbrook Line © METRONET

The Project activities include all investigation, design, approvals, construction, testing and commissioning, Entry Into Service (EIS), training and operational readiness required to incorporate the new railway to Ellenbrook, and tie into the existing network including the associated road, utilities and other required works to interface with adjacent works and contracts. This will include bulk earthworks and retaining, structures, grade separations, roads and drainage.

The design and delivery of the main works package for the Project is broken into three distinct stages:

- Alliance Development Stage
- Project Alliance Reference Design Stage
- Project Alliance Delivery Stage (Detailed Design through to Project close-out).

Figure 2: Architect's Impression of Ellenbrook Station © MELconnx

1.1.2.3 Key project objectives, key compliance objectives and critical success factors

The PTA and MELConnx's single Non-Owner Participant (NOP) Laing O'Rourke Construction Australia Pty Ltd, have formed an integrated, collaborative Project Alliance to successfully deliver rail infrastructure that reflects our absolute commitment to achieving the Project Objectives and delivering positive outcomes for the State.

The following image demonstrates how we have mapped each Key Project Objective in the Project Alliance Agreement (PAA) against the Critical Success Factors to achieve best-for-project outcomes, underpinned by the Key Compliance Objectives.

Key Project Objectives	Critical Success Factors for Successful Project Delivery (abbreviated)
Implementation of a robust, cooperative team culture.	• Development of a culture that results in all Participants developing behavioural values and driving principles to achieve Alliance goals and project objectives • Longevity and stability of key Alliance personnel i.e. Alliance Manager, ALT and AMT.
Timely delivery of Works to achieve project milestones in accordance with agreed program.	• Development of a final proposal with a sufficiently developed design and accurate TOC • Subsequent cash flow management and financial forecasting, scheduling and value-earned calculation and determination • Implementation of PTA mandated systems i.e. TeamBinder, Primavera P6, TILOS and a finance system accepting the PTA's cost breakdown structure • Timely completion of design, construction and commissioning through to practical completion • Timely progress towards construction milestones and completion of close-out to achieve final asset acceptance compliance.
Inclusion of processes that embrace/promote open tendering and promotion of work package development that encourages/ enables second and third tier tendering. **Compliance with WAIPs.**	• For professional service providers, implement a proven and mature supply-chain engagement process, including tender review, contract award and project integration that offers security of payment relative to services delivered in an effort to achieve best-for-project outcomes • For material suppliers and other subcontract service providers, implement a proven and mature supply-chain engagement process, including tender review, contract award and project integration that offers opportunity and security of payment relative to service delivered • Proven and mature supply-chain engagement process for labour hire services, compliant with industrial and safety laws, maintained employee standards/conditions and security of employee payments • Ability to develop contracts and terms and conditions in the spirit of the Alliance values and principles , appropriate and commensurate with the size, complexity and value of packages in accordance with industry best practice.
Optimisation of operational and whole of life costs.	• Sustainability considerations and outcomes for the whole of life of the works.
Ensuring appropriate consultation/integration with stakeholders and community.	• Constant and effective engagement with relevant stakeholders, particularly utilities/services, Main Roads, third party asset owners and relevant unions • Effective management of PTA interfaces and PTA contractors • Constant/effective engagement with the PTA in design reviews, work planning and possessions/shutdowns.
Providing passengers with safe and secure services and facilities.	• Compliance with ONSR requirements • Completed rail line, stations and bus transfer infrastructure are able to deal successfully with the movement of people, including the disabled.
Minimising disruption to current and anticipated rail operations.	• Minimise impact on public transport services disruption • Liaison and interaction with PTA rail operations personnel tasked with determining network closures, to confirm available network shutdowns and implement contingency plans • Effective management of interfaces with others in heavily constrained areas • Effective management/staging of works to reflect staged/constrained site access • Effective management of existing rail infrastructure asset protection.
Recognising the State's desired industrial relations objectives.	• Develop a project-specific Industrial Relations Management Plan based on a proven and successful industrial relations approach that delivers a collaborative worksite, genuine collective agreement, making good faith in negotiations and dispute resolution, and respect for trade union rights of entry.

Key Compliance Objectives (abbreviated)				
Compliance with all Statutory requirements and State Government policy requirements for construction work.	Compliance with the SWTC.	Protecting and minimising disruption to all existing facilities, infrastructure, properties or public utility services.	Meeting all obligations to impacted stakeholders and demonstrating genuine sensitivity.	Compliance with all environmental conditions and minimise adverse environmental impact.

Figure 3: Key Project objectives, Critical Success Factors and Key Compliance Objectives

1.1.3 Alliance vision and delivery approach

The MEL Project will be delivered under an alliance contract to support the management of project and stakeholder interfaces and to mitigate project risks. A collaborative alliance approach will see the Works carried out in a cooperative, coordinated, and efficient manner in compliance with the Alliance Principles.

MELConnx understands that the successful delivery of the Project is critically linked to meeting the PTA's Key Project Objectives. These objectives have shaped our vision for the Project that is around delivering a high-quality product and creating exceptional value-for-money. We are committed to a no-blame culture and to the prompt and mutual resolution of any issues that may arise.

During the AD Stage, representatives from both the PTA and MELConnx participated in an interactive workshop to begin the process of developing a suitable Alliance Vision for the Project (refer Figure 4 below for workshop outcomes).

Figure 4: AD Stage Alliance Vision Development Outcomes (developed with the PTA)

The Alliance Foundation workshop was held on 11/11/2020 and the results of this workshop generated the basis for the Vision, Purpose, Values and Behaviours Commitment Statements represented here.

Figure 5: MELConnx Alliance Vision, Purpose and Values

1.2 Introduction

This report provides an overview of the Transport Impact Assessment for the proposed Whiteman Park Station situated on the Morley-Ellenbrook Line. The sections following comprise an assessment of the site's existing and future transport context, covering changes to the network, integration with surrounding land uses and an analysis of the development's traffic impact.

1.3 Development proposal

Whiteman Park Station has been identified by METRONET and key stakeholders as a significant transit hub in the context of Whiteman, connecting the north-eastern Urban Growth Corridor by mass rapid transit to Bayswater, and the Perth CBD and wider public transport network via the Midland Line. The station will provide an important point of transport access for a locality which is expected to have continuous and sustained urban growth. As well as providing a high quality public transport option for residents in the area, this station will also serve as a new point of regional access to Whiteman Park for recreational purposes.

Whiteman Park Station is proposed to be located above grade on a viaduct, directly west of Drumpellier Drive, in close proximity to the Youle-Dean Road intersection. This land is currently an at-grade carpark with low intensity land-use, including an environmental consultancy.

At opening day (proposed by year 2026). Whiteman Park Station is proposed to consist of:

- One island platform
- A 10-stand bus interchange comprised of:
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- A 14 bay Kiss and Ride (KnR) facility comprised of:
  - 13 standard pick-up / drop-off (PUDO) bays
  - 1 accessible PUDO bay
- 20 sheltered motorcycle bays
- Secure bicycle storage shelter, with storage for up to 50 bicycles
- 10 U-rail bicycle stands

Figure 6 shows the proposed general layout of the Whiteman Park Station development.

1.4 Key issues

The existing residential catchment is currently only serviced by bus routes, with the closest train station being Success Hill Station – approximately 8 kilometres away by road. However Guildford (9.6km / 12 mins) and Bassendean (9.3km / 13mins) stations are most heavily utilised by area residents. The existing site currently has poor accessibility for pedestrians and cyclists, with Drumpellier Drive and the existing major dual-lane roundabout a significant barrier for these modes. The surrounding site development and associated cyclist and pedestrian activity was seen as the key driver in converting the existing roundabout into a signalised intersection. However, in order to facilitate safe and efficient access to support the station, a comprehensive upgrade to the existing active transport and road network, including feeder public transport services, is needed.

1.5 Background information/ previous studies

A number of studies have been undertaken within the surrounding station precinct and along the wider Morley-Ellenbrook Line, including the following:

- Swan Urban Growth Corridor Sub-Regional Structure Plan (2009)
- Perth & Peel @ 3.5 million – North-East Sub-Regional Planning Framework (2018)
- MEL Engineering and Land Use Planning (ELUP) study (2018)
- MEL Project Definition Phase (2019-20)
- MEL TSAP Stage 1 Traffic Modelling Study (2020-21)

Figure 6: Whiteman Park Station masterplan. Drawing no. RD_LA_SK289, Rev A. Drawn 09/09/2021

2 Existing context

To understand the transport impact of the proposed Whiteman Park Station, it is important to understand the existing operation and condition of the surrounding active, public and private transport network. The precinct and station catchment are undergoing significant ongoing change resultant of the station development, activity centre development and residential subdivision, therefore understanding the current context will enable the identification of existing constraints and opportunities applicable to the site and the surrounding transport network.

This section of the report examines the following contextual aspects of the site in relation to its existing surrounding land uses, provisions for pedestrians, cyclists, buses and vehicles, road network and crash history.

2.1 Site uses

The site is currently a mixture of an at-grade carpark and buildings associated with a research and environmental consultancy. The existing land use is low-intensity, and does not generate a significant number of trips. The leases on these tenancies will come to an end prior to the construction of the station.

The site is currently zoned under:

Metropolitan Region Scheme (MRS):

- *Parks and Recreation*
- *Primary Regional Roads*

City of Swan Local Planning Scheme 17 (LPS17)

- *Regional Reserve – Parks and Recreation*
- *Regional Reserve – Primary Regional Road*

2.2 Surrounding land uses

The subject site is located within the north-eastern Urban Growth Corridor, adjacent to a Regional Parks and Recreation Reserve (Whiteman Park), and an emerging District Centre (Albion) with associated residential development. As seen in Figure 7, the site sits within the Whiteman locality, but is directly adjacent to the suburb of Brabham.

Whiteman is almost entirely zoned as *Regional Reserve – Parks & Recreation*, largely vacant and mostly designated as *Bush Forever* (protected bushland). Included in the Whiteman locality is Whiteman Park – a Regional-level recreational area and tourist attraction. This site includes carparking, parks, bushland, a wildlife park and museums.

The locality of Brabham is part of the north-east Urban Growth Corridor. Land to the north and south of Youle-Dean Road is zoned *Special Use (SUZ10)* under *City of Swan LPS17*. Development of the land north of Youle-Dean Road is substantially commenced under the following instruments:

- Albion (Brabham) District Structure Plan (DSP)
    - Albion Local Structure Plans 1A – 3B
- Brabham Activity Centre Plan (BACP)

The Albion DSP includes provision for:

- 5,500 residential lots (R30-R60)
- 2 primary schools
- 1 K-12 school, including educational support facility
- 3 Local Centres
- 1 District Centre

The District Centre is focussed on Whiteman Edge Shopping Centre, and the BACP includes provision for:

- 200+ residential dwellings (R80-R100)
- 30,000m^2 commercial net leaseable area (NLA), including 20,000m^2 shop-retail NLA
- District community centre

2.3 Proposed development

The land south of Youle-Dean Road within the Albion DSP does not currently have an approved Local Structure Plan, however it is understood that the land owners are in the early stages of planning for this area to intensify development within the walkable catchment of the station. The precinct has potential to yield 3,000 homes and create 1,900 direct and 5,900 indirect jobs in the area.

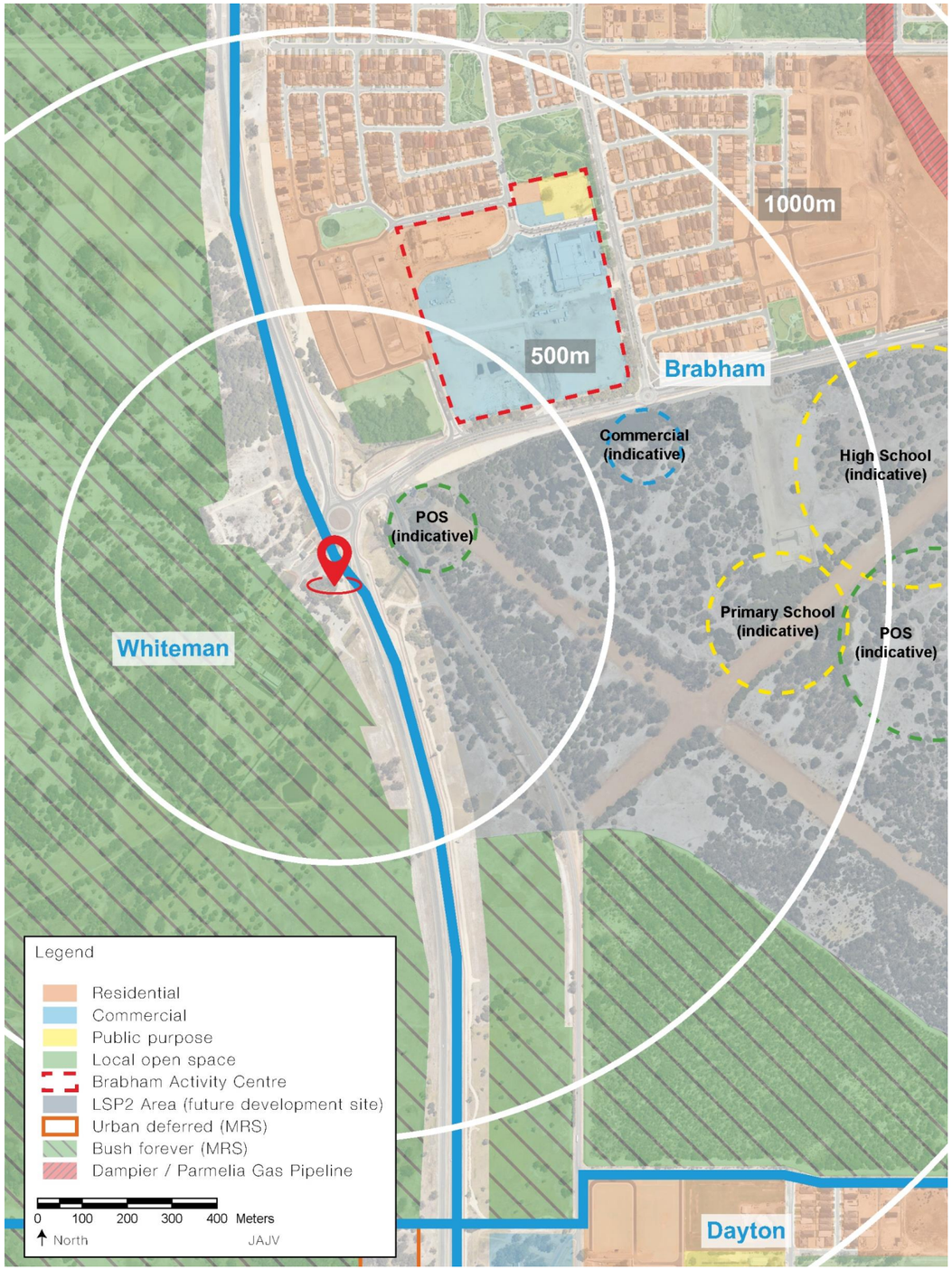


Figure 7: Surrounding land use locale map

2.4 Active transport provisions

A high-level summary of the existing pedestrian and cycling infrastructure surrounding the future station is provided in Figure 9.

Currently, there is a reasonably significant footpath network surrounding the station. There is an existing Principal Shared Path running north-south on the eastern side of Drumpellier Drive which provides a connection between the PSP along Reid Highway to Gnangara Road north of the proposed site.

On-road cycle lanes are provided along both sides of Drumpellier Drive. This is complemented with kerb ramps and median splitter island refuges at all approaches of the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive roundabout. However, pedestrians and cyclists are not provided priority over general traffic and public transport at this intersection.

There are footpaths on both sides of most of the constructed roads in the residential subdivision to the north-east of the proposed site.

The City of Swan has designated future cycling routes as part of its *Draft 2051 Cycle Network Plan* (Figure 8) in accordance with Department of Transport's *Long Term Cycle Network Strategy.* These identify Drumpellier Drive as a *Secondary Route*, with *Local Routes* throughout Brabham on Youle-Dean Road, Everglades Avenue, Partridge Street, Woollcott Avenue and Isoodon Street. Whiteman Drive is designated as a *Tourist Trail*, connecting cycle infrastructure through Whiteman Park.

Figure 8: City of Swan Draft 2051 Cycle Network Plan

2.5 Public transport provisions

A high-level summary of the existing public transport provisions surrounding the future station is provided in Figure 9.

The precinct surrounding the Whiteman Park Station is served currently by two bus services, the 353 and 955 services.

- **Route 353** – between Bassendean Station and Henley Brook Bus Station, typically with 20-minute headways in peak hours
- **Route 955** – between Morley Bus Station and north of Ellenbrook town centre, typically with 10-20 minute headways in peak hours.

2.6 Vehicle provisions

2.6.1 Road network

The functional road hierarchy of key roads surrounding the site are summarised below and shown in Figure 10.

Drumpellier Drive

Is a four-lane Local Distributor road running north-south directly east of the site. It provides a local connection between Reid Highway and Gnangara Road. The posted speed limit is 70kph south of the site before becoming 80kph north of Youle-Dean Road. It carries approximately 16,000 vehicles per day (Main Roads WA Traffic Map, 2021)

Youle-Dean Road

Is a single lane Access Road running east-west and providing access to the residential areas and District Centre to the north-east of the site. The posted speed limit is 70kph. Youle-Dean Road diverges to two lanes in each direction on the approach to the Drumpellier Drive intersection.

Isoodon Street

Is a single lane access road running parallel to Drumpellier Drive providing access to the residential land use south-east to the site. The posted speed limit is 80kph before becoming 70kph closer to the residential catchment south of the site. Access to Youle-Dean Road is to be altered to a bus-only as part of the proposed works.

2.6.2 Parking provisions

There is currently an at-grade carpark associated with a research and environmental consultancy at the proposed Whiteman Park Station site.

An analysis of this car park shows significant unrestricted parking provision located on the proposed station site – approximately 130 bays.

The existing land use is low-intensity, and does not generate a significant number of trips. The existing leases on these tenancies will come to an end prior to the construction of the station.

