PC17 HAUTAPU INDUSTRIAL
Transportation Review, Assessment and Recommendations

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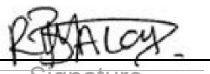
Prepared by: 

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Acronyms / Abbreviations

BIP	Bardowie Industrial Precinct
Council	Waipā District Council
District Plan	Waipā District Plan
DSI	Death and Serious Injury
FPS	Future Proof Strategy
ha	hectare
HG	Harrison Grierson Consultants Ltd
HLG	Hautapu Landowners' Group
ITA	Integrated Transport Assessment
LOS	Level of Service
MCA	Multi-Criteria Analysis
PPC17	Proposed Plan Change 17
PPC	Proposed Plan Change
RPS	Regional Policy Statement
RPTP	Regional Public Transport Plan
SH	State Highway
TIA	Traffic Impact Assessment
vpd	vehicles per day
vph	vehicles per hour
Waka Kotahi	Waka Kotahi New Zealand Transport Agency
WEX	Waikato Expressway
WRC	Waikato Regional Council
WRTM	Waikato Regional Transportation Model

1 Introduction

Stantec has been asked by Waipā District Council (Council) to review, assess, and make recommendations in relation to transportation elements associated with Proposed Plan Change (PPC) 17 – Hautapu Industrial Zones.

PPC17 is described in the Public Notice issued by Council as involving the Hautapu Industrial Area and seeks to reflect infrastructure changes that have happened since the Hautapu Structure Plan was last updated[1], to bring forward industrial land availability, and to re-zone an area of rural land north of Hautapu Road.

Key aspects of PPC17 are described in the Public Notice as follows:

1. ***Changes to the Hautapu Structure Plan*** *- Council had developed a master plan for infrastructure upgrades in and around Growth Cell C8 in the Hautapu Structure Plan area, which supersedes the Structure Plan in the Waipā District Plan. Proposed Plan Change 17 will amend the Structure Plan to align with the masterplan.*

2. ***"Live zoning" the Industrial Zone in Growth Cell C9*** *- The second part of the plan change relates to the Growth Cell C9, shown as "deferred industrial" in the District Plan and planned for development to occur after 2035. The deferred industrial zoning on C9 is no longer fit for purpose as it does not reflect the current land use or the demand for industrial land. Proposed Plan Change 17 proposes to lift the deferred industrial zoning on C9 which will make the industrial zoning "live".*

3. ***Rezone an area from Rural to Industrial*** *- An area to the north of Hautapu Road is currently zoned Rural. Part of this zoning no longer reflects the land use and the Waikato Future Proof Growth Strategy 2022 has identified this area as suitable for "short term" development (industrial). Draft Plan Change 17 proposes to rezone an area of approximately 20ha north of Hautapu Rd from Rural to Industrial which will incorporate a new stormwater pond.*

4. *Consequential changes as necessary to implement the plan change.*

Overall, the purpose of Proposed Plan Change 17 is described in the S32 Report as "*to rationalise and activate industrial zoning in the Hautapu area, through updating the structure plan to include the new master plan and making improvements to the provisions in Part B – Definitions, Section 7 – Industrial Zone, Appendix S1 Future Growth Cells and Appendix S5 Hautapu Industrial Structure Plan, and Planning Maps in order that they are more effective and efficient*."

The relevant traffic and transport matters pertaining to the proposal are assessed and described in the assessment that follows.

[1] The current Hautapu Structure Plan was made operative on 14 March 2019

2 Proposed Changes to the Hautapu Industrial Structure Plan

2.1 Proposed Zoning

Section 1.4 in the S32 Evaluation report discusses the proposed changes to the Cambridge/ Hautapu growth cells, which are summarised below and illustrated in Figure 1:

- Bring forward growth cell C9 from “post-2035” to “pre-2035”;
- Rezone “Area 6” from Rural to Industrial; and
- Addition of “Area 6” to the C9 growth cell.

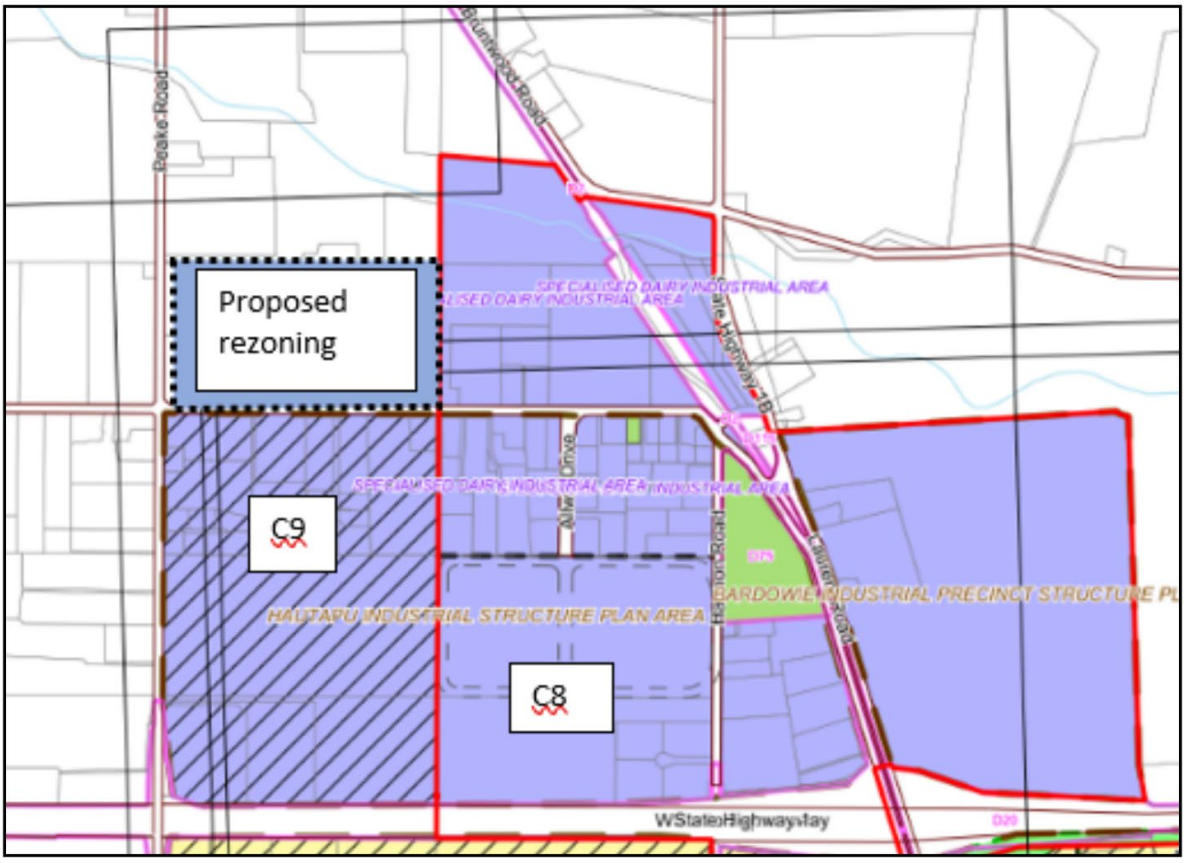


Figure 1: Reference map to show “Area 6” as Proposed rezoning (source: S32 Evaluation report)

2.2 Proposed Amendments to the Structure Plan (as notified)

The proposed Hautapu Industrial Structure Plan as notified, with the proposed amendments as described in the preceding sections of this report, is shown in Figure 2.

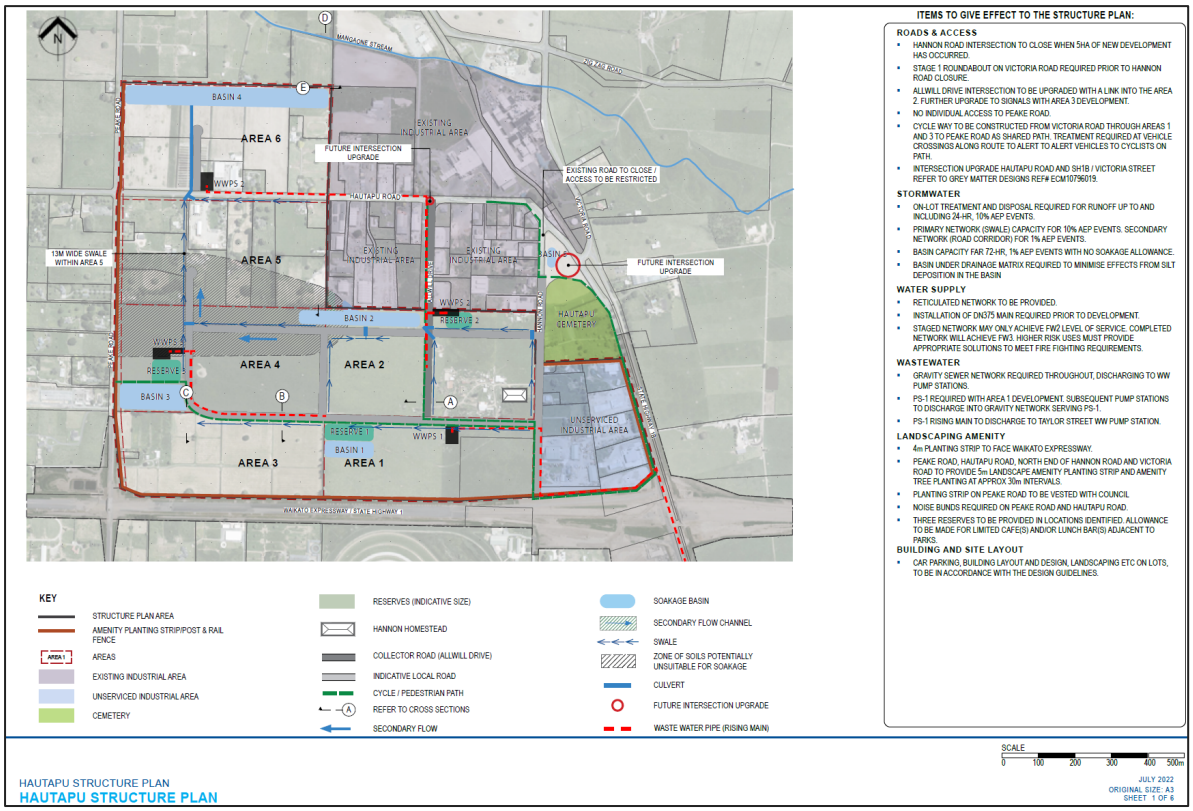


Figure 2: Proposed Hautapu Industrial Structure Plan (as notified)

As shown in Figure 2, the key transportation elements of the proposed structure plan include:

- Closure of Hannon Road following 5ha of new development;
- Construction of a new single lane roundabout on Victoria Road providing access to the structure plan area prior to closure of Hannon Road;
- Upgrade of the existing Hautapu Road/ Allwill Drive priority-controlled intersection with development of Area 2;
- Further upgrade of Hautapu Road / Allwill Dr to traffic signals with development of Area 3;
- Construction of a new local road servicing “Area 6” from Hautapu Road with Area 6 development;
- Dis-establishment of individual crossing places on Peake Road and connection to roading within the structure plan area;
- A connected walking and cycling network; and
- Provision for the future integration of frequent public transport servicing in line with the Future-Proof Strategy 2022.

These and other transport matters are assessed and described in the following sections.

3 Previous Transportation Assessments

The subsections that follow summarise the previous traffic and transportation assessments undertaken by others specifically for the Hautapu Industrial area (i.e., including the C8 and C9 growth cells), the adjacent C10 growth cell, as well as the additional area that is proposed to be rezoned Industrial (i.e., "Area 6"). Reports reviewed include:

- *Hautapu Structure Plan Transport Assessment* report by Beca, dated 28 February 2017;
- *Proposed Plan Change 11 – Bardowie Industrial Precinct Integrated Transport Assessment* report by Gray Matter, dated 25 July 2018;
- *Hautapu Industrial Zone Master Plan Transportation Analysis* report by Harrison Grierson, dated 16 December 2020;
- *C8/C9 Present Industrial Transportation Design Report* by Gray Matter, dated March 2022; and
- *Kama Trust Integrated Transportation Assessment* report by CKL, dated 11 August 2022.

3.1 Hautapu Structure Plan Transport Assessment – Beca Ltd, 28 February 2017

The assessment by Beca evaluated the full Structure Plan area excluding the now additional Area 6 proposal. The assessment also refers to an earlier 2008 assessment, which has not been sourced for the purposes of these assessments. It is stated as addressing the following:

The Transportation Assessment considers the vehicle and non-vehicle transport requirements for the structure plan review and any necessary measures to be delivered as part of the structure plan to provide suitable multi-modal access to the site.

The key documented findings are summarised as follows, together with some commentary to reflect any recent changes:

- Transport modelling at the time indicated the impact of the Waikato Expressway link, and its severance of Hannon Road could be expected to reduce traffic volumes on the structure plan parts of the road by in the order of 500 – 1,500vpd;
- A forecast 7,000vpd based on an assumed 71ha development area. Indicatively, 700vph two way in the peak hour. A single collector road was assessed as providing adequate capacity to accommodate the generated traffic demands. The high potential variability of trip generation within a wide industrial land zoning was noted.
- Allwill Dr / Hautapu Road intersection was identified as needing an upgrade to a roundabout, depending on traffic growth in the corridor. Based on an assessed 2 – 3,000vpd at the time, an upgrade was assessed as being needed at about the time demands reached 5,000vpd. Introduction of the upgrade was to be based on Council's monitoring of the changing demands. Subsequent access needs for the Fonterra site have indicated traffic signals would be preferred to minimise the land area impact on the internal circulation needs for that site.

- In accordance with the Waipā Subdivision Manual, Allwill Dr was recommended to be formed with two 4m lanes plus parking and shared 2.5m pedestrian/cycle paths each side.
- Hannon Road was recommended to provide initial access with a limit of about 500vpd, or about 5ha of development. Subsequently, it was recommended to be closed at the Hautapu Road intersection. Access to and utilisation of the cemetery land for a roading access option (potentially by way of a roundabout) is described but not determined at this time, the land still being identified as needed for cemetery purposes.
- Access via Peake Road for the plan change was identified as less preferred due to the presence of cyclists and equestrian activity and the current road formation. It was assessed that property access for land fronting Peake Road would be better internalised within the structure plan area, which has been adopted.
- The Peake Rd / Hautapu Rd intersection was identified as not being subject to material traffic demand increases and therefore not being identified as necessary for improvement. The predominant access was assessed as being via Victoria Road.
- The internal roading was recommended to be developed to align with Council's Subdivision Manual and intersection forms were to be determined, noting increased radii for trucks and buses were to be expected.
- A 2.5m wide shared pedestrian/cycle path facility was recommended on the main roads servicing the structure plan area. This included an off-road connection with the Hautapu Cambridge cycle trail and linking to the Victoria Road section of the cycle trail as shown on Figure 3. This walking/ cycling connection is included on the current structure plan.

Figure 3: Off-road Cycle Trail – Structure Plan Link

3.2 Proposed Plan Change 11 (Bardowie Industrial Precinct) Integrated Transport Assessment – Gray Matter, 25 July 2018

The 2018 ITA by Gray Matter assessed the effects on the transport networks associated with private Plan Change 11. PC11, which became operative on 14 March 2019, sought to re-zone approximately 56.7 ha of land (referred to as the "Bardowie Industrial Precinct") located to the east of the Hautapu Structure Plan area to Industrial. The approximately 56.7 ha industrial precinct was identified in the District Plan as being located within the previously named "C8"[2] growth cell and was earmarked for future industrial development.

The key documented findings from the ITA that are relevant to this assessment are summarised as follows:

- Once fully developed[3], the Bardowie Industrial Precinct (BIP) was estimated to generate in the order of 12,000 vpd, over an assessed 10-year period. The predicted trip generation was based on a trip generation rate[4] of 20 trips/ha/hr for the peak hour and the assumption that approximately 10% of the average daily traffic is generated during the peak hour (i.e., about 1,200vph).
- It determined a trip distribution of 80% to the south (towards Hamilton/Cambridge and the WEX) and 20% to/from the north (via Victoria Road).
- The projected 2041 peak hour demands for the base network were derived using the Waikato Regional Transportation Model (WRTM). A key assumption[5] was that the baseline traffic demands excluded growth cell C9 (as this was deferred industrial at the time) and included an equivalent[6] 20 ha of development within growth cell C8.
- The form of access determined was a staged arrangement comprising a southern access on Victoria Road opposite the southern part of the Hautapu cemetery to service the initial stages of the industrial precinct (identified as Stages 1& 2); and a northern access adjacent to the Hautapu Road/ SH1B Victoria Road/ Laurent Road intersection to provide access for Stage 3 of the precinct. The northern access was identified as the likely future main access to the BIP and the wider C10 growth cell.
- The ITA notes the shared use trail located along the now decommissioned rail corridor between SH1B Victoria Road / Laurent Road intersection and Cambridge town, connecting with the urban walking and cycling network on the eastern side of Victoria Road. The ITA states that KiwiRail has indicated they wish to maintain the existing railway designation[7] for a possible future extension of the passenger service between Cambridge and Hamilton.
- The intersection form was ultimately determined to be a single-lane roundabout, with Council confirming that construction of the roundabout is anticipated to commence in early 2023.

[2] The growth cell has subsequently been renamed Growth Cell C10.
[3] In a staged manner. Stages 1 & 2 of the BIP involved development of the southern half of the 56.7 ha site over a period of 5 years. Stage 3, which occupies approximately 22.7 ha, was identified as servicing smaller developments rolled out over a period from year 5 into year 10. The remaining 5.2ha of the site is already occupied by Shoof International.
[4] The basis for the trip generation is provided in Section 7.1 of the PC ITA.
[5] PPC11 ITA, Figures 4 and 5
[6] Based on a peak hour trip generation of 20 trips/ha for the approximately 36 ha growth cell.
[7] Designation D2 in the District Plan (Cambridge Branch Railway Line – Bruntwood): the operation, maintenance, and improvement of the existing railway

- Provision was made in the BIP structure plan for walking and cycling connections, with potential to extend the cycle network from Swayne Road to Victoria Road with a cycle path parallel to the WEX. The ITA also notes there being adequate space available within the future internal collector road network to enable public transport infrastructure (bus stops).

Evidence[8] prepared and submitted in support of private PC11 (growth cell C10) was reviewed to confirm whether any further conclusions and recommendations were made in relation to the BIP. Relevant findings are summarised below:

- Mr Gray stated[9] that twin roundabouts and a five-leg roundabout were assessed in the Gray Matter ITA as the best options for the northern access at Victoria Road/Hautapu Road intersection. He further stated that both Council and Waka Kotahi NZ Transport Agency (Waka Kotahi) have expressed preferences for the twin roundabout arrangement due to the rail corridor being least impacted by that arrangement.
- Mr Gray also stated in the same paragraph that both options could be dual-laned if additional capacity is needed in the future, and there are also options for future connections from the BIP to the road network elsewhere to the east and north.

3.3 Hautapu Industrial Zone Master Plan Transportation Analysis – Harrison Grierson, 16 December 2020

The brief for the Master Plan assessment by Harrison Grierson Consultants (HG) is stated as comprising a Master Plan for servicing of the Hautapu Industrial Zone (the subject area) located between Victoria Road, Hautapu Road, Peake Road and the WEX. The C10 growth cell (more specifically, the "Bardowie Industrial Precinct") was described as not forming part of the scope for the assessment as it was separately considered, staged, and provided for in a previous assessment by Gray Matter.

The following key assessments/findings can be noted:

- Masterplan area (inclusive of the C8 and C9 growth cells and excluding "Area 6") comprises an approximately 91ha area, an additional 10 ha to the area identified in the 2017 Beca ITA (refer to Section 3.1).
- Trip generation demand assessments were made on the basis of a 20 trips/ha/hour (two-way) assumption (which equates to approximately 1,820 vph during the peak hour) and intersection performance assessments were sensitivity assessed based on a higher 40 trips/ha/hour assumption[10].
- Similar to the assessment in the Gray Matter ITA, the base models[11] were developed based on the 2041 WRTM developed for the earlier 2007 Aecom assessment[12]. The 2041 assessment models included the 2041 baseline volumes from the WRTM, as well as traffic

[8] Statement of Evidence (Traffic) of Mr. A Gray of Gray Matter (dated 19 November 2018) and Statement of Evidence (Planning) of Mr. T Whittaker (dated 22 November 2018)
[9] Statement of Evidence, paragraph 14
[10] For the sensitivity assessment, trip rate figure was applied only to the C8/C9 areas only, not the C10 growth cell.
[11] The AM and PM base model flows for the 2041 assessment year are illustrated in Figure 8 and 9 of the HG ITA.
[12] Refer to Section 3.2 for a review of the WRTM's baseline traffic demand projections.

associated with the C8/ C9 growth cells, the Fonterra site, and the 56.7 ha BIP (i.e., not the entire C10 growth cell[13]).

- The underlying transport network assumption in the assessment models included closure of Hannon Road and reformation of a roundabout controlled intersection on Victoria Road. The new roundabout is said to direct the volumes of traffic associated with the C8/C9 area away from the Fonterra access and spread the traffic load across the network. Traffic demands at the Hautapu Rd/ Allwill Drive intersection were identified as being in the order of 5% of the total traffic movement for the C8 and C9 areas.

- Also incorporated as part of the future planned/ committed transport network are the two accesses to the adjacent BIP[14].

- The assessment notes that Council intends to restrict / minimise industrial traffic on rural roads such as Peake Road; accordingly, no traffic associated with the structure plan area has been distributed to Peake Road.

- Shared paths were assessed as appropriate within the structure plan area subject to long term demands on their use and the extent to which safe design and management of vehicle crossings is established[15]. These design outcomes are well documented in New Zealand standards and can reasonably be expected to be safely established.

- Public transport outcomes were identified as needing to be provided for longer-term. The proposed internal road cross sections are identified as being wide enough to provide for on street bus stops, and footpaths provided as part of the development would allow for safe and secure connection throughout the C8/C9 areas.

- Several intersection layout options were again considered and assessed for the Victoria Road/ Hautapu Road intersection. The performance of the various options[16], which were assessed using SIDRA Intersection, are summarised below (refer to Table 1 on the following page for the summarised SIDRA analysis):

    - The priority “Give-Way” control and traffic signal options are unable to deliver the forecast capacity needed.

    - A single large roundabout (i.e., the 5-legged roundabout configuration) is expected to result in high delays and practical capacity being reached at about 2041 in the PM peak.

    - The twin roundabout option demonstrates capacity to meet the expected 2041 demands and indicates some resilience with practical capacity being expected where traffic demands are doubled from the structure plan area as indicated in the sensitivity analyses.

[13] It is noted that the remaining areas within the C10 growth are described in the District Plan as being earmarked for development “post-2035”. Since the assessment year is 2041, it is anticipated that some of the deferred industrial land will likely be developed by 2041. It is recommended that sensitivity testing to assess the impact of more industrial land being developed within the C10 growth cell by the 2041 assessment year.
[14] Based on the SIDRA Intersection summaries provided, the trip generation associated with the BIP has been distributed proportionally between the northern and southern accesses.
[15] Proposals to manage conflict between cyclists and HCVs include implementing surface treatments at driveways to provide visual cues to drivers that cyclists and pedestrians are using the shared path.
[16] Important to note that all the roundabout options assessed are all dual-lane roundabouts

- The “twin” roundabout configuration was assessed as operating with the least expected delay when assessed against a range of alternatives. A multi-criterial analysis (MCA) also identified the twin roundabout option as preferred in this location (with a rating of 3.4 out of 5), followed by the double linked signalised intersection (with a rating of 3 out of 5).
- Regard was also noted in terms of continuing to provide for future rail use within the existing rail corridor. The appropriateness of a two-roundabout (twin) arrangement either side of the rail corridor was identified as an appropriate design response.

Table 1: Performance Analysis Summary for 2041 Assessment Year: Victoria Road/ Hautapu Road Intersection

Intersection Option		AM Peak		PM Peak		Comment
		LOS	Ave Delay (sec)	LOS	Ave Delay (sec)	
Existing: Priority-Controlled	Victoria Road/ Hautapu Road	F	7,500	F	9,800	Both intersections over-capacity
	Victoria Road/ Laurent Road	C	26	F	110	
Single Five-Leg Roundabout		D	38	F	73	Over-capacity
Twin Roundabout	West (Hautapu Road)	A	9	B	14	Acceptable LOS
	East (Laurent Road)	A	7	A	7	
Twin Roundabout **Sensitivity**	West (Hautapu Road)	E	60	F	346	@ 40 trips/ha for C8/C9. PM peak over-capacity
	East (Laurent Road)	A	8	A	7	
Five-Leg Traffic Signals		F	487	F	648	Over-capacity
Twin Signals	West (Hautapu Road)	F	153	F	197	Victoria Road/ Hautapu Road intersection over-capacity
	East (Laurent Road)	D	36	C	35	

- For the Hautapu Road/ Allwill Drive intersection, the two options identified in the Beca ITA (traffic signals vs a roundabout configuration) were compared and assessed. The performance assessment of the two options, including sensitivity analyses, is summarised below (refer to Table 2 for a summary of the SIDRA analysis):
    - As shown in Table 2, both the roundabout and traffic signal options indicate the capacity to function at this location up to 2041. It is, however, noted that the existing priority-controlled configuration also functions adequately up to 2041 (on the basis of a trip generate rate of 20 trips/ha in the peak hour), and was identified as being a potentially more efficient outcome in the interim with an upgrade (to either signals or a roundabout) being able to be introduced at a later stage if needed.
    - While a roundabout is expected to operate more efficiently from a vehicle perspective (identified as the reasonable option in terms of delay performance), the HG ITA described this location as a key pedestrian crossing place and recommended the adoption of the traffic signal option from a road safety perspective for vulnerable road users.

  - Traffic signals were determined to be the preferred intersection control at the intersection in terms of compactness and pedestrian/cycle connectivity.

- The MCA identified a signalised intersection (either 3 or 4-leg) as the preferred configuration, with the 4-leg option performing slightly better[17] than 3-leg option because of the improved safety performance associated with relocating and incorporated the Fonterra access into intersection. On this basis, the preferred design included the relocation of the Fonterra access to the west to align with Allwill Drive.

- Traffic signals outscored the roundabout options in the MCA due to the associated capital costs and land acquisition costs[18] of constructing a roundabout at this location.

Table 2: Performance Analysis Summary for 2041 Assessment Year: Hautapu/ Allwill Drive Road Intersection

Intersection Option	AM Peak		PM Peak		Comment
	LOS	Ave Delay (sec)	LOS	Ave Delay (sec)	
With Fonterra Access Excluded (i.e., not relocated to the intersection)					
Existing: Priority-Controlled (3-leg)	A	4	A	5	20 trips/ha/hr. Acceptable LOS.
Single-lane Roundabout (3-leg)	A	6	A	8	20 trips/ha/hr. Acceptable LOS.
Traffic Signals (3-leg)	B	18	C	21	20 trips/ha/hr. Acceptable LOS.
With Fonterra Access relocated to the intersection (forming the fourth leg)					
Existing: Priority-Controlled + Fonterra Access (4-leg)	A	5	B	10	20 trips/ha/hr. Acceptable LOS.
Existing: Priority-Controlled + Fonterra Access (4-leg) **Sensitivity**	A	5	C	22	40 trips/ha/hr. Acceptable LOS. However, right-turn from Allwill Drive @ LOS F in PM peak
Single-lane Roundabout (4-leg) + Fonterra Access	A	6	A	9	20 trips/ha/hr. Acceptable LOS.
Single-lane Roundabout (4-leg) + Fonterra Access **Sensitivity**	A	6	A	9	40 trips/ha/hr. Acceptable LOS.
Traffic Signals (4-leg) + Fonterra Access	C	22	C	33	20 trips/ha/hr. Acceptable LOS.
Traffic Signals (4-leg) + Fonterra Access **Sensitivity**	C	23	D	36	40 trips/ha/hr. Near capacity

By way of confirmation of the conclusions above, the SIDRA modelling files developed by HG were requested and reviewed. It is concluded they are appropriate for informing assessments at this structure planning level of evaluation.

[17] The MCA scored the 4-leg option 3.3 out of 5, and the 3-leg option 3.2 out of 5.
[18] The roundabout options require significant land take from the Fonterra site.

On the basis of these assessments, it can be concluded the recommendations in the HG ITA can be accepted. It is noted the HG ITA does not include an assessment of the proposed rezoning of Area 6. This is assessed further in the following section.

3.4 C8/C9 Present Industrial Transportation Design Report – Gray Matter, March 2022

Gray Matter prepared a design report for the planned improvements to Hautapu Road including the Victoria Road Roundabout, the Fonterra site signalisation, widening of the Hautapu Road carriageway and part of Allwill Drive.

Development of the design concept included consultation with potentially directly affected parties, summarised in *Section 3: Consultation* of the Gray Matter design report as including KiwiRail, Fonterra, Hautapu Country Store, Hautapu Welders and Bardowie Investments Ltd.

Design inquiries included geotechnical and utility services investigations. The developed designs prepared cross sections for the relevant road corridors being Victoria Road, Hannon Road, Hautapu Road, and Allwill Drive.

Appendix B to the assessment include a memorandum titled "*Dual lane design – Hautapu/ Victoria Roundabout*". The purpose of the assessment is described as being concerned with changes necessary to support a future dual-laning of the roundabout design. The assessment identified a slightly amended roundabout design to support future dual-laning in the form indicated in the following Figure:

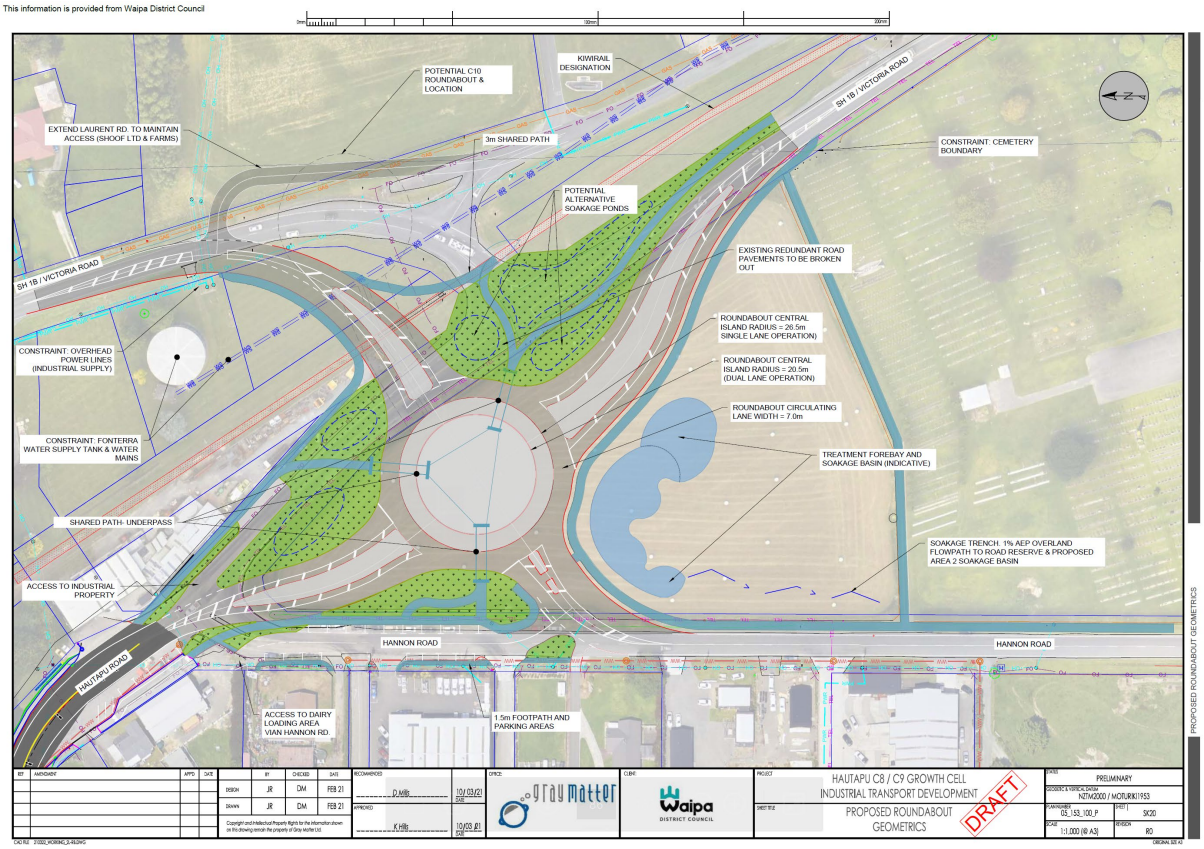


Figure 4: Indicative Future Roundabout Form to Support a Change to Dual Lane Approaches if Required

Council has advised it does not intend to construct the roundabout wholly in the form shown at this time, however, developed design for the intersection, when that occurs, is intended to facilitate the space necessary to support future dual-laning where that is needed.

The memorandum concluded that the revised concept proved the feasibility *"…to locate a single lane roundabout suitable for conversion to a dual lane arrangement at this site…*[19]". It further concluded requirements with respect to land required, services diversions, local access and Laurent Road requirements and rail corridor design impacts. The assessment signalled a need for the detailed design to focus on development of a safe operating environment.

3.5 Kama Trust Integrated Transportation Assessment – CKL, 11 August 2022

The CKL ITA assesses the traffic and transportation effects of rezoning the approximately 20 ha site identified as "Area 6", from Rural to Industrial and including the site within the Hautapu Industrial Structure Plan area.

[19] Gray Matter Memorandum, 13/04/2021, Dual Lane Design – Hautapu / Victoria Roundabout, S7 Conclusion, page 6

The following are key findings relevant to this assessment:

- "Area 6" was assessed in the CKL assessment as generating in the order of 398 vph during the typical commuter peak hour based on the trip generation rate of 20 trips/ha/hr, consistent with the HG and previous assessments.
- Access to "Area 6" was identified as being via a new local road (cul-de-sac) with an intersection on Hautapu Road located approximately 230 m east of Peake Road. The future intersection is indicatively designed as a T-intersection with a right-turn bay facility and associated widening on Hautapu Road. Performance analyses using SIDRA Intersection concluded that the proposed intersection form would function adequately up to 2041.
- All trips to/from "Area 6" were assessed as arriving from / departing to the east along Hautapu Road as this was considered as being the shortest route to the state highway network as well as the main urban Cambridge area. Council had also signalled a desire to limit industrial traffic on Peake Road and other rural roads in the area.
- No access is proposed for properties with frontage onto Peake Road from "Area 6". The assessment considered the Peake Road frontage as being protected from industrial access by Rule 16.4.2.3[20] of the District Plan. Further, the Road and Access text located on the right hand side of the Structure Plan, specifies "No Individual Access To Peake Road".
- Several significant transportation infrastructure upgrades are identified as being committed in the short to medium term. These include the urbanisation works on Hautapu Road (including walking/ cycling facilities on both sides of the road which is expected to connect to the shared path on Victoria Road), and the upgrading of the Hautapu Road/ Allwill Drive and Victoria Road/ Hautapu Road intersections.
- The assessment noted that the earlier HG report evaluated the future Victoria Rd / Hautapu Road intersection as a dual-lane configuration (with additional left-turn slip lanes for the southern and eastern approaches), but through consultation with Council, a single-lane roundabout design was now being advanced for the intersection in the interim to support wider mode shift outcomes. The referenced designs are illustrated in Figure 5 and Figure 6 below.

[20] Rule 16.4.2.3 specifies that when a site has two road frontages, vehicle access and egress must be from the lesser road type. The CKL ITA assesses that since Peake Road (a collector road) has a higher classification compared Hautapu Road and the new internal road (both local roads), future access to the site is only permitted from the lower order roads.

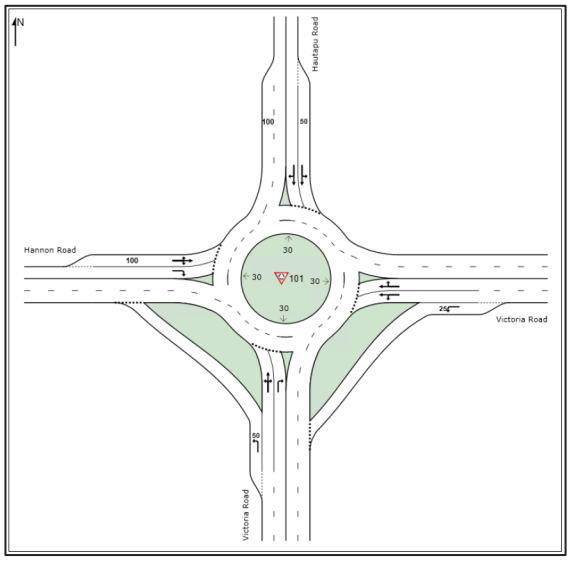


Figure 5: Configuration assessed in the HG ITA for the future Victoria Road/ Hautapu Road roundabout

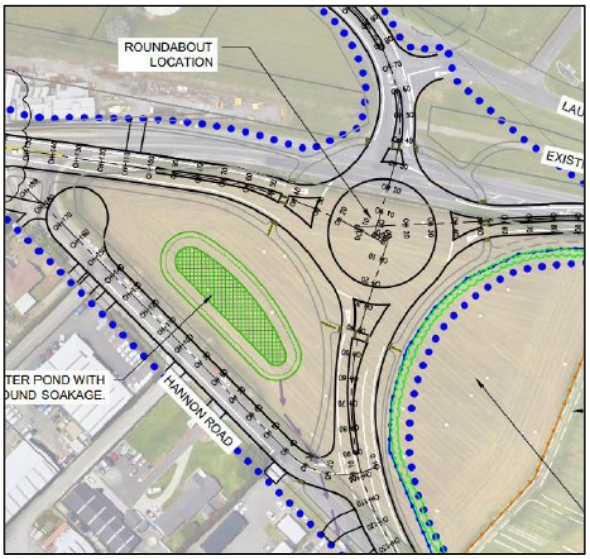


Figure 6: Design being advanced by Council for the future Victoria Road/ Hautapu Road roundabout

- The performance assessment for the Victoria Road/ Hautapu Road intersection with the additional "Area 6" is summarised as follows:
    - The Victoria Road/ Hautapu Road intersection as a single-lane roundabout using the same input volumes used within the HG ITA. SIDRA analyses undertaken showed that a single-lane roundabout configuration was likely to be significantly congested in the long term for the 2041 baseline scenario (LOS F during both the AM and PM peaks) with excessive queueing on the roundabout approaches and delays exceeding 10 minutes.
    - It concluded that the effect of adding the extra traffic associated with "Area 6" was unlikely to be noticed by road users given that the intersection was already modelled as being well over capacity. The assessment recommended no further upgrades.
    - The CKL assessment states that Council had accepted that the single-lane roundabout design would likely result in some congestion in the long-term, with Council confirming an intent to purposefully constrain the network to promote sustainable travel outcomes long-term. The approach is aligned with current transportation policy (the Government Policy Statement – Transport) seeking to reduce reliance on private vehicles and promote public transport, active mode use and reduced vehicle kilometres travelled. Council has also confirmed that the roundabout is to be designed to enable it to be dual-laned in the future if required from a capacity and safety perspective.
- The performance assessment for the Hautapu Road / Allwill Drive intersection (as a signalised intersection) showed that the intersection performed satisfactorily and would be able to accommodate the future traffic demands (inclusive of the "Area 6" traffic) up to 2041.

3.6 Overview of Findings

Overall, it is assessed that previous assessments undertaken for the Hautapu Industrial Structure Plan, including the rezoning of "Area 6", contain sufficient evaluation to inform the scale and likely effects associated with PPC17 (without the inclusion of the Hautapu Landowners' Group (HLG) submission within the scope of works of PPC17; the HLG submission is addressed separately in Section. 7.2).

Review of the background material, including the proposed structure plan (the notified version) and transportation submissions and further submissions (refer to Section 7), has however identified the following matters as requiring further consideration and assessment:

- Confirmation of the effects of additional industrial traffic on Peake Road and the Peake Road/ Hautapu Road intersection. Increased employment within in Hautapu, together with increased living density in the nearby C1, C2, C3 and C4 growth areas, generate a potential increased demand for commuter traffic on Peake Road.
- Confirmation of the staging and timing of the planned transportation infrastructure projects with the inclusion of "Area 6". With "Area 6" identified in the Future Proof Strategy 2022 (refer to Section 4.1) as earmarked for short-term industrial development, development of the site can be expected to bring forward planned improvement projects such as the urbanisation works on Hautapu Road.
- Further identification of walking and cycling linkages within the structure plan area, and with the wider walking / cycling network. A review of the proposed structure plan (the notified version) identified some areas where walking and cycling connectivity could be improved to achieve a well-integrated multi-modal transport outcome more effectively.
- Future public transport servicing for the structure plan area and the wider Hautapu industrial area. While the Hautapu area is currently not serviced by public transport, the industrial node is identified in the Future Proof Strategy 2022 (refer to Section 4.1) as a future local node.

These matters are assessed in Section 6 of this report. Section 6 also details recommended amendments to the structure plan in response to some of these matters.

4 Strategy and Policy Assessment

4.1 Future Proof Strategy 2022

The Future Proof Strategy was most recently updated in 2022 to provide strategic direction and influence changes to the Regional Policy Statement and District Plans. Key elements of the Strategy are summarised as follows:

- The Future Proof Strategy identifies key growth areas as including the Cambridge/ Hautapu areas[21].

[21] Future Proof Strategy 2022, page 6

- Hautapu is identified in a strategic public transport network schematic diagram (refer to Figure 7)[22],as a local node to be serviced at 10 to 15 minute intervals as part of the "*Frequent Network*".
- The proposed urban form is described as comprising of ongoing growth and development of areas/ townships including Hautapu.[23]
- While not identified as part of the metropolitan economic corridor, areas such as Hamilton Airport and the Hautapu Industrial area are described in the Strategy as "*also playing an important role*"[24] in terms of economic activity in the sub-region.
- The Hautapu Industrial area is identified[25] as one of the several "*Strategic Industrial Nodes*" within the Future Proof sub-region. Approximately 227 ha of industrial land is allocated for the Hautapu node, to be released in a staged manner. The Future Proof Strategy anticipated an initial release of approximately 67ha (between 2020 and 2030) and then a further 160 ha post 2030. "Area 6" was recently accepted and included into Future Proof Strategy after it was considered through a submission made and is identified in the 2022 Future Proof Strategy as "*short term development*" for industrial activities.
- The Future Proof Strategy has set minimum residential density[26] targets within urban enablement areas, which includes the Cambridge/ Hautapu areas, and identified the Cambridge/ Hautapu area as being serviced by "Frequent" 10-15 minutes interval public transport service in the future.
- Key actions identified to implement the Future Proof Strategy are described as including the development of a programme business case that will consider supporting and enabling rail and road infrastructure in key growth areas including Cambridge West – Hautapu amongst other areas[27].

