Trentham Racecourse Plan Change - Integrated Transport Assessment

Executive Summary

Gillies Group Management Trust Ltd (GGMT) is preparing to lodge a resource consent application for a mixed use development on approximately 6ha of the Trentham Racecourse. In parallel, Upper Hutt City Council (Council) is proposing to rezone the site, to enable mixed use development.

Council has engaged Abley to prepare this Integrated Transport Assessment (ITA) to assess the potential transport effects of the rezoning.

The ITA has been prepared using the guidance specified in the Waka Kotahi NZ Transport Agency Research Report 422 published in 2010. The guidelines identify four levels of scope for an ITA, named "Basic assessment", "Neighbourhood transport impact assessment", "Local area transport impact assessment" and "Wide area transport assessment." Given the scale, location and anticipated trip generation of the Plan Change a "Wide area transport assessment" has been prepared to prepare a robust and comprehensive assessment of traffic and transportation effects.

Abley have assessed the potential transport effects of the Plan Change, and draw the following conclusions:

- The future masterplan, with some minor alterations (see our recommendations below), can provide a suitable safe, efficient and connected transport network.
- The site is well positioned to be redeveloped as a transit oriented development, with excellent access to the rapid transit network and future increases in train frequencies proposed.
- The intersection improvements that are proposed for Messines Avenue will improve road user safety on the corridor. However, while there are no recent crash records at the intersection of Messines Avenue/Granville Street, the arrangement of the intersection results in complexity, requiring drivers to make multiple decisions that increases opportunities for conflict.
- Up to 22% of the development can be enabled without needing upgrades to the existing transport network. This equates to approximately 380 vehicles in the peak 2 hours, or 190 vehicles in the peak 1 hour.
- To enable development above 190 vehicles in the peak hour, the Messines Avenue/Somme Road intersection requires an upgrade to a single lane roundabout. Preliminary model testing indicates that the Messines Avenue/Seddul Bahr Road intersection requires an upgrade to a roundabout in conjunction with the Messines Avenue/Somme Road.
- To enable full development within the site, the Messines Avenue/Seddul Bahr Road intersection requires an upgrade to a single lane roundabout, and the Sutherland Road/Stafford Street intersection requires an upgrade to a signalised intersection to provide safe crossing opportunities and reduce the complexity of vehicle movement in vicinity of the Messines Ave level crossing.
- With all of the above transport infrastructure in place, increasing the frequency of trains to every 10min does not have a significant effect on the operation of the future transport network.
- Grade separation of the level rail crossing is not required to mitigate transport efficiency effects from the Plan Change. The modelling demonstrates that signalising the Sutherland Avenue/Stafford Street intersection, and integrating the signal operation with the existing level rail crossing controls, maintains acceptable network performance during peak periods.
- The Plan Change aligns well with the transport related Objectives and Policies of the Greater Wellington Regional Policy Statement and the Upper Hutt District Plan.

To address the potential transport effects of the Plan Change, or to ensure that effects are assessed during future resource consent applications, we make the following recommendations:

- that Council requires that developer establish a body corporate or other such method of ensuring the private accessways are managed and maintained to an acceptable standard. Refer to our discussion in Section 2.2.

- that a planning mechanism is included which requires road frontage on Racecourse Road to be vested to Council, and that the road frontage is upgraded in accordance with Council's Code of Practice for Civil Engineering Works Part C2. Refer to our discussion in Section 2.2
- that the developer consider including "no complaints" notices on the property title of all future residential dwellings within the site, relating to transport congestion and noise during race days. Refer to our discussion in Section 2.3.
- that the Messines Avenue/Granville Street intersection is closed to vehicle traffic prior to any development within the Plan Change area, to avoid safety effects at the intersection, and potential amenity effects for residential land use activities on Granville Street. Refer to our discussion in Section 3.8
- that the developer be required to provide a safe pedestrian link between Hutt International Boys School and Trentham station, through the provision of footpath and pedestrian crossing improvements on Racecourse Road and Granville Street. Refer to our discussion in Section 5.2
- that Development Area include provisions that requires the internal street network to prioritise walking, a high-quality pedestrian connection to the Trentham train station, and encourages low vehicle usage. Refer to our discussion in Section 5.
- that, as the site develops, consideration is given to undertaking a One Network Framework assessment that considers the movement and place functions for Granville Street (south) and Seddul Bahr Road. It is considered beneficial to provide improvements that control traffic speeds, improve driver sightlines for on-street parking, and provide for greater pedestrian safety and amenity. Refer to our discussion in Section 5.
- that planning provisions are included, which require the upgrade of the Messines Avenue/ Seddhul Bahr Road, Messines Avenue/Somme Road, and Sutherland Road/Stafford Street intersections prior to the Trentham Racecourse Development site generating more than 190 veh/hr in the weekday peak hour (any 1 hour period between 7am and 9am, and 4pm and 6pm, weekdays). Refer to our discussion in Section 6.

If these recommendations are adopted, Abley consider that the safety and efficiency effects of the Trentham Racecourse Development on the transport network can be appropriately managed through the future resource consent application process.

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Quality Assurance Information

Prepared for	Upper Hutt City Council
Job Number	UHCC-J002
Prepared by	Mat Collins
Reviewed by	Dave Smith

Date issued	Status	Approved by
16 November 2023	A	Dave Smith
27 November 2023	B	Mat Collins
29 November 2023	C	Mat Collins

1. Introduction

Gillies Group Management Trust Ltd (GGMT) is preparing to lodge a resource consent application for a mixed use development on approximately 6ha of the Trentham Racecourse. In parallel, Upper Hutt City Council (Council) is proposing to rezone the site, to enable mixed use development.

Council has engaged Ableyto prepare this Integrated Transport Assessment (ITA) to assess the potential transport effects of the rezoning.

The ITA has been prepared using the guidance specified in the Waka Kotahi NZ Transport Agency Research Report 422 published in 2010. The guidelines identify four levels of scope for an ITA, named “Basic assessment”, “Neighbourhood transport impact assessment”, “Local area transport impact assessment” and “Wide area transport assessment.” Given the scale, location and anticipated trip generation of the Plan Change a “Wide area transport assessment” has been prepared to prepare a robust and comprehensive assessment of traffic and transportation effects.

2. A summary of the Plan Change

2.1 The site

The Plan Change seeks the rezoning of the site comprising Lot 4 DP522882 and Part Lot 2 DP527769 from Special Activity Zone (SAZ) to Mixed Use Zone (MUZ). The site, which is approximately 6ha in area, is part of the Trentham Racecourse and is shown in Figure 2.1.

Figure 2.1 - Plan Change site (sourced from UHCC GIS)

2.2 A description of the masterplan

The masterplan is shown below:

- Figure 2.2 shows the pedestrian movement and access plan for the site.
- Figure 2.3 shows the vehicle movement and access plan for the site.
- Figure 2.4 provides an indicative land use summary and accessway types.
- Proposed land use activities are summarised in Table 2.1.