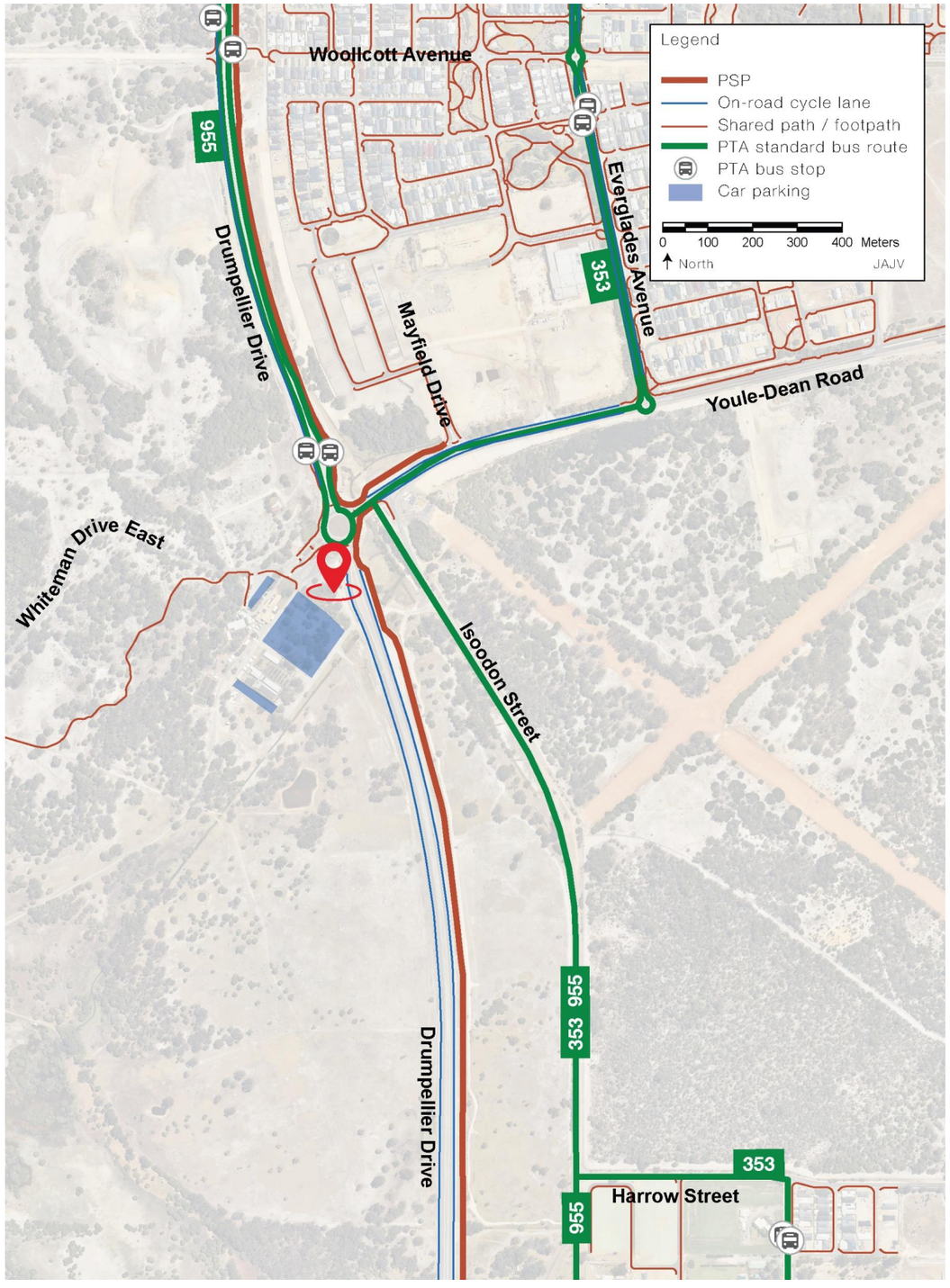


Figure 9: Existing active and public transport provisions

2.7 Existing intersections surrounding the site

The following existing intersections surrounding the site have been identified as potentially impacted by development traffic.

Drumpellier Drive/ Youle-Dean Road-Whiteman Drive East is a four-way roundabout which is to be re-aligned and converted to a signalised intersection to serve as the main vehicle access into the proposed Whiteman Park Station.

Youle-Dean Road/ Isoodon Street is a three-way at-grade priority controlled intersection with two lane approaches on the major east-west road and a single lane along Isoodon Street. This intersection will be re-aligned and converted to a bus-only connection as part of the proposal.

2.8 Crash data

Historical crash data (last five years, 2016-2020) has been presented in Figure 10, in the form of a heatmap, and tabulated in Table 1 and Table 2. The data highlights that most crashes have occurred at the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection proposed as the main access into Whiteman Park Station. A high majority (89%) of the crashes at this intersection were from right angle collisions and were likely a result of high speeds.

The crash severity in the study area was typically low, with only 2 medical crashes across both intersections. The exception was a fatal crash located at the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection.

It is important to consider the Lord Street upgrade which occurred within the 5-year study period. This upgrade consisted of a new dual carriageway road (Drumpellier Drive) between Reid Highway and Gnangara Road and the conversion of Drumpellier Drive/ Youle-Dean Road/ Whiteman Drive from a priority controlled intersection into a roundabout.

Furthermore, both intersections are proposed to be upgraded as part of the Whiteman Park Station development.

Table 1: Crash types at surrounding intersections and midblock locations

Crash type	Drumpellier Drive/ Youle-Dean Road-Whiteman Drive	Youle-Dean Road/ Isoodon Street
Rear end	1	3
Head on	0	0
Sideswipe	0	0
Right angle/ right turn thru	8	1
Non-collision/ other	0	0
Hit object	0	0
Total	***9***	***4***

Table 2: Crash severity at surrounding intersections and midblock locations

Crash type	Drumpellier Drive/ Youle-Dean Road-Whiteman Drive	Youle-Dean Road/ Isoodon Street
Fatal	1	0
Hospitalisation	0	0
Medical	1	1
PDO Major	6	3
PDO Minor	1	0
Total	***9***	***4***

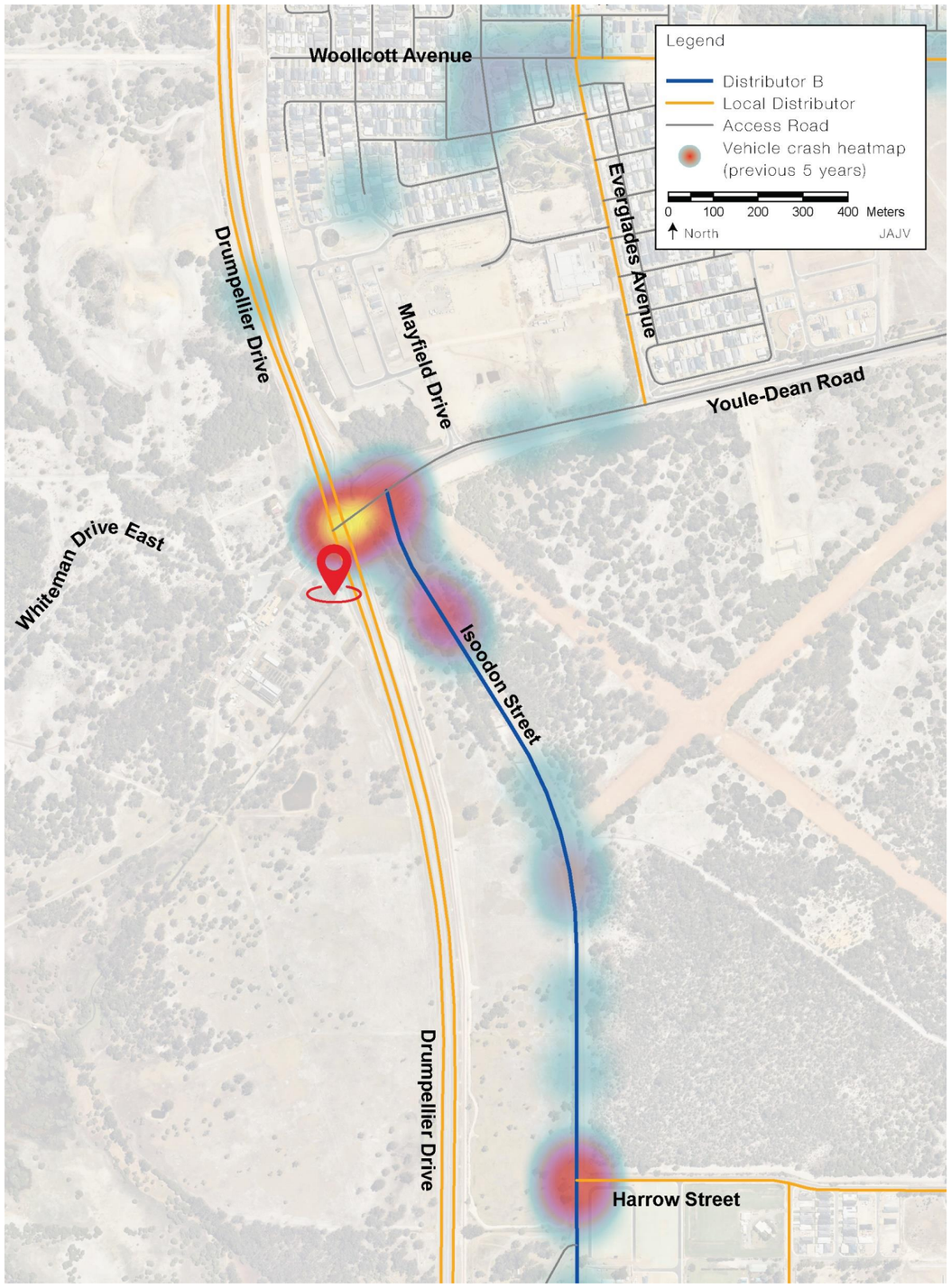


Figure 10: Functional existing road hierarchy and crash data

3 Proposal

The Whiteman Park Station platform is proposed to be located above ground on a viaduct, directly west of Drumpellier Drive, in close proximity to the Youle-Dean Road intersection. This land is currently an at-grade carpark, with low intensity land-use, including an environmental consultancy.

The station will also comprise of the following at-grade features:

- A concourse level (Welcome Area)
- Bus interchange
- 886 bay PnR and 14 bay KnR to the southwest of the new station

The delivery of the station will be accompanied by the opening of MEL which will provide a heavy rail transit (HRT) connection for residents of the North Eastern Suburbs (NES) to the Perth CBD and other major activity centres across the Perth Metropolitan Area via the wider public transport network.

In accordance with the STEM modelling conducted during the MEL PDP stage of the project, the main access modes for the station are anticipated to be dominated by private vehicles (~58%) in the opening year (2026) of the station. This forecast is expected to reduce to approximately 44% by 2041 with active transport (~24%) and bus transfer (~32%) as the lower utilised access modes.

Initially the station's forecast patronage is relatively low – with STEM forecasts estimating a total of around 1,600 boardings a day at opening year. This patronage is expected to grow rapidly along with increased residential development in the medium term, with a forecasted 3,000 boardings a day in 2041.

Major changes to support the site include the conversion of the existing roundabout located at Drumpellier Drive/ Youle-Dean Road-Whiteman Drive into a four-way at-grade signalised intersection. This proposed intersection will support access of vehicles to the station's PnR and KnR facilities along Whiteman Drive and a number of new bus services to the bus interchange.

Figure 11 shows a summary of active and public transport infrastructure upgrades to be delivered as part of the Whiteman Park Station development.

3.1 Precinct vision and land use integration

The 21km MEL will give people living and working in Perth's north-eastern suburbs more transport choice. It provides increased accessibility to the north-eastern Urban Growth Corridor and unlocks significant opportunities for urban development and tourism.

The majority of the Whiteman locality is zoned *Regional Reserve – Parks and Recreation* under City of Swan LPS17. It is almost entirely made up of Whiteman Park, which is largely vacant and designated as *Bush Forever* (protected bushland). Whiteman Park is one of largest metropolitan recreation and tourism reserves in the world.

Current development in Brabham, to the east of the site is largely residential – ranging from medium (R30/R40) to high (R80/R100) density in the town centre. A substantial landholding is currently undeveloped directly to the east of the site, where significant opportunity exists for an integrated transport / land-use approach.

The introduction of high capacity public transport in the form of HRT unlocks the development potential of Brabham. The high level of regional accessibility provided by MEL enables the creation of a significant number of new dwellings and land use opportunities in the area.

Future high density residential development, including Whiteman Edge District Centre, will be within the walkable catchment of the station. This will enable local residents to access the station by active methods.

While planning for the area south of Youle-Dean Road and future road layouts east of the site are still unconfirmed, it is recommended that proposed services are reviewed to enable this area to be well serviced by public transport, with bus stops within 400m of dwellings.

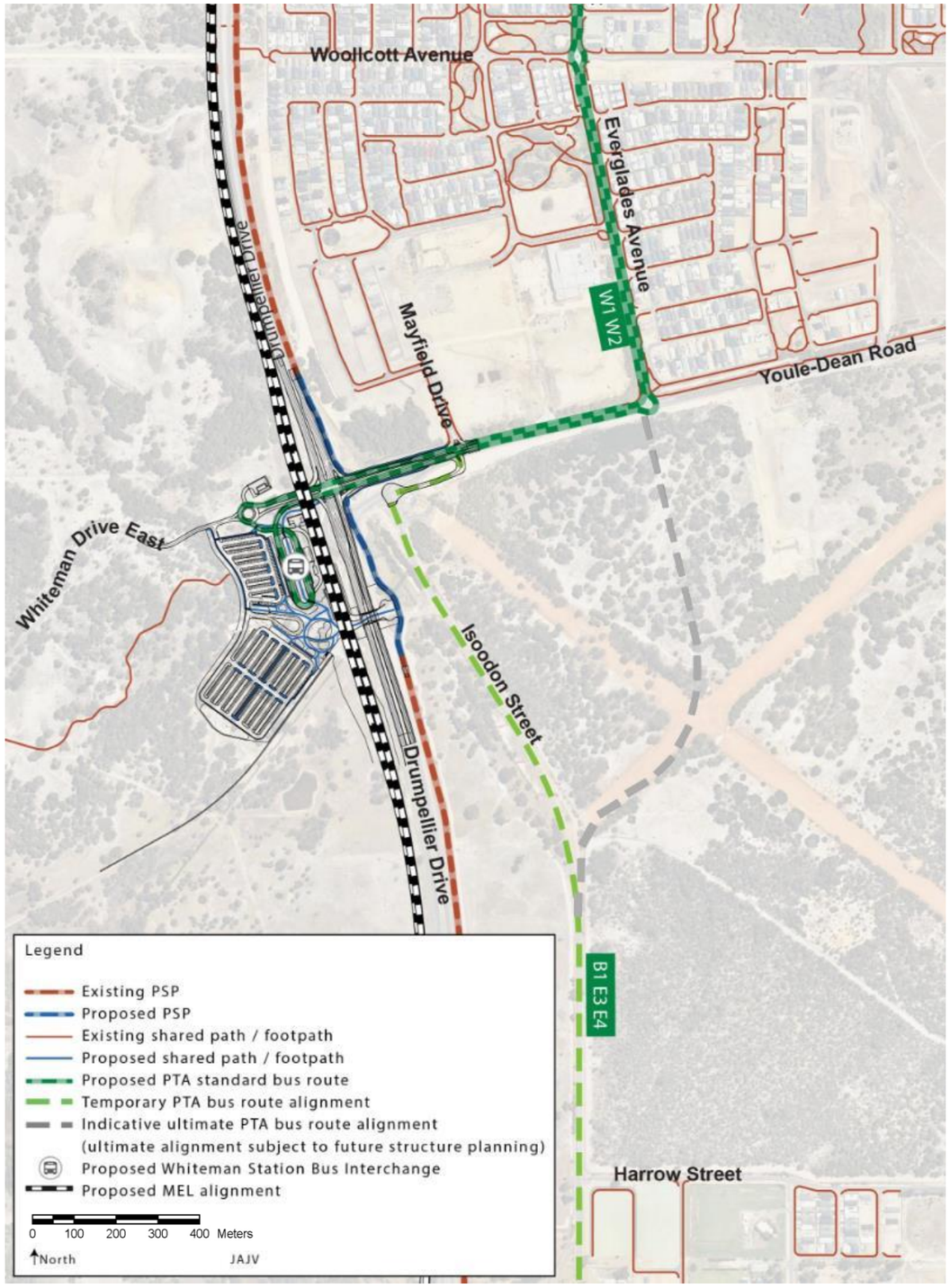


Figure 11: Proposed development and transport infrastructure upgrades

3.2 Proposed access arrangement

3.2.1 Proposed pedestrian and cycling infrastructure

Station precincts have been designed to prioritise safe and easy movement for pedestrians throughout the area. As development around Whiteman Park Station occurs with time, pedestrian and cyclist journeys will become increasingly appealing.

The following improvements are proposed to facilitate pedestrian and cycle access (refer to Section 4 for expanded commentary and figures):

- Pedestrian and cycle underpass below Drumpellier Drive south of Youle-Dean Road to connect the station precinct and the future Brabham residential development in the east. This underpass will be in accordance to design standards with sufficient width of approximately 20 metres and surveillance provided.
- Realignment of the PSP running parallel to Drumpellier Drive in association with the road realignment. The PSP is also proposed to connect with the underpass. This path is then proposed to connect to the Station welcome place and the *Tourist Trail* shared path which will provide pedestrian and cycle access into and through Whiteman Park to the west. The distance from Whiteman Park Station to the Whiteman park entrance along the shared path for cyclists and pedestrians is approximately 1.7 kilometres.
- Addition of pedestrian signals / phasings for the Drumpellier Drive / Youle-Dean Road - Whiteman Drive intersection along the east and south approaches.
- A minimum of 43 bicycle parking bays which accounts for 2.6% of the forecast 2026 opening year boardings.
- Provisions for 150 bicycle parking bays, 5% of 2051 forecasted boardings have been planned in the station precinct. These will utilise Transperth's existing secure cycle storage system, requiring registration and use of a SmartRider card for access.
- 10 bicycle 'u' rails within the station precinct.

