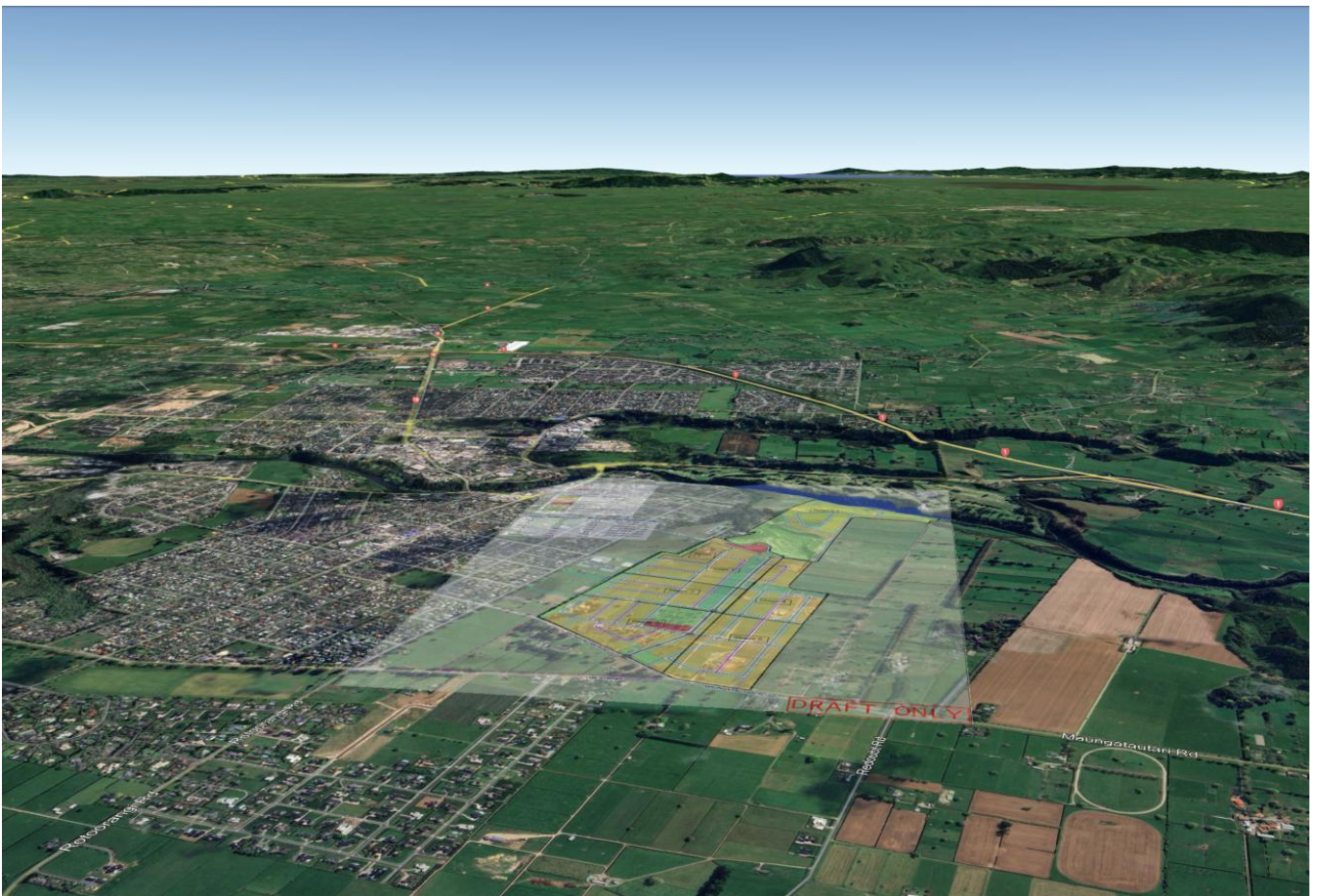


Appendix 7: Integrated Traffic Assessment

Rider Park Structure Plan

Integrated Transport Assessment
Prepared for Power Up Business Consulting Limited

30 October 2025





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1.0 Introduction

Boffa Miskell Limited has been asked by Power Up Business Consulting Limited (the Proponent) to prepare an Integrated Transportation Assessment (ITA) for a proposed Plan Change and Structure Plan covering land to the east of Leamington, Cambridge.

The proposed Structure Plan covers most of the C5 Growth Cell that is depicted in the Waipa District Council (WDC) Operative District Plan (ODP). It also includes some additional land holdings to the north and east.

The proposed Structure Plan provides for the following land-use activities:

- A yield of approximately 1,269 dwellings of varying sizes;
- Two local neighbourhood centres with a combined gross site area of 1.89 hectares (ha);
- A central connector road and local roads with footpaths, shared paths and cycleways; and
- Local reserves, open spaces and stormwater soakage basins.

Consistent with the stated purpose of the C5 growth cell in the WDC ODP (Appendix S1), the Rider Park Structure Plan proposes a new residential community integrated with Leamington.

This ITA assesses and describes the:

- Current transportation environment;
- Road safety environment;
- Planned future transport environment;
- Plan Change proposal;
- Strategic framework;
- Trip generation;
- Plan Change effects; and
- Recommended transport infrastructure approach to be adopted in the Plan Change.

By way of an overall summary, it is concluded that the traffic and transport elements of the proposed Rider Park Structure Plan have been appropriately planned to ensure multi-modal integration with the broader Leamington area. The key transport infrastructure elements necessary to support the staged Structure Plan land uses and the extent to which the Structure Plan contributes to these has been assessed and described. These are proposed to be provided for through a Private Developer Agreement (PDA).

With this infrastructure in place, staged to align with the generation of traffic and multi-modal demands generated by the site, it is concluded that the proposed Structure Plan and

future subdivision plan(s) can be appropriately integrated within the established transportation environment.

2.0 Transport Infrastructure Summary

2.1 Infrastructure Summary

Table 2-1 presents a summary of the external transport infrastructure elements that are assessed as necessary to support the proposed Structure Plan. Where infrastructure elements are needed (at some point) irrespective of the Structure Plan a proportional contribution is noted based on traffic volumes. Staging considerations are noted below the Table.

Table 2-1: Infrastructure Summary

Infrastructure Element	Timing	Proportional Attributable to Structure Plan
Intersection Upgrades		
Signalisation of the Shakespeare Street/Wordsworth Street intersection.	Prior to issue of Section 224(c) certificates (S224(c)) that would enable the 31 st additional dwelling or any further incremental allocation as provided for within the PDA, with access via Wordsworth Street.	18%
Change of priority at the Wordsworth Street/Carlyle Street intersection to give priority to Wordsworth Street.	Prior to issue of Section 224(c) certificates (S224(c)) for lots with access via Wordsworth Street.	100%
Addition of priority Give Way control on the Leamington Cemetery approach to Wordsworth Street		100%
Establishment of a single lane roundabout on Maungatautari Road as the main (and only) southern general traffic access to the Structure Plan area.	In accordance with staging rules below.	100%
Minor safety improvement at the Maungatautari Street/Lamb Street intersection, of a form to be agreed with WDC	Prior to issue of S224(c) for lots with access via Maungatautari Road.	18% ¹

¹ This project and a proportional contribution from C5 are already anticipated in the Waipa DC LTP 2021-2031 (Table 142 Project 3191).

Infrastructure Element	Timing	Proportional Attributable to Structure Plan
External Road Connections		
Extension of Wordsworth Street east to Structure Plan area	Prior to issue of S224c for lots with access via Wordsworth Street.	100%
External Walking and Cycling Infrastructure		
Extension of the Te Awa shared path on Carlyle Street from the Leamington Rugby Sports Club north to Wordsworth Street.	Prior to issue of S224c for lots with access via Wordsworth Street.	16% ²
Establish a shared path and side road crossing treatments on Wordsworth Street between the C5 Growth Cell and Shakespeare Street. Consider the extent to which this integrates with the Te Awa River Ride planned works.		31% ³
The addition of protected pedestrian / cyclist crossing facilities across the northern Carlyle Street approach at the Maungatautari Road / Browning Street / Carlyle Street intersection	Prior to issue of S224c for lots with access via Maungatautari Road.	100%

2.2 Transport Related Staging

In addition to the timings noted in the Table, staging rules are recommended to reflect that:

- If there are dwellings in the Structure Plan area that are reliant on a connection to Wordsworth Street only:
 - The Shakespeare Street/Wordsworth Street signalised intersection upgrade should be in place (or adequately committed) prior to issue of Section 224(c) certificates that would enable the 31st additional dwelling or any further incremental allocation as provided for within the PDA, with access via Wordsworth Street.
 - A further 830 dwellings (up to 860 in total) can be developed with access via Wordsworth Street only.

² In 2021 WDC estimated that 300,000 people per annum use the Te Awa River Ride (an average of 822 per day). Growth of 40% has been applied to this to reflect growth since 2021 and the effects of Plan Change 26 which will add more people to the catchment generally. This estimate assumes that 30% of the 750 daily Structure Plan generated walking and cycling trips (see Section 8.1) use this part of the network.

³ As above but with 70% of the 750 daily Structure Plan generated walking and cycling trips using this part of the network.

- Development beyond this level requires the Structure Plan connector road to connect from Wordsworth Street to Maungatautari Road, and the roundabout to be formed on Maungatautari Road.
- If there are dwellings in the Structure Plan area that are reliant on a connection to Maungatautari Road only:
 - Up to 80 additional dwellings (if developed by 2026) or 40 dwellings (if developed by 2028⁴) could be supported by an interim T-intersection on Maungatautari Road.
 - Development beyond this level requires the roundabout to be formed on Maungatautari Road and the Structure Plan connector road to be connected such that there is a continuous connection from Wordsworth Street to Maungatautari Road.

2.3 Concurrent Stages

The three interim stages identified above address distinct network constraints and may operate concurrently.

The 31st additional dwelling threshold for development that is reliant on access to Wordsworth Street reflects the need to manage additional turning movements in and out of Wordsworth Street at its intersection with Shakespeare Street, where local network pressures already exist.

The 40-80 dwelling threshold for development that is reliant on Maungatautari Road relates to a separate constraint, which is the capacity and safety performance of turning movements at the Browning Street/Maungatautari Road intersection.

Some local traffic from each area may traverse the alternative connection route. For example, someone who uses Maungatautari Road and turns right onto Shakespeare Street from Browning Street, may then travel through the Wordsworth Street intersection as a northbound through movement. The incremental effect of these overlapping movements, given the dispersion of traffic that will occur as people move further from the site, is expected to be minor and well within the range tested by the intersection assessments.

The proposed limit of 860 dwellings that are solely reliant Wordsworth Street is intended to manage the total volume on that corridor to a level that is no higher than what is ultimately intended, when the Structure Plan is fully developed. Allowing an interim stage of 40 to 80 dwellings with access solely from Maungatautari Road is not expected to materially affect those volumes and could therefore proceed concurrently.

Overall, if all interim staging opportunities are utilised, between approximately 900 and 940 dwellings (around 70 to 75% of the anticipated Structure Plan yield) could be developed prior to

⁴ The possible number of dwellings reduces over time due to background traffic growth elsewhere consuming capacity on the network.

completion of the continuous connector road between Wordsworth Street and Maungatautari Road.

3.0 Existing & Planned Transport Infrastructure

The key elements that describe the current and planned future traffic and transport environment are described in the sections that follow.

3.1 Plan Change Location

The proposed Structure Plan area is shown in blue on Figure 3-1 below. It occupies an area of approximately 98.6 hectares (ha) and is bounded by the Waikato River to the north, the Cambridge town belt to the west, and Maungatautari Road to the south.

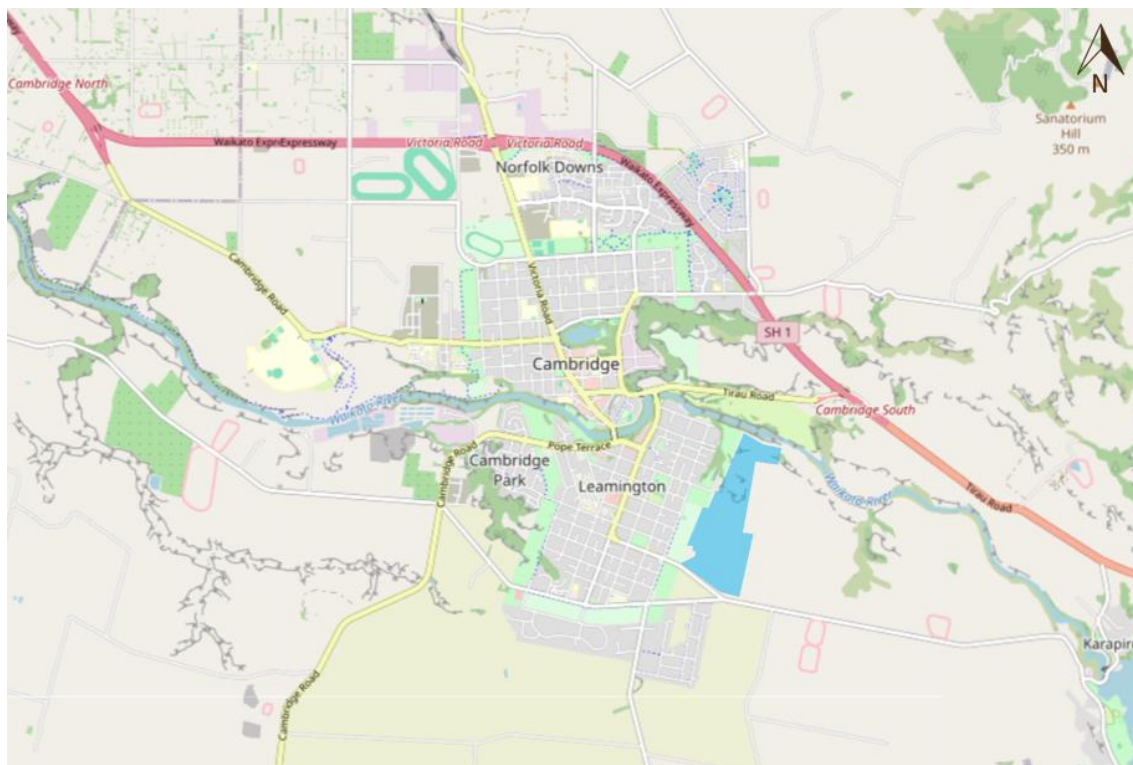


Figure 3-1: Site Location (Base Map Source: Open Street Map)

The proposed Structure Plan area is shown in the context of planned growth areas around Cambridge on Figure 3-2 below. The proposed Structure Plan encompasses most of the planned C5 growth cell and additional areas to the north and east.

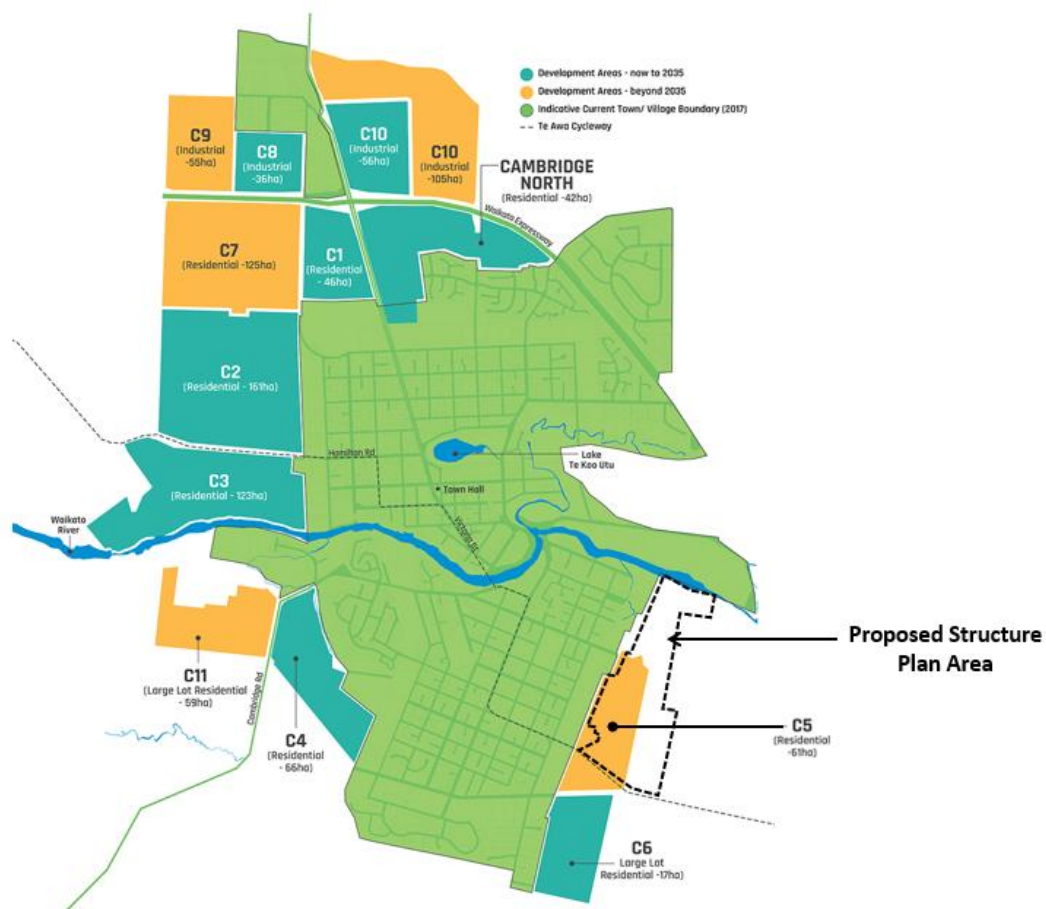


Figure 3-2: Growth Cell Context (Source: www.waipadc.govt.nz/your-waipa/majorprojects/growth/cambridge-growth)

The ODP zoning of the Structure Plan area and its surrounds are shown as Figure 3-3 below.

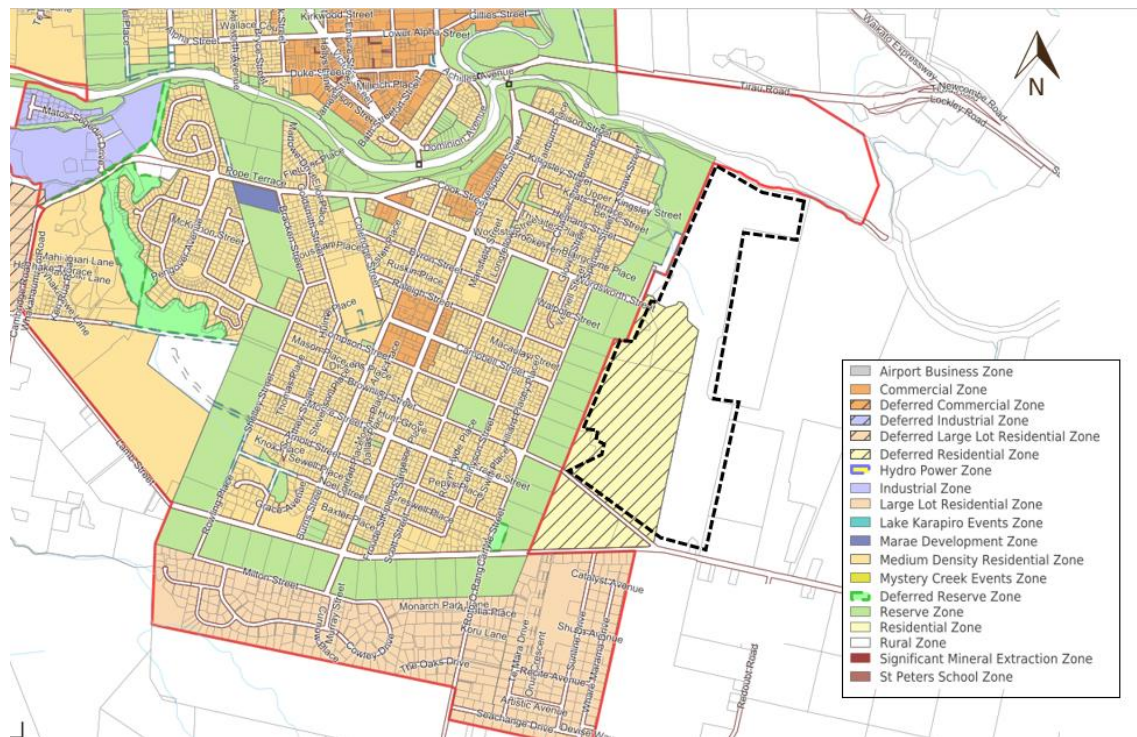


Figure 3-3: WDC ODP Zoning Context

The Structure Plan area is a mixture of Deferred Residential Zone and Rural Zone. The Cambridge town belt to the west of the site is zoned Reserve and most of Leamington is zoned Medium Density Residential, with some areas of Commercial Zone. The structure plan area will be taking on Medium Density zoning as Plan Change 26 is now operative.

3.2 Road Hierarchy

The WDC ODP road hierarchy in the area around the Structure Plan is shown below as Figure 3-4.



Figure 3-4: WDC Road Hierarchy

The major arterial network in the area is provided by the Waikato Expressway (WEX), Tirau Road, Cook Street, Pope Terrace and Cambridge Road. These roads connect Leamington to Cambridge, Hamilton and other destinations in the District and Region.

Maungatautari Road, Lamb Street, Browning Street and Shakespeare Street are classified as minor arterial roads and provide the movement network within Leamington.

Roto O Rangi Road and its continuation as Carlyle Street (as far as Browning Street) are classified as collector roads. All other roads in Leamington, including Wordsworth Street are classified as local roads.

3.3 Road Formation

The Structure Plan area has transport corridor connections available via Maungatautari Road in the south and Wordsworth Street to the west.

