Helena Valley Structure Plan- Lots 253 & 254 Helena Valley Road

Transport Impact Assessment

Stantec

Prepared for:

Ingwe Helena Valley Pty Ltd c/o Jardim Property Group

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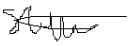

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1 Introduction

1.1 Background

Stantec was commissioned by Ingwe Helena Valley Pty Ltd c/o Jardim Property Group ("the Client") to prepare a Transport Impact Assessment (TIA) for a proposed structure plan on Lots 253 and 254 Helena Valley Road in Helena Valley, within the Shire of Mundaring (the "Site"). This report aims to assess the impact of the proposed structure plan on the surrounding road network. The report will focus on access, public transport, pedestrian and cycle networks, and road network performance.

This Traffic Impact Assessment (TIA) report was prepared in accordance with the *WAPC TIA Guidelines Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (2016)* with the checklist attached in Appendix A.

1.2 Study Area

The Site is located in the suburb of Helena Valley within the Shire of Mundaring as shown in Figure 1-1. It is located approximately 25km east of Perth CBD and lies at the western edge of the Darling Scarp.

Figure 1-1 Site Location

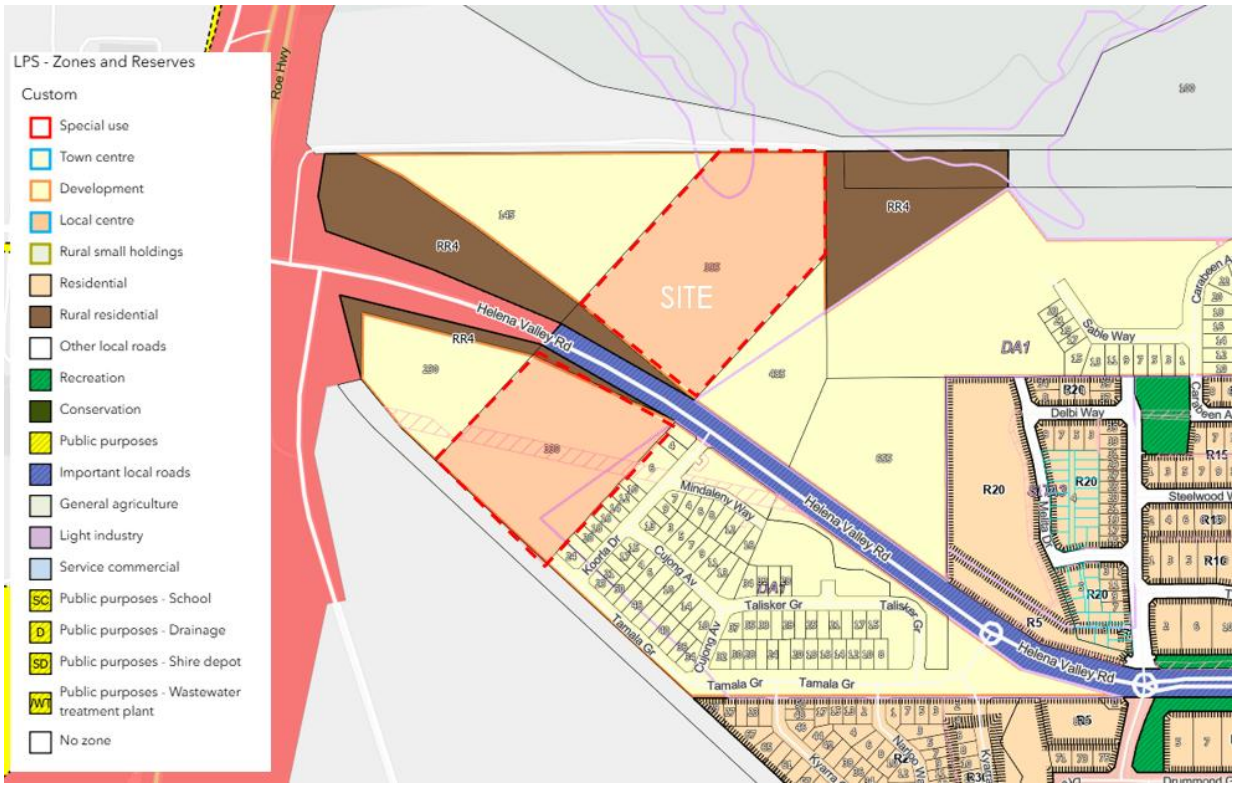
Source: Metromap 2025

2 Existing Situation

2.1 Zoning

Pursuant to the provisions of the *Shire of Mundaring Local Planning Scheme No.4,* the Site is currently zoned as an LPS 'Development' Zone as shown in Figure 2-1.The Site is surrounded by Rural Residential and Development zoning.

Figure 2-1 Structure plan Zoning



Source: Shire of Mundaring Local Planning Scheme No.4

2.2 Existing Road Network of Structure Plan Area

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

- Primary Distributors (light blue): Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State Roads WA.
- Regional Distributors (red): Roads that are not Primary Distributors, but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government

- District Distributor A (green): These carry traffic between industrial, commercial and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining properties. They are managed by Local Government.
- Distributor B (dark blue): Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.
- Local Distributors (orange): Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.
- Access Roads (grey): Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.

The surrounding road network is further described in Table 2-1 and shows the hierarchy as per the Main Roads WA Road Information Mapping System, whilst Figure 2-2 shows a map of the road hierarchy.

Table 2-1 Road Network Classification

Street Names	Road Hierarchy	Jurisdiction	No.of Lanes	No.of Footpaths	Width (m)	Posted Speed
Helena Valley Road	Local Distributor	Local Government	2	0	7	60 km/h
Bushmead Road	Distributor B (East of Midland Road)	Local Government	2	1 (northern side of carriageway after Roe Highway)	10 (including 1.5m sealed shoulder on both sides)	60 km/h
Roe Highway	Primary Distributor	Main Roads, WA	4	0	35 (including 11.5m median)	100 km/h 80 km/h (in the vicinity of GEH intersection
Midland Road	Local Distributor	Local Government	2	0	11 (including 2.5m shared path)	80 km/h

Source: MRWA Road Information Mapping System

Figure 2-2 Existing Road Network Hierarchy Map

Source: MRWA Road Information Mapping System

2.3 Existing Traffic Volumes

The Shire of Mundaring has advised there is no available recent traffic data for the study area surrounding the Helena Valley structure plan.

Based on this advice, classified vehicle movement counts were undertaken by an external service provider on a typical weekday on Thursday 18th September 2025 between 07:00am-9.00am and 4pm-6:00pm at the Helena Valley Road / Koorla Drive intersection.

The Main Roads WA traffic map has limited traffic counts within the vicinity of the structure plan which is summarised in Table 2-2 and the locations shown in Figure 2-3.

Table 2-2 Existing Traffic Volumes

Street Names	Year	Average Daily Traffic Volume	AM Peak Hour (vph)	PM Peak Hour (vph)	Heavy Vehicle %	Source
Midland Road (South of Bushmead Road)	2021/22	6,542	543	633	10.3%	MRWA
Roe Highway (North Of Great Eastern Highway)	2024/25	65,878	3,910	5,095	19.6%	MRWA

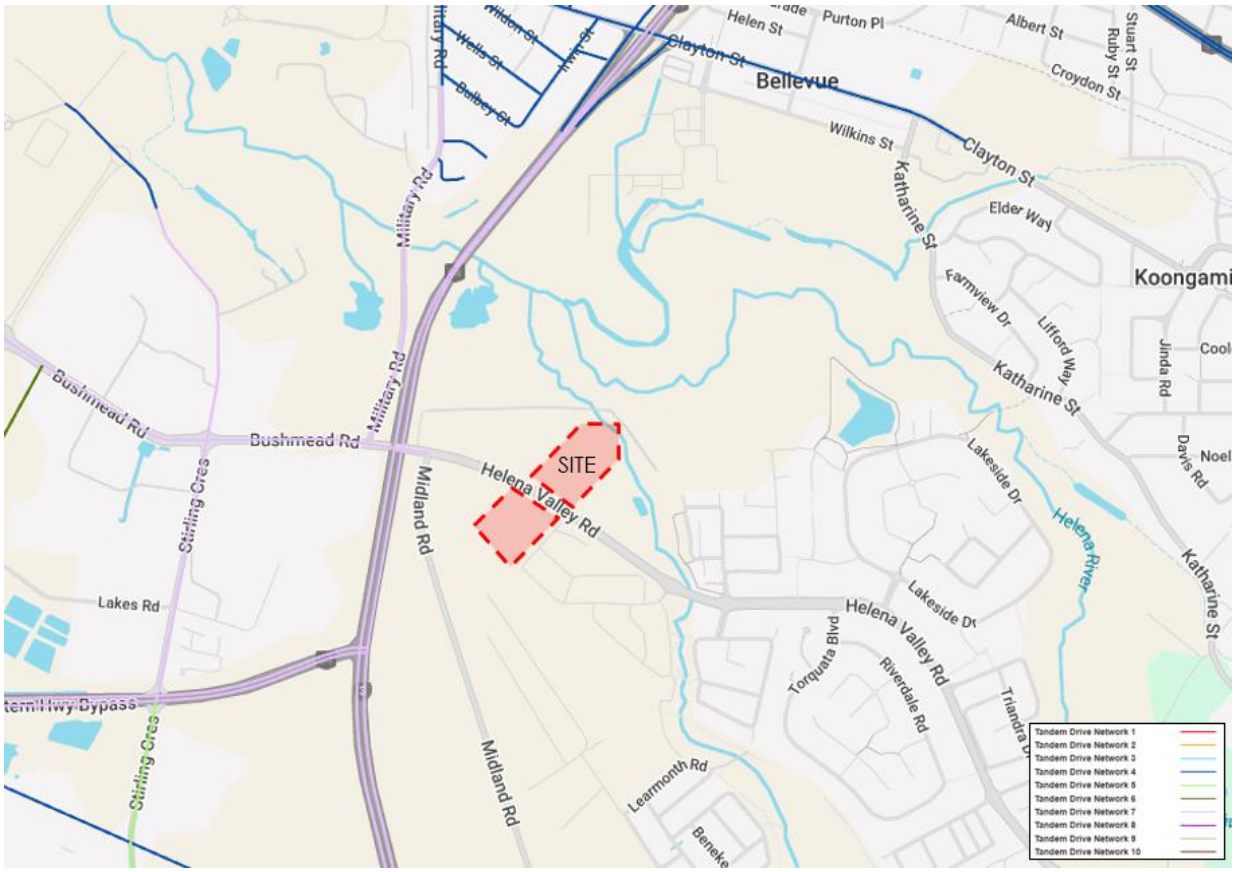
Figure 2-3 MRWA Traffic Map

MRWA Traffic Map 2025

2.4 Restricted Access Vehicle (RAV) Network

Figure 2-4 illustrates the surrounding RAV vehicle network. Roe Highway and Bushmead Road are currently part of the RAV 7 network. Helena Valley Road is currently not included within any RAV classifications.

Figure 2-4 RAV Network

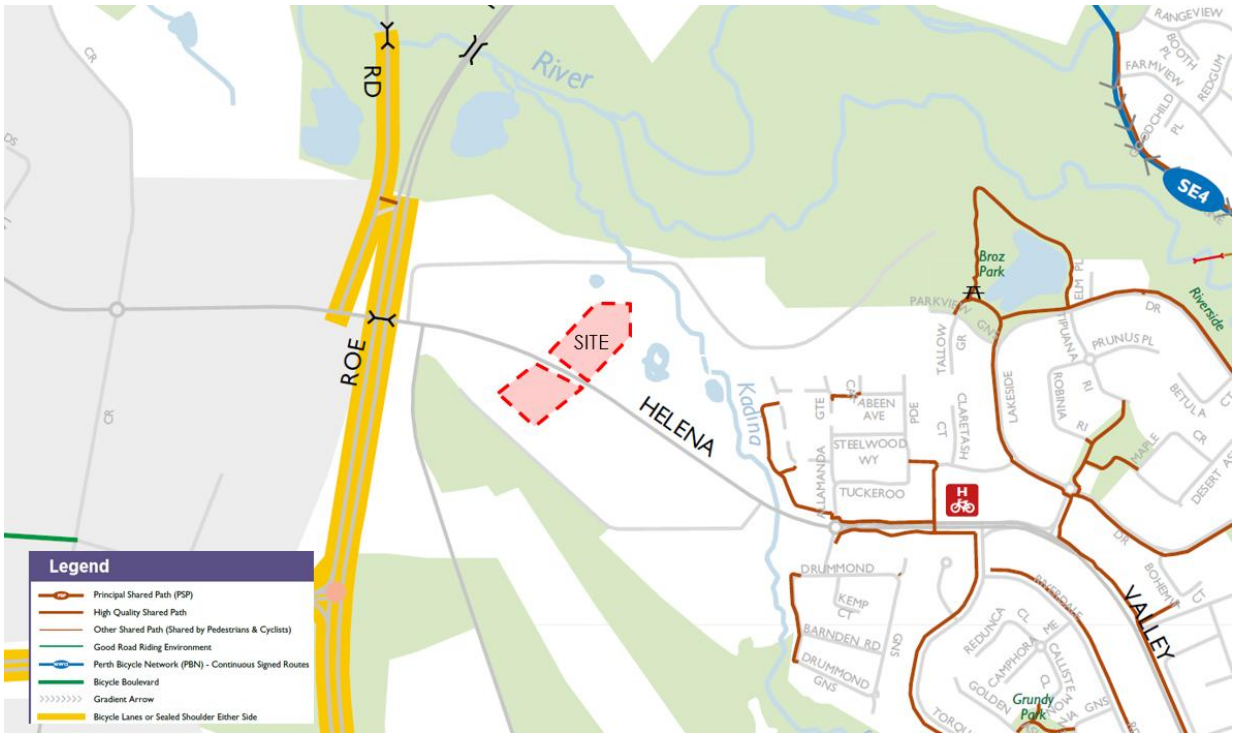


Source: MRWA HVS Network Map (2024)

2.5 Existing Pedestrian and Cycle Networks

Sealed shoulders are provided along Roe Highway and Great Eastern Highway Bypass. Figure 2-5 shows the existing bicycle network within the surrounding area of the Site. There are limited existing on-road bicycle lanes and off-road paths near the proposed site. Other shared paths for pedestrians and cyclists run to the east of the proposed site on Helena Valley Road.

Figure 2-5 Existing Pedestrian and Cycle Links



Source: Department of Transport

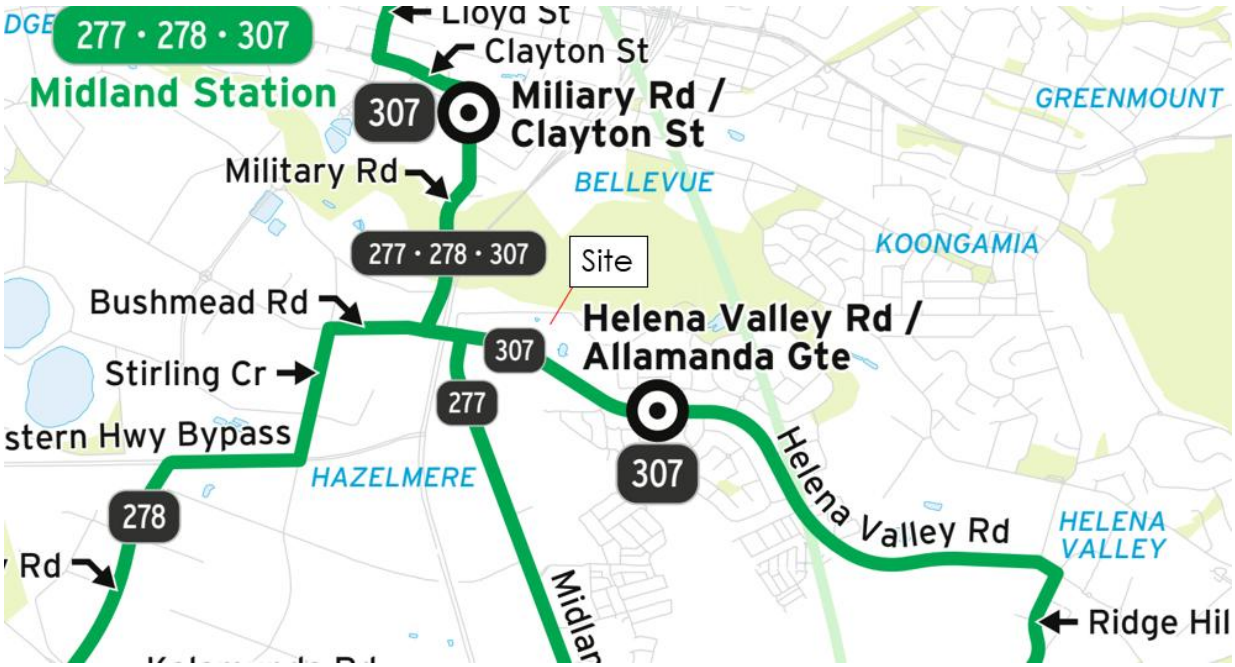
2.6 Existing Public Transport Services

The site is served by adequate public transport network. The nearest bus stops are located on Helena Valley Road and Midland Road serviced by bus route 307 and 277 as shown in Figure 2-6 and Figure 2-7. Table 2-3 shows the summary of bus route and frequency of services.

Figure 2-6 Existing Bus Stops Locations

Source: MetroMap 2025

Figure 2-7 Existing Bus Routes



Source: Transperth 2025

Table 2-3 Existing Bus Routes – Service Frequencies

Route Number	Route Description	Service Frequency	
		Weekday	Weekend Peak
Route 307	Midland Station to Kalamunda Bus Station	20-40 minutes during peak hours	No service
Route 277	High Wycombe Station to Midland Station	15-30 minutes during peak hours	Every 30 to 60 minutes

Despite the close proximity of the bus stops and bus routes that operate near the Site, the buses on these routes operate at between every 15 minutes to 1 hour. Due to the limited flexibility, it is anticipated that there may be fewer patrons using public transport in this area. Notwithstanding, the current bus services provide linkages to both the Midland and High Wycombe train Station which broadens the connectivity across Perth.

2.7 Safe Routes to School

The nearest schools, Helena Valley Primary, Helena River Steiner and Clayton View are located approximately 3km from the Helena Valley Structure plan area. Students are not anticipated to walk to schools due to the long distance. Some students may opt to ride their bikes and may route along Helena Valley Road which as part of the LTCN which has the aspiration to be upgraded to a secondary route as discussed in Section 3-3. The current cycling infrastructure on Helena Valley Road is not conducive for students to walk or cycle to the local schools.

2.8 Crash Assessment

A review of crashes that have been reported within the 5-year period from 2020 – 2024 has been undertaken using the Main Roads WA Crash Analysis Reporting System. Table 2-4 to Table 2-6 provides a summary of all crashes that was recorded within the vicinity of the Site, with the location and severity of these crashes illustrated in Figure 2-8.