[22] Future Proof Strategy 2022, Map 4: *Metro Public Transport Schematics*, page 56
[23] Future Proof Strategy 2022, page 63
[24] Future Proof Strategy 2022, page 71
[25] Future Proof Strategy 2022, page 73, Table 2
[26] Future Proof Strategy 2022, page 96
[27] Future Proof Strategy 2022, page 105

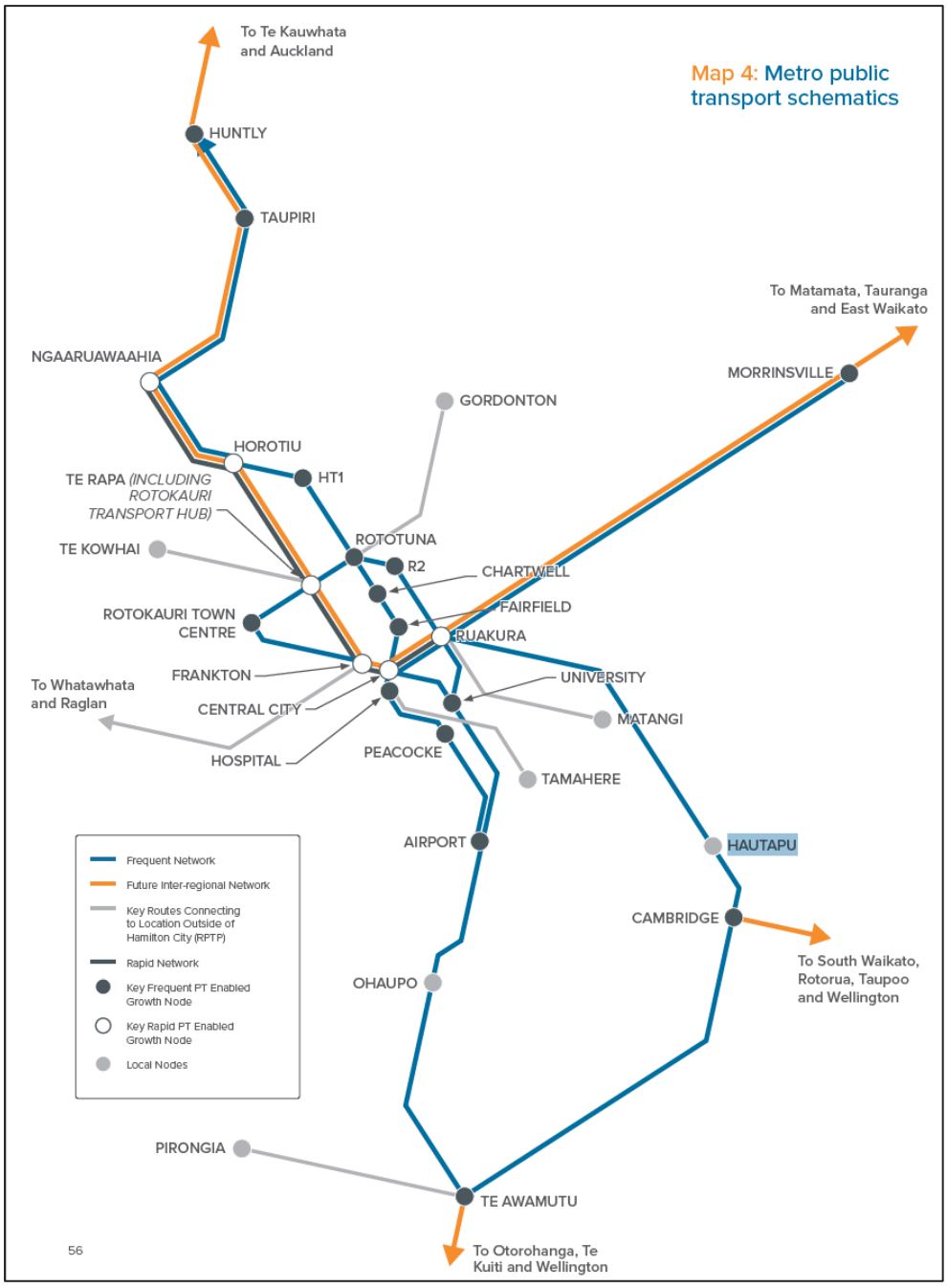


Figure 7: Future Proof Strategy 2022 – Map 4: Metro Public Transport Schematic

4.2 Waikato Regional Policy Statement (Aug 2022)

The Regional Policy Statement (RPS) is intended to communicate outcomes from higher order Resource Management Act, National Policy Statements and Environmental Standards and Strategies through to Regional and District Plans.

The Future Proof industrial land allocations are described in the RPS[28] as including Hautapu, with a total land allocation of approximately 96 ha released in a staged manner as follows:

- Between 2010 and 2021: 20ha;
- Between 2021 and 2041: 30ha; and
- Between 2041-2061: 46ha.

The RPS notes that the area allocated for the Hautapu Industrial Node is the land specified in the previous version of the Waipā 2050 Strategy (2009 version). It is evident the RPS still needs to be updated and incorporate the recent changes reflected in the Future Proof Strategy 2022.

4.3 Waikato Regional Public Transport Plan 2022-2032

The Waikato Regional Public Transport Plan (RPTP) 2022-2023 is a strategic document that sets the objectives, aspirations, and policies for public transport in the region over the next 30 years and provides a concept for regional public transport connectivity for the 10-year period between 2022 and 2032. The overall goal set out in this plan is as follows:

"Enable a better Waikato by enhancing people's lives and shaping the future with outstanding transport solutions."

While there isn't specific reference in the RPTP to public transport linkages to the Hautapu Industrial area / node, the establishment of frequent public transport links between Hamilton and larger metro towns inclusive of Cambridge township has been identified as a key action[29]. Cambridge township is located within easy walking and cycling distance to the industrial area, with walking and cycling linkages already provided and/or proposed.

4.4 Waipā District Walking and Cycling Strategy (2008)

The strategy, dated 2008, continues to provide some direction for walking and cycling outcomes. Key points of reference include:

- The corridor between Cambridge and Hautapu is identified as providing opportunities for off-road cycle paths along the district's cycle routes[30].
- The Hautapu area has been identified[31] as an area for growth of industrial activity, with this therefore being suitably located in terms of the Hautapu Industrial employment area, both north of the Waikato Expressway.
- Trips to work by bicycle in Hautapu were identified as contributing a further 5.7% of all such trips in the Waipā District in 2008[32].

[28] RPS, Part 5: Appendices and Maps, Table 35
[29] RPTP 20222-2023, page 19
[30] Wāipa District Walking and Cycling Strategy 2008, Pg 18
[31] Wāipa District Walking and Cycling Strategy 2008, Page 38
[32] Wāipa District Walking and Cycling Strategy 2008, Page 41

4.5 Waipā DC Transport Strategy 2022-2052

The 2022-2052 Waipā Transport Strategy sets out the direction for the district's transport system over the next 30 years. The vision of the strategy is:

"*People and freight in Waipā have access to an integrated, safe, sustainable transport system that provides a range of travel choices. People are at the centre of our solutions.*"

A concept plan for the rapid transit vision for transport in the Hamilton-Waikato Metro Spatial Plan is illustrated in Figure 8 below.

As shown in the figure, Hautapu is identified as a local node serviced by a "Frequent Network" at 10-15 minutes intervals. The neighbouring Cambridge is identified as a "Key Frequent PT Enabled Growth Node". The strategy aligns with the transport strategy in the Future Proof Strategy 2022.

Figure 8: A rapid vision for transport in the Hamilton-Waikato Metro Spatial Plan (source: 2022-2025 WDC Transport Strategy)

5 Committed Transportation Projects

The subsections to follow describe committed transportation infrastructure improvements works in the Hautapu area (including the Hautapu Industrial Structure Plan and the adjacent Bardowie Industrial Precinct Structure Plan areas).

5.1 Committed Transportation Projects by Others

As described in the preceding sections, the following are key transportation projects planned by others in the wider Hautapu area:

- A new single-lane roundabout on SH1B Victoria Road (opposite and south of the Hautapu cemetery) with a new connector road to the BIP. Based on recent conversations with Council and Waka Kotahi, construction of the new intersection is planned to commence in the first quarter of 2023.
- An additional northern access to the BIP adjacent to the future Victoria Road/ Hautapu Road roundabout. The northern access will form a later stage ("stage 2") of the Victoria Road/ Hautapu Road intersection upgrade (which is indicatively designed as a dog bone roundabout). It is indicated as likely coming online prior to the development of Stage 3 of the BIP (this area may not be developed until 2024).
- Council has allocated $300,000 to a Business Case for the "Cambridge Connections" project which seeks to define the shape of Cambridge's transport infrastructure for the next 30 years and secure government funding to help pay for these.

5.2 WDC Long Term Plan 2021-2031

Approximately $86.1M has been allocated to the Hautapu Industrial area (including the C8, C9 and C10 growth cells) in the Long Term Plan (LTP) for the 10-year period between 2012 and 2031 to "*unlock future growth*"[33]. Of this, approximately $24M has been allocated to transport projects.

Table 3 below provides a summary of key transportation projects identified for the Hautapu industrial node, including any details (if available) related the funding source, timing, and staging provisions.

Table 3: LTP 2021-31 - Committed Transportation Projects for the Hautapu Industrial Area

Project No.	Description	Historical Project	Estimated Capital Costs	Funding Source (%)	
				DC Growth	Other
3076	Hautapu Structure Plan Roading	$1,167,600		85%	15%
3076	Hautapu – Roading	$600,000		100%	0%
3170	Hautapu – Cycleway connection Victoria Road to Hannon Road	$305,940		100%	0%
3192	C8 C9 C10 Hautapu Rd 1st Roundabout at Victoria Rd		$4,149,000	70%	30%

[33] Long Term Plan 2021-2031, Page 44

Project No.	Description	Historical Project	Estimated Capital Costs	Funding Source (%)	
				DC Growth	Other
3193	C8 C9 C10 Hautapu Rd – 1st section of Collector Rd		$2,789,100	100%	0%
3194	C8 C9 C10 Hautapu Rd & Hannon Rd Urbanisation		$4,609,200	60%	40%
3195	C8 C9 C10 Hautapu Road – 2nd roundabout at Victoria Rd		$1,688,400	95%	5%
3199	Hautapu Transportation Land		$10,919,416	100%	0%
Total		**$2,073,540**	**$24,155,116**	**-**	**-**

5.3 WDC Annual Plan 2022-2023

Hautapu infrastructure growth projects are listed in the Annual Plan as one of the key undertakings for the 2022/23 financial year, with a budget of approximately $15,427M committed for the financial year.

The budget allocation has increased by $6.4M since the last LTP to ensure infrastructure provision aligns with timing of development. To that effect, the budget for construction of the C10 (BIP) / Victoria Road southern roundabout and a new collector road (Stage 1) has been included in the Annual Plan with construction projected to be completed in 2022/23. These projects are additional to those budgeted in the 2021-31 LTP.

6 Further Assessment – PPC17 Transportation Effects

6.1 Increased Traffic on Peake Road

6.1.1 PEAKE ROAD CORRIDOR ASSESSMENT

Most of the previous assessments make broad assumptions as to trip distribution, with either 0% or up to 5% of the peak hour traffic demand occurring on Peake Road. With total traffic demands for the structure plan area (inclusive of "Area 6") in the order of 22,200vpd, a 5% trip distribution would see an increase in the order of 1,110 trips per day on Peake Road to/from the urban living environments south of the Waikato Expressway (or approximately 1,130 trips per day inclusive of the HLG land within "Area 6"). Considering that Peake Road currently carries low volumes of traffic[34], it is assessed that the road corridor will have ample and sufficient capacity[35] to accommodate the increased traffic demands to/from the structure plan area).

With the longer term future development within and connection of the C1 to C4 growth areas in Cambridge there exists the potential for some active mode trips (walking, cycling and other non-motorised transport modes) to be generated on Peake Road. On-site observations indicate a shared path section of about 500m in length exists on the eastern side of the Waikato Expressway overbridge between Hautapu Road and Racecourse Road. Further south there is also a short section of shared path north of the Cambridge Road intersection linking back to the Velodrome. Some equestrian movements (horses with riders led by a person holding the reigns) have been observed crossing Peake Road on the section between the expressway and Racecourse Road. These movements align with access points to a separate equestrian path that has been formed within the training track site and separated from the Peake Road corridor.

Evaluation of the development patterns in the wider area indicate that the closest C7 growth cell is currently planned for development commencing beyond 2035. Further south, the C2 growth area has development activity occurring on the southern Cambridge Road frontage. The C1 area fronts Victoria Road on its eastern boundary and would be more effectively connected to the structure plan area via an easterly approach.

Within the structure plan area, principal roading access and associated land development is occurring on the area's eastern boundary. The initial 10 to 15 years development activity and its associated traffic generation is therefore expected to be heavily weighted to movement to/from the east via Hautapu Road, Victoria Road and the proposed roundabout intersection on these roads. This distribution most effectively aligns with planned growth and infrastructure staging and is also highly connected with the Waikato Expressway interchange and established urban areas in Cambridge. Furthermore, walking and cycling accessibility intended by the structure plan aligns well with the established Cambridge urban environment and the currently developing growth cells. Accesses for

[35] According to Section 4.2.4 of the RTA's Guide to Traffic Generating Developments, the typical capacity of a two-way rural road with an 80km/h design speed and 10-15% HCV is approximately 740 – 900 vph during the peak hour **to achieve LOS C** (85-95% of the figures provided in Table 4.5 of the RTA Guide)

[35] According to Section 4.2.4 of the RTA's Guide to Traffic Generating Developments, the typical capacity of a two-way rural road with an 80km/h design speed and 10-15% HCV is approximately 740 – 900 vph during the peak hour **to achieve LOS C** (85-95% of the figures provided in Table 4.5 of the RTA Guide)

development on the Peake Road frontage are also to be internalised and be eastward facing with development of the internal structure plan road network.

Council has considered and acknowledges the longer-term expectation that Peake Road may be urbanised, and that multi-modal accessibility will be developed along its length. While there are no current allocated funded projects within the current 10 years funding window, urbanisation of the corridor is planned to coincide with local urban development, predominantly the post 2035 C7 and the northern and connected section of the C2 growth areas. These land development areas have the potential to generate demands weighted in part towards the western end of the structure plan area and therefore onto Peake Road. There are however not expected to be any demands of more than a negligible nature generated on Peake Road. Accordingly, it is assessed the structure plan does not warrant an urbanisation response on Peake Road frontage.

6.1.2 PEAKE ROAD – HAUTAPU ROAD INTERSECTION

The Peake Road corridor assessment above has determined the potential for additional trip generation on Peake Road and therefore through the intersection is expected to be negligible. Some activities currently have access to the Peake Road corridor. The more recently established site(s) at 280 Peake Road are advised by Council to include conditions of consent requiring these points of access to be closed and connected with the internal structure plan road within 2 months of the road being constructed and vested with Council. The established sites will fall within the proposed rules preventing new accesses to be formed onto the corridor.

Hautapu Road, prior to construction of the Waikato Expressway was a through road with a connection to/from the west. Construction of the expressway severed that and Hautapu Road now terminates at a cul-de-sac west of Peake Road. There exists the potential for some errant trips to travel west on Hautapu Road until there is a sound understanding of the local road network and how it is to be connected. Some submissions, including those from the Hautapu School have identified errant trip making as an undesirable/unsafe impact. They have also described that some children walk and/or ride bicycles along Hautapu Road, crossing at Peake Road on the journey to/from the school.

The structure plan as notified intends the provision of a shared path facility on Hautapu Road east of Peake Road, but not across it. The combined effects of potential errant trip making, interim trips generated from established activities on Peake Road and the lack of a safe system facility to provide for pedestrian and cycle crossing across Peake Road presents as a potentially adverse road safety effect. In response, a range of local traffic management responses are proposed at this intersection as follows:

- The intersection be upgraded within the current road boundary provisions in conjunction with the urbanisation of Hautapu Road between Allwill Drive and Peake Road to a safe system priority-controlled intersection to support safe pedestrian and cycle crossing movements on raised platforms across Peake Road; and
- Map styled signs be established on Hautapu Road, east of Peake Road to convey directional access to the expressway and the “no-exit” arrangement of Hautapu Road west of the intersection.

These additional traffic management measures will provide for an appropriately safe speed pedestrian and/or cycle crossing environment across Peake Road. Signage will actively direct traffic movements and contribute to avoidance over time of errant trips west of Peake Road. The raised traffic managed environment will also actively discourage unnecessary trips on Peake Road and support mode shift outcomes.

6.2 Walking and Cycling Linkages

A review of the proposed structure plan (the notified version) has identified the following areas where walking and cycling connectivity could be improved to enhance the overall connectivity of the structure plan. The following enhancements are now proposed to be included on the structure plan:

- To ensure safe and appropriate connectivity in conjunction with establishment of Area 6, a safe and staged pedestrian/ cycling crossing facility be provided just west of the Area 6 (Road 4) intersection on Hautapu Road in conjunction with urbanisation of Hautapu Road between Allwill Drive and Peake Road;
- Provision of a shared path on the northern side of Road 1 through Areas 2 and 4; and
- A shared path along the northern boundary of Areas 1 and 3 be extended northwards through Areas 4 and 5 to the Road 2 cul-de-sac.

These measures will enhance the overall safety and integration of the structure plan. They are shown on the attached and updated structure plan included as Figure 9 (refer to section 6.5 as follows below).

6.3 Public Transport

As described at Section 4.1, the Hautapu Industrial area is identified as a future “local” PT node. Council has confirmed the following in relation to future long-term public transport servicing of the area:

- Council has recently increased PT funding to improve the bus fleet (E-buses) and the frequency of the current service between Cambridge and Hamilton;
- The current bus services to Cambridge run along the Cambridge Road / Hamilton Road corridor;
- Future public transport servicing and the type of service will be subject to developing demands. Initially it is anticipated the Hautapu structure plan area could be serviced by way of an “on-demand” public transport service which is a shared rider door-to-door service. With increased demands over time the service will be viable to transition to a public transport (bus) service with a dedicated route and scheduled timetable;
- At a strategic level, a range of potential alternate route options are expected to be considered, including the potential for staged implementation to evolve over time. Indicatively, potential route options could include Victoria Road, Hautapu Road, Hannon Road, Allwill Drive and

potentially also Peake Road. These may involve servicing by way of higher two-way frequencies on a single corridor or a loop network options; and

- Bus stops are able to be established as either recessed within the berm areas proposed or as in-lane stops and supporting stop infrastructure is also able to be accommodated with the proposed road corridor areas.

It is evident therefore that the structure plan proposal has been planned to enable public transport services and is aligned with the Regional Public Transport Plan in this regard.

6.4 Staging of Transportation Infrastructure Improvements

6.4.1 VICTORIA ROAD/ HAUTAPU ROAD ROUNDABOUT STAGING

Further analysis has been undertaken to inform the staging from a single lane to a potential future dual lane roundabout operation at this intersection. The assessment that follows describes how an incremental approach to the long-term capacity of the intersection is reasonably able to be employed by Council to support continued mode shift outcomes.

Table 4 that follows summarises capacity analysis results for the Victoria Road/ Hautapu Road intersection, while the SIDRA Intersection summarises are provided in **Appendix B**. The performance assessment is based on:

- A 20-year horizon assessment period (2041) with input volumes from SIDRA modelling undertaken by CKL as part of the Kama Trust Integrated Transportation Assessment (ITA), dated 11 August 2022.
- A gross peak hour trip generation rate of 20trips/hr/ha was adopted for future industrial activities within the structure plan area (and Area 6).
- The single-lane roundabout configuration as illustrated in the concept design drawings by Gray Matter by (Ref# ECM10796019).

This further assessment has included sensitivity testing of various land use scenarios to determine the level of development that could reasonably be accommodated by the single-lane roundabout design.

As shown in Table 4, the single-lane configuration is expected to perform satisfactorily during both the 2041 AM and PM peak periods with up to 60ha of new industrial development within the structure plan area precinct inclusive of the Area 6 area (i.e., an additional 1,200 vph during the typical commuter peak hours). Once development reaches this level, the assessment shows that the roundabout would likely need to be dual-laned, however this will be dependent on the overall rate of trip generation that development within the structure plan area generates.

The assessments also indicate that incremental capacity upgrading may present as low cost and interim responses should they be needed through the period of around 40 to 60ha of development. These incremental responses could be deployed on an as and when needed basis, extending the period before full dual laning of the roundabout becomes necessary. These incremental upgrade

works have been assessed as being likely to include constructing short left-turn slip-lanes on the roundabout approaches. Any incremental response however would be subject to the influences of the pattern of development in the area, inclusive of how development within the C10 development area progresses.

Assuming an uptake rate of between 5-10ha per annum[36], the roundabout is assessed as being likely to warrant upgrading to a dual-lane configuration within 6-12 years (i.e.: between 2029 and 2035) after opening assuming commencement in 2024. It is understood that SH1B (Victoria Road) will be formally revoked to a district road managed by Council within the next 12 months. Any further requirement for upgrading works however remains subject to the rate of development and the rate of trip generation produced by that activity and is assessed as occurring long after the corridor ceases to be a state highway and at a time when Council has full responsibility for operation and maintenance of the road corridor.

Further to the assessments set out in the Table below, the Harrison Grierson assessments identified a dual lane roundabout would be expected to operate and LOS A in the AM and LOS B in the PM. Further sensitivity testing determined a doubling of the long-term trip rate across the full structure plan site would likely result in the dual lane roundabout just reaching practical operational capacity.

These have been further assessed and indicate potential operational performance in the range LOS B in the AM and LOS D in the PM. These longer-term forecasts, however, are quite subjective and are highly dependent on development typologies as well as the potential distributive impacts across the wider transport network. The overall assessment that can be made on these bases is that the performance outcome is likely to be in the order of those levels assessed and described and indicate the dual lane facility will adequately supply the capacity necessary to meet the full structure plan development outcomes.

The assessments demonstrate a robust capacity position is established in terms of the roundabout proposal. A single lane roundabout is expected to operate satisfactorily through to the period between 2029 and 2035. This is a timeframe where the current SH1B corridor will have been revoked and the full capital, operational and maintenance obligations rest with the local authority.

Accordingly, it is concluded the proposal will operate safely and efficiently as a single lane roundabout through the period where Waka Kotahi continues to have accountability for the corridor. The transport capacity to be established will readily support both incremental as well as the long term and full structure plan area development as planned. Any potential impact is therefore assessed as less than minor. The land area allocation is appropriate for the infrastructure required to support the structure plan. On these bases, it is concluded the structure plan and associated infrastructure has been appropriately planned to accommodate the land development and activity types proposed.

[36] Averaged based on uptake rates surveyed for the Hamilton Airport Central Precinct (5.7 ha/annum in 2017/18), Titanium Park (1 ha/annum in 2017/18), and Tauranga City (15 ha/annum (6-year average) and 9.9 ha/annum (10-year average) at 2021).

Table 4: 2041 AM and PM Peak Intersection Performance Summary – Victoria Road/ Hautapu Road/ Hannon Road Intersection

Land Use Scenario	Intersection Configuration	AM Peak			PM Peak			Comment
		Ave Delay (sec)	LOS	95th %-tile queue (m)	Ave Delay (sec)	LOS	95th %-tile queue (m)	
Scenario 1: 2041 Baseline + a total of **5ha** of new development within the Hautapu Industrial Structure Plan area (and **0ha** developed within Area 6)	Single-lane Roundabout	5.9	A	39	5.9	A	49	Roundabout construction triggered. Single-lane roundabout performs at acceptable LOS
Scenario 2: 2041 Baseline + a total of **20ha** of new development within the Hautapu Industrial Structure Plan area (with **0ha** developed within Area 6)	Single-lane Roundabout	7.6	A	67	9.4	A	83	20ha of new development; equivalent to developing Area 1 and 5ha of Area 2. Single-lane roundabout performs at acceptable LOS.
Scenario 3: 2041 Baseline + a total of **40ha** of new development within the Hautapu Industrial Structure Plan area (inclusive of **5ha** developed within Area 6 for trip distribution purposes)	Single-lane Roundabout	11.1	B	170	38.0	D	361	40ha of new development; equivalent to developing Areas 1 & 2 and 5ha of Area 6. While single-lane roundabout performs at acceptable LOS, one approach @ LOS F in PM. Minor upgrading may be required (e.g.: additional left-turn lane).
	Single-lane Roundabout with capacity upgrades (additional left-turn lane on eastern approach)	9.2	A	164	17.5	B	155	Performance of roundabout improves to LOS A/B with minor upgrade works. Dual-laning not required.
Scenario 4: 2041 Baseline + a total of **45ha** of new development within the Hautapu Industrial Structure Plan area (inclusive of **5ha** developed within Area 6 for trip distribution purposes)	Single-lane Roundabout	22.6	C	403	56.1	E	479	45ha of new development; equivalent to developing Areas 1, 2 and 5ha in Areas 3 and 6 (each). Single-lane roundabout at practical capacity in PM peak, with at least one approach @ LOS E/F in AM & PM peaks. Minor upgrading required (additional left-turn lanes).
	Single-lane Roundabout with capacity upgrades (additional left-turn	6.6	A	43	13.4	B	98	Performance of roundabout improves to LOS A/B with minor upgrade works. Dual-laning not required.

Land Use Scenario	Intersection Configuration	AM Peak			PM Peak			Comment
		Ave Delay (sec)	LOS	95th %-tile queue (m)	Ave Delay (sec)	LOS	95th %-tile queue (m)	
	lanes on eastern, southern, and northern approaches)							
Scenario 5: 2041 Baseline + a total of **60ha** of new development within the Hautapu Industrial Structure Plan area (inclusive of **10ha** developed within Area 6 for trip distribution purposes)	Single-lane Roundabout	112.7	F	1,480	159.8	F	1,021	60ha of new development; equivalent to developing Areas 1, 2, 3 and 10ha of Area 6. Single-lane roundabout over-capacity.
	Single-lane Roundabout with capacity upgrades	8.5	A	54	40.0	D	374	Performance of roundabout improves to LOS A/D with upgrade works, however, the Hannon Road approach @ LOS F in PM peak. Upgrading to a dual-lane roundabout likely required before any further development of the structure plan area.
	Dual-lane Roundabout	7.2	A	60	17.8	B	153	Dual-lane roundabout performs at acceptable LOS.
Scenario 6A: 2041 Baseline + a total of **70ha** of new development within the Hautapu Industrial Structure Plan area (inclusive of **20ha** developed within Area 6 for trip distribution purposes)	Single-lane Roundabout	199.3	F	2,345	225.2	F	1,606	70ha of new development; equivalent to developing Areas 1, 2, 3 and 6. Single-lane roundabout over-capacity.
	Single-lane Roundabout with capacity upgrades	17.2	B	166	71.2	F	472	While minor improvement in performance observed, roundabout still at practical capacity in PM peak with proposed upgrades. Upgrading to a dual-lane roundabout likely required.
	Dual-lane Roundabout	9.3	A	114	12.5	B	76	Dual-lane roundabout performs at acceptable LOS.
Scenario 6B: 2041 Baseline + a total of **70ha** of new development within the Hautapu Industrial Structure Plan area (inclusive of **10ha** developed within Area 6 for trip distribution purposes)	Single-lane Roundabout	180.8	F	2,165	207.7	F	1,186	70ha of new development; equivalent to developing Areas 1, 2, 3 and 10ha of Areas 4 and 6 (each). Single-lane roundabout over-capacity.
	Single-lane Roundabout with capacity upgrades	11.0	B	87	88.1	F	1,009	While minor improvement in performance observed, roundabout still at practical capacity in PM peak

Land Use Scenario	Intersection Configuration	AM Peak			PM Peak			Comment
		Ave Delay (sec)	LOS	95th %-tile queue (m)	Ave Delay (sec)	LOS	95th %-tile queue (m)	
								with proposed upgrades. Upgrading to a dual-lane roundabout likely required.
	Dual-lane Roundabout	7.5	A	67	15.8	B	125	Dual-lane roundabout performs at acceptable LOS.
Scenario 7: 2041 Baseline + a total of **85ha** of new development within the Hautapu Industrial Structure Plan area (inclusive of **15ha** developed within Area 6 for trip distribution purposes)	Single-lane Roundabout	290.1	F	3,152	311.9	F	2,070	70ha of new development; equivalent to developing Areas 1, 2, 3, 4 and 15ha of Area 6. Single-lane roundabout over-capacity.
	Dual-lane Roundabout	11.5	B	107	42.0	D	394	Dual-lane roundabout performs at acceptable LOS, however, one approach @ LOS F in PM peak. Further upgrading of dual-lane roundabout unlikely to be required when wider transport network distribution impacts are considered together with wider land use development patterns around Cambridge.
	Dual-lane Roundabout with capacity upgrades	8.7	A	84	13.0	B	84	Upgraded dual-lane roundabout performs at acceptable LOS.

Notes:
1. Input volumes were sourced from the modelling undertaken by CKL for Kama Trust Integrated Transportation Assessment.
2. Traffic associated with the adjacent Bardowie Industrial Precinct is excluded from the baseline traffic demands. Access to the initial stages of the precinct will be provided via a second roundabout on Victoria Road located near the Hautapu Cemetery, and access to these later stages, which are only planned to be developed 5+ years post development of Stage 1, is yet to be confirmed.
3. Peak hour demands were estimated based on a trip generation rate of 20 trips/ha/hr (two-way).

6.4.2 PROPOSED STAGING OF TRANSPORTATION INFRASTRUCTURE IMPROVEMENTS

Recent land development consents in the structure plan area are evident and anecdotal advice from Council points to other planned development proposals being considered in the near future. It is assessed that in practical application terms, the as notified and proposed 5ha threshold for development could be amended to provide enhanced confidence as to the timing of the planned infrastructure works.

Regarding the planning, design and implementation of the work, Council has advised it has authorised funding to progress the early planned works within the Annual Plan and other works are provisioned for within the Long Term Plan. The potential need for these to be brought forward in time will be a matter for monitoring and review within the respective statutory review periods. It is therefore in a position to provide increased confidence in relation to the infrastructure delivery.

Table 5 that follows sets out a summary of the proposed staging, and associated triggers, for the recommended transportation infrastructure improvements associated with PPC17. The triggers associated with each improvement are related to one or both of the following:

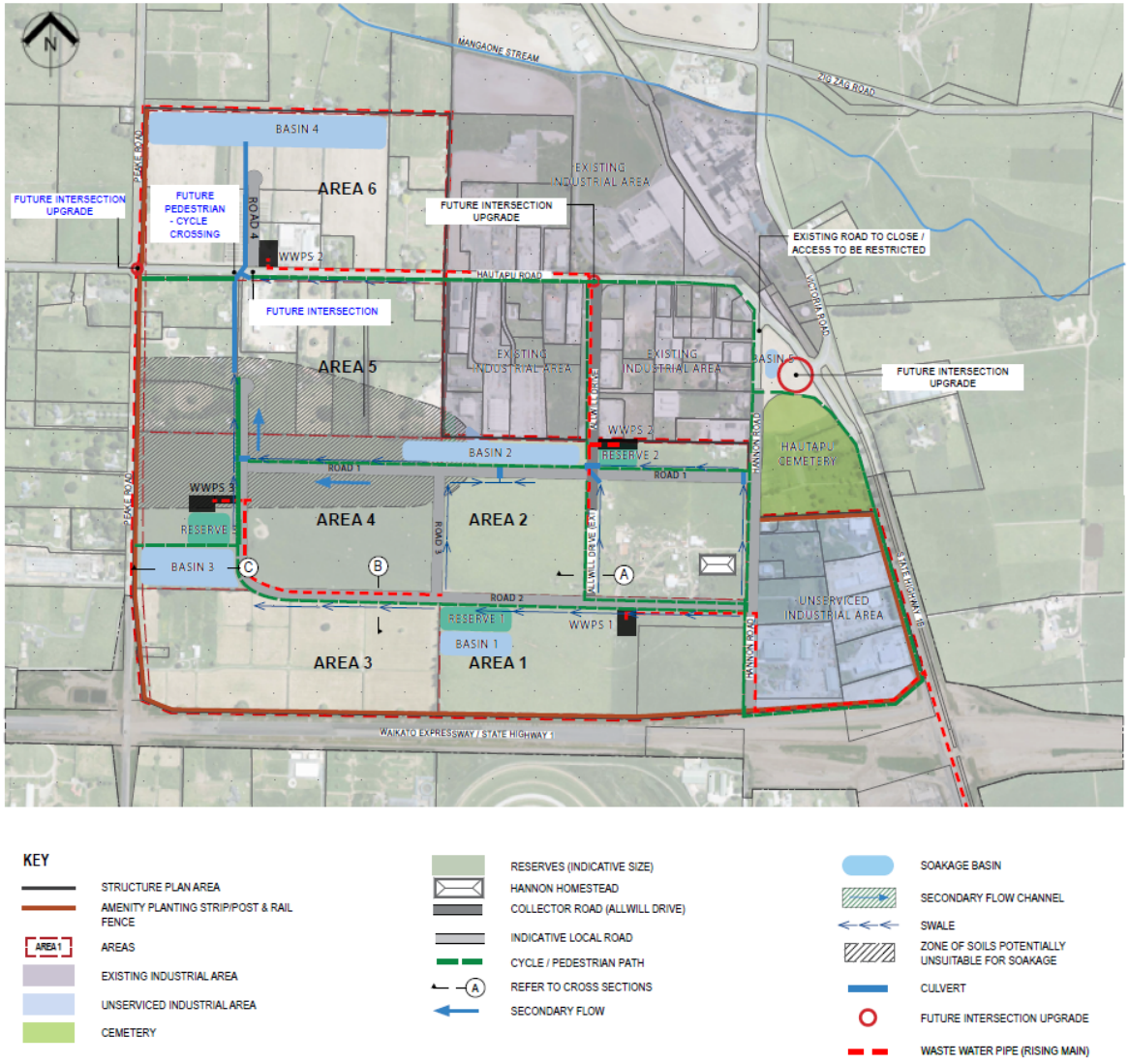
Table 5: Proposed Staging of Transportation Infrastructure Improvements

Improvement Work	Improvement Trigger
Hautapu Road - Victoria Road to Hannon Road including the Victoria Road/Hautapu Road roundabout and closure of Hannon Road	Works to be completed within the 2023-2024 financial year
Hautapu Road - Hannon Road to Allwill Drive including Allwill Drive signalisation	The connection of Allwill Drive to the Collector Road (Road 1); or Development within Area 6 (whichever comes first)
Hautapu Road – Allwill Drive to Peake Road including the Road 4 intersection and crossing and Peake Road intersection works	Upgrade triggered by the development within Area 6

These specific infrastructure triggers are proposed to provide greater assurance as to the timing of infrastructure in relation to land development demand and have been demonstrated to provide the necessary transport corridor capacity and local safety outcomes necessary.

6.5 Proposed Amendments to the Hautapu Industrial Structure Plan

Based on the assessments and infrastructure triggers described above, amendments are proposed to the structure plan as shown on Figure 9 (refer to **Appendix A** for an enlarged version of the structure plan amendments) that follows:



ITEMS TO GIVE EFFECT TO THE STRUCTURE PLAN:

ROADS & ACCESS

- HANNON ROAD INTERSECTION TO CLOSE FOLLOWING OPENING OF THE VICTORIA ROAD / HAUTAPU ROAD ROUNDABOUT TO TRAFFIC IN THE 2023-24 FINANCIAL YEAR ~~WHEN 5HA OF NEW DEVELOPMENT HAS OCCURRED.~~
- STAGE 1 ROUNDABOUT ON VICTORIA ROAD TO BE CONSTRUCTED IN THE 2023-24 FINANCIAL YEAR AND IS REQUIRED PRIOR TO HANNON ROAD CLOSURE.
- ~~ALLWILL DRIVE INTERSECTION TO BE UPGRADED WITH A LINK INTO THE AREA 2 FURTHER UPGRADE TO SIGNALS WITH AREA 3 DEVELOPMENT.~~
- HAUTAPU ROAD, HANNON ROAD TO ALWILL DR, INCLUDING ALLWILL DRIVE SIGNALS, TO BE UPGRADED PRIOR TO ALWILL DRIVE CONNECTION WITH ROAD 1 OR DEVELOPMENT WITHIN AREA 6 (WHICHEVER COMES FIRST).
- HAUTAPU ROAD, ALLWILL DRIVE TO PEAKE ROAD, INCLUDING PEAKE ROAD INTERSECTION IMPROVEMENTS, TO BE UPGRADED PRIOR TO DEVELOPMENT WITHIN AREA 6.
- A RIGHT-TURN BAY AND PEDESTRIAN/CYCLE CROSSING TO BE ESTABLISHED AT THE HAUTAPU ROAD / ROAD 4 INTERSECTION PRIOR TO DEVELOPMENT WITHIN AREA 6.
- NO INDIVIDUAL ACCESS TO PEAKE ROAD.
- CYCLE WAY TO BE CONSTRUCTED FROM VICTORIA ROAD THROUGH AREAS 1 AND 3 TO PEAKE ROAD AS SHARED PATH. TREATMENT REQUIRED AT VEHICLE CROSSINGS ALONG ROUTE TO ALERT TO ALERT VEHICLES TO CYCLISTS ON PATH.
- INTERSECTION UPGRADE HAUTAPU ROAD AND SH1B / VICTORIA STREET REFER TO GREY MATTER DESIGNS REF# ECM10796019.

STORMWATER

- ON-LOT TREATMENT AND DISPOSAL REQUIRED FOR RUNOFF UP TO AND INCLUDING 24-HR, 10% AEP EVENTS.
- PRIMARY NETWORK (SWALE) CAPACITY FOR 10% AEP EVENTS. SECONDARY NETWORK (ROAD CORRIDOR) FOR 1% AEP EVENTS.
- BASIN CAPACITY FAR 72-HR, 1% AEP EVENTS WITH NO SOAKAGE ALLOWANCE.
- BASIN UNDER DRAINAGE MATRIX REQUIRED TO MINIMISE EFFECTS FROM SILT DEPOSITION IN THE BASIN

WATER SUPPLY

- RETICULATED NETWORK TO BE PROVIDED.
- INSTALLATION OF DN375 MAIN REQUIRED PRIOR TO DEVELOPMENT.
- STAGED NETWORK MAY ONLY ACHIEVE FW2 LEVEL OF SERVICE. COMPLETED NETWORK WILL ACHIEVE FW3. HIGHER RISK USES MUST PROVIDE APPROPRIATE SOLUTIONS TO MEET FIRE FIGHTING REQUIREMENTS.

WASTEWATER

- GRAVITY SEWER NETWORK REQUIRED THROUGHOUT, DISCHARGING TO WW PUMP STATIONS.
- PS-1 REQUIRED WITH AREA 1 DEVELOPMENT. SUBSEQUENT PUMP STATIONS TO DISCHARGE INTO GRAVITY NETWORK SERVING PS-1.
- PS-1 RISING MAIN TO DISCHARGE TO TAYLOR STREET WW PUMP STATION.

LANDSCAPING AMENITY

- 4m PLANTING STRIP TO FACE WAIKATO EXPRESSWAY.
- PEAKE ROAD, HAUTAPU ROAD, NORTH END OF HANNON ROAD AND VICTORIA ROAD TO PROVIDE 5m LANDSCAPE AMENITY PLANTING STRIP AND AMENITY TREE PLANTING AT APPROX 30m INTERVALS.
- PLANTING STRIP ON PEAKE ROAD TO BE VESTED WITH COUNCIL
- NOISE BUNDS REQUIRED ON PEAKE ROAD AND HAUTAPU ROAD.
- THREE RESERVES TO BE PROVIDED IN LOCATIONS IDENTIFIED. ALLOWANCE TO BE MADE FOR LIMITED CAFE(S) AND/OR LUNCH BAR(S) ADJACENT TO PARKS.

BUILDING AND SITE LAYOUT

- CAR PARKING, BUILDING LAYOUT AND DESIGN, LANDSCAPING ETC ON LOTS, TO BE IN ACCORDANCE WITH THE DESIGN GUIDELINES.

Figure 9: Proposed Amendments to the Proposed Hautapu Industrial Structure Plan

7 Submissions

7.1 Transportation Submissions

Submissions have been received by Council and summarised in terms of decisions requested by topic. The Transportation submissions are assessed in Table 6 below, while the Hautapu Landowners' Group submission is addressed in section 7.2.

Table 6: Responses to Transportation Submissions

Submission point	Plan Change Reference/ District Plan Provision	Support / Oppose / In Part	My submission is (summary):	Decision requested	Further Submissions	Recommendation
7.5	Appendix S5	Oppose in part	Concerned about additional traffic on Peake Road and seeks that no access is gained from Peake Road either during construction or future development of Area 6.	Do not permit access to Area 6 from Peake Road, during construction and upon future development.	FS08 – Oppose FS20 – Oppose	Accept – This is already a stipulation in the Structure Plan documents. The Peake Road frontage is also protected from industrial access by Rule 16.4.2.3 of the operative District Plan
12.1	General	Support in part	Waka Kotahi are generally supportive of the plan change. They express concerns about the State Highway 1B and Hautapu Road intersection's ability to cater for the additional traffic generated by this proposed plan change. Council intends to construct a roundabout in 2023/2024 construction season. Due to these concerns, Waka Kotahi considers that an assessment of traffic flows and intersection capacity is required to determine whether the existing State Highway 1B/Hautapu Road intersection has capacity to cater for the additional traffic volume. Dependent on the outcome of the assessment, Waka Kotahi consider that a provision may be required to only allow a certain level of development within growth cell C9 prior to the construction of the roundabout.	Undertake an assessment of traffic flows and intersection capacity to determine whether the existing intersection (SH1B/Hautapu Rd) can cater for the additional traffic flows prior to 2023/2024 planned upgrade.	FS07 – Support FS08 – Neutral FS14 – Support	Accept in part. A full assessment of the intersection performance is described in Section 6.4.1. By way of summary, it is concluded the proposal will operate safely and efficiently as a single lane roundabout through the period where Waka Kotahi continues to have accountability for the corridor. The transport capacity to be established will readily support both incremental as well as the long term and full structure plan area development as planned. Any potential impact is therefore assessed as less than minor. Council has engaged with Waka Kotahi on this matter and have provided further information. Waka Kotahi has confirmed that their matters of concern related to the performance of the Victoria Road/ Hautapu Road intersection have been addressed and no longer wish to be heard.