Maungatautari Road has a legal width of approximately 20m along the site frontage. The road carriageway has a sealed width of 7m and provides one traffic lane in each direction.

The current posted speed limit along the site frontage is 80 km/h. This changes to 50 km/h at a point approximately 40m east of Carlyle Street and to 100 km/h at a point approximately 300m east of Lamb Street.

The 3m wide Te Awa River Ride shared path (Leamington – Karapiro section) runs along the northern side of Maungatautari Road. The shared path currently starts/ends at the Leamington Rugby Club located within the town belt along Carlyle Street.

Photos showing the layout and road features of Maungatautari Road along the site frontage (and at the proposed Structure Plan access point) are shown as Figure 3-5.



Figure 3-5: Maungatautari Road looking east towards Lamb Street (left) and right towards Carlyle Street (right)

Wordsworth Street has a legal width of 30m. To the east of Carlyle Street, it provides access into the town belt which includes a recreational reserve (playing field), community garden, farming activity and the Wordsworth Dog Park. It bends north and terminates at the entrance to Leamington Cemetery.

West of Carlyle Street, Wordsworth Street provides access to residential properties and Leamington Domain. It has a sealed width of approximately 11.5m and provides one traffic lane in each direction with sealed shoulders / parking lanes. The shoulders are frequently used by cyclists. The posted speed limit is 50 km/h.

Photos showing the layout and road features of Wordsworth Street are shown in Figure 3-6 below.



Figure 3-6: Wordsworth Street looking north towards Cemetery entrance (left) and west adjacent to Dog Park (right)

3.4 Walking and Cycling

Figure 3-7 and Figure 3-8 below show walking and cycling catchments for 5, 10, 15 and 20-minute walks or rides. The catchments are measured from the Wordsworth Street and Maungatautari Road connection points and do not take into account future connections within the Structure Plan area.

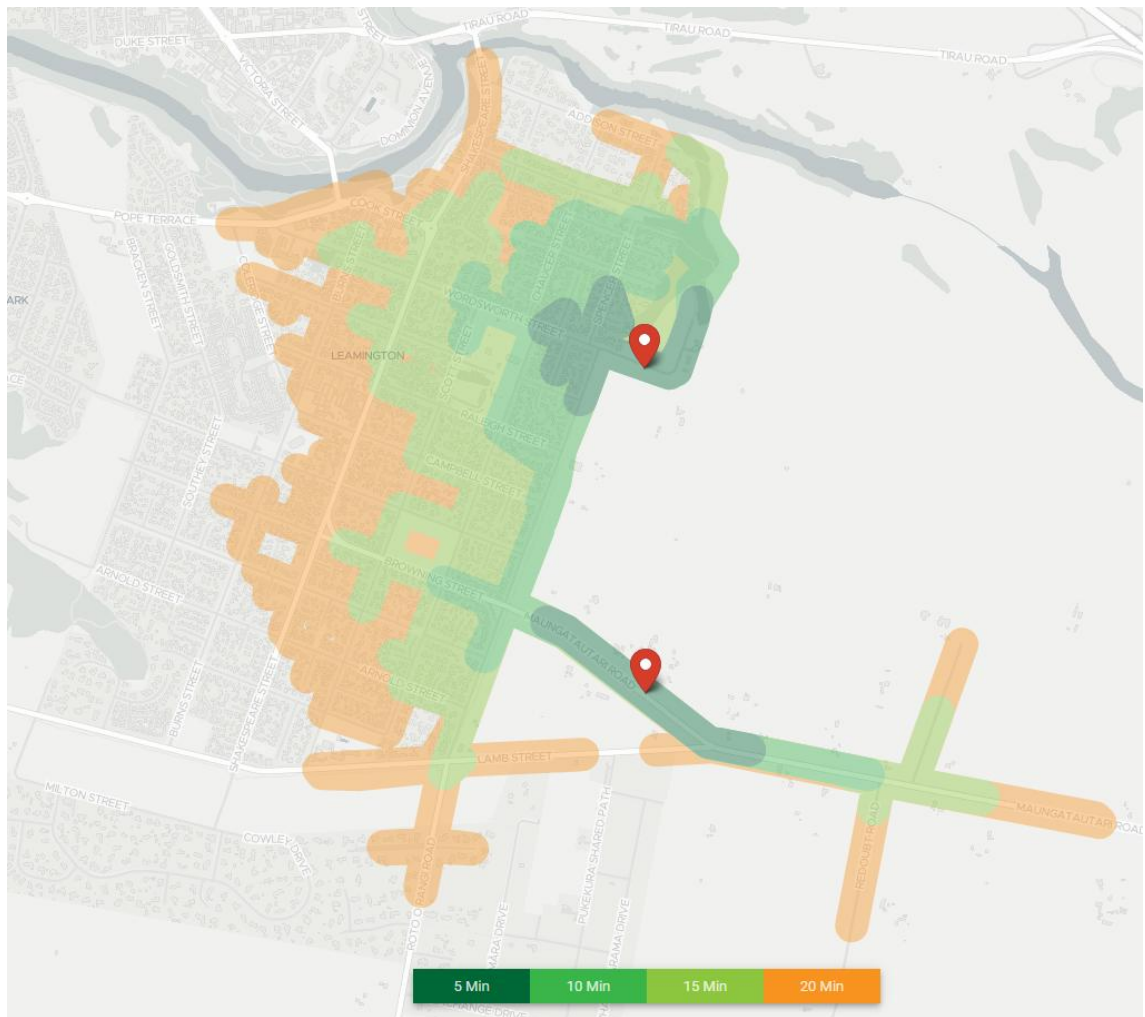


Figure 3-7: Walking Catchments (Source: Targomo)

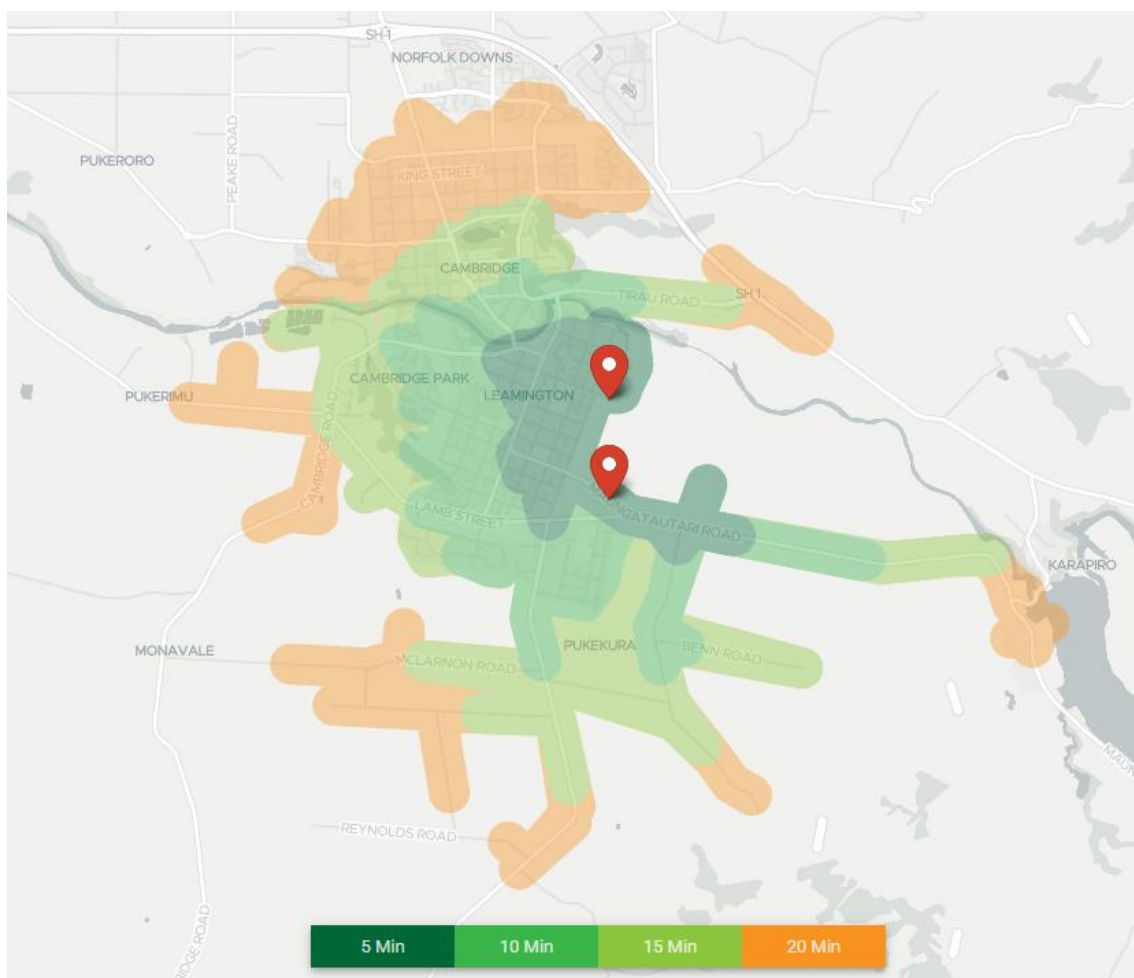


Figure 3-8: Cycling Catchments (Source: Targomo)

The walking catchment of up to 20 minutes covers around half of Leamington. It extends to the Waikato River in the north and captures the local shopping centre on Shakespeare Street, Leamington Primary school and various other parks and green spaces. The cycling catchment covers all of Leamington and most of Cambridge and reaches as far as Karapiro in the east.

Figure 3-10 shows the walking and cycling network around Leamington, as published by WDC. Facilities in the vicinity of the Structure Plan area include the Te Awa River Ride shared path, other off road shared paths in the town belt, and the walking connection from Wordsworth Street north towards the Waikato River. Most roads in Leamington also have a footpath on one or both sides.



Figure 3-9: Extract of Cambridge Walking and Cycling Network (Source: WDC)

The following Figures show the relative use of the various on and off-road paths in the area surrounding the site, by people walking or running (Figure 3-10) and cycling (Figure 3-11). The brightness and thickness of the lines indicate the relative frequency of use.



Figure 3-10: Existing Walking/Running Activity (Source: Strava)



Figure 3-11: Existing Cycling Activity (Source: Strava)

These Figures highlight the opportunities for the Structure Plan area to integrate with established walking and/or cycling networks on the northern, western and southern boundaries.

3.5 Public Transport

Cambridge is currently served by two commuter bus services as well as some regional bus services.

The No. 20 Cambridge service circulates through Leamington with the closest stops to the Structure Plan area being at multiple points along Shakespeare Street. The service runs 18-19 times each way on weekdays and 13 times each way on weekends. It connects Leamington, Cambridge and central Hamilton via various shopping centres and schools along the route. The No. 32 Tokoroa Connector service also runs through Cambridge twice daily.

3.6 Planned Network Changes

3.6.1 WDC Long Term Plan

The WDC Long Term Plan (LTP) 2021-2031 includes the following projects that are relevant to the Structure Plan area:

- (3168) C5, C6 Lamb Street Intersection – Roundabout
- (3191) C5/C6 Lamb Street Intersection⁵

3.6.2 Cambridge Connections

‘Cambridge Connections’ – Our Future Transport Plan is a WDC led project that is intended to shape Cambridge’s transport infrastructure for the next 30 years.

The project began in 2022 and focuses on Cambridge’s transport network, aiming to create an integrated and sustainable transport network to support growth over the next 30 years.

Initial findings, including a potential location for a third bridge across the Waikato River in Cambridge, were shared with the community in early 2024. In response to strong community feedback, WDC has taken a decision to ‘reset’ the project and review the approach taken to community engagement and technical assumptions. It remains in this reset phase at the time of writing this report.

3.6.3 Cambridge Pathway Project

In early 2025 WDC completed the Cambridge Pathway Project which delivered various upgrades on the walking and cycling network in Cambridge. This included connecting the Hamilton Road cycle path and the Te Awa River Ride path to central Cambridge, via Cambridge Middle School and Cambridge Primary School.

Notably, WDC reported⁶ a significant increase in people using the Hamilton Road path, up from 23,905 people in 2023 to 89,418 people in 2024.

3.6.4 Leamington Domain Masterplan

WDC published a masterplan for Leamington Domain in February 2024. Of relevance to transport, this masterplan notes an opportunity to utilise the Te Awa River ride on-road connection on Wordsworth Street to promote walking and cycling access to the Domain.

An enhanced pedestrian and cycle provision along Wordsworth Street in conjunction with the Te Awa cycleway is noted as one of the ‘key moves’, as shown on Figure 3-12 below.

⁵ Understood to be the Maungatautari Road/Lamb Street intersection.

⁶ Extracted from <https://www.waipad.govt.nz/our-council/news?item=id:2ta35hwt517q9svptohj>

KEY MOVE 1: STRENGTHEN HUARAHĪ

- improve all main pedestrian and vehicle entrances,
- prioritise safe and attractive pedestrian and cycling links between residential areas and town centres, particularly along Wordsworth Street,
- provide a visual axis from carpark to heritage listed pavillion / band rotunda,
- improve accessibility in main carpark, and
- provide a pedestrian and cycling connection between the Domain and campground.

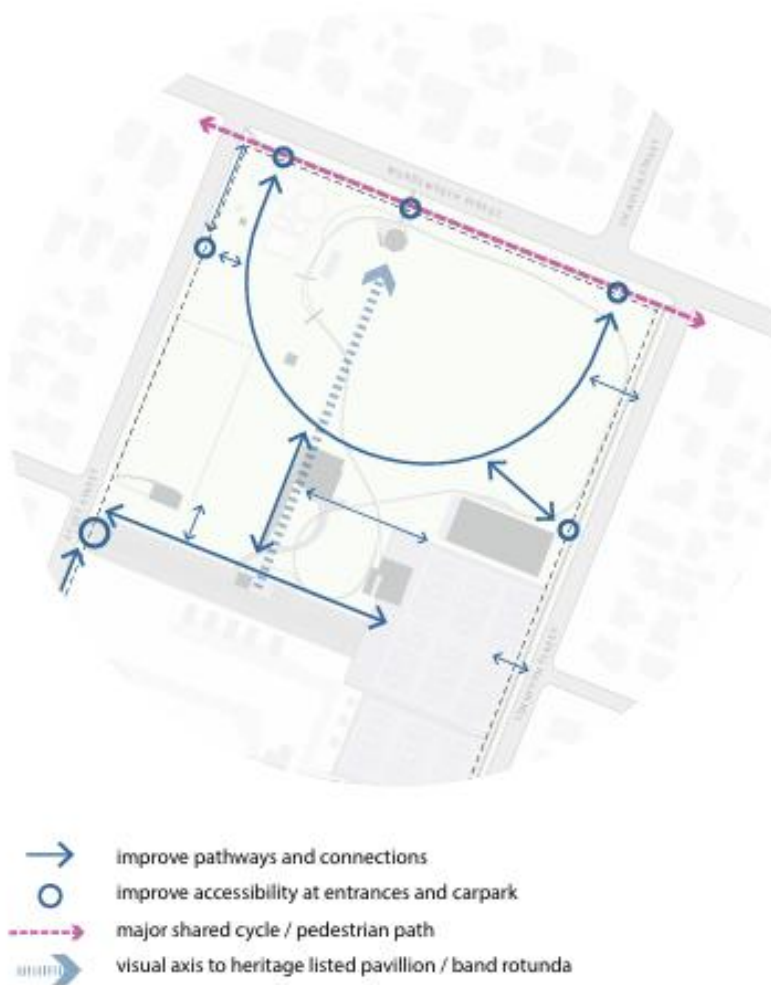


Figure 3-12: Extract from Leamington Domain Masterplan (WDC, February 2024)

There is a synergy in this regard with the recommendations later in this report (at Section 8.2) which include providing an off-road shared path and improved pedestrian crossings along Wordsworth Street. There may be an opportunity to integrate this with planning for the Te Awa River Ride works planned for the road.

3.7 Planned Land Use Changes

3.7.1 Approved Subdivision

Part of the structure plan area was recently subject to a boundary relocation and associated land use consent that were approved by WDC on 15 April 2025 (SP/0026/25.01 and LU/0039/25).

The subdivision of 37 Maungatautari Road and 118 Wordsworth Street, shown below as Figure 3-13 and Figure 3-14 created a new lot for an existing dwelling on Lot 1 and created a new vehicle crossing for that lot to Maungatautari Road.

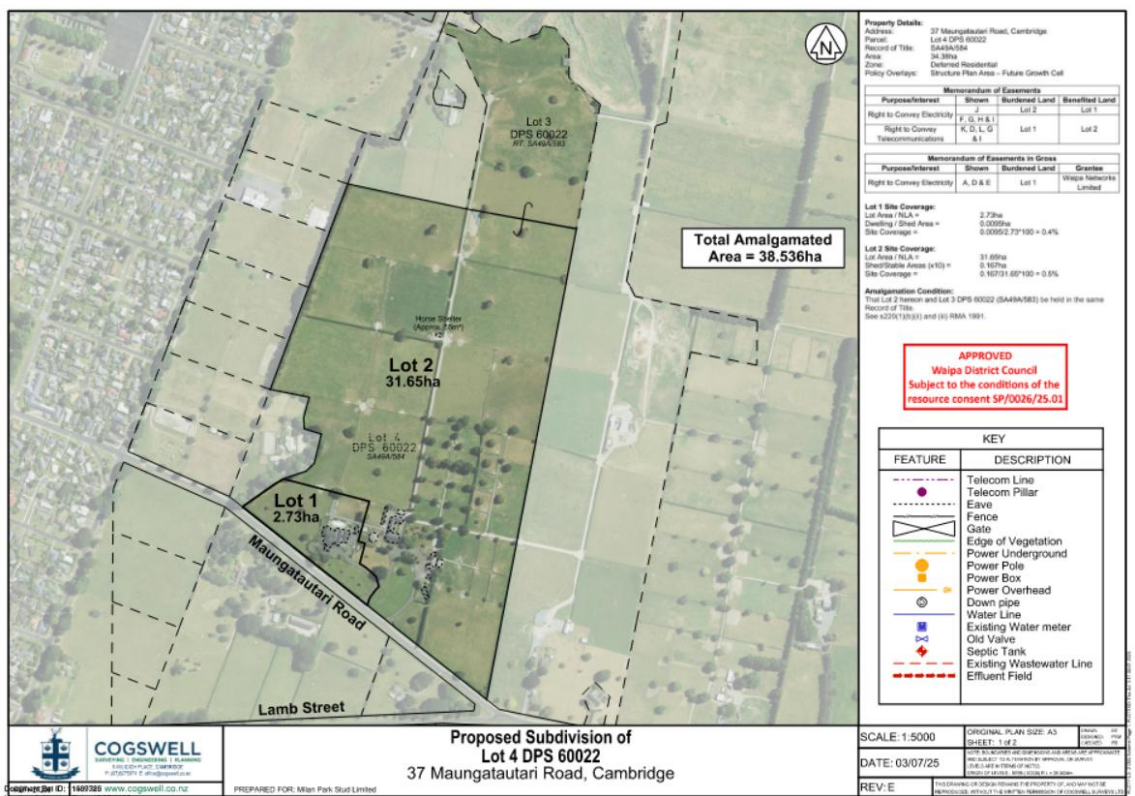


Figure 3-13: Approved Subdivision Plan (Source: Cogswell)

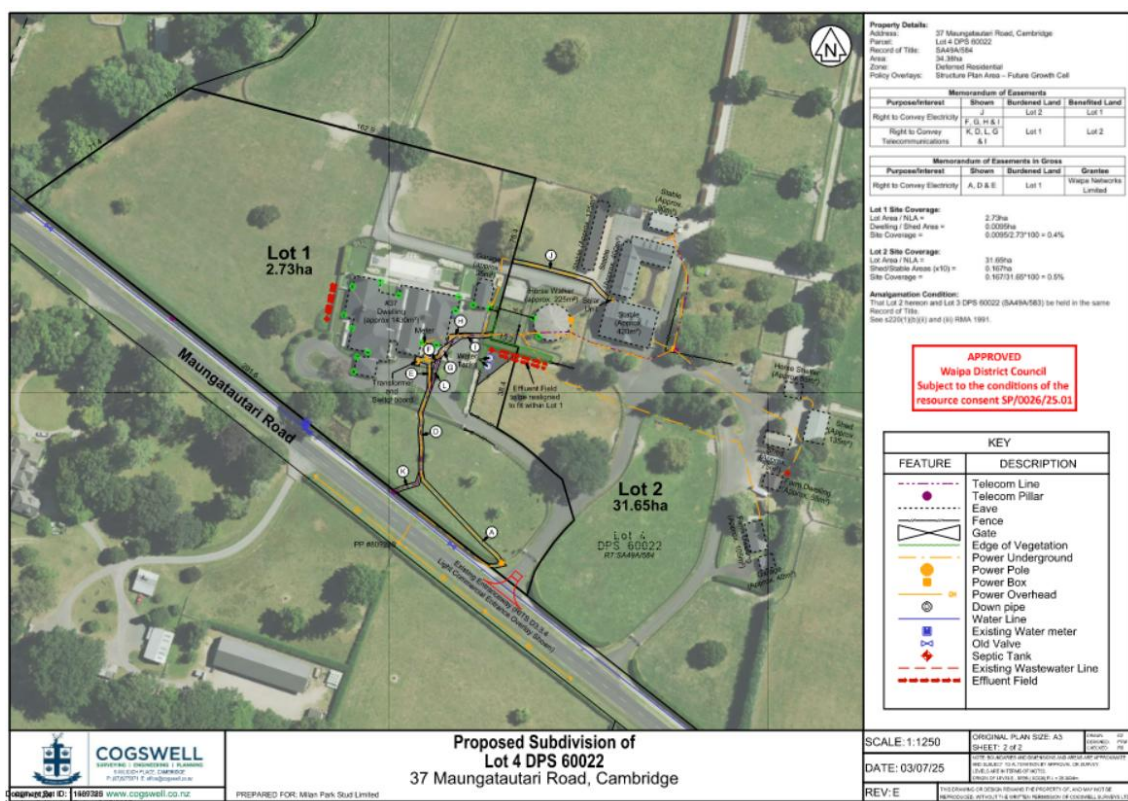


Figure 3-14: Approved Vehicle Access Arrangements (Source: Cogswell)

4.0 Travel Patterns & Road Safety

The existing and expected transport network traffic patterns are described in the following sections.