Figure 2-8 Crash Locations

Source: MRWA Crash Map 2025

Table 2-4 Total Crashes

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Sideswipe Same Direction	-	-	-	-	-	-
Right Turn Thru	-	1	-	-	-	1
Rear End	-	-	5	4	6	15
Hit Object	-	-	-	1	-	1
Head On	-	-	1	-	-	1
Right Angle	-	-	-	1	1	2
Unspecified	-	-	-	-	-	-
Total	**-**	**1**	**6**	**6**	**7**	**20**

Table 2-5 Intersection Crashes

Intersection Name	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Helena Valley Road / Tamala Gr	-	-	1	-	-	1
Helena Valley Road / Drummon Gardens / Allamanda Gate	-	-	1	-	-	1
Helena Valley / Midland Road	-	1	2	6	6	15
Total	**-**	**1**	**4**	**6**	**6**	**17**

Table 2-6 Midblock Crashes

Intersection Name	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Helena Valley Road	-	-	2	-	-	2
Steelwood Way	-	-	-	-	1	1
Total	**-**	**-**	**2**	**-**	**1**	**3**

Results of the crash assessment are summarised as follows:

- A total of twelve (20) crashes were recorded.
- Six (6) PDO major crashes were recorded.
- One (1) hospital crash was recorded.
- Three crashes occurred in midblock sections while 17 crashes occurred at intersections.

There are a number of crashes occurring at the Helena Valley / Midland Road intersection which could be attributed to the high volume of vehicles travelling towards Roe Highway and the Great Eastern Bypass, however it is unlikely that the proposed structure plan on the subject site would have any material impact on road safety in the area due its small scale.

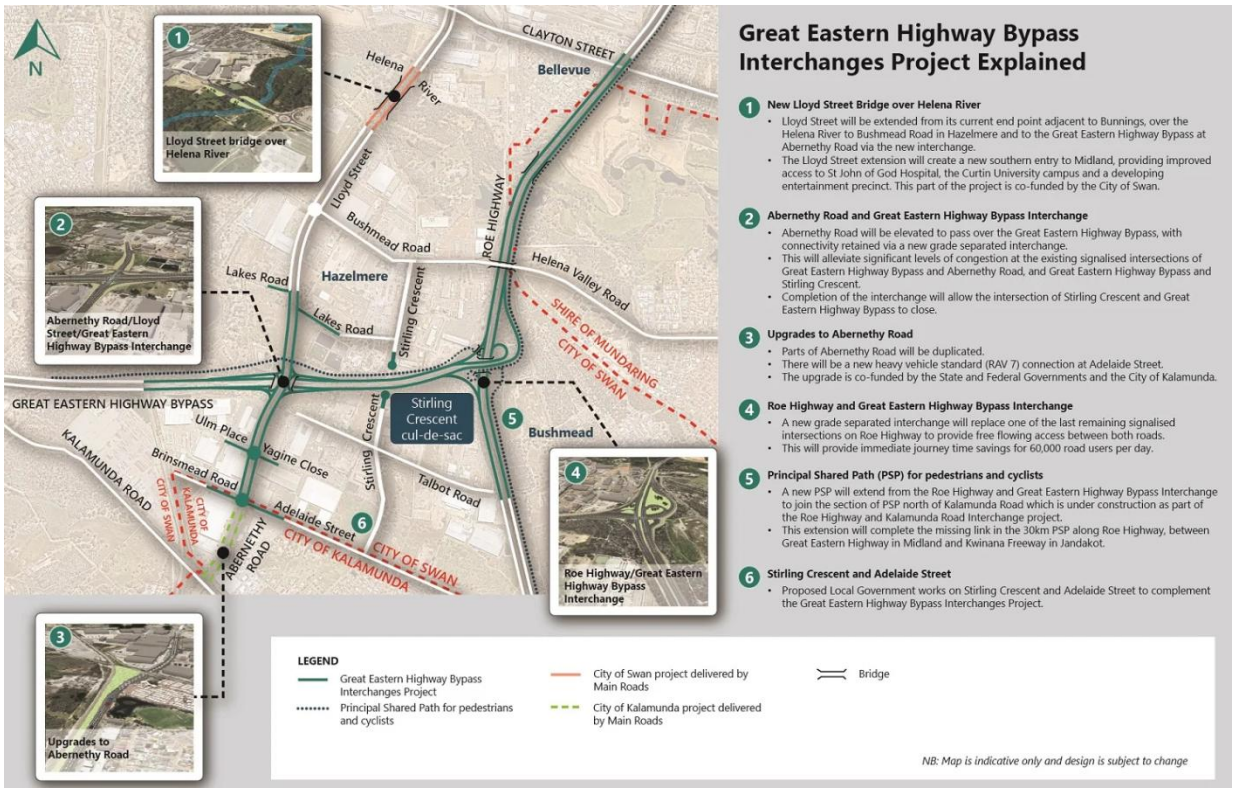
3 Future Transport Network

3.1 External Road Network

Main Roads WA are proposing to upgrade two major interchanges at Roe Highway and Abernethy Road, extending Lloyd St and constructing a new bridge over Helena River.

As of February 2025, early pre-construction works associated with the project are compete with construction placed on hold. These works include services relocations, and protection works across the construction site, including Western Power, ATCO Gas, water corporation and Local Government drainage main installation as illustrated in Figure 3-1. There is currently no confirmed completion date of the GEHBI project. The project has reached a point where major construction works are ready to commence, however, further construction activity has been placed on hold while Main Roads secures the approvals required to deliver the works.

Figure 3-1 Great Eastern Highway Upgrades



Source: Main Roads WA February 2025

Main Roads WA has also previously advised that they have undertaken an investigation into the Bushmead Road overpass, as part of the proposed Midland Freight Rail Realignment being progressed by DPLH. As part of the project the bridge needs to be raised to allow High Wide Load vehicle freight access (10m high, 10m wide, up to 50m long) on Roe Highway. The planning options that were being considered are:

- Option 1 - Raise the bridge on the current alignment.
- Option 2 - Raise the bridge on an alignment to the north.

Based on the abovementioned options, as planning progresses, the bridge has the potential to impact the proposed access to the structure plan.

Access to the structure plan will need to be agreed with Main Roads WA prior to commencement.

It was also advised previously by the Shire of Mundaring that the widening of Roe Highway to 6 lanes and the lifting of Helena Valley Road/Bushmead Road bridge to accommodate the future freight line will affect the Midland Road and Helena Valley Road intersection, which will likely need to be redirected to the east of its current location.

3.2 Future Public Transport Improvements

Stantec contacted the Public Transport Authority PTA and was advised that Route 307 which operates along Helena Valley Rd will undergo a minor route change in February next year, however this route change is not directly in the area of influence. The route is proposed to extend onto Ridge Hill Rd and operate along Broadmeadows Drive which is also subject to Western Power works to connect street lighting. There are no other structural changes proposed, nor likely frequency improvements for the foreseeable future.

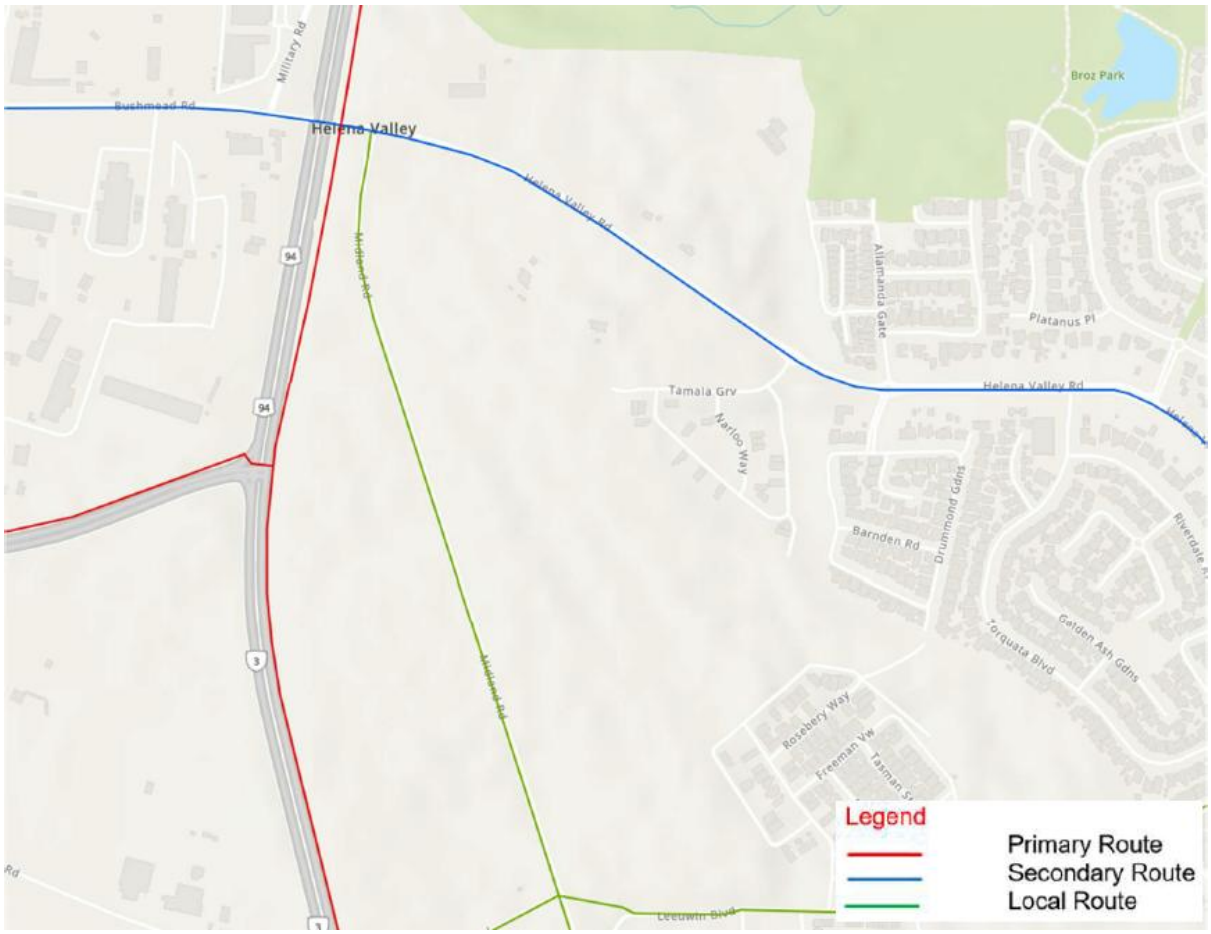
3.3 Future Pedestrian/Cycle Networks and Crossing

The Shire of Mundaring have indicated that Helena Valley Road may undergo a further upgrade at some point in the future as there is anticipated traffic growth in the area.

Main Roads WA is currently pre-constructing the Great Eastern Highway Bypass Upgrade project. It is understood that this project includes Principal Shared Paths along Roe Highway and Great Eastern Highway Bypass however, this remains outside of the proposed structure plan study area.

The Long-Term Cycling Network (LTCN) is an aspirational blueprint to provide a continuous cycling network throughout Perth and identifies the function of a route – primary, secondary or local. The LTCN shows Bushmead Road to be a Secondary route connecting to the wider road network. Figure 3-2. shows the proposed Long-Term Cycle Network surrounding the subject site.

Figure 3-2 Long-Term Cycle Network



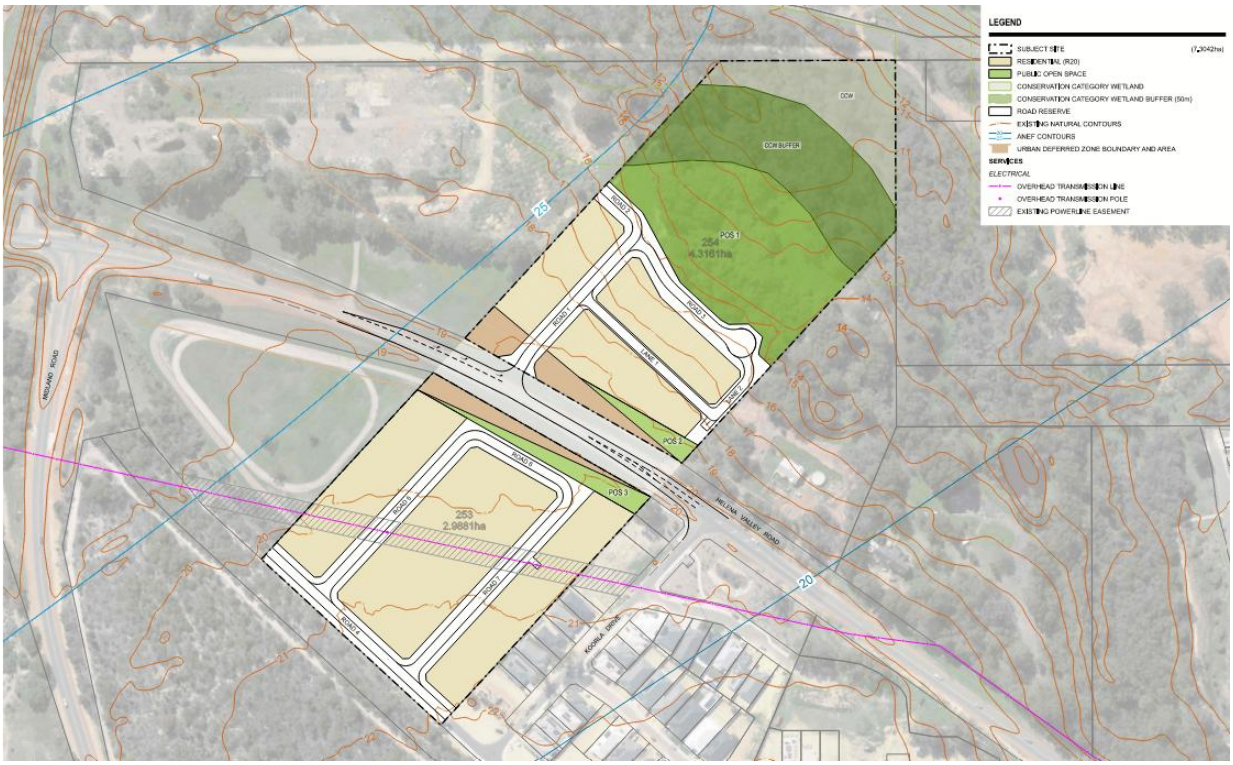
Source: DoT Long Term Cycle Network

4 Proposed Structure Plan

The structure plan comprises of a total lot area of 29,229sqm with an average lot size of 471sqm. There are proposed to be a total of 61 lots as illustrated in Figure 4-1, divided across two precincts (Lots 253 and 254) as follows:

- **Lot 253 Helena Valley North**: 24 residential dwellings
- **Lots 254 Helena Valley South**: 37 residential dwellings

Figure 4-1 Proposed Structure Plan

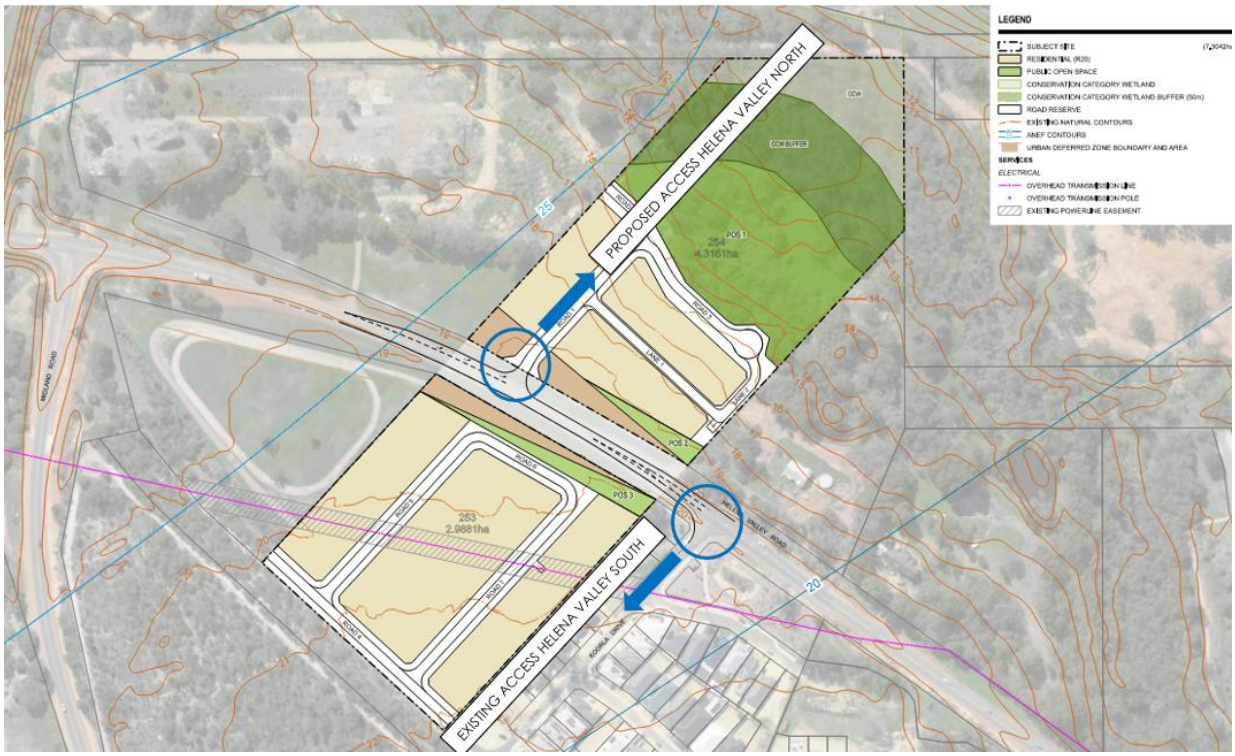


Source: TBB Planning (November 2025)

4.1.1 Proposed Access

It is proposed that the northern precinct will be accessed via a new full movement intersection access on Helena Valley Road. It is anticipated that the southern precinct is to be accessed via the existing Koorla Drive / Helena Valley Road intersection and the proposed Road 4 to the south as shown in Figure 4-2.