3.2.2 Proposed public transport provisions

The introduction of Whiteman Park Station and MEL will provide a significant increase to public transport provision in the area. The station will connect Whiteman Park, an important cultural and ecological attraction in Perth, with the CBD and provide greater urban mobility for the north-east Urban Growth Corridor via HRT.

Five rail services per hour (in each direction) are anticipated to operate during peak periods. During the inter-peak periods, four services per hour (in each direction) are anticipated to operate, with approximately two services per hour in the evening hours (in each direction). The hours of operation for the MEL line and this station are planned to align with existing operations across the Transperth rail network.

Given the anticipated commuter demand for the station, a bus interchange at Whiteman Park Station is required in order to increase connectivity and improve access to the station for additional bus services. The concept design, including additional bus service routes as indicated by the PTA, is shown in Figure 11. The bus interchange is a one-way (anti-clockwise) interchange accessed off Whiteman Drive East.

A bus priority lane located along the eastern approach of Youle-Dean Road has been provisioned to provide better access into the bus interchange and reduce delays at the intersection. This priority lane extends to the western exit lane of the intersection which connects to the Whiteman Park Station Bus Interchange.

The minimum requirements for the interchange facility were discussed with PTA as part of the development of the concept design. These include 10 active stands (8 standard and 2 articulated) and 6 layover stands (4 standard and 2 articulated).

The bus routes proposed to service the future Whiteman Park Station bus interchange will replace the existing routes 353 and 955. Anticipated frequencies vary from three services per hour to six and are provided in more detail in Section 5, Table 5.

3.2.3 Proposed vehicle access and parking

The station design has been undertaken to allow for station access for commuter and service vehicles, and for buses travelling to and from the bus interchange.

The incorporation of access points to and from Whiteman Park Station within the road network, together with future projects anticipated by Main Roads (along Whiteman Drive) will result in changes to the layout of the surrounding road network. These changes are depicted in Figure 12 and include:

- Drumpellier Drive/ Youle-Dean Road-Whiteman Drive roundabout to be upgraded to a new signalised intersection. This will provide access for all modes of transport entering and egressing Whiteman Park Station and feature a bus priority queue jump lane on the eastern approach.
- Isoodon Street to be converted into a cul-de-sac and bus only link to Youle-Dean Road. This will sever the connection for general traffic south-east of the site to Youle-Dean Road.
- Addition of a new roundabout along Whiteman Drive, approximately 105 metres west of Drumpellier Drive. This report will refer to this intersection as 'Whiteman Drive / Bus Interchange Access' which will provide access for buses accessing and egressing the bus interchange . This access will only be utilised by Transperth buses, emergency vehicles and other authorised Transperth vehicles.
- Addition of a new priority controlled intersection on Whiteman Drive, approximately 190 metres west of Drumpellier Drive. This report will refer to this intersection as 'Whiteman Drive/ PnR Access which will provide access for vehicles associated with the Whiteman Station Park n Ride and Kiss n Ride facilities.

Due to its location adjacent to several established residential catchments, Whiteman Park Station will serve as a major PnR destination. As such, a reasonably sized PnR facility with the provision of 886 bays has been allocated to account for this. A KnR facility has also been allocated to the south west of the station entry building.

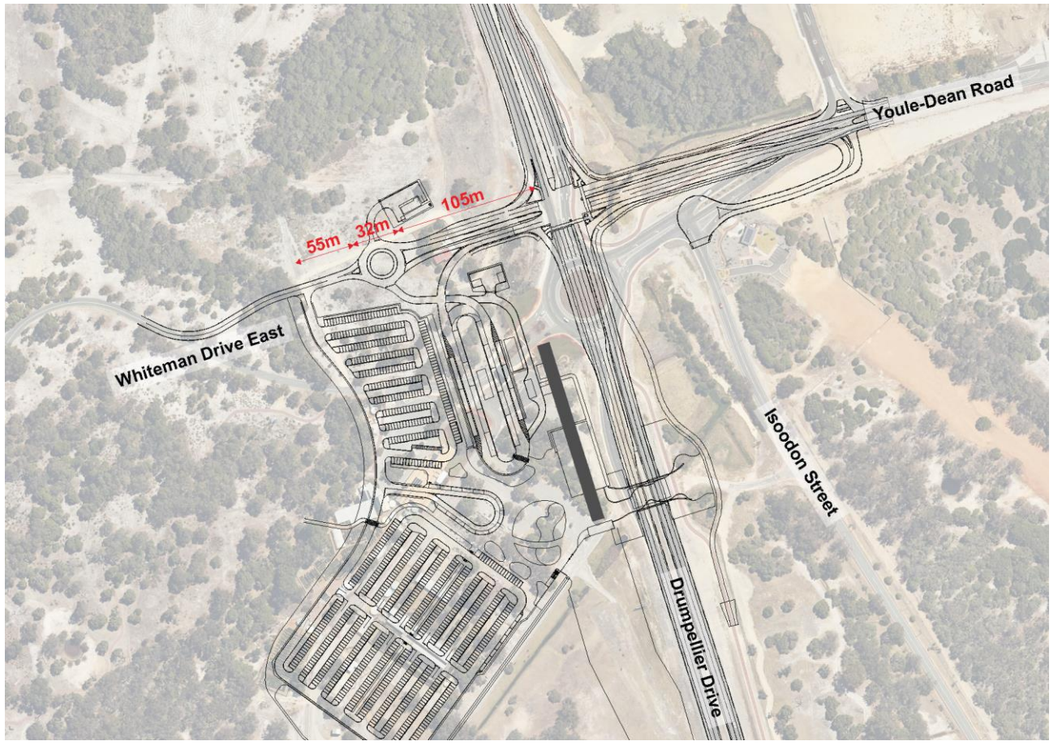


Figure 12: Proposed road network upgrades

4 Access strategy

4.1 Pedestrian and cyclist access

The pedestrian and cyclist catchment surrounding the Whiteman Park Station development is expected to be serviced by connections both internal to the station precinct and the wider network. Active transport access is primarily serviced by the introduction of a pedestrian and cycle underpass link located south of Youle-Dean Road. This link connects the station precinct with the parallel PSP on the eastern side of Drumpellier Drive and the future Brabham residential development.

Users of this underpass will be able to reach the proposed bike shelters in the Whiteman Park station precinct while being entirely segregated from a vehicular traffic and without having to cross a road. This path is then proposed to connect to the Station welcome place and another shared path taking patrons west into Whiteman Park.

The existing PSP along Drumpellier Drive will be realigned due to the conversion of the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive roundabout into a signalised intersection. This PSP provides access to the wider network by connecting with the existing PSP along Reid Highway and extending north to Gnangara Road.

Pedestrians signals and phasings for the Drumpellier Drive / Youle-Dean Road - Whiteman Drive signalised intersection will be provided along the east and south approaches. This will provide secondary access to the station for pedestrians and cyclists. Figure 13 shows the key connections surrounding the site.

4.2 Public transport access

The public transport network proposed to service the Whiteman Park Station precinct and surrounding area is illustrated in Figure 14. The precinct will be primarily serviced by the MEL passenger rail service that will operate northbound towards Ellenbrook and westbound towards Malaga.

The station will also be serviced by a number of feeder bus services connecting the station to wider residential areas to the east, north and south of the station. Proposed routes include a number of new bus services that will replace the existing services in the surrounding area.

The services will access the Whiteman Park Station bus interchange by turning left from the Whiteman Drive left-in slip lane via a bus priority queue jump lane on the eastern approach of the Drumpellier Drive / Youle-Dean Road-Whiteman Drive intersection.

Upon exiting the bus interchange, services will turn right at the Whiteman Drive roundabout and head eastbound beyond Drumpellier Drive and south into the bus only Isoodon Road connection, or north on Everglades Avenue into the wider network.

Proposed bus routes are provisioned to travel along Isoodon Street from an interim access provided from Youle-Dean Road. Planning for the proposed development south-east of the site is expected to cause a realignment of Isoodon Street further east of Evergaldes Avenue. It is envisaged that the interim bus access connecting Youle-Dean Road to Isoodon Street will follow this new alignment once the proposed development south-east of the site is completed.

It is anticipated that public transport users will encounter limited issues in accessing services. Based on the latest design, conflict points between pedestrians and vehicles are avoided due to the bus interchange's prioritised location in front of the station entry, adjacent to the Welcome Place.

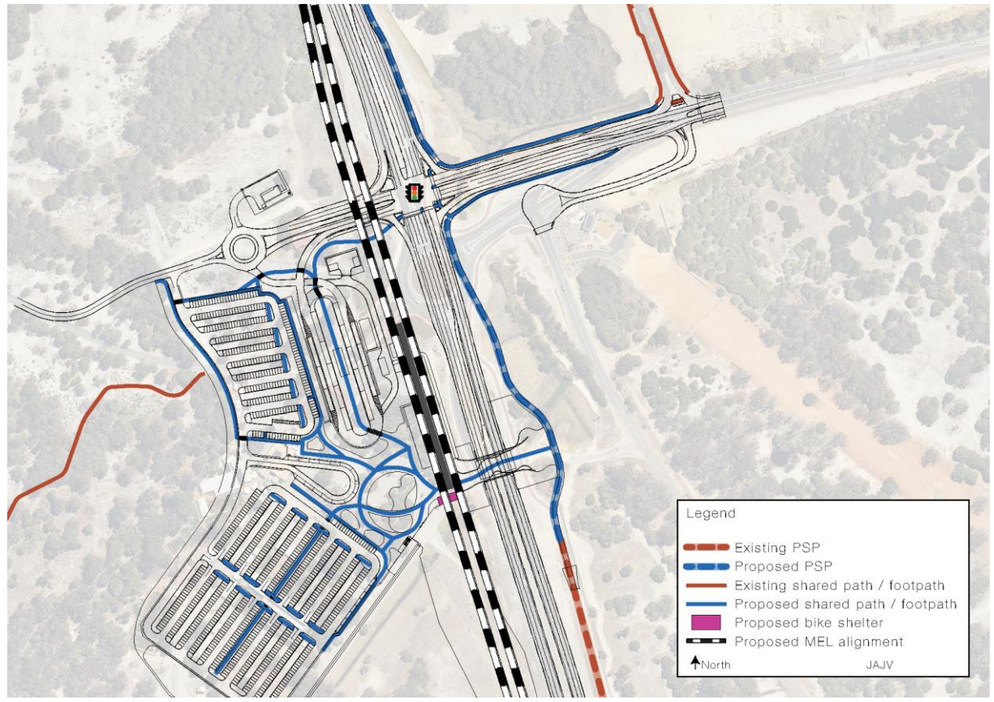


Figure 13: Pedestrian and cycling connections surrounding the development

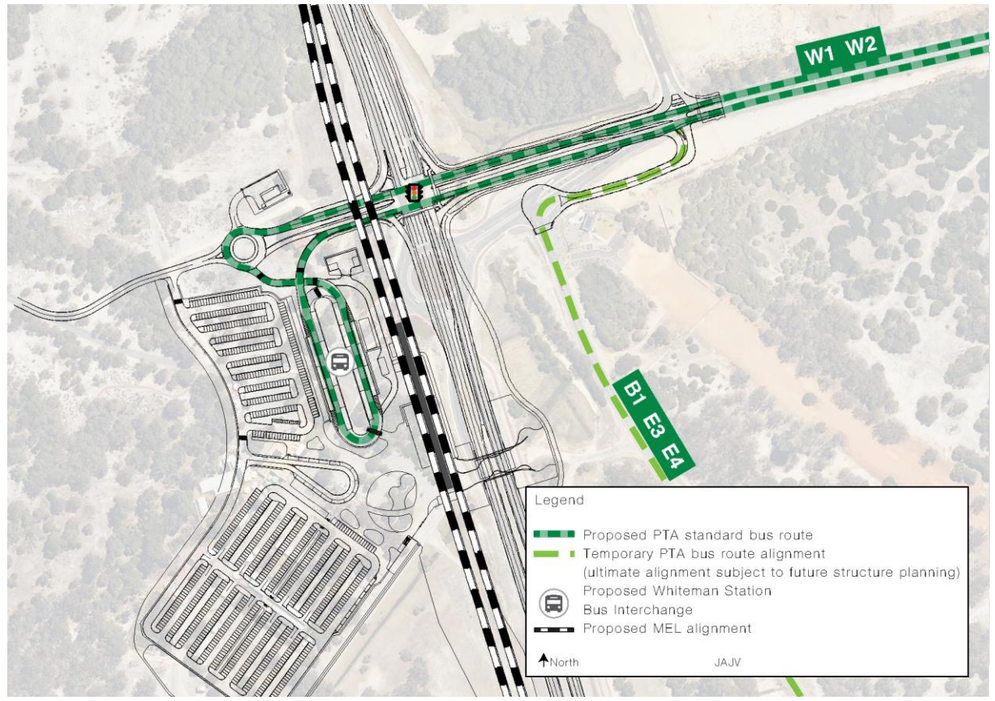


Figure 14: Public transport provisions surrounding the development

4.3 Vehicular access

Based on the proposed access arrangement and modification of existing roads as described in Section 3.1, Figure 15 illustrates the proposed inbound and outbound routes from various origin and destination points surrounding the station precinct. As shown, access and egress to the station PnR and KnR facilities will be facilitated by the proposed access road off the Whiteman Drive priority controlled intersection.

During the AM peak period, inbound vehicles will access the station via the Drumpellier Drive / Youle-Dean Road - Whiteman Drive signalised intersection and the bus interchange roundabout before turning left at the priority controlled intersection into the station precinct. The modelling exercise has shown that no significant queueing issues will be expected at the bus interchange roundabout due to the minimal conflicting movements for inbound vehicles.

In the PM peak, egressing vehicles are required to yield to traffic west of the station precinct and to bus services egressing the bus interchange. However, it is again indicated by the modelling exercise that this will likely not lead to significant problems due to the limited number of vehicles opposing the flow from the PnR/ KnR access road.

Vehicle tracking has been conducted for the design using suitable design vehicles – this is attached for reference in Appendix E.

4.3.1 Parking and parking management

A 886 bay PnR facility is proposed at Whiteman Park Station to support patronage to the MEL passenger rail service. The parking facility is comprised of:

- 846 standard all-day bays
- 13 standard short-term bays
- 1 tenant bay
- 2 EV charging bays
- 17 ACROD bays
- 2 service/loading bays
- 4 staff bays
- 1 taxi bay

20 sheltered motorcycle bays are also provided within the PnR (in addition to the 886 car bays).

These bays (with the exception of the short-term bays) will be available for all-day parking for station passengers. This will be controlled through the existing SmartParker service, which requires those using the facility to have a registered SmartRider pass associated with their vehicle, and pay a small parking fee – currently $2.

In addition to this, a 14 bay KnR has been provisioned for Whiteman Park Station comprising:

- 13 standard pick-up/ drop-off (PUDO) bays
- 1 accessible PUDO bays

These bays will be restricted as 5-minute pick-up/drop-off bays only.

Both the PnR and KnR facilities will be managed, controlled and enforced by Transperth operations.

As indicated by Figure 15, both access points to the PnR offer access and egress movements, enabling better circulation and multiple opportunities to enter and exit the facility.

The following points are recommended for consideration as the design of the facility is progressed:

- Future development has been proposed around Whiteman Park Station east of Drumpellier Drive. It is recommended that the PTA engage developers early in the process to understand the requirements of the station car park in meeting demand. Parking for the development surrounding Whiteman Park Station should be considered holistically, rather than just focusing on the station parking in isolation. This includes providing adequate access for vehicles and the safe movement of pedestrians to/ from their vehicles.

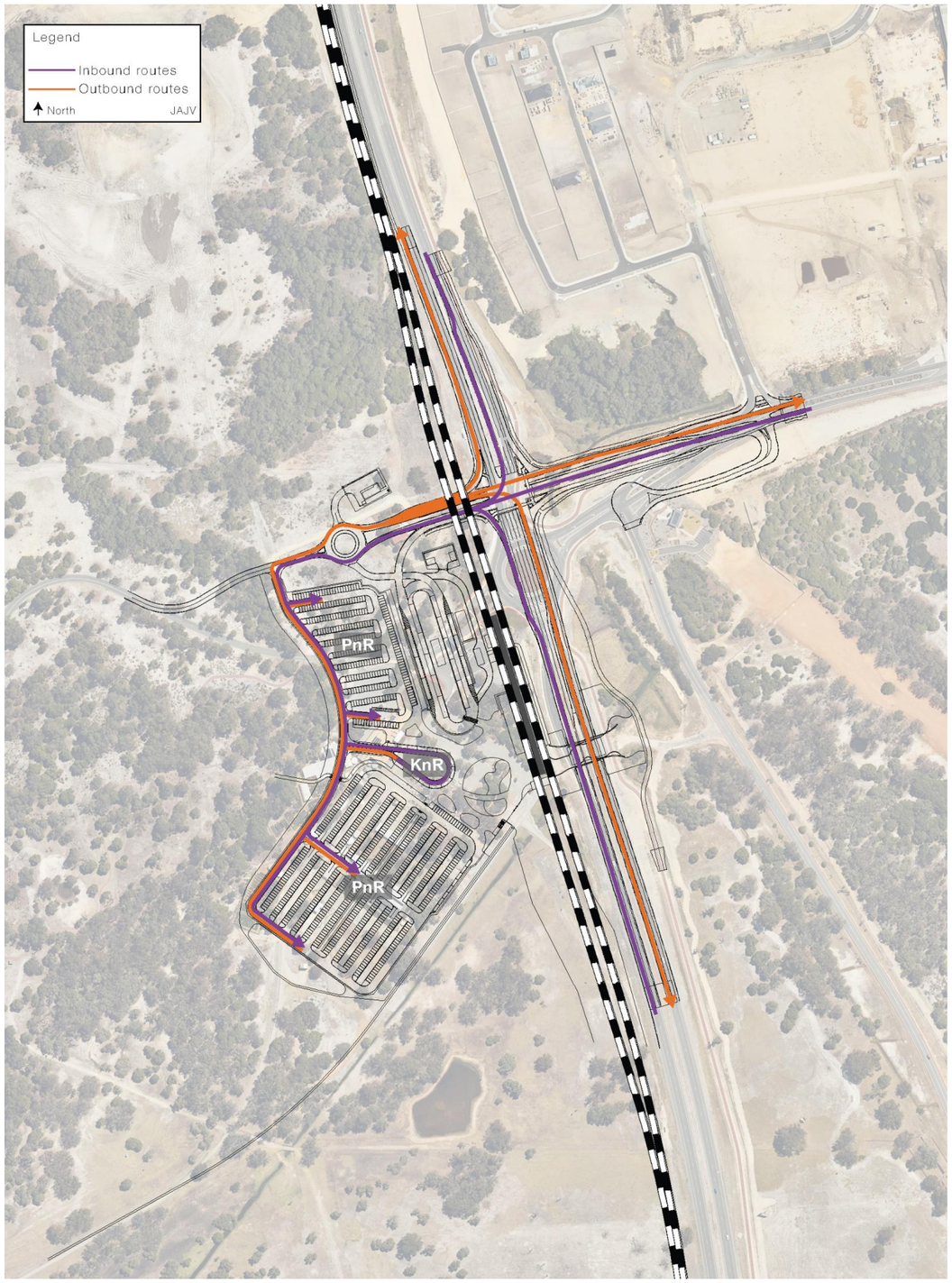


Figure 15: Primary Inbound and outbound routes for the PnR and KnR facilities

5 Traffic impact analysis

A local assessment of the surrounding network performance has been undertaken to assess the planned configuration of the future network with the proposed station access arrangements for each precinct, including Park n Ride (PnR), Kiss n Ride (KnR), and bus interchange access points. This analysis will also demonstrate high-level accessibility and safety considerations for active transport modes.