4.1 Existing Traffic Volumes

According to the MobileRoad website, which sources data from Council and New Zealand Transport Agency (NZTA) asset management databases, daily volumes (in vehicles per day (vpd)) on roads around the site are as shown in Table 4-1.

Table 4-1: Existing Daily Traffic Volumes Around Leamington

Road	Location	ADT (vpd)	WDC Hierarchy Status
Wordsworth Street	East of Carlyle Street	70	Local
	East of Shakespeare Street	2,400	Local
Maungatautari Road	East of Carlyle Street	3,500	Minor Arterial
Browning Street	East of Shakespeare Street	3,700	Minor Arterial
Carlyle Street	South of Maungatautari Road	1,980	Collector
	South of Wordsworth Street	985	Local
Shakespeare Street	South of Maungatautari Road	4,955	Minor Arterial
	South of Maungatautari Road	12,800	Minor Arterial
Lamb Street	West of Maungatautari Road	910	Minor Arterial
	West of Roto O Rangī	1,620	Minor Arterial
Roto o Rangī Road	South of Lamb Street	2,835	Collector

Table 4-1 shows that the highest flows are carried by the minor arterial network, with up to 12,800 vpd on Shakespeare Street. Arterial roads, in mixed land-use urban environments, can typically operate reasonably well with daily flows up to about 18,000-20,000 vpd, but this may be influenced by a range of factors including the number and spacing of intersections and traffic control. All the arterial roads in Leamington are currently operating well within this indicative range.

Other roads are operating well within their daily carrying capacities. NZS 4404:2010 (Land Development and Subdivision Infrastructure) gives these as being approximately:

- 5,000 to 10,000 vpd for primary and secondary collectors; and
- 2,000-5,000 vpd for local roads and access roads.

4.2 Road Safety

The NZTA Crash Analysis System (CAS) was used to review the road safety history the area around the site. The searched covered the most recent five-year period 2020 to 2024 inclusive, and any available data from 2025 to date.

Figure 4-1 below shows the study area and the location and severity of reported crashes. The colour coding represents:

- Green: Non-injury
- Yellow: Minor injury
- Orange: Serious injury
- Red: Fatality (none reported).

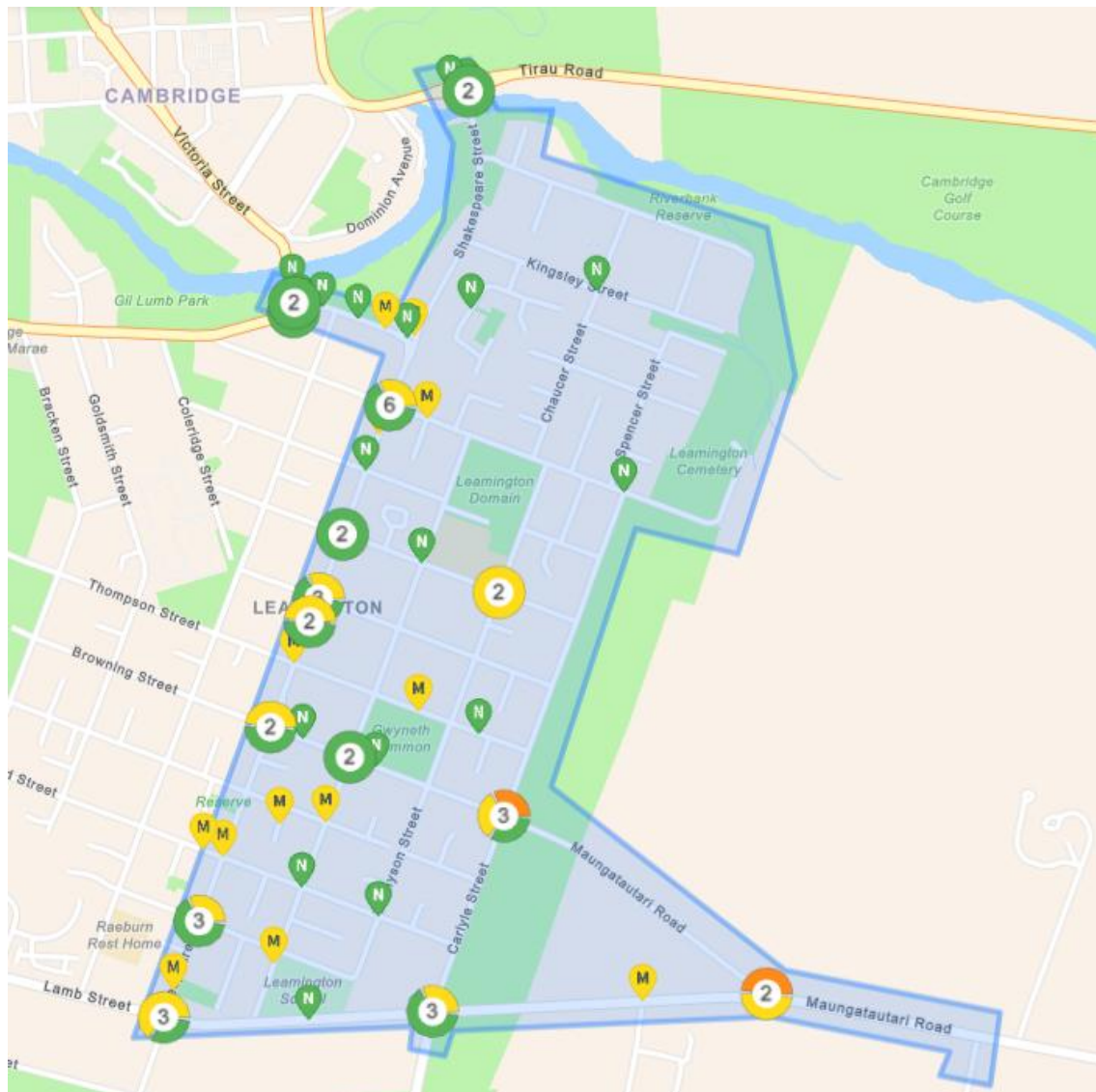


Figure 4-1: CAS Crash Locations and Severity Map

In total, 72 crashes were reported. There were no fatalities, three serious injury crashes and 36 crashes that caused minor injuries. The highest risk locations were Shakespeare Steet, Browning Street and Lamb Street.

Alcohol was listed as a contributing factor in 80% of the crashes. The next most common factors, which each featured in 15-20% of the crash occurrences, were failure to notice other vehicles, failure to give way, failure to stop at a stop sign, and positioning too far left.

The most common crash types were crossing and turning incidents, rear end collisions, loss of control, and hitting parked vehicles. Nine crashes involved pedestrians or cyclists.

The crash records show a higher level of crashes occurring at or on the approach and departure areas of intersections, compared to 'mid-block' road segments. The occurrence of crashes is especially pronounced along the higher-volume roads, notably Shakespeare Street, Browning Street and Cook Street.

The crash history at key intersections in the study area was further assessed to develop a comprehensive understanding of the local road safety environment. This analysis is summarised in Table 4-2.

Table 4-2: CAS Summary (Key Intersections)

Intersection	Crashes by Severity				TOTAL	
	Fatal	Serious	Minor	Non-Injury	Injury	All
Maungatautari Road/Lamb Street*	-	1	1	-	2	2
Maungatautari Road/Carlyle Street	-	1	1	1	2	3
Lamb Street/Carlyle Street/Roto O Rangi	-	-	1	2	1	3
Lamb Street/Shakespeare Street	-	-	2	1	2	3
Shakespeare Street/Noel Street	-	-	1	2	1	3
Shakespeare Street/Browning Street	-	-	1	1	1	2
Shakespeare Street/Cambell Street	-	-	1	2	1	3
Wordsworth Street/Carlyle Street	-	-	-	1	-	1
Shakespeare Street/Wordsworth Street*	-	-	2	4	2	6
Shakespeare Street/Cook Street	-	-	1	1	1	2

Table 4-2 shows that six crashes were reported at the Shakespeare Street/Wordsworth Street intersection. This intersection and the others noted with an asterisk are specifically discussed later in this report.

The Medium Density Residential Zone (MDRZ) provisions will be adopted which enable lots between 500m² and 1,000m² and two dwellings per lot. Some smaller lots may also be created, subject to consenting. The Structure Plan has been modelled with a yield of approximately 1,269 new residential dwellings. Two local commercial areas are also proposed, with a combined gross area of 1.89ha.

5.2 Movement Network

The internal Structure Plan transport corridor design elements are described in the following sections. The movement network is defined indicatively to connector road level, as shown on Figure 5-1. It involves a central connector corridor linking from the end of Wordsworth Street to Maungatautari Road.

5.3 Transport Corridor Design

The Structure Plan establishes only the indicative hierarchy and function of the core transport network (the connector road and the local road on the eastern head of the gully) for the area. It does not prescribe fixed cross-sections or widths at this stage. The design and dimensions of all corridors will be determined at subdivision and Engineering Plan Approval stages, in consultation with WDC.

The general intent is to adopt standard cross-sections from Appendix T4 of the WDC ODP and/or from the standards established in Appendix 19 for other Structure Plan areas. These would generally include up to 25m wide collector roads and typically 15m to 21m wide local roads with supporting 4-6m wide rights of way.

Some departures from these standards may be proposed in appropriate settings, including along reserve edges and where walking and cycling paths are to be included as part of road corridors or adjacent open space areas.

In consultation, WDC noted that the road cross-sections contained in Appendix T4 are out of date in some respects and do not fully reflect current best-practice and multimodal design.

Consistent with this feedback, future road design within the Rider Park Structure Plan will draw on up-to-date guidance from guides including (but not limited to) the Regional Infrastructure Technical Standards (RITS), any updates to the ODP, and national documents such as NZTA's One Network Framework Street Categories, Pedestrian Network Guidance, and Cycle Network Guidance.

This flexible approach enables corridor design to respond to context, mode hierarchies, parking demand, and urban form as the detailed design evolves. It also provides the mechanism to achieve the multimodal outcomes sought by WDC without constraining future subdivision layouts or engineering solutions.

Specific cross-sections can be detailed further by the proponent and considered by WDC as part of subsequent land use and subdivision consents.

5.4 Walking and Cycling Integration

In addition to paths within connector and local road corridors, the Structure Plan intends to include a series of off-road walking and cycling links to existing walking and cycle networks. These are indicatively shown on Figure 5-1 above.

The connections are planned to link open space areas (including the dog park, the area north of the pa site and areas in the town belt) with the various housing areas and Maungatautari Road. Specific connections are noted on Maungatautari Road because vehicle access is proposed to be restricted on this frontage (as per the discussion below at Section 5.6).

The Structure Plan and cycling networks are expected to be highly permeable and designed to minimise the length of trips made by these modes.

5.5 Public Transport Integration

A central connector road is intended to have appropriate width to accommodate public transport services should these be provided in future.

A centrally located connector road would pass within 400m of most of the dwellings and within 700m of the northern-most dwellings (adjacent to the Waikato River). This puts the entire Structure Plan area within a 5 to 10-minute walk of such services.

5.6 Access Management

A vehicle access restriction is proposed along the Maungatautari Road frontage of the site, to minimise conflict with the Te Awa River Ride shared path.

This restriction would prevent any new vehicle accesses being created along Maungatautari Road, excluding any that are already consented/existing (such as that described at Section 3.7.1).

It is envisaged that the various existing accesses along this frontage would be gradually given up as land is developed. Future dwellings that front Maungatautari Road would take access from new internal roads or ROWs.

5.7 Speed Management

Future street cross sections should be designed to support sign posted speed limits of 40km/h to 50km/h.

As part of future engineering design and subdivision approvals there will be the opportunity to further detail the design of roads and intersections to prioritise safe pedestrian and cycle movement through the Structure Plan area.

This will assist in delivering a neighbourhood capable of supporting higher alternative transport mode use and fewer local motorised vehicle trip outcomes.

6.0 Strategic Transport Framework

6.1 Alignment

Appendix 1 presents a tabulated summary of relevant transportation strategies, policies and plans at national, regional and district level.

The policy frameworks provide support for a high-level integration between land-use and transport and promote both densification and the prioritisation of specific transport modes in the appropriate setting.

Strategic support for the C5 growth cell is set out in the WDC ODP at Appendix S1. C5 and the other growth cells around Cambridge and Leamington derive primarily from the Waipa 2050 District Growth Strategy and the various strategic studies that informed it. Their purpose is to provide adequate land supply to meet the housing, employment and lifestyle needs of the future community.

The proposed Structure Plan encompasses part of the C5 growth cell and additional land to the north and east, as illustrated earlier on Figure 3-2.

This overall Structure Plan proposal, including the land that is to be rezoned from Rural to Medium Density Residential, aligns well with the strategic transport planning and land use frameworks considered.

This includes providing for a well-integrated, safe, efficient and sustainable transport system that supports low carbon outcomes, reduced greenhouse gas emissions, inclusive access, choice and mobility and community wellbeing.

The proposal unlocks residential growth, integrated with planned transport infrastructure that provides for a range of transport choices (walkways, cycleways, shared paths and public/private commuter transport facilities). This supports and encourages mode shift and moves away from reliance on private car travel.

The active travel facilities, along with planned improvements on the surrounding network by WDC and expected growth in the use of e-bikes and micromobility devices, is expected to contribute positively towards improving accessibility to local shops, medical facilities and other local services, consistent with the 15-minute city concept and mode shift aspirations.

6.2 District Plan Rule Framework

It is anticipated that the WDC Medium Density Residential Zone rule framework (or where otherwise amended by way of this Plan Change request) will apply to the Structure Plan area. Other than the staging rules recommended in Section 2.0 (which are supported by the analysis in the following sections), no changes to transport rules are sought for the Structure Plan area.

6.3 Regional Policy Statement & Public Transport Plan

An assessment of the proposal in terms of these regional policy directions is set out at Appendix 4. Overall, it is evident the site is strongly aligned with planned urban growth nodes, is aligned with current multi-modal and public transport servicing; and further enables increased servicing outcomes where that is determined as desirable in future.

6.4 Government Emissions Reduction Plan

An assessment of the Government emissions reduction plan is set out at Appendix 5. It is evident the proposal does not foreclose the potential for future EV charging infrastructure and is appropriately aligned with and intends multi-modal and public transport infrastructure integration, supporting lower emissions outcomes.

7.0 Transport Network Assessment

Evaluation of the vehicular trip demands and their corresponding effect on the transport network are described in the sections that follow. Corresponding with these assessments, necessary and immediately local transport infrastructure improvement works are identified and described.

7.1 Methodology

The Waikato Regional Transportation Model (WRTM) was used to assess the potential effects of the proposed Structure Plan on the surrounding transportation network. The model brief was developed in consultation with WDC and made use of models recently used by WDC in their Cambridge Connections project. A copy of the brief is included as Appendix 2.

By way of an overview, the modelling sought to assess future network conditions at the years 2035 and 2055, with and without the full extent of the Structure Plan area.

Four scenarios were modelled in the morning (AM) and evening (PM) peak periods. These were:

- 2035 do minimum
- 2035 do minimum + full development of the Structure Plan area.
- 2055 do minimum
- 2055 do minimum + full development of the Structure Plan area.

The do minimum scenarios at 2035 and 2055 (which were developed by WDC for other purposes) include allowance for some residential development in C5. These assumptions are shown in Table 7-1. The Table also shows the assumptions for the C5 growth cell, which is assumed to be fully developed by 2035.

Table 7-1: Modelled Land Use Inputs

Year	Development Scenario	Households	Total Jobs
2035	Do Minimum	127	0
2035	Do Minimum + Structure Plan	1,269	227
2055	Do Minimum	732	0
2055	Do Minimum + Structure Plan	1,269	227

7.2 Trip Generation (Vehicles)

The WRTM forecasts travel demands using the household and job inputs above. The C5 growth cell is modelled as one zone in the WRTM (Zone 671). The number of vehicle trips modelled travelling to and from this zone is summarised in Table 7-2 below. These totals reflect trips made with an origin or destination outside the zone. Internal trips, such as someone travelling between the commercial area and a house in the Structure Plan area do not add to these totals.

Table 7-2 presents:

- The two-hour volumes from the model for the AM and PM periods;
- Estimated peak hour volumes (vph) for the AM and PM⁷ peak hours; and
- Peak hour trip rates in vehicles per hour per household (vph/HH) for the AM and PM⁸.

Table 7-2: Modelled Trip Generation

Scenario	AM			PM		
	Two-Hour	One-Hour	vph/HH	Two-Hour	One-Hour	vph/HH
2035 Do Min	98	54	0.42	103	57	0.45
2035 Do Min + Structure Plan	1,139	626	0.49	1,448	796	0.63
Volume Change	1,041	573	-	1,345	740	-
2055 Do Min	485	267	0.36	516	284	0.39
2055 Do Min + Structure Plan	1,058	582	0.46	1,371	754	0.59
Volume Change	573	315	-	855	470	-

⁷ Estimated as 0.55 times the two-hour total.

⁸ The rate is expressed as trips per household but captures all trips generated by households and commercial activities (jobs) in the zone.

The Table shows that when fully developed, the Structure Plan area is expected to generate between 630 and 800 vph during the peak hours of the day. The average trip rates with the Structure Plan developed are between 0.49 and 0.63 vph/HH. It is reasonable that these are higher than in the do minimum scenarios, which include only residential development.

On the basis that daily trip generation in residential settings is typically ten times the peak hour, the Structure Plan area is expected to generate⁹ around 6,680 vehicle movements per day (vpd).

The three-step version of the WRTM was used for this project and as such, estimates of walking, cycling and public transport trips were not made within the model. These estimates and active mode infrastructure needs discussed at Section 8.0.

7.3 Assumed Network Upgrades

The following intersection upgrades were included in the models (do minimum and with the Structure plan) and were assumed to be in place by 2035:

- A signalised intersection at Shakespeare Street/Wordsworth Street, replacing the existing Stop controlled cross-roads; and
- Two single lane roundabouts to replace the offset T-intersections at Cambridge Road/Kaipaki Road/Lamb Street.

In the 2055 models, the following intersection upgrade was also included:

- A single lane roundabout at Lamb Street/Roto O Rangi Road/Carlyle Street, replacing the existing Stop controlled cross-roads.

The with the Structure Plan scenarios also included a single lane roundabout where the Rider Park internal road meets Maungatautari Road.

7.4 Levels of Service

Link based level of service assessments for the AM and PM periods in the 2055 + Structure Plan scenario are shown as Figure 7-1 and Figure 7-2 below.

⁹ Ten times the average of the AM and PM peak hour volumes (668 vph).