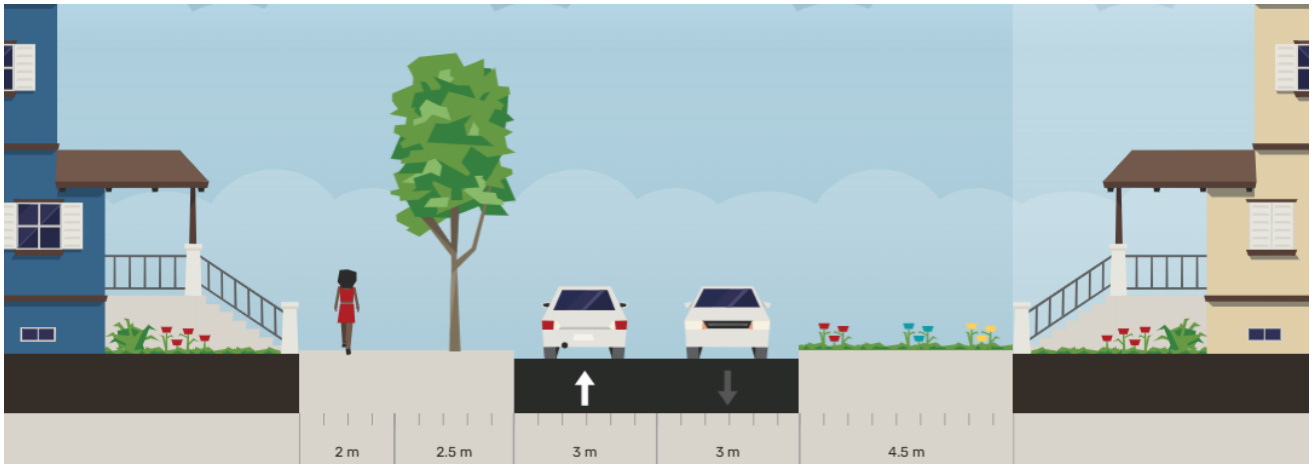
Figure 4-2 Site Access



4.1.2 Road Reservation Widths

The proposed reservation widths within the proposed Helena Valley structure plan for access streets ranges between 8m to 15m. The indicative road reserve widths for laneways/service lanes according to Liveable Neighbourhoods (2009) is 6m with a maximum of 300 vehicles per day. The widths of the access roads within the structure plan are proposed to have widths of 6m with a 4.5m verge on either side. It is anticipated a minimum of one of these verges will incorporate a 2m wide pedestrian footpath. A typical access road cross section is illustrated in Figure 4-3.

Figure 4-3 Typical Access Street Cross Section



Source: Streetmix

4.1.3 Road Speed Limits

According to Liveable Neighbourhoods (2009), the speed limits for Access Streets B, C, and D may range from 20 km/h to 50 km/h. for laneways and service lanes, speed limits are anticipated to not exceed 15 km/h. It is expected that the speeds on the access roads within the structure plan area will be 50 km/h.

4.1.4 Intersection Controls

It is anticipated that give way and stop sign controls will be appropriate for all intersections within the proposed structure plan area since the traffic volumes are anticipated to be low.

4.1.5 Intersection Spacing

Based on Austroads Guide to Road Design Part 4A, the current location of the Helena Valley Road / Proposed Site Access and the Helena Valley Road / Koorla Drive Intersections do not present any spacing concerns and is deemed to be located at an acceptable distance.

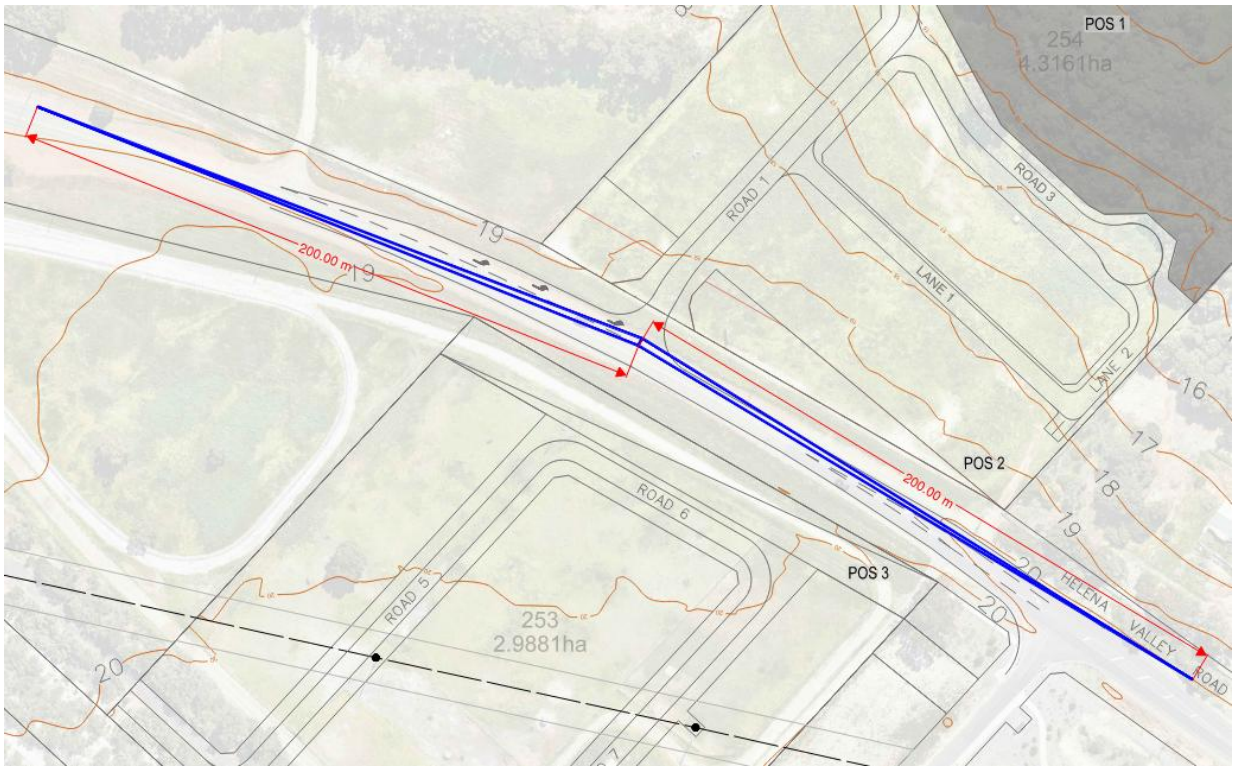
4.2 Vehicle Access Design

4.2.1 Sight Line Assessment

A sight line assessment has been undertaken at the proposed access on Helena Valley Road.

The sight lines at the proposed access point are estimated to exceed 200 metres in both directions, which meets the minimum Safe Intersection Sight Distance (SISD) requirement of 161 metres for a 70 km/h design speed in accordance with as per Austroads Guide to Road Design – Part 4A. The sight line assessment is illustrated in Figure 4-4.

Figure 4-4 Sight Line Assessment



4.2.2 Turn Warrant Assessment

A Turn Warrant Assessment was conducted using *Main Roads WA Supplement to Austroads Guide to Traffic Management – Part 6* to determine the need for dedicated turning lanes at both the proposed site access as well as at the existing Koorla Drive intersection.

The turn warrant assessment has been undertaken for the worst-case vehicle demands for each of the accesses (based on the vehicle trip generation and network distributions detailed in Section 6 of this report for the 2027opening year and the future 2037 design year. The results of the Turn Warrant Assessment are shown in Table 4-1 and Table 4-2 below.

Table 4-1 Turn Warrant Assessment - Opening Year 2027 with Development

	Opening Year 2027 with Development			
	Helena Valley Road/Koorla Drive Intersection		Helena Valley Road/Proposed Site Intersection	
TWA	Right Turn Assessment	Left Turn Assessment	Right Turn Assessment	Left Turn Assessment
AM	Auxiliary Right Turn (AUR)	Simple Left Turn (SL)	Simple Right Turn (SR)	Simple Left Turn (SL)
PM	Channelised Right Turn (CHR)	Basic Left Turn (BAL)	Simple Right Turn (SR)	Auxiliary Left Turn (AUL)

Table 4-2 Turn Warrant Assessment - Future Year 2037 with Development

	Future Year 2027 with Development			
	Helena Valley Road/Koorla Drive Intersection		Helena Valley Road/Proposed Site Intersection	
TWA	Right Turn Assessment	Left Turn Assessment	Right Turn Assessment	Left Turn Assessment
AM	Auxiliary Right Turn (AUR)	Simple Left Turn (SL)	Simple Right Turn (SR)	Simple Left Turn (SL)
PM	Channelised Right Turn (CHR)	Basic Left Turn (BAL)	Simple Right Turn (SR)	Auxiliary Left Turn (AUL)

The results of the Turn Warrant Assessment conclude the following treatments are required:

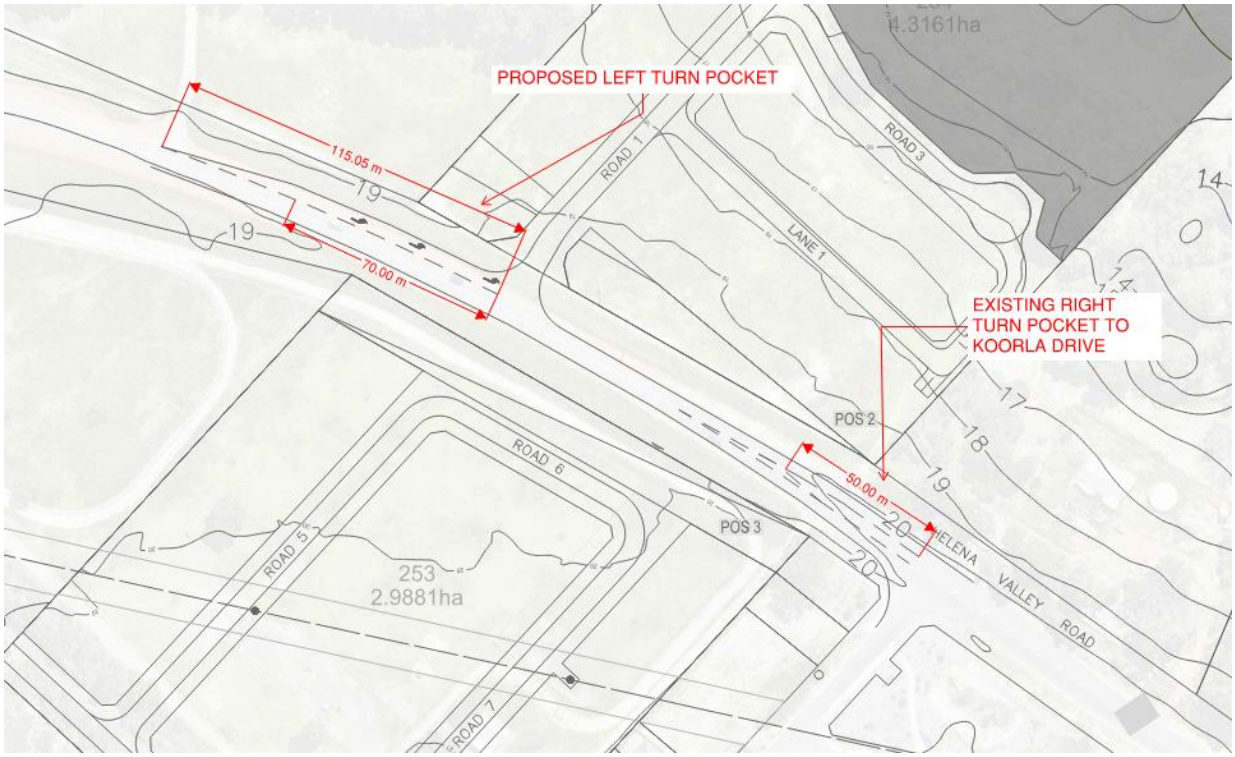
- Helena Valley Road / Koorla Drive Intersection
  - Channelised right turn (CHR)
  - Simple left turn (SL)
- Helena Valley Road / Proposed Site Access
  - Simple Right Turn (SR)
  - Auxiliary left turn (AUL)

The results of the Turn Warrant Assessment indicate that for both the opening year (2027) and future year (2037), an auxiliary left turn lane is warranted with a simple right turn treatment at the proposed site access on Helena Valley Road.

The results also indicate that the existing right turn pocket treatment at the Helena Valley Rd/Koorla Drive intersection is required and there appears to be no need to provide a left turn pocket at this intersection.

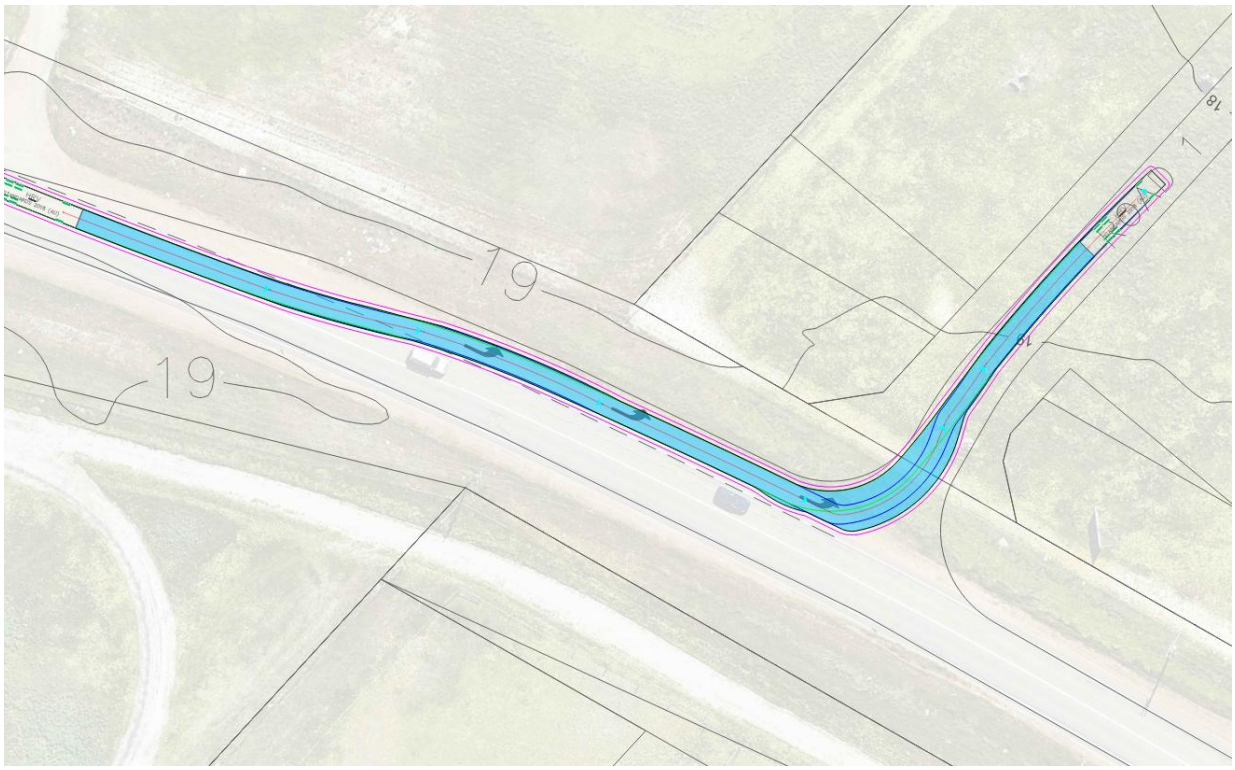
As part of the structure plan proposal, there is the inclusion of an auxiliary left turn lane at the proposed Helena Valley Road / Proposed Site access which measures about 70m in length based on a design speed of 70kmph and a turning radius of 12m in accordance with Austroads Guide to Road Design Part 4A. The proposed configuration is illustrated in Figure 4-5 .

Figure 4-5 TWA - Auxiliary Left Turn



A swept path analysis has been undertaken using the checking vehicle outlined in Austroads Guide to Road Design Part 4 which is a 12.5m truck for local residential intersections. The results indicate the left turn pocket enables the checking vehicle to adequately utilise the left turn pocket as shown in Figure 4-6.

Figure 4-6 Swept Path Analysis HRV - Left Turn Pocket



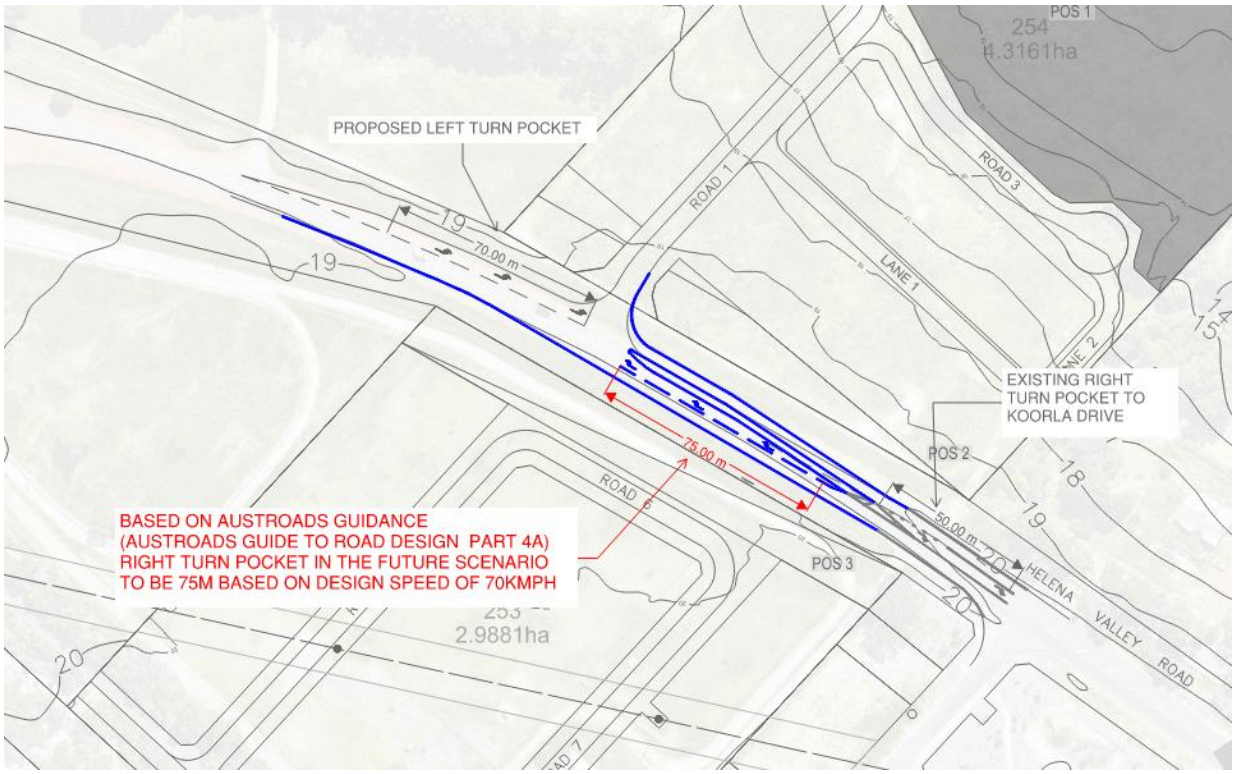
4.2.3 Future Access Considerations

The Turn Warrant Assessment does not currently warrant a right-turn pocket at the proposed Helena Valley Road / proposed Site Access intersection; consideration has been given to futureproofing the site access to allow for a potential right-turn pocket to beyond the 2037 horizon. This consideration is based on several factors:

- **Safety benefits:** A dedicated right-turn lane would reduce conflict between turning and through movements, enhancing overall intersection safety.
- **Feasibility:** There are no apparent land constraints that would prevent its future implementation.
- **Traffic growth potential:** While current traffic patterns are predominantly westbound, future development to the east may alter demand and trigger a revised turn warrant outcome.