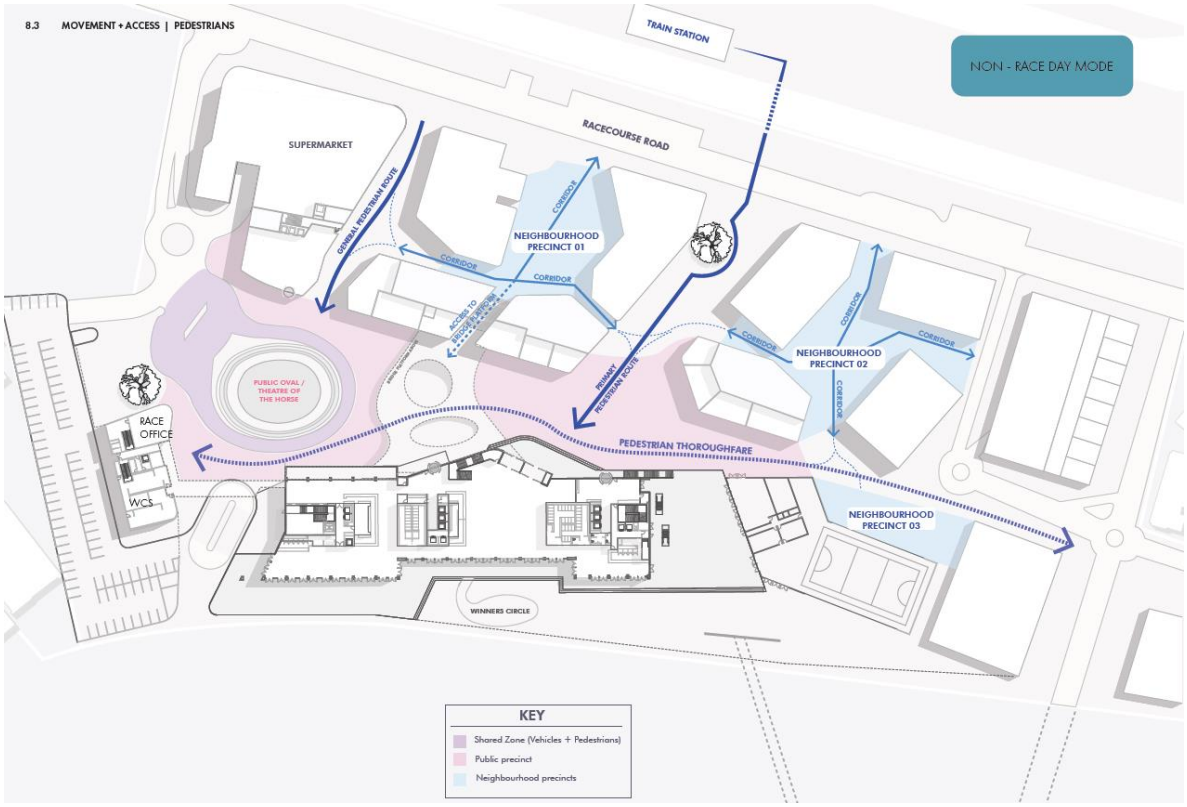

Figure 2.2 - Movement and access plan for pedestrians

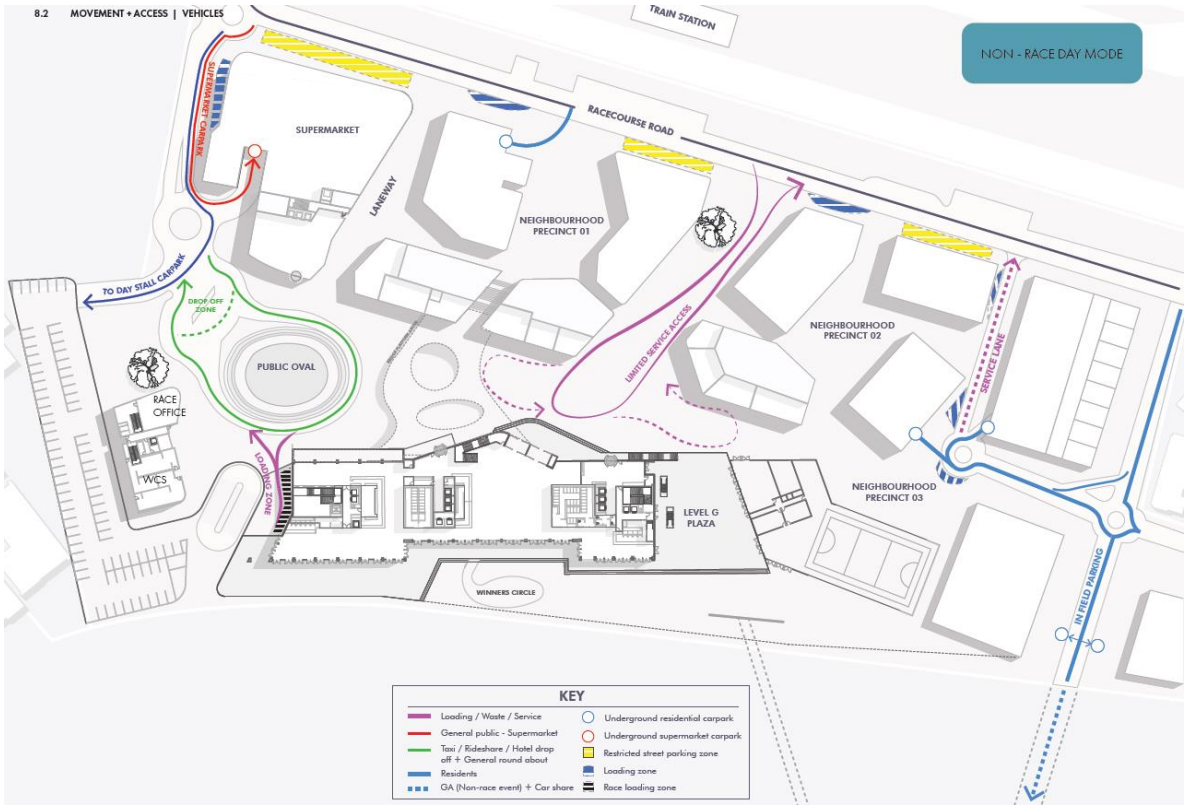

Figure 2.3 - Movement and access plan for vehicles

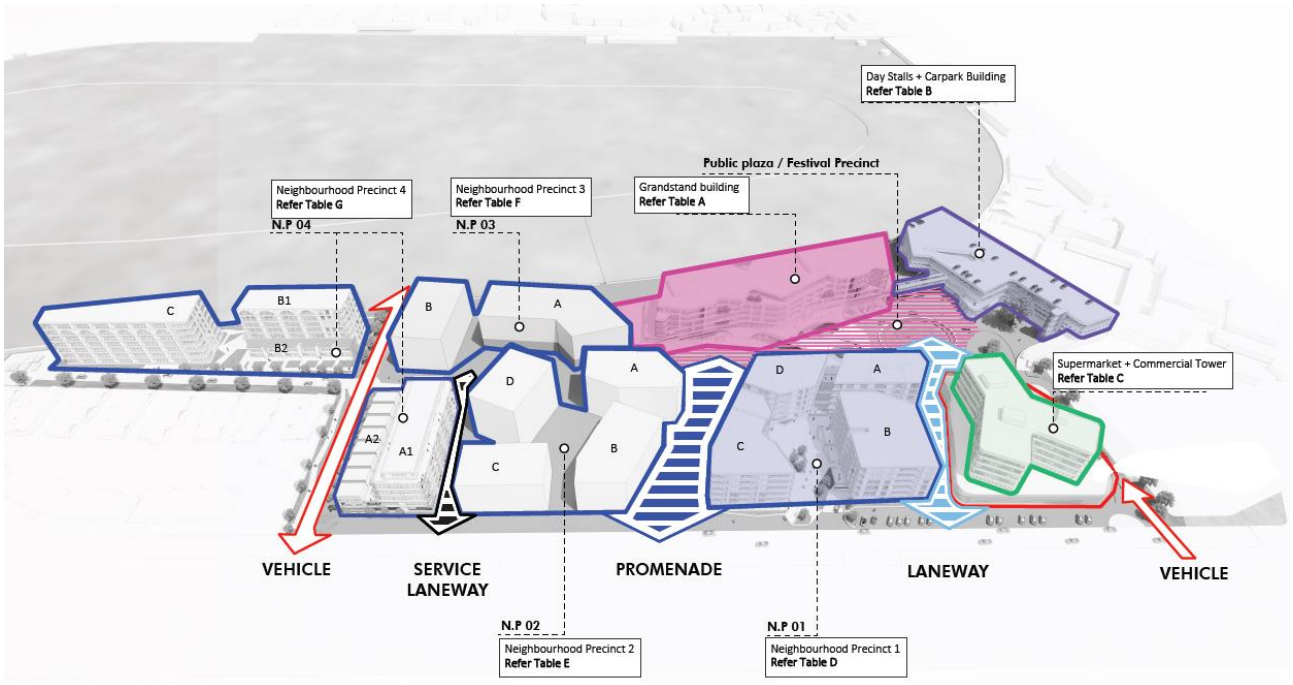

Figure 2.4 - Indicative land use activities

Table 2.1 Proposed land use activities

Land use activity	Quantity
General Residential	726 dwellings
Retail - general	320 m^2 GFA
Retail - F&B	2,500 m^2 GFA
Commercial Office	1,565 m^2 GFA
Commercial General (includes change facilities, break out rooms, RACE administrative and storage activities)	2,090 m^2 GFA
Hotel	78 units
Conference Centre	1,905 m^2 GFA
Supermarket	2,150 m^2 GFA
Tertiary education	1,445 m^2 GFA
Community Centre / Workshop	580 m^2 GFA

Key transport aspects of the masterplan include:

- Two vehicle accesses.
- A service laneway.
- Pedestrian laneway/promenades.
- Streetscape improvements on Racecourse Road to improve integration with the Trentham train station.

We consider that these aspects are suitable and can be refined and assessed during future resource consent applications. While we understand that the vehicle accesses and laneways are proposed to be retained in private ownership, we recommend that Council requires that GGMT establish a body corporate or other such method of ensuring the accessways are managed and maintained to a standard at least as consistent with Council's management of public roads.

We recommend that a planning mechanism is included that requires road frontage to be vested to Council. This should be of sufficient width to enable compliance with Council's Code of Practice for Civil Engineering Works Part C2[1], including the Road Reserve widths identified in Appendix C Figure 1 of the Code of Practice.

We recommend that Council requires that the developer establish a body corporate or other such method of ensuring the private accessways are managed and maintained to an acceptable standard.