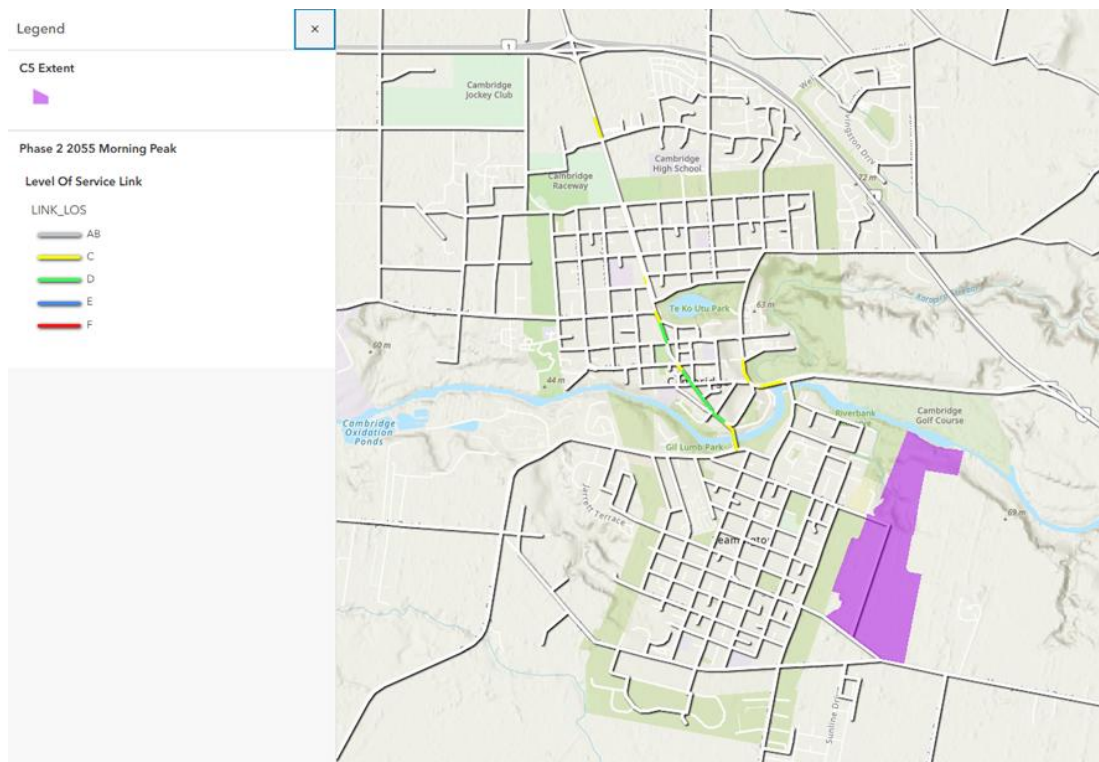


Figure 7-1: AM Link Levels of Service

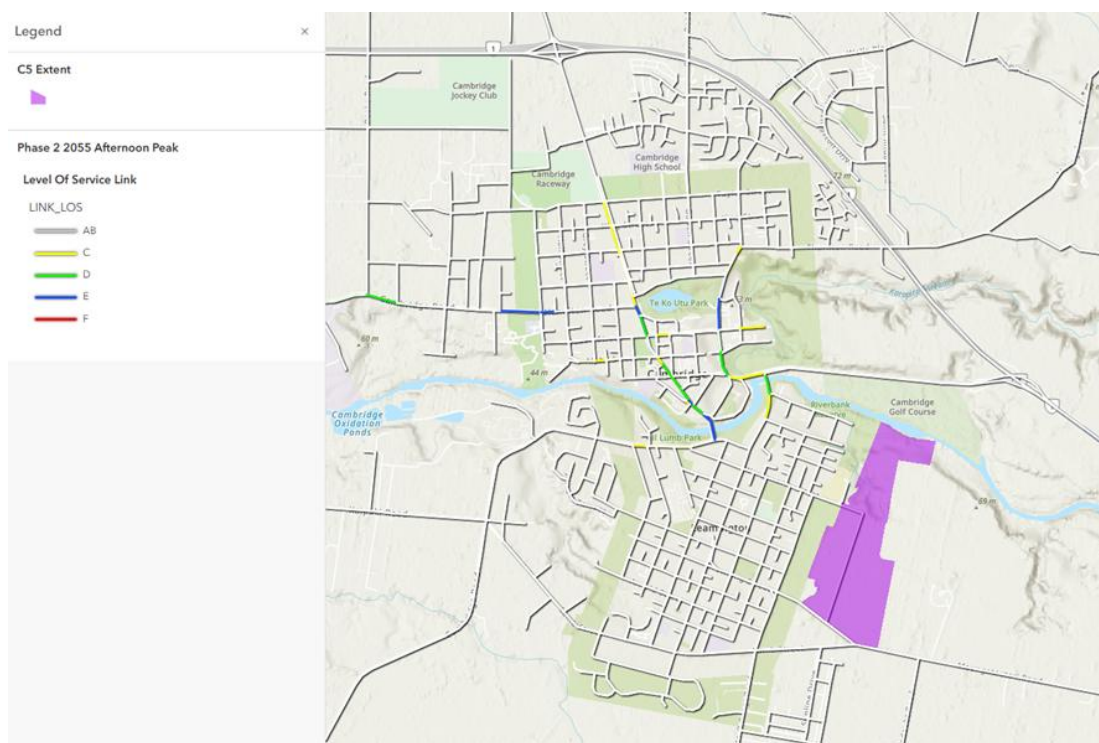


Figure 7-2: PM Link Levels of Service

These diagrams illustrate that overall, the network is operating generally within its capacity. Some links experience LOS D or LOS E during one or both peaks. This is expected during the peak hours of the day in urban networks and is generally confined to the river crossings, which are recognised constraints for vehicles in the Cambridge network.

Intersections around Leamington, including the proposed signals at Shakespeare Street/Wordsworth Street were all modelled as operating with LOS C or better. This indicates that no further intersection upgrades, beyond those listed a Section 7.3 are required to support the intended development in the Structure Plan area.

Staging considerations and proportional use assessments, where relevant, are included for various network components in the following sections.

7.5 Shakespeare Street/Wordsworth Street Intersection

7.5.1 Timing

To assess when the proposed signalised upgrade is needed at this intersection, the existing intersection was modelled in the isolated intersection analysis package SIDRA, with its existing¹⁰ traffic volumes.

This analysis shows that the Stop controlled crossroad intersection is operating with LOS F on the Wordsworth Street (East) approach. The modelled 95th percentile queues are contained to 20-25m (4 to 5 vehicles) however the average delay is 60-70 seconds per vehicle. A lane-based LOS summary is shown below as Figure 7-3. Further SIDRA outputs are included as Appendix 3.

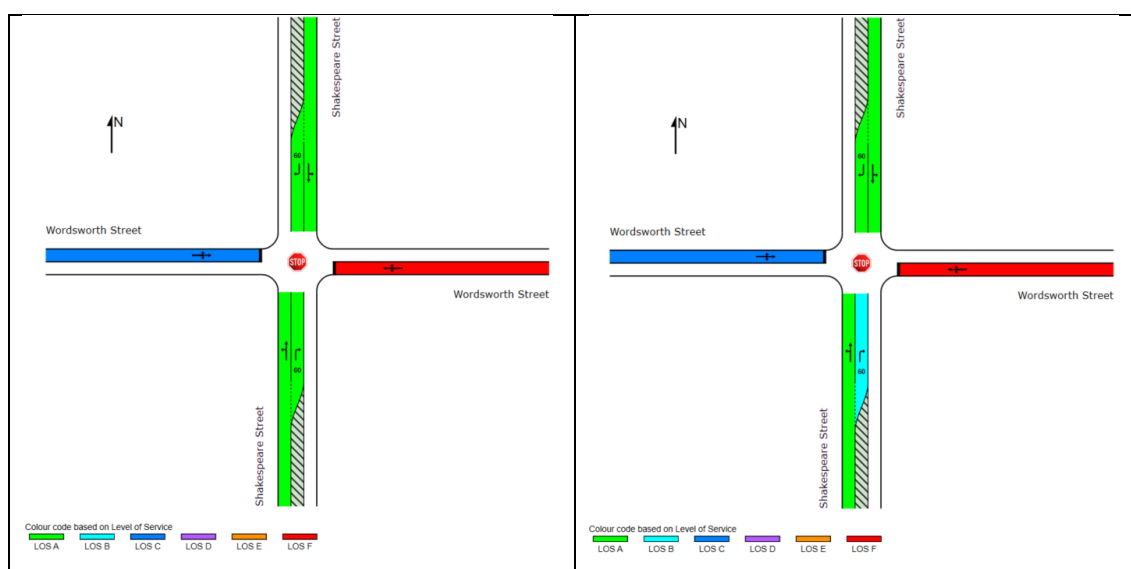


Figure 7-3: Shakespeare Street/Wordsworth Street Lane LOS (AM left, PM right)

¹⁰ Counted by Matrix in November 2022

This analysis indicates that significant new development could not reasonably be supported relying on Wordsworth Street (East) for access, before the upgrade is committed. This is further supported by the analysis in Section 4.2 which shows a cluster of accidents (two injury and four non-injury) at this location.

An initial stage (requiring infrastructure to be provided before S224(c) is issued for the 31st additional dwelling) could be supported on the basis that expected trip generation (15-19 vph @ 0.49-0.63 vph/dwelling) represents a change of around 1% in total peak hour intersection volume. This would result in less than a minor effect, and is assessed as acceptable as an initial stage of works to support development feasibility. It may also be reasonable, based on the actual traffic operational environment (and/or anticipated shared funding availability for the works) at the time, for further dwellings to be enabled for release prior to construction of the Wordsworth Street / Shakespeare Street signalisation. It would be appropriate for a provision for this to be enabled within the PDA, particularly where the potential for more than minor adverse effects either is not expected or will be of an acceptable duration.

It is observed that the predominant need for this mitigation is driven by the wider local and district generated demands on Shakespeare Street limiting the ability for side road access to the corridor at peak times. The growing demands on Shakespeare Street present as an emerging matter for Council consideration in time, whether or not this proposal proceeds, particularly in relation to the evident developing crash record. It is therefore recommended that this upgrade be in place prior to issue of S224(c) that enables the 31st dwelling that relies on Wordsworth Street for access.

A review of the WRTM 2055 modelling, and adjustments to remove the Structure Plan traffic from the do-minimum shows that the Structure Plan area accounts for 18% of the traffic movements through this intersection.

7.5.2 Staging Considerations

It is understood that development is most likely to start in the north of the Structure Plan area and move south. If this is the case, access would be established to Wordsworth Street first and a connection to Maungatautari Road would follow later. From a transportation perspective it is the available connectivity that matters rather than where the development is located within the Structure Plan area.

If there are to be dwellings that are reliant solely on a connection to Wordsworth Street, it would be reasonable to limit how much development can occur before a continuous connection to Maungatautari Road is required.

The modelling indicates that the 2055 with the Structure Plan scenario the Wordsworth Street connection is expected to accommodate around 68% of the total traffic movements generated by the Structure Plan area. The remaining 32% are expected to use the connection to Maungatautari Road.

Managing development (through staging rules) so that a maximum of 860 dwellings (68% of the total) can be developed solely relying on Wordsworth Street, would result in use of Wordsworth Street that is no higher than in the full development scenario.

7.6 Maungatautari Road/Structure Plan Intersection

7.6.1 Intersection Treatment

The Structure Plan has one new external intersection on Maungatautari Road. The form of control for this intersection was assessed and evaluated using a wide range of factors, broadly based on NZTA's project evaluation framework. These factors are:

- Achieving Vision Zero safety objectives;
- Encouraging active modes;
- Public transport prioritisation; and
- Car efficiency.

This approach to intersection design and selection generates a hierarchy of potential treatments to be considered. Grade separation is the higher form of treatment, on the basis that it eliminates conflicts and the potential for harm. The full list of intersection forms is:

- Grade separation of all movements;
- Roundabouts with grade separation for active modes;
- Signalised intersections with grade separation for active modes. Vehicle speeds to be managed through use of raised pedestrian crossings on the approaches, or tables across the whole intersection;
- Signalised intersections with signalised crossings for active modes. Vehicle speeds to be managed through use of raised pedestrian crossings on the approaches, or tables across the whole intersection;
- Roundabouts with "build-outs" (or similar) provided for active mode crossings being made at-grade;
- Signalised intersections with signalised crossings for active modes. No physical control of vehicle speeds; and
- Priority controlled (Give Way) intersections.

Taking into consideration these matters, an evaluative framework has been prepared to provide some guidance and comparative assessment of the options, as set out as Figure 7-4 below.

Evaluation Criteria	Grade separation	Roundabout with grade separation for active modes	Signals with grade separation for active modes	Signals with signalised crossings for active modes, with speed management	Roundabout with "build outs"	Signals with signalised crossings for active modes, no speed management	Priority control
Investment Objectives							
Safety - Contribution to Vision Zero	3	2	2	1	0	-2	2
Encouraging Active Models	-3	3	3	1	0	-1	0
Public Transport Prioritisation	3	1	1	1	1	1	-1
Access/Efficiency	0	3	3	3	3	3	-2
Investment Objectives Sub-Total	3	9	9	6	4	1	-1
Critical Success Factors							
Technical Difficulty (how achievable)	-3	-1	-1	1	1	2	3
Potential Affordability	-3	-2	-2	1	1	-1	3
Enabling Development	-3	3	3	2	3	2	2
Environmental Context	-3	2	2	2	2	2	2
Critical Success Factors Sub-Total	-12	2	2	6	7	5	10
Opportunities and Impacts							
Environment Effects/Constraints	-3	-1	-1	0	0	0	0
Social and Cultural Impacts	-2	1	1	1	1	0	0
Impact to Jobs, Recreation etc	0	1	1	0	0	0	0
Climate Change Adaption	-2	2	2	1	1	-1	-1
Maintenance	-2	-1	-1	0	0	0	0
Opportunities and Impacts Sub-Total	-9	2	2	2	2	-1	-1
Overall Total	-18	13	13	14	13	5	8
Ranking	7	2	2	1	2	6	5

Figure 7-4: Intersection Control Evaluation (Maungatautari Road/Structure Plan connector road)

This analysis shows that the top-ranking options are assessed to be roundabouts or signals with or without grade-separated pedestrian crossings or speed management and at grade crossing facilities. Overall, an at-grade roundabout with speed management is assessed as appropriate because it:

- Satisfactorily achieves the necessary safety and performance outcomes;
- Provides appropriate capacity and a speed management mechanism at the rural/urban interface along Maungatautari Road;
- Provides for future integration with development on the opposite side of Maungatautari Road, if and when required; and
- Is an affordable solution.

The design of the roundabout would be advanced in consultation with WDC and would be subject to standard approval processes.

7.6.2 Interim Intersection Treatment Opportunity

The opportunity to stage construction of the intersection was also explored at this location. In the first test, the single lane roundabout was replaced with a priority-controlled T-intersection. This intersection was modelled with:

- WRTM forecast 2055 with Structure Plan volumes;

- Existing traffic volumes along Maungatautari Road¹¹ + 2055 Structure Plan area traffic movements; and
- Sensitivity test volumes along Maungatautari Road¹² + 2055 traffic movements.

In all cases the intersection performed acceptably, with LOS A or better for all movements. SIDRA summaries are included in Appendix 3.

7.6.3 Staging Considerations

It is understood that development is most likely to start in the north of the Structure Plan area and move south. If this is the case, access would be established to Wordsworth Street first and a connection to Maungatautari Road would follow later.

As noted above, it is recommended that the Shakespeare Street/Wordsworth Street intersection be signalised before development of the 31st new dwelling that relies on Wordsworth Street for access (either solely or otherwise).

The modelling highlights the dominance of demand for movement to and from the north. This is logical given that the Cambridge town centre and connections to the WEX are located in this direction. With the signals in place, these critical movements (turns from Wordsworth Street onto Shakespeare Street) are provided for in a controlled manner.

This would not be the case for any development areas that relied solely on access to Maungatautari Road. In this situation, Browning Street and its intersection with Shakespeare Street would become more important as an access route to/from the north.

The capacity of this intersection, rather than the Structure Plan/Maungatautari Road intersection, is the critical capacity constraint for development stages relying solely on Maungatautari Road.

To assess how many dwellings could potentially be accommodated in such a scenario, the existing Shakespeare Street/Browning Street intersection was modelled in SIDRA with its existing traffic volumes¹³.

The intersection is currently operating at LOS C in the AM peak, with delays of up to 24 seconds/vehicle on the Browning Street east approach. In the PM peak it also operates with LOS C and delays of up to 18 seconds/vehicle.

Iterative testing¹⁴ showed that an estimated 170 dwellings could be added in the Structure Plan area, on top of the volumes counted at this intersection in 2022, before it moves beyond LOS D (for the worst individual movement).

If background traffic at this intersection increases, the number of possible dwellings reduces each year. Figure 7-5 shows the number of possible dwellings by year, assuming 1% or 2% annual background growth¹⁵.

¹¹ Through volumes along Maungatautari Road were taken from a survey of the adjacent Maungatautari Road/Carlyle Street intersection by Matrix in November 2022.

¹² This test assumed that Maungatautari Road's AADT doubled from the existing 3,500 vpd to 7,500 vpd.

¹³ As counted by Matrix in November 2022

¹⁴ The AM peak is the critical scenario. Testing assumed that 75% of all trips generated by the Structure Plan in this scenario use either the right turn (Browning to Shakespeare) or left turn (Shakespeare to Browning) at this intersection. To reflect that early stages of development may not have the level of mixed use and internal trip capture that the full development does, a higher trip rate of 0.7 vph/dwelling was assumed.

¹⁵ Applied to the through movements along Shakespeare Street only.

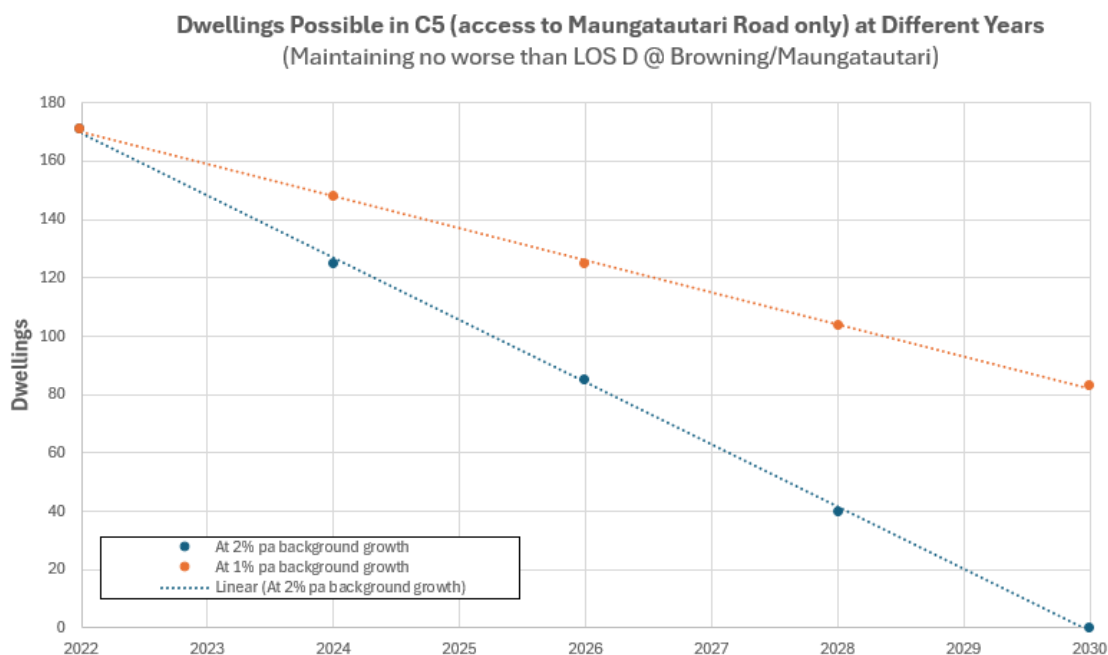


Figure 7-5: Potential Dwellings in Structure Plan Area by Year

Development beyond these levels, at each specified year, would require a connection to be made to north via the Structure Plan network to Wordsworth Street and the signalised upgrade to be in place at Shakespeare Street/Wordsworth Street.

Adopting the more robust 2% per annum rate, up to 80 dwellings could be developed before 2026, or 40 dwellings by 2028.

7.7 Maungatautari Road/Lamb Street

The Maungatautari Road/Lamb Street priority-controlled T-intersection has an existing deficiency in terms of the acute angle at which the Lamb Street leg intersects Maungatautari Road from the west. There have been two reported crashes at the intersection in the last five years, both causing injury. The existing intersection is shown as Figure 7-6 below.



Figure 7-6: Existing Maungatautari Road/Lamb Street Intersection (Source: WDC Maps)

The WRTM indicates that 8-10% of all trips generated by the Structure Plan area use the Maungatautari Road/Structure Plan intersection to travel to and from the east and therefore use the Lamb Street/Maungatautari Road intersection.

Adjusting for the fact that some of the Structure Plan area development is already included in the do-minimum WRTM scenarios, the proportional use of this intersection by Structure Plan traffic is estimated as being 18% of its total volume.

A proportional contribution to the planned upgrade of this intersection would be appropriate, if it has not been addressed by others at the time the Structure Plan area is developed and has access formed to Maungatautari Road.

7.8 Other Transport Infrastructure Needs

The following changes are also required to integrate the Structure Plan area with the surrounding network.

7.8.1 Wordsworth Street/Carlyle Street Intersection

This intersection is an unmarked priority intersection. The Wordsworth Street corridor technically has priority, but the dominant movements are currently around the corner from Wordsworth Street (West) to Carlyle Street (South) and vice versa. The area is shown as Figure 7-7 below.



Figure 7-7: Existing Eastern End of Wordsworth Street (Source: WDC Maps)

When the Structure Plan is developed, movement along Wordsworth Street will become dominant. It is recommended that the Carlyle Street leg be marked with Give Way control, and that safe pedestrian crossing facilities be included across Carlyle Street also.

This change is recommended to be made when the first dwellings are occupied in the Structure Plan area with access to Wordsworth Street.

7.8.1 Leamington Cemetery Access

Figure 7-7 above shows that Wordsworth Street bends northwards and provides access to Leamington Cemetery and some private properties. For the same reasons as outlined above, it is recommended that this northern leg be marked with Give Way control, and the east-west route to and from the Structure Plan area becomes the priority route.

This change is recommended to be made when the first dwellings are occupied in the Structure Plan area with access to Wordsworth Street.

7.8.1 Speed Limit Changes

Engagement with WDC is recommended to facilitate a safe and appropriate local road speed limit on Maungatautari Road. Subject to the nature of access to be established a form of localised safety response could entail a 50 or 60 km/h speed limit being established in the area as a gateway to the Leamington urban environment. The speed limit will be relevant to the detailed design of the roundabout but does not impact the conclusions above at Section 7.6.

Any change is recommended to be made when access is created to the Structure Plan area from Maungatautari Road and in consultation with WDC.

8.0 Active Mode Networks

8.1 Trip Generation

According to the 2023 Census, residents of Leamington¹⁶ make approximately 4% of trips to work and 14% of trips to education by walking or cycling.

Taking a weighted average (based on relative numbers of workers versus students) some 7% of trips generated by communities in Leamington are made using these modes. Allowing for use of these modes to grow to 10% in future, the Structure Plan could generate an estimated 750 walking or cycling trips per day, plus other trips made for purposes such as recreation which are not specifically captured in the Census.

8.2 Infrastructure Needs

To support trips made by walking, cycling and other micromobility devices and integrate the new Structure Plan transport network with the surrounding area, the following infrastructure works are recommended:

- Extension of the Te Awa shared path on Carlyle Street from the Leamington Rugby Sports Club north to Wordsworth Street.
- Establish a shared path (including safe side road crossing facilities) on Wordsworth Street between the C5 Growth Cell and Shakespeare Street.
- The addition of protected pedestrian / cyclist crossing facilities across both Carlyle Street approaches at the Maungatautari Road / Browning Street / Carlyle Street intersection.