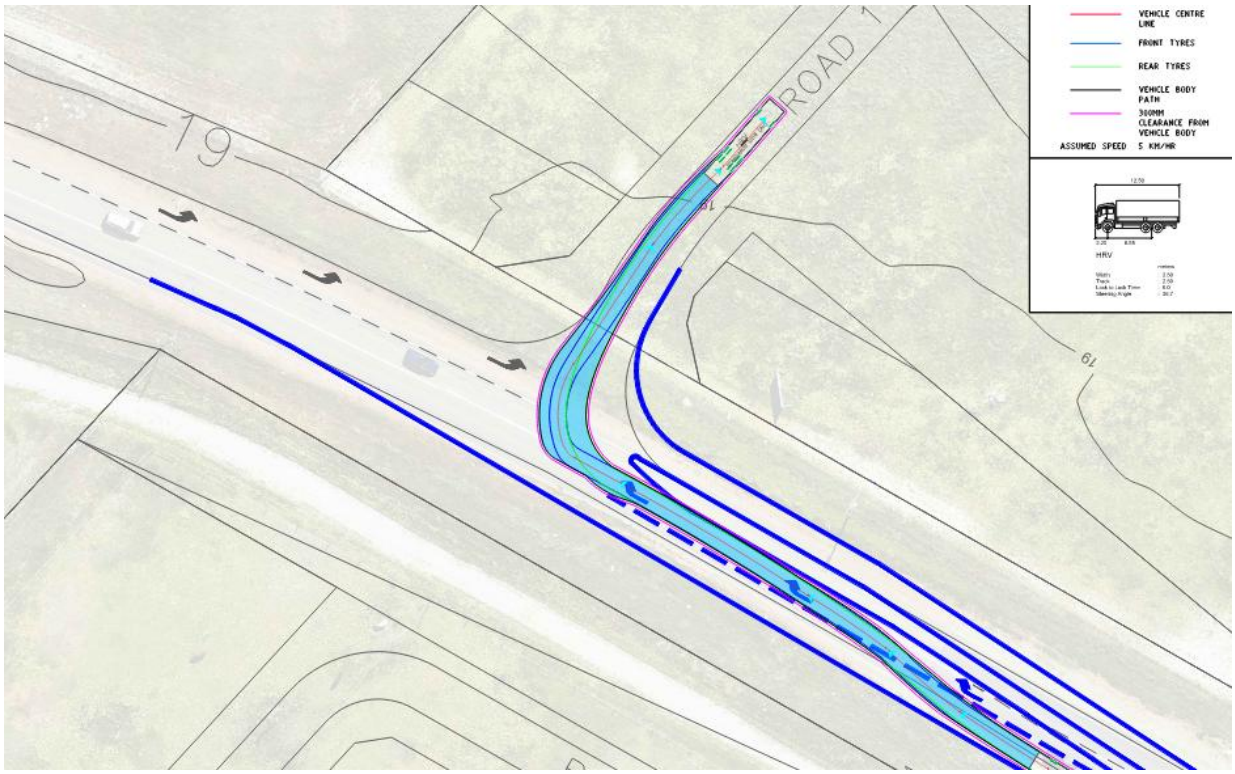
At this stage, the left-turn lane only is proposed for implementation to meet current and future +10 year traffic demand. It is acknowledged that whilst the right-turn lane is not warranted it could be considered in the future as development and traffic flows increase in the study area. The timing of delivery of the proposed right term pocket is anticipated to be in excess of 10 years and will be subject to further discussions with the Shire. Figure 4-7 illustrates a concept sketch of the proposed future channelising right turn pocket treatment. The proposed right turn pocket is estimated to be approximately 75m in length based on a design speed of 70kmph as per Austroads Guide to Road Design Part 4A.

Figure 4-7 TWA Channelised Right Turn Future Scenario



The swept path analysis was undertaken using a 12.5m truck for local residential intersections as the checking vehicle outlined in Austroads Guide to Road Design Part 4. The results indicate the right turn lane enables the checking vehicle to adequately access the site as shown in Figure 4-8.

Figure 4-8 Swept Path Analysis HRV - Right Turn Lane



4.3 Design Traffic Flows

Based on the forecasted trip generation of the Helena Valley structure plan in the ultimate 2037 scenario, the traffic flow volumes for the Helena Valley Road / Proposed Site Access are anticipated to remain under the maximum volume for an Access Street C from the *Liveable Neighbourhoods Guidelines,* which is 3,000vpd and therefore follow the function and characteristics detailed in Table 4-3.

Table 4-3 Function and Characteristics of Local Streets (Excerpt from Liveable Neighbourhoods)

Street type and function	Street name	Projected maximum volume (vehicles per day)	Indicative street reserve width (metres)	Maximum design/ target operating speed (km/hr)	Minimum street pavement width (metres)	Typical residential density
Neighbourhood connectors Streets with mostly residential frontage that typically provide the lower order sub-arterial network. These streets service and link neighbourhoods and activity centres.	**Neighbourhood connector A**	7,000	27.6	50 / 50	2 x 7.3 including parking, on-street bike lane, median plus shared path on one verge and footpath on the other side	R40 to R80
	Neighbourhood connector B	3,000	21.6	50 / 50	11.6 including parking, plus shared path on one verge.	R40 to R80
Access streets Access streets are to accommodate shared pedestrian, bike and vehicular movements. The requirements of adjacent land uses should be supported through street design.	**Access street A –** avenue	3,000	Overall width depends on design and function of central median	50 / 40	2 x 3.5 plus embayment parking.	Varies
	Access street B – wider street	3,000	20.1	50 / 40	10	Up to R40
	Access street C – yield or give way street	3,000	17.2	50 / 30	7.2 typical 7-7.5 range	Up to R35
	Access street D – narrow yield or give way street	1,000	15.5	50-20	5.5 typical 5.5-6 range	Less than R30

Source: WAPC Draft Liveable Neighbourhoods (2009)

5 Integration with Surrounding Area

5.1 Trip Attractors/Generators

No significant external traffic attractors in the vicinity of the Site other than Hillview Golf course, Banksia Tourist Park and Greenmount National Park for recreational activities. However, traffic from the Site would be attracted to centres such as Midland and High Wycombe industrial area.

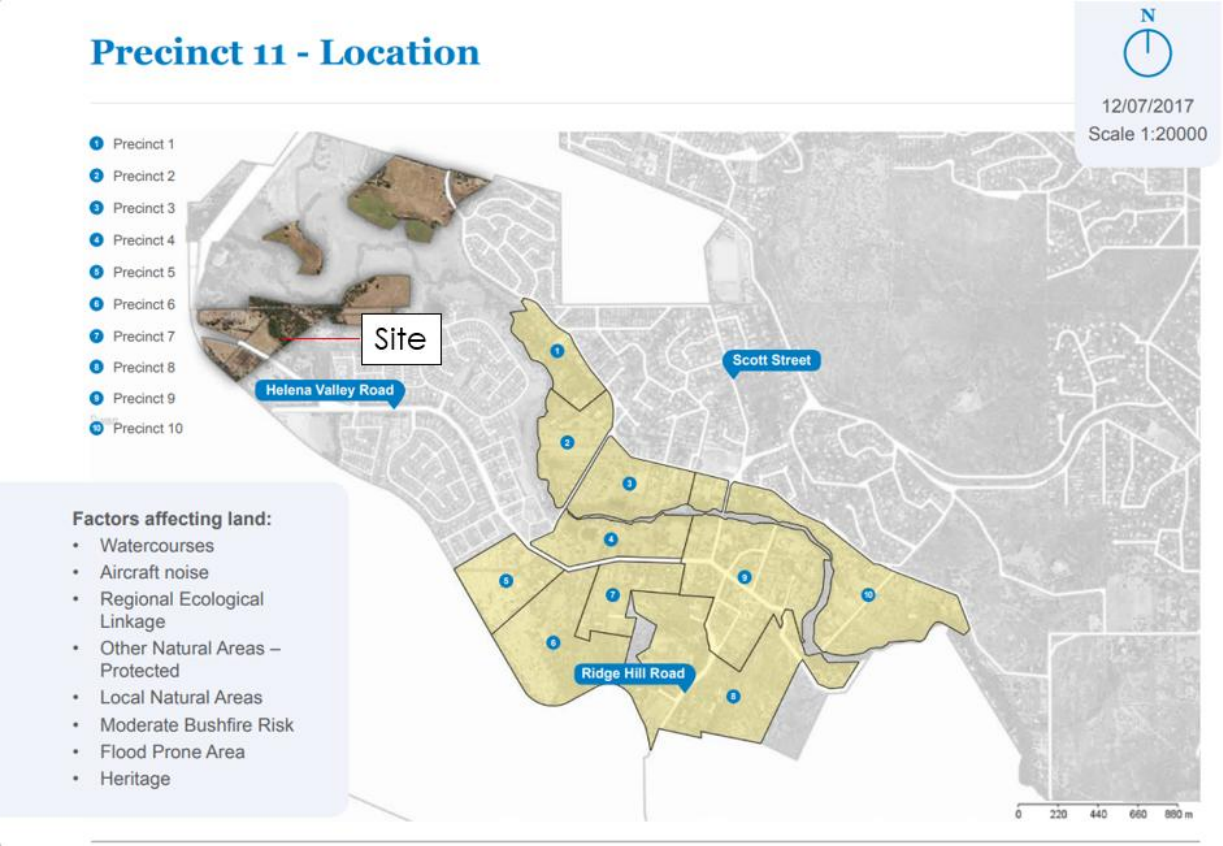
5.2 Proposed Changes to Surrounding Land Uses

5.2.1 Shire of Mundaring Foothills Growth Strategy

The Foothills Growth Strategy (FGS) has been prepared to supplement Directions 2031, Perth and Peel @ 3.5 million and the north-east sub-regional planning framework with regard to planning for increasing residential densities in proximity to activity centres, public transport nodes and places of employment. Strategically, Bellevue and Helena Valley are ideally located to accommodate sustainable residential infill due to their proximity to Midland. The purpose of this Strategy is to achieve the dwelling infill targets set by the state planning framework and coordinate growth by balancing land capability and planning requirements with the interests, aspirations and requirements of various stakeholders.

The Strategy will inform the Shire when considering rezoning under the MRS and local planning scheme, structure plans, subdivision, development applications and operational works. Actions are required to be undertaken prior to urban expansion occurring which have been set out in the section ‘Implementation Milestones.’ Once these have been completed, the Shire may then consider rezoning, subdivision and development of properties within the Strategy area. As illustrated in Figure 5-1, the proposed Helena Valley structure plan falls in Precinct 11 area which is designed for ‘medium density residential development and commercial mix’.

Figure 5-1 Extract of Precinct 11 Location Plan



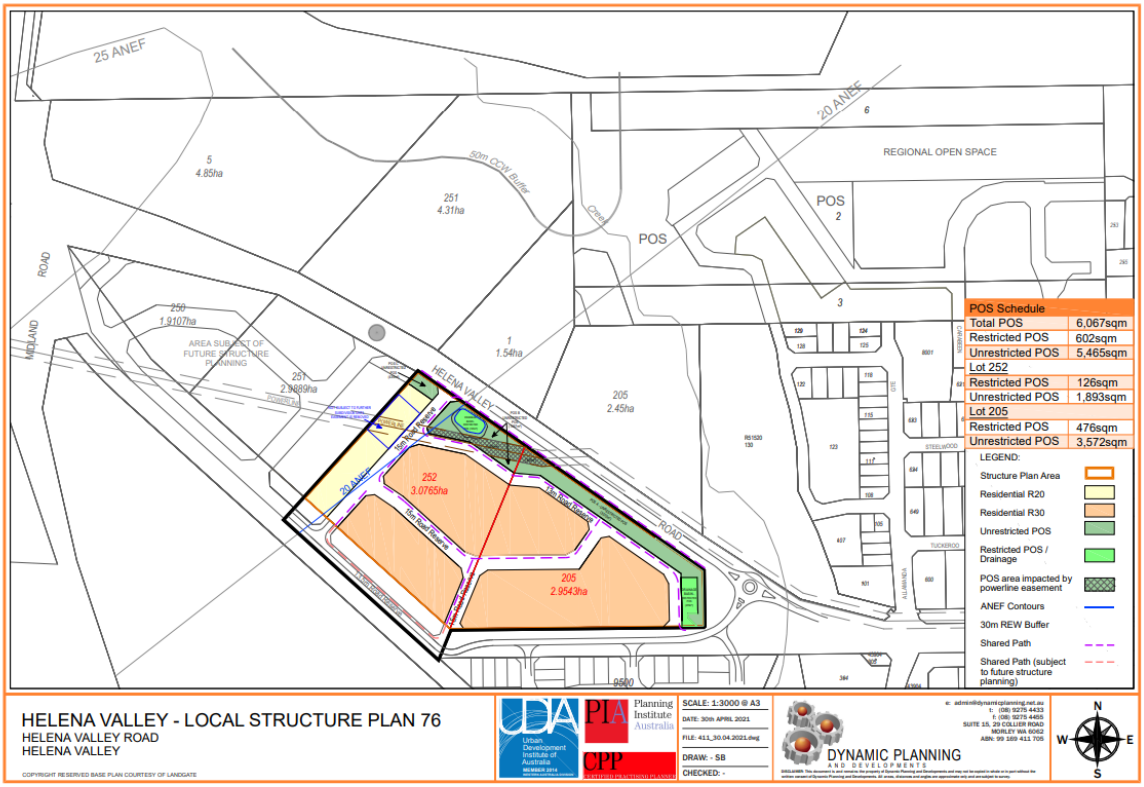
Source: Shire of Mundaring Foothills Growth Strategy

5.2.2 Helena Valley – Local Structure Plan 76

The Helena Valley – Local Structure Plan 76 applies to 2 separate allotments comprising Pt Lot 205 (No. 655) southern portion and Pt Lot 252 (No. 480) Helena Valley Road, Helena Valley adjacent to the Structure plan. The LSP area encompasses a total land area of 6.03ha and the area is largely unimproved with the majority of lots comprising only a single house and/or outbuilding associated with past rural-residential functions.

At present, there are approximately 34 lots out of 51 lots that are built or under construction as shown in Figure 5-2 and Figure 5-3.

Figure 5-2 Helena Valley - Structure Plan 76



Source: Shire of Mundaring – Helena Valley SPN 2184

Figure 5-3 LSP Construction

Source: Metromap2025

6 Analysis of Transport Network

To identify the impact of the proposed structure plan development on the surrounding road network, the performance of the following intersections was assessed:

- Helena Valley Road / Koorla Drive Intersection, and
- Helena Valley Road / Proposed Site Access.

6.1 Data Sources

The following datasets and information sources were utilised in the preparation of this traffic analysis:

- Traffic Survey undertaken by external service provider on 18 September 2025
- Main Roads WA Supplement to Austroads Guide to Traffic Management – Part 6

Where other sources of data have been relied upon, specific references are provided in the relevant sections of this report.

6.2 Assessment Years and Time Periods

To assess the operational performance of the site, five traffic modelling scenarios were developed.

These scenarios reflect both short-term and long-term conditions, with and without the inclusion of a right-turn pocket at Helena Valley Road/Proposed site access intersection.

- Scenario 1: 2025 background traffic
- Scenario 2: 2027 Opening Year (without Right-Turn Pocket)
- Scenario 3: 2037 Future Year (without Right Turn Pocket)
- Scenario 4: 2027 Opening Year (with Right-Turn Pocket)
- Scenario 5: 2037 Future Year (with Right-Turn Pocket)

Based on the examination of the traffic survey data undertaken at the Helena Valley Road/Koorla Drive Intersection, the following peak hours were identified for analysis:

- Weekday AM Peak: 7:30-8:30 AM
- Weekday PM Peak: 4:00-5:00 PM

6.3 Key Assumptions

Assumptions used in undertaking the SIDRA analysis are detailed below:

- The 2025 base scenario volumes were obtained through the traffic survey undertaken on 18th September 2025 between 07:00am-9.00am and 4pm-6:00pm at the Helena Valley Road / Koorla Drive intersection.
- The background traffic growth rate along Helena Valley Road was assumed to be 2% per annum with the growth rate on Koorla Drive calculated to be 5% per annum as summarised in Table 6-1.

- Heavy vehicle percentage used in the analysis is based on the surveyed traffic data. It is assumed that the distribution of vehicle classes will not change in future scenarios. The existing counts indicated that no Class 10, 11, and 12 vehicles are using the existing intersection.

6.4 Estimated Growth Rates

Different growth rates were used for Helena Valley Road and Koorla Drive as indicated in Table 6-1. , The growth rate for Koorla Drive was generated based on two-thirds of the lots associated with the Local Structure Plan 76 has been build out or constructed. Since 34 out of 51 houses are built or under construction a growth rate of 5% has been applied to the opening year of 2027.

Table 6-1 Estimated Growth Rates

Analysis Period	Traffic Corridor	Growth Rate Per Annum
2025 – 2027 Growth to Opening Year	Helena Valley Road	2%
	Koorla Drive	5%
2027-2037 Growth to Future year	Helena Valley Road	2%
	Koorla Drive	No Growth Applied

6.5 Structure Plan Generated Traffic

Trip generation rates were sourced from the *Western Australian Planning Commission Transport Impact Assessment Guidelines (*WAPC*) Volume 5*, based on the land uses proposed for the Helena Valley structure plan. The Helena Valley structure plan is divided into two precincts:

- **Helena Valley North Precinct**: 24 residential dwellings
- **Helena Valley South Precinct**: 37 residential dwellings

The adopted trip generation rates are presented in Table 6-2.

Table 6-2 Adopted Trip Generation Rates

Land Use	Yield	Source	AM Peak (In)	AM Peak (out)	PM Peak (In)	PM Peak (Out)
Residential Dwelling – Helena North Precinct	24	WAPC Transport Impact Assessment Guidelines (Vol. 3)	0.2 per dwelling	0.6 per dwelling	0.5 per dwelling	0.3 per dwelling
Residential Dwelling – Helena South Precinct	37	WAPC Transport Impact Assessment Guidelines (Vol. 3)	0.2 per dwelling	0.6 per dwelling	0.5 per dwelling	0.3 per dwelling

The accompanying directional distribution has again been based on the WAPC Guidelines as illustrated in Table 6-3 for estimating the inbound and outbound traffic proportions.