Submission point	Plan Change Reference/ District Plan Provision	Support / Oppose / In Part	My submission is (summary):	Decision requested	Further Submissions	Recommendation
13.2	General	Oppose	Concerned about traffic safety due to the current poor state of the road and increase in heavy vehicle movements, lack of walking and cycling. Particularly for children attending Hautapu School and horse riders.	Do not rezone any land in the area.	FS07 – Support FS08 – Oppose	Reject – The submitter raises valid points, and it is acknowledged that Hautapu Road requires attention. The plan change identifies the following improvement works are planned in the short-term to improve the safety risks on Hautapu Road and the intersections with Hannon Road and Peake Road: • Hautapu Road will be upgraded in the 20223/24 financial years to an industrial road standard, including resealing and widening the existing carriageway, kerb and channel treatment, stormwater drainage, and walking/ cycling facilities (shared path of the southern side and footpath on the northern side). • The Hautapu Road/ Hannon Road intersection is to be closed with a new road connection from Hannon Road to the future Victoria Road/ Hautapu Road roundabout.

						The proposed improvement works will deliver an appropriately safe local road environment. Localised safety improvement and traffic management constraint measures are proposed on Peake Road and at the Peake Road/ Hautapu Road intersection to enhance and ensure safe pedestrian / cycle crossing movements there. Signage illustrating that Hautapu Road (the section to the west of Peake Road) is a "no-exit" road and directing traffic to Victoria Road is proposed. This will discourage heavy vehicle and other industrial traffic travelling west on Hautapu Road.
14.9	Appendix S5	Support in part	There is potential for the future industrial activities in 'Area 6' to increase traffic on Peake Road and Hautapu Road (west of Peake Road). Vehicles associated with the activities may use the local roads, rather than the Hautapu interchange and expressway. Moving the indicative local road as far east as possible would make it more likely that vehicles would use the Hautapu interchange and expressway.	Amend the Structure Plan and move the indicative local road as far east as possible.	FS08 – Oppose	Reject – Hautapu Road, west of Peake Road is a no-exit road. The potential for increased traffic is minimal. The only practical way for traffic to access the expressway is via the improved Hautapu Road and Victoria Road corridors. It is acknowledged that there remains the potential for an occasional and ill-informed driver movement to travel west via Peake Road in search of an access to the WEX. This behaviour can be expected to diminish over time and drivers develop an awareness of the local road network. The potential impact is assessed to be infrequent and of less than a minor impact, having regard for the nature of rural vehicle movements expected on the road corridor. West of the Area 6 Road 6, a staged pedestrian/cycle crossing threshold is proposed together with directional signage conveying the "no-exit" end to Hautapu Road west and further traffic management measures are proposed on Peake Road to slow traffic speeds and support safe crossing movements. The Hautapu interchange access will be a clear access preference together with the Victoria Road corridor.
15.2	General	Oppose	There is no footpath on Peake Road and children cycle on that road to school – the increased activity as a result of this plan change will put them at risk.	Specific relief not mentioned.	FS07 – Support FS08 – Neutral	Accept in part – already assessed in submission 7.5 and 13.2 above. The proposal has been amended to include local safety improvements to support safe pedestrian and cycle crossing of Peake Road at the Hautapu Road intersection.
16.3	General	Oppose	Concerned about the additional traffic the rezoning will generate.	Not rezoning any land in the area.	FS08 – Oppose	Reject – The area is identified as a strategic development node in Future Proof, other regional and Strategic District Planning documents. The assessments undertaken show that the proposed transportation infrastructure will be appropriate to support the traffic demands expected.
Submission point	**Plan Change Reference/ District Plan Provision**	**Support / Oppose / In Part**	**My submission is (summary):**	**Decision requested**	**Further Submissions**	**Recommendation**
18.2	General	Oppose	Increase in traffic (especially trucking) in the area which will negatively impact the current bottleneck north of Cambridge.	Do not rezone any land in the area.	FS08 – Oppose	Reject – The area is identified as a strategic development node in Future Proof, other regional and Strategic District Planning documents. The assessments undertaken show that the proposed transportation infrastructure will be appropriate to support the traffic demands expected.
19.2	General	Oppose	Increase in traffic (especially trucking) in the area which will negatively impact the current bottleneck north of Cambridge.	Do not rezone any land in the area.	FS08 – Oppose	Reject – The area is identified as a strategic development node in Future Proof, other regional and Strategic District Planning documents. The assessments undertaken show that the proposed transportation infrastructure will be appropriate to support the traffic demands expected.
26.1	General	Oppose	The changes proposed in PC17 will increase traffic in the area.	Do not implement PC17.	FS07 – Support FS08 – Oppose	Reject – The area is identified as a strategic development node in Future Proof, other regional and Strategic District Planning documents.

						The assessments undertaken show that the proposed transportation infrastructure will be appropriate to support the traffic demands expected.

7.2 Hautapu Landowners' Group Submission

This section of the report provides a high-level assessment of the traffic and transport effects associated with the inclusion of the Hautapu Landowners' Group (HLG) proposal within PPC17. The HLG submission relates to the rezoning of approximately 20 ha of land located to the north of "Area 6" from Rural to Deferred Industrial. At the time of writing this report, technical assessments evaluating the inclusion of this proposal within PC117 had not been completed, and a decision by the Hearing's panel to include the HLG proposal within the scope of PC17 was still pending.

On the basis of the trip rate adopted in earlier assessments for the Hautapu industrial area, the HLG site is expected to generate an additional 400 vph during the typical commuter peak hour.

SIDRA Intersection modelling has been undertaken to identify whether any additional transport infrastructure would be required to support the submission. The results from the capacity assessments are summarised below (refer to **Appendix C** for the SIDRA Intersection summaries):

- The Hautapu Road/ Road 4 intersection, as a priority-controlled T-intersection with a right-turn bay on Hautapu Road, is expected to perform at acceptable level of service with the inclusion of traffic associated with the HLG submission. Sensitivity testing various trip distribution scenarios (0% vs 20% of the trips from the structure plan precinct, inclusive of the HLG site, to/from the west via Peake Road) confirmed that the proposed intersection form is robust, and no capacity upgrades are required.
- The Hautapu Road/ Allwill Drive signalised intersection:

  On the basis of the assumption that all trips within Area 6, inclusive of the HLG site, travel to/ from the east, the performance of the signalised intersection is expected to deteriorate (from LOS C/D to LOS F) with the inclusion of traffic associated with the HLG submission[37]. Queuing in excess of 1km on Hautapu Road is identified. Capacity upgrades to the intersection would be required to noticeably improve the intersection performance. However, since the HLG proposal is to rezone the land to Deferred Industrial, any capacity upgrades at the intersection, if they manifest at that time, would be required post 2035 (i.e., when the site is live zoned and subsequently developed). The long-term effects will also be subject to the eventual wider structure plan area trip demands and distribution outcomes.

  Long-term, Council has also signalled the potential to develop Peake Road commensurate with the C7 and other more southerly growth cells. This would result in a change in distribution patterns including a shift in the order of 15% to 20% (WRTM) of trips to the Peake Road corridor. The long-term wider network integration and trip distribution under this scenario results in redistribution of an almost equivalent number of trips[38] to/from Peake Road, much of which would no longer require movement through the Allwill Drive signalised intersection. The modelling results at **Appendix C** indicate the intersection operating at LOS C/C for the AM and PM peaks respectively. On this basis, it is assessed the proposed Allwill

[37] The Fonterra access approach is modelled as operating at LOS E for the various trip distribution scenarios. However, the concept designs prepared by Gray Matter for the intersection upgrade show a possible left-out access where the existing access is. So outbound turning volumes at the intersection approach (and resulting approach performance) are likely to be lower than modelled. Further modelling has identified that adjustment for this impact has no material impact on altering the intersection performance as described.

[38] Based on 15%-20% * 22,200 = 3,330 to 4,440 trips per day or about 330 to 440 trips in the peak hour. This compares with the 400 additional trip generation assessed as due to the HLG land.

Drive/ Hautapu Road intersection infrastructure will be sufficient to support the HLG additional land being included in the structure plan area if that is determined.

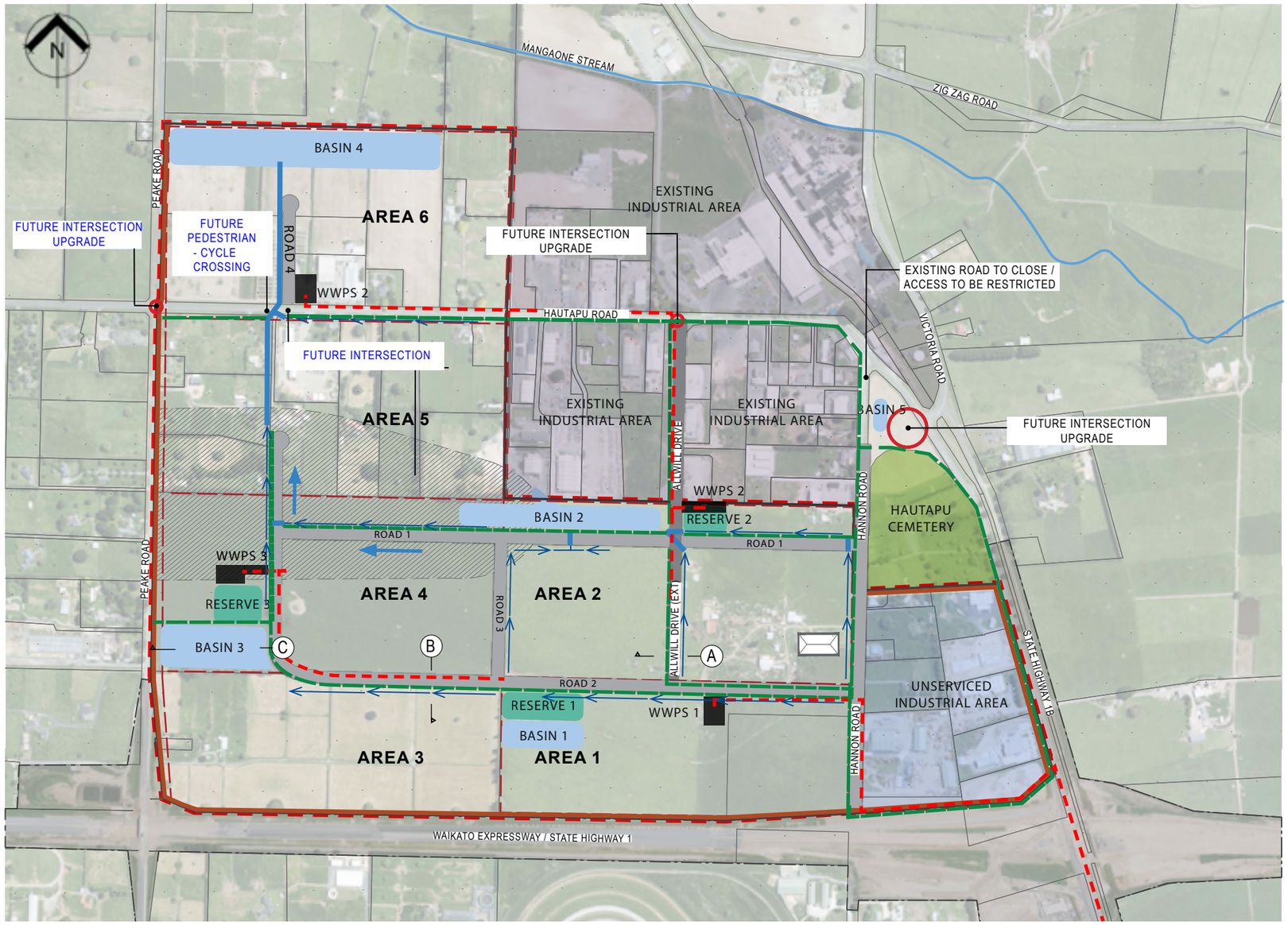
- The Victoria Road/ Hautapu Road intersection has also been assessed. The assessments (refer to **Appendix C**) indicate a level of service deterioration from LOS C/D to LOS F/F in the respective AM and PM peak periods. Queue lengths are expected to increase to over 1km in this scenario. Further assessment having regard for a potential future 20% network redistribution to Peake Road post 2035, results in an improvement in performance at this intersection to LOS E/D in the AM and PM peaks respectively. This represents an acceptable LOS operation at full structure plan area development. Overall, therefore it is assessed no further infrastructure requirement is expected at this intersection as a result of the HLG land parcel.

8 Conclusions

Overall, it is assessed that while previous assessments undertaken for the Hautapu Industrial Structure Plan, including the rezoning of “Area 6”, contain sufficient background information to be able to understand the scale and likely effects associated with PPC17. The further assessments undertaken as part of this assessment give confidence that the effects associated with PPC17 have been adequately identified, and the recommended transport proposals and amendments to the Structure Plan (as illustrated in Figure 9 and attached in **Appendix A**) are sufficient to mitigation any adverse effects.

APPENDICES

Appendix A - Proposed Hautapu Structure Plan



KEY

- STRUCTURE PLAN AREA
- AMENITY PLANTING STRIP/POST & RAIL FENCE
- AREA 1 — AREAS
- EXISTING INDUSTRIAL AREA
- UNSERVICED INDUSTRIAL AREA
- CEMETERY
- RESERVES (INDICATIVE SIZE)
- HANNON HOMESTEAD
- COLLECTOR ROAD (ALLWILL DRIVE)
- INDICATIVE LOCAL ROAD
- CYCLE / PEDESTRIAN PATH
- A — REFER TO CROSS SECTIONS
- SECONDARY FLOW
- SOAKAGE BASIN
- SECONDARY FLOW CHANNEL
- SWALE
- ZONE OF SOILS POTENTIALLY UNSUITABLE FOR SOAKAGE
- CULVERT
- FUTURE INTERSECTION UPGRADE
- WASTE WATER PIPE (RISING MAIN)

ITEMS TO GIVE EFFECT TO THE STRUCTURE PLAN:

ROADS & ACCESS

- HANNON ROAD INTERSECTION TO CLOSE FOLLOWING OPENING OF THE VICTORIA ROAD / HAUTAPU ROAD ROUNDABOUT TO TRAFFIC IN THE 2023-24 FINANCIAL YEAR ~~WHEN 5HA OF NEW DEVELOPMENT HAS OCCURRED.~~
- STAGE 1 ROUNDABOUT ON VICTORIA ROAD TO BE CONSTRUCTED IN THE 2023-24 FINANCIAL YEAR AND IS REQUIRED PRIOR TO HANNON ROAD CLOSURE.
- ~~ALLWILL DRIVE INTERSECTION TO BE UPGRADED WITH A LINK INTO THE AREA 2 FURTHER UPGRADE TO SIGNALS WITH AREA 3 DEVELOPMENT.~~
- HAUTAPU ROAD, HANNON ROAD TO ALWILL DR, INCLUDING ALLWILL DRIVE SIGNALS, TO BE UPGRADED PRIOR TO ALWILL DRIVE CONNECTION WITH ROAD 1 OR DEVELOPMENT WITHIN AREA 6 (WHICHEVER COMES FIRST).
- HAUTAPU ROAD, ALLWILL DRIVE TO PEAKE ROAD, INCLUDING PEAKE ROAD INTERSECTION IMPROVEMENTS, TO BE UPGRADED PRIOR TO DEVELOPMENT WITHIN AREA 6.
- A RIGHT-TURN BAY AND PEDESTRIAN/CYCLE CROSSING TO BE ESTABLISHED AT THE HAUTAPU ROAD / ROAD 4 INTERSECTION PRIOR TO DEVELOPMENT WITHIN AREA 6.
- NO INDIVIDUAL ACCESS TO PEAKE ROAD.
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- INTERSECTION UPGRADE HAUTAPU ROAD AND SH1B / VICTORIA STREET REFER TO GREY MATTER DESIGNS REF# ECM10796019.

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- ON-LOT TREATMENT AND DISPOSAL REQUIRED FOR RUNOFF UP TO AND INCLUDING 24-HR, 10% AEP EVENTS.
- PRIMARY NETWORK (SWALE) CAPACITY FOR 10% AEP EVENTS. SECONDARY NETWORK (ROAD CORRIDOR) FOR 1% AEP EVENTS.
- BASIN CAPACITY FAR 72-HR, 1% AEP EVENTS WITH NO SOAKAGE ALLOWANCE.
- BASIN UNDER DRAINAGE MATRIX REQUIRED TO MINIMISE EFFECTS FROM SILT DEPOSITION IN THE BASIN

WATER SUPPLY

- RETICULATED NETWORK TO BE PROVIDED.
- INSTALLATION OF DN375 MAIN REQUIRED PRIOR TO DEVELOPMENT.
- STAGED NETWORK MAY ONLY ACHIEVE FW2 LEVEL OF SERVICE. COMPLETED NETWORK WILL ACHIEVE FW3. HIGHER RISK USES MUST PROVIDE APPROPRIATE SOLUTIONS TO MEET FIRE FIGHTING REQUIREMENTS.

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- PS-1 REQUIRED WITH AREA 1 DEVELOPMENT. SUBSEQUENT PUMP STATIONS TO DISCHARGE INTO GRAVITY NETWORK SERVING PS-1.
- PS-1 RISING MAIN TO DISCHARGE TO TAYLOR STREET WW PUMP STATION.

LANDSCAPING AMENITY

- 4m PLANTING STRIP TO FACE WAIKATO EXPRESSWAY.
- PEAKE ROAD, HAUTAPU ROAD, NORTH END OF HANNON ROAD AND VICTORIA ROAD TO PROVIDE 5m LANDSCAPE AMENITY PLANTING STRIP AND AMENITY TREE PLANTING AT APPROX 30m INTERVALS.
- PLANTING STRIP ON PEAKE ROAD TO BE VESTED WITH COUNCIL
- NOISE BUNDS REQUIRED ON PEAKE ROAD AND HAUTAPU ROAD.
- THREE RESERVES TO BE PROVIDED IN LOCATIONS IDENTIFIED. ALLOWANCE TO BE MADE FOR LIMITED CAFE(S) AND/OR LUNCH BAR(S) ADJACENT TO PARKS.

BUILDING AND SITE LAYOUT

- CAR PARKING, BUILDING LAYOUT AND DESIGN, LANDSCAPING ETC ON LOTS, TO BE IN ACCORDANCE WITH THE DESIGN GUIDELINES.

SCALE
0 100 200 300 400 500m

HAUTAPU STRUCTURE PLAN
HAUTAPU STRUCTURE PLAN

JULY 2022
ORIGINAL SIZE: A3
SHEET 1 OF 5

Appendix B - SIDRA Intersection Summaries

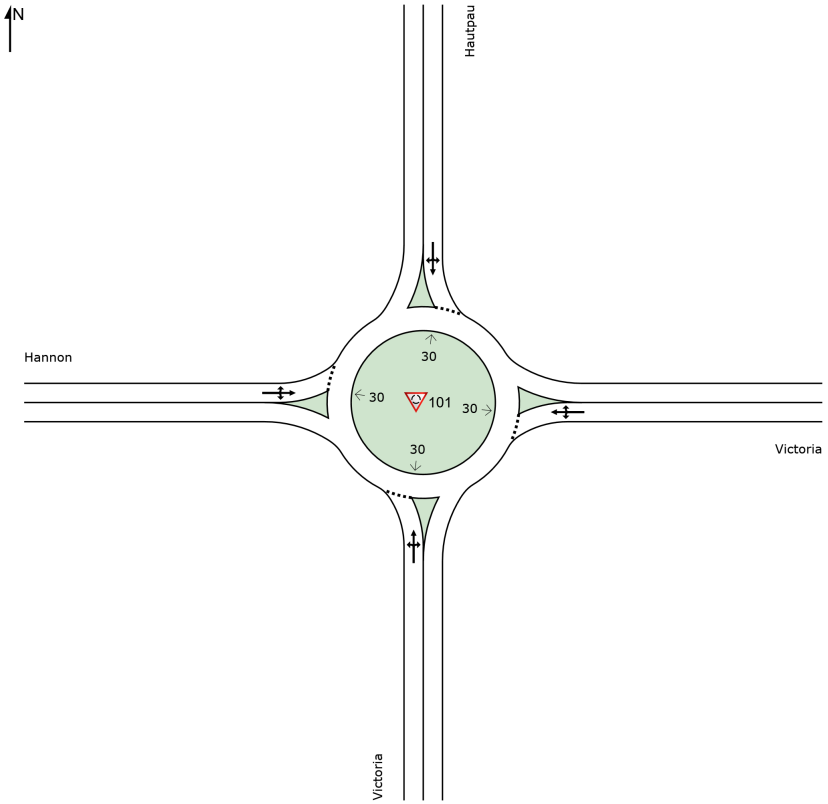
SIDRA Intersection Results: Scenario 1

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 1_Single Lane_AM (Site Folder: Scenario 1: 2041 Baseline without BIL and Area 6, and with 5ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 1_Single Lane_AM (Site Folder: Scenario 1: 2041 Baseline without BIL and Area 6, and with 5ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	53	10.0	56	10.0	0.520	2.6	LOS A	5.0	38.4	0.28	0.42	0.28	46.7
2	T1	353	10.0	372	10.0	0.520	2.3	LOS A	5.0	38.4	0.28	0.42	0.28	48.1
3	R2	344	10.0	362	10.0	0.520	7.8	LOS A	5.0	38.4	0.28	0.42	0.28	48.6
Approach		750	10.0	789	10.0	0.520	4.9	LOS A	5.0	38.4	0.28	0.42	0.28	48.2
East: Victoria														
4	L2	427	10.0	449	10.0	0.543	6.9	LOS A	4.9	37.1	0.83	0.84	0.92	45.9
5	T1	13	10.0	14	10.0	0.543	6.6	LOS A	4.9	37.1	0.83	0.84	0.92	47.3
6	R2	18	10.0	19	10.0	0.543	12.1	LOS B	4.9	37.1	0.83	0.84	0.92	47.8
Approach		458	10.0	482	10.0	0.543	7.1	LOS A	4.9	37.1	0.83	0.84	0.92	46.0
North: Hautpau														
7	L2	125	10.0	132	10.0	0.577	6.3	LOS A	5.1	38.7	0.74	0.74	0.82	46.2
8	T1	423	10.0	445	10.0	0.577	6.0	LOS A	5.1	38.7	0.74	0.74	0.82	47.5
9	R2	10	10.0	11	10.0	0.577	11.5	LOS B	5.1	38.7	0.74	0.74	0.82	48.0
Approach		558	10.0	587	10.0	0.577	6.1	LOS A	5.1	38.7	0.74	0.74	0.82	47.2
West: Hannon														
10	L2	10	10.0	11	10.0	0.055	6.9	LOS A	0.3	2.5	0.72	0.70	0.72	44.5
11	T1	6	10.0	6	10.0	0.055	6.6	LOS A	0.3	2.5	0.72	0.70	0.72	45.7
12	R2	23	10.0	24	10.0	0.055	12.1	LOS B	0.3	2.5	0.72	0.70	0.72	46.2
Approach		39	10.0	41	10.0	0.055	9.9	LOS A	0.3	2.5	0.72	0.70	0.72	45.7
All Vehicles		1805	10.0	1900	10.0	0.577	5.9	LOS A	5.1	38.7	0.57	0.63	0.62	47.3

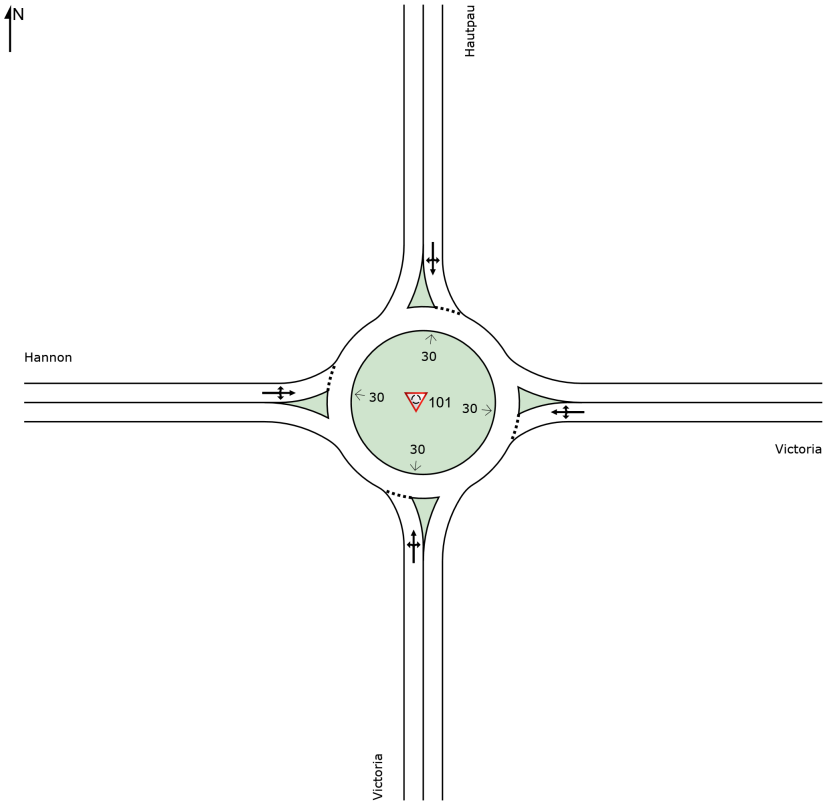
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 1_Single Lane_PM (Site Folder: Scenario 1: 2041 Baseline without BIL and Area 6, and with 5ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 1_Single Lane_PM (Site Folder: Scenario 1: 2041 Baseline without BIL and Area 6, and with 5ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	23	10.0	24	10.0	0.487	2.8	LOS A	4.5	34.0	0.33	0.42	0.33	46.7
2	T1	375	10.0	395	10.0	0.487	2.4	LOS A	4.5	34.0	0.33	0.42	0.33	48.1
3	R2	277	10.0	292	10.0	0.487	7.9	LOS A	4.5	34.0	0.33	0.42	0.33	48.6
Approach		675	10.0	711	10.0	0.487	4.7	LOS A	4.5	34.0	0.33	0.42	0.33	48.2
East: Victoria														
4	L2	523	10.0	551	10.0	0.625	7.3	LOS A	6.4	48.6	0.83	0.86	0.97	45.6
5	T1	6	10.0	6	10.0	0.625	7.0	LOS A	6.4	48.6	0.83	0.86	0.97	46.9
6	R2	42	10.0	44	10.0	0.625	12.5	LOS B	6.4	48.6	0.83	0.86	0.97	47.4
Approach		571	10.0	601	10.0	0.625	7.7	LOS A	6.4	48.6	0.83	0.86	0.97	45.7
North: Hautpau														
7	L2	106	10.0	112	10.0	0.457	4.9	LOS A	3.2	24.3	0.65	0.57	0.65	46.6
8	T1	335	10.0	353	10.0	0.457	4.6	LOS A	3.2	24.3	0.65	0.57	0.65	47.9
9	R2	10	10.0	11	10.0	0.457	10.1	LOS B	3.2	24.3	0.65	0.57	0.65	48.4
Approach		451	10.0	475	10.0	0.457	4.8	LOS A	3.2	24.3	0.65	0.57	0.65	47.6
West: Hannon														
10	L2	10	10.0	11	10.0	0.107	6.9	LOS A	0.6	4.9	0.73	0.74	0.73	44.3
11	T1	13	10.0	14	10.0	0.107	6.5	LOS A	0.6	4.9	0.73	0.74	0.73	45.5
12	R2	53	10.0	56	10.0	0.107	12.1	LOS B	0.6	4.9	0.73	0.74	0.73	45.9
Approach		76	10.0	80	10.0	0.107	10.4	LOS B	0.6	4.9	0.73	0.74	0.73	45.6
All Vehicles		1773	10.0	1866	10.0	0.625	5.9	LOS A	6.4	48.6	0.59	0.61	0.64	47.1

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

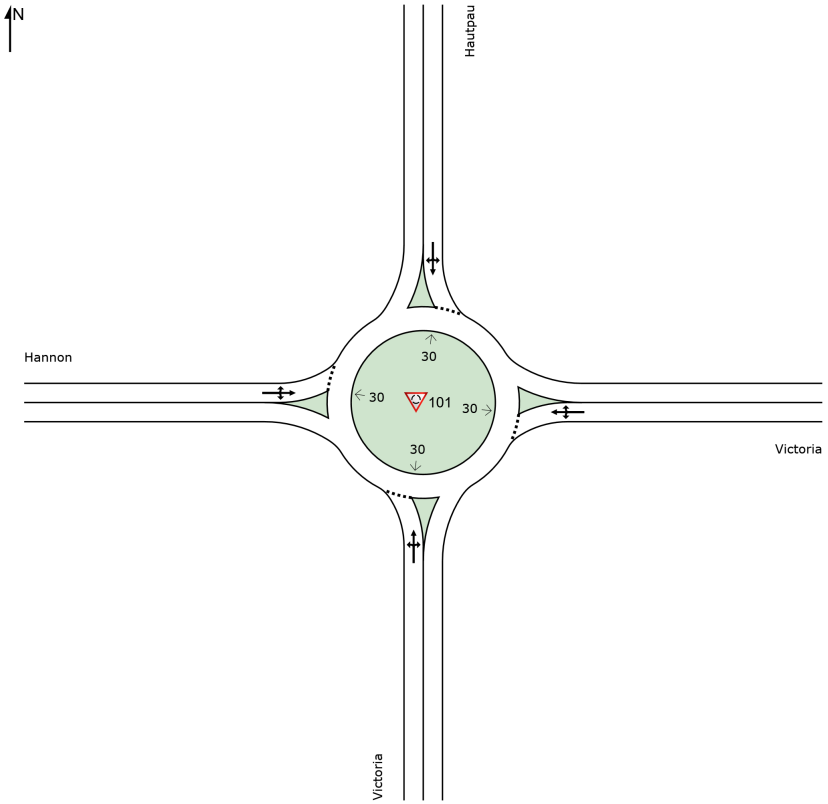
SIDRA Intersection Results: Scenario 2

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 2_Single Lane_AM (Site Folder: Scenario 2: 2041 Baseline without BIL and Area 6, and with 20ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 2_Single Lane_AM (Site Folder: Scenario 2: 2041 Baseline without BIL and Area 6, and with 20ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	213	10.0	224	10.0	0.692	3.3	LOS A	8.9	67.4	0.58	0.46	0.58	46.1
2	T1	361	10.0	380	10.0	0.692	2.9	LOS A	8.9	67.4	0.58	0.46	0.58	47.4
3	R2	344	10.0	362	10.0	0.692	8.5	LOS A	8.9	67.4	0.58	0.46	0.58	47.9
Approach		918	10.0	966	10.0	0.692	5.1	LOS A	8.9	67.4	0.58	0.46	0.58	47.3
East: Victoria														
4	L2	427	10.0	449	10.0	0.653	9.9	LOS A	7.2	54.9	0.93	1.02	1.19	44.3
5	T1	53	10.0	56	10.0	0.653	9.6	LOS A	7.2	54.9	0.93	1.02	1.19	45.5
6	R2	26	10.0	27	10.0	0.653	15.1	LOS B	7.2	54.9	0.93	1.02	1.19	46.0
Approach		506	10.0	533	10.0	0.653	10.2	LOS B	7.2	54.9	0.93	1.02	1.19	44.5
North: Hautpau														
7	L2	125	10.0	132	10.0	0.645	8.7	LOS A	6.9	52.1	0.86	0.92	1.07	45.2
8	T1	427	10.0	449	10.0	0.645	8.3	LOS A	6.9	52.1	0.86	0.92	1.07	46.5
9	R2	10	10.0	11	10.0	0.645	13.9	LOS B	6.9	52.1	0.86	0.92	1.07	47.0
Approach		562	10.0	592	10.0	0.645	8.5	LOS A	6.9	52.1	0.86	0.92	1.07	46.2
West: Hannon														
10	L2	10	10.0	11	10.0	0.198	7.6	LOS A	1.3	10.2	0.82	0.82	0.82	43.9
11	T1	23	10.0	24	10.0	0.198	7.2	LOS A	1.3	10.2	0.82	0.82	0.82	45.0
12	R2	92	10.0	97	10.0	0.198	12.7	LOS B	1.3	10.2	0.82	0.82	0.82	45.5
Approach		125	10.0	132	10.0	0.198	11.3	LOS B	1.3	10.2	0.82	0.82	0.82	45.3
All Vehicles		2111	10.0	2222	10.0	0.692	7.6	LOS A	8.9	67.4	0.75	0.74	0.87	46.2

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

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 2_Single Lane_PM (Site Folder: Scenario 2: 2041 Baseline without BIL and Area 6, and with 20ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

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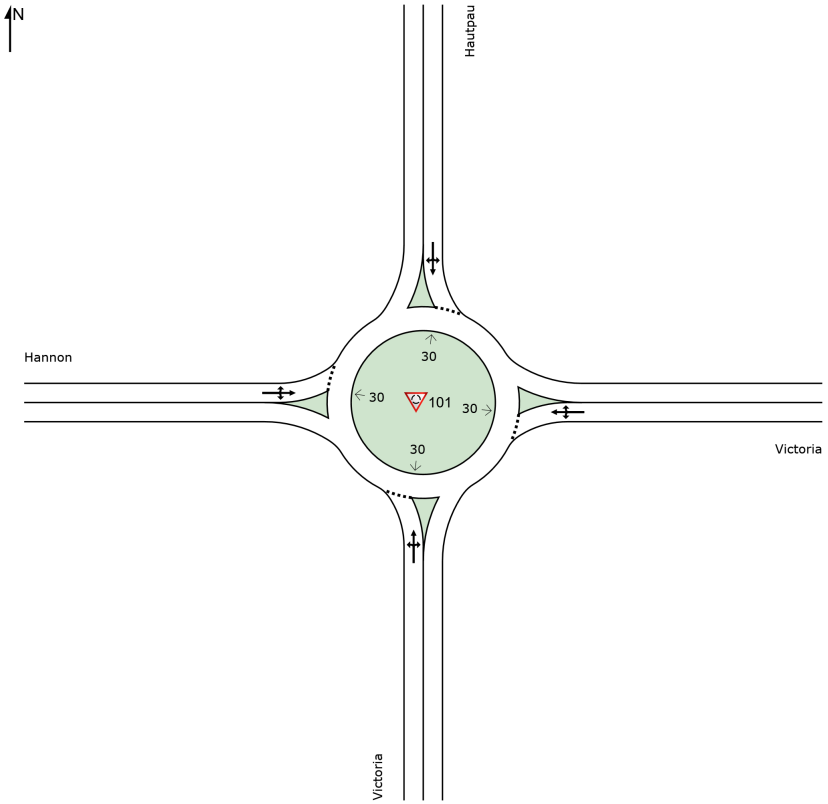

MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 2_Single Lane_PM (Site Folder: Scenario 2: 2041 Baseline without BIL and Area 6, and with 20ha of C8/C9)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	92	10.0	97	10.0	0.560	3.0	LOS A	5.9	44.5	0.45	0.43	0.45	46.5
2	T1	379	10.0	399	10.0	0.560	2.6	LOS A	5.9	44.5	0.45	0.43	0.45	47.8
3	R2	277	10.0	292	10.0	0.560	8.2	LOS A	5.9	44.5	0.45	0.43	0.45	48.3
Approach		748	10.0	787	10.0	0.560	4.7	LOS A	5.9	44.5	0.45	0.43	0.45	47.8
East: Victoria														
4	L2	523	10.0	551	10.0	0.767	14.5	LOS B	10.9	83.1	1.00	1.22	1.53	41.9
5	T1	23	10.0	24	10.0	0.767	14.1	LOS B	10.9	83.1	1.00	1.22	1.53	43.0
6	R2	46	10.0	48	10.0	0.767	19.6	LOS B	10.9	83.1	1.00	1.22	1.53	43.4
Approach		592	10.0	623	10.0	0.767	14.8	LOS B	10.9	83.1	1.00	1.22	1.53	42.1
North: Hautpau														
7	L2	108	10.0	114	10.0	0.572	8.6	LOS A	5.4	40.7	0.85	0.91	1.03	45.2
8	T1	345	10.0	363	10.0	0.572	8.3	LOS A	5.4	40.7	0.85	0.91	1.03	46.5
9	R2	10	10.0	11	10.0	0.572	13.8	LOS B	5.4	40.7	0.85	0.91	1.03	47.0
Approach		463	10.0	487	10.0	0.572	8.5	LOS A	5.4	40.7	0.85	0.91	1.03	46.2
West: Hannon														
10	L2	10	10.0	11	10.0	0.402	8.1	LOS A	2.9	22.2	0.85	0.89	0.87	43.5
11	T1	53	10.0	56	10.0	0.402	7.8	LOS A	2.9	22.2	0.85	0.89	0.87	44.7
12	R2	213	10.0	224	10.0	0.402	13.3	LOS B	2.9	22.2	0.85	0.89	0.87	45.1
Approach		276	10.0	291	10.0	0.402	12.0	LOS B	2.9	22.2	0.85	0.89	0.87	45.0
All Vehicles		2079	10.0	2188	10.0	0.767	9.4	LOS A	10.9	83.1	0.75	0.82	0.94	45.3

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

SIDRA Intersection Results: Scenario 3

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_AM (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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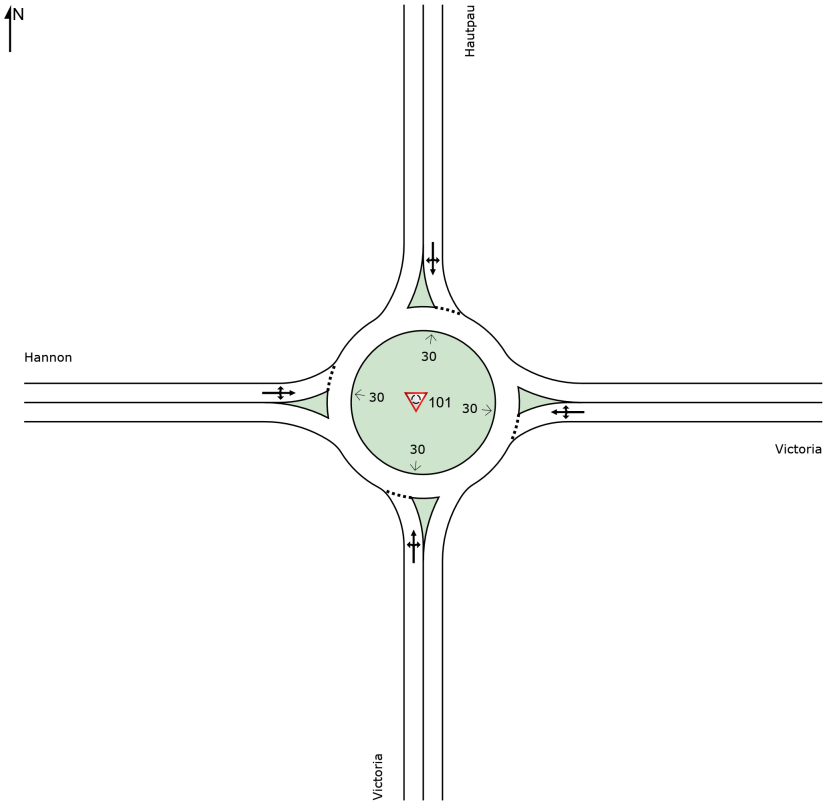

MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_AM (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	372	10.0	392	10.0	0.911	6.1	LOS D	22.4	169.9	1.00	0.65	1.05	45.1
2	T1	441	10.0	464	10.0	0.911	5.8	LOS D	22.4	169.9	1.00	0.65	1.05	46.3
3	R2	344	10.0	362	10.0	0.911	11.3	LOS D	22.4	169.9	1.00	0.65	1.05	46.8
Approach		1157	10.0	1218	10.0	0.911	7.5	LOS A	22.4	169.9	1.00	0.65	1.05	46.1
East: Victoria														
4	L2	427	10.0	449	10.0	0.770	15.7	LOS B	10.9	82.5	1.00	1.25	1.55	41.4
5	T1	93	10.0	98	10.0	0.770	15.3	LOS B	10.9	82.5	1.00	1.25	1.55	42.5
6	R2	19	10.0	20	10.0	0.770	20.9	LOS C	10.9	82.5	1.00	1.25	1.55	42.9
Approach		539	10.0	567	10.0	0.770	15.8	LOS B	10.9	82.5	1.00	1.25	1.55	41.7
North: Hautpau														
7	L2	128	10.0	135	10.0	0.747	13.0	LOS B	10.1	76.4	0.99	1.16	1.43	43.0
8	T1	439	10.0	462	10.0	0.747	12.7	LOS B	10.1	76.4	0.99	1.16	1.43	44.1
9	R2	10	10.0	11	10.0	0.747	18.2	LOS B	10.1	76.4	0.99	1.16	1.43	44.5
Approach		577	10.0	607	10.0	0.747	12.9	LOS B	10.1	76.4	0.99	1.16	1.43	43.8
West: Hannon														
10	L2	10	10.0	11	10.0	0.437	10.2	LOS B	3.7	28.2	1.00	1.00	1.07	42.5
11	T1	40	10.0	42	10.0	0.437	9.9	LOS A	3.7	28.2	1.00	1.00	1.07	43.6
12	R2	160	10.0	168	10.0	0.437	15.4	LOS B	3.7	28.2	1.00	1.00	1.07	44.0
Approach		210	10.0	221	10.0	0.437	14.1	LOS B	3.7	28.2	1.00	1.00	1.07	43.9
All Vehicles		2483	10.0	2614	10.0	0.911	11.1	LOS B	22.4	169.9	1.00	0.93	1.25	44.4