These connections will connect the Structure Plan area to the surrounding active mode network and take advantage of the existing networks and established activity patterns shown earlier as Figure 3-9, Figure 3-10 and Figure 3-11.

¹⁶ Using the Leamington East, West, South and Central area units

9.0 Conclusion

The proposed Rider Park Structure Plan provides for the following land-use activities:

- In the order of 1,269 residential dwellings of various typologies;
- Local / neighbourhood centre areas (1.89 ha);
- Supporting access roads, local roads and accessways including dedicated footpaths, shared paths and cycleways;
- Local reserves, and open green space / parks; and
- Stormwater soakage basins.

The proposed land-use activities and supporting transportation network is in general accordance with the C5 Growth Cell land-use expectations. The arrangement of and provision for land use activities including local reserves and neighbourhood commercial area support long-term minimised external vehicular traffic demand and support low-emissions community outcomes.

The multi-modal transport network planned has had regard for effective integration with adjacent land uses, for optimised local travel by non-motorised modes and support a well-integrated local community environment.

Provision is not foreclosed for the potential future integration with other land development where that is planned. A distributive and efficient transport network that internalises local distributive movements has been planned through connector road connections to both Wordsworth Street and Maungatautari Road.

Potential transport demands and their distribution on the local district road network has been assessed using the Waikato Regional Transport Model (WRTM). The assessments have identified some anticipated local road capacity constraint areas and improvement works have been planned.

A strategic and integrated approach to planning for and managing the extent to which the proposal contributes to transport system is proposed to be implemented through a Private Development Agreement (PDA).

By way of an overall summary, it is concluded that the traffic and transport elements of the proposed Rider Park Structure Plan have been appropriately planned to ensure multi-modal integration with the broader Leamington area.

Appendix 1: Strategic Assessment

Policies, Plans & Strategies	Key Focus
National	
Government Policy Statement on Land Transport 2024-2034	The Government Policy Statement (GPS) on Land Transport 2024-2034 sets out how money will be invested to achieve the Government's transport outcomes and priorities. The four strategic priorities and the outcomes sought by the Government under each are: 1. Economic growth and productivity - Reduced journey times and increased travel time reliability - Less congestion and increased patronage on public transport - Improved access to markets, employment and areas that contribute to economic growth. - More efficient supply chains for freight. - Unlocked access to greenfield land for housing development and supporting greater intensification. 1. Increased maintenance and resilience - More kilometres of the road network resealed and rehabilitated each year - Fewer potholes - A more resilient road and rail network. 2. Safety - Reduction in deaths and serious injuries - Increased enforcement 3. Value for money - Better use of existing capacity - Less expenditure on temporary traffic management
Arataki 30-Year Plan (September 2023)	Arataki sets out NZTA's view of how the transport system should be planned, developed and invested in over the next 30 years. The foundation outcomes are inclusive access, economic prosperity, resilience and security, healthy and safe people and environmental sustainability. The relevant regional priorities identified for the Waikato region include: - Encouraging growth and development that supports compact, mixed use urban form, reduces trip length, and lessens car dependency. - Making changes to the allocation of road space on existing roads and streets to enable and prioritise mode shift to public transport, walking and cycling. - Continuing to support development and improvement of walking and cycling networks and infrastructure to enable safe, integrated, connected multi-modal networks.
2050 Climate Change Response (Zero Carbon) Amendment Act	New Zealand's climate change response to achieving net zero transport emissions by 2050.

Policies, Plans & Strategies	Key Focus
New Zealand's Road Safety Objectives¹⁷	This document outlines the Government's three year plan to tackling New Zealand's most challenging road safety issues. The guiding principles are: 1. Actions should be supported by evidence and focus on the causal factors of death and serious injury. 2. Road safety should consider the economic and social outcomes sought from the road system, including the need to get to destinations efficiently. 3. Road safety should be delivered in an efficiency and cost-effective way that achieves value for money, and takes into account the regulatory burden it places on New Zealanders. 4. Road safety is everyone's responsibility – road users have a role to play in improving road safety outcomes. 5. Actions should consider community and road users views, ensuring there is public acceptability.
Urban Growth Agenda (UGA) & National Policy Statement on Urban Development (NPS-UD) (2020)	UGA: main objective to improve housing affordability, underpinned by affordable land. NPS-UD: aim for well-functioning urban environments. Waipā has been identified in Tier 1 urban environments. For Tier 1,2 and 3 Policy 11 requires district plans not to set minimum parking requirements and have comprehensive parking management plans.
Keeping Cities Moving – a plan for mode shift for NZ Cities (2019)	Priorities: shaping urban form, making shared and active modes more attractive, influencing travel demand and transport choices. The plan seeks to influence mode shift in three main ways: 1. Shaping urban form; 2. Making share and active modes more attractive; and 3. Influencing travel demand and transport choices. The project proposals will support this strategy in several ways, including: • Prioritising walking, cycling and other active modes within the internal transport network; Adopting a land-use form that provides residential density and an integrated mixed-use area to enable a range of local commercial activities and services.
The New Zealand Rail Plan (April 2021)	Outlines long term commitment to rail and investment needed to achieve a resilient, reliable and safe rail network.
NZ Infrastructure Strategy (2022-2052)	Key strategic objectives: enabling a net-zero carbon Aotearoa (reducing carbon emissions), supporting towns and regions to flourish and building attractive and inclusive cities (with good public transport).
NZTA State Highway Investment Proposal (2024-2034)	The State Highway Investment Proposal sets out the activities that will receive funding in the National Land Transport Programme (NLTP). These activities aim to give effect to the GPS strategic priorities which are outlined earlier in this table. State Highway 1 (Cambridge to Pairere) is identified in this document as a proposed road of national significance.

¹⁷ Which replaced the Road to Zero strategy in October 2024

Regional	
Hamilton-Waikato Metro Spatial Plan – Future Proof (2020)	The plan identifies an urban form to cater for growth supported by a multimodal rapid and frequent transport system to improve access. Specific to Waipā are fast and frequent connections between Te Awamutu and Hamilton and Cambridge and Hamilton.
Hamilton-Waikato Mode Shift Plan (2020)	Mode plan for 'Keeping Cities Moving'. Prioritises walking and cycling networks in Te Awamutu and Cambridge, future growth locations, and gradual increases in peak hour bus services to Hamilton City.
Road to Zero for the Waikato (2020-2030)	National priority. Vision: Accessible journeys free of deaths and serious injuries. National and regional target: 40% reduction in deaths and serious injuries by 2030.
Waikato Regional Land Transport Plan (RLTP) 2021-2051	The RLTP articulates how the Waikato Region (which Waipā is a part of) will align with the NZTS and GPS and sets the long-term strategic direction for the next 30 years. The plan identifies three strategic priority objectives: • Strategic corridors and economic development – efficient and resilient land transport system that advances regional economic wellbeing and supports liveable urban areas now, and in the future. • Road safety – no-one is killed or seriously injured on our regional transport system. • Access and mobility – our land transport system provides an inclusive range of integrated and safe travel choices for people to meet their various needs. It also has two underpinning objectives: • Climate change and environmental sustainability – ensuring that transport plays its role in delivering an energy efficient, resilient, and low carbon sustainable future. • Integrated land use and transport planning – ensuring collaborative spatial-based approaches to decision-making to drive the best outcomes for our communities. The plan has a number of objectives, policies and measures to assist with guiding funding investment which this Strategy must be consistent with.
Waikato Regional Public Transport Plan (2022-2032)	Main mechanism for the delivery of public transport services in the Waikato region.

District	
Waipa Transport Strategy 2022 - 2052	The Strategy vision shows that the way we move around is changing and we are needing to shift to a more multi-modal transport system. The vision is as follows: 'People and freight in Waipā have access to an integrated, safe, sustainable transport system that provides a range of travel choices.'
Waipā Growth Strategy 2050	Framework for outlining aspirations and where additional population and employment is to be provided for.
Waipā District Plan	Policy guidance and rules on development and Structure Plan. Also seeks to protect important buildings, landscapes and natural areas.
2021-51 Waipā Infrastructure Strategy	Framework for 30-year Infrastructure Strategy and includes district's water supply, wastewater, stormwater drainage, and roads and footpaths.
Town Concept Plans	Plans for future development which consider the look and feel of these places to 2050. Key themes: connectivity, safety and amenity, and cycleways and walkways.
Waipā Community Spatial Plan (currently under development)	Plan aims to spatially articulate the community's near-term and long-term aspirations.

Appendix 2: WRTM Model Brief

Waikato Regional Transportation Model (WRTM) Project Briefing Form

WRTM Operator Representative:



Client:

Boffa Miskell's Client: Power Up Business Consulting Ltd
WLASS Client for the purposes of invoicing: Boffa Miskell Ltd Ref: BM210028

Client Representative(s):

Mark Apeldoorn – Boffa Miskell Ltd

Purpose of Modelling:

- The purpose of the modelling is to enable an assessment of the change effect due to the planned development for the C5 Growth Area.
- The outcome of the modelling is to enable both traffic volume and level of service comparisons on links and at intersections to be made between the base with the C5 Growth Area currently in the WRTM ("baseline development") and with the full C5 Growth Area ("full development") scenarios included, which is specified below.
- The end use is to enable the change effects to be described and for the contributing impact of the C5 Growth Cell to changing traffic demands on the transport network to be evaluated based on a change in LOS to LOS D or worse and where the C5 Growth Cell contributes more than +5% change in traffic demand.

Stakeholders Involved:

Stakeholder 1 - Waipa District Council
Stakeholder 2 -
Stakeholder 3 -
Stakeholder 4 -

Model Version	WL – 2013 Validated	WM – 2018 Interim Futures	WM – 2018 Validated
Forecast Year	☐ 2013 ☐ 2021 ☐ 2031 ☐ 2041 ☐ 2051 ☐ Other (Please specify in Network and Land use Changes to be tested below)	☐ 2031 ☐ 2041 ☐ 2051 ☐ ☐	☐ 2018 ☐ 2025 ☒ 2035 ☐ 2045 ☒ 2055
Peak Period	☒ AM ☐ IP ☒ PM ☐ Factored Daily		

Network(s) to be used:

Land Use scenario(s) to be used:

a) 2035 initial network, code E2 or E7 – Stantec to confirm. To be modified to be equivalent to DoMin in Round 1A for Cambridge Connections. See network changes below. b) 2055 Do-Min Round 1A network (code 55) from Cambridge Connections	Current modified comprehensive HIGH land use Code: FH The C5 development is fully contained within model zone 671. This contains 127 households in 2035 and 732 households in 2055. There is no commercial activity and no school in the baseline traffic forecasts. This forms the "baseline" development to be tested.
--	---

Network and Land Use Changes to be Tested:

Baseline Development, Network Changes:

- Create 2035 DoMin equivalent to 2055 DoMin (Round 1A) for Cambridge Connections

This should include the speed limit changes that were applied to the 2055 Round 1 do-minimum scenario (to create Network 55) as shown in the diagrams in Appendix A. It should also include all the do-minimum road and intersection upgrades (in Appendix A) except the new roundabout at Rotorangi Road/Lamb Street in Round 1. Rotorangi Road/Lamb Street intersection should remain in its existing (Stop controlled) form.

The further changes in Round 1A should also be included (Appendix A), noting the 2035 network already excludes Southern Links. Also include C5 signals at Shakespear Street/Wordsworth Street (in baseline and full development). Modify 2035 network to improve zone loading of zone 671 (C5). To be undertaken at no cost to the project.

- Modify 2055 network to improve zone loading of zone 671. To be undertaken at no cost to the project.

Full Development, Network Changes:

- Southern connection of proposed land use with Maungatautari Road – assume a roundabout
- Connection with Wordsworth Street is a link road with no intersection required.

Land use changes, Full Development:

The total number of households is to remain unchanged in Cambridge.

Land use for C5 Structure Plan to be replaced with information below and in **Appendix B** for the Full Development scenario.

This assumes 25 dwellings per hectare. Based on the 50.7654ha zoned area, this equates to 1,269 lots/dwellings.

Because the total number of households is to remain unchanged, this means houses will be removed from other growth nodes in Cambridge. In 2035, 1142 households will be removed elsewhere (1269 C5 full development less the 127 houses in the baseline) and in 2055, 537 households will be removed from elsewhere (1269 C5 full development less the 732 houses in the baseline). This will be removed on a pro-rata basis from model zones 623 and 704 (C1 growth node), and 622 and 638 (C2) (see Appendix C). **Please include C2, C3, C4 and C7 in this pro-rata adjustment.**

Provision for commercial activities is also included. Two areas are shown in red on the structure plan as supporting commercial. **These areas are in addition to the 50.7654ha residential and 1,269 HH described above.** These are anticipated to support the following activities: shops, a convenience store / supermarket, fast-food restaurants, coffee shop, day care centre, medical/dental office, pharmacy, offices (e.g., real estate agencies), liquor store, veterinary clinic, pet shop, and hair / beauty salon. Collectively these are planned to comprise 1.89 ha gross site area. The number and mix of jobs in these areas to be estimated using job inputs from other similar areas in the model, factored in proportion to site area. Other examples provided in Appendix B.

No reduction in jobs elsewhere will be undertaken (to maintain the overall control total), as the total number of trips in the model is related to the number of households.

Model runs:

Run the **2035** and **2055** model with baseline development in C5, and then with full development of C5 as per specification above.

Deliver results for review.

Allowance for an optional further run of the 2035 and 2055 model (AM and PM) with full development. These would be assignment only (i.e. no change in input land use, change in network only). A list of off-site infrastructure improvements to be modelled in the with development scenario (if any) will be provided by Boffa Miskell.

Outputs Required:

- | | |
|--|--|
| ☒ Loaded Networks
(software output) | ☐ PDF plots |
| ☒ GIS exports
(.shp) | ☐ Demand matrices
(.csv) |

Other (please specify):

Provide:

- Model zone, node, link numbering diagrams, which are included in the SHP file of traffic flows
- TRACKS loaded networks AM/PM
- Link volumes, SHP file format AM/PM
- Node locations/numbering, SHP file format. One peak period only. To identify zone and node numbers as requested
- LoS, intersection and road, SHP file format AM/PM
- Select Link SHP file format AM/PM for the Full Development tests only
- NetBen statistics (window) (Baseline and Full Development) AM/PM
- Zone map (SHP file format) and land use input file (text file format)

Select link analyses, directional, to be prepared for the following locations:

- Wordsworth St eastern end at point of connection with proposed land use
- Southern connection of proposed land use with Maungatautari Road

For cost-effectiveness, we will only supply the TRACKS loaded networks and LoS shape files for the full development scenario initially. If no infrastructure changes are required, the rest of the outputs will be supplied.

Date for Delivery of Services:

Preferred Date: 27/02/2025

Agreed Date (operator to complete): Within 3 weeks of Stakeholder agreement. This is based on any additional infrastructure in the full development test to be promptly provided.

Cost of Services (operator to complete – including any cost sharing arrangements)

Fixed price of \$10,350 + GST for scope excluding optional additional runs below.

Optional additional model runs: fixed price of \$3900 + GST (2035 & 2055, AM & PM, network changes only – no land use changes).

WCLASS 20% Third Party Fee to be added [Yes]

Other Comments:

Off-site infrastructure improvements for full development to be provided by Boffa Miskell.

Brief Agreed Between:

Mark Apeldoorn

Power Up Business
Consulting Ltd C/o Boffa
Miskell



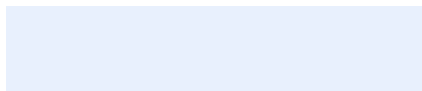
Name

Stakeholder
represented

Signature

Bryan Hudson

Waipa District Council



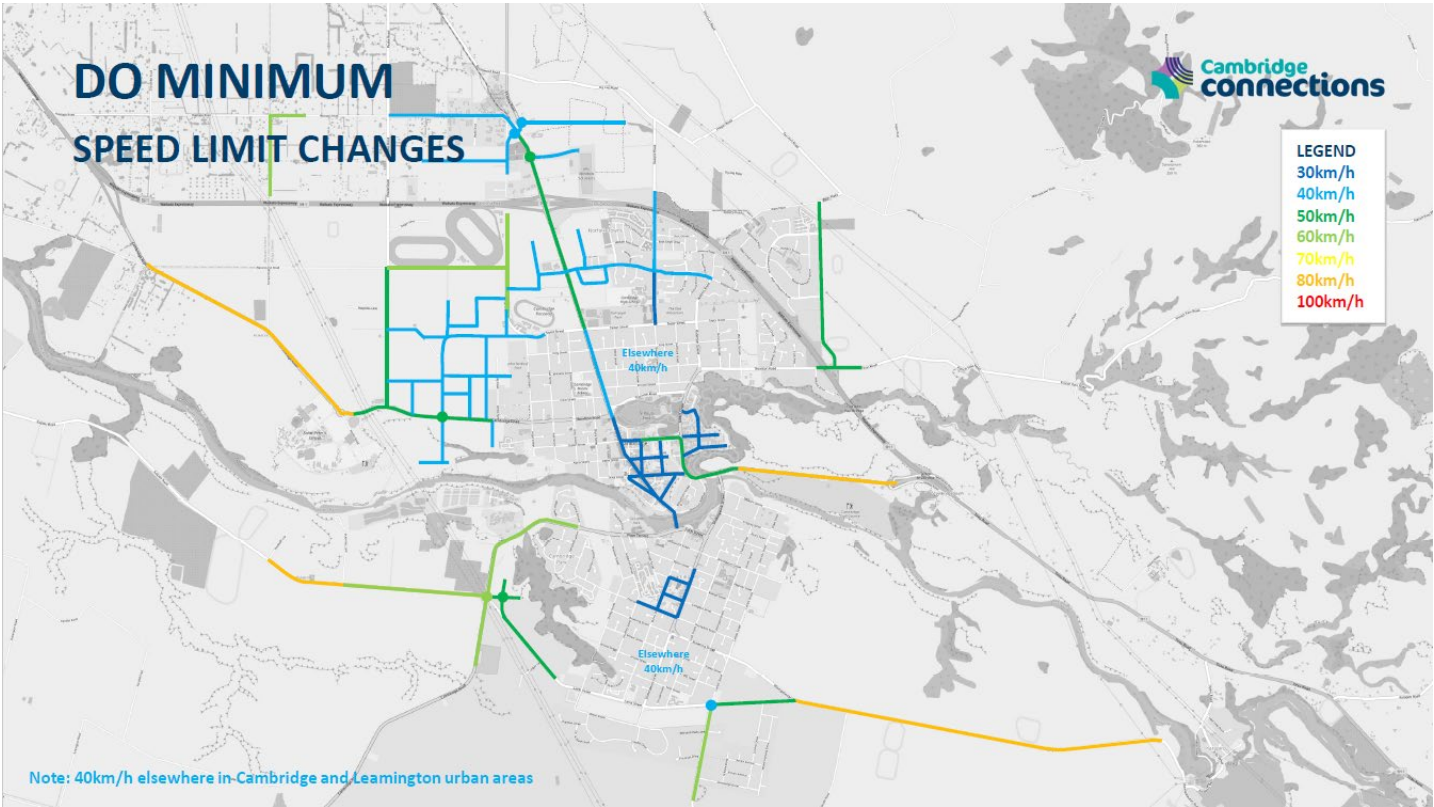
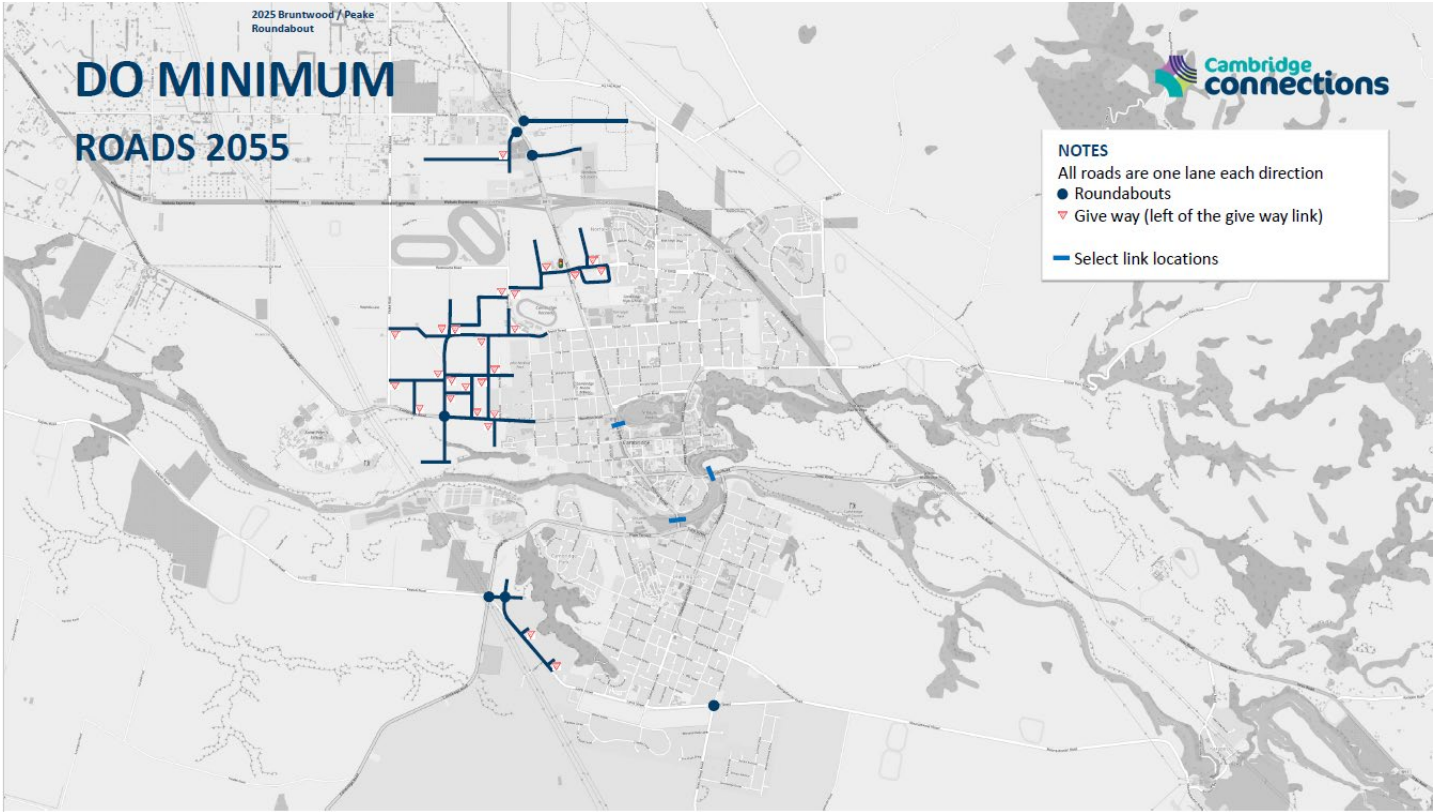
Name	Stakeholder represented	Signature
Click or tap here to enter text.	Click or tap here to enter text.	
Name	Stakeholder represented	Signature
Name	Stakeholder represented	Signature