Table 6-3 Directional Distribution

	AM Peak		PM Peak		Daily	
Land Use	**In**	**Out**	**In**	**Out**	**In**	**Out**
Residential Dwellings	25%	75%	62.5%	37.5%	50%	50%

Using the above trip generation rates and distribution, the total estimated trips to be generated for the full build-out of the proposed Helena Valley development is shown in Table 6-4.

Table 6-4 Estimated Total Trip Generation

	AM Peak		PM Peak	
Land Use	**In**	**Out**	**In**	**Out**
Residential Dwelling – Helena Valley North Precinct	5	14	12	7
Residential Dwelling – Helena Valley South Precinct	8	22	19	11
Sub Total	13	36	31	18
Total	**49**		**49**	

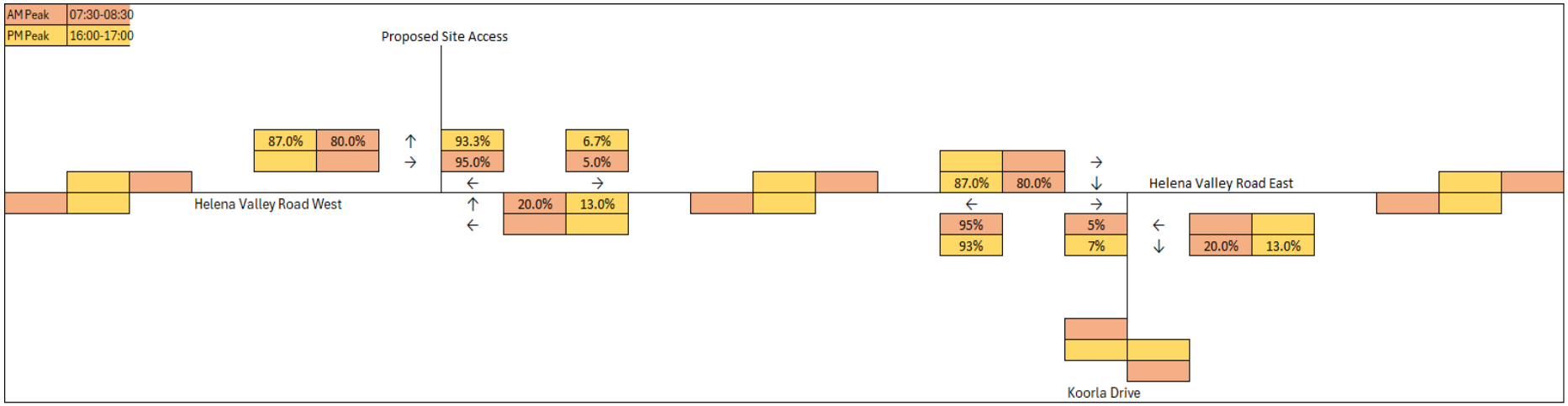
The estimated traffic to be generated by the proposed structure plan is 49 vehicular trips in both AM and PM peak hour periods respectively.

6.6 Trip Distribution

The trip distribution for the proposed structure plan was based on the existing turning movements obtained from the traffic survey undertaken on 18th September 2025 during the peak hour periods at the Helena Valley Road/ Koorla Drive Intersection. It was assumed that the same turning movements would be applied at the proposed intersection into the subject sites as both the LPS 76 and the Helena Valley Structure plan have a similar development lot yields.

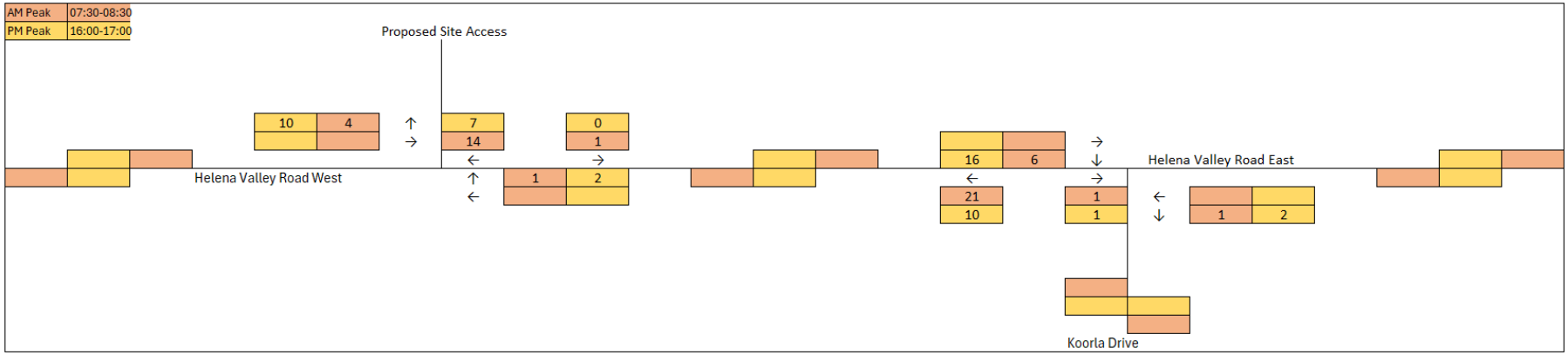
The trip distribution indicated a high percentage of traffic routing to and from the west of the subject site towards Roe Highway as illustrated in Figure 6-1.

Figure 6-1 Percentage Trip Distribution



Using the proposed percentage trip distribution in Figure 6-1 above, the anticipated development traffic was distributed across the network as shown in Figure 6-2.

Figure 6-2 Development Traffic



6.7 Traffic Volumes

The traffic volumes for the assessed intersections for the 2025 base year, 2027 opening year and 2037 future year are presented in the following figures.

Figure 6-3 shows the 2025 base scenario volumes for the Helena Valley Rd / Koorla Drive and the Helena Valley Road / Proposed Site Access intersections. Figure 6-4 shows the traffic volumes for the 2027 opening year with development for the Helena Valley Rd / Koorla Drive and the Helena Valley Road / Proposed Site Access intersections and

Figure 6-5 shows the future 2037 year with development traffic for both intersections.

Figure 6-3 Scenario 1 – 2025: Base Year Scenario

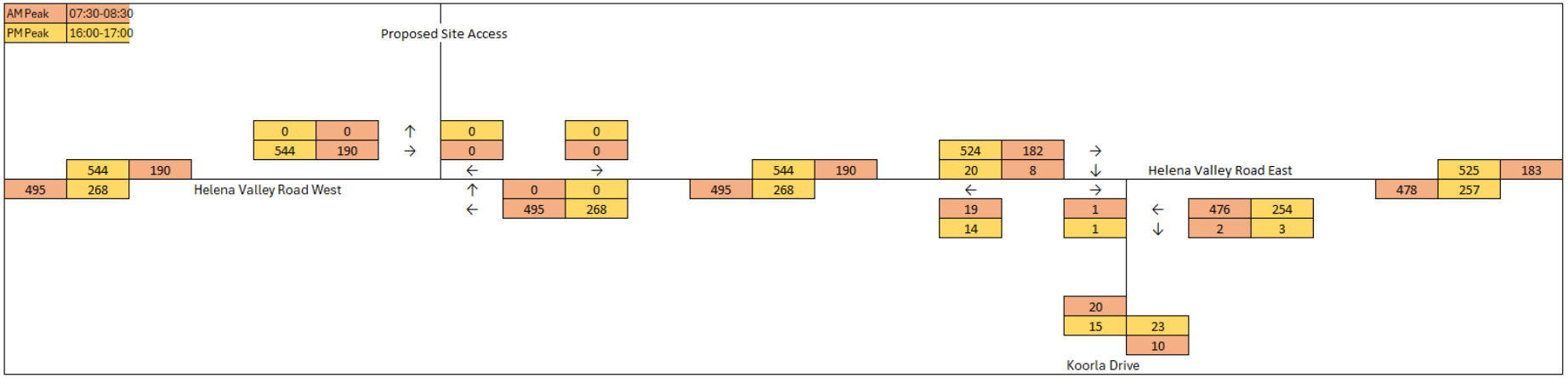


Figure 6-4 Scenario 2 – 2027 Opening Year with Development

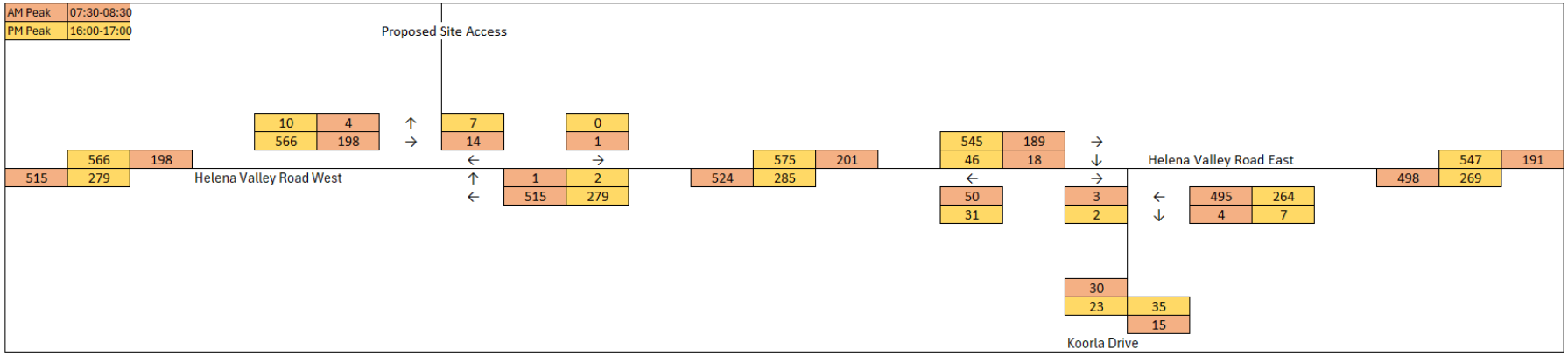
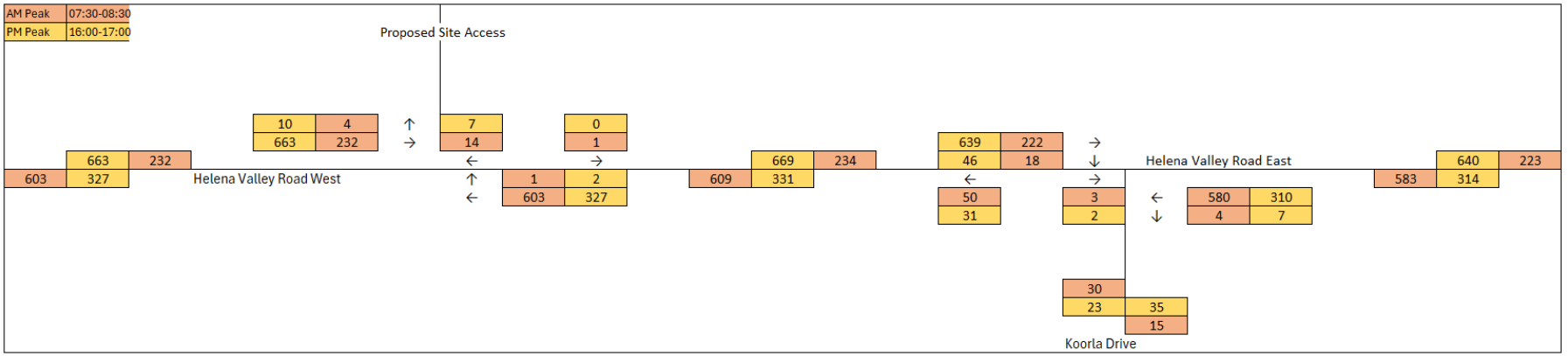


Figure 6-5 Scenario 3 – 2037 Future Year with Development



7 Key Intersection Analysis

7.1.1 SIDRA Results Definition

SIDRA results for each approach are presented below in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics are defined as follows:

- **Degree of Saturation (DOS):** the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an un-signalized intersection where DOS > 0.80;
- **95% Queue:** is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- **Average Delay:** is the average of all travel time delays for vehicles through the intersection. An unsignalised intersection can be considered to be operated at capacity where the average delay exceeds 40 seconds for any movement; and
- **Level of Service (LOS):** is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 7-1**.

Table 7-1 Level of Service (LOS) Performance Criteria

LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	5-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

The results of the SIDRA analysis are discussed in the following subsections. Detailed results of the SIDRA analysis are provided in Appendix C.

As previously stated, to assess the operational performance of the Helena Valley Road / Proposed Site access and Helena Valley Road / Koorla Drive Intersection, five traffic modelling scenarios were developed. These scenarios reflect both short-term and long-term conditions, with and without the inclusion of a right-turn pocket at Helena Valley Road:

- **Scenario 1:** 2025 background traffic only
- **Scenario 2:** 2027 Opening Year – without right-turn pocket
- **Scenario 3:** 2037 Future Year – without right-turn pocket
- **Scenario 4:** 2027 Opening Year – with right-turn pocket
- **Scenario 5:** 2037 Future Year – with right-turn pocket

7.1.2 Scenario 1 – 2025 Base Scenario

The SIDRA network layout for the intersections that were assessed is illustrated in Figure 7-1.

The performance of Helena Valley Road / Proposed Site Access and Helena Valley Road / Koorla Drive intersections for Scenario 1 (2025 base scenario) is summarised in Table 7-2 and Table 7-3.

Figure 7-1 SIDRA Layout Scenario 1

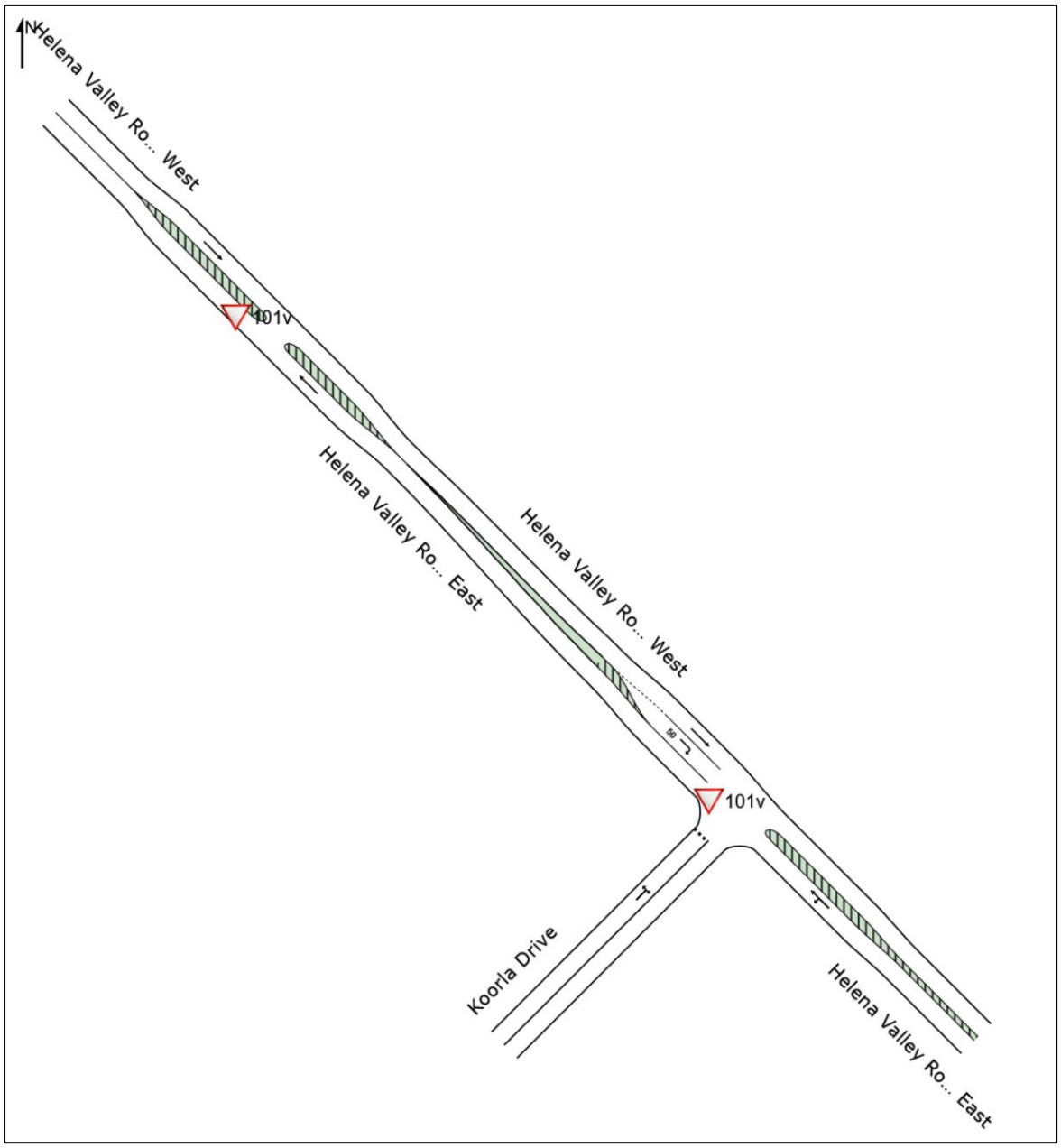


Table 7-2 Scenario 1: Helena Valley Rd / Proposed Site Access

Intersection	Approach	AM Peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Rd East	T	0.276	0.0	A	0.0	0.151	0.0	A	0.0
NorthWest: Helena Valley Rd West	T	0.111	0.0	A	0.0	0.295	0.1	A	0.0
All Vehicles		**0.276**	**0.0**	**NA**	**0.0**	**0.295**	**0.1**	**NA**	**0.0**

Table 7-3 Scenario 1: Helena Valley Road / Koorla Drive Intersection

Intersection	Approach	AM Peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Rd East	L	0.266	5.6	A	0.0	0.145	5.6	A	0.0
	T	0.266	0.1	A	0.0	0.145	0.0	A	0.0
NorthWest: Helena Valley Rd West	T	0.106	0.0	A	0.0	0.285	0.0	A	0.0
	R	0.008	7.4	A	0.2	0.015	6.4	A	0.5
SouthWest: Koorla Drive	L	0.023	6.6	A	0.6	0.015	5.4	A	0.4
	R	0.023	10.8	B	0.6	0.015	12.9	B	0.4
All Vehicles		**0.266**	**0.4**	**NA**	**0.6**	**0.285**	**0.3**	**NA**	**0.5**

The results of the analysis indicates that both intersections perform at an excellent LOS with minimal delays and queues.

7.1.3 Scenario 2 – 2027 Opening Year (without Right Turn Pocket)

The SIDRA network layout for the intersections that were assessed in this scenario is illustrated in Figure 7-2.