The existing Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection is currently a two-way roundabout. This is proposed to be upgraded to a signalised intersection as shown in Figure 12. As a result, no base modelling assessing the existing conditions to validate the proposed models was required to be undertaken.

5.1 Assumptions and parameters

5.1.1 Proposed site plan

Traffic modelling for Whiteman Park has been undertaken based on the proposed station configuration, as described in previous sections, and the likely impacts station generated traffic will have on the surrounding road network.

5.1.2 Assessment years

The scenarios that have been investigated for the transport assessment on the proposed surrounding road network have included the following project case scenarios:

- 2026 AM/ PM peaks – Opening year of Whiteman Park Station
- 2031 AM/ PM peaks – Opening of Whiteman Park Station +5 years
- 2036 AM/ PM peaks – Opening of Whiteman Park Station +10 years.

5.1.3 Background future trip growth

Background traffic demands have been based on STEM link volumes on an all-day level. These all-day STEM link volumes have been provided for the following years:

- 2016 (Base)
- 2021
- 2026
- 2031
- 2041.

Based on the all-day STEM link volumes the Main Roads WA Urban Road Planning (URP) approach has been utilised to assess peak hour forecast volumes from all-day STEM forecasts. The step-by-step process used to determine the background traffic growth for each relevant year is detailed as follows:

1. Compare the all-day STEM 2016 and 2021 outputs using linear growth to create an all-day STEM 2020 demand (on a link level), adopted from STEM (MULFS v1.6.1)
2. Compare calculated all-day STEM 2020 to the all-day observed traffic volumes obtained from the video survey (on a link level) to identify the all-day flow differences for each link volume to obtain the calibrated STEM adjustment factor
3. Apply the calibrated STEM adjustment factor to the provided all-day STEM demands (on a link level). This creates an all-day project demand (on a link level)
4. Apply the identified peak one-hour factors (on a link level) based on 2020 video survey* to the all-day project demands to create link volume AM and PM peak hour project demands
5. Apply the turning distribution as defined in the 2020 video survey, to the link AM and PM peak project demands, resulting in the AM and PM peak hour turning movements by approach.

*Base modelling was completed utilising existing counts retrieved for December 2019. As part of the forecast assessment, these counts were considered more reflective of 2020 conditions, hereafter referred to as 2020 video survey counts.

Following consultation with the METRONET team, the traffic forecasts for the Whiteman Park Station precinct were endorsed on the 15th September 2020. These final demand forecasts have been provided within **Appendix A.**

5.2 Trip generation and distribution

5.2.1 PnR/ KnR traffic generation and distribution

The anticipated PnR and KnR traffic has been calculated based on the benchmarking of existing stations.

Surveyed information collected for Murdoch Station on the 4th April 2011 between 5am – 10:00pm has been sourced as a comparison. This station profile was utilised to understand the anticipated peak hour demand attributed to the Whiteman Park Station PnR and KnR due to the similar number of bays assumed at both stations and the similar distance to the Perth CBD.

The profile indicates that PnR demand rapidly increases in the morning, remains relatively unchanged between 8am and 2pm, and drops significantly in the evening between 3pm – 6pm. The findings of the benchmarked station profile analysis are described as follows:

- During the morning peak hour, the PnR facility is indicated to fill by approximately 66% of total capacity
- During the evening peak hour, the PnR facility is indicated to empty by approximately 45% of total capacity.

As conservative assumption, the PnR peak inbound and outbound movements will coincide with the commuter peak and the facility will operate at capacity from opening day.

For KnR traffic, the profile for the benchmarked station has been utilised for the number of KnR traffic movements within each 15-minute time period between 5am-10pm.

Analysis of the KnR morning and evening peaks have been calculated as a function of the benchmarked station PnR capacity. The findings of this analysis have been shown below.

- During the morning peak hour, the total trips within the KnR is indicated to represent approximately 22% of the Park n Ride capacity.
- During the evening peak hour, the total trips within the KnR is indicated to represent approximately 16% of the Park n Ride capacity.

Based on the benchmarked profile analysis, the additional PnR and KnR traffic for Whiteman Park Station is shown within Table 3. This demand is assumed to be consistent for all future modelling scenarios.

The traffic attributed to the station PnR and KnR facility has then been distributed based on all-day STEM Turning Volume Diagrams (TVDs) supplied by METRONET on 3rd August 2020. This allows an understanding of where inbound and outbound traffic come from and go to within the peak period. This assumed station traffic distributions are shown within Table 3.

Table 3: Generated traffic demand – PnR and KnR facilities

	PnR demand (veh/ %)		KnR demand (veh/ %)		Total (veh)	
Peak	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM peak hour	660 (66%)	0	220 (22%)	220 (22%)	880	220
PM peak hour	0	450 (45%)	160 (16%)	160 (16%)	160	610

Table 4: PnR and KnR traffic distribution

	Distribution of Inbound traffic			Distribution of Outbound traffic		
Associated STEM year	From North	From East	From South	To the North	To the East	To the South
2026 - 2041	*50%*	*40%*	*10%*	*50%*	*40%*	*10%*
2041 onwards	*27%*	*55%*	*18%*	*36%*	*46%*	*18%*

5.2.2 Public transport traffic

The bus forecasts provided have been updated from past assumptions outlined within the PDP planning stage for MEL, however, the final routes, services, and frequencies are still yet to be confirmed. The anticipated bus routes within the Whiteman Park Station road network as used in this analysis have been shown previously in Figure 11 on Page 10. The accompanying services and headways noted within Figure 11 have been summarised in Table 5.

5.2.3 Traffic flows

The distribution of vehicle classifications for the intersection is shown within Table 6 and Table 7.

These vehicle class percentages, along with the respective vehicle class passenger car equivalent (PCU) conversion factors outlined within the Main Roads WA Operational Modelling Guidelines have been used within the SIDRA modelling for each peak period scenario.

Peak period turning movement volumes within the road network for all future modelled scenarios have been summarised within **Appendix B.**

Table 5: Forecasted public transport – peak AM/ PM headway (mins)

Route number	Route	AM Peak Headway (minutes)		PM Peak Headway (minutes)	
		Inbound	Outbound	Inbound	Outbound
W1	*Whiteman Station to Ellenbrook Station via Pinaster Parade*	*10*	*10*	*10*	*10*
W2	*Whiteman Station to Ellenbrook Station via Henley Brook Avenue*	*20*	*20*	*20*	*20*
B1	*Whiteman Station to Midland Health Campus via Midland Station*	*20*	*20*	*20*	*20*
E3	*Whiteman Station to Bassendean Station*	*20*	*20*	*20*	*20*
E4	*Morley Central Station to Whiteman Park Station via Bassendean Station and Altone Road*	*20*	*20*	*20*	*20*

Table 6: Vehicle classification proportions – AM peak

	Vehicle classification (%) w/o buses											
Class	1	2	3	4	5	6	7	8	9	10	11	12
Class %	95.3 %	1.3%	2.3%	0.4%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%
Group %	95.3 %	3.9%				0.8%				0.0%	0.0%	0.0%

Table 7: Vehicle classification proportions – PM peak

	Vehicle classification (%) w/o buses											
Class	1	2	3	4	5	6	7	8	9	10	11	12
Class %	97.4 %	0.4%	1.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
Group %	97.4 %	2.4%				0.2%				0.0%	0.0%	0.0%

5.3 Key modelling findings

Based on the traffic generation and distribution exercise summarised in the section so far, static traffic modelling through the use of SIDRA Intersections (version 8.0) has been used to analyse the operational performance at the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection and the two Whiteman Park Station access intersections.

A detailed summary of the project case scenario results as well as the SIDRA network layout has been provided within **Appendix C** with the SIDRA movement summaries output provided within **Appendix D**.

5.3.1 Opening year (2026)

The network operates with good performance at each intersection performing with a LOS C or better during the opening year of the station (2024) as shown below in Table 8.

The worst performing approach is the east and south approaches at the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection during the AM and PM peaks respectively. Both approaches reported below 80% degree of saturation.

The east approach of the Whiteman Drive/ Bus Interchange access is forecast to approach capacity with a DoS of 83.4% during the critical AM peak attributed to the large demand entering Whiteman Park Station.

Table 8: Future modelling results – Whiteman Park Station road network (2026 opening year)

	Intersection	Drumpellier Drive/ Youle-Dean Road-Whiteman Drive		Whiteman Drive/ Bus Interchange Access		Whiteman Drive/ PnR Access	
	Peak	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	Worst approach (DoS)	East	South	East	West	East	South
Criteria	*Overall LOS*	**LOS C**	**LOS B**	**LOS A**	**LOS A**	**NA**	**NA**
	Worst LOS	**LOS D**	**LOS C**	**LOS C**	**LOS B**	**LOS A**	**LOS A**
	Overall average delay (s)	24.5	19.9	5.2	5.2	5.4	5.2
	Worst delay (s)	35.2	19.9	29.8	10.7	8.6	5.9
	Worst DoS	78.1	67.1	83.4	49.2	53.5	44.8
	Worst queue results (vehs)	17.6	9.1	1.5	5.4	0.5	1.5

5.3.2 Opening +5 years (2031)

The network will remain operating with good performance at each intersection 5 years post opening of the station with a an average intersection LOS C or better as shown in Table 9.

The worst performing approaches develop to be the north and south approaches at the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection during the AM and PM peaks respectively. Both approaches continue to operate within capacity, with the AM peak expected to perform with a 80.8% degree of saturation.

It is noted that performance during the AM peak is critical in the Opening +5 years scenario (DoS 80.8%) compared to the Opening +10 years scenario (DoS 80.3%). This is attributed to the demand of the right turn movement from the north approach being higher in 2031 over 2036 due to the change in the PnR distributions between the scenario years. More PnR traffic enter the station from the north in 2031 compared to in 2036 where more PnR traffic enter the station from the east instead.

There is no change expected to the performance of the other two station access with both intersections expected to continue to operate with an average intersection LOS A.

Table 9: Future modelling results – Whiteman Park Station road network (2031)

	Intersection	Drumpellier Drive/ Youle-Dean Road-Whiteman Drive		Whiteman Drive/ Bus Interchange Access		Whiteman Drive/ PnR Access	
	Peak	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	Worst approach (DoS)	North	South	East	West	East	South
Criteria	*Overall LOS*	**LOS C**	**LOS B**	**LOS A**	**LOS A**	**NA**	**NA**
	Worst LOS	**LOS C**	**LOS C**	**LOS C**	**LOS B**	**LOS A**	**LOS A**
	Overall average delay (s)	27.0	20.0	5.2	5.2	5.3	5.2
	Worst delay (s)	37.2	27.4	30.9	10.7	9.7	5.9
	Worst DoS	80.8	72.6	85.9	49.2	55.1	45.0
	Worst queue results (vehs)	19.7	11.7	1.5	5.4	0.5	1.6

5.3.3 Opening +10 years (2036)

Network performance of the Whiteman Park Station precinct does not significantly degrade 10-years post opening of the station with all intersections maintaining an average intersection LOS C or below as shown in Table 10.

The critical approaches at the Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection are the south and west approaches during the AM and PM peaks respectively.

However, both critical approaches continue to operate within capacity, with the AM peak expected to perform with a 80.3% degree of saturation. The west approach is indicated to perform with a LOS D and queue length of approximately 30 metres. It is recommended that queues and delays from this approach is monitored in the future to ensure that it does not extend and impact the adjacent Whiteman Drive/ Bus Interchange access.

The performance at the two station access intersections continue to operate with good performance, continuing to operate with an average intersection LOS A.

Table 10: Future modelling results – Whiteman Park Station road network (2036)

	Intersection	Drumpellier Drive/ Youle-Dean Road-Whiteman Drive		Whiteman Drive/ Bus Interchange Access		Whiteman Drive/ PnR Access	
	Peak	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	Worst approach (DoS)	South	West	East	West	East	South
Criteria	*Overall LOS*	**LOS C**	**LOS C**	**LOS A**	**LOS A**	**NA**	**NA**
	Worst LOS	**LOS C**	**LOS D**	**LOS C**	**LOS B**	**LOS A**	**LOS A**
	Overall average delay (s)	28.3	25.6	5.2	5.2	5.3	5.2
	Worst delay (s)	34.7	36.8	31.6	12.1	10.4	5.9
	Worst DoS	80.3	77.5	87.3	53.3	56.1	45.1
	Worst queue results (vehs)	19.5	16.7	1.5	5.4	0.5	1.6

5.3.4 Summary of findings

Based on the analysis completed, all intersections as part of the surrounding Whiteman Park Station precinct will operate with good performance (LOS C or better) up to 10-years post opening of the station.

The Drumpellier Drive/ Youle-Dean Road-Whiteman Drive intersection is forecast to perform within capacity up to and including 10-years post station opening, with the AM peak operating with a degree of saturation of 80.3%.

The performance of the two station access intersections operate within capacity up to and including 10-years post station opening. Critically, the east approach of the Whiteman Drive/ Bus Interchange access is forecast to approach capacity 10-years post station opening with a DoS of 87.3% during the critical AM peak attributed to the large demand entering Whiteman Park Station.

6 Recommendations and summary

The Whiteman Park Station precinct is currently being planned as part of the overall delivery of the MEL passenger rail service proposed to operate between Bayswater and Ellenbrook, with an expected opening year of 2026. This TIA has detailed the associated impacts that the development will have on the surrounding transport network and the expected land uses within and surrounding the vicinity of the site.

The proposed site is planned to be located above ground on a viaduct accompanied by a 900 bay PnR and KnR facility, a 10-stand active bus interchange and large cycling facility for both station and non-station users. Access to the station will be facilitated by Whiteman Drive, allowing two access points. One access point will facilitate bus services into the bus interchange via a roundabout west of the station. The second access point will facilitate access to the PnR and KnR facilities. This will be complemented with modifications to the Drumpellier Drive / Youle-Dean Road - Whiteman Drive intersection which is to be converted into a signalised intersection from the existing roundabout configuration.

The subject site is located in the vicinity of two major land uses. Whiteman is almost entirely zoned as *Regional Reserve – Parks & Recreation*, largely vacant and mostly designated as *Bush Forever* (protected bushland). The suburb of Brabham east of the proposed site is part of the North East Urban Growth Corridor. The existing land use is largely residential – ranging from medium (R30/R40) to high (R80/R100) density in the town centre, as well as a District Centre currently under development. There is significant ongoing development in the vicinity of the station which is likely to serve as a major transit hub connecting the community to employment, commercial, retail and recreational areas along the MEL alignment and beyond.

The station is estimated to generate 1,100 vehicle trips by the opening year of the station during the AM peak hour and 770 trips during the PM peak hour. Although this is a high trip generator, the provision of alternate transport modes and the surround road network upgrades detailed above mean that the traffic network is able to operate within capacity. All movements operate with an average intersection Level of Service C or above and a degree of saturation below 90% for all intersections up to and including 10-years post opening of the station.

Based on the operational analysis and assessment of the access and supporting network, the following recommendations have been developed:

Pedestrian and cyclist access:

- Provision of shared path facilities from the proposed Town Centre and developments in Brabham south-east of the site should be investigated to ensure that adequate access to and from the Whiteman Park Station is provided prior to the completion of the proposed developments
- To support the attractiveness of Whiteman Park as a tourist destination, the tourist cycling trail along Whiteman Drive proposed as part of the City of Swan 2051 cycle plan and the proposed shared path connecting Whiteman Park Station and the existing Whiteman Park shared path should be delivered as a priority project.

Public transport access:

- While planning for the surrounding residential areas and the future road network east of the site are still unconfirmed, it is recommended that proposed services are reviewed to enable the integration of new development with the station to the south and east of the station, and to allow future development to be well serviced by public transport, with bus stops within 400m of dwellings.

Vehicle access and parking:

- Future development has been proposed around Whiteman Park Station east of Drumpellier Drive. It is recommended that the PTA engage developers early in the process to understand the requirements of the station car park in meeting demand. Parking for the development surrounding Whiteman Park Station should be considered holistically, rather than just focusing on the station parking in isolation. This includes providing adequate access for vehicles and the safe movement of pedestrians to/ from their vehicles.
- Queuing on the eastern and western approach of the Whiteman Drive / Bus Interchange Access during the AM and PM peaks respectively should be monitored post-opening. Consideration of further treatments and signal modifications to increase the green split priority for these movements should be investigated. This is to mitigate any future blocking of movements at Drumpellier Drive. Current modelling does not suggest that this queueing will be an issue up to and including 10-years post station opening.