We recommend that a planning mechanism is included which requires road frontage on Racecourse Road to be vested to Council, and that the road frontage is upgraded in accordance with Council's Code of Practice for Civil Engineering Works Part C2.

2.3 "Race day" format

The masterplan includes indicative activities and transport assess strategies for "non-race day mode" and "race day mode". Our review has focused on non-race day activities, as we have assumed that race day activities will be managed by a Temporary Traffic Management Plan (TTPM).

Race days are likely to generate a high number of traffic and pedestrian movements through the development, which will likely affect residents within the site. We recommend that the developer consider including "no complaints" notices on the property title of all future residential dwellings within the site, relating to transport congestion and noise during race days.

We recommend that the developer consider including "no complaints" notices on the property title of all future residential dwellings within the site, relating to transport congestion and noise during race days.

[1] Code of Practice for Civil Engineering Works, available online at https://www.upperhuttcity.com/files/assets/public/v/1/services/code-of-practice-for-civil-engineering-works.pdf

3. A summary of the current environment

3.1 Locality

The site is located approximately 3km south west of the Upper Hutt City Centre, and is adjacent to the Trentham train station. Nearby land uses are predominantly residential and special purpose activities, which include Trentham Military Camp, Hutt International Boys School, and Trentham Racecourse, as shown in Figure 3.1.

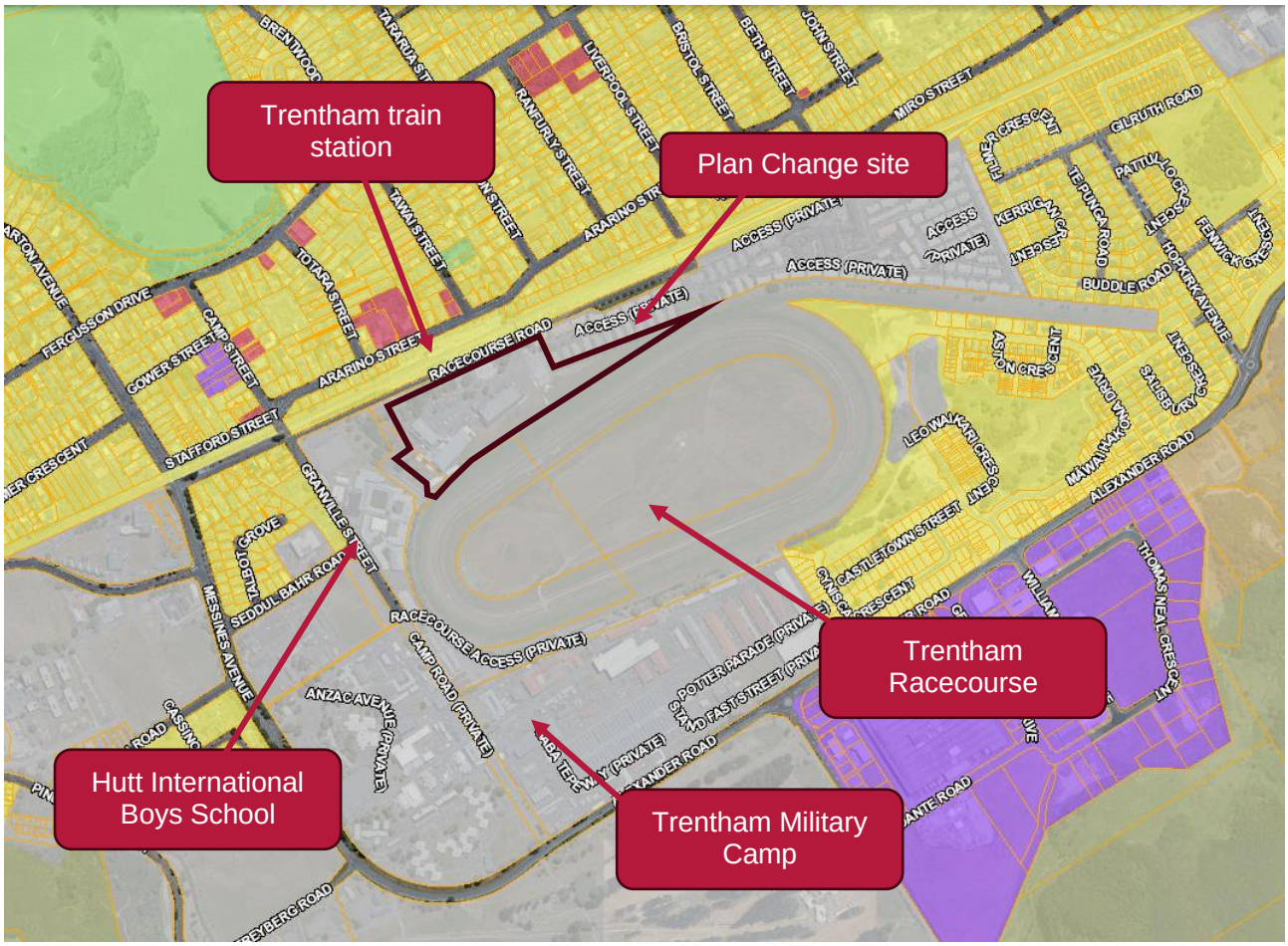

Figure 3.1 – Land use zoning (sourced from UHCC GIS)

3.2 Walking and cycling network

Footpaths are generally available near the site, however along the site frontage there is no footpath. The adjacent Trentham train station provides a well-lit and universally accessible pedestrian underpass to Ararino Street.