The performance of Helena Valley Rd / Proposed Site Access and Helena Valley Road / Koorla Drive Intersection without the Right Turn Pocket for Scenario 2 2027 Opening Year without the Right turn Pocket) is summarised in Table 7-4 and Table 7-5.

Figure 7-2 SIDRA Layout Scenario 2

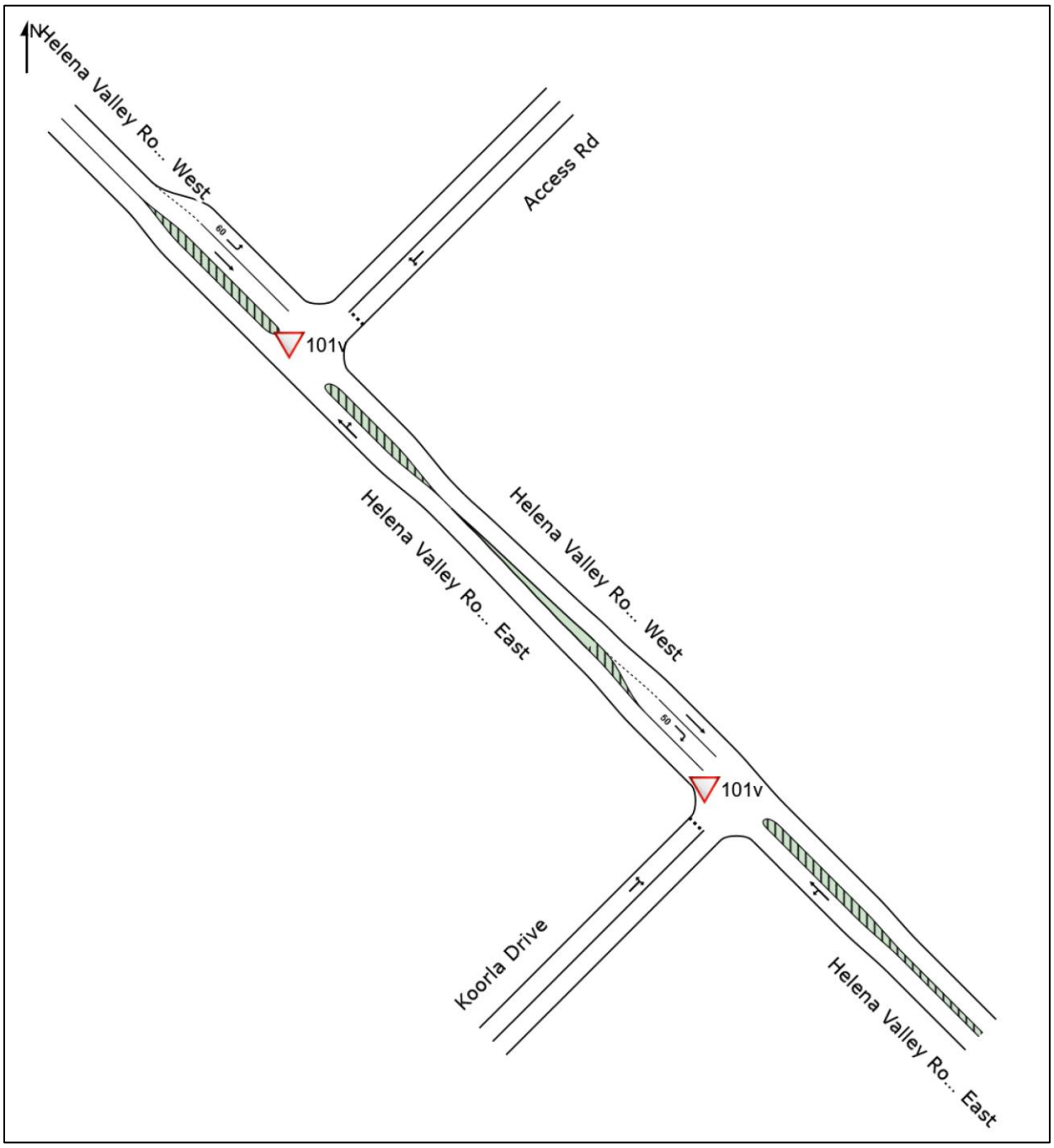


Table 7-4 Scenario 2: Helena Valley Rd / Proposed Site Access

		AM Peak				PM Peak			
Intersection	Approach	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	T	0.288	0.0	A	0.1	0.160	0.0	A	0.3
	R	0.288	5.7	A	0.1	0.160	12.3	B	0.3
NorthEast: Access Rd	L	0.037	5.2	B	0.9	0.024	7.1	A	0.6
	R	0.037	11.7	B	0.9	0.024	14.0	B	0.6
NorthWest: Helena Valley Road West	L	0.002	5.6	A	0.0	0.006	5.6	A	0.0
	T	0.116	0.0	A	0.0	0.307	0.1	A	0.0
All vehicles		**0.288**	**0.3**	**NA**	**0.9**	**0.307**	**0.3**	**NA**	**0.6**

Table 7-5 Scenario 2: Helena Valley Road / Koorla Drive Intersection

		AM Peak				PM Peak			
Intersection	Approach	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	L	0.278	5.6	A	0.0	0.153	5.6	A	0.0
	T	0.278	0.1	A	0.0	0.153	0.0	A	0.0
NorthWest: Helena Valley Road West	T	0.110	0.0	A	0.0	0.296	0.0	A	0.0
	R	0.019	7.6	A	0.5	0.036	6.5	A	1.1
SouthWest: Koorla Drive	L	0.063	6.8	A	1.7	0.033	5.5	A	0.9
	R	0.063	11.7	B	1.7	0.033	14.4	B	0.9
All vehicles		**0.278**	**0.8**	**NA**	**1.7**	**0.296**	**0.6**	**NA**	**1.1**

The results indicate that all movements at both intersections are anticipated to operate at acceptable level of service (minimum of LOS B) with minimal delays and queues

7.1.4 Scenario 3 – 2037 Future Year (without Right Turn Pocket)

The SIDRA network layout for the intersections that were assessed for this scenario is illustrated in Figure 7-3.

The performance of Helena Valley Rd / Proposed Site Access without the Right Turn Pocket for Scenario 3 2037 Future Year (without right turn pocket) is summarised in Table 7-6. The performance of Helena Valley Road / Koorla Drive Intersection without the Right Turn Pocket for Scenario 3 is summarised in Table 7-7.

Figure 7-3 SIDRA Layout Scenario 3

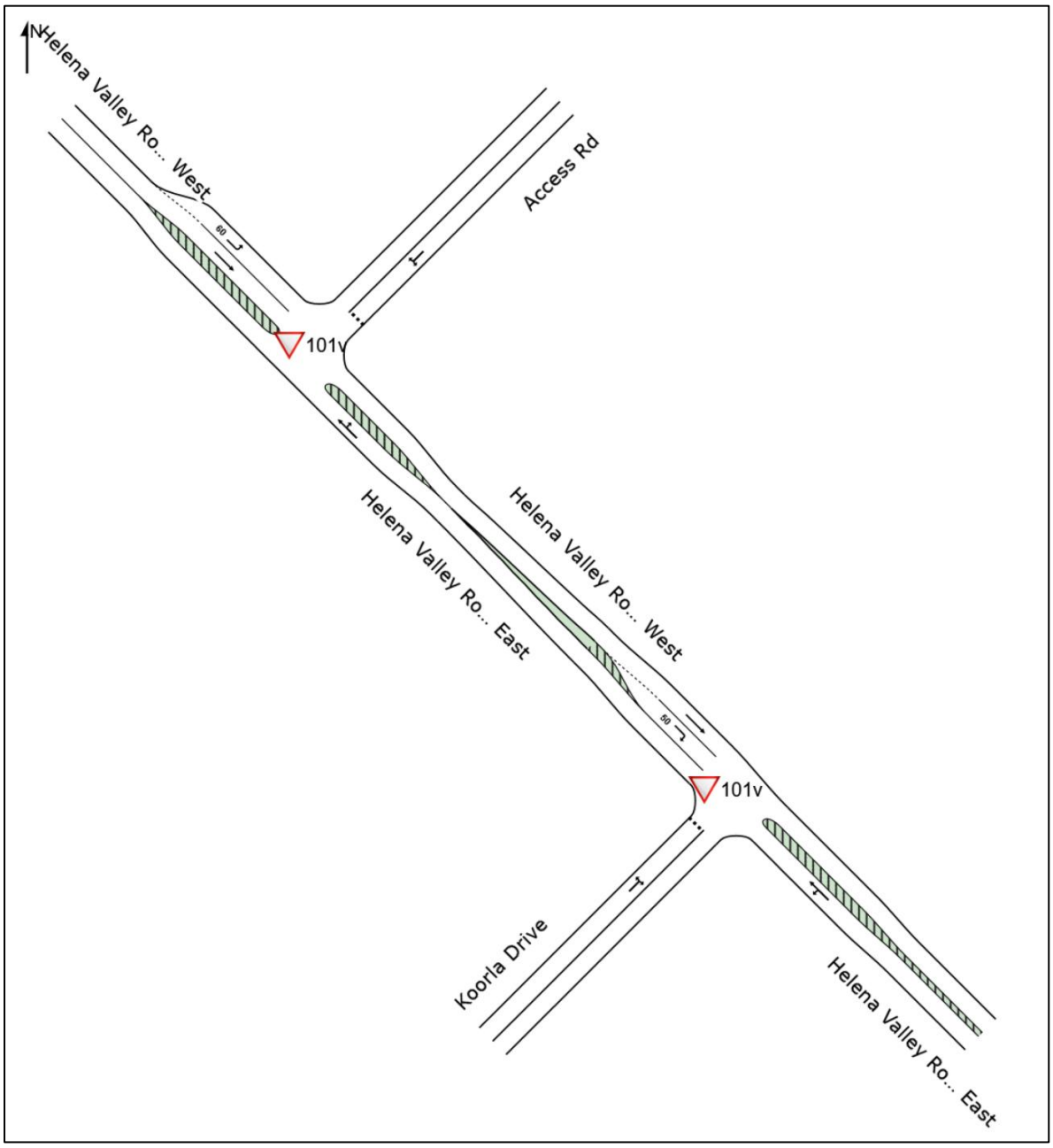


Table 7-6 Scenario 3: Helena Valley Rd / Proposed Site Access

Intersection	Approach	AM Peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	T	0.337	0.0	A	0.1	0.188	0.0	A	0.3
	R	0.337	5.7	A	0.1	0.188	15.8	C	0.3
NorthEast: Access Rd	L	0.046	5.4	A	1.1	0.032	7.9	A	0.7
	R	0.046	14.4	B	1.1	0.032	18.1	C	0.7
NorthWest: Helena Valley Road West	L	0.002	5.6	A	0.0	0.006	5.6	A	0.0
	T	0.135	0.1	A	0.0	0.360	0.1	A	0.0
All vehicles		**0.337**	**0.3**	**NA**	**1.1**	**0.360**	**0.3**	**NA**	**0.7**

This intersection is expected to operate at satisfactory levels with a maximum delay of 18.1 seconds anticipated for vehicles turning right from the proposed Access Rd approach during the PM peak hour period.

Table 7-7 Scenario 3: Helena Valley Road / Koorla Drive Intersection

Intersection	Approach	AM Peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	L	0.325	5.7	A	0.0	0.179	5.6	A	0.0
	T	0.325	0.1	A	0.0	0.179	0.0	A	0.0
NorthWest: Helena Valley Road West	T	0.130	0.0	A	0.0	0.347	0.0	A	0.0
	R	0.021	8.2	A	0.6	0.038	6.7	A	1.1
SouthWest: Koorla Drive	L	0.073	7.4	A	1.9	0.036	5.7	A	0.9
	R	0.073	14.3	B	1.9	0.036	18.4	C	0.9
All vehicles		**0.325**	**0.7**	**NA**	**1.9**	**0.347**	**0.6**	**NA**	**1.1**

The results show that the future intersection is expected to operate at satisfactory level of service with minimal delays and queues.

7.1.5 Scenario 4 – 2027 Opening Year (with Right Turn Pocket)

The SIDRA network layout for the intersections that were assessed for this scenario is illustrated in Figure 7-4.

The performance of Helena Valley Rd / Proposed Site Access including the proposed Right Turn Pocket for Scenario 4 2027 opening year with right turn pocket is summarised in Table 7-8. The performance of Helena Valley Road / Koorla Drive Intersection with the Right Turn Pocket for Scenario 4 is summarised in Table 7-9.

Figure 7-4 SIDRA Layout Scenario 4

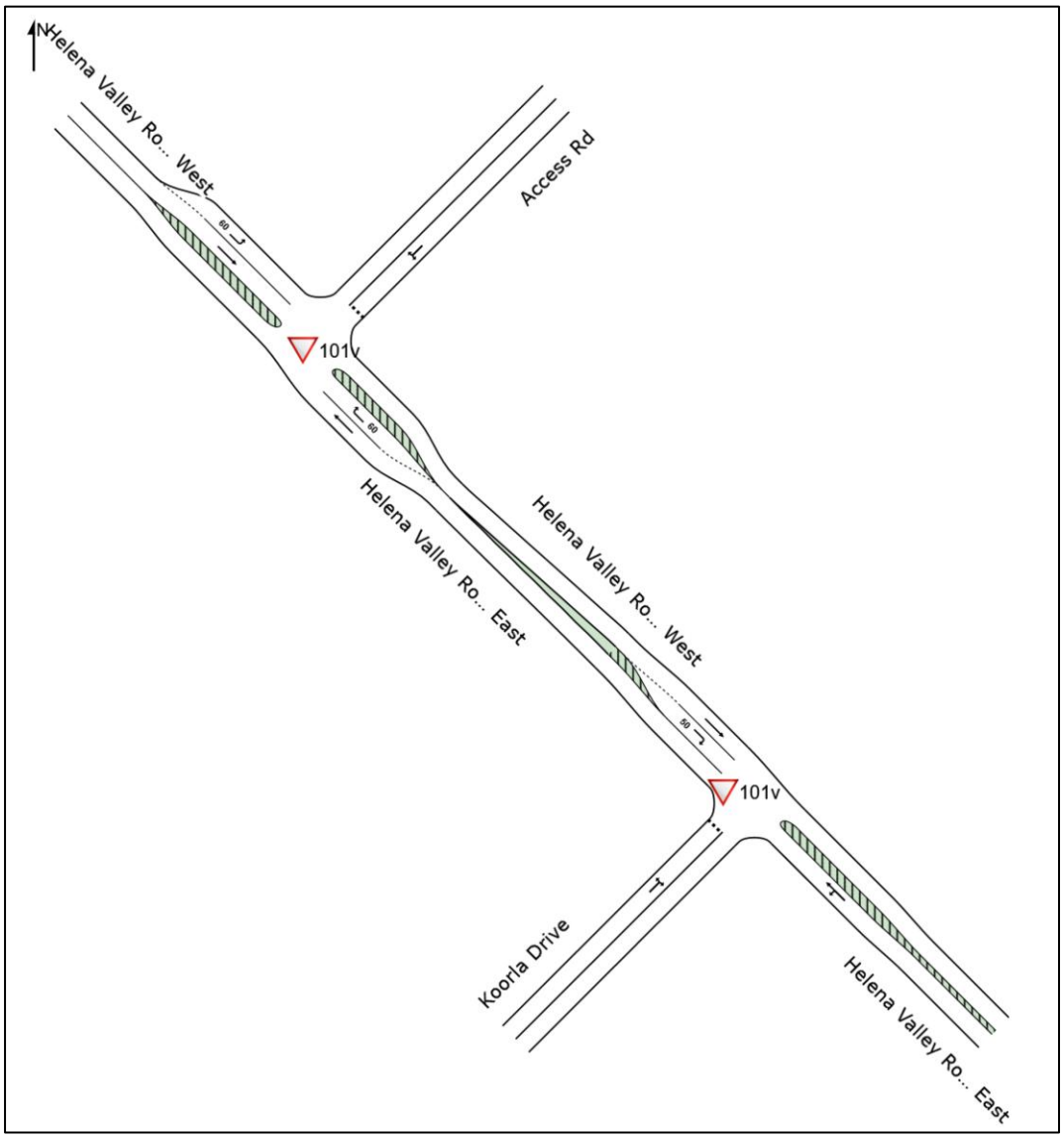


Table 7-8 Scenario 4: Helena Valley Rd / Proposed Site Access

		AM Peak				PM Peak			
Intersection	Approach	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	T	0.287	0.0	A	0.0	0.157	0.0	A	0.0
	R	0.001	6.3	A	0.0	0.003	8.8	A	0.1
NorthEast: Access Rd	L	0.045	5.4	A	0.2	0.030	7.9	A	0.7
	R	0.045	13.7	B	0.2	0.030	16.8	C	0.7
NorthWest: Helena Valley Road West	L	0.002	5.6	A	0.0	0.006	5.6	A	0.0
	T	0.116	0.0	A	0.0	0.307	0.1	A	0.0
All vehicles		**0.287**	**0.3**	**NA**	**1.1**	**0.307**	**0.3**	**NA**	**0.7**

The above results shows that even at full buildout, all movements at the intersection are still anticipated to operate at an acceptable level of service with minimal delays and short queue lengths. A maximum delay of 16.8 seconds is anticipated to be experienced by right turning vehicles from the proposed Access Rd approach during the PM peak hour period.

Table 7-9 Scenario 4: Helena Valley Road / Koorla Drive Intersection

		AM Peak				PM Peak			
Intersection	Approach	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	L	0.278	5.6	A	0.0	0.153	5.6	A	0.0
	T	0.278	0.1	A	0.0	0.153	0.0	A	0.0
NorthWest: Helena Valley Road West	T	0.110	0.0	A	0.0	0.296	0.0	A	0.0
	R	0.019	7.6	A	0.5	0.036	6.5	A	1.1
SouthWest: Koorla Drive	L	0.063	6.8	A	1.7	0.033	5.5	A	0.9
	R	0.063	11.7	B	1.7	0.033	14.4	B	0.9
All vehicles		**0.278**	**0.8**	**NA**	**1.7**	**0.296**	**0.6**	**NA**	**1.1**

The results indicate that this intersection is anticipated to operate at good level of service with minimal delays and queueing during the AM and PM peak hour periods.

7.1.6 Scenario 5 – 2037 Future Year (with Right Turn Pocket)

The SIDRA network layout for the intersections that were assessed for this scenario is illustrated in Figure 7-5.

The performance of Helena Valley Rd / Proposed Site Access with the Right Turn Pocket for Scenario 5 is summarised in

Table 7-10. The performance of Helena Valley Road / Koorla Drive Intersection with the Right Turn Pocket for Scenario 5 is summarised in Table 7-11.