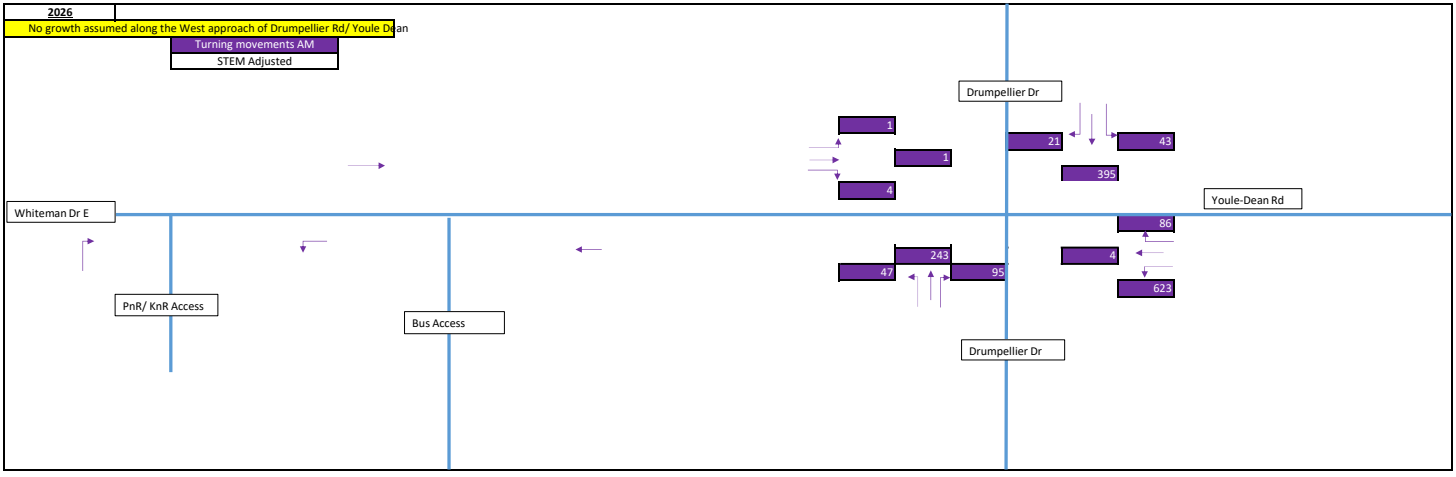
Summary

Based on these findings it is recommended that the site requirements and supporting infrastructure within the surrounding road network be implemented prior to opening of the station.

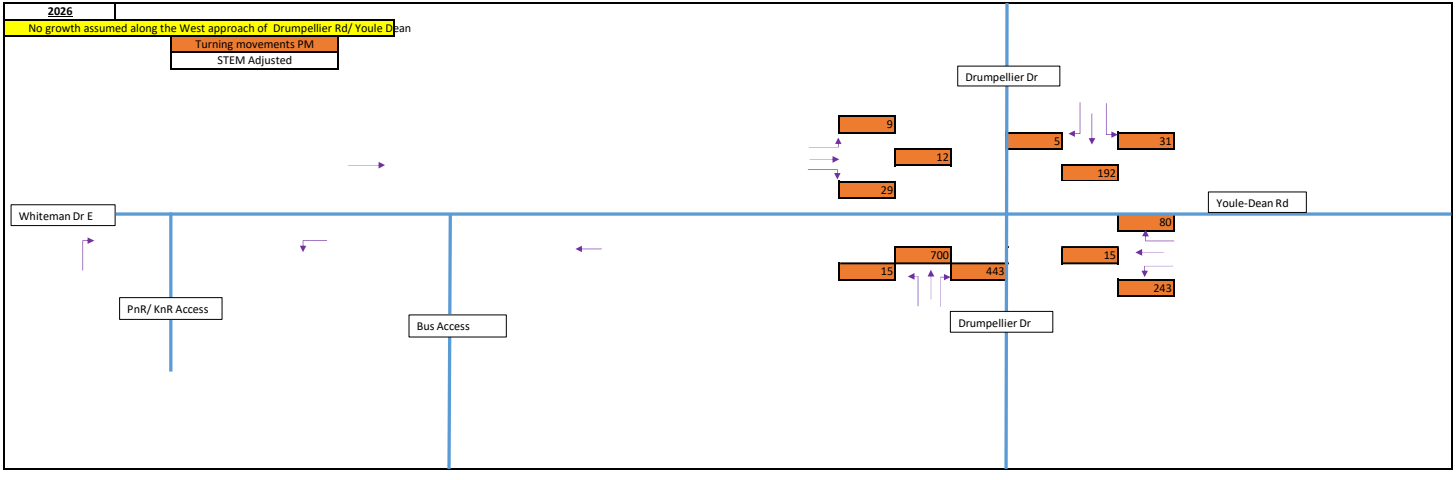
It is shown however, that the station is fit for purpose and well serviced by the proposed surrounding transport network, facilitating safe and adequate access for pedestrians, cyclists, buses and general vehicles.

Appendix A – Whiteman Park Station precinct traffic forecasts

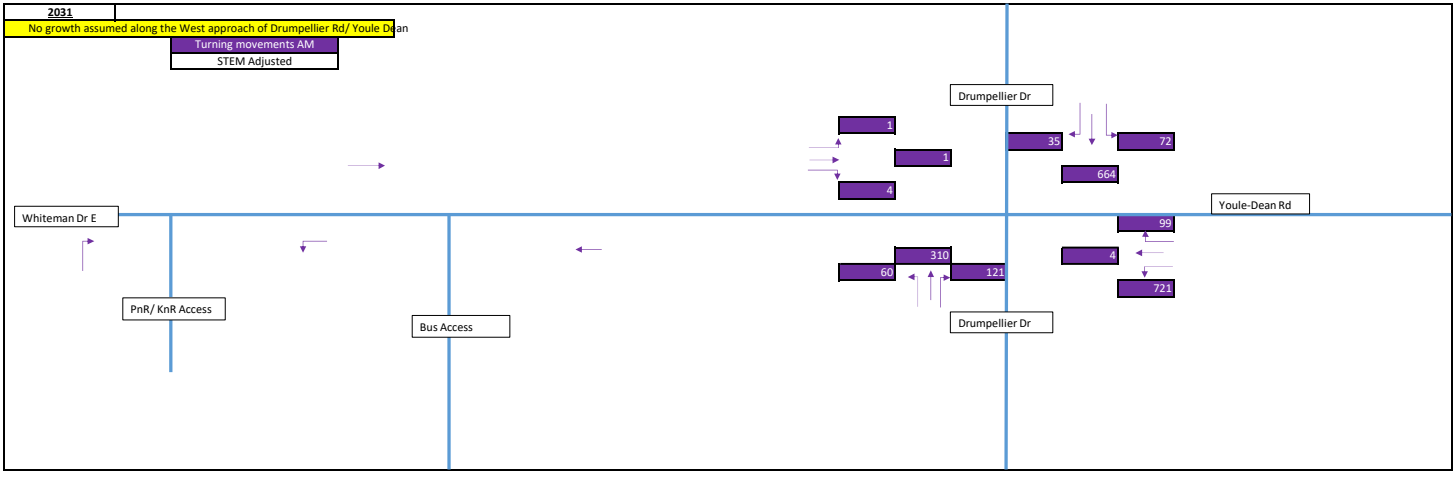
2026 AM turning volumes based on existing turning proportions and peak hour percentages



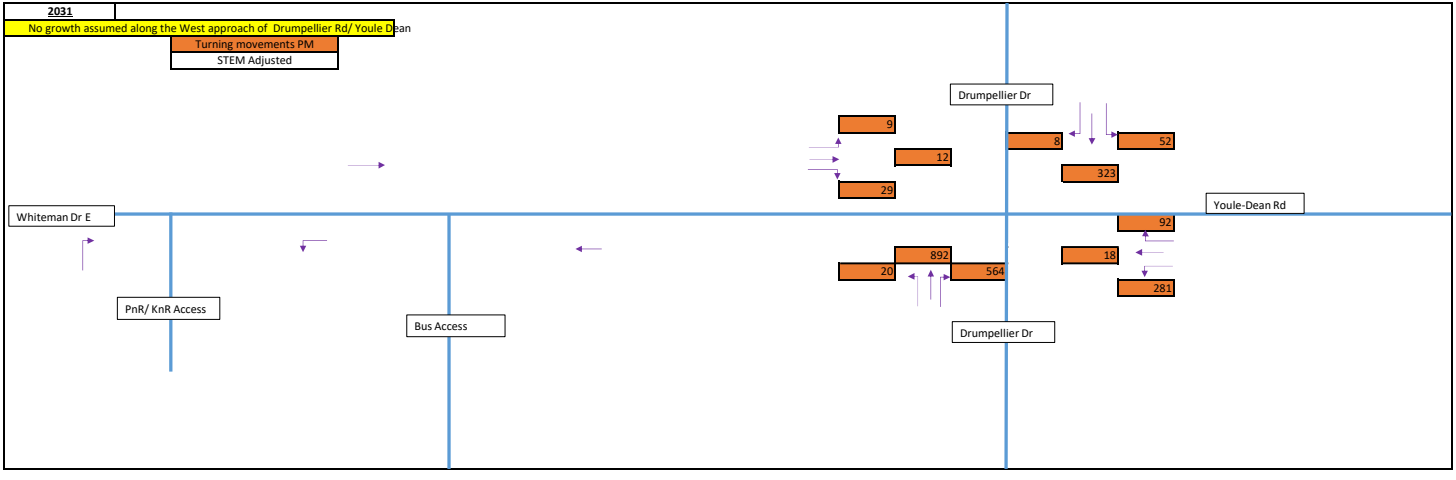
2026 PM turning volumes based on existing turning proportions and peak hour percentages



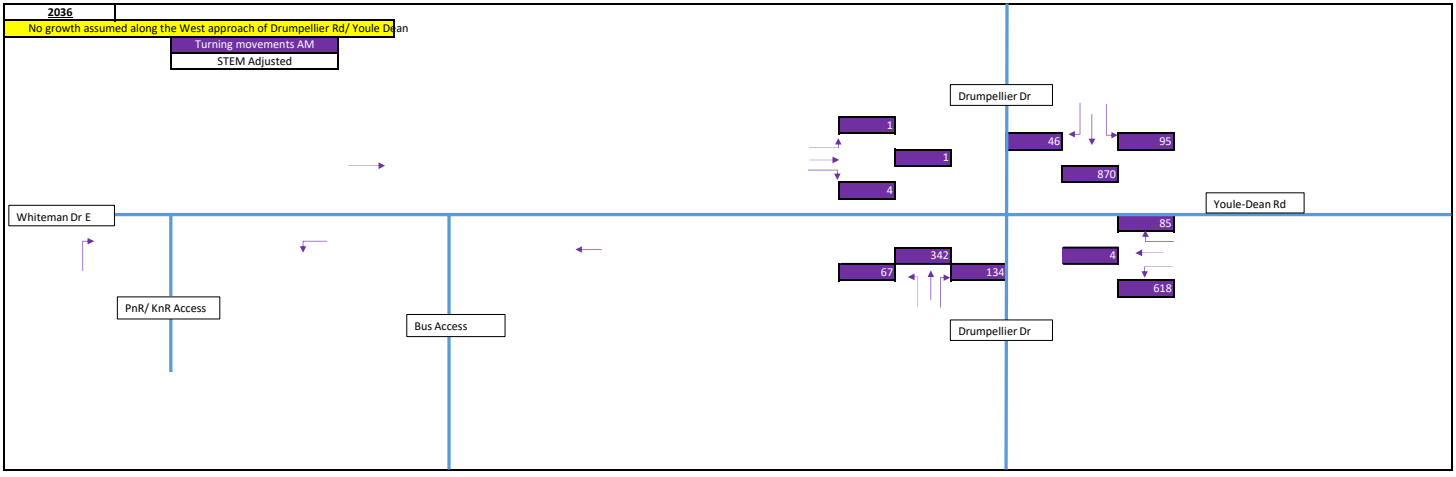
2031 AM turning volumes based on existing turning proportions and peak hour percentages



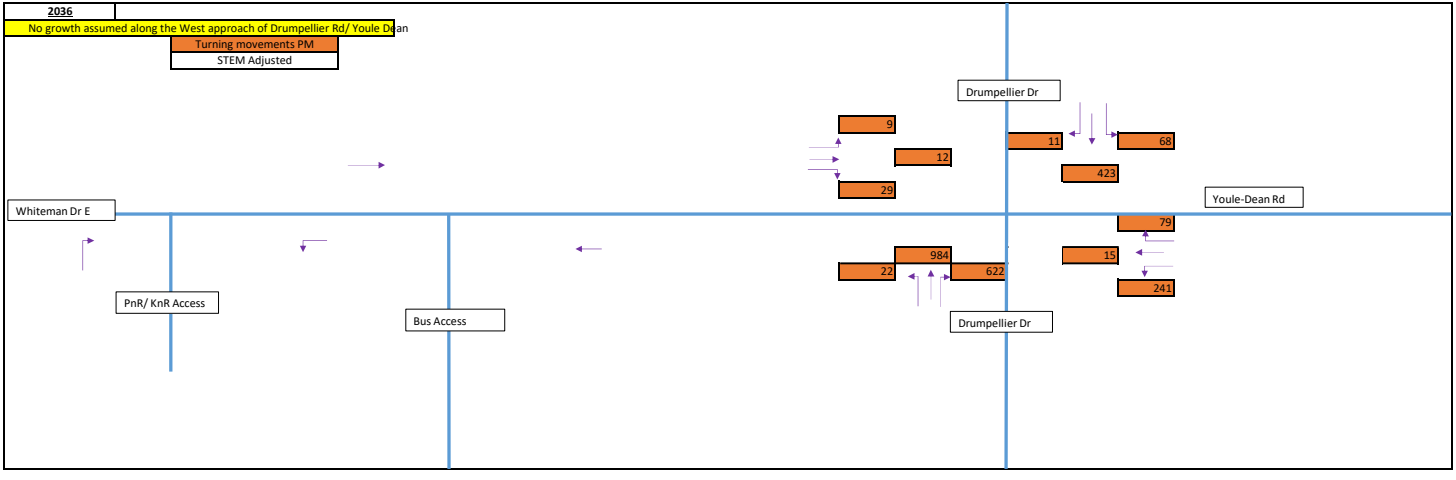
2031 PM turning volumes based on existing turning proportions and peak hour percentages