Existing cycle facilities are very limited, as shown in Figure 3.2.

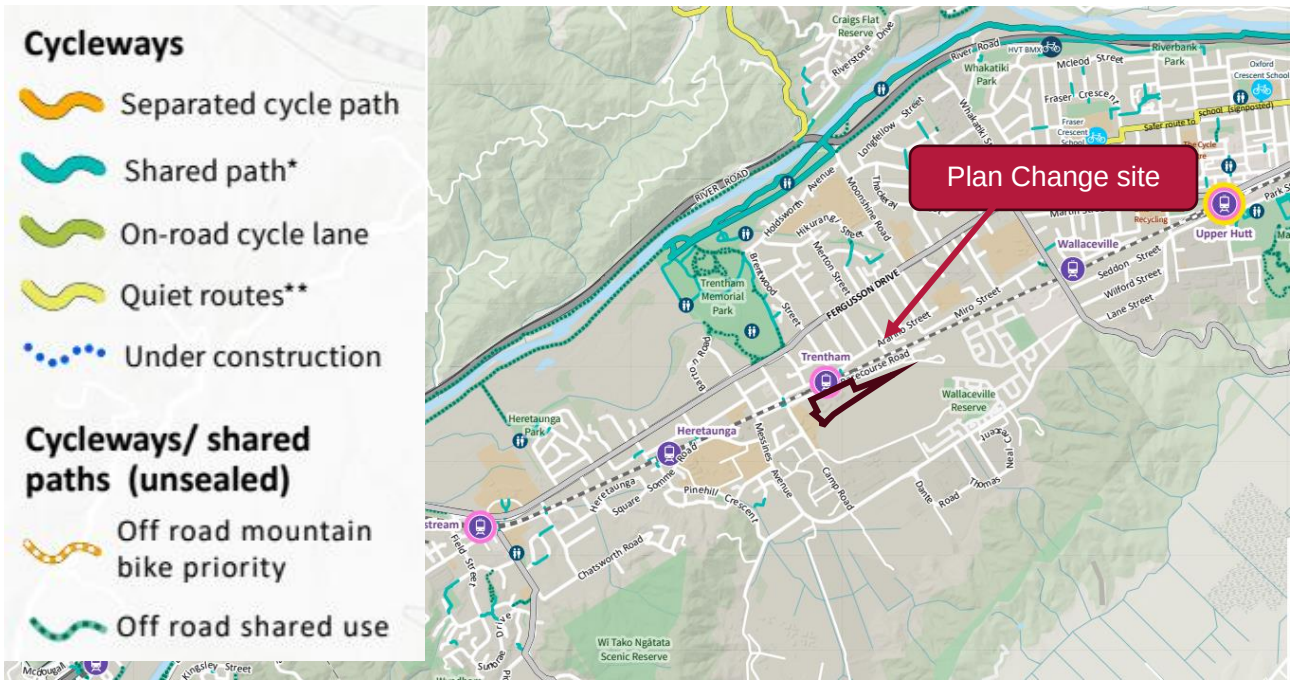

Figure 3.2 – Upper Hutt cycle network[2]

3.3 Public transport network

The site is well served by public transport as summarised in and shown in Figure 3.3, with the Trentham train station and the 114 bus service within easy walking distance. Details of Trentham station and services are discussed in Section 3.4. The frequent 110 bus service operates along Fergusson Drive, which is approximately 800m walking distance from the site.

Table 3.1 Public transport services

Service number	Frequency	Service span	Walking distance from the site
Hutt Valley Line (HVL) Upper Hutt - Wellington	20min 6am – 6.30pm 30min other times	4.30am – 12pm	<100m
110 bus service Emerald Hill – Upper Hutt – Lower Hutt - Petone	5 – 10min during peak 15min interpeak 30min other times	7am – 11pm	800m
114 bus service Trentham – Elderslea – Upper Hutt	40min during peak 60min interpeak	6am – 7pm	<100m
115 bus service Upper Hutt – Pinehaven – Upper Hutt	10min during peak 30-60min interpeak	6.30am – 6.30pm	<100m

[2] Hutt Valley Cycle Map, published by Greater Wellington, available online at https://www.gw.govt.nz/assets/Documents/2022/08/J001606-Hutt-Valley-Cycle-map-2021-2.3_WEB.pdf