Figure 7-5 SIDRA Layout Scenario 5

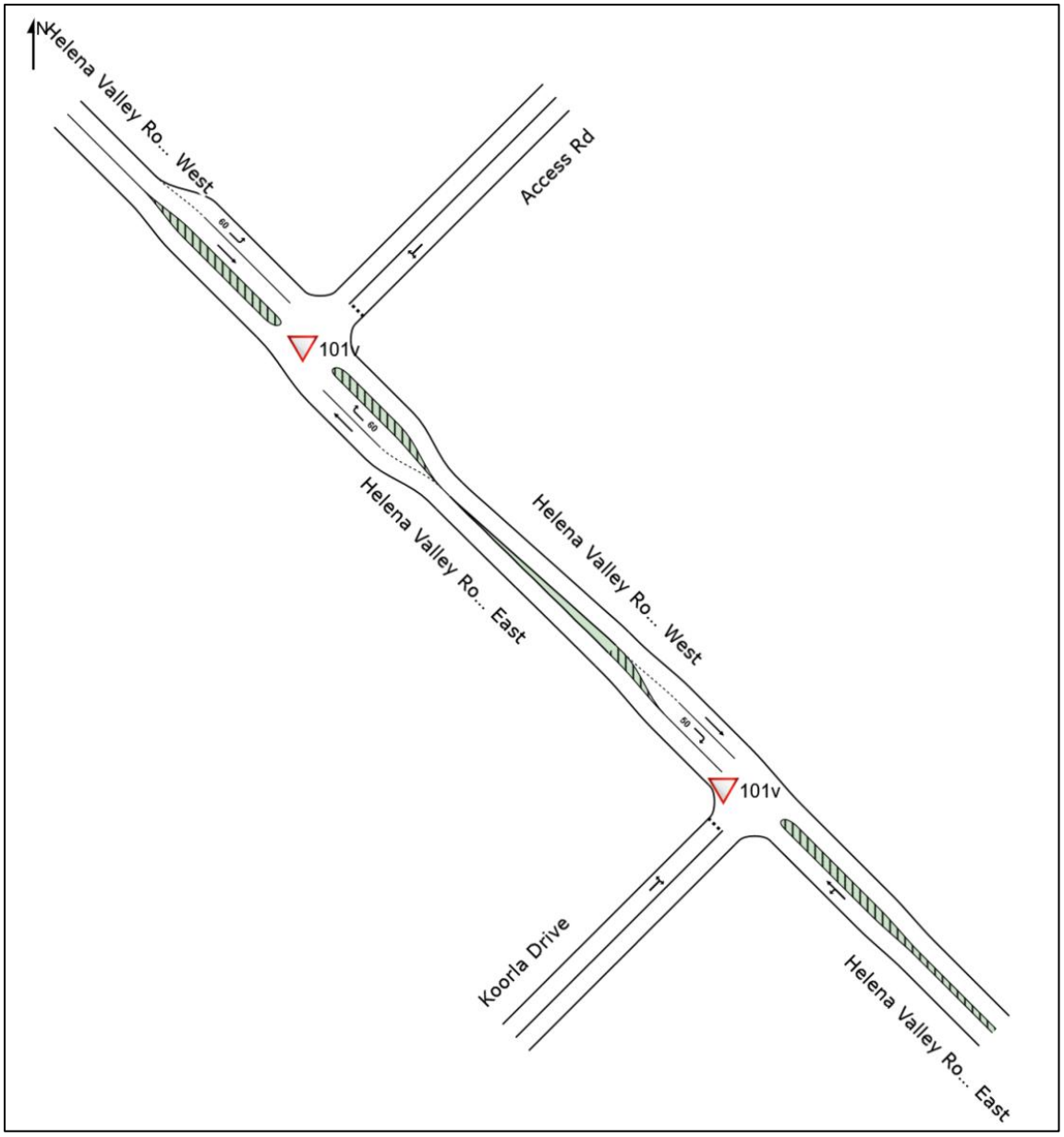


Table 7-10 Scenario 5: Helena Valley Rd / Proposed Site Access

		AM Peak				PM Peak			
Intersection	Approach	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	T	0.337	0.0	A	0.1	0.188	0.0	A	0.3
	R	0.337	5.7	A	0.1	0.188	15.8	C	0.3
NorthEast: Access Rd	L	0.046	5.4	A	1.1	0.032	7.9	A	0.7
	R	0.046	14.4	B	1.1	0.032	18.1	C	0.7
NorthWest: Helena Valley Road West	L	0.002	5.6	A	0.0	0.006	5.6	A	0.0
	T	0.135	0.0	A	0.0	0.360	0.1	A	0.0
All vehicles		**0.337**	**0.3**	**NA**	**1.1**	**0.360**	**0.3**	**NA**	**0.7**

Table 7-11 Scenario 5: Helena Valley Road / Koorla Drive Intersection

		AM Peak				PM Peak			
Intersection	Approach	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
SouthEast: Helena Valley Road East	L	0.325	5.7	A	0.0	0.179	5.6	A	0.0
	T	0.325	0.1	A	0.0	0.179	0.0	A	0.0
NorthWest: Helena Valley Road West	T	0.130	0.0	A	0.0	0.347	0.0	A	0.0
	R	0.021	8.2	A	0.6	0.038	6.7	A	1.1
SouthWest: Koorla Drive	L	0.073	7.4	A	1.9	0.036	5.7	A	0.9
	R	0.073	14.3	B	1.9	0.036	18.4	C	0.9
All vehicles		**0.325**	**0.7**	**NA**	**1.9**	**0.347**	**0.6**	**NA**	**1.1**

The results show that both intersections are expected to perform at a good level of service with minimal delays and queues.

7.2 SIDRA Results Summary

The SIDRA 'All Vehicles' results for each scenario and each intersection are summarised in Table 7-12.

Table 7-12 SIDRA Results Summary

Helena Valley Road / Proposed Site Access									
Scenario		AM Peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
1	2025 Base Scenario	0.276	0.0	NA	0.0	0.295	0.1	NA	0.0
2	Opening year 2027 without RT Pocket	0.288	0.3	NA	0.9	0.307	0.3	NA	0.6
3	Future year 2037 without RT Pocket	0.337	0.3	NA	1.1	0.360	0.3	NA	0.7
4	Opening year 2027 with RT Pocket	0.287	0.3	NA	1.1	0.307	0.3	NA	0.7
5	Future year 2037 with RT Pocket	0.337	0.3	NA	1.1	0.360	0.3	NA	0.7
Helena Valley Road / Koorla Drive intersection									
Scenario		AM Peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
1	2025 Base Scenario	0.266	0.4	NA	0.6	0.285	0.3	NA	0.5
2	Opening year 2027 without RT Pocket	0.278	0.8	NA	1.7	0.296	0.6	NA	1.1
3	Future year 2037 without RT Pocket	0.325	0.7	NA	1.9	0.347	0.6	NA	1.1
4	Opening year 2027 with RT Pocket	0.278	0.8	NA	1.7	0.296	0.6	NA	1.1
5	Future year 2037 with RT Pocket	0.325	0.7	NA	1.9	0.347	0.6	NA	1.1

The SIDRA analysis for both the base year and future year scenarios of the proposed development shows generally smooth traffic flow with no major delays, breakdowns, or congestion at the key intersections analysed.

In summary, the trips generated by the proposed Helena Valley structure plan is not expected to significantly impact the performance of the existing Helena Valley Road/Koorla Drive intersection. It is also anticipated that the future Helena Valley Rd/Proposed Site Access will perform at satisfactory levels of service and capacity.

The results also indicate that the Helena Valley Road / Proposed Site Access and the Helena Valley Road/ Koorla Drive intersection is expected to operate at a good LOS, with minimal delays and queues for the "with" and "without" a right turn pocket in both the 2027 Opening Year and the 2037 Future design year.

8 Conclusions

This Transport Impact Assessment (TIA) outlines the transport aspects of the proposed Helena Valley structure plan, focusing on traffic operations, access and intersection performances. Included are discussions regarding pedestrian, cycle, and public transport considerations.

This report has been prepared in accordance with the *Western Australian Planning Commission (WAPC) TIA Guidelines Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (2016).*

The following conclusions have been made regarding the proposed structure plan:

- The proposed Helena Valley structure plan currently has adequate connectivity to public transportation, however due to limited flexibility it is anticipated that there may be fewer patrons that will use the public transport. The PTA have confirmed no anticipated major upgrades are intended.
- The proposed Helena Valley structure plan area is considered to be adequately connected to the surrounding road network (Roe Highway and Midland Road to the West and Great Eastern Highway to the north).
- In terms of traffic generation, the proposed Helena Valley structure plan is expected to generate a total of 49 trips in the AM peak hour and 49 trips in the PM peak hour when the subject site is fully developed.
- The sight lines at the proposed access point are estimated to exceed 200 metres in both directions, which meets the minimum Safe Intersection Sight Distance (SISD) requirement
- The results of the Turn Warrant assessment indicate a requirement to provide a left turn lane at the Helena Valley Road / Proposed Site Access. Consideration has also been given to a providing a potential right-turn pocket to futureproof the proposed site access beyond the 2037 horizon.

- The SIDRA results indicate that the Helena Valley Road / Proposed Site Access and the Helena Valley Road/ Koorla Drive intersections are expected to operate at a good level of service with minimal delays and queues for the “with” and “without” right turn pocket scenarios in both the 2027 Opening Year and the 2037 future design year.

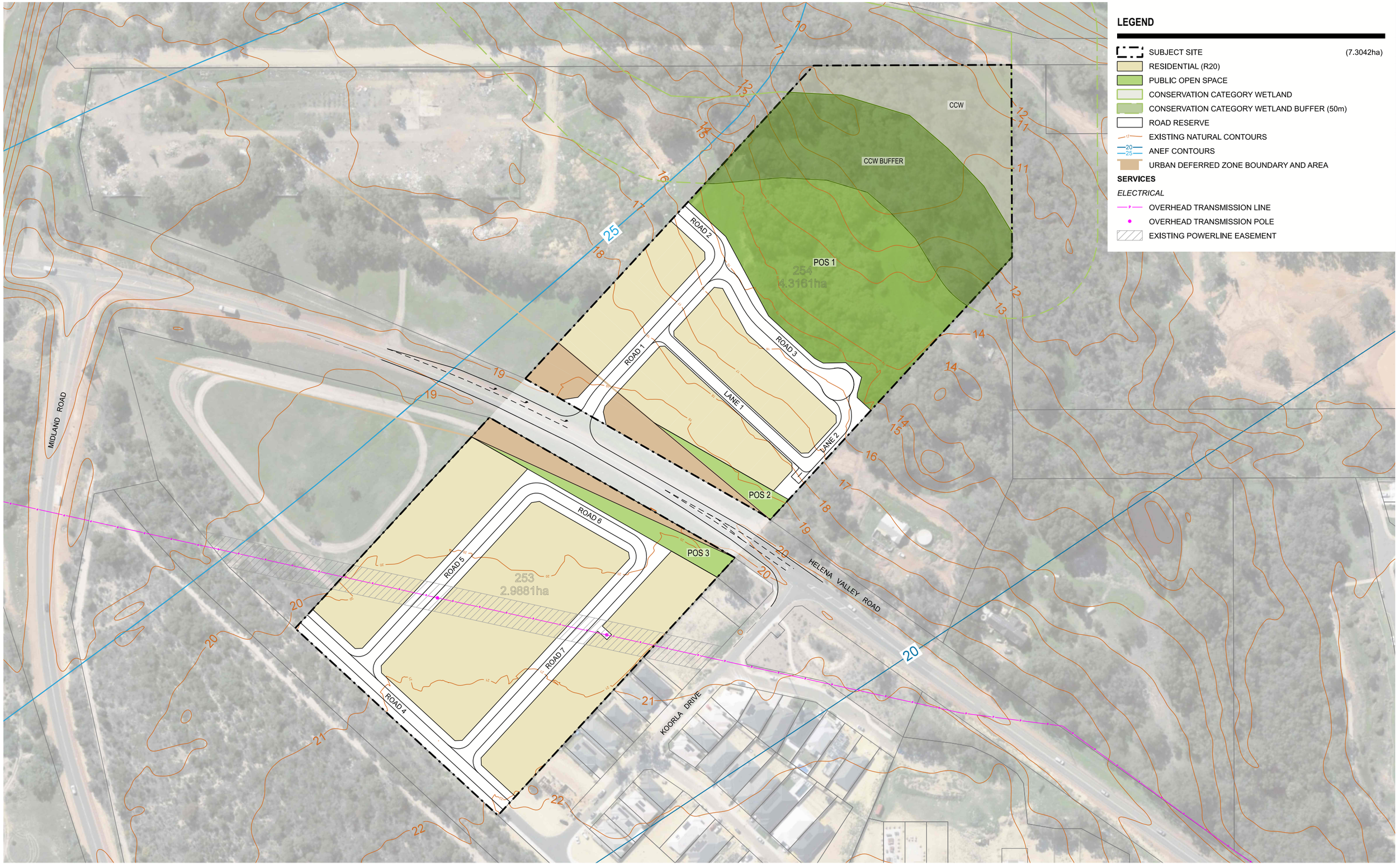
Overall, the proposed structure plan on Lots 253 and 254 Helena Valley Road is expected to have minimal impact on the traffic operations and safety on the surrounding road network.

Appendix A WAPC Checklist

Item	Section	Comments/Proposals
SUMMARY	Section 1	
INTRODUCTION/BACKGROUND	Section 1	
STRUCTURE PLAN PROPOSAL		
Regional context	Section 2	
Proposed land uses	Section 4	
Table of land uses and quantities	Section 4	
Major attractors/generators	Section 5	
Any specific issues	NA	
EXISTING SITUATION		
Existing land uses within structure plan	Section 2	
Existing land uses within 800m of Structure Plan area	Section 2	
Existing road network within Structure Plan area	Section 2	
Existing pedestrian/cycle networks within Structure Plan area	Section 2	
Existing public transport services within Structure Plan area	Section 2	
Existing road network within 2 (or 5) km of Structure Plan area	Section 2	
Traffic flows on roads within Structure Plan area (AM and PM Peak Hours)	Section 2	
Traffic flows on roads within 2 (or 5) km of Structure Plan area (AM and PM Peak Hours)	Section 2	
Existing pedestrian/cycle networks within 800m of the Structure Plan area	Section 2	
Existing public transport services within 800m of the Structure Plan area	Section 2	
PROPOSED INTERNAL TRANSPORT NETWORKS		
Changes/additions to existing road network or proposed new road network	Section 3	
Road reservation widths	Section 3	
Road cross-sections & speed limits	Section 3	
Intersection controls	Section 3	
Pedestrian/cycle networks and crossing facilities	Section 3	
Public transport routes	Section 3	
CHANGES TO EXTERNAL TRANSPORT NETWORKS		
Road network	Section 3	
Intersection controls	Section 3	
Pedestrian/cycle networks and crossing facilities	Section 3	
Public transport services	Section 3	
INTEGRATION WITH SURROUNDING AREA		
Trip attractors/generators within 800m	Section 5	
Proposed changes to land uses within 800m	Section 3	
Travel desire lines from Structure Plan to these attractors/generators	N/A	
Adequacy of existing transport networks	N/A	
Deficiencies in existing transport networks	N/A	
Remedial measures to address deficiencies	N/A	
ANALYSIS OF INTERNAL TRANSPORT		
Assessment years and time periods	Section 6	
Structure Plan generated traffic	Section 6	
Extraneous (through) traffic	Section 6	
Design traffic flows	Section 6	

Road cross-sections	Section 4
Intersection controls	Section 4
Access strategy	Section 4
Pedestrian/cycle networks	Section 3
Safe routes to schools	Section 2
Pedestrian permeability & efficiency	Section 3
Access to public transport	Section 3
ANALYSIS OF EXTERNAL TRANSPORT NETWORKS	
Extent of analysis	Section 7
Base flows for assessment years	Section 7
Total traffic flows	Section 6
Road cross-sections	Section 3
Intersection layouts & controls	Section 7
Pedestrian/cycle networks	Section 2
CONCLUSIONS	Section 8

Appendix B Structure Plan Concept Plan



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Scale
1:2000@A3
1:1000@A1

0 10 20 30 40

N

Date
26/11/2025

Plan
25/031/002A

Grid
PCG 2020

Drawn
MH

Approved
BDM

Structure Plan Concept

LOTS 253 & 254 HELENA VALLEY ROAD, HELLENA VALLEY

Appendix C SIDRA Results

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access - 2025 Base AM (Site Folder: 2025 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	521	4.2	521	4.2	0.276	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			521	4.2	521	4.2	0.276	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
NorthWest: Helena Valley Road West															
28	T1	All MCs	200	9.2	200	9.2	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			200	9.2	200	9.2	0.111	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles			721	5.6	721	5.6	0.276	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access - 2025 Base PM (Site Folder: 2025 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	282	5.5	282	5.5	0.151	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			282	5.5	282	5.5	0.151	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
NorthWest: Helena Valley Road West															
28	T1	All MCs	573	1.6	573	1.6	0.295	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			573	1.6	573	1.6	0.295	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
All Vehicles			855	2.9	855	2.9	0.295	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2025 Base AM (Site Folder: 2025 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	2	2.0	2	2.0	0.266	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	55.9
22	T1	All MCs	501	4.2	501	4.2	0.266	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			503	4.2	503	4.2	0.266	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
NorthWest: Helena Valley Road West															
28	T1	All MCs	192	9.2	192	9.2	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
29	R2	All MCs	8	2.0	8	2.0	0.008	7.4	LOS A	0.0	0.2	0.50	0.62	0.50	40.0
Approach			200	8.9	200	8.9	0.106	0.3	NA	0.0	0.2	0.02	0.03	0.02	59.2
SouthWest: Koorla Drive															
30	L2	All MCs	20	2.0	20	2.0	0.023	6.6	LOS A	0.1	0.6	0.49	0.63	0.49	40.2
32	R2	All MCs	1	2.0	1	2.0	0.023	10.8	LOS B	0.1	0.6	0.49	0.63	0.49	46.1
Approach			21	2.0	21	2.0	0.023	6.8	LOS A	0.1	0.6	0.49	0.63	0.49	40.6
All Vehicles			724	5.4	724	5.4	0.266	0.4	NA	0.1	0.6	0.02	0.03	0.02	59.1

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2025 Base PM (Site Folder: 2025 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	3	2.0	3	2.0	0.145	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	55.9
22	T1	All MCs	267	5.5	267	5.5	0.145	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach			271	5.5	271	5.5	0.145	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
NorthWest: Helena Valley Road West															
28	T1	All MCs	552	1.6	552	1.6	0.285	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29	R2	All MCs	21	2.0	21	2.0	0.015	6.4	LOS A	0.1	0.5	0.36	0.57	0.36	40.7
Approach			573	1.7	573	1.7	0.285	0.3	NA	0.1	0.5	0.01	0.02	0.01	59.2
SouthWest: Koorla Drive															
30	L2	All MCs	15	2.0	15	2.0	0.015	5.4	LOS A	0.1	0.4	0.37	0.54	0.37	40.9
32	R2	All MCs	1	2.0	1	2.0	0.015	12.9	LOS B	0.1	0.4	0.37	0.54	0.37	46.6
Approach			16	2.0	16	2.0	0.015	5.9	LOS A	0.1	0.4	0.37	0.54	0.37	41.5
All Vehicles			859	2.9	859	2.9	0.285	0.3	NA	0.1	0.5	0.02	0.03	0.02	59.1