2036 AM turning volumes based on existing turning proportions and peak hour percentages

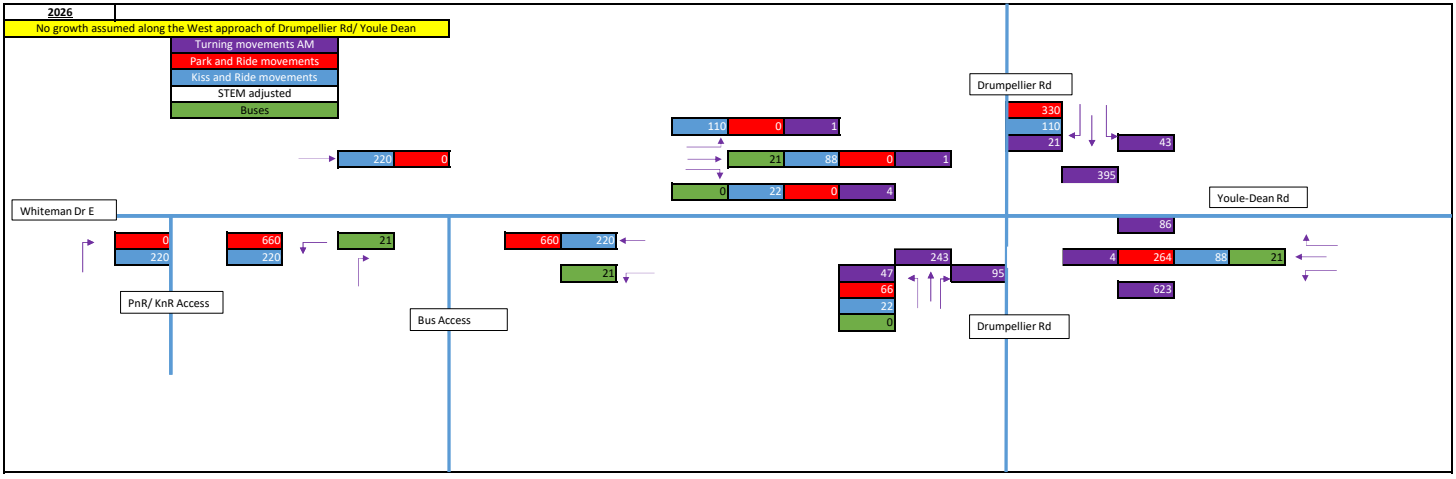


2036 PM turning volumes based on existing turning proportions and peak hour percentages

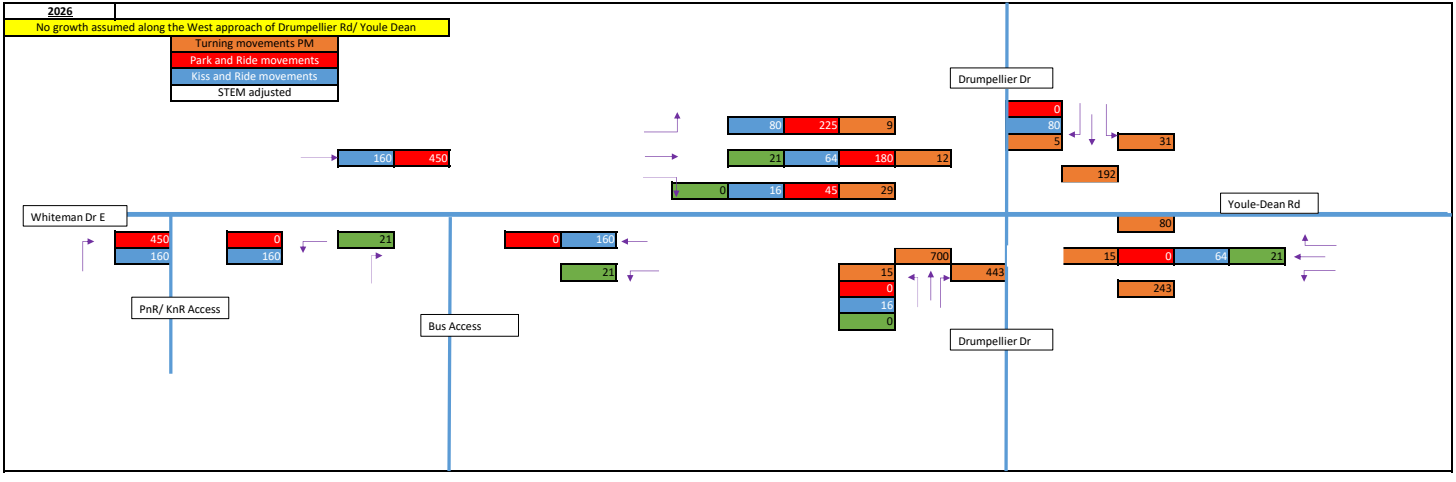


Appendix B – Whiteman Park Station future peak period turning movement volumes

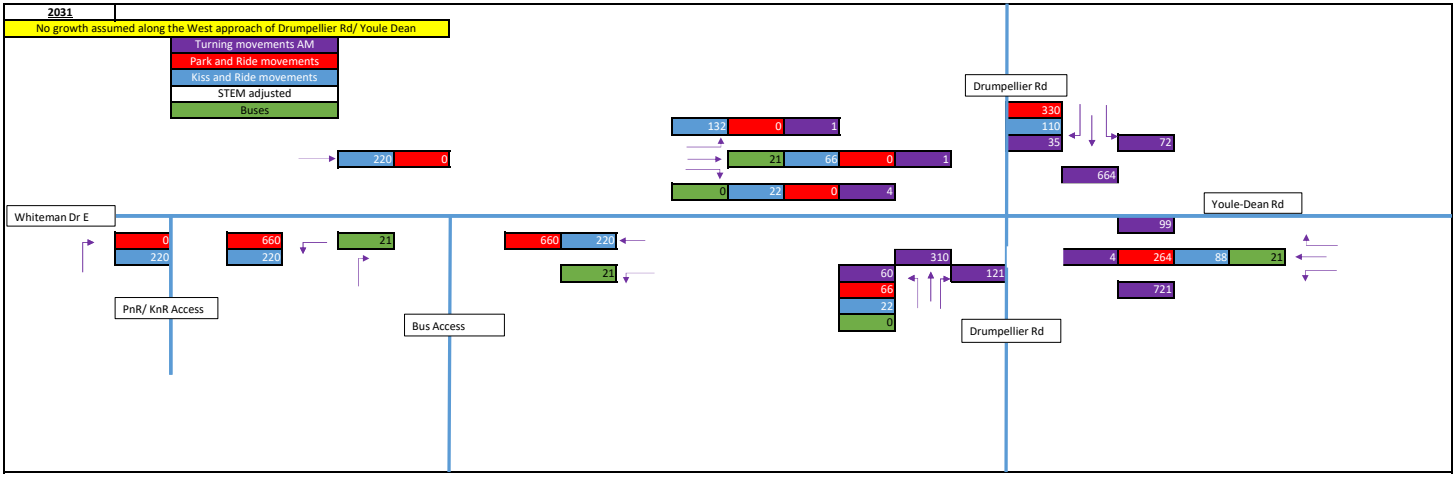
2026 AM turning volumes based on existing turning proportions and peak hour percentages



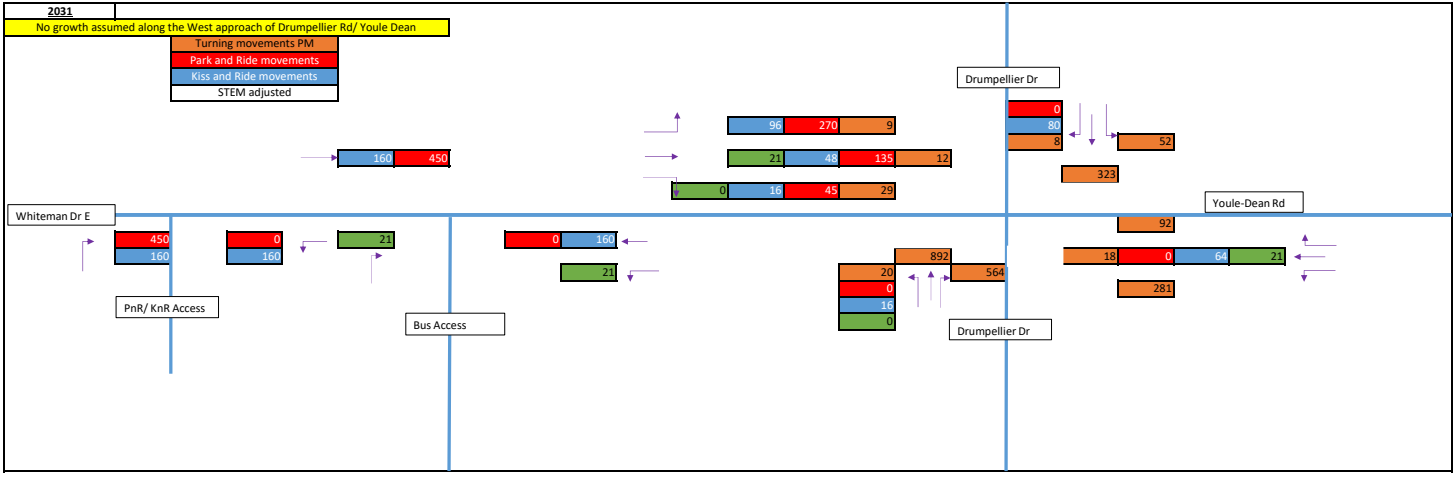
2026 PM turning volumes based on existing turning proportions and peak hour percentages



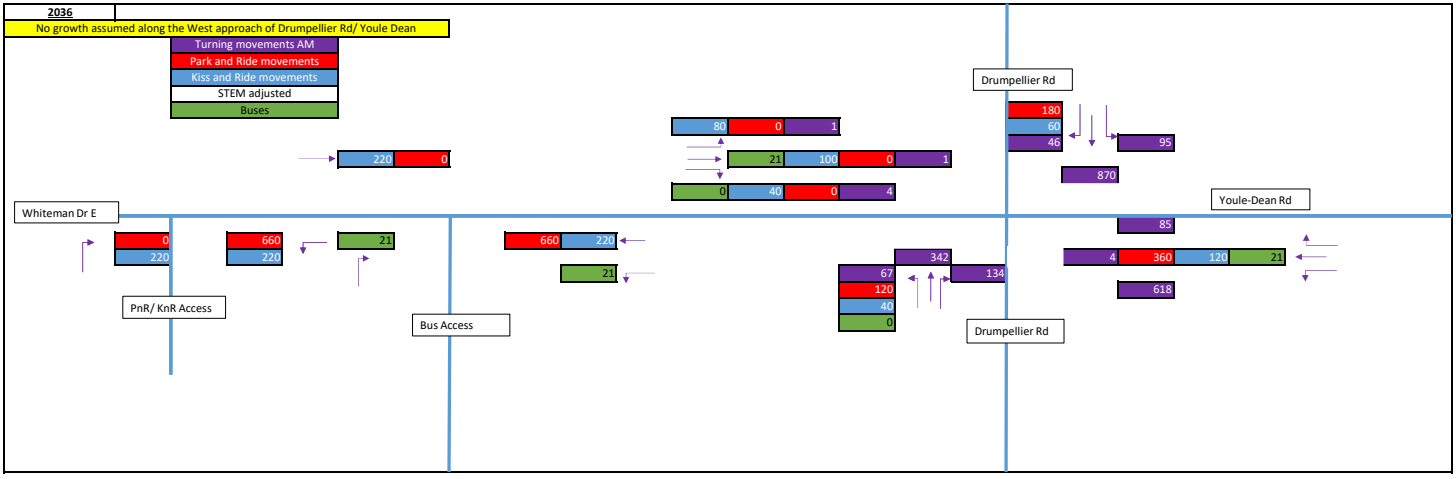
2031 AM turning volumes based on existing turning proportions and peak hour percentages



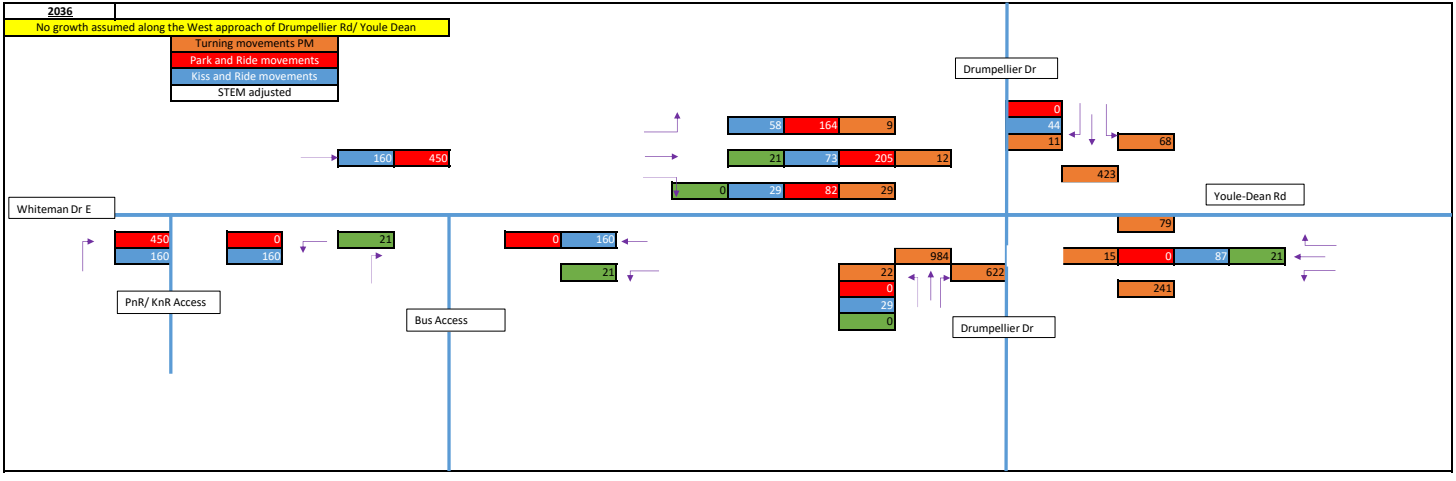
2031 PM turning volumes based on existing turning proportions and peak hour percentages



2036 AM turning volumes based on existing turning proportions and peak hour percentages



2036 PM turning volumes based on existing turning proportions and peak hour percentages

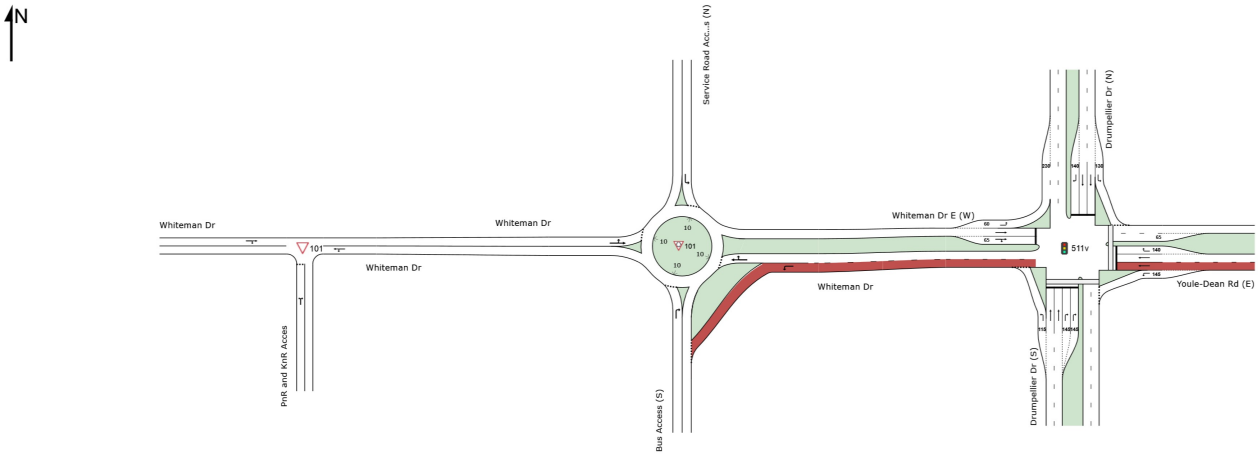


Appendix C – Project case scenario results

NETWORK LAYOUT

Network: N101 [AM Peak 2036]

New Network
Network Category: (None)



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
511v	NA	AM Peak 2036 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd
101	NA	AM Peak 2036 - Bus Access Roundabout
101	NA	AM Peak 2036 - PnR and KnR Access

Organisation: ARUP PTY LTD | Created: Wednesday, 1 September 2021 10:54:31 AM
Project: \\global.arup.com\australasia\PER\Projects\279000\279640-00 Morley to Ellenbrook\Work\Internal\Design\Transport\Transport Modelling\Whiteman\Modelling\SIDRA\Whiteman Park Stn_TIA.sip8

2026 Results

Intersection	Approach	Lane	LOS		Average Delay (s)		Degree of Saturation		Queue Results (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Drumpellier Dr/ Youle-Dean Rd/ Whiteman Dr	North	Left	LOS A	LOS B	7.4	12	3.9%	4.6%	2.5	3.1
		Through	LOS B	LOS C	19.9	26	31.2%	35.1%	46.4	21.2
		Right	LOS C	LOS D	31.1	35.8	75.8%	51.7%	139.1	20.5
	East	Left/ Through	LOS B	LOS A	10.8	9.3	60.2%	22.9%	75.9	11.3
		Through	LOS C	LOS C	32.8	20.4	78.1%	18.6%	118	15.2
		Right	LOS D	LOS D	37.2	37.3	31.5%	47.7%	25.9	20.3
	South	Left	LOS B	LOS A	19.6	7.4	24.8%	2.8%	26.3	1.5
		Through	LOS D	LOS B	41.3	18.2	69.7%	57.6%	41.8	69
		Right	LOS D	LOS C	41.7	26.6	34.2%	67.1%	21	68.4
	West	Left	LOS A	LOS A	6.2	6.2	7.1%	19.1%	0	0
		Through	LOS C	LOS C	26	23.8	27.1%	63.9%	33.4	61.2
		Through/ Right	LOS D	LOS C	46.3	29.1	21.9%	30.4%	8.5	18.8
Whiteman Dr/ Bus Access	North	Left/ Through/ Right	LOS A	LOS B	6	10.7	0.1%	0.2%	0	0.1
	East	Left/ Through	LOS A	LOS A	4.7	4.7	83.4%	16.9%	0	0
	South	Right	LOS C	LOS A	29.8	10	7.5%	3.3%	7.1	1.6
	West	Left/ Through	LOS A	LOS A	5.1	5.2	17.3%	49.2%	10.7	38.7
Whiteman Dr/ Park and Ride	East	Left/ Through	LOS A	LOS A	6.6	5.9	20.3%	44.8%	3.6	10.8
	South	Left/ Right	LOS A	LOS A	5.6	5.5	53.5%	11.0%	0	0
	West	Through/ Right	LOS A	LOS A	6.9	0	0.8%	2.9%	0.4	0.1

2031 Results

Intersection	Approach	Lane	LOS		Average Delay (s)		Degree of Saturation		Queue Results (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Drumpellier Dr/ Youle-Dean Rd/ Whiteman Dr	North	Left	LOS A	LOS B	7.4	12.6	6.6%	8.1%	4.4	5.6
		Through	LOS C	LOS C	21	27.4	50.8%	59.1%	84	37.5
		Right	LOS C	LOS D	34.9	35.9	80.8%	53.5%	155.7	21.4
	East	Left/ Through	LOS B	LOS A	19.9	9.9	78.4%	27.5%	129.4	15.7
		Through	LOS C	LOS C	32.8	23.4	78.1%	24.5%	118	17
		Right	LOS D	LOS D	36.6	40.7	34.2%	67.8%	29.6	24.9
	South	Left	LOS C	LOS A	20.5	7.4	27.6%	3.2%	29.8	1.7
		Through	LOS D	LOS B	42.7	16.6	79.0%	63.8%	55.1	86.6
		Right	LOS D	LOS C	43.4	25.4	48.3%	72.6%	27.7	88.5
	West	Left	LOS A	LOS A	6.2	6.2	8.5%	22.8%	0	0
		Through	LOS C	LOS C	25.7	27.4	22.2%	69.2%	27.1	55.9
		Through/ Right	LOS D	LOS C	46.3	32.4	21.9%	38.5%	8.5	20.2
Whiteman Dr/ Bus Access	North	Left/ Through/ Right	LOS A	LOS B	6	10.7	0.1%	0.2%	0	0.1
	East	Left/ Through	LOS A	LOS A	4.7	4.7	85.9%	17.8%	0	0
	South	Right	LOS C	LOS B	30.9	10	7.9%	3.4%	7.2	1.7
	West	Left/ Through	LOS A	LOS A	5.1	5.2	17.3%	49.2%	10.7	38.8
Whiteman Dr/ Park and Ride	East	Left/ Through	LOS A	LOS A	6.7	5.9	20.7%	45.0%	3.7	10.9
	South	Left/ Right	LOS A	LOS A	5.6	5.5	55.1%	11.5%	0	0
	West	Through/ Right	LOS A	LOS A	7.9	0	0.8%	2.9%	0.4	0.1