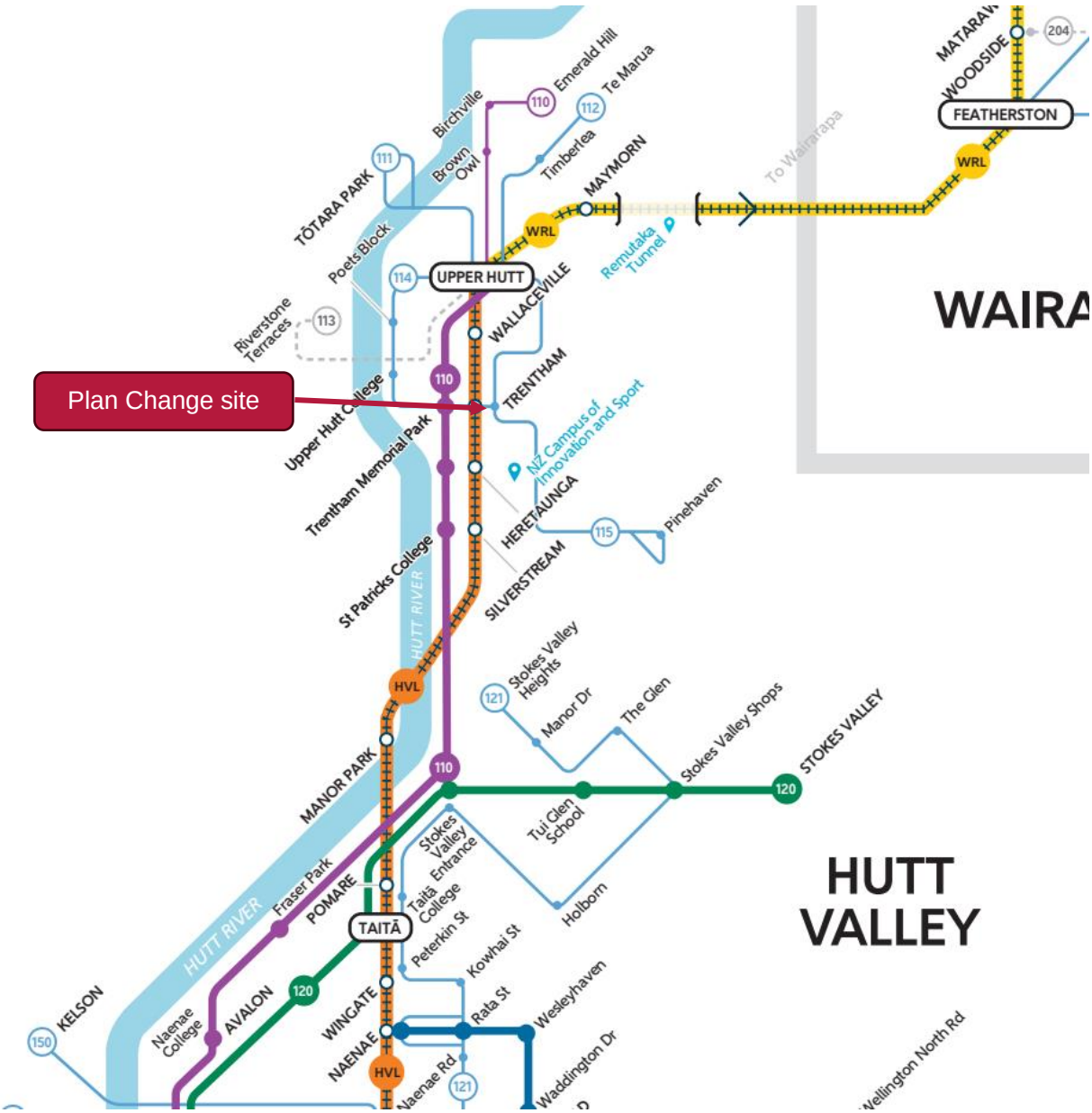

Figure 3.3 – Upper Hutt public transport network[3]

3.4 Surrounding transport network

The site is opposite the Trentham trail station and has frontage to Racecourse Road along its northern boundary, which in turn is accessed via Granville Street, Seddul Bahr Road, Messines Avenue and Sutherland Avenue. Transport network characteristics are discussed in the following subsections.

[3] Wellinton Regional Public Transport Map, published by Metlink, available online at https://www.metlink.org.nz/assets/Network-maps/WRC_Schematic_Wgtn-Future-Network_COMPLETE_v6.pdf

Trentham train station

The Trentham train station is directly opposite the site. Key characteristics are:

- Train services between Upper Hutt and Wellington Stations.
- 20min frequency between 6am and 6pm.
- 30min – 60min frequencies between 4am and 11pm.
- Recently constructed underpass, linking the station frontages between Racecourse Road and Ararino Street.
- A pedestrian overbridge approximately 150m northeast of the station platforms.

Figure 3.4 – Trentham Station underpass (left hand side) and platform (right hand side)

Racecourse Road

Racecourse Road is classified as a Local Road in the District Plan. Key characteristics are:

- a legal width of approximately 10m.
- one lane in each direction, each with a width of approximately 4.2m.
- a footpath on the northern side, with a width of approximately 1.5m.

Figure 3.5 – Racecourse Road looking northeast (left hand side) and southwest (right hand side)

Granville Street

Granville Street is classified as a Local Road in the District Plan. Key characteristics are:

- a legal width of approximately 20m.
- two distinct sections:
  - a one-way section between Messines Avenue and Racecourse Road, with angled parking on street.
  - a two-way section between Raceource Avenue and Seddul Bahr Road with parallel parking on street.
- carriageway widths varying from approximately 9m to 13.5m.
- a footpath on the southern/western side, with a width varying between approximately 1.5m and 3m.
- a footpath on the northern side, along the frontage with Hutt International Boys School.

Figure 3.6 – Granville Road between Messines Avenue and Racecourse Road looking northwest (left hand side) and southeast (right hand side)

Figure 3.7 – Granville Road between Seddul Bahr Road and Racecourse Road looking southeast

Granville Street/Racecourse Road intersection

The Granville Street/Racecourse Road intersection is a give way controlled intersection with the priority given to Granville Street (eastern arm) and Racecourse Road (northern arm). It is the southern arm of Granville Street that is stop controlled and prohibits entry movements. Visibility is generally good in all directions.

Seddul Bahr Road

Granville Street is classified as a Local Road in the District Plan. Key characteristics are:

- a legal width of approximately 24m.
- carriageway width of approximately 15m, which includes angled parking on the southern side and parallel parking on the northern side.
- a footpath on the northern side, with a width varying between approximately 1.5m and 2.2m.

Figure 3.8 – Seddul Bahr Road between Messines Avenue and Granville Street looking northeast (left hand side) and southwest (right hand side)

Messines Avenue

Messines Avenue is classified as a Secondary (District) Arterial in the District Plan. Key characteristics are:

- a legal width of approximately 30 - 32m.
- carriageway width of approximately 11m, which includes a flush median or turn pocket in some locations.
- footpaths on both sides of the road.
- indented parking in some locations.

Figure 3.9 –Messines Avenue between Seddul Bahr Road and Granville Street looking south (left hand side) and north (right hand side)

Messines Avenue/Seddul Bahr Road intersection

The Messines Avenue/Seddul Bahr Road intersection is a priority-controlled intersection with the priority given to Messines Avenue. A zebra crossing with a pedestrian refuge is located on the northern side of the intersection. Visibility is generally good in all directions. Messines Avenue has a right turn pocket, and Seddul Bahr Road has a left turn slip lane.

Messines Avenue/Somme Road intersection

The Messines Avenue/Somme Road intersection is a priority-controlled intersection with the priority given to Messines Avenue. Visibility is generally good in all directions. Messines Avenue has a right turn pocket, and there is a pedestrian refuge provided on Somme Bahr Road.

Messines Avenue/Granville Street and Sutherland Avenue/Stafford Street intersection

The Messines Avenue/Granville Street intersection is a give way controlled intersection with the priority given to Messines Avenue. The intersection is adjacent to the level rail crossing, as well as the Sutherland Avenue/Stafford Street intersection. Visibility is generally good in all directions, however the arrangement of the intersection results in complexity and increases opportunities for conflict.

Figure 3.10 – Messines Avenue/Granville Street looking north

3.5 Existing traffic volumes

The most recent Annual Average Daily Traffic (AADT) for the roads and streets near the site are summarised in Table 3.2.

Table 3.2 Traffic counts[4]

Road	AADT (veh/day)	HGV (%)	Year
Racecourse Road	630 (estimated)	6% (estimated)	2022
Granville Street (west)	100 (estimated)	3% (estimated)	2022
Granville Street (south)	300 (estimated)	4% (estimated)	2022
Seddul Bahr Road	1000 (estimated)	5% (estimated)	2022
Messines Avenue	8100 (estimated)	6% (estimated)	2022

[4] Estimated counts, sourced from Mobile Road

3.6 Waka Kotahi Crash Analysis System (CAS) Review

A search of the Waka Kotahi Crash Analysis System (CAS) database was conducted for the area surrounding the site as seen in Figure 3.6.1. The analysis reveals a total of eight crashes that have been reported over the five years between 2018 and 2023 inclusive. A summary of the number of different crash types is presented in Table 3.3.