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access without RT - 2027 AM (Site Folder: 2027 Opening Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	542	4.2	542	4.2	0.288	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	60.0
23	R2	All MCs	1	2.0	1	2.0	0.288	5.7	LOS A	0.0	0.1	0.00	0.00	0.00	50.2
Approach			543	4.2	543	4.2	0.288	0.0	NA	0.0	0.1	0.00	0.00	0.00	60.0
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.037	5.2	LOS A	0.1	0.9	0.62	0.75	0.62	35.8
26	R2	All MCs	15	2.0	15	2.0	0.037	11.7	LOS B	0.1	0.9	0.62	0.75	0.62	42.8
Approach			16	2.0	16	2.0	0.037	11.3	LOS B	0.1	0.9	0.62	0.75	0.62	42.5
NorthWest: Helena Valley Road West															
27	L2	All MCs	4	2.0	4	2.0	0.002	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	208	9.2	208	9.2	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			213	9.1	213	9.1	0.116	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles			772	5.5	772	5.5	0.288	0.3	NA	0.1	0.9	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access without RT - 2027 PM (Site Folder: 2027 Opening Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	294	5.5	294	5.5	0.160	0.0	LOS A	0.0	0.3	0.01	0.02	0.01	59.9
23	R2	All MCs	2	2.0	2	2.0	0.160	12.3	LOS B	0.0	0.3	0.01	0.02	0.01	50.1
Approach			296	5.5	296	5.5	0.160	0.1	NA	0.0	0.3	0.01	0.02	0.01	59.8
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.024	7.1	LOS A	0.1	0.6	0.70	0.81	0.70	34.3
26	R2	All MCs	7	2.0	7	2.0	0.024	14.0	LOS B	0.1	0.6	0.70	0.81	0.70	41.5
Approach			8	2.0	8	2.0	0.024	13.2	LOS B	0.1	0.6	0.70	0.81	0.70	40.8
NorthWest: Helena Valley Road West															
27	L2	All MCs	12	2.0	12	2.0	0.006	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	596	1.6	596	1.6	0.307	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			607	1.6	607	1.6	0.307	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
All Vehicles			912	2.9	912	2.9	0.307	0.3	NA	0.1	0.6	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2027 AM (Site Folder: 2027 Opening Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	4	2.0	4	2.0	0.278	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	55.9
22	T1	All MCs	521	4.2	521	4.2	0.278	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			525	4.2	525	4.2	0.278	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
NorthWest: Helena Valley Road West															
28	T1	All MCs	199	9.2	199	9.2	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
29	R2	All MCs	19	2.0	19	2.0	0.019	7.6	LOS A	0.1	0.5	0.51	0.65	0.51	39.8
Approach			218	8.6	218	8.6	0.110	0.7	NA	0.1	0.5	0.04	0.06	0.04	58.4
SouthWest: Koorla Drive															
30	L2	All MCs	53	2.0	53	2.0	0.063	6.8	LOS A	0.2	1.7	0.51	0.68	0.51	39.8
32	R2	All MCs	3	2.0	3	2.0	0.063	11.7	LOS B	0.2	1.7	0.51	0.68	0.51	45.8
Approach			56	2.0	56	2.0	0.063	7.1	LOS A	0.2	1.7	0.51	0.68	0.51	40.3
All Vehicles			799	5.2	799	5.2	0.278	0.8	NA	0.2	1.7	0.05	0.07	0.05	58.1

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2027 PM (Site Folder: 2027 Opening Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	7	2.0	7	2.0	0.153	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	55.8
22	T1	All MCs	278	5.5	278	5.5	0.153	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach			285	5.4	285	5.4	0.153	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
NorthWest: Helena Valley Road West															
28	T1	All MCs	574	1.6	574	1.6	0.296	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29	R2	All MCs	48	2.0	48	2.0	0.036	6.5	LOS A	0.2	1.1	0.38	0.59	0.38	40.6
Approach			622	1.7	622	1.7	0.296	0.5	NA	0.2	1.1	0.03	0.05	0.03	58.5
SouthWest: Koorla Drive															
30	L2	All MCs	33	2.0	33	2.0	0.033	5.5	LOS A	0.1	0.9	0.38	0.56	0.38	40.8
32	R2	All MCs	2	2.0	2	2.0	0.033	14.4	LOS B	0.1	0.9	0.38	0.56	0.38	46.6
Approach			35	2.0	35	2.0	0.033	6.1	LOS A	0.1	0.9	0.38	0.56	0.38	41.4
All Vehicles			942	2.8	942	2.8	0.296	0.6	NA	0.2	1.1	0.03	0.06	0.03	58.3

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access without RT - 2037 AM (Site Folder: 2037 Future Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	635	4.2	635	4.2	0.337	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	60.0
23	R2	All MCs	1	2.0	1	2.0	0.337	5.7	LOS A	0.0	0.1	0.00	0.00	0.00	50.2
Approach			636	4.2	636	4.2	0.337	0.0	NA	0.0	0.1	0.00	0.00	0.00	60.0
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.046	5.4	LOS A	0.2	1.1	0.70	0.83	0.70	33.8
26	R2	All MCs	15	2.0	15	2.0	0.046	14.4	LOS B	0.2	1.1	0.70	0.83	0.70	41.1
Approach			16	2.0	16	2.0	0.046	13.8	LOS B	0.2	1.1	0.70	0.83	0.70	40.7
NorthWest: Helena Valley Road West															
27	L2	All MCs	4	2.0	4	2.0	0.002	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	244	9.2	244	9.2	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			248	9.1	248	9.1	0.135	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles			900	5.5	900	5.5	0.337	0.3	NA	0.2	1.1	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access without RT - 2037 PM (Site Folder: 2037 Future Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	344	5.5	344	5.5	0.188	0.0	LOS A	0.0	0.3	0.01	0.02	0.01	59.9
23	R2	All MCs	2	2.0	2	2.0	0.188	15.8	LOS C	0.0	0.3	0.01	0.02	0.01	50.1
Approach			346	5.5	346	5.5	0.188	0.1	NA	0.0	0.3	0.01	0.02	0.01	59.8
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.032	7.9	LOS A	0.1	0.7	0.78	0.90	0.78	31.6
26	R2	All MCs	7	2.0	7	2.0	0.032	18.1	LOS C	0.1	0.7	0.78	0.90	0.78	39.2
Approach			8	2.0	8	2.0	0.032	16.9	LOS C	0.1	0.7	0.78	0.90	0.78	38.5
NorthWest: Helena Valley Road West															
27	L2	All MCs	12	2.0	12	2.0	0.006	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	698	1.6	698	1.6	0.360	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			709	1.6	709	1.6	0.360	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
All Vehicles			1064	2.9	1064	2.9	0.360	0.3	NA	0.1	0.7	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2037 AM (Site Folder: 2037 Future Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	4	2.0	4	2.0	0.325	5.7	LOS A	0.0	0.0	0.00	0.00	0.00	55.9
22	T1	All MCs	611	4.2	611	4.2	0.325	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach			615	4.2	615	4.2	0.325	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
NorthWest: Helena Valley Road West															
28	T1	All MCs	234	9.2	234	9.2	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
29	R2	All MCs	19	2.0	19	2.0	0.021	8.2	LOS A	0.1	0.6	0.55	0.69	0.55	39.2
Approach			253	8.7	253	8.7	0.130	0.6	NA	0.1	0.6	0.04	0.05	0.04	58.5
SouthWest: Koorla Drive															
30	L2	All MCs	53	2.0	53	2.0	0.073	7.4	LOS A	0.3	1.9	0.55	0.73	0.55	39.1
32	R2	All MCs	3	2.0	3	2.0	0.073	14.3	LOS B	0.3	1.9	0.55	0.73	0.55	45.2
Approach			56	2.0	56	2.0	0.073	7.8	LOS A	0.3	1.9	0.55	0.73	0.55	39.6
All Vehicles			923	5.3	923	5.3	0.325	0.7	NA	0.3	1.9	0.04	0.06	0.04	58.3

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2037 PM (Site Folder: 2037 Future Year without RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	7	2.0	7	2.0	0.179	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	55.9
22	T1	All MCs	326	5.5	326	5.5	0.179	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach			334	5.4	334	5.4	0.179	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
NorthWest: Helena Valley Road West															
28	T1	All MCs	673	1.6	673	1.6	0.347	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29	R2	All MCs	48	2.0	48	2.0	0.038	6.7	LOS A	0.2	1.1	0.41	0.61	0.41	40.5
Approach			721	1.7	721	1.7	0.347	0.5	NA	0.2	1.1	0.03	0.04	0.03	58.7
SouthWest: Koorla Drive															
30	L2	All MCs	33	2.0	33	2.0	0.036	5.7	LOS A	0.1	0.9	0.43	0.58	0.43	40.5
32	R2	All MCs	2	2.0	2	2.0	0.036	18.4	LOS C	0.1	0.9	0.43	0.58	0.43	46.3
Approach			35	2.0	35	2.0	0.036	6.5	LOS A	0.1	0.9	0.43	0.58	0.43	41.0
All Vehicles			1089	2.8	1089	2.8	0.347	0.6	NA	0.2	1.1	0.03	0.05	0.03	58.5

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access with RT - 2027 AM (Site Folder: 2027 Opening Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	542	4.2	542	4.2	0.287	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
23	R2	All MCs	1	2.0	1	2.0	0.001	6.3	LOS A	0.0	0.0	0.31	0.53	0.31	41.0
Approach			543	4.2	543	4.2	0.287	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.045	5.4	LOS A	0.2	1.1	0.66	0.80	0.66	34.3
26	R2	All MCs	15	2.0	15	2.0	0.045	13.7	LOS B	0.2	1.1	0.66	0.80	0.66	41.5
Approach			16	2.0	16	2.0	0.045	13.1	LOS B	0.2	1.1	0.66	0.80	0.66	41.2
NorthWest: Helena Valley Road West															
27	L2	All MCs	4	2.0	4	2.0	0.002	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	208	9.2	208	9.2	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			213	9.1	213	9.1	0.116	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles			772	5.5	772	5.5	0.287	0.3	NA	0.2	1.1	0.01	0.02	0.01	59.2

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access with RT- 2027 PM (Site Folder: 2027 Opening Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	294	5.5	294	5.5	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
23	R2	All MCs	2	2.0	2	2.0	0.003	8.8	LOS A	0.0	0.1	0.54	0.63	0.54	38.8
Approach			296	5.5	296	5.5	0.157	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.8
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.030	7.9	LOS A	0.1	0.7	0.74	0.86	0.74	32.4
26	R2	All MCs	7	2.0	7	2.0	0.030	16.8	LOS C	0.1	0.7	0.74	0.86	0.74	39.9
Approach			8	2.0	8	2.0	0.030	15.7	LOS C	0.1	0.7	0.74	0.86	0.74	39.2
NorthWest: Helena Valley Road West															
27	L2	All MCs	12	2.0	12	2.0	0.006	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	596	1.6	596	1.6	0.307	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			607	1.6	607	1.6	0.307	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
All Vehicles			912	2.9	912	2.9	0.307	0.3	NA	0.1	0.7	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2027 AM (Site Folder: 2027 Opening Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	4	2.0	4	2.0	0.278	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	55.9
22	T1	All MCs	521	4.2	521	4.2	0.278	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			525	4.2	525	4.2	0.278	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
NorthWest: Helena Valley Road West															
28	T1	All MCs	199	9.2	199	9.2	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
29	R2	All MCs	19	2.0	19	2.0	0.019	7.6	LOS A	0.1	0.5	0.51	0.65	0.51	39.8
Approach			218	8.6	218	8.6	0.110	0.7	NA	0.1	0.5	0.04	0.06	0.04	58.4
SouthWest: Koorla Drive															
30	L2	All MCs	53	2.0	53	2.0	0.063	6.8	LOS A	0.2	1.7	0.51	0.68	0.51	39.8
32	R2	All MCs	3	2.0	3	2.0	0.063	11.7	LOS B	0.2	1.7	0.51	0.68	0.51	45.8
Approach			56	2.0	56	2.0	0.063	7.1	LOS A	0.2	1.7	0.51	0.68	0.51	40.3
All Vehicles			799	5.2	799	5.2	0.278	0.8	NA	0.2	1.7	0.05	0.07	0.05	58.1

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2027 PM (Site Folder: 2027 Opening Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	7	2.0	7	2.0	0.153	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	55.8
22	T1	All MCs	278	5.5	278	5.5	0.153	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach			285	5.4	285	5.4	0.153	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
NorthWest: Helena Valley Road West															
28	T1	All MCs	574	1.6	574	1.6	0.296	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29	R2	All MCs	48	2.0	48	2.0	0.036	6.5	LOS A	0.2	1.1	0.38	0.59	0.38	40.6
Approach			622	1.7	622	1.7	0.296	0.5	NA	0.2	1.1	0.03	0.05	0.03	58.5
SouthWest: Koorla Drive															
30	L2	All MCs	33	2.0	33	2.0	0.033	5.5	LOS A	0.1	0.9	0.38	0.56	0.38	40.8
32	R2	All MCs	2	2.0	2	2.0	0.033	14.4	LOS B	0.1	0.9	0.38	0.56	0.38	46.6
Approach			35	2.0	35	2.0	0.033	6.1	LOS A	0.1	0.9	0.38	0.56	0.38	41.4
All Vehicles			942	2.8	942	2.8	0.296	0.6	NA	0.2	1.1	0.03	0.06	0.03	58.3

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access with RT - 2037 AM (Site Folder: 2037 Future Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	635	4.2	635	4.2	0.337	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	60.0
23	R2	All MCs	1	2.0	1	2.0	0.337	5.7	LOS A	0.0	0.1	0.00	0.00	0.00	50.2
Approach			636	4.2	636	4.2	0.337	0.0	NA	0.0	0.1	0.00	0.00	0.00	60.0
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.046	5.4	LOS A	0.2	1.1	0.70	0.83	0.70	33.8
26	R2	All MCs	15	2.0	15	2.0	0.046	14.4	LOS B	0.2	1.1	0.70	0.83	0.70	41.1
Approach			16	2.0	16	2.0	0.046	13.8	LOS B	0.2	1.1	0.70	0.83	0.70	40.7
NorthWest: Helena Valley Road West															
27	L2	All MCs	4	2.0	4	2.0	0.002	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	244	9.2	244	9.2	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			248	9.1	248	9.1	0.135	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles			900	5.5	900	5.5	0.337	0.3	NA	0.2	1.1	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/Access with RT - 2037 PM (Site Folder: 2037 Future Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
22	T1	All MCs	344	5.5	344	5.5	0.188	0.0	LOS A	0.0	0.3	0.01	0.02	0.01	59.9
23	R2	All MCs	2	2.0	2	2.0	0.188	15.8	LOS C	0.0	0.3	0.01	0.02	0.01	50.1
Approach			346	5.5	346	5.5	0.188	0.1	NA	0.0	0.3	0.01	0.02	0.01	59.8
NorthEast: Access Rd															
24	L2	All MCs	1	2.0	1	2.0	0.032	7.9	LOS A	0.1	0.7	0.78	0.90	0.78	31.6
26	R2	All MCs	7	2.0	7	2.0	0.032	18.1	LOS C	0.1	0.7	0.78	0.90	0.78	39.2
Approach			8	2.0	8	2.0	0.032	16.9	LOS C	0.1	0.7	0.78	0.90	0.78	38.5
NorthWest: Helena Valley Road West															
27	L2	All MCs	12	2.0	12	2.0	0.006	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	50.1
28	T1	All MCs	698	1.6	698	1.6	0.360	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			709	1.6	709	1.6	0.360	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
All Vehicles			1064	2.9	1064	2.9	0.360	0.3	NA	0.1	0.7	0.01	0.02	0.01	59.4

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2037 AM (Site Folder: 2037 Future Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	4	2.0	4	2.0	0.325	5.7	LOS A	0.0	0.0	0.00	0.00	0.00	55.9
22	T1	All MCs	611	4.2	611	4.2	0.325	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach			615	4.2	615	4.2	0.325	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
NorthWest: Helena Valley Road West															
28	T1	All MCs	234	9.2	234	9.2	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
29	R2	All MCs	19	2.0	19	2.0	0.021	8.2	LOS A	0.1	0.6	0.55	0.69	0.55	39.2
Approach			253	8.7	253	8.7	0.130	0.6	NA	0.1	0.6	0.04	0.05	0.04	58.5
SouthWest: Koorla Drive															
30	L2	All MCs	53	2.0	53	2.0	0.073	7.4	LOS A	0.3	1.9	0.55	0.73	0.55	39.1
32	R2	All MCs	3	2.0	3	2.0	0.073	14.3	LOS B	0.3	1.9	0.55	0.73	0.55	45.2
Approach			56	2.0	56	2.0	0.073	7.8	LOS A	0.3	1.9	0.55	0.73	0.55	39.6
All Vehicles			923	5.3	923	5.3	0.325	0.7	NA	0.3	1.9	0.04	0.06	0.04	58.3

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

MOVEMENT SUMMARY

Site: 101v [Helena Valley Road/ Koorla Drive - 2037 PM (Site Folder: 2037 Future Year with RT Pocket)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Helena Valley Road East															
21	L2	All MCs	7	2.0	7	2.0	0.179	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	55.9
22	T1	All MCs	326	5.5	326	5.5	0.179	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach			334	5.4	334	5.4	0.179	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
NorthWest: Helena Valley Road West															
28	T1	All MCs	673	1.6	673	1.6	0.347	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29	R2	All MCs	48	2.0	48	2.0	0.038	6.7	LOS A	0.2	1.1	0.41	0.61	0.41	40.5
Approach			721	1.7	721	1.7	0.347	0.5	NA	0.2	1.1	0.03	0.04	0.03	58.7
SouthWest: Koorla Drive															
30	L2	All MCs	33	2.0	33	2.0	0.036	5.7	LOS A	0.1	0.9	0.43	0.58	0.43	40.5
32	R2	All MCs	2	2.0	2	2.0	0.036	18.4	LOS C	0.1	0.9	0.43	0.58	0.43	46.3
Approach			35	2.0	35	2.0	0.036	6.5	LOS A	0.1	0.9	0.43	0.58	0.43	41.0
All Vehicles			1089	2.8	1089	2.8	0.347	0.6	NA	0.2	1.1	0.03	0.05	0.03	58.5

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

With every community, we redefine what's possible.

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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