Disclaimer:

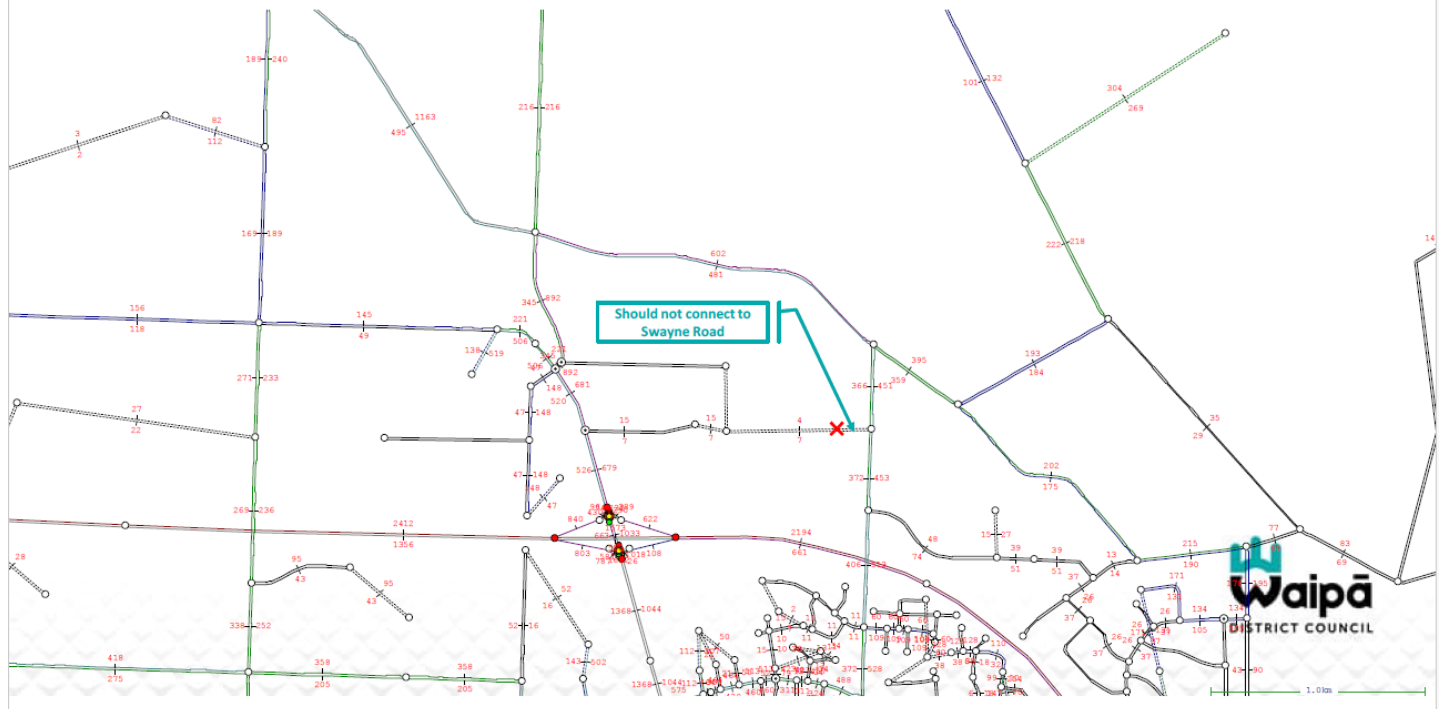
By using the WRTM you agree to the following.

Use of the WRTM is at the User’s own risk and the User releases Waikato Local Authority Shared Services Limited / Co-Lab and its shareholders and Waka Kotahi NZ Transport Agency (WK), and each of their respective directors, employees, contractors, agents and sub-consultants from all liability. The WRTM is provided on an “as is” basis and by using the WRTM you agree that Co-Lab makes no representations with respect to the WRTM. Co-Lab disclaims all liability to the fullest extent permissible by law, including all warranties, representations, conditions, or other terms whether expressed or implied by law relating to the nature, condition, accuracy, completeness and quality of the WRTM, including without limitation, fitness for a particular purpose. To the extent that Co-Lab and WK’s liability is not otherwise limited or excluded, the aggregate liability of Co-Lab and WK whether in tort, contract, at law (including for a misrepresentation) or otherwise for any loss, damage or injury in relation use of the WRTM is limited to \$10.00.

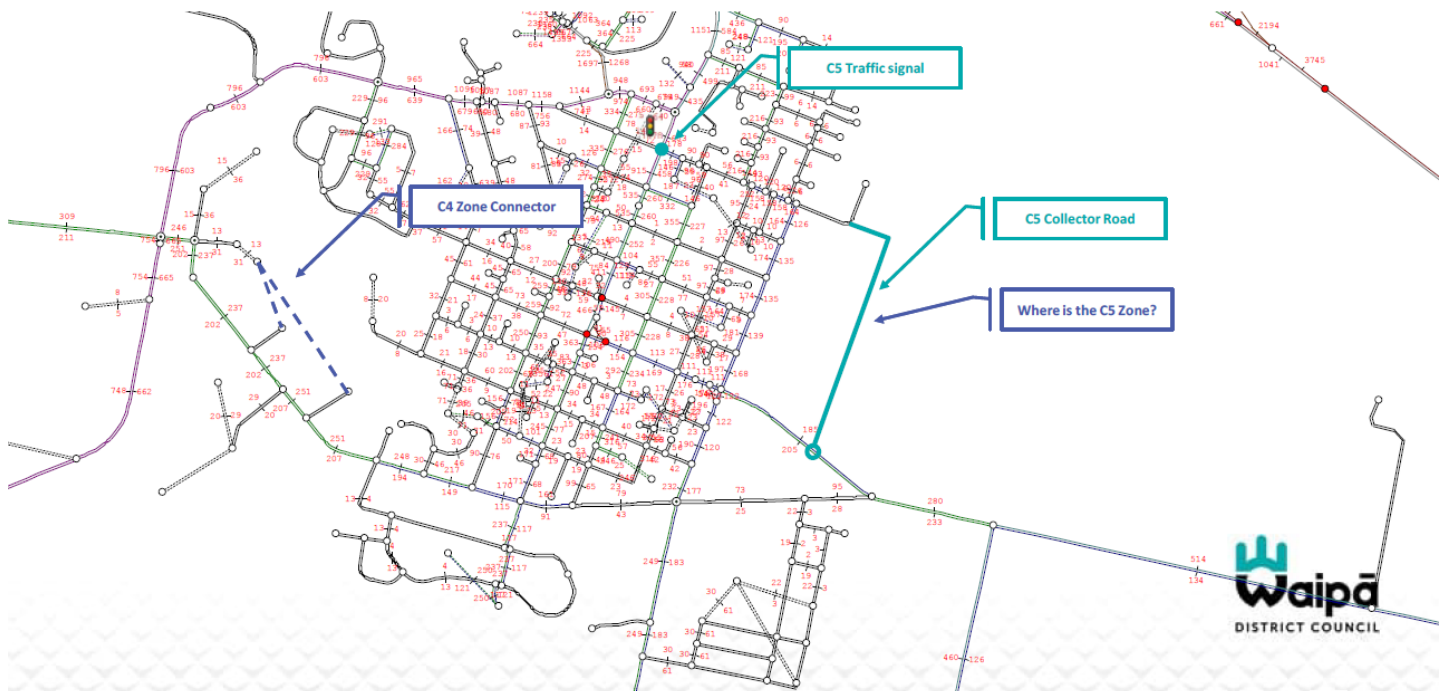
Appendix A – Cambridge Connections, Round 1, Network Changes



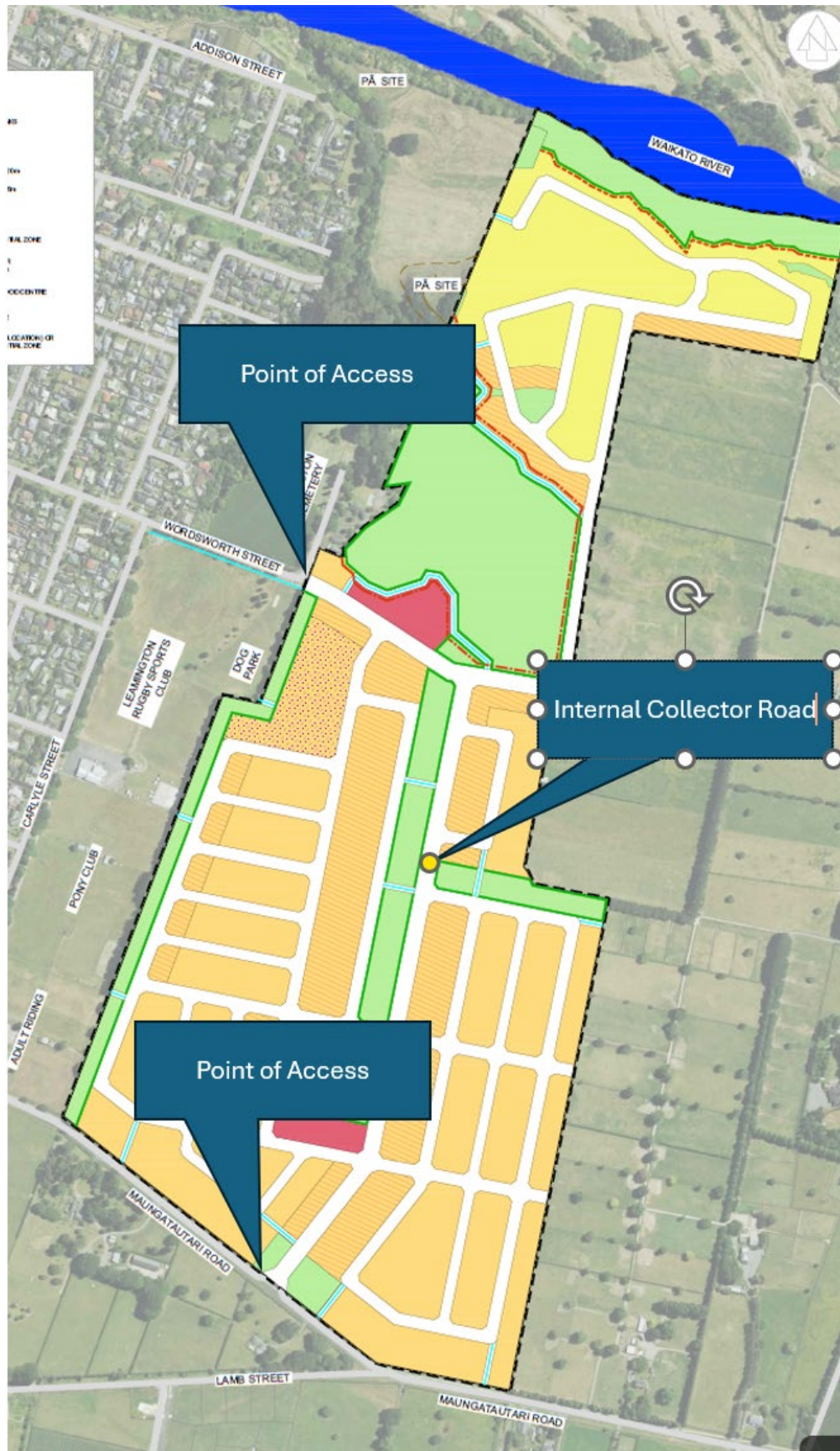
C10 ZONE CONNECTORS



C5 COLLECTOR ROAD & SIGNAL, C4 CONN.

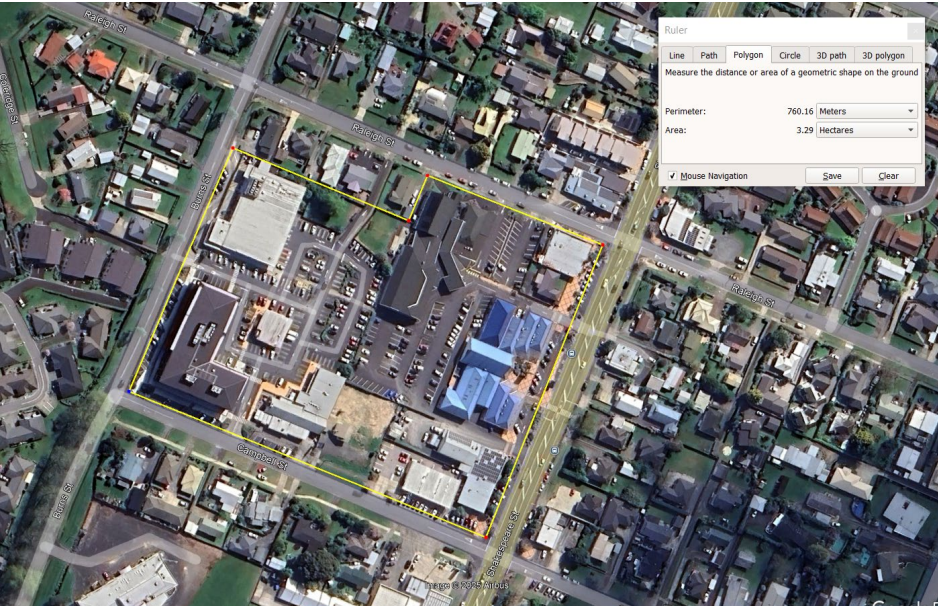


The C5 Growth Cell indicative concept is shown in the following image. The internal road network is indicative only and does not require modelling.

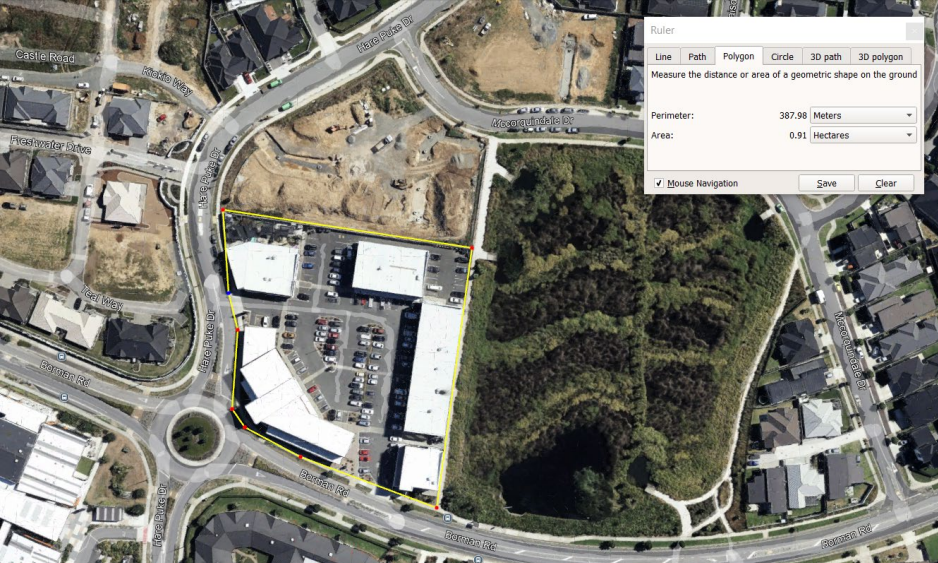


Examples of other areas with similar commercial centres:

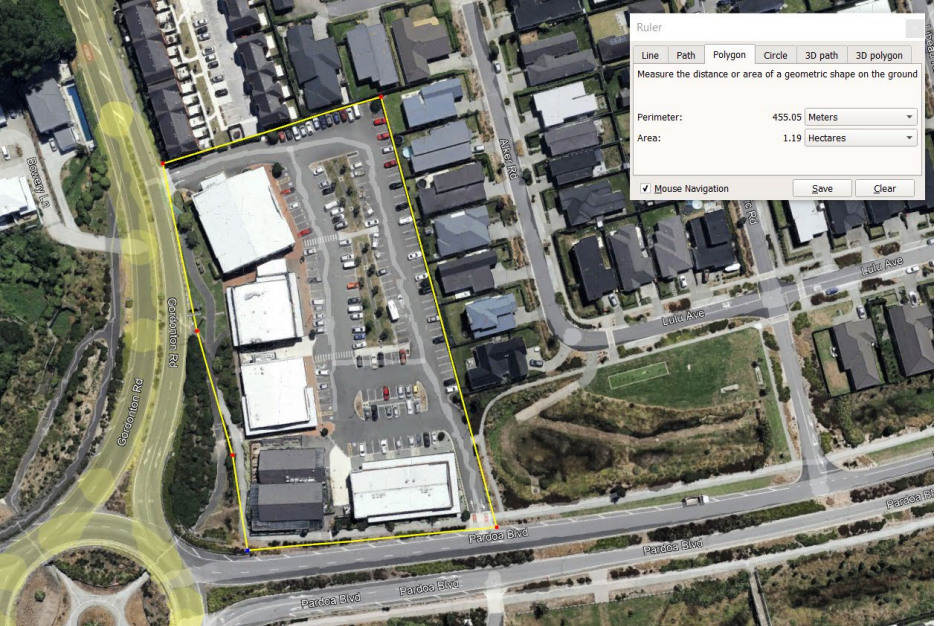
Example 1 – Leamington town centre (bounded by Campbell Street, Burns Street, Shakespeare Street and Raleigh Street. Site area = ~3.3ha.



Example 2 – Borman Road/Hare Puke Drive (Hamilton). Site area ~ 0.9ha



Example 3 – Pardoia Boulevard/Gordonton Road (Hamilton). Site area ~1.2ha.

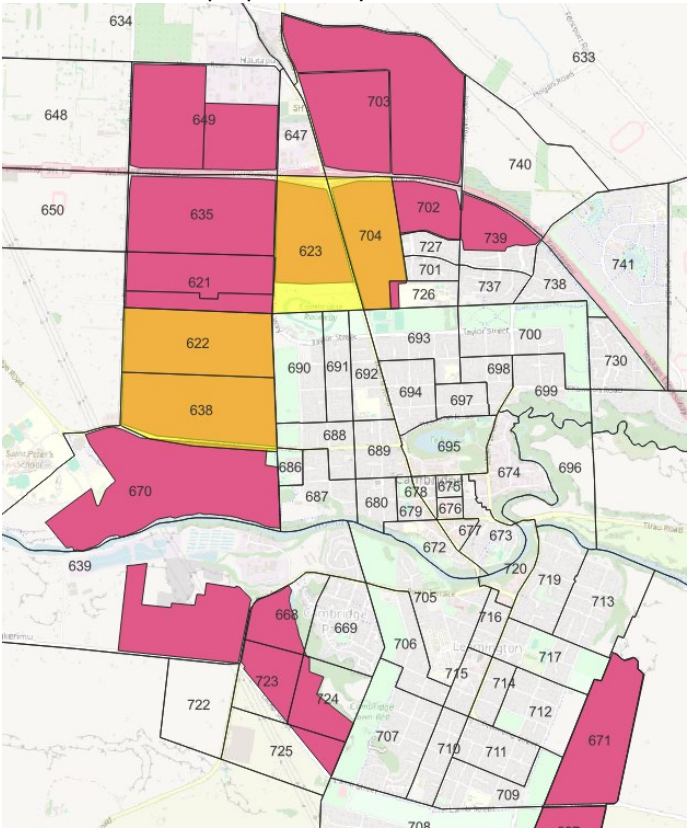


Appendix C – Cambridge Growth Nodes



WRTM zones. Below:

- Cambridge growth areas in pink
- Black are WRTM model zones
- Yellow highlight are zones with large increase in residential development by 2035 and where development will be removed proportionally.