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

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_PM (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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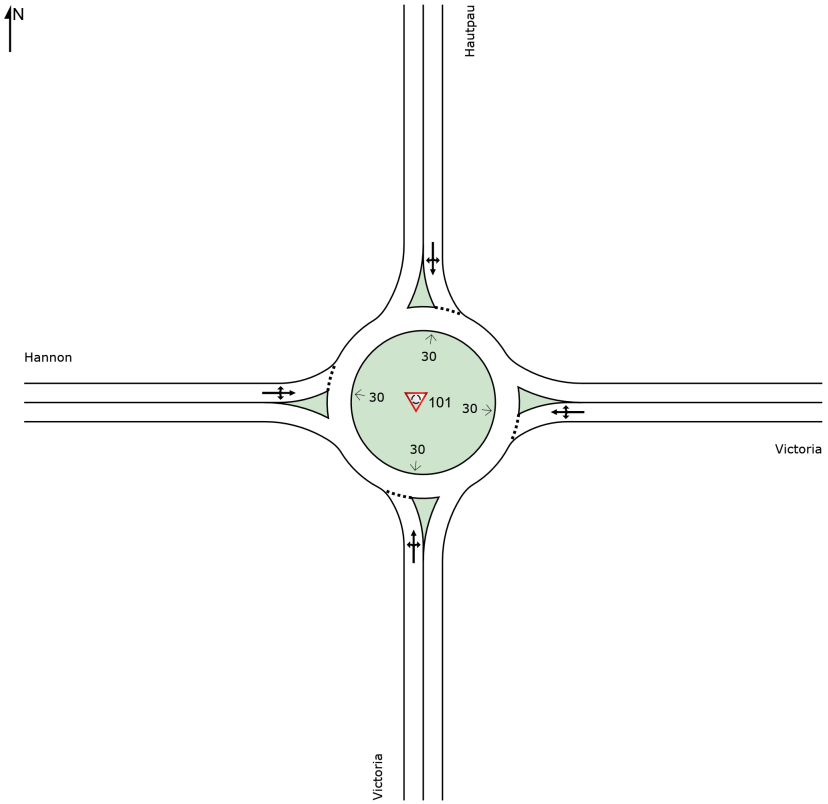


MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_PM (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	160	10.0	168	10.0	0.639	3.2	LOS A	7.4	56.4	0.55	0.45	0.55	46.3
2	T1	397	10.0	418	10.0	0.639	2.9	LOS A	7.4	56.4	0.55	0.45	0.55	47.6
3	R2	277	10.0	292	10.0	0.639	8.4	LOS A	7.4	56.4	0.55	0.45	0.55	48.1
Approach		834	10.0	878	10.0	0.639	4.8	LOS A	7.4	56.4	0.55	0.45	0.55	47.5
East: Victoria														
4	L2	523	10.0	551	10.0	1.046	97.6	LOS F	47.4	360.5	1.00	2.98	5.26	21.5
5	T1	40	10.0	42	10.0	1.046	97.2	LOS F	47.4	360.5	1.00	2.98	5.26	21.8
6	R2	47	10.0	49	10.0	1.046	102.8	LOS F	47.4	360.5	1.00	2.98	5.26	21.9
Approach		610	10.0	642	10.0	1.046	98.0	LOS F	47.4	360.5	1.00	2.98	5.26	21.5
North: Hautpau														
7	L2	126	10.0	133	10.0	0.910	36.8	LOS D	20.3	154.6	1.00	1.74	2.57	33.7
8	T1	419	10.0	441	10.0	0.910	36.4	LOS D	20.3	154.6	1.00	1.74	2.57	34.4
9	R2	10	10.0	11	10.0	0.910	42.0	LOS D	20.3	154.6	1.00	1.74	2.57	34.7
Approach		555	10.0	584	10.0	0.910	36.6	LOS D	20.3	154.6	1.00	1.74	2.57	34.3
West: Hannon														
10	L2	10	10.0	11	10.0	0.731	17.1	LOS B	9.5	72.2	1.00	1.27	1.58	39.4
11	T1	93	10.0	98	10.0	0.731	16.8	LOS B	9.5	72.2	1.00	1.27	1.58	40.4
12	R2	372	10.0	392	10.0	0.731	22.3	LOS C	9.5	72.2	1.00	1.27	1.58	40.7
Approach		475	10.0	500	10.0	0.731	21.1	LOS C	9.5	72.2	1.00	1.27	1.58	40.7
All Vehicles		2474	10.0	2604	10.0	1.046	38.0	LOS D	47.4	360.5	0.85	1.52	2.36	33.7

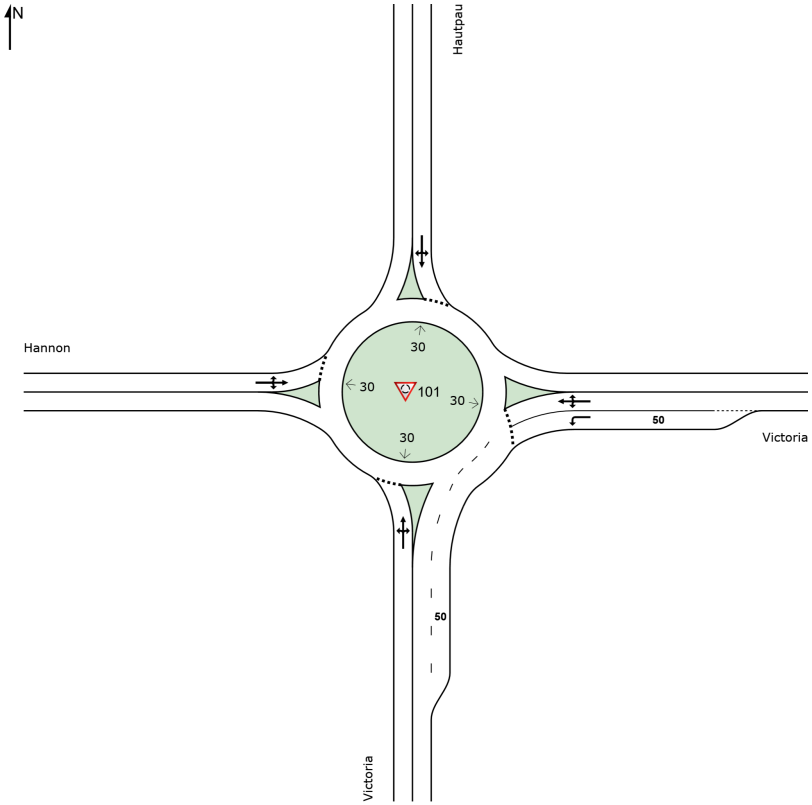
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_AM_With Upgrades (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_AM_With Upgrades (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	372	10.0	392	10.0	0.908	6.0	LOS D	21.6	164.3	1.00	0.64	1.05	45.1
2	T1	441	10.0	464	10.0	0.908	5.7	LOS D	21.6	164.3	1.00	0.64	1.05	46.4
3	R2	344	10.0	362	10.0	0.908	11.2	LOS D	21.6	164.3	1.00	0.64	1.05	46.8
Approach		1157	10.0	1218	10.0	0.908	7.4	LOS A	21.6	164.3	1.00	0.64	1.05	46.1
East: Victoria														
4	L2	427	10.0	449	10.0	0.488	7.1	LOS A	4.4	33.6	0.86	0.81	0.90	45.9
5	T1	93	10.0	98	10.0	0.488	6.2	LOS A	4.4	33.6	0.89	0.83	0.94	47.2
6	R2	19	10.0	20	10.0	0.488	11.8	LOS B	4.4	33.6	0.89	0.83	0.94	47.7
Approach		539	10.0	567	10.0	0.488	7.1	LOS A	4.4	33.6	0.87	0.81	0.91	46.1
North: Hautpau														
7	L2	128	10.0	135	10.0	0.747	13.0	LOS B	10.1	76.4	0.99	1.16	1.43	43.0
8	T1	439	10.0	462	10.0	0.747	12.9	LOS B	10.1	76.4	0.99	1.16	1.43	44.1
9	R2	10	10.0	11	10.0	0.747	18.2	LOS B	10.1	76.4	0.99	1.16	1.43	44.5
Approach		577	10.0	607	10.0	0.747	13.0	LOS B	10.1	76.4	0.99	1.16	1.43	43.8
West: Hannon														
10	L2	10	10.0	11	10.0	0.437	10.2	LOS B	3.7	28.2	1.00	1.00	1.07	42.5
11	T1	40	10.0	42	10.0	0.437	9.9	LOS A	3.7	28.2	1.00	1.00	1.07	43.6
12	R2	160	10.0	168	10.0	0.437	15.6	LOS B	3.7	28.2	1.00	1.00	1.07	44.0
Approach		210	10.0	221	10.0	0.437	14.3	LOS B	3.7	28.2	1.00	1.00	1.07	43.9
All Vehicles		2483	10.0	2614	10.0	0.908	9.2	LOS A	21.6	164.3	0.97	0.83	1.11	45.4

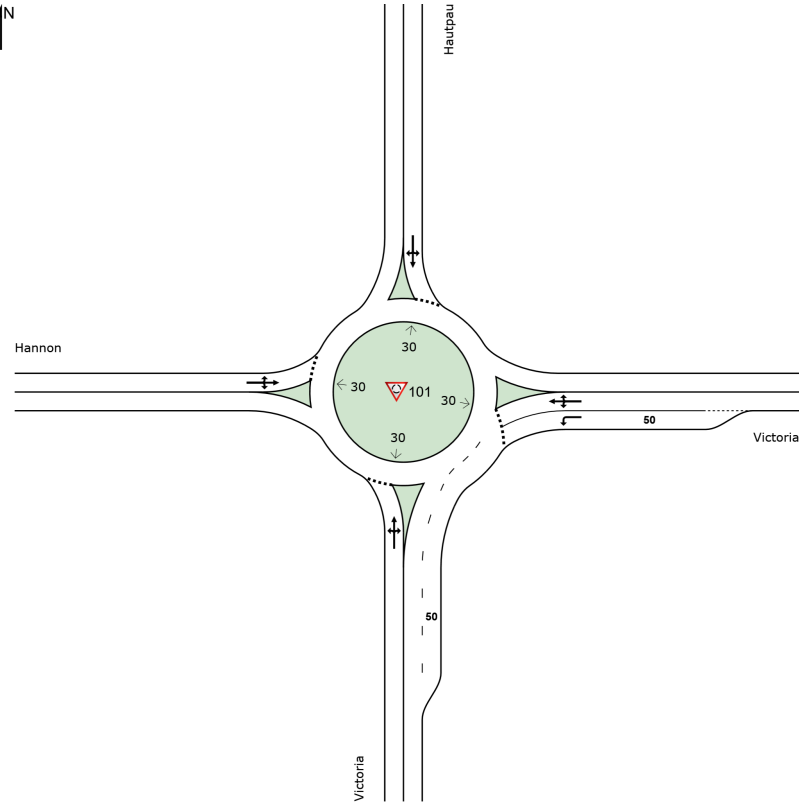
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_PM_With Upgrades (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 3_Single Lane_PM_With Upgrades (Site Folder: Scenario 3: 2041 Baseline without BIL and with 35ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	160	10.0	168	10.0	0.641	3.3	LOS A	7.5	56.8	0.56	0.45	0.56	46.3
2	T1	397	10.0	418	10.0	0.641	2.9	LOS A	7.5	56.8	0.56	0.45	0.56	47.6
3	R2	277	10.0	292	10.0	0.641	8.5	LOS A	7.5	56.8	0.56	0.45	0.56	48.1
Approach		834	10.0	878	10.0	0.641	4.8	LOS A	7.5	56.8	0.56	0.45	0.56	47.5
East: Victoria														
4	L2	523	10.0	551	10.0	0.647	13.3	LOS B	8.2	62.1	0.97	1.07	1.27	42.7
5	T1	40	10.0	42	10.0	0.647	13.3	LOS B	8.2	62.1	1.00	1.14	1.39	43.3
6	R2	47	10.0	49	10.0	0.647	18.8	LOS B	8.2	62.1	1.00	1.14	1.39	43.7
Approach		610	10.0	642	10.0	0.647	13.7	LOS B	8.2	62.1	0.97	1.08	1.29	42.8
North: Hautpau														
7	L2	126	10.0	133	10.0	0.910	36.8	LOS D	20.3	154.6	1.00	1.74	2.57	33.7
8	T1	419	10.0	441	10.0	0.910	37.3	LOS D	20.3	154.6	1.00	1.74	2.57	34.4
9	R2	10	10.0	11	10.0	0.910	42.0	LOS D	20.3	154.6	1.00	1.74	2.57	34.7
Approach		555	10.0	584	10.0	0.910	37.3	LOS D	20.3	154.6	1.00	1.74	2.57	34.3
West: Hannon														
10	L2	10	10.0	11	10.0	0.733	17.3	LOS B	9.6	72.7	1.00	1.27	1.58	39.4
11	T1	93	10.0	98	10.0	0.733	16.9	LOS B	9.6	72.7	1.00	1.27	1.58	40.3
12	R2	372	10.0	392	10.0	0.733	22.8	LOS C	9.6	72.7	1.00	1.27	1.58	40.7
Approach		475	10.0	500	10.0	0.733	21.5	LOS C	9.6	72.7	1.00	1.27	1.58	40.6
All Vehicles		2474	10.0	2604	10.0	0.910	17.5	LOS B	20.3	154.6	0.84	1.05	1.39	41.4

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

SIDRA Intersection Results: Scenario 4

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_AM (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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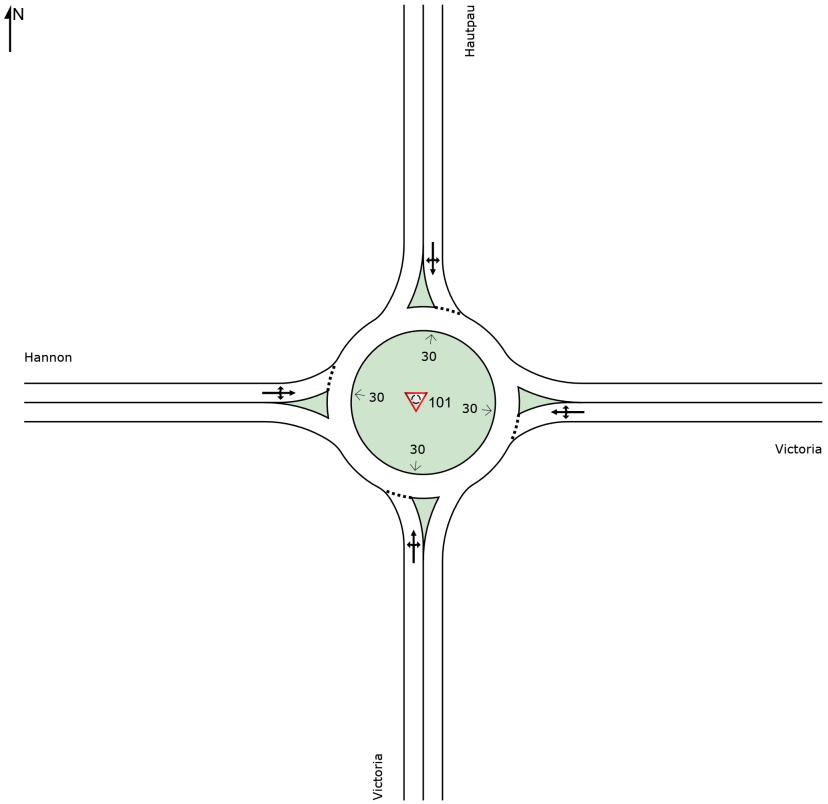


MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_AM (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	425	10.0	447	10.0	1.000	26.9	LOS F	53.1	403.4	1.00	1.24	1.79	36.6
2	T1	443	10.0	466	10.0	1.000	26.5	LOS F	53.1	403.4	1.00	1.24	1.79	37.4
3	R2	344	10.0	362	10.0	1.000	32.1	LOS F	53.1	403.4	1.00	1.24	1.79	37.7
Approach		1212	10.0	1276	10.0	1.000	28.2	LOS C	53.1	403.4	1.00	1.24	1.79	37.2
East: Victoria														
4	L2	427	10.0	449	10.0	0.841	21.3	LOS C	14.5	109.9	1.00	1.41	1.86	38.9
5	T1	107	10.0	113	10.0	0.841	21.0	LOS C	14.5	109.9	1.00	1.41	1.86	39.9
6	R2	39	10.0	41	10.0	0.841	26.5	LOS C	14.5	109.9	1.00	1.41	1.86	40.2
Approach		573	10.0	603	10.0	0.841	21.6	LOS C	14.5	109.9	1.00	1.41	1.86	39.2
North: Hautpau														
7	L2	128	10.0	135	10.0	0.769	14.6	LOS B	10.9	82.8	1.00	1.22	1.53	42.2
8	T1	441	10.0	464	10.0	0.769	14.3	LOS B	10.9	82.8	1.00	1.22	1.53	43.3
9	R2	10	10.0	11	10.0	0.769	19.8	LOS B	10.9	82.8	1.00	1.22	1.53	43.7
Approach		579	10.0	609	10.0	0.769	14.5	LOS B	10.9	82.8	1.00	1.22	1.53	43.0
West: Hannon														
10	L2	10	10.0	11	10.0	0.510	12.4	LOS B	4.7	35.5	1.00	1.07	1.17	41.5
11	T1	45	10.0	47	10.0	0.510	12.1	LOS B	4.7	35.5	1.00	1.07	1.17	42.5
12	R2	183	10.0	193	10.0	0.510	17.6	LOS B	4.7	35.5	1.00	1.07	1.17	42.9
Approach		238	10.0	251	10.0	0.510	16.4	LOS B	4.7	35.5	1.00	1.07	1.17	42.8
All Vehicles		2602	10.0	2739	10.0	1.000	22.6	LOS C	53.1	403.4	1.00	1.26	1.69	39.3

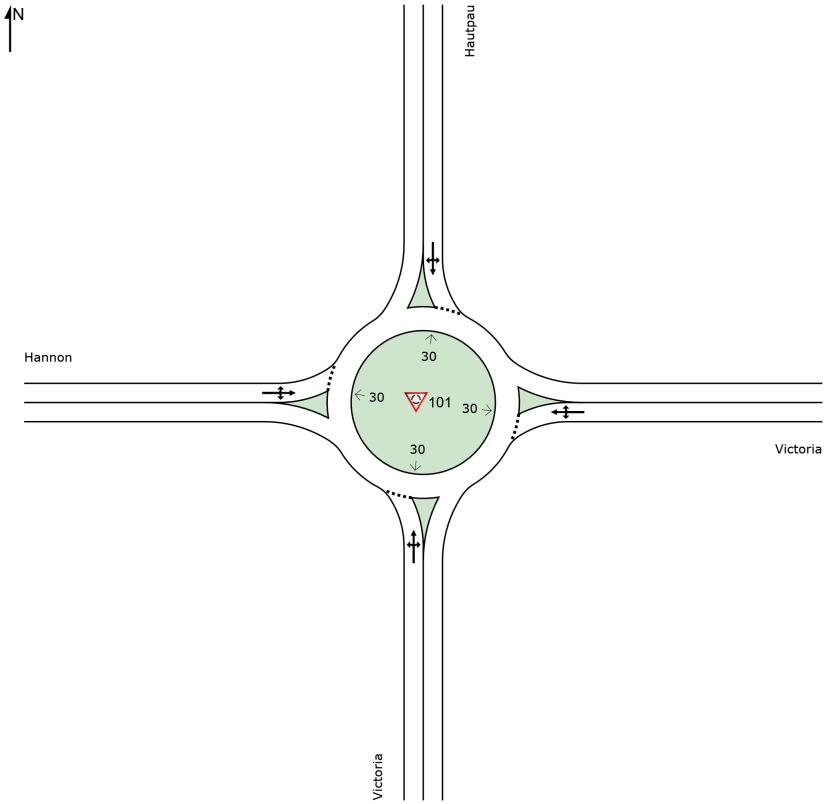
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_PM (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_PM (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	183	10.0	193	10.0	0.658	3.3	LOS A	7.9	60.0	0.57	0.45	0.57	46.3
2	T1	399	10.0	420	10.0	0.658	2.9	LOS A	7.9	60.0	0.57	0.45	0.57	47.6
3	R2	277	10.0	292	10.0	0.658	8.5	LOS A	7.9	60.0	0.57	0.45	0.57	48.1
Approach		859	10.0	904	10.0	0.658	4.8	LOS A	7.9	60.0	0.57	0.45	0.57	47.5
East: Victoria														
4	L2	523	10.0	551	10.0	1.103	139.4	LOS F	63.0	478.6	1.00	3.65	6.77	17.2
5	T1	45	10.0	47	10.0	1.103	139.1	LOS F	63.0	478.6	1.00	3.65	6.77	17.4
6	R2	47	10.0	49	10.0	1.103	144.6	LOS F	63.0	478.6	1.00	3.65	6.77	17.5
Approach		615	10.0	647	10.0	1.103	139.8	LOS F	63.0	478.6	1.00	3.65	6.77	17.3
North: Hautpau														
7	L2	127	10.0	134	10.0	0.993	70.0	LOS E	32.6	247.9	1.00	2.33	3.88	26.0
8	T1	409	10.0	431	10.0	0.993	69.6	LOS E	32.6	247.9	1.00	2.33	3.88	26.4
9	R2	10	10.0	11	10.0	0.993	75.2	LOS F	32.6	247.9	1.00	2.33	3.88	26.5
Approach		546	10.0	575	10.0	0.993	69.8	LOS E	32.6	247.9	1.00	2.33	3.88	26.3
West: Hannon														
10	L2	10	10.0	11	10.0	0.840	24.9	LOS C	14.6	110.6	1.00	1.48	2.01	36.5
11	T1	107	10.0	113	10.0	0.840	24.5	LOS C	14.6	110.6	1.00	1.48	2.01	37.4
12	R2	425	10.0	447	10.0	0.840	30.0	LOS C	14.6	110.6	1.00	1.48	2.01	37.7
Approach		542	10.0	571	10.0	0.840	28.9	LOS C	14.6	110.6	1.00	1.48	2.01	37.6
All Vehicles		2562	10.0	2697	10.0	1.103	56.1	LOS E	63.0	478.6	0.85	1.84	3.07	28.9

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

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_AM_With Upgrades (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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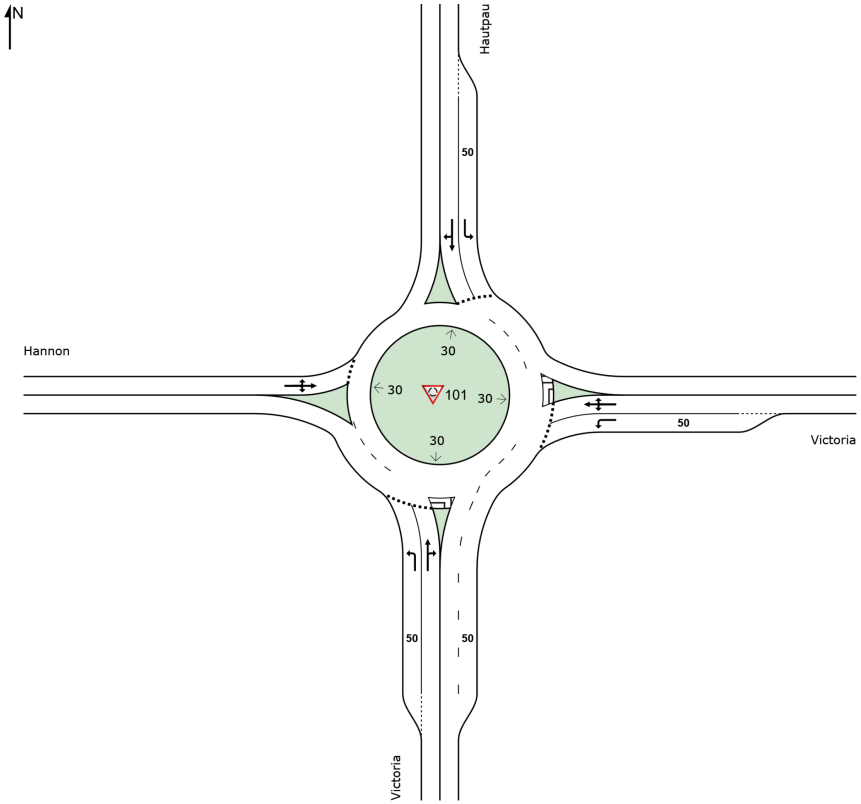


MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_AM_With Upgrades (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	425	10.0	447	10.0	0.387	3.7	LOS A	2.9	22.3	0.50	0.49	0.50	47.2
2	T1	443	10.0	466	10.0	0.566	3.0	LOS A	5.6	42.5	0.57	0.48	0.57	47.3
3	R2	344	10.0	362	10.0	0.566	8.5	LOS A	5.6	42.5	0.57	0.48	0.57	47.8
Approach		1212	10.0	1276	10.0	0.566	4.8	LOS A	5.6	42.5	0.55	0.48	0.55	47.4
East: Victoria														
4	L2	427	10.0	449	10.0	0.509	7.6	LOS A	4.7	36.1	0.86	0.84	0.92	45.5
5	T1	107	10.0	113	10.0	0.509	6.9	LOS A	4.7	36.1	0.89	0.87	0.97	46.8
6	R2	39	10.0	41	10.0	0.509	12.4	LOS B	4.7	36.1	0.89	0.87	0.97	47.3
Approach		573	10.0	603	10.0	0.509	7.8	LOS A	4.7	36.1	0.87	0.85	0.93	45.9
North: Hautpau														
7	L2	128	10.0	135	10.0	0.181	6.6	LOS A	1.1	8.1	0.69	0.70	0.69	46.1
8	T1	441	10.0	464	10.0	0.445	5.7	LOS A	3.5	26.3	0.79	0.65	0.79	47.3
9	R2	10	10.0	11	10.0	0.445	11.0	LOS B	3.5	26.3	0.79	0.65	0.79	47.8
Approach		579	10.0	609	10.0	0.445	6.0	LOS A	3.5	26.3	0.77	0.66	0.77	47.0
West: Hannon														
10	L2	10	10.0	11	10.0	0.423	10.5	LOS B	3.4	25.5	0.93	0.98	1.01	42.4
11	T1	45	10.0	47	10.0	0.423	10.1	LOS B	3.4	25.5	0.93	0.98	1.01	43.5
12	R2	183	10.0	193	10.0	0.423	15.9	LOS B	3.4	25.5	0.93	0.98	1.01	43.9
Approach		238	10.0	251	10.0	0.423	14.6	LOS B	3.4	25.5	0.93	0.98	1.01	43.7
All Vehicles		2602	10.0	2739	10.0	0.566	6.6	LOS A	5.6	42.5	0.70	0.65	0.72	46.6

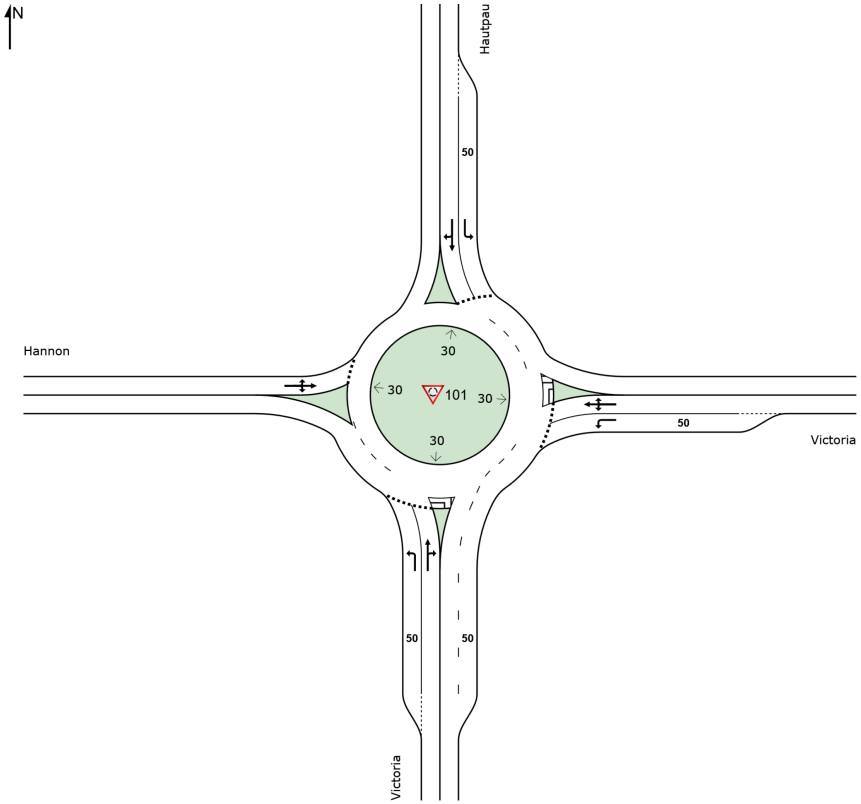
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_PM_With Upgrades (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 4_Single Lane_PM_With Upgrades (Site Folder: Scenario 4: 2041 Baseline without BIL and with 40ha of C8/C9 + 5ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	183	10.0	193	10.0	0.180	3.3	LOS A	1.1	8.5	0.36	0.42	0.36	47.6
2	T1	399	10.0	420	10.0	0.461	2.6	LOS A	4.2	32.1	0.43	0.43	0.43	47.8
3	R2	277	10.0	292	10.0	0.461	8.1	LOS A	4.2	32.1	0.43	0.43	0.43	48.3
Approach		859	10.0	904	10.0	0.461	4.5	LOS A	4.2	32.1	0.41	0.43	0.41	47.9
East: Victoria														
4	L2	523	10.0	551	10.0	0.679	15.4	LOS B	9.2	70.0	0.97	1.12	1.36	41.7
5	T1	45	10.0	47	10.0	0.679	15.8	LOS B	9.2	70.0	1.00	1.20	1.50	42.1
6	R2	47	10.0	49	10.0	0.679	21.4	LOS C	9.2	70.0	1.00	1.20	1.50	42.5
Approach		615	10.0	647	10.0	0.679	15.9	LOS B	9.2	70.0	0.98	1.14	1.38	41.7
North: Hautpau														
7	L2	127	10.0	134	10.0	0.247	9.3	LOS A	1.7	13.1	0.89	0.87	0.89	44.6
8	T1	409	10.0	431	10.0	0.581	12.5	LOS B	6.6	49.9	1.00	1.06	1.26	44.8
9	R2	10	10.0	11	10.0	0.581	17.0	LOS B	6.6	49.9	1.00	1.06	1.26	45.3
Approach		546	10.0	575	10.0	0.581	11.8	LOS B	6.6	49.9	0.97	1.02	1.17	44.8
West: Hannon														
10	L2	10	10.0	11	10.0	0.807	21.9	LOS C	12.9	97.7	1.00	1.41	1.88	37.6
11	T1	107	10.0	113	10.0	0.807	21.6	LOS C	12.9	97.7	1.00	1.41	1.88	38.4
12	R2	425	10.0	447	10.0	0.807	27.5	LOS C	12.9	97.7	1.00	1.41	1.88	38.8
Approach		542	10.0	571	10.0	0.807	26.2	LOS C	12.9	97.7	1.00	1.41	1.88	38.7
All Vehicles		2562	10.0	2697	10.0	0.807	13.4	LOS B	12.9	97.7	0.79	0.93	1.12	43.5

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

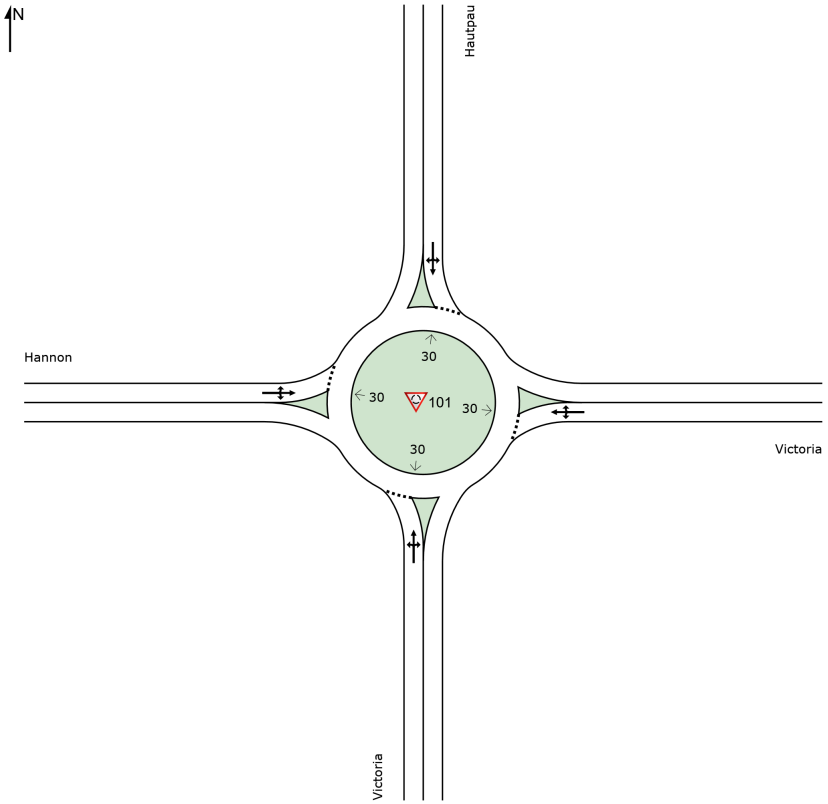
SIDRA Intersection Results: Scenario 5

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_AM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_AM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	532	10.0	560	10.0	1.215	202.8	LOS F	194.7	1479.8	1.00	5.12	7.42	13.4
2	T1	520	10.0	547	10.0	1.215	202.4	LOS F	194.7	1479.8	1.00	5.12	7.42	13.5
3	R2	344	10.0	362	10.0	1.215	208.0	LOS F	194.7	1479.8	1.00	5.12	7.42	13.6
Approach		1396	10.0	1469	10.0	1.215	203.9	LOS F	194.7	1479.8	1.00	5.12	7.42	13.5
East: Victoria														
4	L2	427	10.0	449	10.0	0.960	46.5	LOS E	27.8	211.3	1.00	2.02	3.13	30.8
5	T1	133	10.0	140	10.0	0.960	46.1	LOS E	27.8	211.3	1.00	2.02	3.13	31.4
6	R2	58	10.0	61	10.0	0.960	51.7	LOS E	27.8	211.3	1.00	2.02	3.13	31.6
Approach		618	10.0	651	10.0	0.960	46.9	LOS D	27.8	211.3	1.00	2.02	3.13	31.0
North: Hautpau														
7	L2	131	10.0	138	10.0	0.770	14.6	LOS B	10.9	83.1	1.00	1.23	1.53	42.2
8	T1	452	10.0	476	10.0	0.770	14.2	LOS B	10.9	83.1	1.00	1.23	1.53	43.3
9	R2	10	10.0	11	10.0	0.770	19.8	LOS B	10.9	83.1	1.00	1.23	1.53	43.7
Approach		593	10.0	624	10.0	0.770	14.4	LOS B	10.9	83.1	1.00	1.23	1.53	43.1
West: Hannon														
10	L2	10	10.0	11	10.0	0.571	12.8	LOS B	5.6	42.4	1.00	1.10	1.24	41.3
11	T1	57	10.0	60	10.0	0.571	12.4	LOS B	5.6	42.4	1.00	1.10	1.24	42.4
12	R2	228	10.0	240	10.0	0.571	18.0	LOS B	5.6	42.4	1.00	1.10	1.24	42.7
Approach		295	10.0	311	10.0	0.571	16.7	LOS B	5.6	42.4	1.00	1.10	1.24	42.6
All Vehicles		2902	10.0	3055	10.0	1.215	112.7	LOS F	194.7	1479.8	1.00	3.26	4.68	20.2

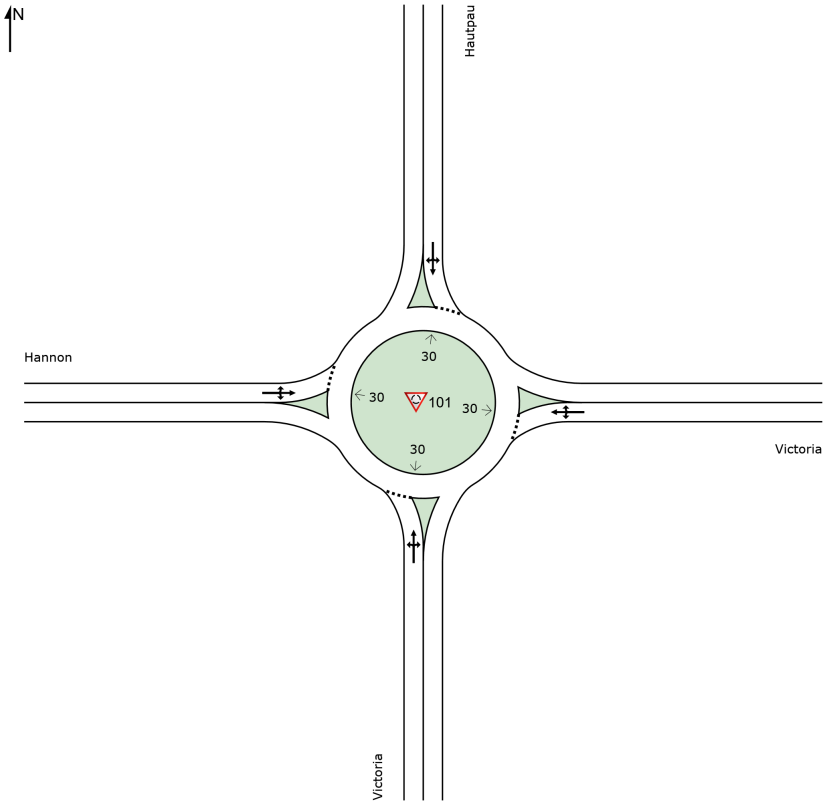
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_PM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_PM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	228	10.0	240	10.0	0.704	3.4	LOS A	9.3	70.7	0.63	0.46	0.63	46.2
2	T1	416	10.0	438	10.0	0.704	3.1	LOS A	9.3	70.7	0.63	0.46	0.63	47.5
3	R2	277	10.0	292	10.0	0.704	8.6	LOS A	9.3	70.7	0.63	0.46	0.63	48.0
Approach		921	10.0	969	10.0	0.704	4.8	LOS A	9.3	70.7	0.63	0.46	0.63	47.3
East: Victoria														
4	L2	523	10.0	551	10.0	1.201	217.0	LOS F	90.7	689.0	1.00	4.71	9.09	12.6
5	T1	57	10.0	60	10.0	1.201	216.7	LOS F	90.7	689.0	1.00	4.71	9.09	12.7
6	R2	51	10.0	54	10.0	1.201	222.2	LOS F	90.7	689.0	1.00	4.71	9.09	12.8
Approach		631	10.0	664	10.0	1.201	217.4	LOS F	90.7	689.0	1.00	4.71	9.09	12.6
North: Hautpau														
7	L2	145	10.0	153	10.0	1.371	363.1	LOS F	134.4	1021.2	1.00	6.00	11.96	8.5
8	T1	492	10.0	518	10.0	1.371	362.8	LOS F	134.4	1021.2	1.00	6.00	11.96	8.5
9	R2	10	10.0	11	10.0	1.371	368.3	LOS F	134.4	1021.2	1.00	6.00	11.96	8.6
Approach		647	10.0	681	10.0	1.371	362.9	LOS F	134.4	1021.2	1.00	6.00	11.96	8.5
West: Hannon														
10	L2	10	10.0	11	10.0	1.086	118.8	LOS F	61.6	468.5	1.00	3.50	6.31	19.2
11	T1	133	10.0	140	10.0	1.086	118.5	LOS F	61.6	468.5	1.00	3.50	6.31	19.4
12	R2	532	10.0	560	10.0	1.086	124.0	LOS F	61.6	468.5	1.00	3.50	6.31	19.5
Approach		675	10.0	711	10.0	1.086	122.8	LOS F	61.6	468.5	1.00	3.50	6.31	19.5
All Vehicles		2874	10.0	3025	10.0	1.371	159.8	LOS F	134.4	1021.2	0.88	3.35	6.37	16.0

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

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_AM_With Upgrades (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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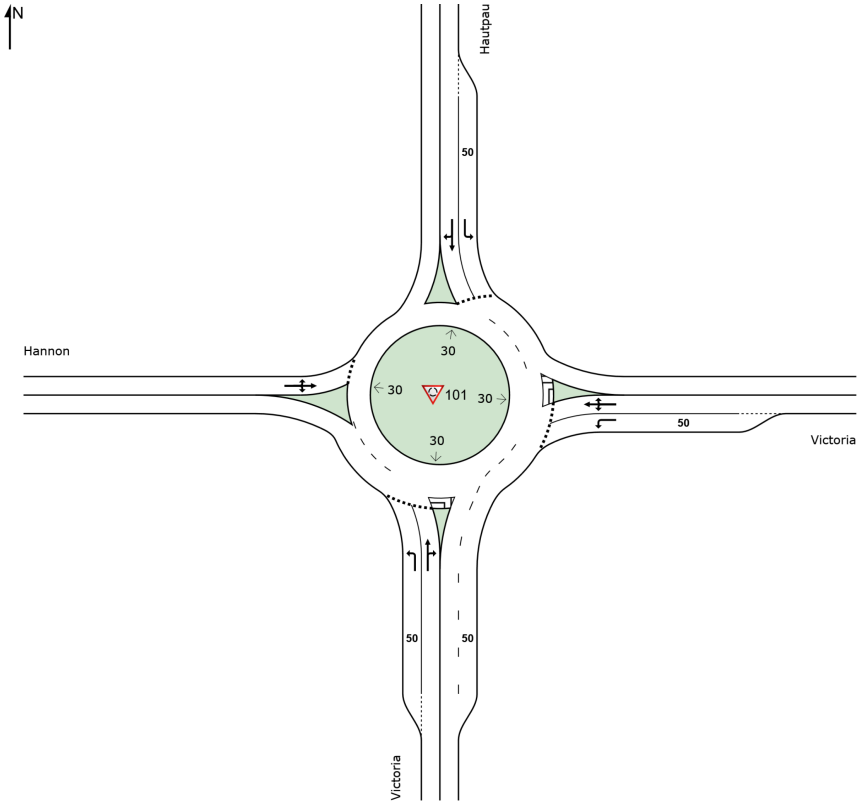


MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_AM_With Upgrades (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	532	10.0	560	10.0	0.504	4.2	LOS A	4.3	32.6	0.63	0.57	0.63	46.9
2	T1	520	10.0	547	10.0	0.653	3.5	LOS A	7.1	53.7	0.71	0.51	0.71	46.9
3	R2	344	10.0	362	10.0	0.653	9.0	LOS A	7.1	53.7	0.71	0.51	0.71	47.4
Approach		1396	10.0	1469	10.0	0.653	5.1	LOS A	7.1	53.7	0.68	0.54	0.68	47.0
East: Victoria														
4	L2	427	10.0	449	10.0	0.587	9.5	LOS A	6.4	48.7	0.91	0.94	1.07	44.6
5	T1	133	10.0	140	10.0	0.587	9.2	LOS A	6.4	48.7	0.96	1.00	1.17	45.5
6	R2	58	10.0	61	10.0	0.587	14.7	LOS B	6.4	48.7	0.96	1.00	1.17	46.0
Approach		618	10.0	651	10.0	0.587	9.9	LOS A	6.4	48.7	0.93	0.96	1.10	44.9
North: Hautpau														
7	L2	131	10.0	138	10.0	0.198	7.2	LOS A	1.2	9.3	0.74	0.74	0.74	45.8
8	T1	452	10.0	476	10.0	0.490	6.8	LOS A	4.3	32.7	0.86	0.81	0.92	47.0
9	R2	10	10.0	11	10.0	0.490	12.1	LOS B	4.3	32.7	0.86	0.81	0.92	47.5
Approach		593	10.0	624	10.0	0.490	7.0	LOS A	4.3	32.7	0.83	0.79	0.88	46.7
West: Hannon														
10	L2	10	10.0	11	10.0	0.639	20.4	LOS C	6.9	52.8	1.00	1.21	1.47	38.2
11	T1	57	10.0	60	10.0	0.639	20.0	LOS C	6.9	52.8	1.00	1.21	1.47	39.1
12	R2	228	10.0	240	10.0	0.639	25.8	LOS C	6.9	52.8	1.00	1.21	1.47	39.4
Approach		295	10.0	311	10.0	0.639	24.5	LOS C	6.9	52.8	1.00	1.21	1.47	39.3
All Vehicles		2902	10.0	3055	10.0	0.653	8.5	LOS A	7.1	53.7	0.80	0.75	0.89	45.6

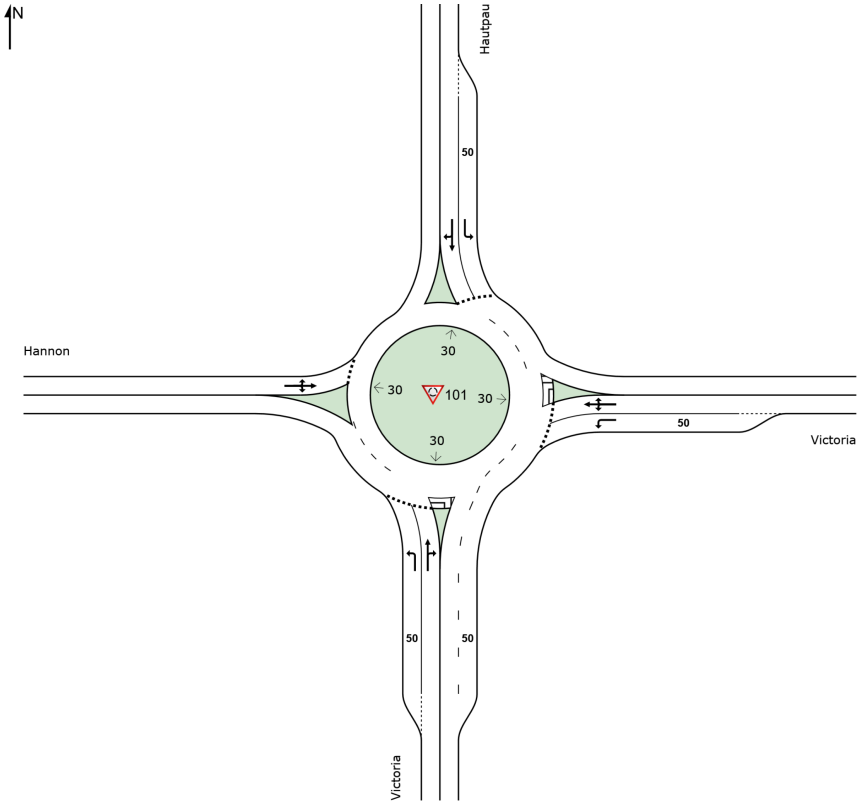
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_PM_With Upgrades (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Single Lane_PM_With Upgrades (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	228	10.0	240	10.0	0.218	3.4	LOS A	1.4	10.8	0.39	0.43	0.39	47.5
2	T1	416	10.0	438	10.0	0.481	2.7	LOS A	4.5	34.0	0.47	0.44	0.47	47.7
3	R2	277	10.0	292	10.0	0.481	8.2	LOS A	4.5	34.0	0.47	0.44	0.47	48.2
Approach		921	10.0	969	10.0	0.481	4.5	LOS A	4.5	34.0	0.45	0.43	0.45	47.8
East: Victoria														
4	L2	523	10.0	551	10.0	0.883	43.1	LOS D	21.5	163.2	0.99	1.66	2.39	31.9
5	T1	57	10.0	60	10.0	0.883	50.6	LOS E	21.5	163.2	1.00	1.88	2.83	30.1
6	R2	51	10.0	54	10.0	0.883	56.1	LOS E	21.5	163.2	1.00	1.88	2.83	30.3
Approach		631	10.0	664	10.0	0.883	44.8	LOS D	21.5	163.2	0.99	1.70	2.46	31.6
North: Hautpau														
7	L2	145	10.0	153	10.0	0.336	11.3	LOS B	2.5	18.9	0.97	0.95	0.97	43.6
8	T1	492	10.0	518	10.0	0.840	34.9	LOS C	16.4	124.7	1.00	1.56	2.18	35.5
9	R2	10	10.0	11	10.0	0.840	38.9	LOS D	16.4	124.7	1.00	1.56	2.18	35.8
Approach		647	10.0	681	10.0	0.840	29.7	LOS C	16.4	124.7	0.99	1.42	1.90	37.0
West: Hannon														
10	L2	10	10.0	11	10.0	1.041	89.1	LOS F	49.1	373.5	1.00	3.00	5.26	22.6
11	T1	133	10.0	140	10.0	1.041	88.8	LOS F	49.1	373.5	1.00	3.00	5.26	22.9
12	R2	532	10.0	560	10.0	1.041	95.0	LOS F	49.1	373.5	1.00	3.00	5.26	23.0
Approach		675	10.0	711	10.0	1.041	93.7	LOS F	49.1	373.5	1.00	3.00	5.26	23.0
All Vehicles		2874	10.0	3025	10.0	1.041	40.0	LOS D	49.1	373.5	0.82	1.54	2.35	33.3

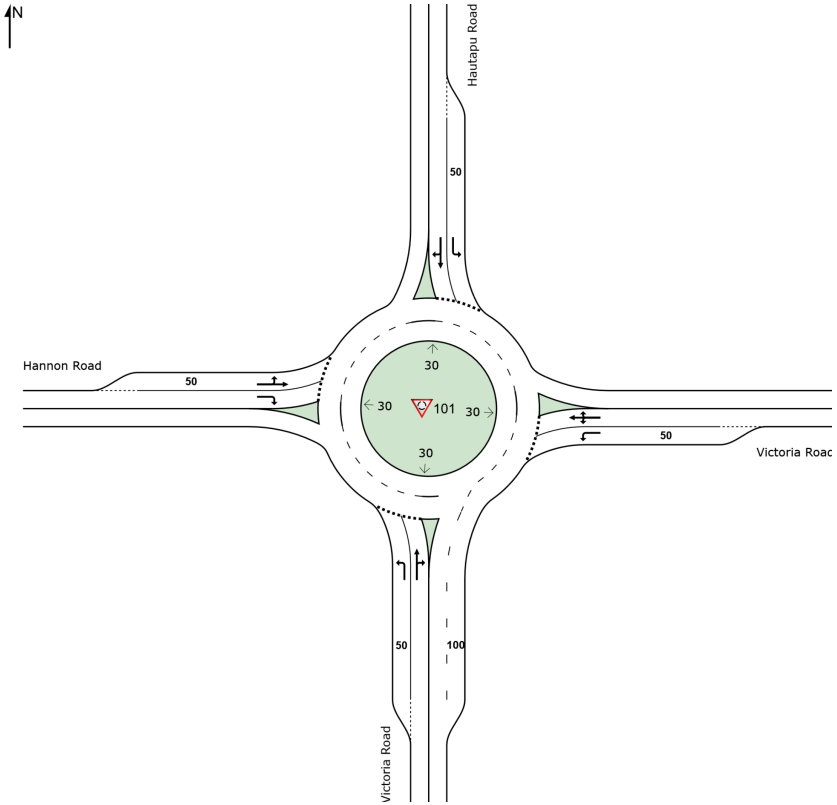
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Dual Lane_AM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Dual Lane_AM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	532	10.0	560	10.0	0.534	4.1	LOS A	4.0	30.5	0.58	0.56	0.58	47.0
2	T1	520	10.0	547	10.0	0.716	4.0	LOS A	7.9	60.2	0.72	0.58	0.74	47.0
3	R2	344	10.0	362	10.0	0.716	9.5	LOS A	7.9	60.2	0.72	0.58	0.74	47.5
Approach		1396	10.0	1469	10.0	0.716	5.4	LOS A	7.9	60.2	0.67	0.57	0.68	47.1
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.559	8.9	LOS A	5.0	38.1	0.82	0.91	0.93	45.0
5	T1	133	10.0	140	10.0	0.559	8.7	LOS A	5.0	38.1	0.87	0.97	1.06	45.9
6	R2	58	10.0	61	10.0	0.559	14.2	LOS B	5.0	38.1	0.87	0.97	1.06	46.4
Approach		618	10.0	651	10.0	0.559	9.4	LOS A	5.0	38.1	0.84	0.93	0.97	45.3
North: Hautapu Road														
7	L2	131	10.0	138	10.0	0.219	6.0	LOS A	0.9	7.0	0.61	0.74	0.61	46.6
8	T1	452	10.0	476	10.0	0.495	5.2	LOS A	3.1	23.3	0.68	0.62	0.76	47.8
9	R2	10	10.0	11	10.0	0.495	10.5	LOS B	3.1	23.3	0.68	0.62	0.76	48.3
Approach		593	10.0	624	10.0	0.495	5.5	LOS A	3.1	23.3	0.67	0.65	0.73	47.5
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.188	11.3	LOS B	1.1	8.5	0.86	0.88	0.86	44.0
11	T1	57	10.0	60	10.0	0.188	10.8	LOS B	1.1	8.5	0.86	0.88	0.86	45.3
12	R2	228	10.0	240	10.0	0.428	16.2	LOS B	3.5	26.6	0.97	1.00	1.05	43.4
Approach		295	10.0	311	10.0	0.428	15.0	LOS B	3.5	26.6	0.94	0.98	1.01	43.8
All Vehicles		2902	10.0	3055	10.0	0.716	7.2	LOS A	7.9	60.2	0.73	0.70	0.79	46.4

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

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Dual Lane_PM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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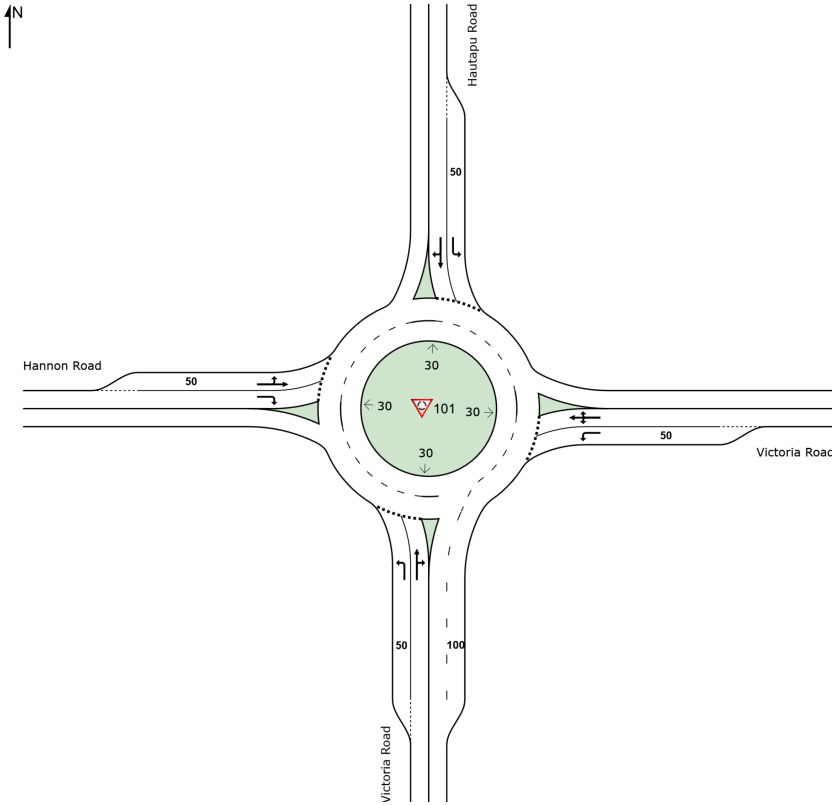


MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 5_Dual Lane_PM (Site Folder: Sceanrio 5: 2041 Baseline without BIL and with 50ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	228	10.0	240	10.0	0.252	3.4	LOS A	1.4	10.7	0.37	0.44	0.37	47.7
2	T1	416	10.0	438	10.0	0.530	2.7	LOS A	4.5	34.2	0.45	0.44	0.45	47.8
3	R2	277	10.0	292	10.0	0.530	8.2	LOS A	4.5	34.2	0.45	0.44	0.45	48.3
Approach		921	10.0	969	10.0	0.530	4.5	LOS A	4.5	34.2	0.43	0.44	0.43	47.9
East: Victoria Road														
4	L2	523	10.0	551	10.0	0.908	44.1	LOS D	20.2	153.3	0.99	1.62	2.38	31.7
5	T1	57	10.0	60	10.0	0.908	54.8	LOS E	20.2	153.3	1.00	1.90	2.99	29.2
6	R2	51	10.0	54	10.0	0.908	60.3	LOS E	20.2	153.3	1.00	1.90	2.99	29.4
Approach		631	10.0	664	10.0	0.908	46.4	LOS D	20.2	153.3	0.99	1.67	2.49	31.3
North: Hautapu Road														
7	L2	145	10.0	153	10.0	0.299	7.0	LOS A	1.4	10.3	0.73	0.82	0.74	46.0
8	T1	492	10.0	518	10.0	0.670	9.2	LOS A	5.2	39.6	0.86	1.01	1.14	47.0
9	R2	10	10.0	11	10.0	0.670	13.2	LOS B	5.2	39.6	0.86	1.01	1.14	47.5
Approach		647	10.0	681	10.0	0.670	8.8	LOS A	5.2	39.6	0.83	0.97	1.05	46.8
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.299	9.2	LOS A	1.6	12.4	0.77	0.83	0.77	45.1
11	T1	133	10.0	140	10.0	0.299	8.7	LOS A	1.6	12.4	0.77	0.83	0.77	46.5
12	R2	532	10.0	560	10.0	0.716	20.2	LOS C	8.7	66.4	0.97	1.22	1.47	41.8
Approach		675	10.0	711	10.0	0.716	17.7	LOS B	8.7	66.4	0.93	1.14	1.32	42.7
All Vehicles		2874	10.0	3025	10.0	0.908	17.8	LOS B	20.2	153.3	0.76	0.99	1.23	41.7

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

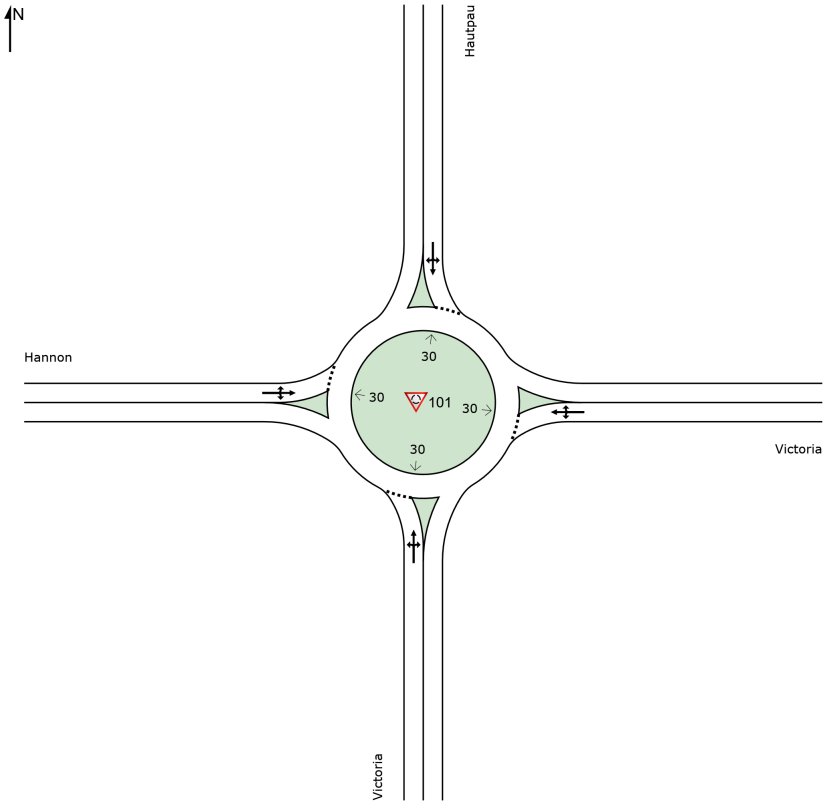
SIDRA Intersection Results: Scenario 6A

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_AM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_AM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	532	10.0	560	10.0	1.379	349.1	LOS F	308.5	2344.8	1.00	7.64	11.43	8.8
2	T1	663	10.0	698	10.0	1.379	348.7	LOS F	308.5	2344.8	1.00	7.64	11.43	8.9
3	R2	344	10.0	362	10.0	1.379	354.3	LOS F	308.5	2344.8	1.00	7.64	11.43	8.9
Approach		1539	10.0	1620	10.0	1.379	350.1	LOS F	308.5	2344.8	1.00	7.64	11.43	8.8
East: Victoria														
4	L2	427	10.0	449	10.0	1.065	103.1	LOS F	53.8	408.7	1.00	3.15	5.55	20.9
5	T1	133	10.0	140	10.0	1.065	102.8	LOS F	53.8	408.7	1.00	3.15	5.55	21.1
6	R2	93	10.0	98	10.0	1.065	108.3	LOS F	53.8	408.7	1.00	3.15	5.55	21.2
Approach		653	10.0	687	10.0	1.065	103.8	LOS F	53.8	408.7	1.00	3.15	5.55	21.0
North: Hautpau														
7	L2	136	10.0	143	10.0	0.795	14.9	LOS B	12.1	92.0	1.00	1.24	1.57	42.1
8	T1	485	10.0	511	10.0	0.795	14.5	LOS B	12.1	92.0	1.00	1.24	1.57	43.2
9	R2	10	10.0	11	10.0	0.795	20.1	LOS C	12.1	92.0	1.00	1.24	1.57	43.6
Approach		631	10.0	664	10.0	0.795	14.7	LOS B	12.1	92.0	1.00	1.24	1.57	42.9
West: Hannon														
10	L2	10	10.0	11	10.0	0.611	15.3	LOS B	6.2	47.4	1.00	1.15	1.32	40.2
11	T1	57	10.0	60	10.0	0.611	15.0	LOS B	6.2	47.4	1.00	1.15	1.32	41.2
12	R2	228	10.0	240	10.0	0.611	20.5	LOS C	6.2	47.4	1.00	1.15	1.32	41.6
Approach		295	10.0	311	10.0	0.611	19.3	LOS B	6.2	47.4	1.00	1.15	1.32	41.4
All Vehicles		3118	10.0	3282	10.0	1.379	199.3	LOS F	308.5	2344.8	1.00	4.79	7.25	13.7

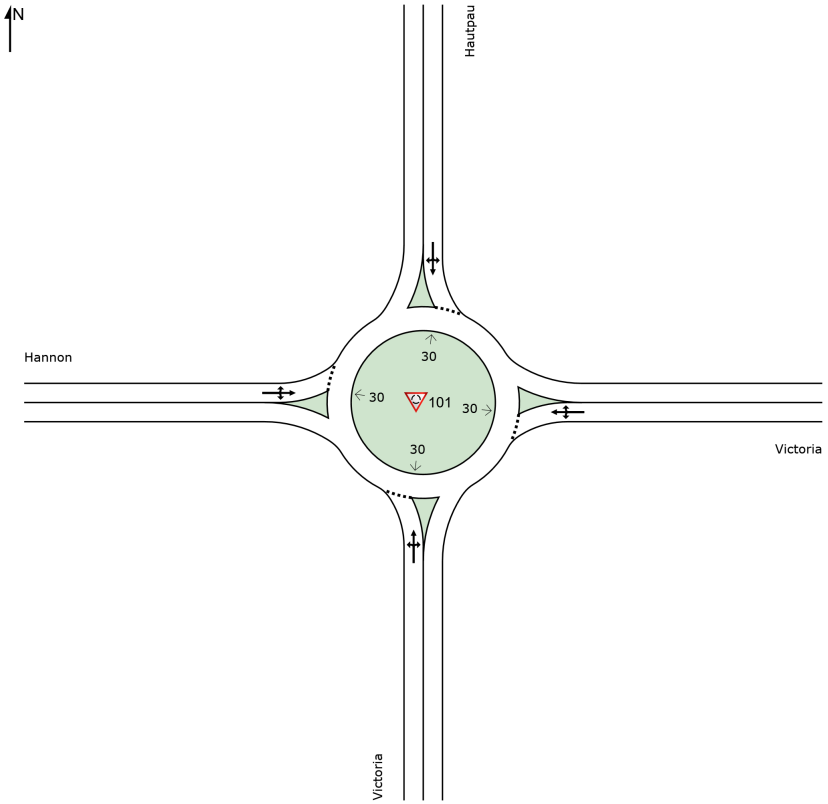
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_PM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_PM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	228	10.0	240	10.0	0.733	3.6	LOS A	10.2	77.4	0.68	0.47	0.68	46.0
2	T1	445	10.0	468	10.0	0.733	3.2	LOS A	10.2	77.4	0.68	0.47	0.68	47.3
3	R2	277	10.0	292	10.0	0.733	8.7	LOS A	10.2	77.4	0.68	0.47	0.68	47.8
Approach		950	10.0	1000	10.0	0.733	4.9	LOS A	10.2	77.4	0.68	0.47	0.68	47.2
East: Victoria														
4	L2	523	10.0	551	10.0	1.185	203.2	LOS F	87.3	663.5	1.00	4.59	8.82	13.3
5	T1	57	10.0	60	10.0	1.185	202.8	LOS F	87.3	663.5	1.00	4.59	8.82	13.4
6	R2	59	10.0	62	10.0	1.185	208.3	LOS F	87.3	663.5	1.00	4.59	8.82	13.4
Approach		639	10.0	673	10.0	1.185	203.6	LOS F	87.3	663.5	1.00	4.59	8.82	13.3
North: Hautpau														
7	L2	177	10.0	186	10.0	1.580	543.4	LOS F	211.3	1606.0	1.00	7.93	16.10	6.0
8	T1	607	10.0	639	10.0	1.580	543.0	LOS F	211.3	1606.0	1.00	7.93	16.10	6.0
9	R2	10	10.0	11	10.0	1.580	548.5	LOS F	211.3	1606.0	1.00	7.93	16.10	6.0
Approach		794	10.0	836	10.0	1.580	543.2	LOS F	211.3	1606.0	1.00	7.93	16.10	6.0
West: Hannon														
10	L2	10	10.0	11	10.0	1.160	177.5	LOS F	83.6	635.4	1.00	4.36	8.20	14.8
11	T1	133	10.0	140	10.0	1.160	177.2	LOS F	83.6	635.4	1.00	4.36	8.20	14.9
12	R2	532	10.0	560	10.0	1.160	182.7	LOS F	83.6	635.4	1.00	4.36	8.20	15.0
Approach		675	10.0	711	10.0	1.160	181.5	LOS F	83.6	635.4	1.00	4.36	8.20	15.0
All Vehicles		3058	10.0	3219	10.0	1.580	225.2	LOS F	211.3	1606.0	0.90	4.13	8.05	12.5

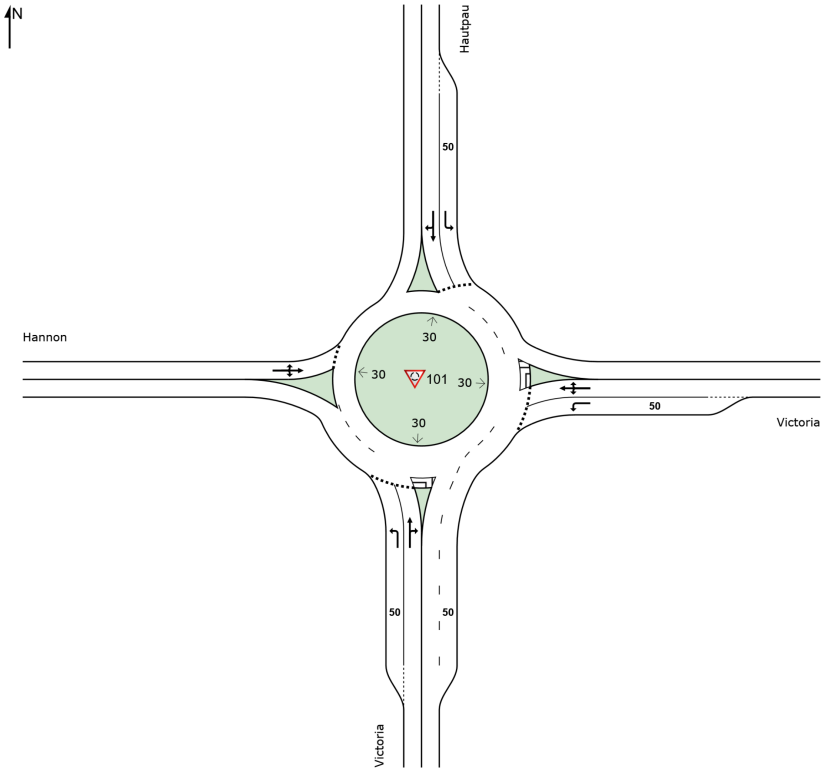
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_AM_With Upgrades (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_AM_With Upgrades (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	532	10.0	560	10.0	0.536	4.6	LOS A	4.6	35.1	0.70	0.63	0.70	46.7
2	T1	663	10.0	698	10.0	0.789	5.6	LOS A	12.3	93.5	0.89	0.74	0.99	46.3
3	R2	344	10.0	362	10.0	0.789	11.1	LOS B	12.3	93.5	0.89	0.74	0.99	46.8
Approach		1539	10.0	1620	10.0	0.789	6.5	LOS A	12.3	93.5	0.82	0.70	0.89	46.5
East: Victoria														
4	L2	427	10.0	449	10.0	0.651	11.2	LOS B	8.1	61.4	0.95	1.01	1.19	43.6
5	T1	133	10.0	140	10.0	0.651	11.4	LOS B	8.1	61.4	1.00	1.10	1.34	44.2
6	R2	93	10.0	98	10.0	0.651	17.0	LOS B	8.1	61.4	1.00	1.10	1.34	44.6
Approach		653	10.0	687	10.0	0.651	12.1	LOS B	8.1	61.4	0.97	1.04	1.24	43.8
North: Hautpau														
7	L2	136	10.0	143	10.0	0.209	7.2	LOS A	1.3	9.8	0.75	0.75	0.75	45.8
8	T1	485	10.0	511	10.0	0.530	7.4	LOS A	5.0	38.4	0.88	0.87	0.99	46.9
9	R2	10	10.0	11	10.0	0.530	12.7	LOS B	5.0	38.4	0.88	0.87	0.99	47.4
Approach		631	10.0	664	10.0	0.530	7.5	LOS A	5.0	38.4	0.86	0.84	0.94	46.7
West: Hannon														
10	L2	10	10.0	11	10.0	0.966	101.4	LOS F	21.9	166.2	1.00	2.01	3.27	21.1
11	T1	57	10.0	60	10.0	0.966	101.0	LOS F	21.9	166.2	1.00	2.01	3.27	21.4
12	R2	228	10.0	240	10.0	0.966	106.9	LOS F	21.9	166.2	1.00	2.01	3.27	21.5
Approach		295	10.0	311	10.0	0.966	105.6	LOS F	21.9	166.2	1.00	2.01	3.27	21.5
All Vehicles		3118	10.0	3282	10.0	0.966	17.2	LOS B	21.9	166.2	0.88	0.93	1.20	41.4

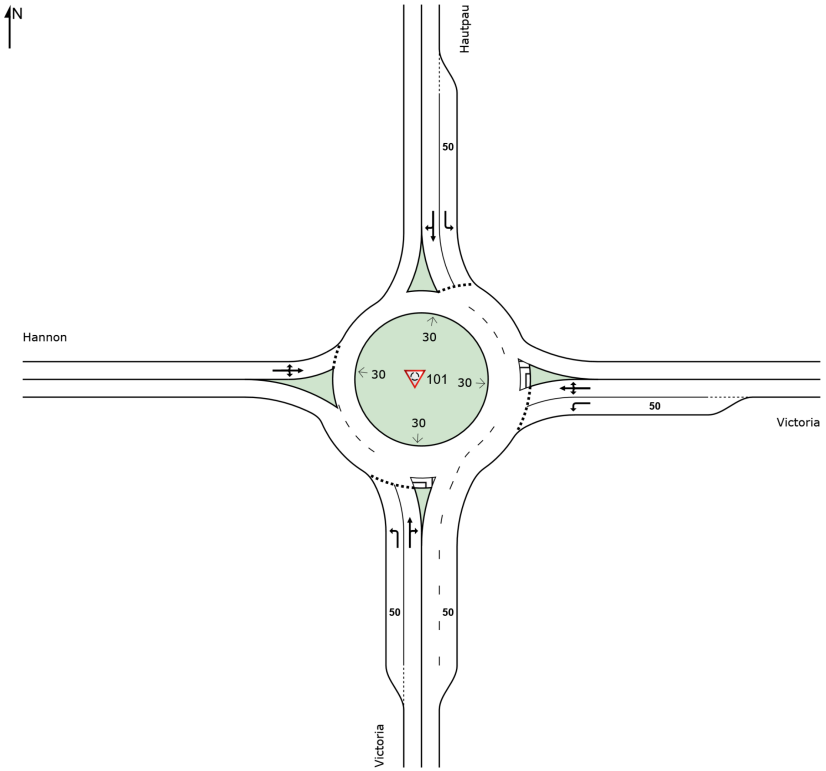
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_PM_With Upgrades (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Single Lane_PM_With Upgrades (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	228	10.0	240	10.0	0.220	3.4	LOS A	1.4	10.9	0.40	0.44	0.40	47.5
2	T1	445	10.0	468	10.0	0.502	2.7	LOS A	4.8	36.3	0.48	0.43	0.48	47.7
3	R2	277	10.0	292	10.0	0.502	8.2	LOS A	4.8	36.3	0.48	0.43	0.48	48.2
Approach		950	10.0	1000	10.0	0.502	4.5	LOS A	4.8	36.3	0.46	0.43	0.46	47.8
East: Victoria														
4	L2	523	10.0	551	10.0	1.069	118.2	LOS F	53.3	404.9	1.00	2.68	4.53	19.3
5	T1	57	10.0	60	10.0	1.069	148.9	LOS F	53.3	404.9	1.00	3.23	5.68	16.7
6	R2	59	10.0	62	10.0	1.069	154.5	LOS F	53.3	404.9	1.00	3.23	5.68	16.7
Approach		639	10.0	673	10.0	1.069	124.3	LOS F	53.3	404.9	1.00	2.78	4.74	18.8
North: Hautpau														
7	L2	177	10.0	186	10.0	0.396	11.9	LOS B	3.1	23.2	0.97	0.99	1.03	43.3
8	T1	607	10.0	639	10.0	0.994	76.0	LOS F	38.1	289.6	1.00	2.49	4.04	25.6
9	R2	10	10.0	11	10.0	0.994	79.9	LOS F	38.1	289.6	1.00	2.49	4.04	25.8
Approach		794	10.0	836	10.0	0.994	61.8	LOS E	38.1	289.6	0.99	2.16	3.37	28.1
West: Hannon														
10	L2	10	10.0	11	10.0	1.085	120.8	LOS F	62.0	471.5	1.00	3.56	6.49	19.0
11	T1	133	10.0	140	10.0	1.085	120.5	LOS F	62.0	471.5	1.00	3.56	6.49	19.2
12	R2	532	10.0	560	10.0	1.085	127.2	LOS F	62.0	471.5	1.00	3.56	6.49	19.3
Approach		675	10.0	711	10.0	1.085	125.8	LOS F	62.0	471.5	1.00	3.56	6.49	19.3
All Vehicles		3058	10.0	3219	10.0	1.085	71.2	LOS F	62.0	471.5	0.83	2.06	3.44	26.1

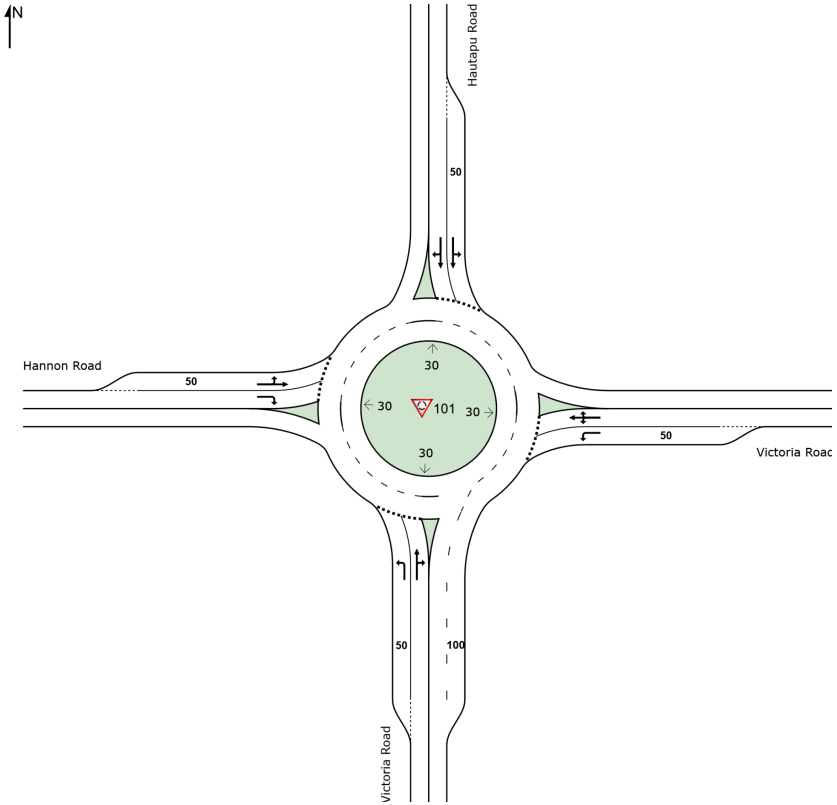
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Dual Lane_AM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Dual Lane_AM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	532	10.0	560	10.0	0.571	4.7	LOS A	4.4	33.7	0.64	0.63	0.65	46.9
2	T1	663	10.0	698	10.0	0.856	7.4	LOS A	15.0	114.4	0.94	0.85	1.13	45.9
3	R2	344	10.0	362	10.0	0.856	12.8	LOS B	15.0	114.4	0.94	0.85	1.13	46.4
Approach		1539	10.0	1620	10.0	0.856	7.7	LOS A	15.0	114.4	0.83	0.78	0.96	46.4
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.544	7.4	LOS A	4.0	30.7	0.74	0.86	0.83	45.8
5	T1	133	10.0	140	10.0	0.544	6.7	LOS A	4.0	30.7	0.78	0.91	0.93	46.8
6	R2	93	10.0	98	10.0	0.544	12.2	LOS B	4.0	30.7	0.78	0.91	0.93	47.3
Approach		653	10.0	687	10.0	0.544	8.0	LOS A	4.0	30.7	0.76	0.88	0.86	46.2
North: Hautapu Road														
7	L2	136	10.0	143	10.0	0.315	5.4	LOS A	1.5	11.4	0.64	0.67	0.64	46.7
8	T1	485	10.0	511	10.0	0.443	4.9	LOS A	2.6	19.6	0.67	0.58	0.70	47.9
9	R2	10	10.0	11	10.0	0.443	10.1	LOS B	2.6	19.6	0.67	0.56	0.72	48.3
Approach		631	10.0	664	10.0	0.443	5.1	LOS A	2.6	19.6	0.66	0.60	0.69	47.6
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.285	16.1	LOS B	1.9	14.1	0.97	0.98	0.97	41.6
11	T1	57	10.0	60	10.0	0.285	15.7	LOS B	1.9	14.1	0.97	0.98	0.97	42.8
12	R2	228	10.0	240	10.0	0.658	33.5	LOS C	7.2	55.1	1.00	1.23	1.51	36.3
Approach		295	10.0	311	10.0	0.658	29.4	LOS C	7.2	55.1	0.99	1.17	1.39	37.5
All Vehicles		3118	10.0	3282	10.0	0.856	9.3	LOS A	15.0	114.4	0.80	0.80	0.93	45.5

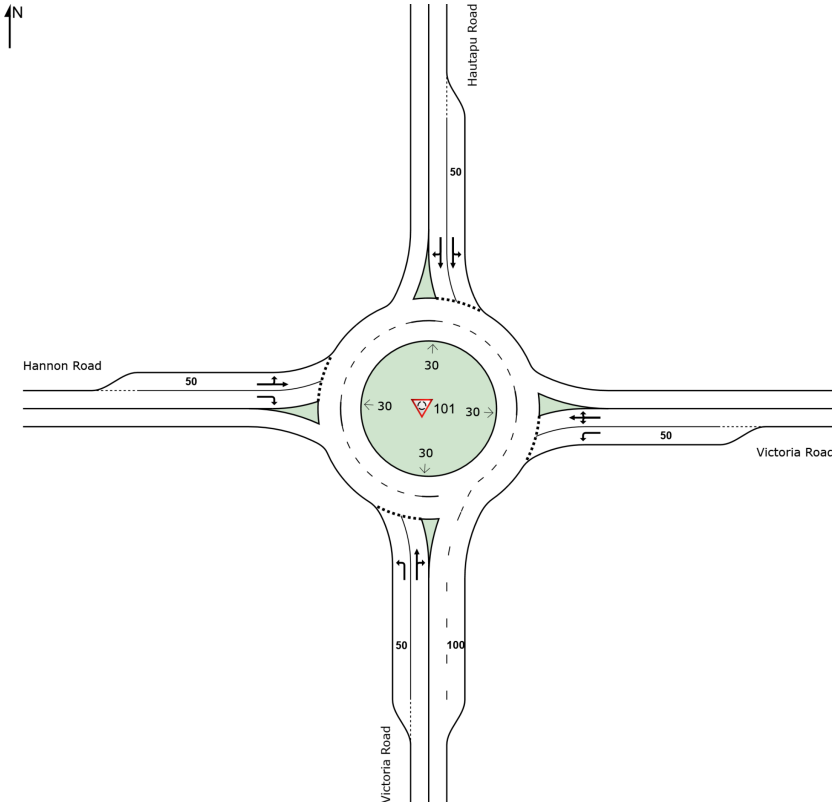
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Dual Lane_PM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6A_Dual Lane_PM (Site Folder: Scenario 6A: 2041 Baseline without BIL and with 50ha of C8/C9 + 20ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	228	10.0	240	10.0	0.258	3.5	LOS A	1.4	11.0	0.38	0.45	0.38	47.6
2	T1	445	10.0	468	10.0	0.557	2.8	LOS A	4.9	37.1	0.49	0.44	0.49	47.8
3	R2	277	10.0	292	10.0	0.557	8.3	LOS A	4.9	37.1	0.49	0.44	0.49	48.3
Approach		950	10.0	1000	10.0	0.557	4.6	LOS A	4.9	37.1	0.46	0.44	0.46	47.9
East: Victoria Road														
4	L2	523	10.0	551	10.0	0.782	21.1	LOS C	9.7	74.0	0.96	1.25	1.60	39.7
5	T1	57	10.0	60	10.0	0.782	22.1	LOS C	9.7	74.0	1.00	1.38	1.89	39.4
6	R2	59	10.0	62	10.0	0.782	27.5	LOS C	9.7	74.0	1.00	1.38	1.89	39.7
Approach		639	10.0	673	10.0	0.782	21.8	LOS C	9.7	74.0	0.96	1.27	1.65	39.7
North: Hautapu Road														
7	L2	177	10.0	186	10.0	0.496	8.0	LOS A	2.9	21.7	0.79	0.92	0.94	45.6
8	T1	607	10.0	639	10.0	0.697	9.0	LOS A	5.7	43.0	0.87	1.02	1.15	46.8
9	R2	10	10.0	11	10.0	0.697	13.6	LOS B	5.7	43.0	0.88	1.04	1.19	47.3
Approach		794	10.0	836	10.0	0.697	8.8	LOS A	5.7	43.0	0.85	1.00	1.10	46.6
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.314	9.7	LOS A	1.8	13.3	0.80	0.84	0.80	44.9
11	T1	133	10.0	140	10.0	0.314	9.2	LOS A	1.8	13.3	0.80	0.84	0.80	46.2
12	R2	532	10.0	560	10.0	0.753	22.2	LOS C	10.1	76.4	1.00	1.30	1.63	40.6
Approach		675	10.0	711	10.0	0.753	19.5	LOS B	10.1	76.4	0.96	1.20	1.45	41.6
All Vehicles		3058	10.0	3219	10.0	0.782	12.5	LOS B	10.1	76.4	0.78	0.93	1.10	44.2