Table 3.3 Summary of Crashes – 2018-2023 (Source: Waka Kotahi CAS Database)

Fatal	Serious	Minor	Non Injury	Total
0	1	2	5	**8**

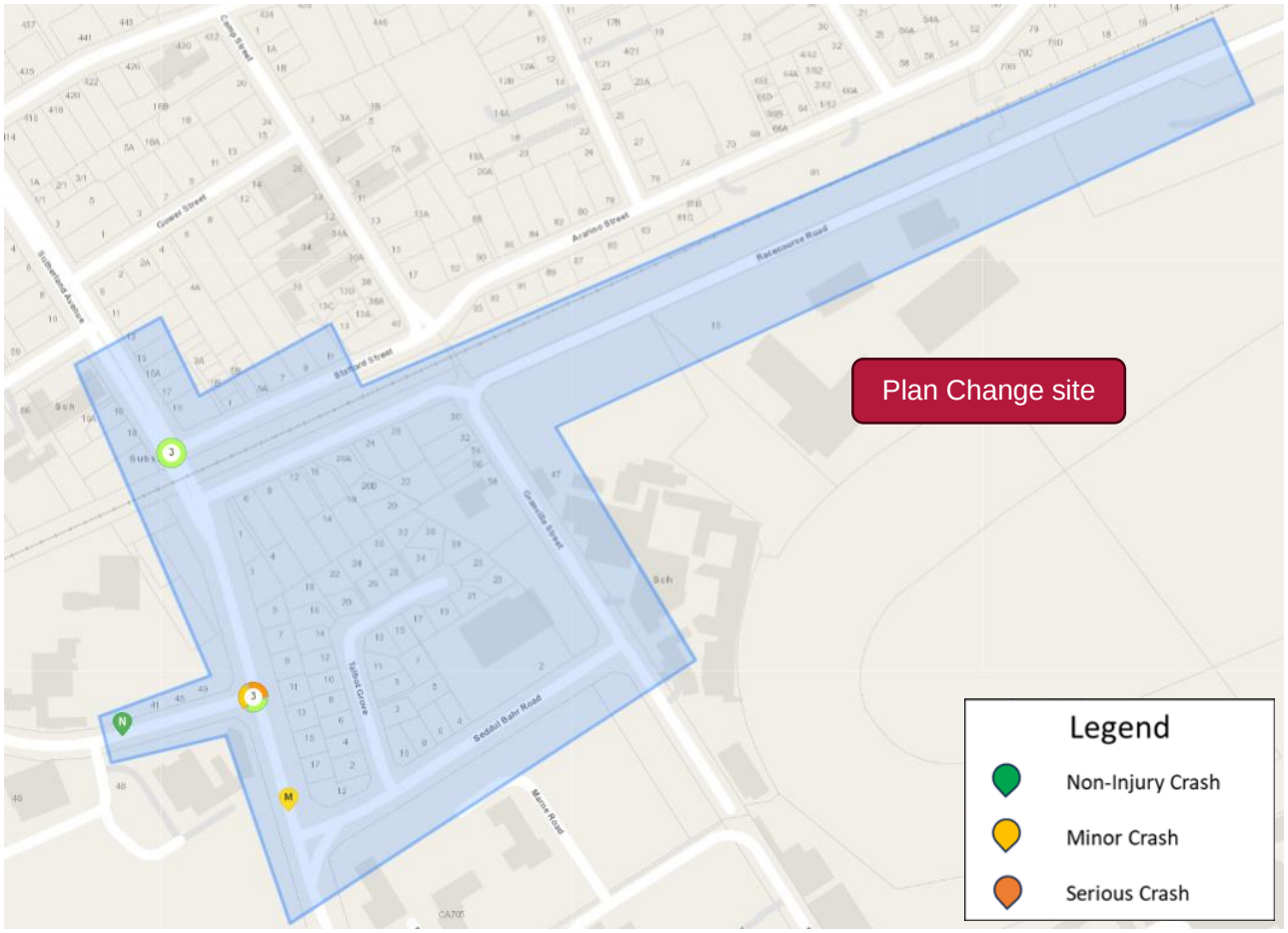

Figure 3.6.1 – Site CAS Analysis Area (Source: Waka Kotahi CAS Database)

There have been no fatal crashes within the CAS analysis study area. One serious injury crash occurred in 2023 at the intersection of Messines Avenue and Somme Road. The collision involved a driver turning left from Somme Road onto Messines Avenue failing to give way to a northbound cyclist on Messines Avenue. The driver claimed to not have seen the cyclist, hence the failure to give way. Sightlines at the intersection are excellent – the crash was therefore a result of driver error rather than poor intersection geometry.

Two minor injury crashes occurred in the study area – one involved a car driver colliding with a pedestrian at the zebra crossing on Messines Avenue, and the other involved a car driver rear-ending a motorcyclist at the intersection of Messines Avenue and Somme Road.

Five non-injury crashes occurred within the study area. Two of these crashes involved collisions with parked vehicles, and the other three were a result of driver error when conducting turning manoeuvres. None of the non-injury crashes involved pedestrians or cyclists.

3.7 Collective and Personal Risk Assessment

Waka Kotahi MegaMaps has been referred to analyse the road safety of road corridors. The two types of risk metrics are summarised as follows:

- Collective risk is a measure of the total estimated death and serious injury (DSi) casualty equivalents for a site. It is effectively a measure of the number of deaths and serious injuries that can be expected at a site over the next analysis period (typically five years). At a corridor level, Collective Risk is the total estimated DSi casualty equivalents derived from the intersection and midblock components divided by the length of the corridor. It is expressed as estimated DSi / km. This is shown in Figure 3.7.1.
- Personal risk is a measure of the risk of an individual dying or being seriously injured at a site. It is calculated by dividing Collective Risk by a measure of traffic volume exposure. This is shown in Figure 3.7.2.

The risk ratings indicate if there are any underlying safety issues along a corridor. Figure 3.7.1 shows the collective risk for the nearby network, and Figure 3.7.2 shows the personal risk for the nearby network.

As seen in both figures, the network surrounding the site has predominantly low collective and personal risk ratings. These results indicate that there are no underlying road safety issues for the area surrounding the site.