2036 Results

Intersection	Approach	Lane	LOS		Average Delay (s)		Degree of Saturation		Queue Results (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Drumpellier Dr/ Youle-Dean Rd/ Whiteman Dr	North	Left	LOS A	LOS B	7.9	16.9	9.2%	11.6%	6.7	11.3
		Through	LOS C	LOS D	31.4	38.6	79.8%	73.2%	143	69.2
		Right	LOS D	LOS D	38.1	48.2	72.9%	45.7%	91.6	18.2
	East	Left/ Through	LOS B	LOS B	19.5	11	69.6%	24.9%	103.2	18.5
		Through	LOS C	LOS C	27.3	27.9	78.1%	24.3%	154.2	27
		Right	LOS C	LOS D	29.8	52.5	22.3%	70.3%	22	29.1
	South	Left	LOS B	LOS A	19.2	7.1	36.3%	4.2%	44.7	2.7
		Through	LOS D	LOS B	38.8	18.2	71.3%	59.8%	57.6	118
		Right	LOS D	LOS C	50.4	29.6	80.3%	72.9%	34.8	125.9
	West	Left	LOS A	LOS A	6.2	6.2	5.2%	14.1%	0	0
		Through	LOS B	LOS D	19.3	35.7	21.5%	77.5%	31.5	108.1
		Through/ Right	LOS D	LOS D	43.8	39.5	31.5%	53.9%	14.1	42
Whiteman Dr/ Bus Access	North	Left/ Through/ Right	LOS A	LOS B	6	10.7	0.1%	0.2%	0	0.1
	East	Left/ Through	LOS A	LOS A	4.7	4.7	87.3%	17.9%	0	0
	South	Right	LOS C	LOS B	31.6	10.1	8.1%	3.7%	7.3	1.6
	West	Left/ Through	LOS A	LOS A	5.1	5.2	17.3%	53.3%	10.7	38.8
Whiteman Dr/ Park and Ride	East	Left/ Through	LOS A	LOS A	6.7	5.9	21.0%	45.1%	3.8	10.9
	South	Left/ Right	LOS A	LOS A	5.6	5.5	56.1%	11.6%	0	0
	West	Through/ Right	LOS A	LOS A	8.6	0	0.9%	2.9%	0.5	0.1

Appendix D – SIDRA movement summaries

MOVEMENT SUMMARY

Site: 511v [AM Peak 2026 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd]

Network: N101 [AM Peak 2026]

Drumpellier Drive/ Whiteman Drive - Youle-Dean Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drumpellier Dr (S)														
1	L2	142	6.4	142	6.4	0.248	19.6	LOS B	3.3	26.3	0.72	0.74	0.72	36.9
2	T1	256	6.4	256	6.4	0.697	41.3	LOS D	5.3	41.8	1.00	0.86	1.15	35.9
3	R2	100	6.4	100	6.4	0.342	41.7	LOS D	2.7	21.0	0.94	0.75	0.94	36.7
Approach		498	6.4	498	6.4	0.697	35.2	LOS D	5.3	41.8	0.91	0.80	0.99	36.3
East: Youle-Dean Rd (E)														
4	L2	656	6.4	656	6.4	0.602	10.8	LOS B	9.6	75.9	0.56	0.78	0.56	56.1
5	T1	397	12.0	397	12.0	0.781	32.8	LOS C	14.9	118.0	0.98	0.90	1.10	33.3
6	R2	91	7.7	91	7.7	0.315	37.2	LOS D	3.1	25.9	0.89	0.77	0.89	39.9
Approach		1143	8.4	1143	8.4	0.781	20.5	LOS C	14.9	118.0	0.73	0.82	0.77	47.3
North: Drumpellier Dr (N)														
7	L2	45	6.4	45	6.4	0.039	7.4	LOS A	0.3	2.5	0.28	0.61	0.28	55.7
8	T1	416	6.4	416	6.4	0.312	19.9	LOS B	5.9	46.4	0.76	0.63	0.76	45.3
9	R2	485	6.4	485	6.4	0.758	31.1	LOS C	17.6	139.1	0.93	0.89	1.00	30.2
Approach		946	6.4	946	6.4	0.758	25.0	LOS C	17.6	139.1	0.82	0.76	0.86	39.0
West: Whiteman Dr E (W)														
10	L2	117	6.4	117	6.4	0.071	6.2	LOS A	0.0	0.0	0.00	0.59	0.00	58.9
11	T1	116	25.9	116	25.9	0.271	26.0	LOS C	3.7	33.4	0.83	0.68	0.83	40.8
12	R2	27	6.4	27	6.4	0.219	46.3	LOS D	1.1	8.5	0.97	0.71	0.97	27.3
Approach		260	15.1	260	15.1	0.271	19.2	LOS B	3.7	33.4	0.47	0.64	0.47	44.7
All Vehicles		2847	8.0	2847	8.0	0.781	24.5	LOS C	17.6	139.1	0.77	0.78	0.81	41.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	34.3	LOS D			0.93	0.93

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 [AM Peak 2026 - Bus Access Roundabout]

Network: N101 [AM Peak 2026]

Bus Access Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bus Access (S)														
3	R2	22	100.0	22	100.0	0.075	29.8	LOS C	0.5	7.1	0.86	0.77	0.86	31.3
Approach		22	100.0	22	100.0	0.075	29.8	LOS C	0.5	7.1	0.86	0.77	0.86	31.3
East: Whiteman Dr														
4	L2	22	100.0	22	100.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	52.1
5	T1	1002	6.4	1002	6.4	0.834	4.7	LOS A	0.0	0.0	0.00	0.47	0.00	37.3
6	R2	1	6.4	1	6.4	0.834	8.2	LOS A	0.0	0.0	0.00	0.47	0.00	51.6
Approach		1025	8.4	1025	8.4	0.834	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
North: Service Road Access (N)														
7	L2	1	0.0	1	0.0	0.001	6.0	LOS A	0.0	0.0	0.46	0.48	0.46	49.8
Approach		1	0.0	1	0.0	0.001	6.0	LOS A	0.0	0.0	0.46	0.48	0.46	49.8
West: Whiteman Dr														
10	L2	1	6.4	1	6.4	0.173	4.9	LOS A	1.5	10.7	0.22	0.44	0.22	50.8
11	T1	238	6.4	238	6.4	0.173	5.1	LOS A	1.5	10.7	0.22	0.44	0.22	43.1
Approach		239	6.4	239	6.4	0.173	5.1	LOS A	1.5	10.7	0.22	0.44	0.22	43.1
All Vehicles		1287	9.6	1287	9.6	0.834	5.2	LOS A	1.5	10.7	0.06	0.47	0.06	39.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM Peak 2026 - PnR and KnR Access]

Network: N101 [AM Peak 2026]

PnR and KnR Acces
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: PnR and KnR Acces														
1	L2	1	0.0	1	0.0	0.203	5.8	LOS A	0.5	3.6	0.34	0.71	0.34	52.7
3	R2	232	0.0	232	0.0	0.203	6.6	LOS A	0.5	3.6	0.34	0.71	0.34	49.2
Approach		233	0.0	233	0.0	0.203	6.6	LOS A	0.5	3.6	0.34	0.71	0.34	49.3
East: Whiteman Dr														
4	L2	926	0.0	926	0.0	0.535	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	51.9
5	T1	76	6.4	76	6.4	0.535	0.0	LOS A	0.0	0.0	0.00	0.53	0.00	53.6
Approach		1002	0.5	1002	0.5	0.535	5.2	NA	0.0	0.0	0.00	0.53	0.00	52.0
West: Whiteman Dr														
11	T1	6	6.4	6	6.4	0.008	6.9	LOS A	0.1	0.4	0.47	0.11	0.47	46.8
12	R2	1	0.0	1	0.0	0.008	19.0	LOS C	0.1	0.4	0.47	0.11	0.47	50.8
Approach		7	5.5	7	5.5	0.008	8.6	NA	0.1	0.4	0.47	0.11	0.47	47.7
All Vehicles		1242	0.4	1242	0.4	0.535	5.4	NA	0.5	3.6	0.07	0.57	0.07	51.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 511v [PM Peak 2026 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd]

Network: N101 [PM Peak 2026]

Drumpellier Drive/ Whiteman Drive - Youle-Dean Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drumpellier Dr (S)														
1	L2	33	2.4	33	2.4	0.028	7.4	LOS A	0.2	1.5	0.34	0.61	0.34	48.4
2	T1	737	2.4	737	2.4	0.576	18.2	LOS B	9.1	69.0	0.88	0.75	0.88	46.3
3	R2	466	2.4	466	2.4	0.671	26.6	LOS C	9.1	68.4	0.90	0.83	0.94	43.8
Approach		1236	2.4	1236	2.4	0.671	21.1	LOS C	9.1	69.0	0.87	0.78	0.89	45.3
East: Youle-Dean Rd (E)														
4	L2	256	2.4	256	2.4	0.229	9.3	LOS A	1.5	11.3	0.39	0.70	0.39	57.6
5	T1	105	22.9	105	22.9	0.186	20.4	LOS C	2.0	15.2	0.83	0.64	0.83	41.7
6	R2	84	3.7	84	3.7	0.477	37.3	LOS D	2.5	20.3	0.99	0.76	0.99	40.0
Approach		445	7.5	445	7.5	0.477	17.2	LOS B	2.5	20.3	0.61	0.70	0.61	50.2
North: Drumpellier Dr (N)														
7	L2	33	2.4	33	2.4	0.046	12.0	LOS B	0.4	3.1	0.57	0.66	0.57	53.1
8	T1	202	2.4	202	2.4	0.351	26.0	LOS C	2.8	21.2	0.94	0.73	0.94	42.2
9	R2	89	2.4	89	2.4	0.517	35.8	LOS D	2.7	20.5	0.99	0.77	1.01	28.0
Approach		324	2.4	324	2.4	0.517	27.3	LOS C	2.8	21.2	0.91	0.74	0.92	39.8
West: Whiteman Dr E (W)														
10	L2	331	2.4	331	2.4	0.191	6.2	LOS A	0.0	0.0	0.00	0.59	0.00	60.8
11	T1	269	10.8	269	10.8	0.639	23.8	LOS C	7.5	61.2	0.95	0.81	0.99	43.1
12	R2	95	2.4	95	2.4	0.304	29.1	LOS C	2.5	18.8	0.89	0.77	0.89	34.5
Approach		695	5.6	695	5.6	0.639	16.1	LOS B	7.5	61.2	0.49	0.70	0.51	48.2
All Vehicles		2700	4.1	2700	4.1	0.671	19.9	LOS B	9.1	69.0	0.74	0.74	0.75	45.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
P2	East Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		105	24.4	LOS C			0.90	0.90

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 [PM Peak 2026 - Bus Access Roundabout]

Network: N101 [PM Peak 2026]

Bus Access Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bus Access (S)														
3	R2	22	100.0	22	100.0	0.033	10.0	LOS A	0.1	1.6	0.30	0.66	0.30	46.2
Approach		22	100.0	22	100.0	0.033	10.0	LOS A	0.1	1.6	0.30	0.66	0.30	46.2
East: Whiteman Dr														
4	L2	22	100.0	22	100.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	52.1
5	T1	206	2.4	206	2.4	0.169	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	37.3
6	R2	1	2.4	1	2.4	0.169	8.1	LOS A	0.0	0.0	0.00	0.48	0.00	52.1
Approach		229	11.8	229	11.8	0.169	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	41.4
North: Service Road Access (N)														
7	L2	1	0.0	1	0.0	0.002	10.7	LOS B	0.0	0.1	0.75	0.56	0.75	44.5
Approach		1	0.0	1	0.0	0.002	10.7	LOS B	0.0	0.1	0.75	0.56	0.75	44.5
West: Whiteman Dr														
10	L2	1	2.4	1	2.4	0.492	5.0	LOS A	5.4	38.7	0.29	0.44	0.29	50.8
11	T1	695	2.4	695	2.4	0.492	5.2	LOS A	5.4	38.7	0.29	0.44	0.29	42.4
Approach		696	2.4	696	2.4	0.492	5.2	LOS A	5.4	38.7	0.29	0.44	0.29	42.4
All Vehicles		948	6.9	948	6.9	0.492	5.2	LOS A	5.4	38.7	0.22	0.45	0.22	42.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Peak 2026 - PnR and KnR Access]

Network: N101 [PM Peak 2026]

PnR and KnR Acces
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: PnR and KnR Acces														
1	L2	1	0.0	1	0.0	0.448	5.7	LOS A	1.5	10.8	0.23	0.61	0.23	53.0
3	R2	642	0.0	642	0.0	0.448	5.9	LOS A	1.5	10.8	0.23	0.61	0.23	49.8
Approach		643	0.0	643	0.0	0.448	5.9	LOS A	1.5	10.8	0.23	0.61	0.23	49.8
East: Whiteman Dr														
4	L2	168	0.0	168	0.0	0.110	5.5	LOS A	0.0	0.0	0.00	0.48	0.00	52.6
5	T1	38	2.4	38	2.4	0.110	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	54.4
Approach		206	0.4	206	0.4	0.110	4.5	NA	0.0	0.0	0.00	0.48	0.00	52.9
West: Whiteman Dr														
11	T1	53	2.4	53	2.4	0.029	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	59.6
12	R2	1	0.0	1	0.0	0.029	6.5	LOS A	0.0	0.1	0.02	0.01	0.02	57.6
Approach		54	2.4	54	2.4	0.029	0.2	NA	0.0	0.1	0.02	0.01	0.02	59.6
All Vehicles		903	0.2	903	0.2	0.448	5.2	NA	1.5	10.8	0.16	0.54	0.16	51.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 511v [AM Peak 2031 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd]

Network: N101 [AM Peak 2031]

Drumpellier Drive/ Whiteman Drive - Youle-Dean Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drumpellier Dr (S)														
1	L2	156	6.4	156	6.4	0.276	20.5	LOS C	3.8	29.8	0.74	0.75	0.74	36.3
2	T1	326	6.4	326	6.4	0.790	42.7	LOS D	7.0	55.1	1.00	0.93	1.27	35.4
3	R2	127	6.4	127	6.4	0.483	43.4	LOS D	3.5	27.7	0.97	0.76	0.97	36.1
Approach		609	6.4	609	6.4	0.790	37.2	LOS D	7.0	55.1	0.93	0.85	1.07	35.7
East: Youle-Dean Rd (E)														
4	L2	759	6.4	759	6.4	0.784	19.9	LOS B	16.4	129.4	0.83	0.93	1.01	49.3
5	T1	397	12.0	397	12.0	0.781	32.8	LOS C	14.9	118.0	0.98	0.90	1.10	33.3
6	R2	104	7.7	104	7.7	0.342	36.6	LOS D	3.6	29.6	0.88	0.78	0.88	40.2
Approach		1260	8.3	1260	8.3	0.784	25.3	LOS C	16.4	129.4	0.88	0.90	1.03	44.3
North: Drumpellier Dr (N)														
7	L2	76	6.4	76	6.4	0.066	7.4	LOS A	0.6	4.4	0.29	0.62	0.29	55.7
8	T1	699	6.4	699	6.4	0.508	21.0	LOS C	10.6	84.0	0.82	0.71	0.82	44.7
9	R2	500	6.4	500	6.4	0.808	34.9	LOS C	19.7	155.7	0.96	0.93	1.09	28.4
Approach		1275	6.4	1275	6.4	0.808	25.6	LOS C	19.7	155.7	0.85	0.79	0.90	39.7
West: Whiteman Dr E (W)														
10	L2	140	6.4	140	6.4	0.085	6.2	LOS A	0.0	0.0	0.00	0.59	0.00	58.9
11	T1	93	30.7	93	30.7	0.222	25.7	LOS C	2.9	27.1	0.82	0.66	0.82	40.8
12	R2	27	6.4	27	6.4	0.219	46.3	LOS D	1.1	8.5	0.97	0.71	0.97	27.3
Approach		260	15.1	260	15.1	0.222	17.3	LOS B	2.9	27.1	0.40	0.63	0.40	46.1
All Vehicles		3404	7.8	3404	7.8	0.808	27.0	LOS C	19.7	155.7	0.84	0.83	0.94	40.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	34.3	LOS D			0.93	0.93

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 [AM Peak 2031 - Bus Access Roundabout]

Network: N101 [AM Peak 2031]

Bus Access Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bus Access (S)														
3	R2	22	100.0	22	100.0	0.079	30.9	LOS C	0.6	7.2	0.86	0.79	0.86	30.7
Approach		22	100.0	22	100.0	0.079	30.9	LOS C	0.6	7.2	0.86	0.79	0.86	30.7
East: Whiteman Dr														
4	L2	22	100.0	22	100.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	52.1
5	T1	1032	6.4	1032	6.4	0.859	4.7	LOS A	0.0	0.0	0.00	0.47	0.00	37.3
6	R2	1	6.4	1	6.4	0.859	8.2	LOS A	0.0	0.0	0.00	0.47	0.00	51.6
Approach		1055	8.4	1055	8.4	0.859	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
North: Service Road Access (N)														
7	L2	1	0.0	1	0.0	0.001	6.0	LOS A	0.0	0.0	0.46	0.48	0.46	49.8
Approach		1	0.0	1	0.0	0.001	6.0	LOS A	0.0	0.0	0.46	0.48	0.46	49.8
West: Whiteman Dr														
10	L2	1	6.4	1	6.4	0.173	4.9	LOS A	1.5	10.7	0.22	0.44	0.22	50.8
11	T1	238	6.4	238	6.4	0.173	5.1	LOS A	1.5	10.7	0.22	0.44	0.22	43.1
Approach		239	6.4	239	6.4	0.173	5.1	LOS A	1.5	10.7	0.22	0.44	0.22	43.1
All Vehicles		1317	9.5	1317	9.5	0.859	5.2	LOS A	1.5	10.7	0.06	0.47	0.06	39.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM Peak 2031 - PnR and KnR Access]

Network: N101 [AM Peak 2031]