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

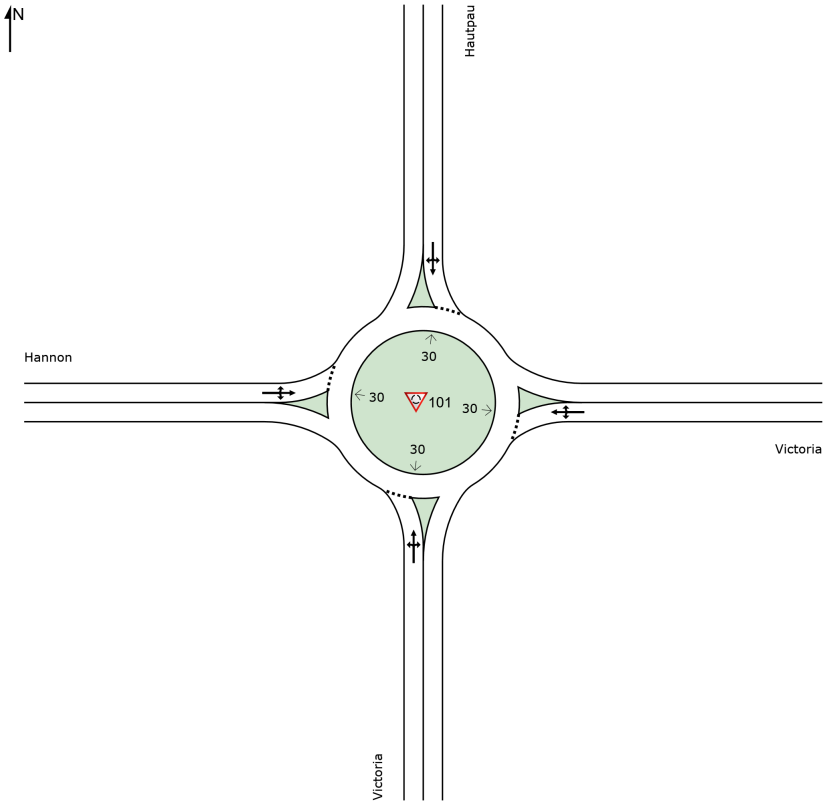
SIDRA Intersection Results: Scenario 6B

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_AM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_AM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	639	10.0	673	10.0	1.344	318.1	LOS F	284.9	2165.1	1.00	7.15	10.63	9.5
2	T1	526	10.0	554	10.0	1.344	317.8	LOS F	284.9	2165.1	1.00	7.15	10.63	9.5
3	R2	344	10.0	362	10.0	1.344	323.3	LOS F	284.9	2165.1	1.00	7.15	10.63	9.6
Approach		1509	10.0	1588	10.0	1.344	319.2	LOS F	284.9	2165.1	1.00	7.15	10.63	9.5
East: Victoria														
4	L2	427	10.0	449	10.0	1.055	97.6	LOS F	50.8	386.4	1.00	3.05	5.36	21.5
5	T1	160	10.0	168	10.0	1.055	97.3	LOS F	50.8	386.4	1.00	3.05	5.36	21.8
6	R2	59	10.0	62	10.0	1.055	102.8	LOS F	50.8	386.4	1.00	3.05	5.36	21.9
Approach		646	10.0	680	10.0	1.055	98.0	LOS F	50.8	386.4	1.00	3.05	5.36	21.6
North: Hautpau														
7	L2	132	10.0	139	10.0	0.810	17.6	LOS B	12.8	97.5	1.00	1.32	1.70	40.8
8	T1	454	10.0	478	10.0	0.810	17.3	LOS B	12.8	97.5	1.00	1.32	1.70	41.8
9	R2	10	10.0	11	10.0	0.810	22.8	LOS C	12.8	97.5	1.00	1.32	1.70	42.2
Approach		596	10.0	627	10.0	0.810	17.4	LOS B	12.8	97.5	1.00	1.32	1.70	41.6
West: Hannon														
10	L2	10	10.0	11	10.0	0.611	12.3	LOS B	6.3	47.6	1.00	1.11	1.27	41.5
11	T1	68	10.0	72	10.0	0.611	11.9	LOS B	6.3	47.6	1.00	1.11	1.27	42.6
12	R2	274	10.0	288	10.0	0.611	17.4	LOS B	6.3	47.6	1.00	1.11	1.27	43.0
Approach		352	10.0	371	10.0	0.611	16.2	LOS B	6.3	47.6	1.00	1.11	1.27	42.9
All Vehicles		3103	10.0	3266	10.0	1.344	180.8	LOS F	284.9	2165.1	1.00	4.49	6.75	14.7

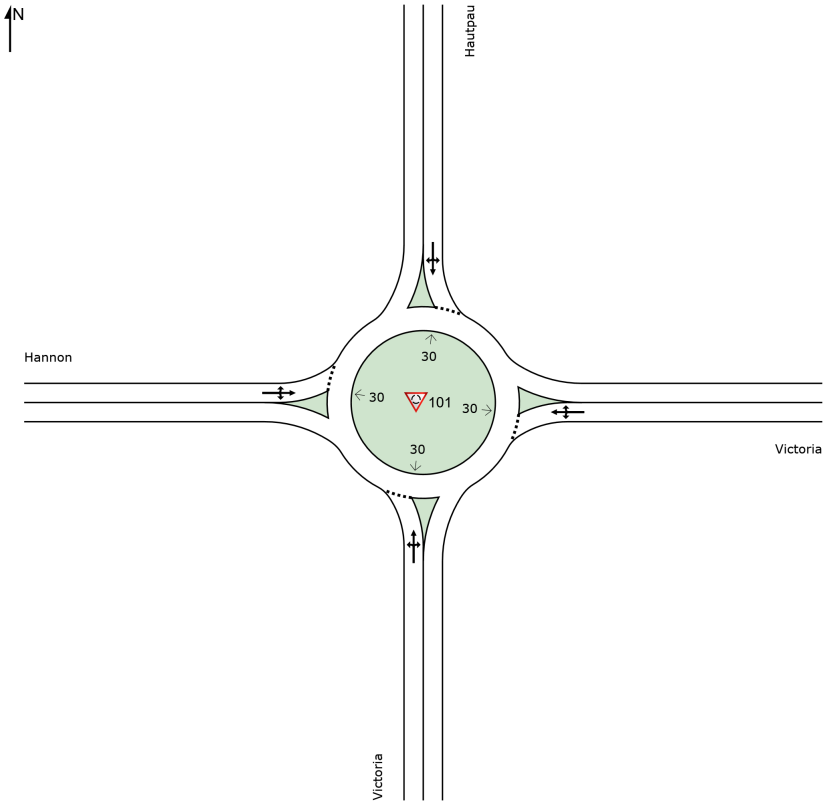
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_PM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_PM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	274	10.0	288	10.0	0.751	3.6	LOS A	10.7	81.5	0.71	0.48	0.71	46.0
2	T1	418	10.0	440	10.0	0.751	3.3	LOS A	10.7	81.5	0.71	0.48	0.71	47.3
3	R2	277	10.0	292	10.0	0.751	8.8	LOS A	10.7	81.5	0.71	0.48	0.71	47.8
Approach		969	10.0	1020	10.0	0.751	5.0	LOS A	10.7	81.5	0.71	0.48	0.71	47.0
East: Victoria														
4	L2	523	10.0	551	10.0	1.202	217.3	LOS F	92.4	702.3	1.00	4.76	9.19	12.6
5	T1	68	10.0	72	10.0	1.202	216.9	LOS F	92.4	702.3	1.00	4.76	9.19	12.7
6	R2	52	10.0	55	10.0	1.202	222.4	LOS F	92.4	702.3	1.00	4.76	9.19	12.7
Approach		643	10.0	677	10.0	1.202	217.6	LOS F	92.4	702.3	1.00	4.76	9.19	12.6
North: Hautpau														
7	L2	146	10.0	154	10.0	1.348	341.6	LOS F	130.2	989.2	1.00	5.91	11.74	8.9
8	T1	498	10.0	524	10.0	1.348	341.2	LOS F	130.2	989.2	1.00	5.91	11.74	9.0
9	R2	10	10.0	11	10.0	1.348	346.7	LOS F	130.2	989.2	1.00	5.91	11.74	9.0
Approach		654	10.0	688	10.0	1.348	341.4	LOS F	130.2	989.2	1.00	5.91	11.74	9.0
West: Hannon														
10	L2	10	10.0	11	10.0	1.344	330.8	LOS F	156.0	1185.6	1.00	6.64	12.98	9.3
11	T1	160	10.0	168	10.0	1.344	330.4	LOS F	156.0	1185.6	1.00	6.64	12.98	9.3
12	R2	638	10.0	672	10.0	1.344	336.0	LOS F	156.0	1185.6	1.00	6.64	12.98	9.4
Approach		808	10.0	851	10.0	1.344	334.8	LOS F	156.0	1185.6	1.00	6.64	12.98	9.3
All Vehicles		3074	10.0	3236	10.0	1.348	207.7	LOS F	156.0	1185.6	0.91	4.15	8.06	13.3

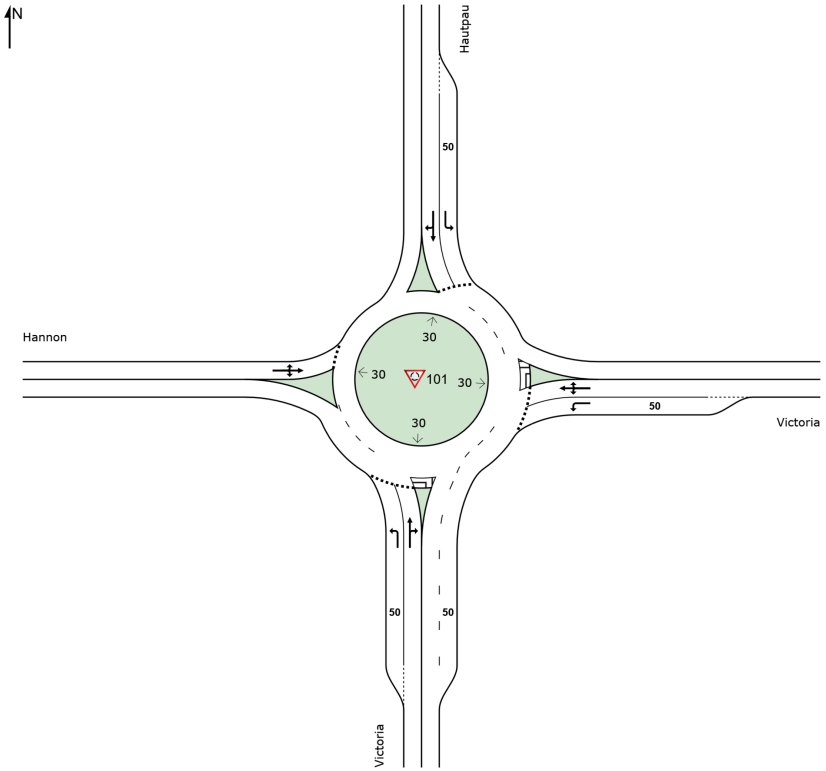
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_AM_With Upgrades (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_AM_With Upgrades (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	639	10.0	673	10.0	0.614	4.8	LOS A	6.0	46.0	0.74	0.65	0.76	46.5
2	T1	526	10.0	554	10.0	0.677	3.9	LOS A	7.7	58.5	0.77	0.56	0.78	46.8
3	R2	344	10.0	362	10.0	0.677	9.4	LOS A	7.7	58.5	0.77	0.56	0.78	47.3
Approach		1509	10.0	1588	10.0	0.677	5.5	LOS A	7.7	58.5	0.76	0.60	0.77	46.8
East: Victoria														
4	L2	427	10.0	449	10.0	0.648	11.5	LOS B	8.0	61.0	0.95	1.02	1.20	43.6
5	T1	160	10.0	168	10.0	0.648	11.7	LOS B	8.0	61.0	1.00	1.10	1.34	44.2
6	R2	59	10.0	62	10.0	0.648	17.2	LOS B	8.0	61.0	1.00	1.10	1.34	44.6
Approach		646	10.0	680	10.0	0.648	12.0	LOS B	8.0	61.0	0.97	1.05	1.25	43.8
North: Hautpau														
7	L2	132	10.0	139	10.0	0.214	7.8	LOS A	1.4	10.3	0.79	0.78	0.79	45.5
8	T1	454	10.0	478	10.0	0.528	8.3	LOS A	5.1	39.1	0.92	0.91	1.05	46.7
9	R2	10	10.0	11	10.0	0.528	13.5	LOS B	5.1	39.1	0.92	0.91	1.05	47.2
Approach		596	10.0	627	10.0	0.528	8.2	LOS A	5.1	39.1	0.89	0.88	0.99	46.5
West: Hannon														
10	L2	10	10.0	11	10.0	0.793	32.6	LOS C	11.4	86.5	1.00	1.42	1.92	34.0
11	T1	68	10.0	72	10.0	0.793	32.3	LOS C	11.4	86.5	1.00	1.42	1.92	34.7
12	R2	274	10.0	288	10.0	0.793	38.1	LOS D	11.4	86.5	1.00	1.42	1.92	35.0
Approach		352	10.0	371	10.0	0.793	36.8	LOS D	11.4	86.5	1.00	1.42	1.92	34.9
All Vehicles		3103	10.0	3266	10.0	0.793	11.0	LOS B	11.4	86.5	0.85	0.84	1.04	44.4

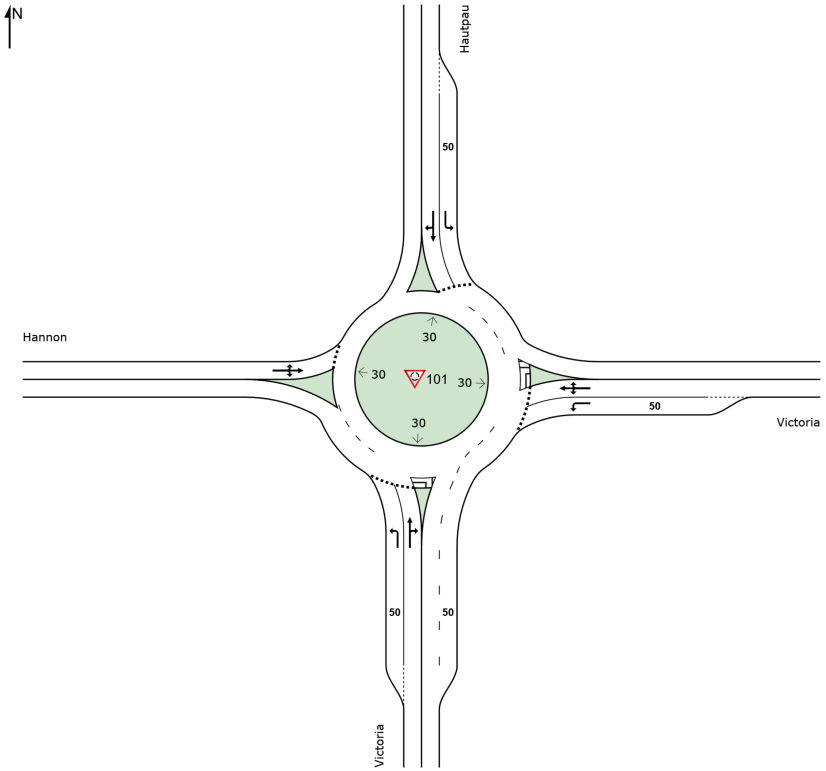
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_PM_With Upgrades (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Single Lane_PM_With Upgrades (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	274	10.0	288	10.0	0.256	3.4	LOS A	1.7	13.2	0.42	0.45	0.42	47.4
2	T1	418	10.0	440	10.0	0.490	2.7	LOS A	4.6	34.6	0.49	0.44	0.49	47.6
3	R2	277	10.0	292	10.0	0.490	8.3	LOS A	4.6	34.6	0.49	0.44	0.49	48.1
Approach		969	10.0	1020	10.0	0.490	4.5	LOS A	4.6	34.6	0.47	0.44	0.47	47.7
East: Victoria														
4	L2	523	10.0	551	10.0	0.898	45.3	LOS D	23.0	174.7	0.99	1.71	2.49	31.3
5	T1	68	10.0	72	10.0	0.898	53.8	LOS E	23.0	174.7	1.00	1.95	2.98	29.4
6	R2	52	10.0	55	10.0	0.898	59.3	LOS E	23.0	174.7	1.00	1.95	2.98	29.6
Approach		643	10.0	677	10.0	0.898	47.3	LOS D	23.0	174.7	0.99	1.75	2.58	30.9
North: Hautpau														
7	L2	146	10.0	154	10.0	0.335	11.1	LOS B	2.4	18.6	0.96	0.95	0.96	43.7
8	T1	498	10.0	524	10.0	0.839	34.0	LOS C	16.3	123.7	1.00	1.55	2.16	35.8
9	R2	10	10.0	11	10.0	0.839	38.0	LOS D	16.3	123.7	1.00	1.55	2.16	36.1
Approach		654	10.0	688	10.0	0.839	29.0	LOS C	16.3	123.7	0.99	1.42	1.89	37.3
West: Hannon														
10	L2	10	10.0	11	10.0	1.266	264.0	LOS F	132.8	1009.0	1.00	6.07	11.80	11.1
11	T1	160	10.0	168	10.0	1.266	263.7	LOS F	132.8	1009.0	1.00	6.07	11.80	11.2
12	R2	638	10.0	672	10.0	1.266	269.9	LOS F	132.8	1009.0	1.00	6.07	11.80	11.2
Approach		808	10.0	851	10.0	1.266	268.6	LOS F	132.8	1009.0	1.00	6.07	11.80	11.2
All Vehicles		3074	10.0	3236	10.0	1.266	88.1	LOS F	132.8	1009.0	0.83	2.41	4.19	23.3

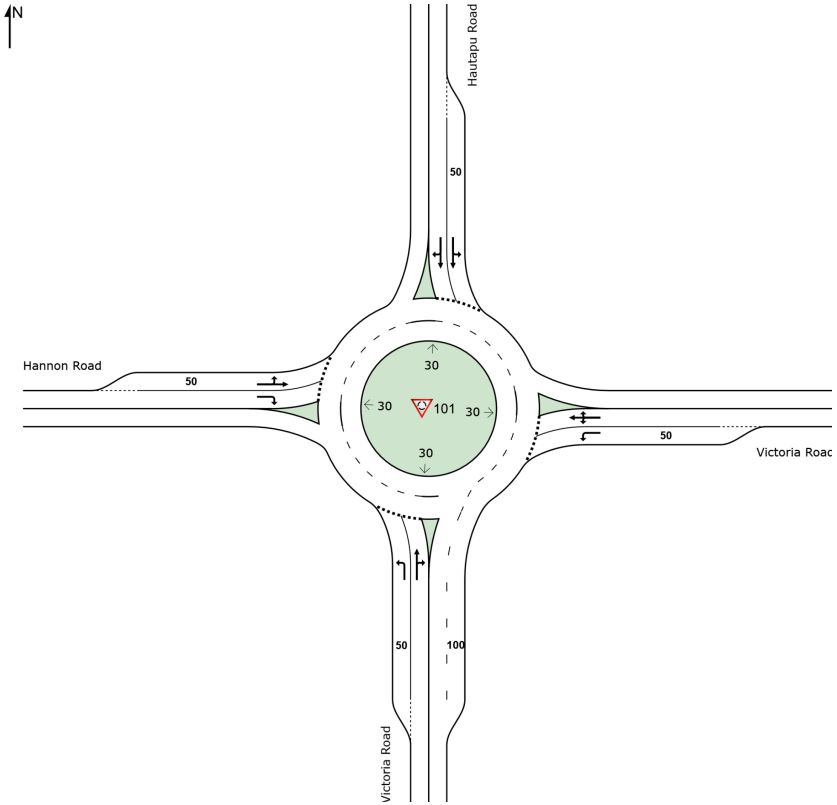
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Dual Lane_AM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Dual Lane_AM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	639	10.0	673	10.0	0.635	4.9	LOS A	5.7	43.5	0.68	0.65	0.71	46.8
2	T1	526	10.0	554	10.0	0.738	4.8	LOS A	8.8	66.6	0.76	0.66	0.82	46.8
3	R2	344	10.0	362	10.0	0.738	10.3	LOS B	8.8	66.6	0.76	0.66	0.82	47.3
Approach		1509	10.0	1588	10.0	0.738	6.1	LOS A	8.8	66.6	0.73	0.66	0.77	46.9
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.541	7.6	LOS A	4.0	30.8	0.75	0.87	0.83	45.8
5	T1	160	10.0	168	10.0	0.541	6.9	LOS A	4.0	30.8	0.79	0.92	0.94	46.9
6	R2	59	10.0	62	10.0	0.541	12.4	LOS B	4.0	30.8	0.79	0.92	0.94	47.4
Approach		646	10.0	680	10.0	0.541	7.9	LOS A	4.0	30.8	0.76	0.88	0.87	46.2
North: Hautapu Road														
7	L2	132	10.0	139	10.0	0.305	5.5	LOS A	1.4	10.7	0.64	0.69	0.64	46.7
8	T1	454	10.0	478	10.0	0.428	5.0	LOS A	2.4	18.3	0.67	0.59	0.71	47.9
9	R2	10	10.0	11	10.0	0.428	10.2	LOS B	2.4	18.3	0.68	0.57	0.72	48.3
Approach		596	10.0	627	10.0	0.428	5.2	LOS A	2.4	18.3	0.67	0.61	0.69	47.6
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.228	11.6	LOS B	1.4	10.4	0.88	0.91	0.88	43.9
11	T1	68	10.0	72	10.0	0.228	11.1	LOS B	1.4	10.4	0.88	0.91	0.88	45.2
12	R2	274	10.0	288	10.0	0.531	18.7	LOS B	5.0	37.7	1.00	1.11	1.23	42.1
Approach		352	10.0	371	10.0	0.531	17.0	LOS B	5.0	37.7	0.97	1.06	1.15	42.7
All Vehicles		3103	10.0	3266	10.0	0.738	7.5	LOS A	8.8	66.6	0.75	0.74	0.82	46.4

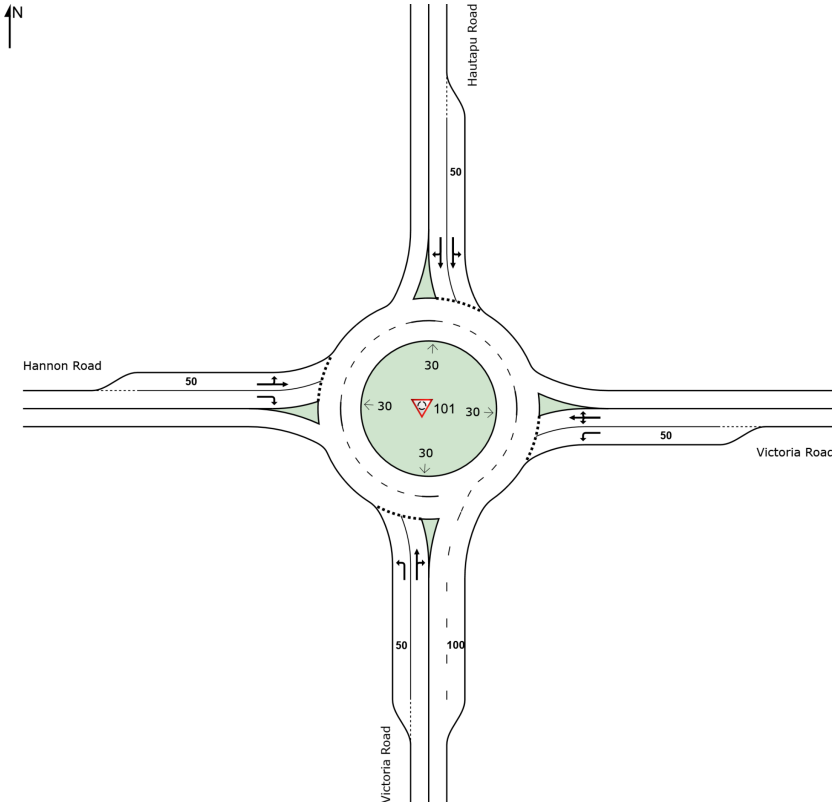
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Dual Lane_PM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 6B_Dual Lane_PM (Site Folder: Scenario 6B: 2041 Baseline without BIL and with 60ha of C8/C9 + 10ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	274	10.0	288	10.0	0.289	3.4	LOS A	1.7	12.9	0.39	0.45	0.39	47.6
2	T1	418	10.0	440	10.0	0.540	2.8	LOS A	4.6	35.0	0.48	0.45	0.48	47.7
3	R2	277	10.0	292	10.0	0.540	8.3	LOS A	4.6	35.0	0.48	0.45	0.48	48.2
Approach		969	10.0	1020	10.0	0.540	4.5	LOS A	4.6	35.0	0.46	0.45	0.46	47.8
East: Victoria Road														
4	L2	523	10.0	551	10.0	0.847	26.5	LOS C	12.6	95.6	0.97	1.35	1.83	37.5
5	T1	68	10.0	72	10.0	0.847	29.8	LOS C	12.6	95.6	1.00	1.53	2.22	36.4
6	R2	52	10.0	55	10.0	0.847	35.3	LOS D	12.6	95.6	1.00	1.53	2.22	36.7
Approach		643	10.0	677	10.0	0.847	27.6	LOS C	12.6	95.6	0.97	1.38	1.90	37.4
North: Hautapu Road														
7	L2	146	10.0	154	10.0	0.455	8.4	LOS A	2.5	19.3	0.81	0.92	0.94	45.4
8	T1	498	10.0	524	10.0	0.640	9.1	LOS A	4.8	36.7	0.87	1.01	1.12	46.8
9	R2	10	10.0	11	10.0	0.640	13.7	LOS B	4.8	36.7	0.89	1.03	1.15	47.3
Approach		654	10.0	688	10.0	0.640	9.0	LOS A	4.8	36.7	0.86	0.99	1.08	46.4
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.361	9.8	LOS A	2.1	15.9	0.80	0.86	0.84	44.8
11	T1	160	10.0	168	10.0	0.361	9.3	LOS A	2.1	15.9	0.80	0.86	0.84	46.2
12	R2	638	10.0	672	10.0	0.868	29.5	LOS C	16.4	124.8	1.00	1.54	2.14	37.7
Approach		808	10.0	851	10.0	0.868	25.2	LOS C	16.4	124.8	0.96	1.40	1.86	39.2
All Vehicles		3074	10.0	3236	10.0	0.868	15.8	LOS B	16.4	124.8	0.78	1.01	1.26	42.6

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

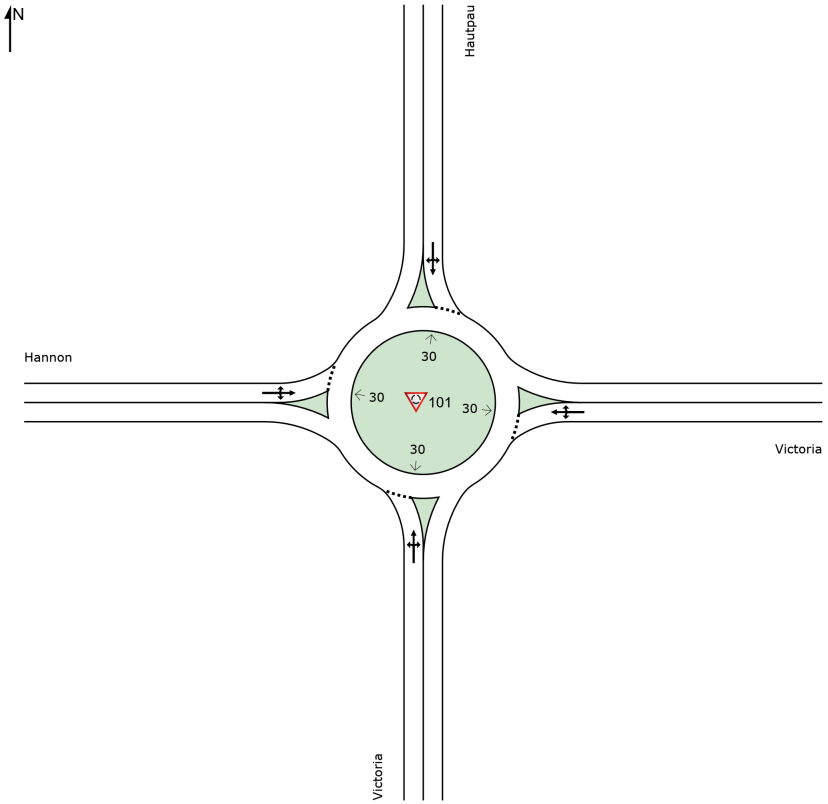
SIDRA Intersection Results: Scenario 7

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Single Lane_AM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Single Lane_AM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	745	10.0	784	10.0	1.528	482.1	LOS F	414.7	3151.8	1.00	9.44	14.27	6.7
2	T1	603	10.0	635	10.0	1.528	481.7	LOS F	414.7	3151.8	1.00	9.44	14.27	6.7
3	R2	344	10.0	362	10.0	1.528	487.3	LOS F	414.7	3151.8	1.00	9.44	14.27	6.7
Approach		1692	10.0	1781	10.0	1.528	483.0	LOS F	414.7	3151.8	1.00	9.44	14.27	6.7
East: Victoria														
4	L2	427	10.0	449	10.0	1.203	213.9	LOS F	98.2	746.3	1.00	4.90	9.38	12.8
5	T1	186	10.0	196	10.0	1.203	213.6	LOS F	98.2	746.3	1.00	4.90	9.38	12.9
6	R2	78	10.0	82	10.0	1.203	219.1	LOS F	98.2	746.3	1.00	4.90	9.38	13.0
Approach		691	10.0	727	10.0	1.203	214.4	LOS F	98.2	746.3	1.00	4.90	9.38	12.9
North: Hautpau														
7	L2	135	10.0	142	10.0	0.868	23.6	LOS D	16.6	125.8	1.00	1.49	2.02	38.3
8	T1	465	10.0	489	10.0	0.868	23.2	LOS D	16.6	125.8	1.00	1.49	2.02	39.2
9	R2	10	10.0	11	10.0	0.868	28.8	LOS D	16.6	125.8	1.00	1.49	2.02	39.6
Approach		610	10.0	642	10.0	0.868	23.4	LOS C	16.6	125.8	1.00	1.49	2.02	39.0
West: Hannon														
10	L2	10	10.0	11	10.0	0.683	14.0	LOS B	7.9	59.9	1.00	1.17	1.38	40.8
11	T1	80	10.0	84	10.0	0.683	13.7	LOS B	7.9	59.9	1.00	1.17	1.38	41.8
12	R2	319	10.0	336	10.0	0.683	19.2	LOS B	7.9	59.9	1.00	1.17	1.38	42.1
Approach		409	10.0	431	10.0	0.683	18.0	LOS B	7.9	59.9	1.00	1.17	1.38	42.0
All Vehicles		3402	10.0	3581	10.0	1.528	290.1	LOS F	414.7	3151.8	1.00	6.10	9.53	10.3

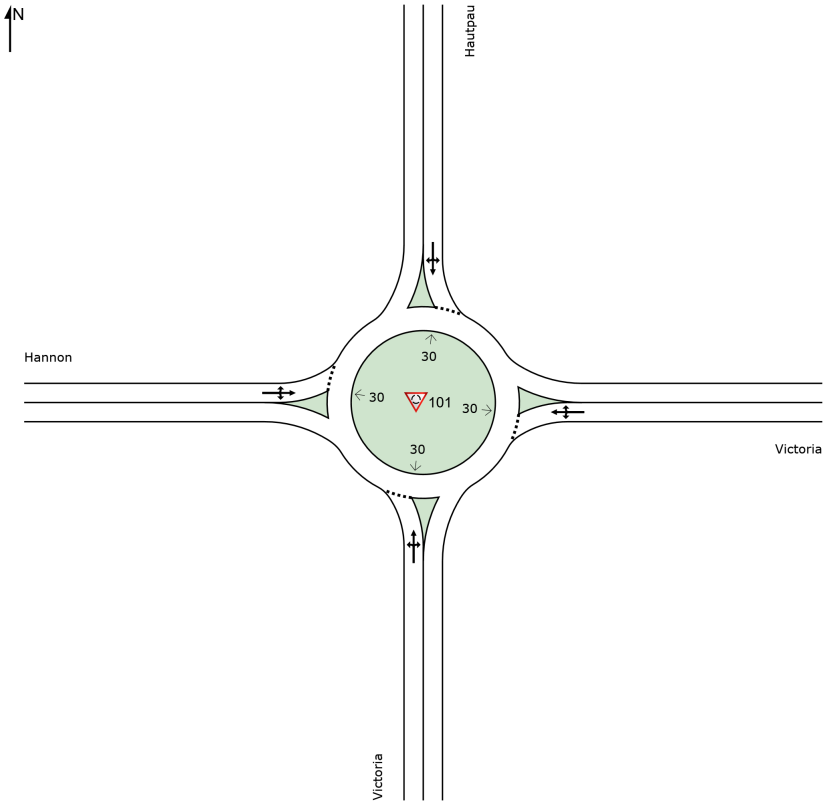
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Single Lane_PM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Single Lane_PM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria														
1	L2	319	10.0	336	10.0	0.814	4.0	LOS A	13.0	98.8	0.85	0.52	0.85	45.6
2	T1	435	10.0	458	10.0	0.814	3.7	LOS A	13.0	98.8	0.85	0.52	0.85	46.9
3	R2	277	10.0	292	10.0	0.814	9.2	LOS A	13.0	98.8	0.85	0.52	0.85	47.4
Approach		1031	10.0	1085	10.0	0.814	5.3	LOS A	13.0	98.8	0.85	0.52	0.85	46.7
East: Victoria														
4	L2	523	10.0	551	10.0	1.201	215.7	LOS F	94.1	715.0	1.00	4.82	9.31	12.7
5	T1	80	10.0	84	10.0	1.201	215.3	LOS F	94.1	715.0	1.00	4.82	9.31	12.8
6	R2	56	10.0	59	10.0	1.201	220.9	LOS F	94.1	715.0	1.00	4.82	9.31	12.8
Approach		659	10.0	694	10.0	1.201	216.1	LOS F	94.1	715.0	1.00	4.82	9.31	12.7
North: Hautpau														
7	L2	164	10.0	173	10.0	1.429	409.4	LOS F	166.0	1261.3	1.00	6.93	13.87	7.7
8	T1	569	10.0	599	10.0	1.429	409.1	LOS F	166.0	1261.3	1.00	6.93	13.87	7.7
9	R2	10	10.0	11	10.0	1.429	414.6	LOS F	166.0	1261.3	1.00	6.93	13.87	7.7
Approach		743	10.0	782	10.0	1.429	409.2	LOS F	166.0	1261.3	1.00	6.93	13.87	7.7
West: Hannon														
10	L2	10	10.0	11	10.0	1.687	634.0	LOS F	272.4	2070.4	1.00	9.11	18.32	5.3
11	T1	186	10.0	196	10.0	1.687	633.7	LOS F	272.4	2070.4	1.00	9.11	18.32	5.4
12	R2	745	10.0	784	10.0	1.687	639.2	LOS F	272.4	2070.4	1.00	9.11	18.32	5.4
Approach		941	10.0	991	10.0	1.687	638.1	LOS F	272.4	2070.4	1.00	9.11	18.32	5.4
All Vehicles		3374	10.0	3552	10.0	1.687	311.9	LOS F	272.4	2070.4	0.95	5.17	10.24	9.7

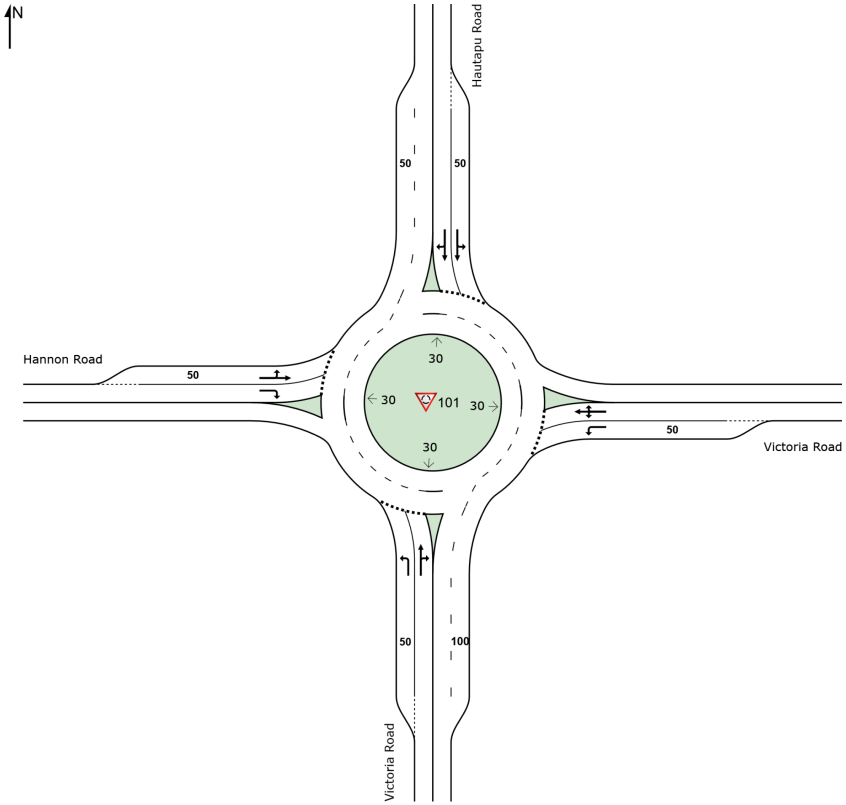
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Dual Lane_AM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Dual Lane_AM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	745	10.0	784	10.0	0.769	7.5	LOS A	9.9	75.5	0.86	0.85	1.02	45.8
2	T1	603	10.0	635	10.0	0.842	7.8	LOS A	14.1	107.0	0.94	0.90	1.17	45.8
3	R2	344	10.0	362	10.0	0.842	13.3	LOS B	14.1	107.0	0.94	0.90	1.17	46.3
Approach		1692	10.0	1781	10.0	0.842	8.8	LOS A	14.1	107.0	0.91	0.88	1.10	45.9
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.606	8.8	LOS A	5.1	38.7	0.79	0.93	0.93	45.2
5	T1	186	10.0	196	10.0	0.606	8.3	LOS A	5.1	38.7	0.84	1.01	1.09	46.1
6	R2	78	10.0	82	10.0	0.606	14.0	LOS B	5.1	38.7	0.84	1.01	1.09	46.6
Approach		691	10.0	727	10.0	0.606	9.3	LOS A	5.1	38.7	0.81	0.96	0.99	45.6
North: Hautapu Road														
7	L2	135	10.0	142	10.0	0.326	5.7	LOS A	1.5	11.6	0.67	0.72	0.67	46.6
8	T1	465	10.0	489	10.0	0.458	5.3	LOS A	2.7	20.4	0.70	0.63	0.76	47.7
9	R2	10	10.0	11	10.0	0.458	10.5	LOS B	2.7	20.4	0.71	0.62	0.78	48.2
Approach		610	10.0	642	10.0	0.458	5.5	LOS A	2.7	20.4	0.70	0.65	0.74	47.5
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.341	14.8	LOS B	2.2	17.0	0.96	0.98	0.99	42.3
11	T1	80	10.0	84	10.0	0.341	14.3	LOS B	2.2	17.0	0.96	0.98	0.99	43.5
12	R2	319	10.0	336	10.0	0.805	41.5	LOS D	11.4	86.4	1.00	1.41	1.91	33.7
Approach		409	10.0	431	10.0	0.805	35.5	LOS D	11.4	86.4	0.99	1.32	1.71	35.4
All Vehicles		3402	10.0	3581	10.0	0.842	11.5	LOS B	14.1	107.0	0.86	0.91	1.09	44.5

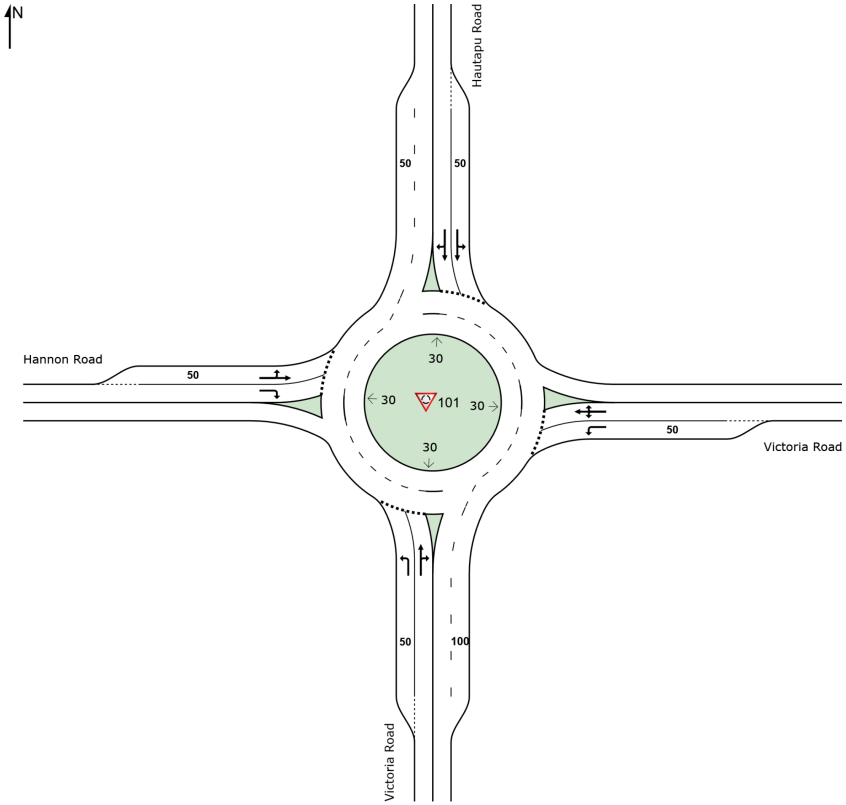
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Dual Lane_PM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautaupu Road_Scenario 7_Dual Lane_PM (Site Folder: Scenario 7: 2041 Baseline without BIL and with 70ha of C8/C9 + 15ha of Area 6)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	319	10.0	336	10.0	0.328	3.5	LOS A	2.0	15.3	0.42	0.47	0.42	47.5
2	T1	435	10.0	458	10.0	0.560	2.9	LOS A	4.9	37.0	0.51	0.45	0.51	47.7
3	R2	277	10.0	292	10.0	0.560	8.4	LOS A	4.9	37.0	0.51	0.45	0.51	48.2
Approach		1031	10.0	1085	10.0	0.560	4.6	LOS A	4.9	37.0	0.48	0.46	0.48	47.8
East: Victoria Road														
4	L2	523	10.0	551	10.0	1.041	80.9	LOS F	36.7	278.6	0.98	2.22	3.87	24.3
5	T1	80	10.0	84	10.0	1.041	108.8	LOS F	36.7	278.6	1.00	2.83	5.28	20.5
6	R2	56	10.0	59	10.0	1.041	114.4	LOS F	36.7	278.6	1.00	2.83	5.28	20.6
Approach		659	10.0	694	10.0	1.041	87.2	LOS F	36.7	278.6	0.99	2.34	4.16	23.4
North: Hautapu Road														
7	L2	164	10.0	173	10.0	0.566	10.6	LOS B	3.5	26.5	0.86	1.00	1.10	44.2
8	T1	569	10.0	599	10.0	0.795	14.1	LOS B	7.6	57.8	0.95	1.18	1.47	44.3
9	R2	10	10.0	11	10.0	0.795	18.5	LOS B	7.6	57.8	0.96	1.21	1.54	44.6
Approach		743	10.0	782	10.0	0.795	13.4	LOS B	7.6	57.8	0.93	1.14	1.39	44.3
West: Hannon Road														
10	L2	10	10.0	11	10.0	0.430	11.4	LOS B	2.8	21.0	0.83	0.93	0.96	44.0
11	T1	186	10.0	196	10.0	0.430	10.9	LOS B	2.8	21.0	0.83	0.93	0.96	45.3
12	R2	745	10.0	784	10.0	1.045	90.5	LOS F	51.9	394.2	1.00	3.09	5.42	23.6
Approach		941	10.0	991	10.0	1.045	73.9	LOS F	51.9	394.2	0.97	2.64	4.49	26.2
All Vehicles		3374	10.0	3552	10.0	1.045	42.0	LOS D	51.9	394.2	0.81	1.59	2.52	32.9