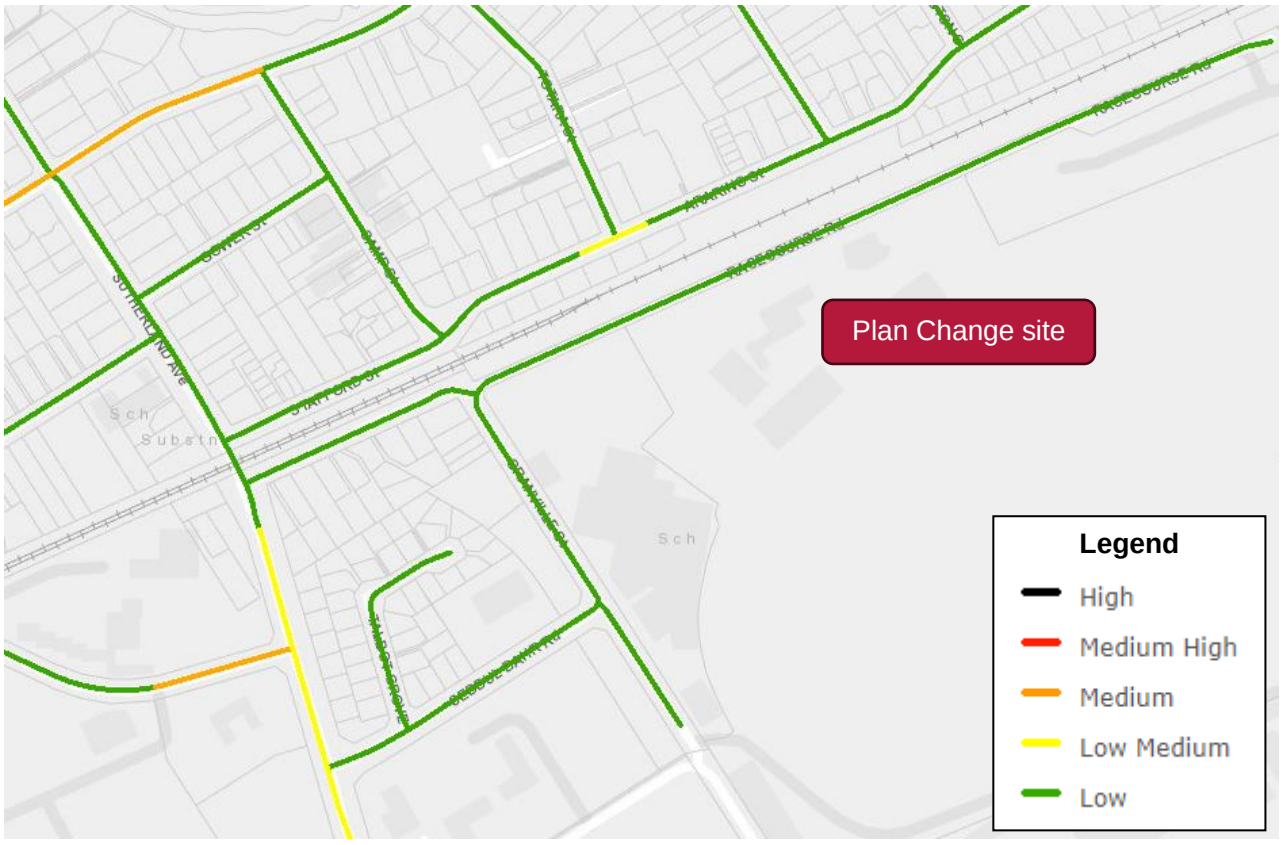

Figure 3.7.1 – Collective Risk for the Surrounding Network (Source: Waka Kotahi MegaMaps)

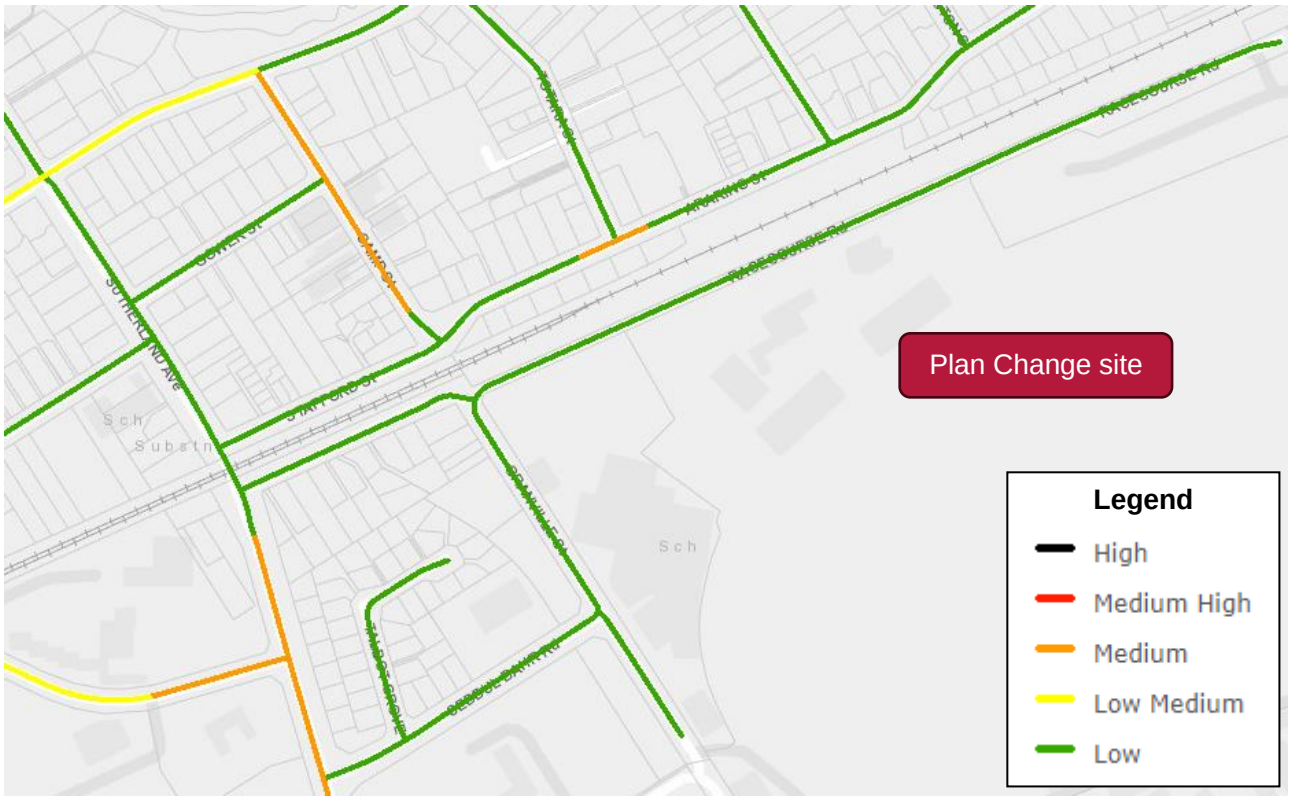

Figure 3.7.2 – Personal Risk for the Surrounding Network (Source: Waka Kotahi MegaMaps)

3.8 Summary of our safety assessment

The existing transport network generally operates acceptably, and the crash history and crash risk scores do not indicate any underlying safety issues. Several crashes have occurred on Messines Avenue, consistent with a high traffic corridor. The intersection improvements, which we discuss later in Section 6 of this report, will improve safety along the Messines Avenue corridor.

While there are no recent crash records at the intersection of Messines Avenue/Granville Street, the arrangement of the intersection results in complexity, requiring drivers to make multiple decisions that increase opportunities for conflict. We recommend that, to address this existing issue and mitigate safety effects that could be exacerbated by the Plan Change, Messines Avenue/Granville Street intersection is closed to vehicle traffic prior to any development within the Plan Change area.

We recommend that the Messines Avenue/Granville Street intersection is closed to vehicle traffic prior to any development within the Plan Change area, to avoid safety effects at the intersection, and potential amenity effects for residential land use activities on Granville Street.

4. What future improvements and changes to the transport network a proposed?

In this Section, we provide a summary of transport improvements that are funded or indicated to be delivered by other parties. Note, that a discussion of the future transport demands and effects from the Plan Change is provided in Section 6.

4.1 Regional Land Transport Plan (RLTP)

Table 4.1 provides a summary of activities that are included in the RLPT, that are relevant to the Plan Change. Of note is the increase to rail capacity and level crossing safety upgrades, which will include train services to Trentham Station and improvements to the Messines Avenue/Sutherland Avenue level rail crossing.

Table 4.1 Prioritised significant activities in the RLTP[5]

Rank	Activity	Organisation	Description	Dates
4	Rail capacity step change (10-minute timetable)	GW, KR	Network infrastructure improvements to enable a 10-minute timetable for rail	20231/2031
8	SH2 Hutt Valley and Remutaka	WK	Safe system interventions that may include a mix of responses that will be confirmed through refinement of the project scope and a design process	2021/2024
19	Level crossing safety upgrades	GW	A programme to improve safety at road level crossings and pedestrian level crossings that do not meet the latest safety standards. We understand that this includes the Messines Avenue crossing.	2021/2030
27	Fergusson Drive arterial link improvements	UHCC	Intersection and other improvements to accommodate growing demand on the main route linking Upper Hutt to the state highway and the wider Wellington Region.	2021/2030

4.2 UHCC transport strategy

Council is preparing a transport strategy for the District, and has recently sought public feedback on the challenges, outcomes and focus areas that Council has identified[6].

Stage two of the strategy will identify implementation plans for the future of transport in Upper Hutt. At the time of writing this ITA, this information was not available.