PnR and KnR Acces
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: PnR and KnR Acces														
1	L2	1	0.0	1	0.0	0.207	5.9	LOS A	0.5	3.7	0.35	0.72	0.35	52.7
3	R2	232	0.0	232	0.0	0.207	6.7	LOS A	0.5	3.7	0.35	0.72	0.35	49.2
Approach		233	0.0	233	0.0	0.207	6.7	LOS A	0.5	3.7	0.35	0.72	0.35	49.2
East: Whiteman Dr														
4	L2	926	0.0	926	0.0	0.551	5.6	LOS A	0.0	0.0	0.00	0.52	0.00	52.0
5	T1	105	6.4	105	6.4	0.551	0.0	LOS A	0.0	0.0	0.00	0.52	0.00	53.8
Approach		1032	0.7	1032	0.7	0.551	5.0	NA	0.0	0.0	0.00	0.52	0.00	52.2
West: Whiteman Dr														
11	T1	6	6.4	6	6.4	0.008	7.9	LOS A	0.1	0.4	0.49	0.12	0.49	45.5
12	R2	1	0.0	1	0.0	0.008	20.4	LOS C	0.1	0.4	0.49	0.12	0.49	50.1
Approach		7	5.5	7	5.5	0.008	9.7	NA	0.1	0.4	0.49	0.12	0.49	46.6
All Vehicles		1272	0.6	1272	0.6	0.551	5.3	NA	0.5	3.7	0.07	0.56	0.07	51.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 511v [PM Peak 2031 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd]

Network: N101 [PM Peak 2031]

Drumpellier Drive/ Whiteman Drive - Youle-Dean Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drumpellier Dr (S)														
1	L2	38	2.4	38	2.4	0.032	7.4	LOS A	0.2	1.7	0.34	0.62	0.34	48.4
2	T1	939	2.4	939	2.4	0.638	16.6	LOS B	11.5	86.6	0.87	0.76	0.87	47.2
3	R2	594	2.4	594	2.4	0.726	25.4	LOS C	11.7	88.5	0.89	0.85	0.95	44.5
Approach		1571	2.4	1571	2.4	0.726	19.7	LOS B	11.7	88.5	0.87	0.79	0.89	46.2
East: Youle-Dean Rd (E)														
4	L2	296	2.4	296	2.4	0.275	9.9	LOS A	2.1	15.7	0.44	0.71	0.44	57.2
5	T1	108	22.3	108	22.3	0.245	23.4	LOS C	2.3	17.0	0.89	0.68	0.89	39.1
6	R2	97	3.7	97	3.7	0.678	40.7	LOS D	3.1	24.9	1.00	0.82	1.21	38.6
Approach		501	7.0	501	7.0	0.678	18.8	LOS B	3.1	24.9	0.65	0.73	0.69	49.2
North: Drumpellier Dr (N)														
7	L2	55	2.4	55	2.4	0.081	12.6	LOS B	0.7	5.6	0.60	0.68	0.60	52.6
8	T1	340	2.4	340	2.4	0.591	27.4	LOS C	5.0	37.5	0.98	0.80	1.02	41.5
9	R2	93	2.4	93	2.4	0.535	35.9	LOS D	2.8	21.4	0.99	0.78	1.03	28.0
Approach		487	2.4	487	2.4	0.591	27.4	LOS C	5.0	37.5	0.94	0.79	0.97	40.5
West: Whiteman Dr E (W)														
10	L2	395	2.4	395	2.4	0.228	6.2	LOS A	0.0	0.0	0.00	0.59	0.00	60.8
11	T1	227	12.3	227	12.3	0.692	27.4	LOS C	6.8	55.9	0.99	0.86	1.11	40.3
12	R2	95	2.4	95	2.4	0.385	32.4	LOS C	2.7	20.2	0.94	0.77	0.94	32.9
Approach		717	5.5	717	5.5	0.692	16.4	LOS B	6.8	55.9	0.44	0.70	0.48	47.8
All Vehicles		3276	3.8	3276	3.8	0.726	20.0	LOS B	11.7	88.5	0.75	0.76	0.78	45.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
P2	East Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		105	24.4	LOS C			0.90	0.90

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 [PM Peak 2031 - Bus Access Roundabout]

Network: N101 [PM Peak 2031]

Bus Access Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bus Access (S)														
3	R2	22	100.0	22	100.0	0.034	10.0	LOS B	0.1	1.7	0.31	0.66	0.31	46.1
Approach		22	100.0	22	100.0	0.034	10.0	LOS B	0.1	1.7	0.31	0.66	0.31	46.1
East: Whiteman Dr														
4	L2	22	100.0	22	100.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	52.1
5	T1	217	2.4	217	2.4	0.178	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	37.3
6	R2	1	2.4	1	2.4	0.178	8.1	LOS A	0.0	0.0	0.00	0.48	0.00	52.1
Approach		240	11.4	240	11.4	0.178	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	41.2
North: Service Road Access (N)														
7	L2	1	0.0	1	0.0	0.002	10.7	LOS B	0.0	0.1	0.75	0.56	0.75	44.5
Approach		1	0.0	1	0.0	0.002	10.7	LOS B	0.0	0.1	0.75	0.56	0.75	44.5
West: Whiteman Dr														
10	L2	1	2.4	1	2.4	0.492	5.0	LOS A	5.4	38.8	0.29	0.44	0.29	50.8
11	T1	695	2.4	695	2.4	0.492	5.2	LOS A	5.4	38.8	0.29	0.44	0.29	42.4
Approach		696	2.4	696	2.4	0.492	5.2	LOS A	5.4	38.8	0.29	0.44	0.29	42.4
All Vehicles		959	6.9	959	6.9	0.492	5.2	LOS A	5.4	38.8	0.22	0.45	0.22	42.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Peak 2031 - PnR and KnR Access]

Network: N101 [PM Peak 2031]

PnR and KnR Acces
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: PnR and KnR Acces														
1	L2	1	0.0	1	0.0	0.450	5.8	LOS A	1.6	10.9	0.24	0.61	0.24	53.0
3	R2	642	0.0	642	0.0	0.450	5.9	LOS A	1.6	10.9	0.24	0.61	0.24	49.7
Approach		643	0.0	643	0.0	0.450	5.9	LOS A	1.6	10.9	0.24	0.61	0.24	49.7
East: Whiteman Dr														
4	L2	168	0.0	168	0.0	0.115	5.5	LOS A	0.0	0.0	0.00	0.45	0.00	52.8
5	T1	48	2.4	48	2.4	0.115	0.0	LOS A	0.0	0.0	0.00	0.45	0.00	54.7
Approach		217	0.5	217	0.5	0.115	4.3	NA	0.0	0.0	0.00	0.45	0.00	53.2
West: Whiteman Dr														
11	T1	53	2.4	53	2.4	0.029	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	59.6
12	R2	1	0.0	1	0.0	0.029	6.5	LOS A	0.0	0.1	0.02	0.01	0.02	57.6
Approach		54	2.4	54	2.4	0.029	0.2	NA	0.0	0.1	0.02	0.01	0.02	59.6
All Vehicles		914	0.3	914	0.3	0.450	5.2	NA	1.6	10.9	0.17	0.54	0.17	51.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 511v [AM Peak 2036 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd]

Network: N101 [AM Peak 2036]

Drumpellier Drive/ Whiteman Drive - Youle-Dean Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drumpellier Dr (S)														
1	L2	239	6.4	239	6.4	0.363	19.2	LOS B	5.7	44.7	0.73	0.76	0.73	37.3
2	T1	360	6.4	360	6.4	0.713	38.8	LOS D	7.3	57.6	1.00	0.88	1.13	36.8
3	R2	141	6.4	141	6.4	0.803	50.4	LOS D	4.4	34.8	1.00	0.87	1.27	33.8
Approach		740	6.4	740	6.4	0.803	34.7	LOS C	7.3	57.6	0.91	0.84	1.03	36.1
East: Youle-Dean Rd (E)														
4	L2	651	6.4	651	6.4	0.696	19.5	LOS B	13.1	103.2	0.77	0.89	0.96	49.6
5	T1	532	8.8	532	8.8	0.781	27.3	LOS C	19.5	154.2	0.95	0.88	1.03	37.1
6	R2	89	7.7	89	7.7	0.223	29.8	LOS C	2.6	22.0	0.78	0.76	0.78	43.4
Approach		1272	7.5	1272	7.5	0.781	23.5	LOS C	19.5	154.2	0.84	0.88	0.98	44.9
North: Drumpellier Dr (N)														
7	L2	100	6.4	100	6.4	0.092	7.9	LOS A	0.8	6.7	0.32	0.63	0.32	55.3
8	T1	916	6.4	916	6.4	0.798	31.4	LOS C	18.1	143.0	0.98	0.94	1.11	39.7
9	R2	301	6.4	301	6.4	0.729	38.1	LOS D	11.6	91.6	0.97	0.88	1.07	27.1
Approach		1317	6.4	1317	6.4	0.798	31.1	LOS C	18.1	143.0	0.93	0.91	1.04	38.3
West: Whiteman Dr E (W)														
10	L2	85	6.4	85	6.4	0.052	6.2	LOS A	0.0	0.0	0.00	0.59	0.00	58.9
11	T1	128	24.1	128	24.1	0.215	19.3	LOS B	3.5	31.5	0.73	0.60	0.73	46.5
12	R2	46	6.4	46	6.4	0.315	43.8	LOS D	1.8	14.1	0.96	0.75	0.96	28.1
Approach		260	15.1	260	15.1	0.315	19.4	LOS B	3.5	31.5	0.53	0.62	0.53	44.4
All Vehicles		3588	7.4	3588	7.4	0.803	28.3	LOS C	19.5	154.2	0.87	0.86	0.98	40.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	34.3	LOS D			0.93	0.93

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 [AM Peak 2036 - Bus Access Roundabout]

Network: N101 [AM Peak 2036]

Bus Access Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bus Access (S)														
3	R2	22	100.0	22	100.0	0.081	31.6	LOS C	0.6	7.3	0.87	0.80	0.87	30.4
Approach		22	100.0	22	100.0	0.081	31.6	LOS C	0.6	7.3	0.87	0.80	0.87	30.4
East: Whiteman Dr														
4	L2	22	100.0	22	100.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	52.1
5	T1	1049	6.4	1049	6.4	0.873	4.7	LOS A	0.0	0.0	0.00	0.47	0.00	37.3
6	R2	1	6.4	1	6.4	0.873	8.2	LOS A	0.0	0.0	0.00	0.47	0.00	51.6
Approach		1073	8.3	1073	8.3	0.873	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
North: Service Road Access (N)														
7	L2	1	0.0	1	0.0	0.001	6.0	LOS A	0.0	0.0	0.46	0.48	0.46	49.8
Approach		1	0.0	1	0.0	0.001	6.0	LOS A	0.0	0.0	0.46	0.48	0.46	49.8
West: Whiteman Dr														
10	L2	1	6.4	1	6.4	0.173	4.9	LOS A	1.5	10.7	0.22	0.44	0.22	50.8
11	T1	238	6.4	238	6.4	0.173	5.1	LOS A	1.5	10.7	0.22	0.44	0.22	43.1
Approach		239	6.4	239	6.4	0.173	5.1	LOS A	1.5	10.7	0.22	0.44	0.22	43.1
All Vehicles		1335	9.5	1335	9.5	0.873	5.2	LOS A	1.5	10.7	0.05	0.47	0.05	39.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM Peak 2036 - PnR and KnR Access]

Network: N101 [AM Peak 2036]

PnR and KnR Acces
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: PnR and KnR Acces														
1	L2	1	0.0	1	0.0	0.210	6.0	LOS A	0.5	3.8	0.36	0.73	0.36	52.6
3	R2	232	0.0	232	0.0	0.210	6.7	LOS A	0.5	3.8	0.36	0.73	0.36	49.1
Approach		233	0.0	233	0.0	0.210	6.7	LOS A	0.5	3.8	0.36	0.73	0.36	49.2
East: Whiteman Dr														
4	L2	926	0.0	926	0.0	0.561	5.6	LOS A	0.0	0.0	0.00	0.51	0.00	52.1
5	T1	123	6.4	123	6.4	0.561	0.1	LOS A	0.0	0.0	0.00	0.51	0.00	53.9
Approach		1049	0.8	1049	0.8	0.561	4.9	NA	0.0	0.0	0.00	0.51	0.00	52.3
West: Whiteman Dr														
11	T1	6	6.4	6	6.4	0.009	8.6	LOS A	0.1	0.5	0.51	0.12	0.51	44.7
12	R2	1	0.0	1	0.0	0.009	21.4	LOS C	0.1	0.5	0.51	0.12	0.51	49.6
Approach		7	5.5	7	5.5	0.009	10.4	NA	0.1	0.5	0.51	0.12	0.51	45.8
All Vehicles		1289	0.6	1289	0.6	0.561	5.3	NA	0.5	3.8	0.07	0.55	0.07	51.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 511v [PM Peak 2036 - Drumpellier Drive/ Whiteman Drive/ Youle-Dean Rd]

Network: N101 [PM Peak 2036]

Drumpellier Drive/ Whiteman Drive - Youle-Dean Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 82 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drumpellier Dr (S)														
1	L2	54	2.4	54	2.4	0.042	7.1	LOS A	0.4	2.7	0.26	0.61	0.26	48.8
2	T1	1036	2.4	1036	2.4	0.598	18.2	LOS B	15.6	118.0	0.81	0.71	0.81	46.3
3	R2	655	2.4	655	2.4	0.729	29.6	LOS C	16.7	125.9	0.88	0.84	0.90	42.3
Approach		1744	2.4	1744	2.4	0.729	22.2	LOS C	16.7	125.9	0.82	0.76	0.83	44.7
East: Youle-Dean Rd (E)														
4	L2	254	2.4	254	2.4	0.249	11.0	LOS B	2.4	18.5	0.45	0.71	0.45	56.2
5	T1	129	19.5	129	19.5	0.243	27.9	LOS C	3.6	27.0	0.85	0.66	0.85	35.9
6	R2	83	3.7	83	3.7	0.703	52.5	LOS D	3.6	29.1	1.00	0.83	1.22	34.3
Approach		466	7.4	466	7.4	0.703	23.1	LOS C	3.6	29.1	0.66	0.72	0.70	45.9
North: Drumpellier Dr (N)														
7	L2	72	2.4	72	2.4	0.116	16.9	LOS B	1.5	11.3	0.62	0.70	0.62	49.6
8	T1	445	2.4	445	2.4	0.732	38.6	LOS D	9.2	69.2	1.00	0.89	1.13	36.9
9	R2	58	2.4	58	2.4	0.457	48.2	LOS D	2.4	18.2	1.00	0.75	1.00	23.6
Approach		575	2.4	575	2.4	0.732	36.8	LOS D	9.2	69.2	0.95	0.85	1.05	37.0
West: Whiteman Dr E (W)														
10	L2	243	2.4	243	2.4	0.141	6.2	LOS A	0.0	0.0	0.00	0.59	0.00	60.8
11	T1	326	9.6	326	9.6	0.775	35.7	LOS D	13.4	108.1	0.99	0.92	1.13	35.2
12	R2	147	2.4	147	2.4	0.539	39.5	LOS D	5.6	42.0	0.95	0.80	0.95	29.8
Approach		717	5.7	717	5.7	0.775	26.5	LOS C	13.4	108.1	0.65	0.78	0.71	39.4
All Vehicles		3502	3.7	3502	3.7	0.775	25.6	LOS C	16.7	125.9	0.78	0.77	0.82	42.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	35.3	LOS D	0.1	0.1	0.93	0.93
P2	East Full Crossing	53	35.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	35.3	LOS D			0.93	0.93

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 [PM Peak 2036 - Bus Access Roundabout]

Network: N101 [PM Peak 2036]

Bus Access Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bus Access (S)														
3	R2	22	100.0	22	100.0	0.037	10.1	LOS B	0.1	1.6	0.31	0.66	0.31	46.1
Approach		22	100.0	22	100.0	0.037	10.1	LOS B	0.1	1.6	0.31	0.66	0.31	46.1
East: Whiteman Dr														
4	L2	22	100.0	22	100.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	52.1
5	T1	219	2.4	219	2.4	0.179	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	37.3
6	R2	1	2.4	1	2.4	0.179	8.1	LOS A	0.0	0.0	0.00	0.48	0.00	52.1
Approach		242	11.3	242	11.3	0.179	4.7	LOS A	0.0	0.0	0.00	0.48	0.00	41.2
North: Service Road Access (N)														
7	L2	1	0.0	1	0.0	0.002	10.7	LOS B	0.0	0.1	0.75	0.56	0.75	44.5
Approach		1	0.0	1	0.0	0.002	10.7	LOS B	0.0	0.1	0.75	0.56	0.75	44.5
West: Whiteman Dr														
10	L2	1	2.4	1	2.4	0.533	5.0	LOS A	5.4	38.8	0.29	0.44	0.29	50.8
11	T1	695	2.4	695	2.4	0.533	5.2	LOS A	5.4	38.8	0.29	0.44	0.29	42.4
Approach		696	2.4	696	2.4	0.533	5.2	LOS A	5.4	38.8	0.29	0.44	0.29	42.4
All Vehicles		961	6.9	961	6.9	0.533	5.2	LOS A	5.4	38.8	0.22	0.45	0.22	42.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Peak 2036 - PnR and KnR Access]

Network: N101 [PM Peak 2036]

PnR and KnR Acces
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: PnR and KnR Acces														
1	L2	1	0.0	1	0.0	0.451	5.8	LOS A	1.6	10.9	0.24	0.61	0.24	53.0
3	R2	642	0.0	642	0.0	0.451	5.9	LOS A	1.6	10.9	0.24	0.61	0.24	49.7
Approach		643	0.0	643	0.0	0.451	5.9	LOS A	1.6	10.9	0.24	0.61	0.24	49.7
East: Whiteman Dr														
4	L2	168	0.0	168	0.0	0.116	5.5	LOS A	0.0	0.0	0.00	0.45	0.00	52.9
5	T1	51	2.4	51	2.4	0.116	0.0	LOS A	0.0	0.0	0.00	0.45	0.00	54.7
Approach		219	0.6	219	0.6	0.116	4.3	NA	0.0	0.0	0.00	0.45	0.00	53.3
West: Whiteman Dr														
11	T1	53	2.4	53	2.4	0.029	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	59.6
12	R2	1	0.0	1	0.0	0.029	6.5	LOS A	0.0	0.1	0.02	0.01	0.02	57.6
Approach		54	2.4	54	2.4	0.029	0.2	NA	0.0	0.1	0.02	0.01	0.02	59.6
All Vehicles		916	0.3	916	0.3	0.451	5.2	NA	1.6	10.9	0.17	0.54	0.17	51.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.