Appendix 3: SIDRA Modelling

SITE LAYOUT

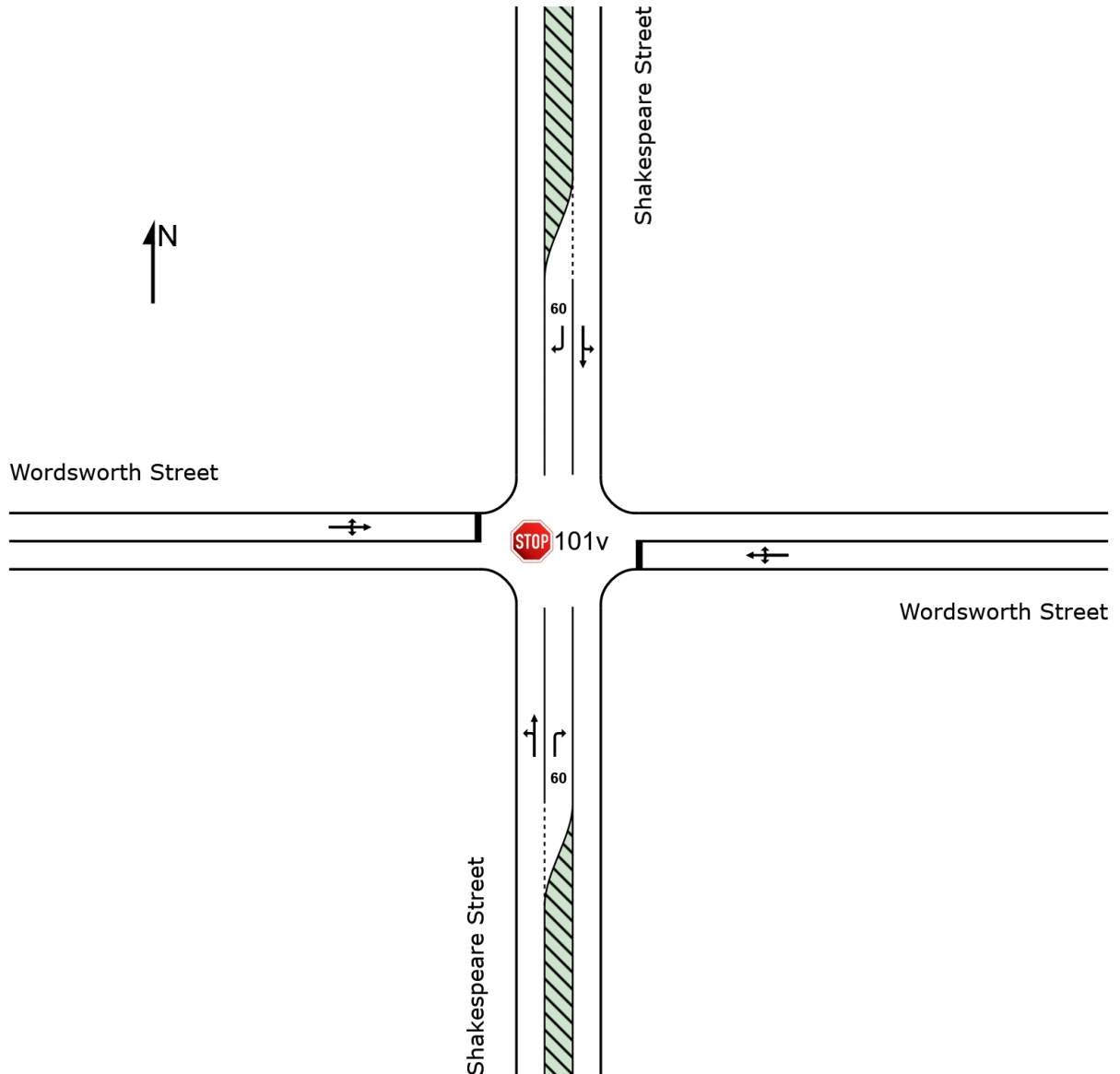
 **Site: 101v [Shakespeare/Wordsworth AM 2022 Survey (Site Folder: General)]**

New Site

Site Category: (None)

Stop (Two-Way)

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



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MOVEMENT SUMMARY

 **Site: 101v [Shakespeare/Wordsworth AM 2022 Survey (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh Dist] veh m		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shakespeare Street															
1	L2	All MCs	13	5.0	13	5.0	0.428	4.8	LOS A	0.0	0.0	0.00	0.01	0.00	48.4
2	T1	All MCs	796	5.0	796	5.0	0.428	0.2	LOS A	0.0	0.0	0.00	0.01	0.00	49.7
3	R2	All MCs	19	5.0	19	5.0	0.021	7.3	LOS A	0.1	0.6	0.55	0.67	0.55	44.2
Approach			827	5.0	827	5.0	0.428	0.4	NA	0.1	0.6	0.01	0.02	0.01	49.5
East: Wordsworth Street															
4	L2	All MCs	21	5.0	21	5.0	0.690	27.5	LOS D	2.7	19.4	0.95	1.20	1.63	29.5
5	T1	All MCs	4	5.0	4	5.0	0.690	56.2	LOS F	2.7	19.4	0.95	1.20	1.63	29.5
6	R2	All MCs	69	5.0	69	5.0	0.690	57.7	LOS F	2.7	19.4	0.95	1.20	1.63	29.4
Approach			95	5.0	95	5.0	0.690	50.9	LOS F	2.7	19.4	0.95	1.20	1.63	29.5
North: Shakespeare Street															
7	L2	All MCs	57	5.0	57	5.0	0.317	4.7	LOS A	0.0	0.0	0.00	0.05	0.00	48.3
8	T1	All MCs	539	5.0	539	5.0	0.317	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	49.5
9	R2	All MCs	25	5.0	25	5.0	0.041	9.6	LOS A	0.1	1.1	0.65	0.80	0.65	43.0
Approach			621	5.0	621	5.0	0.317	0.9	NA	0.1	1.1	0.03	0.08	0.03	49.1
West: Wordsworth Street															
10	L2	All MCs	32	5.0	32	5.0	0.123	16.9	LOS C	0.4	2.7	0.76	1.00	0.76	39.7
11	T1	All MCs	2	5.0	2	5.0	0.123	38.9	LOS E	0.4	2.7	0.76	1.00	0.76	39.7
12	R2	All MCs	1	5.0	1	5.0	0.123	37.3	LOS E	0.4	2.7	0.76	1.00	0.76	39.6
Approach			35	5.0	35	5.0	0.123	18.9	LOS C	0.4	2.7	0.76	1.00	0.76	39.7
All Vehicles			1578	5.0	1578	5.0	0.690	4.1	NA	2.7	19.4	0.09	0.14	0.13	47.2

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

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MOVEMENT SUMMARY

 **Site: 101v [Shakespeare/Wordsworth PM 2022 Survey (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shakespeare Street															
1	L2	All MCs	11	5.0	11	5.0	0.295	4.7	LOS A	0.0	0.0	0.00	0.01	0.00	48.5
2	T1	All MCs	545	5.0	545	5.0	0.295	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
3	R2	All MCs	27	5.0	27	5.0	0.055	11.2	LOS B	0.2	1.4	0.72	0.88	0.72	42.2
Approach			583	5.0	583	5.0	0.295	0.7	NA	0.2	1.4	0.03	0.05	0.03	49.4
East: Wordsworth Street															
4	L2	All MCs	18	5.0	18	5.0	0.796	43.4	LOS E	3.3	24.3	0.97	1.28	1.95	26.5
5	T1	All MCs	6	5.0	6	5.0	0.796	69.1	LOS F	3.3	24.3	0.97	1.28	1.95	26.4
6	R2	All MCs	76	5.0	76	5.0	0.796	69.9	LOS F	3.3	24.3	0.97	1.28	1.95	26.4
Approach			100	5.0	100	5.0	0.796	65.1	LOS F	3.3	24.3	0.97	1.28	1.95	26.4
North: Shakespeare Street															
7	L2	All MCs	156	5.0	156	5.0	0.488	4.8	LOS A	0.0	0.0	0.00	0.09	0.00	47.9
8	T1	All MCs	757	5.0	757	5.0	0.488	0.2	LOS A	0.0	0.0	0.00	0.09	0.00	49.2
9	R2	All MCs	15	5.0	15	5.0	0.016	7.0	LOS A	0.1	0.5	0.53	0.64	0.53	44.3
Approach			927	5.0	927	5.0	0.488	1.1	NA	0.1	0.5	0.01	0.10	0.01	48.9
West: Wordsworth Street															
10	L2	All MCs	12	5.0	12	5.0	0.103	11.8	LOS B	0.3	2.1	0.78	1.00	0.78	37.5
11	T1	All MCs	5	5.0	5	5.0	0.103	46.1	LOS E	0.3	2.1	0.78	1.00	0.78	37.5
12	R2	All MCs	3	5.0	3	5.0	0.103	33.5	LOS D	0.3	2.1	0.78	1.00	0.78	37.4
Approach			20	5.0	20	5.0	0.103	24.3	LOS C	0.3	2.1	0.78	1.00	0.78	37.5
All Vehicles			1631	5.0	1631	5.0	0.796	5.2	NA	3.3	24.3	0.09	0.17	0.15	46.4

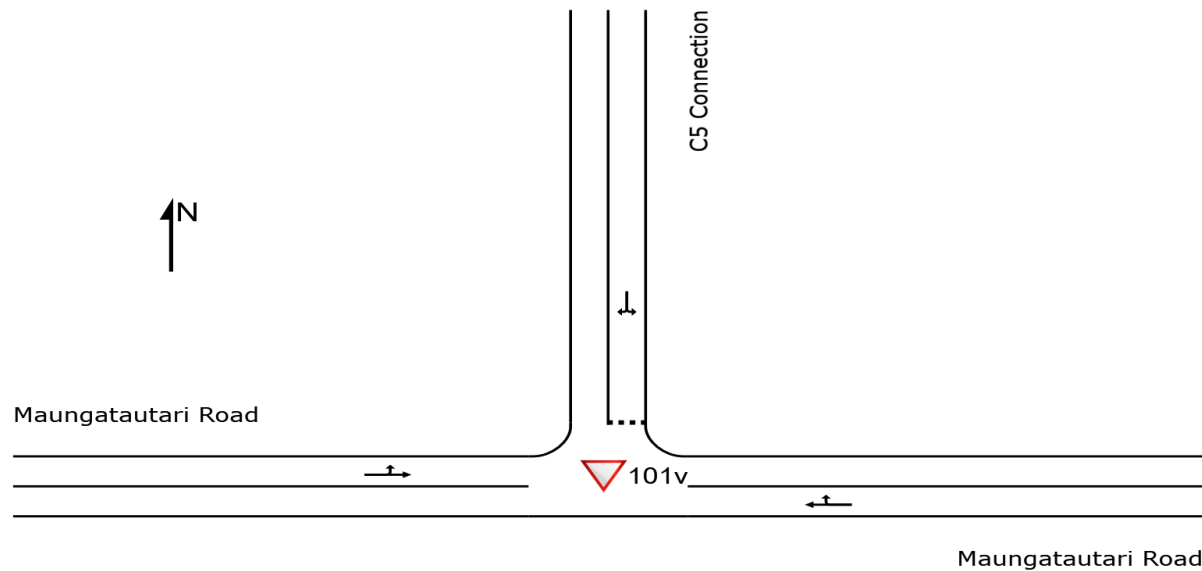
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of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

SITE LAYOUT

▽ Site: 101v [Maungatautari/C5 AM 2022 with C5 (Site Folder: General)]

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

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



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Project: C:\Users\annaj\OneDrive\AW Consulting\Projects\Boffa Miskell Jobs\C5 Cambridge\Test Models for ITA.sip9

MOVEMENT SUMMARY

Site: 101v [Maungatautari/C5 AM 2022 with C5 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
East: Maungatautari Road															
5	T1	All MCs	156	5.0	156	5.0	0.088	0.1	LOS A	0.1	0.7	0.05	0.06	0.05	49.6
6	R2	All MCs	13	5.0	13	5.0	0.088	5.2	LOS A	0.1	0.7	0.05	0.06	0.05	48.2
Approach			168	5.0	168	5.0	0.088	0.5	NA	0.1	0.7	0.05	0.06	0.05	49.5
North: C5 Connection															
7	L2	All MCs	36	5.0	36	5.0	0.071	4.9	LOS A	0.2	1.6	0.20	0.53	0.20	45.4
9	R2	All MCs	79	5.0	79	5.0	0.071	5.0	LOS A	0.2	1.6	0.20	0.53	0.20	45.3
Approach			115	5.0	115	5.0	0.071	5.0	LOS A	0.2	1.6	0.20	0.53	0.20	45.4
West: Maungatautari Road															
10	L2	All MCs	68	5.0	68	5.0	0.090	4.6	LOS A	0.0	0.0	0.00	0.21	0.00	47.5
11	T1	All MCs	104	5.0	104	5.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	48.8
Approach			173	5.0	173	5.0	0.090	1.8	NA	0.0	0.0	0.00	0.21	0.00	48.3
All Vehicles			456	5.0	456	5.0	0.090	2.1	NA	0.2	1.6	0.07	0.24	0.07	47.9

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

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MOVEMENT SUMMARY

Site: 101v [Maungatautari/C5 AM 2022 with C5 Sensitivity
(Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
East: Maungatautari Road															
5	T1	All MCs	366	5.0	366	5.0	0.200	0.1	LOS A	0.1	1.1	0.05	0.06	0.05	49.7
6	R2	All MCs	13	5.0	13	5.0	0.200	7.1	LOS A	0.1	1.1	0.05	0.06	0.05	48.3
Approach			379	5.0	379	5.0	0.200	0.4	NA	0.1	1.1	0.05	0.06	0.05	49.7
North: C5 Connection															
7	L2	All MCs	36	5.0	36	5.0	0.097	6.4	LOS A	0.3	2.2	0.41	0.68	0.41	45.0
9	R2	All MCs	79	5.0	79	5.0	0.097	5.8	LOS A	0.3	2.2	0.41	0.68	0.41	44.9
Approach			115	5.0	115	5.0	0.097	6.0	LOS A	0.3	2.2	0.41	0.68	0.41	44.9
West: Maungatautari Road															
10	L2	All MCs	68	5.0	68	5.0	0.253	4.7	LOS A	0.0	0.0	0.00	0.08	0.00	48.2
11	T1	All MCs	423	5.0	423	5.0	0.253	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	49.5
Approach			492	5.0	492	5.0	0.253	0.7	NA	0.0	0.0	0.00	0.08	0.00	49.3
All Vehicles			985	5.0	985	5.0	0.253	1.2	NA	0.3	2.2	0.07	0.14	0.07	48.9

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

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Project: C:\Users\annaj\OneDrive\AW Consulting\Projects\Boffa Miskell Jobs\C5 Cambridge\Test Models for ITA.sip9

MOVEMENT SUMMARY

Site: 101v [Maungatautari/C5 PM 2022 with C5 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
East: Maungatautari Road															
5	T1	All MCs	128	5.0	128	5.0	0.111	0.5	LOS A	0.4	3.1	0.25	0.28	0.25	48.4
6	R2	All MCs	61	5.0	61	5.0	0.111	5.5	LOS A	0.4	3.1	0.25	0.28	0.25	47.0
Approach			189	5.0	189	5.0	0.111	2.1	NA	0.4	3.1	0.25	0.28	0.25	47.9
North: C5 Connection															
7	L2	All MCs	18	5.0	18	5.0	0.065	5.1	LOS A	0.2	1.3	0.24	0.56	0.24	45.4
9	R2	All MCs	85	5.0	85	5.0	0.065	5.1	LOS A	0.2	1.3	0.24	0.56	0.24	45.2
Approach			103	5.0	103	5.0	0.065	5.1	LOS A	0.2	1.3	0.24	0.56	0.24	45.3
West: Maungatautari Road															
10	L2	All MCs	91	5.0	91	5.0	0.125	4.6	LOS A	0.0	0.0	0.00	0.20	0.00	47.6
11	T1	All MCs	149	5.0	149	5.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	48.8
Approach			240	5.0	240	5.0	0.125	1.8	NA	0.0	0.0	0.00	0.20	0.00	48.3
All Vehicles			533	5.0	533	5.0	0.125	2.5	NA	0.4	3.1	0.13	0.30	0.13	47.6

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

MOVEMENT SUMMARY

Site: 101v [Maungatautari/C5 PM 2022 with C5 Sensitivity
(Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
East: Maungatautari Road															
5	T1	All MCs	501	5.0	501	5.0	0.309	0.4	LOS A	0.6	4.6	0.14	0.16	0.14	49.3
6	R2	All MCs	61	5.0	61	5.0	0.309	6.5	LOS A	0.6	4.6	0.14	0.16	0.14	47.9
Approach			562	5.0	562	5.0	0.309	1.0	NA	0.6	4.6	0.14	0.16	0.14	49.1
North: C5 Connection															
7	L2	All MCs	18	5.0	18	5.0	0.086	5.7	LOS A	0.2	1.7	0.39	0.67	0.39	45.0
9	R2	All MCs	85	5.0	85	5.0	0.086	6.0	LOS A	0.2	1.7	0.39	0.67	0.39	44.9
Approach			103	5.0	103	5.0	0.086	5.9	LOS A	0.2	1.7	0.39	0.67	0.39	44.9
West: Maungatautari Road															
10	L2	All MCs	91	5.0	91	5.0	0.196	4.7	LOS A	0.0	0.0	0.00	0.13	0.00	47.9
11	T1	All MCs	288	5.0	288	5.0	0.196	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	49.2
Approach			379	5.0	379	5.0	0.196	1.2	NA	0.0	0.0	0.00	0.13	0.00	48.9
All Vehicles			1044	5.0	1044	5.0	0.309	1.6	NA	0.6	4.6	0.12	0.20	0.12	48.6

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

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SITE LAYOUT

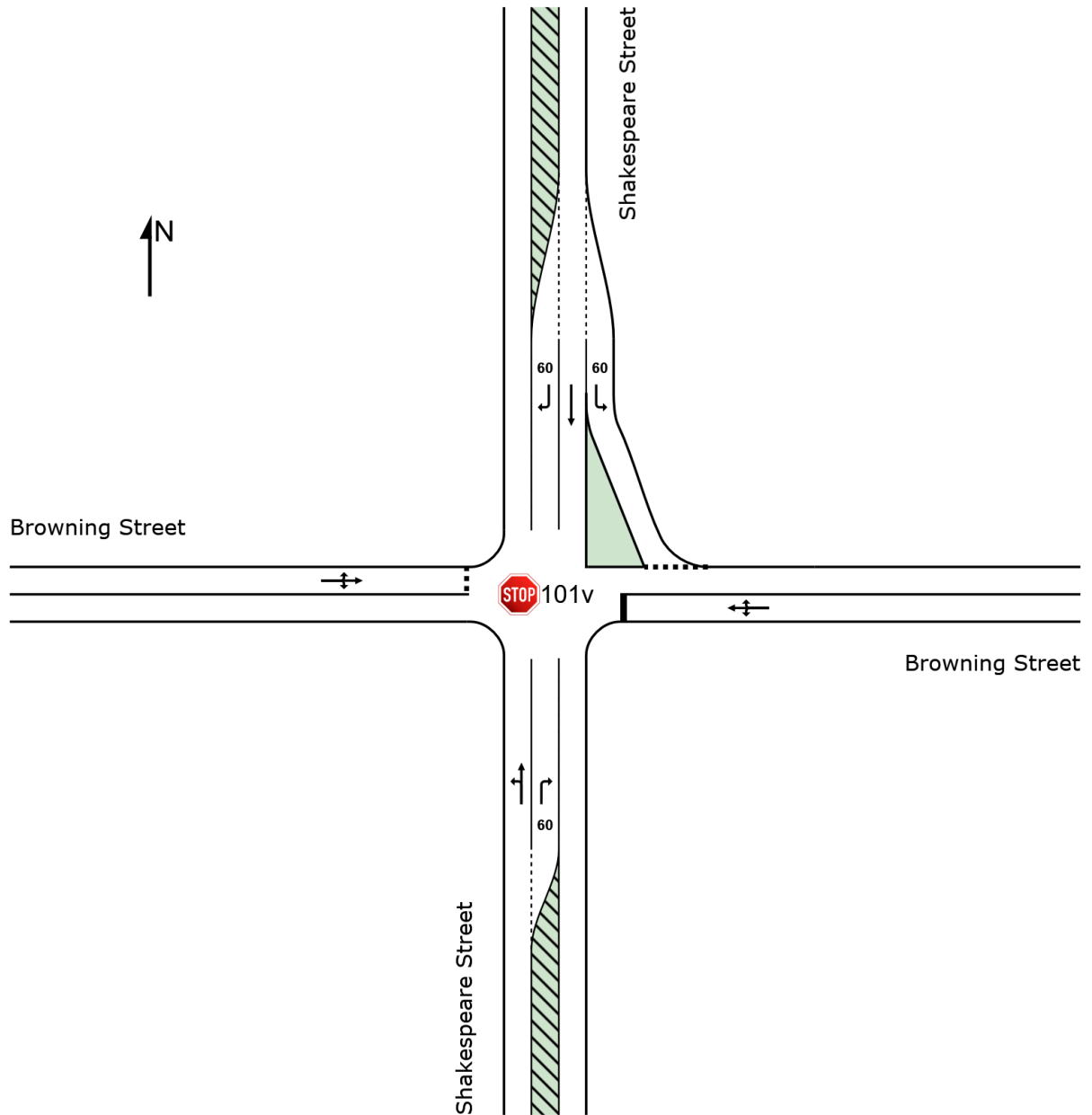
 **Site: 101v [Shakespeare/Browning AM 2022 Survey + Incremental Test (Site Folder: General)]**

New Site

Site Category: (None)

Stop (Two-Way)

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



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Project: C:\Users\annaj\OneDrive\AW Consulting\Projects\Boffa Miskell Jobs\C5 Cambridge\Test Models for ITA.sip9