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

Appendix C – Intersection Performance Assessment: Inclusion of the Hautapu Landowners' Group Submission to PPC17

HLG Submission SIDRA Intersection Results:

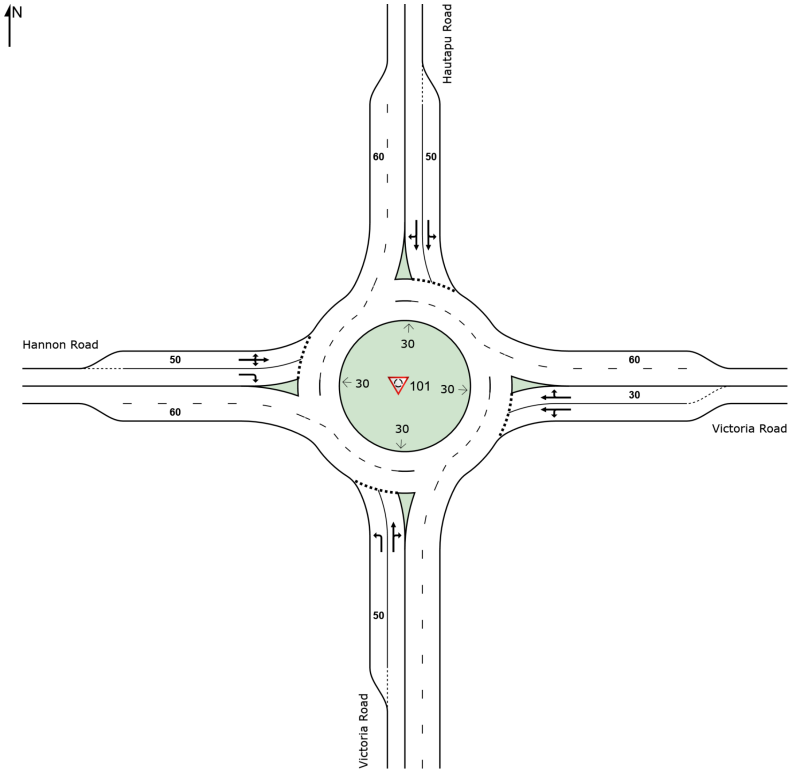
Victoria Road/ Hautapu Road Intersection

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Dual Lane_AM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Dual Lane_AM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	908	10.0	956	10.0	0.979	29.0	LOS C	33.4	253.5	1.00	1.66	2.40	36.1
2	T1	686	10.0	722	10.0	0.969	22.7	LOS C	32.2	244.4	1.00	1.51	2.13	39.0
3	R2	344	10.0	362	10.0	0.969	28.2	LOS C	32.2	244.4	1.00	1.51	2.13	39.4
Approach		1938	10.0	2040	10.0	0.979	26.6	LOS C	33.4	253.5	1.00	1.58	2.26	37.7
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.501	6.3	LOS A	3.0	23.0	0.73	0.88	0.85	46.4
5	T1	242	10.0	255	10.0	0.501	7.8	LOS A	2.9	21.7	0.74	0.89	0.89	46.7
6	R2	99	10.0	104	10.0	0.501	12.7	LOS B	2.9	21.7	0.74	0.89	0.89	47.2
Approach		768	10.0	808	10.0	0.501	7.6	LOS A	3.0	23.0	0.73	0.88	0.87	46.6
North: Hautapu Road														
7	L2	138	10.0	145	10.0	0.432	6.0	LOS A	2.6	19.8	0.75	0.73	0.82	46.3
8	T1	478	10.0	503	10.0	0.432	6.0	LOS A	2.6	19.8	0.75	0.76	0.83	47.6
9	R2	1	10.0	1	10.0	0.432	12.9	LOS B	2.4	18.6	0.75	0.78	0.84	48.0
Approach		617	10.0	649	10.0	0.432	6.0	LOS A	2.6	19.8	0.75	0.75	0.83	47.3
West: Hannon Road														
10	L2	1	10.0	1	10.0	0.890	69.0	LOS E	15.2	115.8	1.00	1.65	2.46	25.9
11	T1	104	10.0	109	10.0	0.890	68.6	LOS E	15.2	115.8	1.00	1.65	2.46	26.4
12	R2	389	10.0	409	10.0	0.890	76.1	LOS F	15.2	115.8	1.00	1.61	2.41	26.0
Approach		494	10.0	520	10.0	0.890	74.5	LOS F	15.2	115.8	1.00	1.62	2.42	26.1
All Vehicles		3817	10.0	4018	10.0	0.979	25.7	LOS C	33.4	253.5	0.91	1.31	1.77	38.1

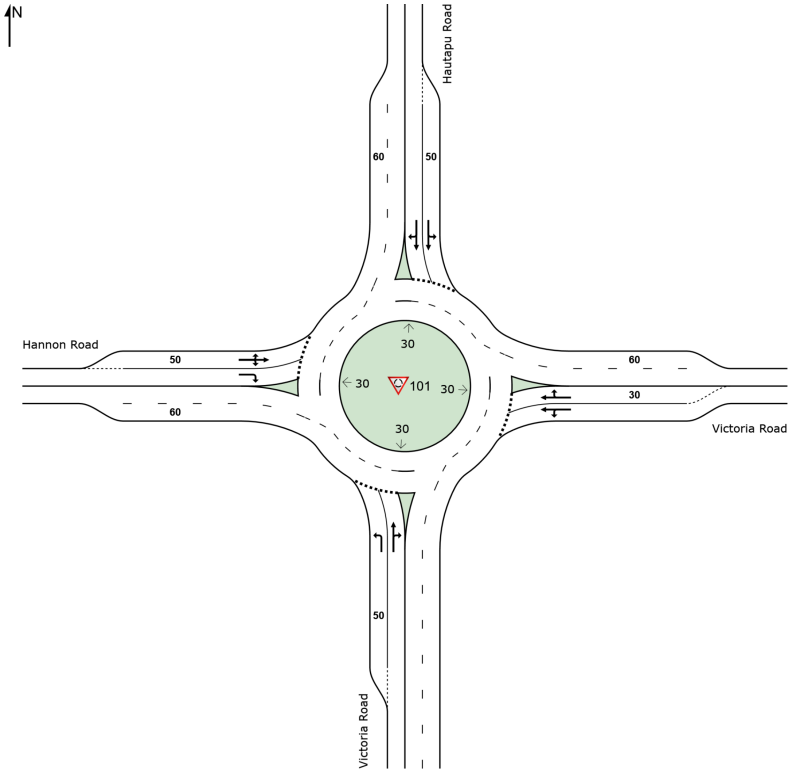
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Dual Lane_PM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Dual Lane_PM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	389	10.0	409	10.0	0.398	3.7	LOS A	2.6	19.5	0.47	0.50	0.47	47.4
2	T1	454	10.0	478	10.0	0.637	3.2	LOS A	6.0	45.2	0.59	0.49	0.59	47.3
3	R2	341	10.0	359	10.0	0.637	8.8	LOS A	6.0	45.2	0.59	0.49	0.59	47.8
Approach		1184	10.0	1246	10.0	0.637	5.0	LOS A	6.0	45.2	0.55	0.50	0.55	47.5
East: Victoria Road														
4	L2	523	10.0	551	10.0	0.911	27.3	LOS C	12.2	92.4	0.98	1.59	2.51	36.7
5	T1	104	10.0	109	10.0	0.418	10.4	LOS B	2.1	16.3	0.83	0.95	0.98	44.6
6	R2	61	10.0	64	10.0	0.418	15.9	LOS B	2.1	16.3	0.83	0.95	0.98	45.1
Approach		688	10.0	724	10.0	0.911	23.7	LOS C	12.2	92.4	0.95	1.44	2.14	38.4
North: Hautapu Road														
7	L2	183	10.0	193	10.0	0.958	38.9	LOS D	15.5	118.0	1.00	1.79	2.98	33.2
8	T1	646	10.0	680	10.0	0.958	41.8	LOS D	15.5	118.0	0.99	1.74	2.94	33.0
9	R2	1	10.0	1	10.0	0.958	50.5	LOS E	12.5	95.0	0.98	1.70	2.90	32.4
Approach		830	10.0	874	10.0	0.958	41.2	LOS D	15.5	118.0	0.99	1.75	2.95	33.0
West: Hannon Road														
10	L2	1	10.0	1	10.0	1.024	80.6	LOS F	42.0	319.3	1.00	2.75	4.76	24.0
11	T1	242	10.0	255	10.0	1.024	80.2	LOS F	42.0	319.3	1.00	2.75	4.76	24.4
12	R2	908	10.0	956	10.0	1.024	87.6	LOS F	42.0	319.3	1.00	2.65	4.67	24.1
Approach		1151	10.0	1212	10.0	1.024	86.0	LOS F	42.0	319.3	1.00	2.67	4.69	24.1
All Vehicles		3853	10.0	4056	10.0	1.024	40.3	LOS D	42.0	319.3	0.85	1.59	2.59	33.2

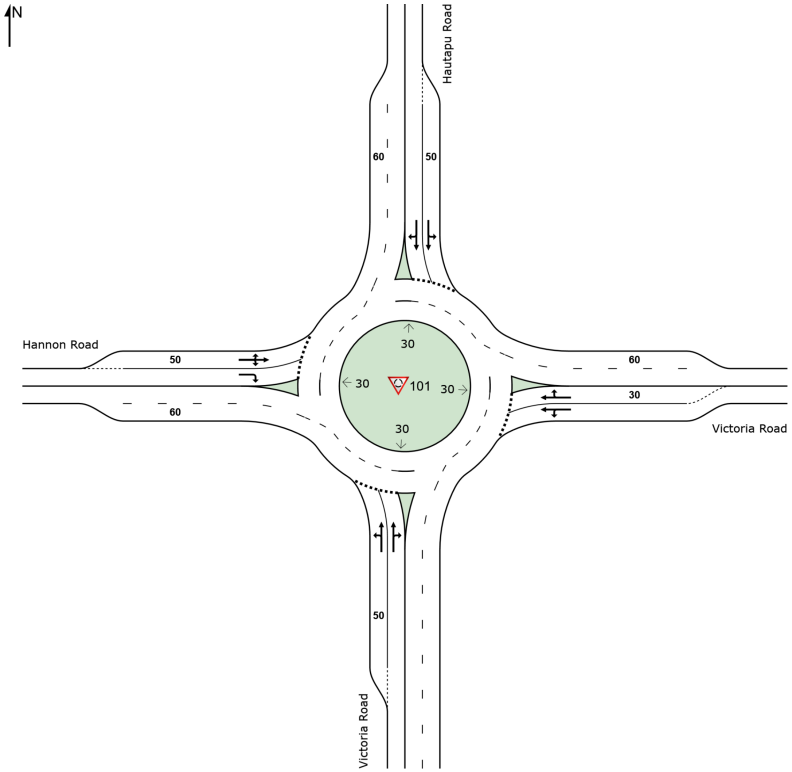
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_100%:0% E/W distr_Dual Lane_AM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_100%:0% E/W distr_Dual Lane_AM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	908	10.0	956	10.0	1.108	116.5	LOS F	82.4	626.1	1.00	3.81	6.52	19.3
2	T1	971	10.0	1022	10.0	1.328	304.9	LOS F	235.5	1789.9	1.00	8.02	13.95	10.0
3	R2	344	10.0	362	10.0	1.328	310.4	LOS F	235.5	1789.9	1.00	8.02	13.95	10.0
Approach		2223	10.0	2340	10.0	1.328	228.8	LOS F	235.5	1789.9	1.00	6.30	10.92	12.4
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.507	6.4	LOS A	3.1	23.4	0.74	0.89	0.87	46.3
5	T1	242	10.0	255	10.0	0.603	8.7	LOS A	3.9	29.9	0.78	0.98	1.03	45.7
6	R2	170	10.0	179	10.0	0.603	13.5	LOS B	3.9	29.9	0.78	0.98	1.03	46.2
Approach		839	10.0	883	10.0	0.603	8.5	LOS A	3.9	29.9	0.76	0.93	0.95	46.1
North: Hautapu Road														
7	L2	147	10.0	155	10.0	0.438	5.6	LOS A	2.6	19.9	0.73	0.68	0.79	46.3
8	T1	513	10.0	540	10.0	0.438	5.5	LOS A	2.6	19.9	0.73	0.70	0.80	47.7
9	R2	1	10.0	1	10.0	0.438	12.1	LOS B	2.5	18.9	0.74	0.71	0.82	48.1
Approach		661	10.0	696	10.0	0.438	5.5	LOS A	2.6	19.9	0.73	0.69	0.80	47.4
West: Hannon Road														
10	L2	1	10.0	1	10.0	0.921	85.2	LOS F	17.5	133.0	1.00	1.81	2.80	23.4
11	T1	104	10.0	109	10.0	0.921	84.1	LOS F	17.5	133.0	1.00	1.81	2.80	23.8
12	R2	389	10.0	409	10.0	0.921	92.0	LOS F	17.5	133.0	1.00	1.75	2.73	23.5
Approach		494	10.0	520	10.0	0.921	90.3	LOS F	17.5	133.0	1.00	1.76	2.75	23.5
All Vehicles		4217	10.0	4439	10.0	1.328	133.8	LOS F	235.5	1789.9	0.91	3.82	6.39	18.1

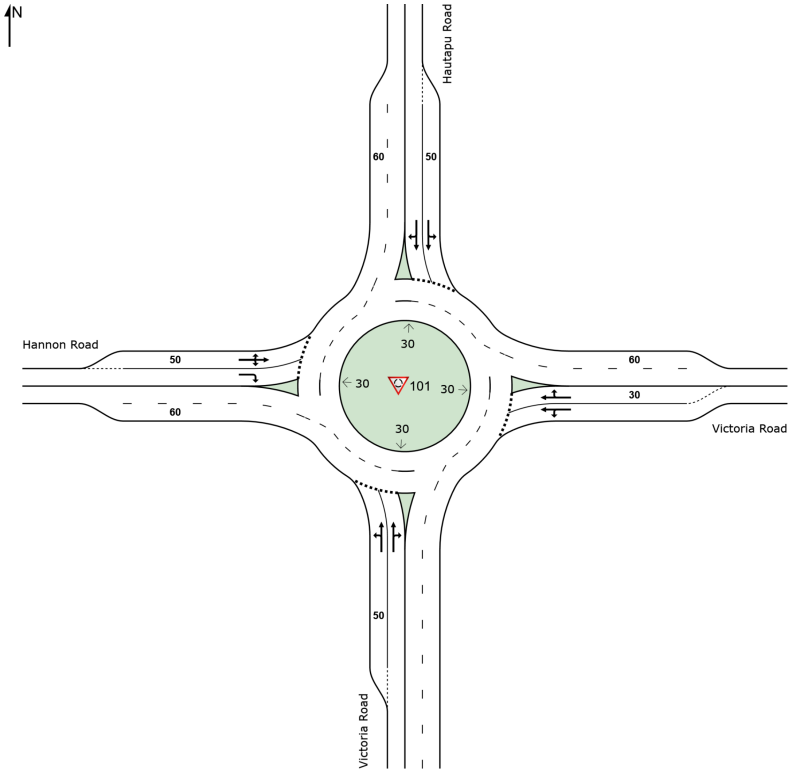
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_100%:0% E/W distr_Dual Lane_PM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_100%:0% E/W distr_Dual Lane_PM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	389	10.0	409	10.0	0.413	3.9	LOS A	2.7	20.2	0.50	0.52	0.50	47.3
2	T1	513	10.0	540	10.0	0.694	3.5	LOS A	7.0	53.2	0.67	0.51	0.67	47.2
3	R2	341	10.0	359	10.0	0.694	9.1	LOS A	7.0	53.2	0.67	0.51	0.67	47.7
Approach		1243	10.0	1308	10.0	0.694	5.1	LOS A	7.0	53.2	0.61	0.51	0.61	47.3
East: Victoria Road														
4	L2	523	10.0	551	10.0	0.860	20.6	LOS C	9.6	73.2	0.96	1.41	2.07	39.3
5	T1	104	10.0	109	10.0	0.429	10.4	LOS B	2.2	16.8	0.82	0.96	0.99	44.4
6	R2	76	10.0	80	10.0	0.429	15.8	LOS B	2.2	16.8	0.82	0.96	0.99	44.9
Approach		703	10.0	740	10.0	0.860	18.6	LOS B	9.6	73.2	0.92	1.30	1.79	40.6
North: Hautapu Road														
7	L2	248	10.0	261	10.0	1.189	189.1	LOS F	82.4	626.4	1.00	5.14	11.20	14.2
8	T1	907	10.0	955	10.0	1.189	190.6	LOS F	82.4	626.4	1.00	4.73	10.50	14.2
9	R2	1	10.0	1	10.0	1.189	198.0	LOS F	61.9	470.2	1.00	4.37	9.90	14.2
Approach		1156	10.0	1217	10.0	1.189	190.3	LOS F	82.4	626.4	1.00	4.82	10.65	14.2
West: Hannon Road														
10	L2	1	10.0	1	10.0	1.182	200.4	LOS F	86.0	653.4	1.00	4.54	8.72	13.7
11	T1	242	10.0	255	10.0	1.182	199.8	LOS F	86.0	653.4	1.00	4.54	8.72	13.8
12	R2	908	10.0	956	10.0	1.182	206.8	LOS F	86.0	653.4	1.00	4.29	8.40	13.7
Approach		1151	10.0	1212	10.0	1.182	205.3	LOS F	86.0	653.4	1.00	4.34	8.47	13.7
All Vehicles		4253	10.0	4477	10.0	1.189	111.8	LOS F	86.0	653.4	0.87	2.85	5.66	20.3

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

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_80%:20% E/W distr_Dual Lane_AM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

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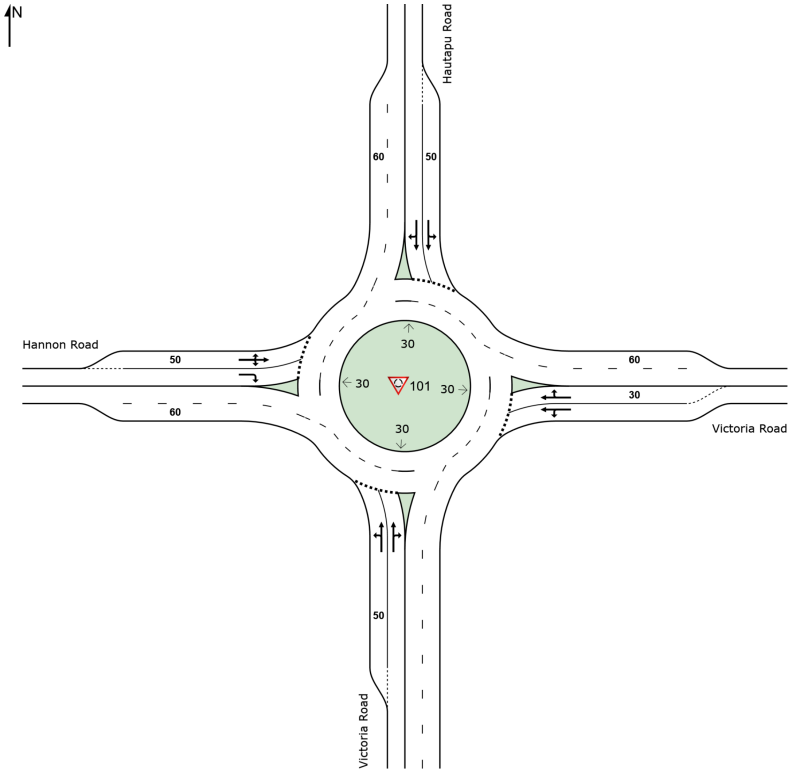


MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_80%:20% E/W distr_Dual Lane_AM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	726	10.0	764	10.0	0.879	15.0	LOS B	15.8	119.9	1.00	1.24	1.60	41.8
2	T1	853	10.0	898	10.0	1.170	165.5	LOS F	138.5	1052.4	1.00	5.26	8.80	15.8
3	R2	344	10.0	362	10.0	1.170	171.0	LOS F	138.5	1052.4	1.00	5.26	8.80	15.8
Approach		1923	10.0	2024	10.0	1.170	109.7	LOS F	138.5	1052.4	1.00	3.74	6.08	20.5
East: Victoria Road														
4	L2	427	10.0	449	10.0	0.488	6.0	LOS A	2.9	22.0	0.71	0.86	0.82	46.6
5	T1	242	10.0	255	10.0	0.534	7.3	LOS A	3.2	24.4	0.74	0.91	0.91	46.5
6	R2	141	10.0	148	10.0	0.534	12.3	LOS B	3.2	24.4	0.74	0.91	0.91	46.9
Approach		810	10.0	853	10.0	0.534	7.5	LOS A	3.2	24.4	0.72	0.88	0.86	46.6
North: Hautapu Road														
7	L2	143	10.0	151	10.0	0.408	5.3	LOS A	2.3	17.7	0.70	0.63	0.73	46.4
8	T1	495	10.0	521	10.0	0.408	5.2	LOS A	2.3	17.7	0.70	0.65	0.75	47.8
9	R2	1	10.0	1	10.0	0.408	11.5	LOS B	2.2	16.9	0.71	0.66	0.76	48.2
Approach		639	10.0	673	10.0	0.408	5.2	LOS A	2.3	17.7	0.70	0.65	0.74	47.5
West: Hannon Road														
10	L2	1	10.0	1	10.0	0.800	54.5	LOS E	10.8	82.2	1.00	1.45	2.00	28.9
11	T1	104	10.0	109	10.0	0.800	53.4	LOS E	10.8	82.2	1.00	1.45	2.00	29.5
12	R2	311	10.0	327	10.0	0.800	61.3	LOS E	10.8	82.2	1.00	1.42	1.97	28.9
Approach		416	10.0	438	10.0	0.800	59.3	LOS E	10.8	82.2	1.00	1.42	1.98	29.0
All Vehicles		3788	10.0	3987	10.0	1.170	64.7	LOS E	138.5	1052.4	0.89	2.35	3.61	27.3

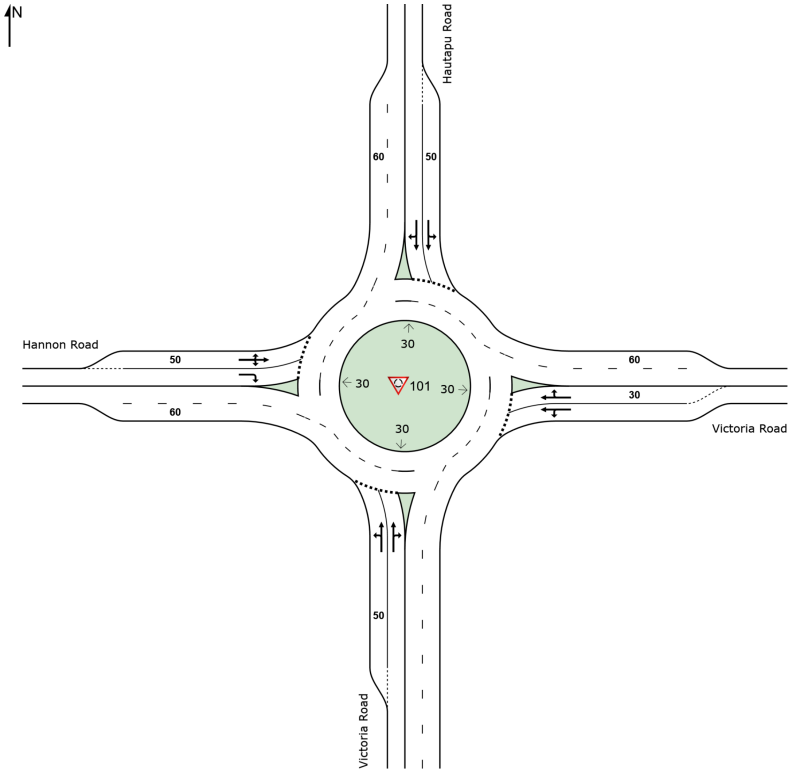
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

SITE LAYOUT

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_80%:20% E/W distr_Dual Lane_PM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Victoria Rd/ Hautapu Rd_C8/C9 (91ha) + Area 6 (20ha)+ HLG site (20ha)_80%:20% E/W distr_Dual Lane_PM (Site Folder: Victoria Road & Hautapu Road Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Road														
1	L2	311	10.0	327	10.0	0.349	3.9	LOS A	2.1	15.8	0.47	0.51	0.47	47.4
2	T1	485	10.0	511	10.0	0.668	3.3	LOS A	6.5	49.2	0.63	0.50	0.63	47.2
3	R2	341	10.0	359	10.0	0.668	9.0	LOS A	6.5	49.2	0.63	0.50	0.63	47.7
Approach		1137	10.0	1197	10.0	0.668	5.2	LOS A	6.5	49.2	0.59	0.50	0.59	47.4
East: Victoria Road														
4	L2	523	10.0	551	10.0	0.866	21.5	LOS C	10.0	76.3	0.97	1.44	2.12	39.0
5	T1	104	10.0	109	10.0	0.421	10.4	LOS B	2.2	16.5	0.82	0.95	0.98	44.5
6	R2	71	10.0	75	10.0	0.421	15.8	LOS B	2.2	16.5	0.82	0.95	0.98	45.0
Approach		698	10.0	735	10.0	0.866	19.2	LOS B	10.0	76.3	0.93	1.32	1.83	40.3
North: Hautapu Road														
7	L2	221	10.0	233	10.0	1.036	69.9	LOS E	32.1	244.0	1.00	2.67	5.11	26.0
8	T1	800	10.0	842	10.0	1.036	72.6	LOS F	32.1	244.0	1.00	2.54	4.93	25.9
9	R2	1	10.0	1	10.0	1.036	81.0	LOS F	25.3	192.0	1.00	2.43	4.78	25.6
Approach		1022	10.0	1076	10.0	1.036	72.1	LOS F	32.1	244.0	1.00	2.57	4.97	25.9
West: Hannon Road														
10	L2	1	10.0	1	10.0	0.930	46.6	LOS D	22.4	170.3	1.00	1.90	2.96	30.7
11	T1	242	10.0	255	10.0	0.930	46.0	LOS D	22.4	170.3	1.00	1.90	2.96	31.3
12	R2	726	10.0	764	10.0	0.930	53.5	LOS E	22.4	170.3	1.00	1.86	2.93	30.7
Approach		969	10.0	1020	10.0	0.930	51.6	LOS E	22.4	170.3	1.00	1.87	2.94	30.8
All Vehicles		3826	10.0	4027	10.0	1.036	37.4	LOS D	32.1	244.0	0.86	1.55	2.58	34.1

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

HLG Submission SIDRA Intersection Results:

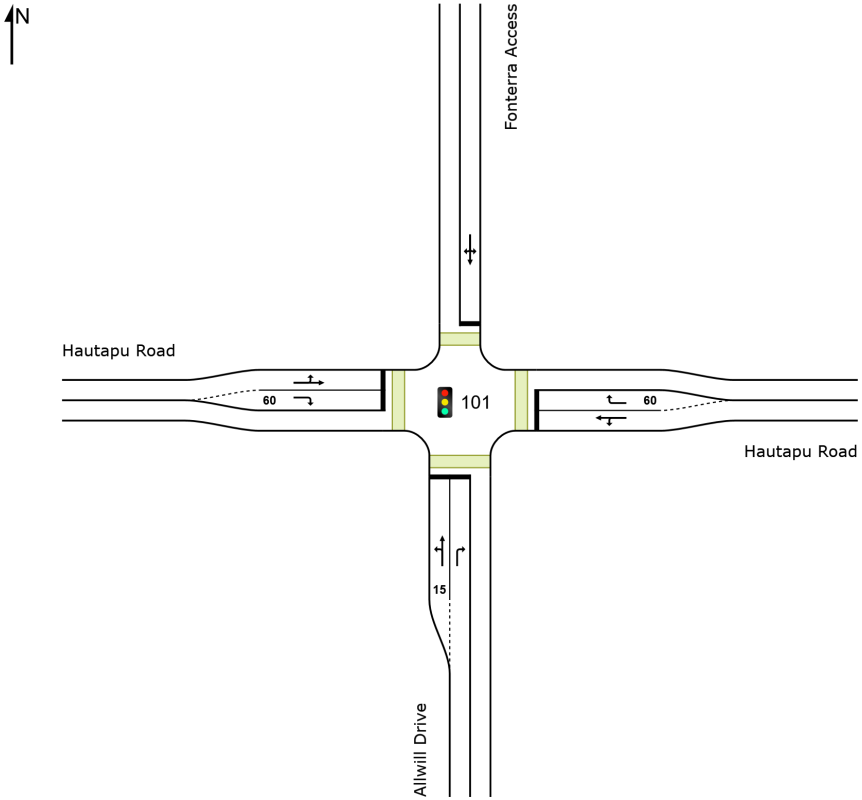
Hautapu Road / Allwill Drive Intersection

SITE LAYOUT

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Signals_AM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Signals_AM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Allwill Drive														
1	L2	1	10.0	1	10.0	0.014	63.9	LOS E	0.1	0.9	0.94	0.60	0.94	26.9
2	T1	1	10.0	1	10.0	0.014	59.3	LOS E	0.1	0.9	0.94	0.60	0.94	27.1
3	R2	107	10.0	113	10.0	* 0.775	73.6	LOS E	7.6	57.8	1.00	0.88	1.20	24.7
Approach		109	10.0	115	10.0	0.775	73.3	LOS E	7.6	57.8	1.00	0.87	1.20	24.7
East: Hautapu Road														
4	L2	304	10.0	320	10.0	0.801	23.9	LOS C	36.0	273.5	0.78	0.76	0.78	38.4
5	T1	463	10.0	487	10.0	* 0.801	19.3	LOS B	36.0	273.5	0.78	0.76	0.78	38.8
6	R2	76	10.0	80	10.0	0.333	60.3	LOS E	4.7	35.6	0.95	0.77	0.95	27.0
Approach		843	10.0	887	10.0	0.801	24.7	LOS C	36.0	273.5	0.79	0.76	0.79	37.2
North: Fonterra Access														
7	L2	208	10.0	219	10.0	0.508	49.6	LOS D	12.1	91.8	0.91	0.81	0.91	29.6
8	T1	1	10.0	1	10.0	* 0.508	45.0	LOS D	12.1	91.8	0.91	0.81	0.91	29.8
9	R2	1	10.0	1	10.0	0.508	49.6	LOS D	12.1	91.8	0.91	0.81	0.91	29.5
Approach		210	10.0	221	10.0	0.508	49.6	LOS D	12.1	91.8	0.91	0.81	0.91	29.6
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.336	24.2	LOS C	11.6	87.9	0.63	0.55	0.63	39.0
11	T1	300	10.0	316	10.0	0.336	19.5	LOS B	11.6	87.9	0.63	0.55	0.63	39.4
12	R2	1	10.0	1	10.0	* 0.013	70.5	LOS E	0.1	0.5	0.97	0.59	0.97	25.2
Approach		302	10.0	318	10.0	0.336	19.7	LOS B	11.6	87.9	0.63	0.55	0.63	39.4
All Vehicles		1464	10.0	1541	10.0	0.801	30.8	LOS C	36.0	273.5	0.79	0.73	0.80	35.0

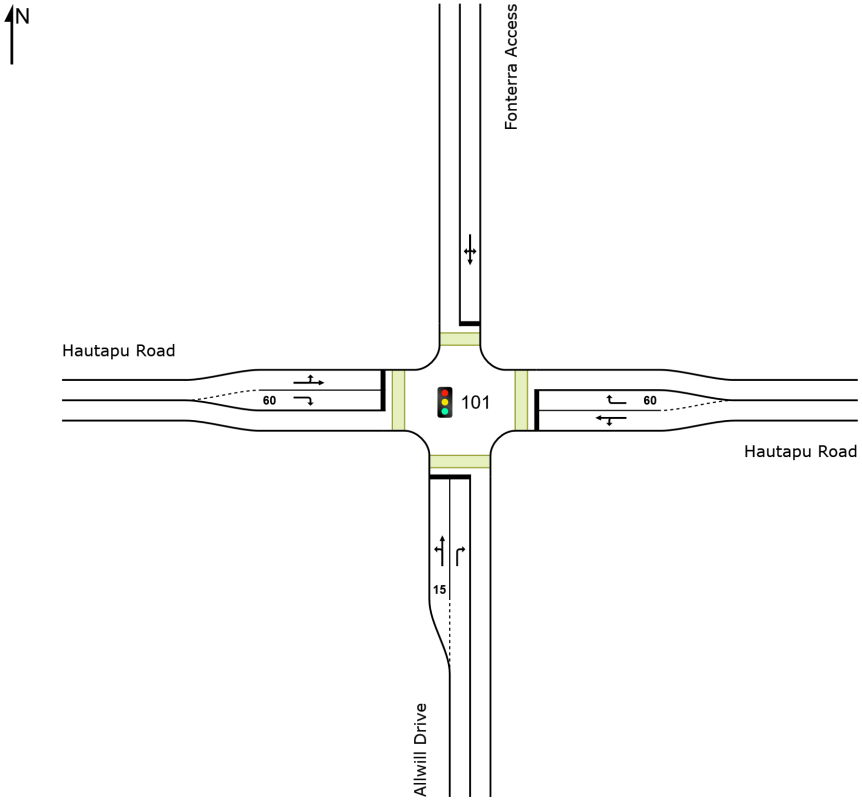
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

SITE LAYOUT

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Signals_PM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Signals_PM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Allwill Drive														
1	L2	1	10.0	1	10.0	0.005	39.4	LOS D	0.1	0.7	0.79	0.56	0.79	32.9
2	T1	1	10.0	1	10.0	0.005	34.8	LOS C	0.1	0.7	0.79	0.56	0.79	33.2
3	R2	304	10.0	320	10.0	*0.816	53.9	LOS D	17.9	135.9	1.00	0.92	1.16	28.5
Approach		306	10.0	322	10.0	0.816	53.8	LOS D	17.9	135.9	1.00	0.92	1.15	28.5
East: Hautapu Road														
4	L2	107	10.0	113	10.0	0.758	32.9	LOS C	19.2	145.6	0.83	0.78	0.87	35.3
5	T1	317	10.0	334	10.0	0.758	28.3	LOS C	19.2	145.6	0.83	0.78	0.87	35.6
6	R2	205	10.0	216	10.0	*0.805	59.0	LOS E	12.3	93.4	1.00	0.91	1.19	27.3
Approach		629	10.0	662	10.0	0.805	39.1	LOS D	19.2	145.6	0.88	0.82	0.97	32.4
North: Fonterra Access														
7	L2	79	10.0	83	10.0	0.188	38.5	LOS D	3.6	27.0	0.81	0.74	0.81	32.5
8	T1	1	10.0	1	10.0	*0.188	33.9	LOS C	3.6	27.0	0.81	0.74	0.81	32.8
9	R2	1	10.0	1	10.0	0.188	38.5	LOS D	3.6	27.0	0.81	0.74	0.81	32.4
Approach		81	10.0	85	10.0	0.188	38.5	LOS D	3.6	27.0	0.81	0.74	0.81	32.5
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.809	45.7	LOS D	24.8	188.7	0.98	0.93	1.07	31.7
11	T1	446	10.0	469	10.0	*0.809	41.0	LOS D	24.8	188.7	0.98	0.93	1.07	32.0
12	R2	1	10.0	1	10.0	0.011	59.4	LOS E	0.1	0.4	0.96	0.59	0.96	27.3
Approach		448	10.0	472	10.0	0.809	41.1	LOS D	24.8	188.7	0.98	0.93	1.07	32.0
All Vehicles		1464	10.0	1541	10.0	0.816	42.7	LOS D	24.8	188.7	0.93	0.87	1.03	31.4

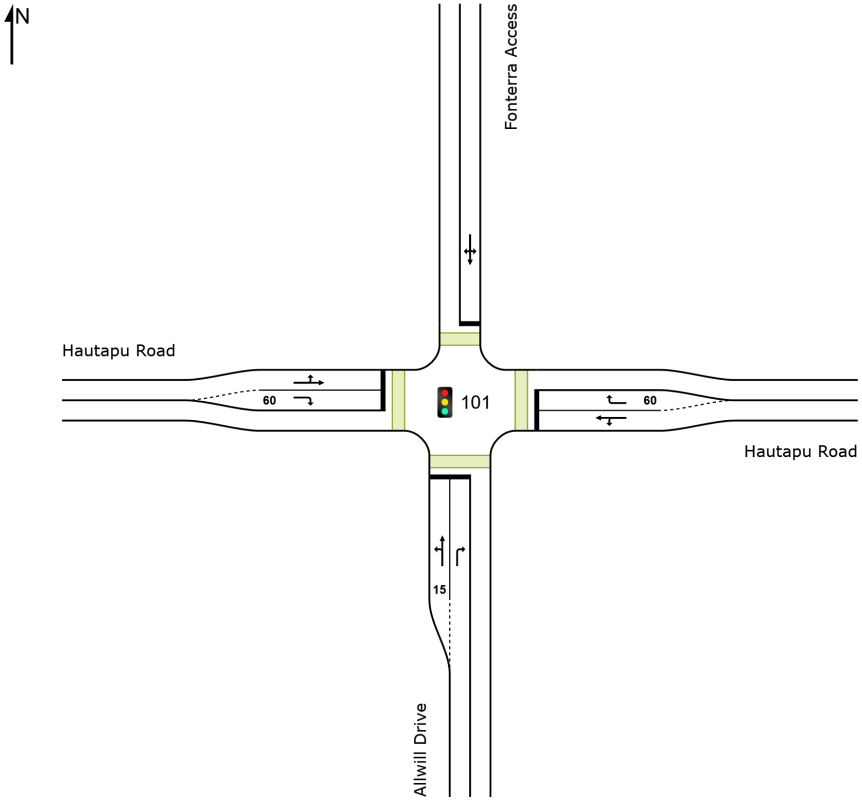
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

SITE LAYOUT

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Signals_AM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Signals_AM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Allwill Drive														
1	L2	1	10.0	1	10.0	0.014	54.0	LOS D	0.1	0.9	0.93	0.59	0.93	29.1
2	T1	1	10.0	1	10.0	0.014	49.3	LOS D	0.1	0.9	0.93	0.59	0.93	29.3
3	R2	107	10.0	113	10.0	* 0.895	93.1	LOS F	9.3	71.0	1.00	0.97	1.41	21.8
Approach		109	10.0	115	10.0	0.895	92.3	LOS F	9.3	71.0	1.00	0.96	1.40	21.9
East: Hautapu Road														
4	L2	304	10.0	320	10.0	1.070	133.2	LOS F	147.4	1120.2	1.00	1.38	1.61	17.8
5	T1	828	10.0	872	10.0	* 1.070	128.6	LOS F	147.4	1120.2	1.00	1.38	1.61	17.8
6	R2	76	10.0	80	10.0	0.346	69.3	LOS E	5.4	41.1	0.95	0.77	0.95	25.3
Approach		1208	10.0	1272	10.0	1.070	126.0	LOS F	147.4	1120.2	1.00	1.34	1.57	18.2
North: Fonterra Access														
7	L2	208	10.0	219	10.0	0.540	58.4	LOS E	14.2	107.6	0.93	0.82	0.93	27.6
8	T1	1	10.0	1	10.0	* 0.540	53.7	LOS D	14.2	107.6	0.93	0.82	0.93	27.8
9	R2	1	10.0	1	10.0	0.540	58.4	LOS E	14.2	107.6	0.93	0.82	0.93	27.6
Approach		210	10.0	221	10.0	0.540	58.3	LOS E	14.2	107.6	0.93	0.82	0.93	27.6
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.347	23.6	LOS C	13.8	105.2	0.59	0.52	0.59	39.3
11	T1	336	10.0	354	10.0	0.347	18.9	LOS B	13.8	105.2	0.59	0.52	0.59	39.7
12	R2	1	10.0	1	10.0	* 0.015	81.6	LOS F	0.1	0.6	0.98	0.59	0.98	23.4
Approach		338	10.0	356	10.0	0.347	19.1	LOS B	13.8	105.2	0.59	0.52	0.59	39.6
All Vehicles		1865	10.0	1963	10.0	1.070	97.1	LOS F	147.4	1120.2	0.91	1.11	1.31	21.3

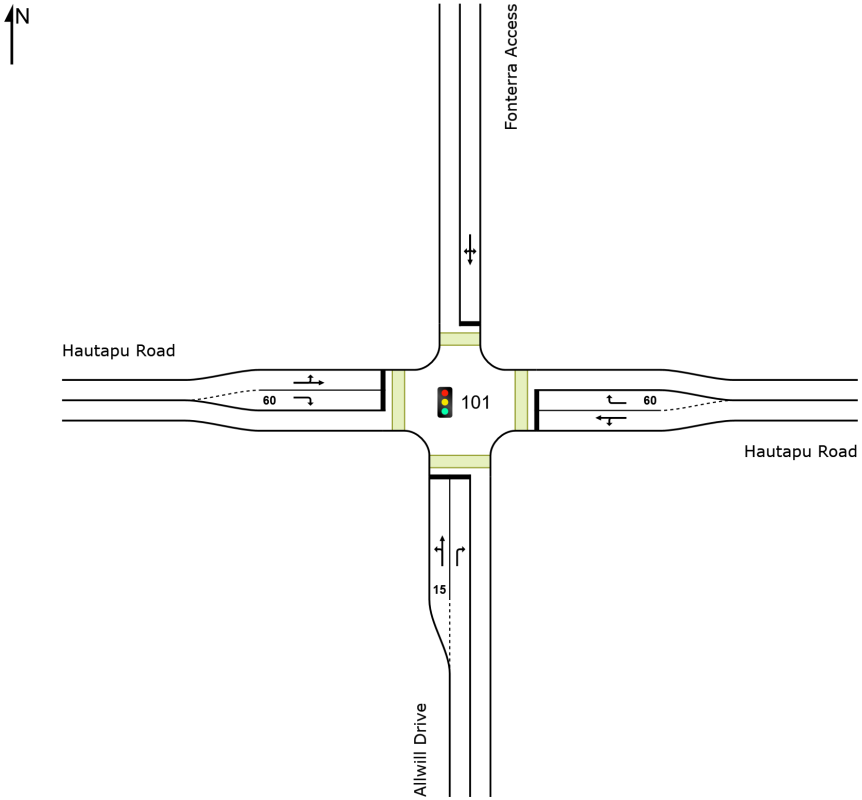
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