MOVEMENT SUMMARY

 **Site: 101v [Shakespeare/Browning AM 2022 Survey (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shakespeare Street															
1	L2	All MCs	3	5.0	3	5.0	0.219	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	48.6
2	T1	All MCs	411	5.0	411	5.0	0.219	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	All MCs	7	5.0	7	5.0	0.005	5.2	LOS A	0.0	0.2	0.31	0.52	0.31	45.0
Approach			421	5.0	421	5.0	0.219	0.2	NA	0.0	0.2	0.01	0.01	0.01	49.8
East: Browning Street															
4	L2	All MCs	8	5.0	8	5.0	0.728	15.5	LOS C	5.3	38.6	0.85	1.35	1.86	37.8
5	T1	All MCs	13	5.0	13	5.0	0.728	22.6	LOS C	5.3	38.6	0.85	1.35	1.86	37.8
6	R2	All MCs	294	5.0	294	5.0	0.728	23.8	LOS C	5.3	38.6	0.85	1.35	1.86	37.9
Approach			315	5.0	315	5.0	0.728	23.5	LOS C	5.3	38.6	0.85	1.35	1.86	37.9
North: Shakespeare Street															
7	L2	All MCs	191	5.0	191	5.0	0.121	4.6	LOS A	0.5	3.9	0.08	0.47	0.08	46.0
8	T1	All MCs	206	5.0	206	5.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	All MCs	5	5.0	5	5.0	0.005	6.1	LOS A	0.0	0.1	0.45	0.56	0.45	44.8
Approach			402	5.0	402	5.0	0.121	2.3	LOS A	0.5	3.9	0.04	0.23	0.04	47.9
West: Browning Street															
10	L2	All MCs	47	5.0	47	5.0	0.083	6.8	LOS A	0.3	2.1	0.48	0.67	0.48	44.5
11	T1	All MCs	12	5.0	12	5.0	0.083	7.5	LOS A	0.3	2.1	0.48	0.67	0.48	44.8
12	R2	All MCs	4	5.0	4	5.0	0.083	8.6	LOS A	0.3	2.1	0.48	0.67	0.48	44.4
Approach			63	5.0	63	5.0	0.083	7.1	LOS A	0.3	2.1	0.48	0.67	0.48	44.6
All Vehicles			1201	5.0	1201	5.0	0.728	7.4	NA	5.3	38.6	0.26	0.47	0.53	45.2

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

MOVEMENT SUMMARY

 **Site: 101v [Shakespeare/Browning AM 2022 Survey + Incremental Test (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shakespeare Street															
1	L2	All MCs	3	5.0	3	5.0	0.236	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	48.6
2	T1	All MCs	443	5.0	443	5.0	0.236	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	All MCs	7	5.0	7	5.0	0.005	5.3	LOS A	0.0	0.2	0.32	0.52	0.32	45.0
Approach			454	5.0	454	5.0	0.236	0.2	NA	0.0	0.2	0.01	0.01	0.01	49.8
East: Browning Street															
4	L2	All MCs	8	5.0	8	5.0	0.872	24.9	LOS C	8.8	64.1	0.93	1.69	2.99	34.0
5	T1	All MCs	13	5.0	13	5.0	0.872	33.4	LOS D	8.8	64.1	0.93	1.69	2.99	34.0
6	R2	All MCs	322	5.0	322	5.0	0.872	34.8	LOS D	8.8	64.1	0.93	1.69	2.99	34.0
Approach			343	5.0	343	5.0	0.872	34.5	LOS D	8.8	64.1	0.93	1.69	2.99	34.0
North: Shakespeare Street															
7	L2	All MCs	208	5.0	208	5.0	0.133	4.6	LOS A	0.6	4.3	0.08	0.47	0.08	46.0
8	T1	All MCs	223	5.0	223	5.0	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	All MCs	5	5.0	5	5.0	0.005	6.3	LOS A	0.0	0.1	0.47	0.57	0.47	44.7
Approach			437	5.0	437	5.0	0.133	2.3	LOS A	0.6	4.3	0.04	0.23	0.04	47.9
West: Browning Street															
10	L2	All MCs	47	5.0	47	5.0	0.087	7.1	LOS A	0.3	2.2	0.50	0.69	0.50	44.4
11	T1	All MCs	12	5.0	12	5.0	0.087	8.0	LOS A	0.3	2.2	0.50	0.69	0.50	44.6
12	R2	All MCs	4	5.0	4	5.0	0.087	9.2	LOS A	0.3	2.2	0.50	0.69	0.50	44.3
Approach			63	5.0	63	5.0	0.087	7.4	LOS A	0.3	2.2	0.50	0.69	0.50	44.4
All Vehicles			1297	5.0	1297	5.0	0.872	10.3	NA	8.8	64.1	0.29	0.56	0.83	43.6

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

MOVEMENT SUMMARY

 **Site: 101v [Shakespeare/Browning PM 2022 Survey (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shakespeare Street															
1	L2	All MCs	4	5.0	4	5.0	0.145	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.6
2	T1	All MCs	269	5.0	269	5.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
3	R2	All MCs	9	5.0	9	5.0	0.007	5.5	LOS A	0.0	0.2	0.36	0.53	0.36	44.9
Approach			283	5.0	283	5.0	0.145	0.3	NA	0.0	0.2	0.01	0.03	0.01	49.7
East: Browning Street															
4	L2	All MCs	16	5.0	16	5.0	0.493	11.8	LOS B	2.6	19.2	0.72	1.14	1.11	40.4
5	T1	All MCs	17	5.0	17	5.0	0.493	17.0	LOS C	2.6	19.2	0.72	1.14	1.11	40.4
6	R2	All MCs	202	5.0	202	5.0	0.493	17.6	LOS C	2.6	19.2	0.72	1.14	1.11	40.4
Approach			235	5.0	235	5.0	0.493	17.2	LOS C	2.6	19.2	0.72	1.14	1.11	40.4
North: Shakespeare Street															
7	L2	All MCs	280	5.0	280	5.0	0.179	4.6	LOS A	0.8	6.1	0.10	0.47	0.10	45.9
8	T1	All MCs	275	5.0	275	5.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
9	R2	All MCs	22	5.0	22	5.0	0.017	5.5	LOS A	0.1	0.5	0.36	0.55	0.36	44.9
Approach			577	5.0	577	5.0	0.179	2.5	LOS A	0.8	6.1	0.06	0.25	0.06	47.7
West: Browning Street															
10	L2	All MCs	22	5.0	22	5.0	0.051	5.8	LOS A	0.2	1.3	0.43	0.60	0.43	44.9
11	T1	All MCs	17	5.0	17	5.0	0.051	6.8	LOS A	0.2	1.3	0.43	0.60	0.43	45.2
12	R2	All MCs	3	5.0	3	5.0	0.051	8.0	LOS A	0.2	1.3	0.43	0.60	0.43	44.8
Approach			42	5.0	42	5.0	0.051	6.4	LOS A	0.2	1.3	0.43	0.60	0.43	45.0
All Vehicles			1137	5.0	1137	5.0	0.493	5.1	NA	2.6	19.2	0.20	0.39	0.28	46.3

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

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MOVEMENT SUMMARY

 **Site: 101v [Shakespeare/Browning PM 2022 Survey + Incremental Test (Site Folder: General)]**

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

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh Dist] veh m		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shakespeare Street															
1	L2	All MCs	4	5.0	4	5.0	0.145	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.6
2	T1	All MCs	269	5.0	269	5.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
3	R2	All MCs	9	5.0	9	5.0	0.007	5.5	LOS A	0.0	0.2	0.36	0.53	0.36	44.9
Approach			283	5.0	283	5.0	0.145	0.3	NA	0.0	0.2	0.01	0.03	0.01	49.7
East: Browning Street															
4	L2	All MCs	16	5.0	16	5.0	0.600	13.2	LOS B	3.6	26.6	0.78	1.21	1.38	39.4
5	T1	All MCs	17	5.0	17	5.0	0.600	19.2	LOS C	3.6	26.6	0.78	1.21	1.38	39.4
6	R2	All MCs	242	5.0	242	5.0	0.600	19.9	LOS C	3.6	26.6	0.78	1.21	1.38	39.5
Approach			275	5.0	275	5.0	0.600	19.4	LOS C	3.6	26.6	0.78	1.21	1.38	39.5
North: Shakespeare Street															
7	L2	All MCs	335	5.0	335	5.0	0.215	4.6	LOS A	1.0	7.5	0.10	0.47	0.10	45.9
8	T1	All MCs	275	5.0	275	5.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
9	R2	All MCs	22	5.0	22	5.0	0.017	5.5	LOS A	0.1	0.5	0.36	0.55	0.36	44.9
Approach			632	5.0	632	5.0	0.215	2.7	LOS A	1.0	7.5	0.07	0.27	0.07	47.5
West: Browning Street															
10	L2	All MCs	22	5.0	22	5.0	0.051	5.8	LOS A	0.2	1.3	0.43	0.60	0.43	44.9
11	T1	All MCs	17	5.0	17	5.0	0.051	6.8	LOS A	0.2	1.3	0.43	0.60	0.43	45.2
12	R2	All MCs	3	5.0	3	5.0	0.051	8.0	LOS A	0.2	1.3	0.43	0.60	0.43	44.8
Approach			42	5.0	42	5.0	0.051	6.4	LOS A	0.2	1.3	0.43	0.60	0.43	45.0
All Vehicles			1232	5.0	1232	5.0	0.600	6.0	NA	3.6	26.6	0.23	0.43	0.36	45.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Appendix 4: Waikato Regional Policy and Plan Assessment

Waikato Regional Policy Statement (RPS) Transport Assessment

The following sets out an assessment of the plan change proposal in terms of the relevant RPS Transport provisions.

RPS Reference	Assessment
EIT-M1 – Plan provisions	
Regional and district plans shall include provisions that give effect to EIT-P1, and in particular, that management of the built environment: avoids, as far as practicable, adverse effects on the function of significant transport corridors as defined in Maps 25 and 26, and otherwise remedies or mitigates any adverse effects that cannot be practicably be avoided; avoids, as far as practicable, the adverse effects of ribbon development along the defined significant transport corridors, and otherwise remedies or mitigates any adverse effects that cannot practicably be avoided; avoids as far as practicable, the need for additional access points onto the defined significant transport corridors, and otherwise remedies or mitigates the adverse effects of any additional access points that cannot practicably be avoided;	Aligned: The transport infrastructure undertakings described are specifically targeted to avoiding the adverse effects of the planned activities on the significant transport corridors. The 2041 assessed operating performance appropriately responds to this. The C5 Growth Cell is planned integrated urban development areas that avoid ribbon development outcomes. The structure plan restricts access to individual dwellings onto the adjacent road network, internalises access activity and consolidates access places strategically with the formed transport network. The

RPS Reference	Assessment
avoids as far as is practicable, the exacerbation of community severance caused by defined significant transport corridors, and otherwise remedies or mitigates the adverse effects of any exacerbated community severance that cannot practicably be avoided; provides for renewable energy by having particular regard to: the increasing requirement for electricity generation from renewable sources such as geothermal, fresh water, wind, solar, biomass and marine, and the need to maintain generation from existing renewable electricity generation activities; the need for electricity generation to locate where energy sources exist, and transmission infrastructure to connect these generation sites to the national grid or local distribution network; the logistical or technical practicalities associated with developing, upgrading, operating or maintaining renewable electricity generation, or electricity transmission activities; any residual environmental effects of renewable electricity generation activities which cannot be avoided, remedied or mitigated can be offset or compensated to benefit the affected community or the region; and the benefits of renewable electricity generation activities including maintaining or increasing security of electricity supply. provides for infrastructure in a manner that: recognises that infrastructure development can adversely affect people and communities; enables the ongoing operation, maintenance, upgrading and development of municipal water supply infrastructure so as to provide for the justified and reasonably foreseeable needs of current and future generations; and	points of access have been designed based on safe system principles. Community severance is avoided by through the integrated multi-modal transport design. Access in terms of the wider catchments is appropriately distributed, avoiding unnecessary traffic on local environments and delivering an optimised distribution of movement to/from the wider transport network. N/A, not a renewable energy generation activity

RPS Reference	Assessment
does not result in land uses that adversely affect the effective and efficient operation of existing and planned regionally significant infrastructure. considers how existing and planned renewable electricity generation activities and existing and planned urban development will be managed in relation to one another.	Particular controls on access and for transport infrastructure are defined in the structure plan to protect people and community environments. N/A The transport modelling assessments described demonstrate the operational capacity of the transport environment is maintained in the longer term. N/A
UFD-O1 – Built environment	
Development of the built environment (including transport and other infrastructure) and associated land use occurs in an integrated, sustainable and planned manner which enables positive environmental, social, cultural and economic outcomes, including by: integrating land use and infrastructure planning, including by ensuring that development of the built environment does not compromise the safe, efficient and effective operation of infrastructure corridors; recognising and protecting the value and long-term benefits of regionally significant infrastructure;	Aligned The proposed structure plan identifies and requires transport infrastructure ensuring the transport effects do not compromise safe, efficient and effective operation of the transport corridors.

RPS Reference	Assessment
strategically planning for growth and development to create responsive and well-functioning urban environments, that: support reductions in greenhouse gas emissions and are resilient to the current and future effects of climate change; improve housing choice, quality, and affordability; enable a variety of homes that enable Māori to express their cultural traditions and norms; ensure sufficient development capacity, supported by integrated infrastructure provision, for identified housing and business needs in the short, medium and long term; improves connectivity within urban areas, particularly by active transport and public transport; take into account the values and aspirations of hapū and iwi for urban development.	Regionally significant transport infrastructure is unaffected by the integrated urban neighbourhood proposal. The proposal is aligned with established Growth Cell planning for the area. Determination of the Growth Cell and its function set in place the strategic greenhouse gas emissions outcomes for the zone. Transport connectivity in particular active transport provision and public transport enablement within the plan change and structure plan achieve alignment with these objectives.
UFD-P1 – Planned and co-ordinated subdivision, use and development	
Subdivision, use and development of the built environment, including transport, occurs in a planned and co-ordinated manner which: has regard to the principles in APP11; recognises and addresses potential cumulative effects of subdivision, use and development; is based on sufficient information to allow assessment of the potential long-term effects of subdivision, use and development; and has regard to the existing built environment.	Aligned APP 11 design principles are assessed below. The assessments for transport adopt an appropriate longer term 20 year horizon. The infrastructure response addresses the potential cumulative effects expected to arise as a result of subdivision.
UFD-P2 – Co-ordinating growth and infrastructure	

RPS Reference	Assessment
Management of the built environment ensures: the nature, timing and sequencing of new development is co-ordinated with the development, funding, implementation and operation of transport and other infrastructure, in order to: optimise the efficient and affordable provision of both the development and the infrastructure; maintain or enhance the operational effectiveness, viability and safety of existing and planned infrastructure; protect investment in existing infrastructure; and ensure new development does not occur until provision for appropriate infrastructure necessary to service the development is in place; the spatial pattern of land use development, as it is likely to develop over at least a 30-year period, is understood sufficiently to inform reviews of the Regional Land Transport Plan. As a minimum, this will require the development and maintenance of growth strategies where strong population growth is anticipated <u>or as required for tier 3 local authorities as set out in UFD-P18 and its associated methods</u>; the efficient and effective functioning of infrastructure, including transport corridors, is maintained, and the ability to maintain and upgrade that infrastructure is retained; and a co-ordinated and integrated approach across regional and district boundaries and between agencies; and that where new infrastructure is provided by the private sector, it does not compromise the function of existing, or the planned provision of, infrastructure provided by central, regional and local government agencies.	Aligned Recommended transport infrastructure is provisioned to enable appropriate timing, sequencing and funding. This is secured in the proposed plan change through the Development Agreement provisions. Efficient and effective functioning of the transport corridor is addressed and provided for and described.
UFD-P4 – Energy demand management	
Development should minimise transport, energy demand and waste production, encourage beneficial re-use of waste materials, and promote the efficient use of energy.	Aligned. The potential for development generated transport is predominantly determined by establishment of the C5 Growth Cell in the first

RPS Reference	Assessment
	instance. Minimisation of transport is assessed as being achieved through delivering a comprehensive design response to active and public transport alternatives. The active travel initiatives extend beyond the Site boundary to ensure integration with the built environment.
APP11 - Development Principles	
promote compact urban form, design and location to: minimise energy and carbon use; minimise the need for private motor vehicle use; maximise opportunities to support and take advantage of public transport in particular by encouraging employment activities in locations that are or can in the future be served efficiently by public transport; encourage walking, cycling and multi-modal transport connections; and maximise opportunities for people to live, work and play within their local area;	The compact urban form aspect of the C5 Growth cell has been previously determined by Future Proof and then reflected as an identifiable Growth Cell within the District Plan. Its location adjacent and adjoining the current built urban environment together with the motorised and non-motorised transport mode integration measures described are proposed to deliver in a way that is consistent with the strategic directions on location and density. The No. 20 bus traverses Shakespeare Street, Cambridge and is within a 5-10 minute walk of the development area. Walking and cycling accessibility for the C5 area is comprehensively addressed and provisioned for within the proposed plan change. The area is a planned and integrated extension to the Leamington urban environment.

Waikato Regional Public Transport Plan (RPTP) - Transport Assessment

The following sets out an assessment of the plan change proposal in terms of the relevant RPTP Transport provisions.

RPTP Reference	Assessment
Policy 67 Development of new urban areas, redevelopment and/or the expansion of existing urban areas should be undertaken in a way that is consistent with the urban form and transport design factors such as proximity, linearity, connectivity and land use intensity, as outlined in Appendix B.	The plan change area is an identified Growth Cell in the District Plan. The development boundaries include all of the intended growth area with some localised extension to this. The transport design enables either access to or integrated public transport servicing when that is determined to be established by the Regional Council.
Policy 68 The council will not provide public transport services sufficient to enable well-functioning urban areas where the nature and location of the proposed urban development is inconsistent with the urban form and transport design factors outlined in Appendix B.	The subject plan change area is consistent with the long-term planned urban form, it is contained within the identified Growth Cell defined in the District Plan. Specific alignment with Appendix B factors is assessed below.
Appendix B Factors	
Proximity Is development area within or in very close proximity to the existing built urban area?	Aligned: The C5 area is consistent with planned future urban growth for Leamington. The 30 minutes walking and cycling isochrones described above demonstrate extensive non-motorised proximity in terms of the wider Cambridge built and proposed future urban environments.
Linearity Is the new development area situated “on the way” to other existing key destinations via a direct route alignment?; Or Can the area be serviced by way of a short linear extension to an existing or planned public transport line?; Or	Aligned: The proposal supports current linearity for public transport servicing in the Leamington. Further however, the proposed plan change additionally enables the possibility of accommodating public transport servicing through the

Appendix 4: Waikato Regional Policy and Plan Assessment

Boffa Miskell Ltd | Rider Park Structure Plan | Integrated Transportation Assessment

RPTP Reference	Assessment
Does the new development area justify the creation of a new frequent line that connects to multiple other key locations in a way that aligns well with the assessment criteria outlined in this table?	site's internal connector road network if that is determined as the best outcome in future.
Connectivity Will the development area have a highly connected and safe walking and micro-mobility network? Will the street layout and design enable the efficient movement of public transport vehicles? Will on street public transport infrastructure enable the safe and efficient boarding and alighting of people of all abilities during all weather conditions?	Aligned: An integrated and connected network or walking and cycling infrastructure is identified on the road cross sections and transport network proposed.
Density Does the development area include density that warrants/requires frequent service provision?	Aligned: The plan change area is located to be readily accessible to the current public transport services, and is arranged to support increased frequency or specific servicing within the site should that be proposed in future.

Appendix 5: Emissions Reduction Plan 2 (ERP2) 2026-30

In December 2024, the Government released New Zealand's second emissions reduction plan 2026-2030. Section 9. Transport sets out relevant policies for the sector. The key Pillars of the Climate Strategy for Transport are described as:

- *Credible*
- *ets support the climate transition.*
- *Clean energy is abundant and affordable.*

The key actions and policies are defined as:

- *Aiming for a network of 10,000 public EV charging points by 2030 and facilitating private investment in EV charging infrastructure.*
- *Reviewing regulatory barriers to decarbonising heavy vehicles (eg, EVs and hydrogen).*
- *Promoting innovation through the Low Emissions Heavy Vehicle Fund.*
- *Continuing to support the aviation sector to decarbonise, and working with other countries on low- and zero-carbon shipping on key trade routes by 2035.*
- *Supporting public transport in our main cities.*

The following assessments are made in terms of S74(2)(d) of the RMA and having regard to any emissions reduction plan, and in relation to the ERP2 policies on transport:

Action and Policy	Assessment
<i>Aiming for a network of 10,000 public EV charging points by 2030 and facilitating private investment in EV charging infrastructure.</i>	Electricity lines companies, motorist service stations and other private investment undertakings are leading the delivery of these facilities. A key policy stated in ERP2 is “ <i>Facilitating private investment</i> ”. There are currently 5 charge locations within the Cambridge CBD area. Personal charging on a site by site basis is an option available to each land owner and not prevented by the current District Plan.
<i>Reviewing regulatory barriers to decarbonising heavy vehicles (eg, EVs and hydrogen).</i>	Regulatory review is the realm of Government
<i>Promoting innovation through the Low Emissions Heavy Vehicle Fund.</i>	Government is signalling a promotion fund
<i>Continuing to support the aviation sector to decarbonise, and working with other countries on low- and zero-carbon shipping on key trade routes by 2035.</i>	N/A
<i>Supporting public transport in our main cities.</i>	This policy signals continuing support for public transport. The policy explanations in ERP2 cite the following Government and Regional Authority actions in relation to public transport emissions: Supporting the transition to zero-emissions buses <i>Most public transport authorities have begun using zero-emissions buses in their public transport fleets, because of the economic, health and emissions benefits.</i> <i>From 1 July 2025, authorities are required to procure only zero-emissions buses.</i> <i>To support this transition, the Government has reconfirmed \$44.721 million through Budget 2024 over four years. Co-funding will be available to authorities to:</i> <i>• speed up the deployment of the buses</i> <i>• encourage innovative approaches for the rollout of buses and infrastructure.</i>

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Whangarei, Auckland, Hamilton, Tauranga, Wellington, Nelson, Christchurch, Dunedin, and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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