SITE LAYOUT

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Signals_PM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Signals_PM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Allwill Drive														
1	L2	1	10.0	1	10.0	0.006	50.5	LOS D	0.1	0.8	0.84	0.57	0.84	29.9
2	T1	1	10.0	1	10.0	0.006	45.8	LOS D	0.1	0.8	0.84	0.57	0.84	30.1
3	R2	304	10.0	320	10.0	* 1.005	112.9	LOS F	29.4	223.2	1.00	1.14	1.64	19.5
Approach		306	10.0	322	10.0	1.005	112.4	LOS F	29.4	223.2	1.00	1.14	1.64	19.5
East: Hautapu Road														
4	L2	107	10.0	113	10.0	0.743	28.2	LOS C	22.9	173.7	0.75	0.70	0.75	37.0
5	T1	393	10.0	414	10.0	0.743	23.6	LOS C	22.9	173.7	0.75	0.70	0.75	37.4
6	R2	205	10.0	216	10.0	* 1.011	117.4	LOS F	19.7	149.9	1.00	1.13	1.74	18.9
Approach		705	10.0	742	10.0	1.011	51.6	LOS D	22.9	173.7	0.82	0.82	1.04	29.1
North: Fonterra Access														
7	L2	79	10.0	83	10.0	0.220	48.4	LOS D	4.4	33.4	0.85	0.75	0.85	29.9
8	T1	1	10.0	1	10.0	* 0.220	43.7	LOS D	4.4	33.4	0.85	0.75	0.85	30.1
9	R2	1	10.0	1	10.0	0.220	48.4	LOS D	4.4	33.4	0.85	0.75	0.85	29.8
Approach		81	10.0	85	10.0	0.220	48.3	LOS D	4.4	33.4	0.85	0.75	0.85	29.9
West: Hautapu Road														
10	L2	1	10.0	1	10.0	1.031	114.5	LOS F	82.3	625.2	1.00	1.38	1.58	19.7
11	T1	771	10.0	812	10.0	* 1.031	109.9	LOS F	82.3	625.2	1.00	1.38	1.58	19.8
12	R2	1	10.0	1	10.0	0.013	70.5	LOS E	0.1	0.5	0.97	0.59	0.97	25.2
Approach		773	10.0	814	10.0	1.031	109.8	LOS F	82.3	625.2	1.00	1.38	1.58	19.8
All Vehicles		1865	10.0	1963	10.0	1.031	85.6	LOS F	82.3	625.2	0.93	1.10	1.35	22.9

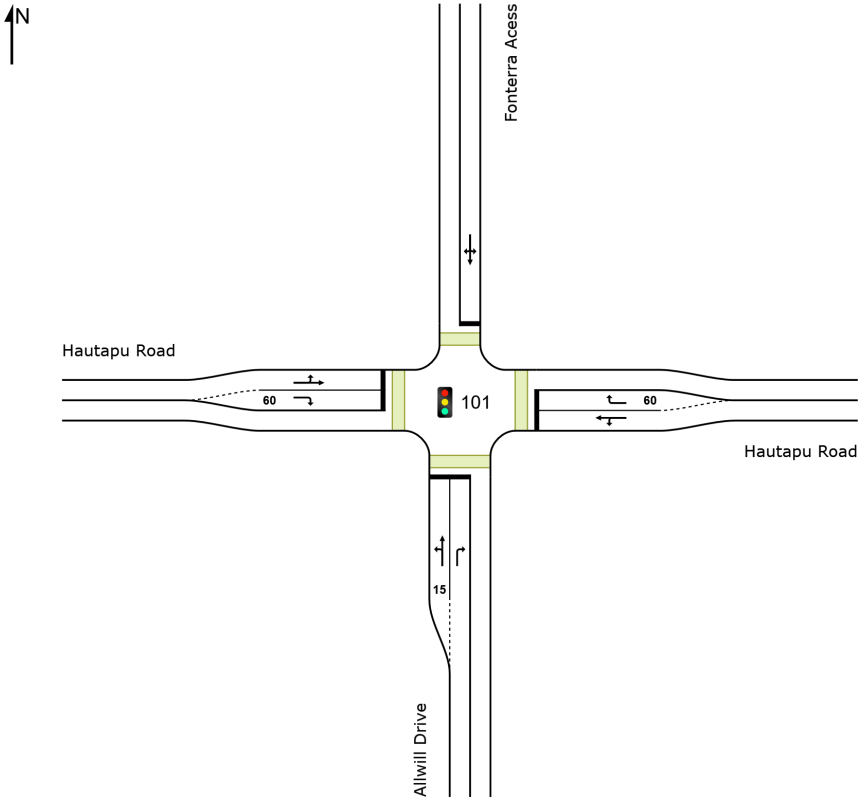
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

SITE LAYOUT

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Signals_AM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Signals_AM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Allwill Drive														
1	L2	78	10.0	82	10.0	0.207	20.8	LOS C	1.9	14.7	0.84	0.73	0.84	38.6
2	T1	1	10.0	1	10.0	*0.207	16.1	LOS B	1.9	14.7	0.84	0.73	0.84	39.0
3	R2	29	10.0	31	10.0	0.201	43.5	LOS D	1.2	9.0	0.96	0.72	0.96	31.0
Approach		108	10.0	114	10.0	0.207	26.8	LOS C	1.9	14.7	0.87	0.73	0.87	36.2
East: Hautapu Road														
4	L2	122	10.0	128	10.0	0.830	34.1	LOS C	21.4	162.8	0.94	0.95	1.10	34.9
5	T1	394	10.0	415	10.0	*0.830	29.4	LOS C	21.4	162.8	0.94	0.95	1.10	35.3
6	R2	76	10.0	80	10.0	0.336	39.8	LOS D	3.0	22.5	0.94	0.76	0.94	31.8
Approach		592	10.0	623	10.0	0.830	31.7	LOS C	21.4	162.8	0.94	0.93	1.08	34.7
North: Fonterra Acess														
7	L2	208	10.0	219	10.0	0.438	29.4	LOS C	7.1	53.9	0.85	0.79	0.85	35.4
8	T1	1	10.0	1	10.0	*0.438	24.8	LOS C	7.1	53.9	0.85	0.79	0.85	35.7
9	R2	1	10.0	1	10.0	0.438	29.4	LOS C	7.1	53.9	0.85	0.79	0.85	35.2
Approach		210	10.0	221	10.0	0.438	29.4	LOS C	7.1	53.9	0.85	0.79	0.85	35.4
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.432	24.2	LOS C	8.9	67.3	0.78	0.67	0.78	39.0
11	T1	290	10.0	305	10.0	0.432	19.5	LOS B	8.9	67.3	0.78	0.67	0.78	39.4
12	R2	182	10.0	192	10.0	*0.804	46.7	LOS D	8.2	62.5	1.00	0.94	1.28	30.2
Approach		473	10.0	498	10.0	0.804	30.0	LOS C	8.9	67.3	0.87	0.77	0.97	35.3
All Vehicles		1383	10.0	1456	10.0	0.830	30.4	LOS C	21.4	162.8	0.90	0.84	0.99	35.1

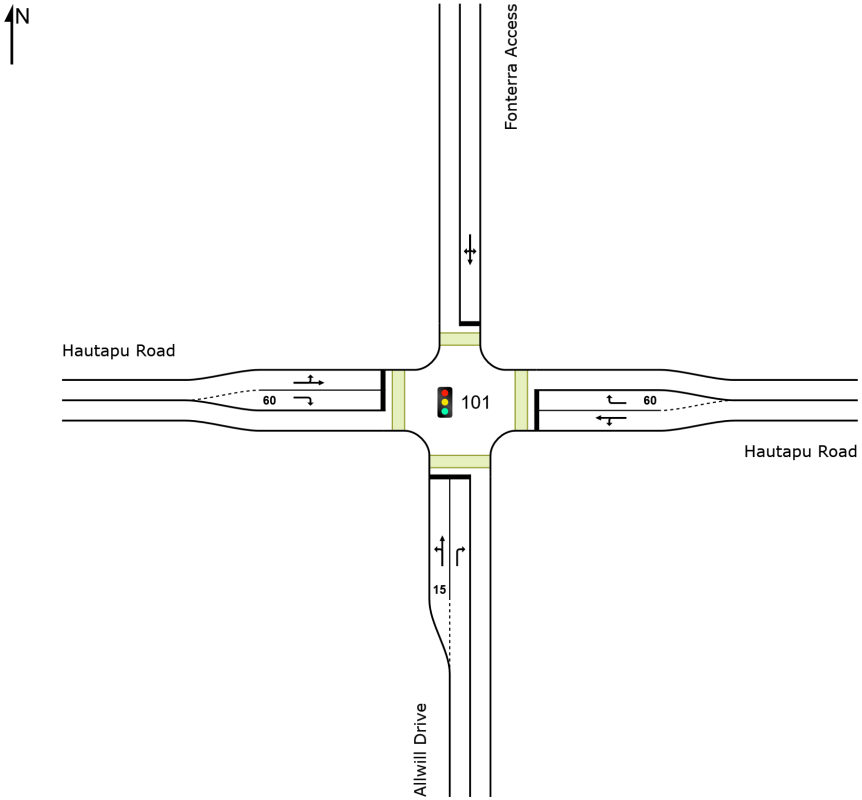
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

SITE LAYOUT

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Signals_PM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Allwill Dr_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Signals_PM (Site Folder: Hautapu Road/ Allwill Drive Intersection)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Allwill Drive														
1	L2	182	10.0	192	10.0	0.845	42.5	LOS D	7.4	56.1	0.98	1.02	1.43	31.4
2	T1	1	10.0	1	10.0	*0.845	37.9	LOS D	7.4	56.1	0.98	1.02	1.43	31.6
3	R2	122	10.0	128	10.0	0.517	33.9	LOS C	4.1	31.3	0.94	0.78	0.94	33.7
Approach		305	10.0	321	10.0	0.845	39.1	LOS D	7.4	56.1	0.97	0.92	1.23	32.3
East: Hautapu Road														
4	L2	29	10.0	31	10.0	0.610	27.1	LOS C	10.4	78.8	0.90	0.78	0.90	37.7
5	T1	303	10.0	319	10.0	0.610	22.4	LOS C	10.4	78.8	0.90	0.78	0.90	38.1
6	R2	205	10.0	216	10.0	*0.871	46.0	LOS D	8.8	66.6	1.00	1.02	1.48	30.2
Approach		537	10.0	565	10.0	0.871	31.7	LOS C	10.4	78.8	0.94	0.87	1.13	34.6
North: Fonterra Access														
7	L2	79	10.0	83	10.0	0.169	24.4	LOS C	2.2	16.6	0.77	0.73	0.77	37.2
8	T1	1	10.0	1	10.0	*0.169	19.8	LOS B	2.2	16.6	0.77	0.73	0.77	37.5
9	R2	1	10.0	1	10.0	0.169	24.4	LOS C	2.2	16.6	0.77	0.73	0.77	37.0
Approach		81	10.0	85	10.0	0.169	24.4	LOS C	2.2	16.6	0.77	0.73	0.77	37.2
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.854	39.5	LOS D	15.7	119.0	1.00	1.07	1.30	33.5
11	T1	381	10.0	401	10.0	*0.854	34.9	LOS D	15.7	119.0	1.00	1.07	1.30	33.8
12	R2	78	10.0	82	10.0	0.553	40.9	LOS D	2.9	22.4	1.00	0.79	1.05	31.7
Approach		460	10.0	484	10.0	0.854	35.9	LOS D	15.7	119.0	1.00	1.02	1.26	33.4
All Vehicles		1383	10.0	1456	10.0	0.871	34.3	LOS C	15.7	119.0	0.96	0.92	1.17	33.8

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

HLG Submission SIDRA Intersection Results:

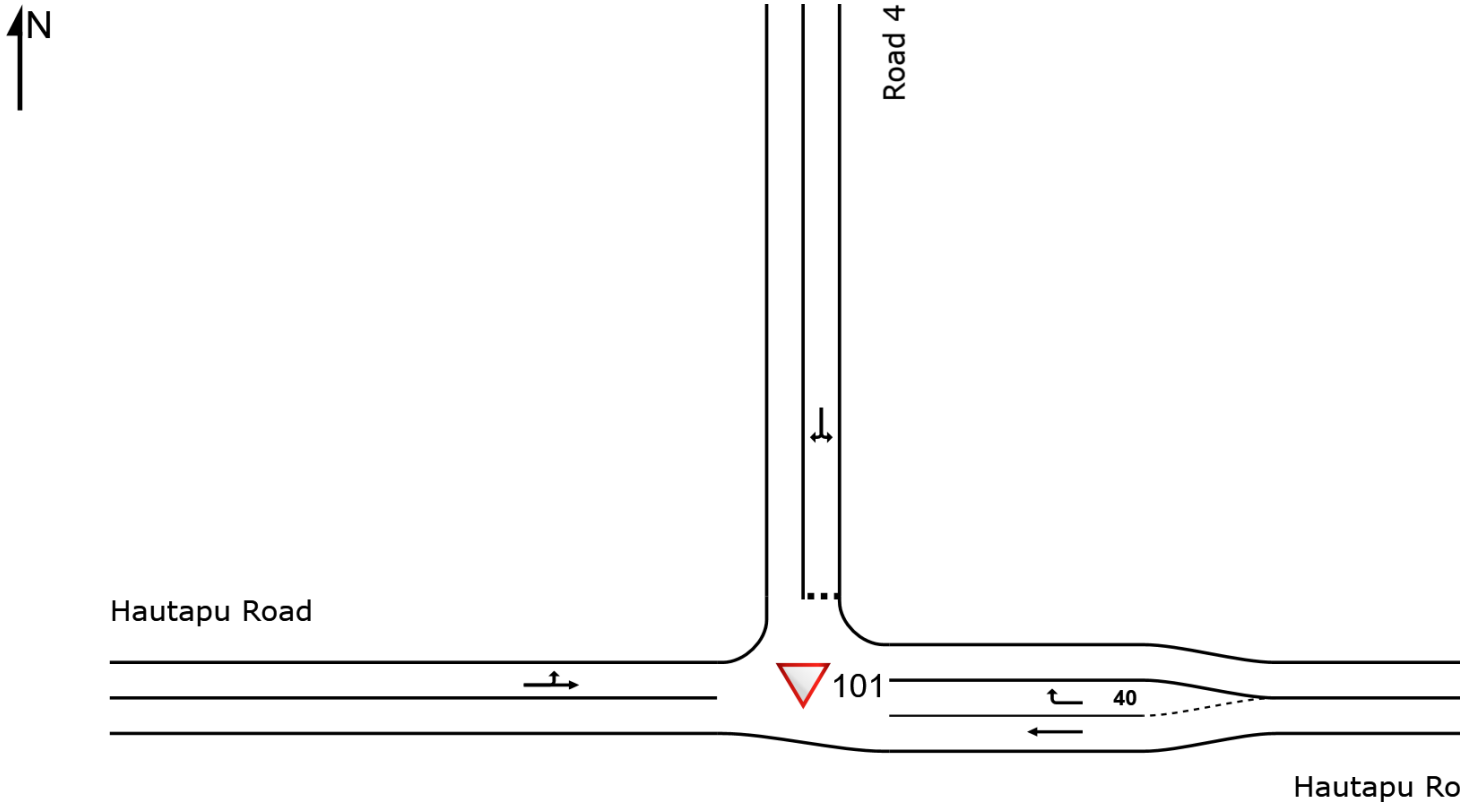
Hautapu Road / Road 4 Intersection

SITE LAYOUT

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Give-way_AM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Give-way_AM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hautapu Road														
5	T1	116	10.0	122	10.0	0.067	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	347	10.0	365	10.0	0.279	5.9	LOS A	1.4	11.0	0.44	0.62	0.44	45.1
Approach		463	10.0	487	10.0	0.279	4.4	NA	1.4	11.0	0.33	0.47	0.33	46.2
North: Road 4														
7	L2	52	10.0	55	10.0	0.048	5.6	LOS A	0.2	1.4	0.36	0.56	0.36	45.6
9	R2	1	10.0	1	10.0	0.048	12.3	LOS B	0.2	1.4	0.36	0.56	0.36	45.2
Approach		53	10.0	56	10.0	0.048	5.8	LOS A	0.2	1.4	0.36	0.56	0.36	45.6
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.143	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
11	T1	248	10.0	261	10.0	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		249	10.0	262	10.0	0.143	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		765	10.0	805	10.0	0.279	3.1	NA	1.4	11.0	0.22	0.32	0.22	47.3

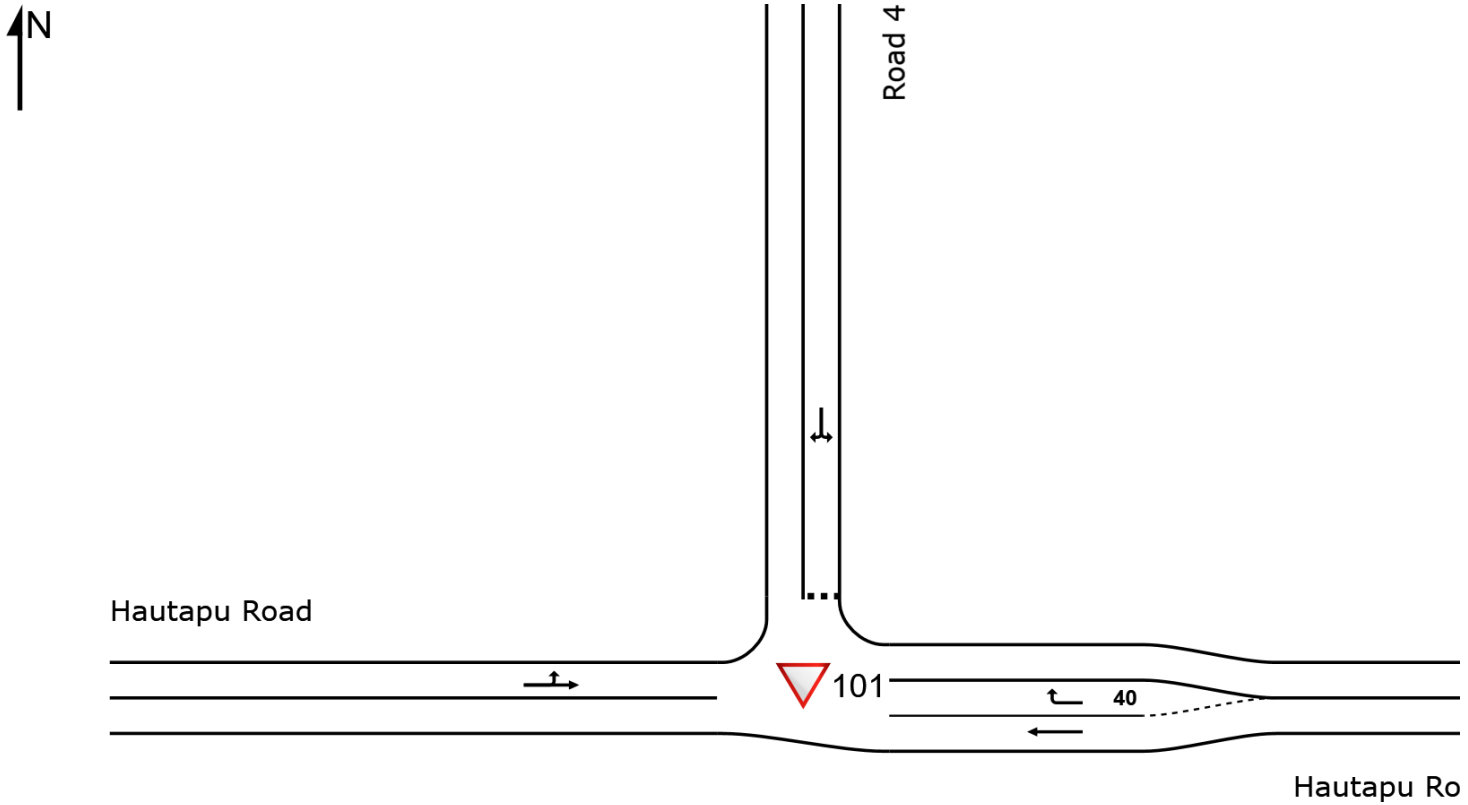
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Minor Road Approach LOS values are based on average delay for all movements (v/c not used).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Give-way_PM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) w/o HLG site_100%:0% E/W distr_Give-way_PM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hautapu Road														
5	T1	245	10.0	258	10.0	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
6	R2	72	10.0	76	10.0	0.050	5.1	LOS A	0.2	1.7	0.25	0.53	0.25	45.5
Approach		317	10.0	334	10.0	0.142	1.2	NA	0.2	1.7	0.06	0.12	0.06	48.9
North: Road 4														
7	L2	327	10.0	344	10.0	0.250	5.2	LOS A	1.2	9.1	0.27	0.53	0.27	45.8
9	R2	1	10.0	1	10.0	0.250	9.4	LOS A	1.2	9.1	0.27	0.53	0.27	45.4
Approach		328	10.0	345	10.0	0.250	5.2	LOS A	1.2	9.1	0.27	0.53	0.27	45.8
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.069	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
11	T1	119	10.0	125	10.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		120	10.0	126	10.0	0.069	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		765	10.0	805	10.0	0.250	2.7	NA	1.2	9.1	0.14	0.28	0.14	47.7

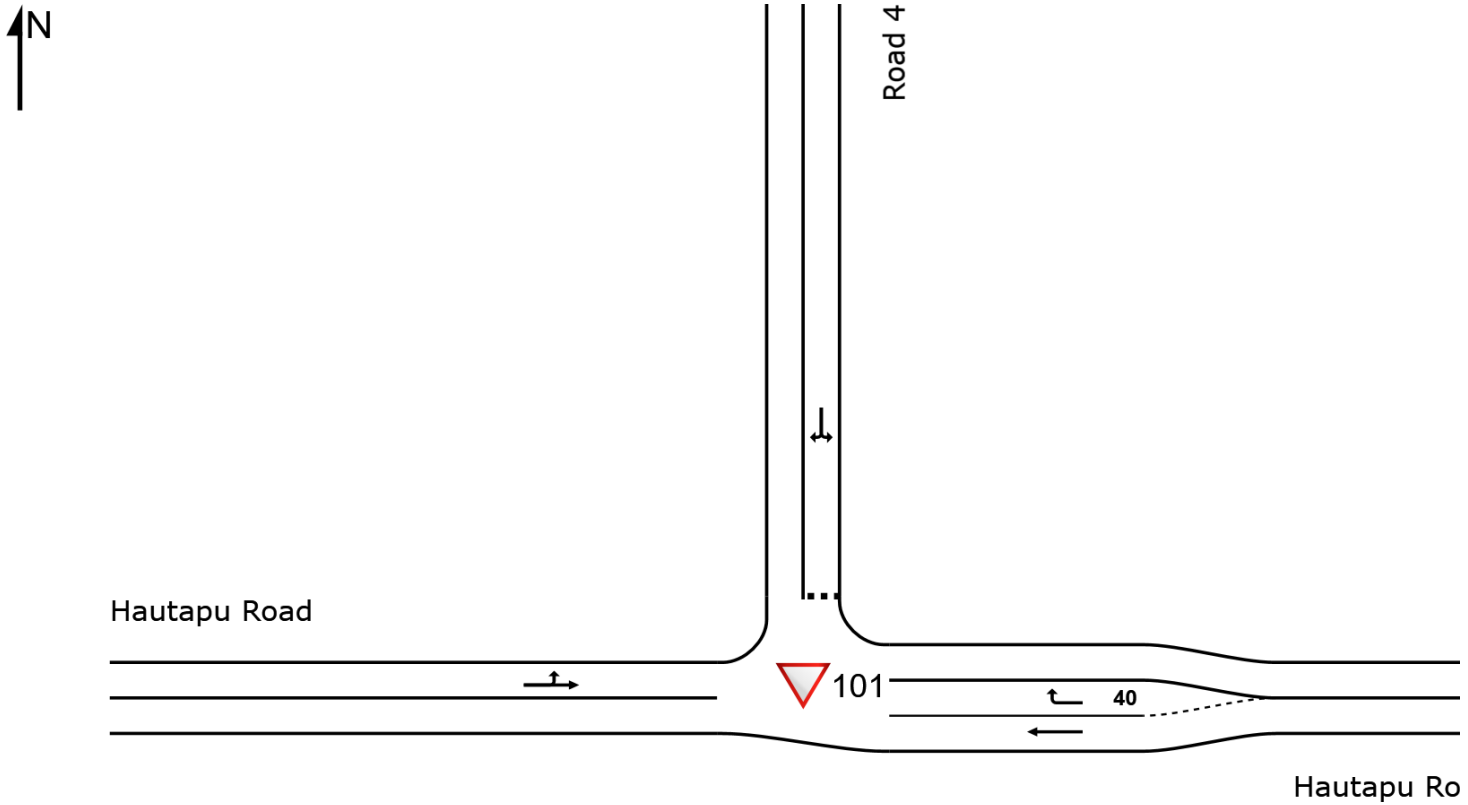
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Minor Road Approach LOS values are based on average delay for all movements (v/c not used).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Give-way_AM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Give-way_AM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hautapu Road														
5	T1	116	10.0	122	10.0	0.085	0.4	LOS A	0.4	2.9	0.33	0.00	0.33	49.1
6	R2	712	10.0	749	10.0	0.571	7.5	LOS A	6.0	45.6	0.57	0.75	0.76	44.4
Approach		828	10.0	872	10.0	0.571	6.5	NA	6.0	45.6	0.54	0.65	0.70	45.0
North: Road 4														
7	L2	88	10.0	93	10.0	0.083	5.7	LOS A	0.3	2.5	0.37	0.57	0.37	45.6
9	R2	1	10.0	1	10.0	0.083	26.2	LOS D	0.3	2.5	0.37	0.57	0.37	45.2
Approach		89	10.0	94	10.0	0.083	5.9	LOS A	0.3	2.5	0.37	0.57	0.37	45.6
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.143	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
11	T1	248	10.0	261	10.0	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		249	10.0	262	10.0	0.143	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		1166	10.0	1227	10.0	0.571	5.1	NA	6.0	45.6	0.41	0.50	0.52	46.0

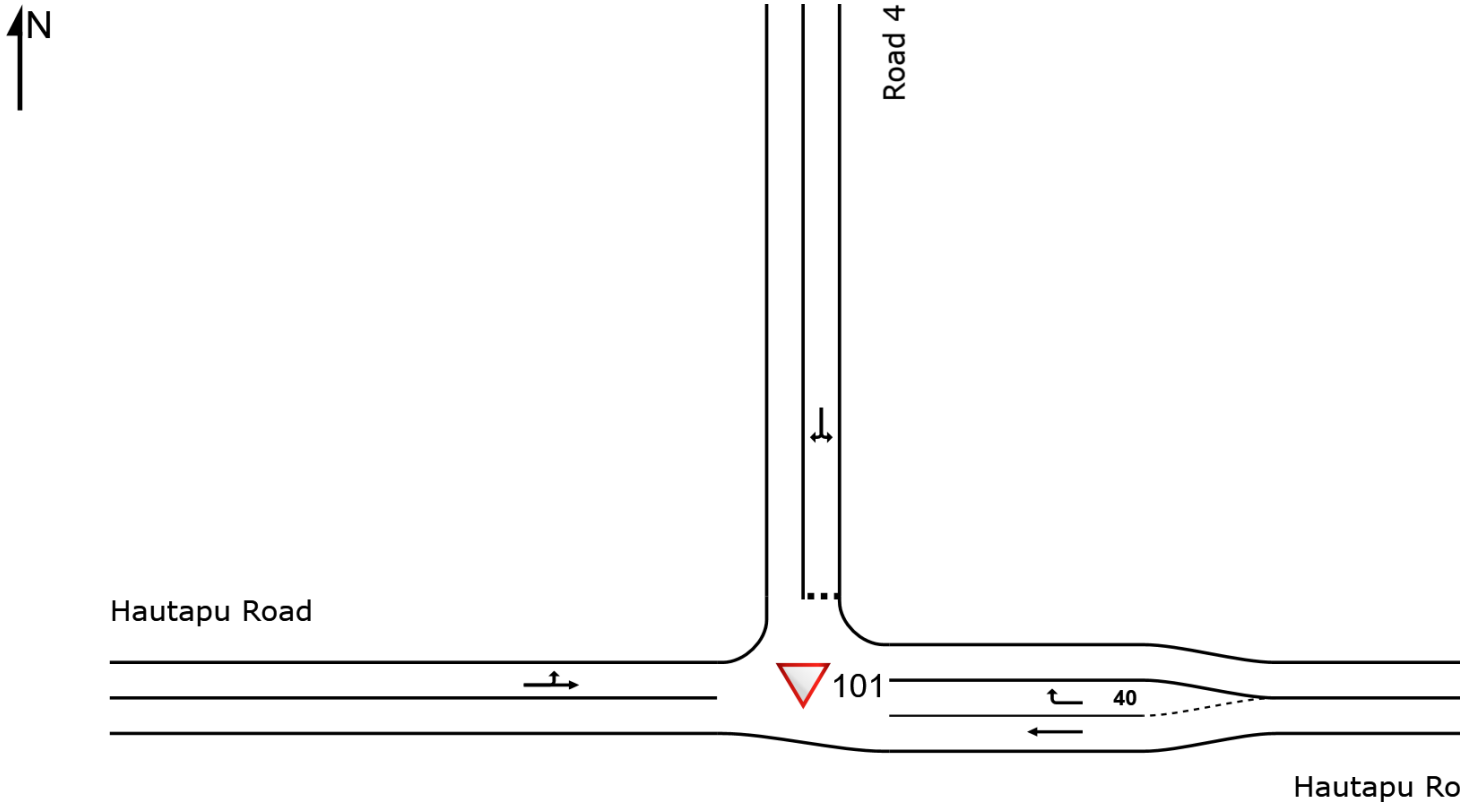
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Minor Road Approach LOS values are based on average delay for all movements (v/c not used).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Give-way_PM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_100%:0% E/W distr_Give-way_PM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hautapu Road														
5	T1	245	10.0	258	10.0	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
6	R2	148	10.0	156	10.0	0.103	5.1	LOS A	0.5	3.7	0.26	0.54	0.26	45.5
Approach		393	10.0	414	10.0	0.142	2.0	NA	0.5	3.7	0.10	0.20	0.10	48.2
North: Road 4														
7	L2	652	10.0	686	10.0	0.497	5.4	LOS A	3.2	24.1	0.36	0.54	0.36	45.6
9	R2	1	10.0	1	10.0	0.497	13.0	LOS B	3.2	24.1	0.36	0.54	0.36	45.2
Approach		653	10.0	687	10.0	0.497	5.5	LOS A	3.2	24.1	0.36	0.54	0.36	45.6
West: Hautapu Road														
10	L2	1	10.0	1	10.0	0.069	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
11	T1	119	10.0	125	10.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		120	10.0	126	10.0	0.069	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		1166	10.0	1227	10.0	0.497	3.7	NA	3.2	24.1	0.23	0.37	0.23	46.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Minor Road Approach LOS values are based on average delay for all movements (v/c not used).
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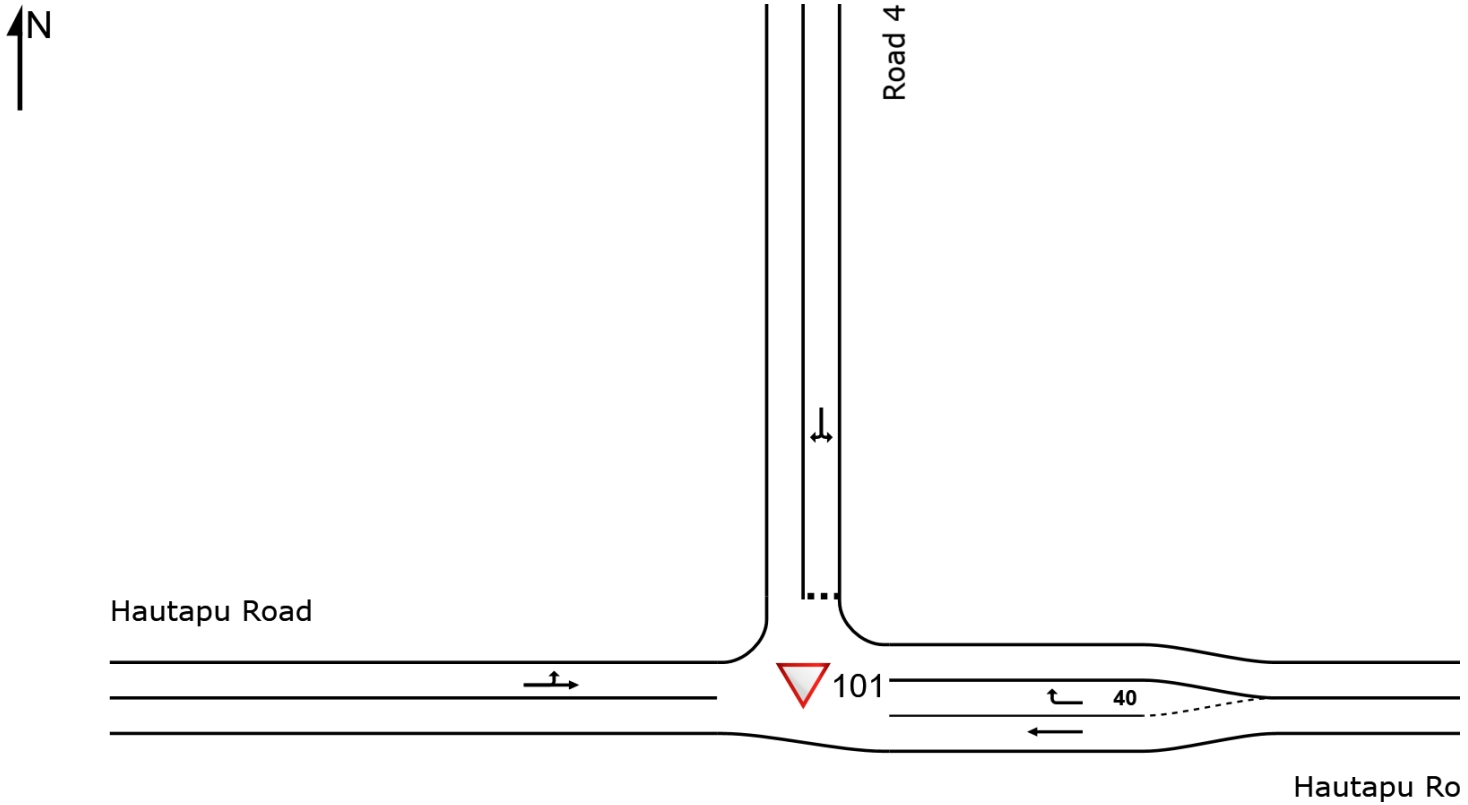
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Give-way_AM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Give-way_AM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hautapu Road														
5	T1	194	10.0	204	10.0	0.205	1.3	LOS A	0.9	7.1	0.51	0.00	0.51	48.6
6	R2	570	10.0	600	10.0	0.722	13.7	LOS B	7.5	56.7	0.79	1.30	1.74	41.3
Approach		764	10.0	804	10.0	0.722	10.6	NA	7.5	56.7	0.72	0.97	1.43	42.9
North: Road 4														
7	L2	70	10.0	74	10.0	0.219	6.8	LOS A	0.8	5.7	0.65	0.78	0.65	42.4
9	R2	18	10.0	19	10.0	0.219	33.8	LOS D	0.8	5.7	0.65	0.78	0.65	42.0
Approach		88	10.0	93	10.0	0.219	12.3	LOS B	0.8	5.7	0.65	0.78	0.65	42.3
West: Hautapu Road														
10	L2	142	10.0	149	10.0	0.333	4.8	LOS A	0.0	0.0	0.00	0.13	0.00	48.5
11	T1	430	10.0	453	10.0	0.333	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	49.1
Approach		572	10.0	602	10.0	0.333	1.3	NA	0.0	0.0	0.00	0.13	0.00	48.9
All Vehicles		1424	10.0	1499	10.0	0.722	6.9	NA	7.5	56.7	0.43	0.62	0.81	45.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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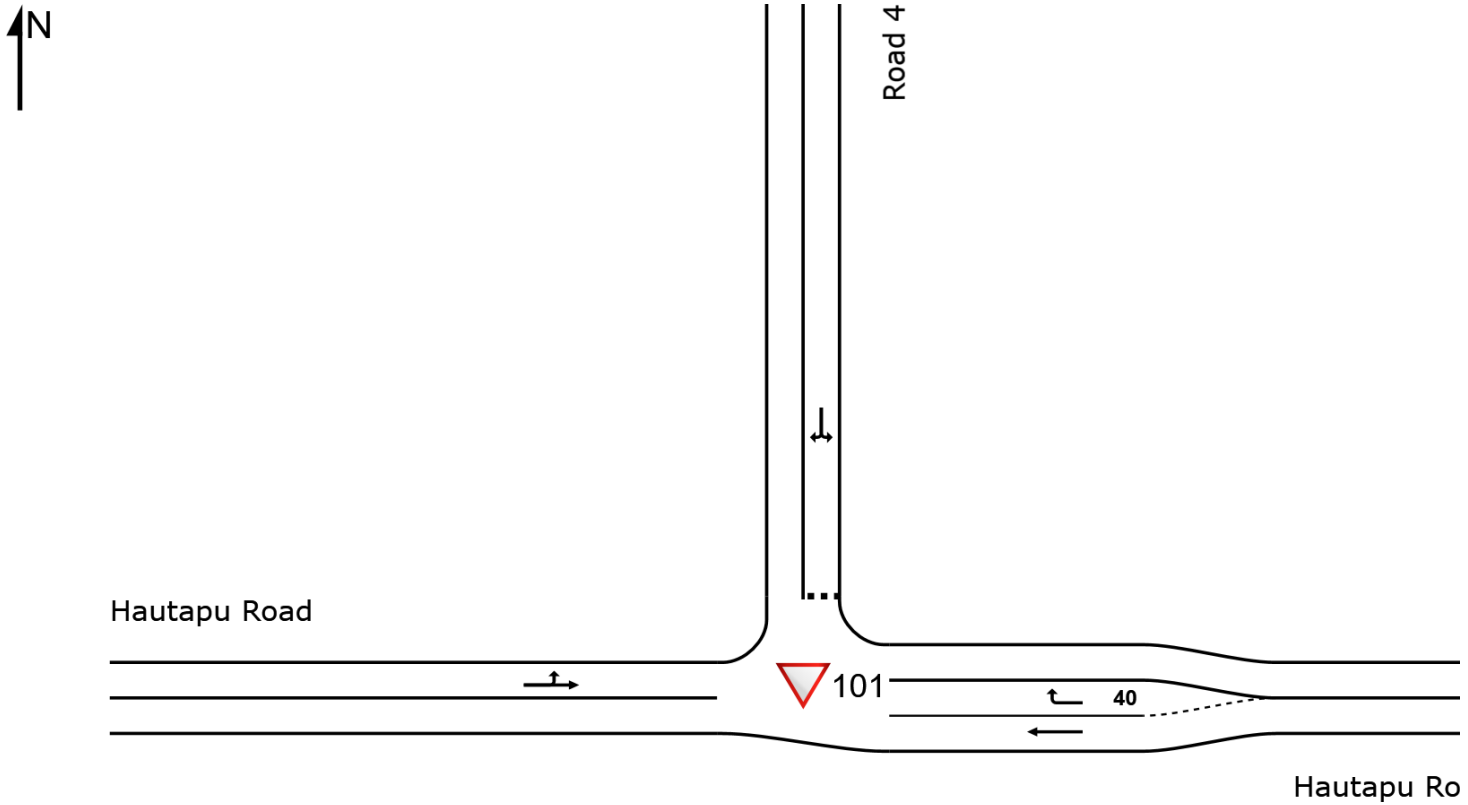
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Give-way_PM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

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



MOVEMENT SUMMARY

Site: 101 [Hautapu Rd/ Road 4_Area 6 (20ha) + HLG site (20ha)_80%:20% E/W distr_Give-way_PM (Site Folder: Hautapu Road/ Road 4 Intersection)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hautapu Road														
5	T1	427	10.0	449	10.0	0.247	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
6	R2	118	10.0	124	10.0	0.092	5.6	LOS A	0.4	3.2	0.37	0.58	0.37	45.3
Approach		545	10.0	574	10.0	0.247	1.3	NA	0.4	3.2	0.08	0.13	0.08	48.8
North: Road 4														
7	L2	522	10.0	549	10.0	0.809	13.9	LOS B	14.9	113.1	0.62	1.14	1.64	40.1
9	R2	130	10.0	137	10.0	0.809	30.0	LOS D	14.9	113.1	0.62	1.14	1.64	39.8
Approach		652	10.0	686	10.0	0.809	17.1	LOS C	14.9	113.1	0.62	1.14	1.64	40.0
West: Hautapu Road														
10	L2	30	10.0	32	10.0	0.131	4.7	LOS A	0.0	0.0	0.00	0.07	0.00	48.9
11	T1	197	10.0	207	10.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	49.5
Approach		227	10.0	239	10.0	0.131	0.7	NA	0.0	0.0	0.00	0.07	0.00	49.5
All Vehicles		1424	10.0	1499	10.0	0.809	8.4	NA	14.9	113.1	0.31	0.58	0.78	44.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Minor Road Approach LOS values are based on average delay for all movements (v/c not used).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.