4.3 UHCC Interim Speed Management Plan

Council is proposing a range of speed limit reductions within the District, including for Messines Avenue and Alexander Road between Freyberg Road and Ward Street[7], as shown in Figure 4.1. While this

[5] Wellinton RLTP 2021, available online at https://www.gw.govt.nz/assets/Documents/2021/10/Wellington-Regional-Land-Transport-Plan-2021web.pdf
[6] Getting into gear: Improving Upper Hutt's transport network, available online at https://letskorero.upperhuttcity.com/transport
[7] Interim Speed Management Plan, available online at https://letskorero.upperhuttcity.com/smp

speed reduction is not required to mitigate effects of the Plan Change, we consider that it would support safer outcomes along Messines Avenue and be complimentary to the Plan Change.

In our modelling, discussed in Section 6, we have assumed that Messines Avenue and Alexander Road between Freyberg Road and Ward Street will be reduced to a 50km/hr speed limit, which is likely to reduce the attractiveness of this corridor for through traffic movement.

Figure 4.1 – Proposed speed limit on Alexander Road and Messines Avenue, Council's Interim Speed Management Plan

4.4 Intensification Planning Instrument (IPI)

The Government has introduced new rules for all high-growth areas to accommodate more residents, businesses and community services in urban areas. Council prepared an IPI, which is the complete set of changes Councils must make to their District Plans to enable high and medium density development in existing residential and commercial areas. This includes mandatory requirements to be included in the District Plan for medium density development.

GGMT made a submission on the IPI, which was (in terms of transport matters) generally consistent with the changes sought by this Plan Change. We have not relied upon material in GGMT's submission or evidence, however we note that Council's experts we generally supportive of the request to rezone the Trentham Racecourse Development site [8] / [9] if provisions were included to assess the potential transport effects of rezoning. The hearing took place in April and May. The Commissioners decision report will be made available on this webpage once finalised, which is expected to be no later than 20 December 2023.

[8] Statement of Evidence of Donald Wignall on behalf of Upper Hutt City Council, paragraphs 17 – 25, available online at https://www.upperhuttcity.com/files/assets/public/v/1/districtplan/ipi/appendix-4-tranpsort-evidence-don-wignall.pdf
[9] Statement of Evidence of Andrew Brown Cumming on behalf of Upper Hutt City Council, paragraphs 47 - 66, available online at https://www.upperhuttcity.com/files/assets/public/v/1/districtplan/ipi/statement-of-evidence-uhcc-ipi-andrew-cumming-14-april-2023.pdf

5. Accessibility assessment

In the following subsections we assess the level of accessibility by walking, cycling and public transport for the site, and destinations that may attract trips by these modes.

5.1 Public Transport

With an approximate 45min travel time during peak periods the following key centres are accessible:

- Wellington Central.
- Lower Hutt.
- Upper Hutt.

The close proximity of the Trentham train station, planning investment in increasing train frequency, and the relatively large size of the site, means the Plan Change presents a unique opportunity to develop a Transit Oriented Development (TOD). The masterplan leverages on this by providing a high-quality pedestrian environment within the site, a range of land use activities that support public transport, and a high amenity connection to Trentham train station.

5.2 Walking

With an approximate 30min walking distance the following key locations are accessible:

- Multiple schools and child care centres.
- Several parks.
- Several small retail/commercial clusters.

Footpaths are generally provided on all major roads within the vicinity of the site, and regular crossing opportunities are provided for pedestrians. However, the site frontage currently does not have a footpath and the increase in traffic on Racecourse Road and Granville Street will have a negative effect on pedestrian safety and connectivity between Hutt International Boys School and Trentham station.

We recommend that the Plan Change include a requirement for:

- sufficient road frontage to Racecourse Road be vested to Council, sufficient to provide a suitable footpath and other requirements of Council's Engineering Code of Practice, as discussed in Section 2.2.
- the developer to provide a safe pedestrian link between Hutt International Boys School and Trentham station, either through the provision of footpath and pedestrian crossing improvements on Racecourse Road and Granville Street, or through the provision of a public pedestrian link through the development which integrates with Hutt International Boys School.

We recommend that the developer be required to provide a safe pedestrian link between Hutt International Boys School and Trentham station, through the provision of footpath and pedestrian crossing improvements on Racecourse Road and Granville Street.

5.3 Cycling and micro mobility

There are currently very limited existing cycling facilities on the surrounding transport network, therefore there is not expected to be a large uptake of cycling for the site. However, we understand that Council is investigating whether a shared use path could be located within the rail corridor, which would be greatly beneficial to accessibility for the site. We recommend that development within the site includes

numerous and convenient visitor, staff, and private bicycle parking facilities, and that commercial activities provide end-of-trip facilities.

With an approximate 30min cycling distance the following key locations are accessible:

- Upper Hutt city centre
- Several employment clusters.

We recommend that Development Area include provisions that requires the internal street network to prioritise walking, a high-quality pedestrian connection to the Trentham train station, and encourages low vehicle usage.

5.4 Potential upgrades to Seddul Bahr Road and Granville Street

As discussed in Section 3.4, Seddul Bahr Road and Granville Street have relatively wide carriageways, angled and parallel parking, and various footpath widths. Development of the site is expected to generate around 900 vehicle movements in the peak hour, which represents a significant increase on existing traffic movements for these roads.

We recommend that, as the site develops, consideration is given to undertaking a One Network Framework assessment [11] that considers the movement and place functions for these streets.

Potential changes to Seddul Bahr Road and Granville Street (south) could include:

- Converting angled parking on Seddul Bahr Road to parallel parking, to improve driver sightlines.
- Introducing traffic calming, to control vehicle speeds.
- Installing a mini roundabout at the Seddul Bahr Road/Granville Street intersection to improve safety.
- Widening existing footpaths and installing new footpaths where these are currently absent.
- Providing additional pedestrian crossing points, potentially on raised platforms.

We recommend that, as the site develops, consideration is given to undertaking a One Network Framework assessment that considers the movement and place functions for Granville Street (south) and Seddul Bahr Road. It is considered beneficial to provide improvements that control traffic speeds, improve driver sightlines for on-street parking, and provide for greater pedestrian safety and amenity.

[11] Waka Kotahi One Network Framework, available online at https://www.nzta.govt.nz/planning-and-investment/planning/one-network-framework/

6. Discussion of transport modelling

Abley has developed a Paramics Discovery microsimulation model of the Messines Avenue corridor to assess the traffic effects of the Plan Change. A detailed technical note is provided in Appendix A, which we have summarised in the following section.

6.1 What trip generation did we assume?

We have calculated the number of peak hour vehicle trips that are expected to be generated by the site, using NZTA Research Report 453 and a draft update to trip generation rates in Waka Kotahi NZTA's Planning and Policy Manual (prepared by Abley). We have then applied trip reduction factors:

- Mode share reduction, to reflect the excellent access to public transport that the site has we have adopted a mode share rate of 20% for non-residential activities (noting that the trip rate for residential activities already reflects a reduction for public transport use). For context, commuter public transport mode share data for rapid transit station catchments in Auckland[12] are:
  - New Lynn: 20%
  - Kingsland: 17%
  - Newmarket: 26%
- Internal capture and multipurpose trips, due to the mix of uses proposed within the site. We have applied these reductions to retail activities.
- Pass by trips. While this is a reduction factor that is often applied, we have not applied it to the site as it is unlikely to attract trips that are already on the Messines Avenue corridor.

After applying these reduction rates, we estimate that at full buildout the development will generate approximately 885 vehicle trips in the peak hour, with detail of this provided in Table 6.1.

Table 6.1 Trentham Racecourse Plan Change, peak hour vehicle trip generation

Land use	Quantity	Peak hour vehicle trip generation rate	Peak hour trips-unfactored (v/hr)	Reduction factors				Peak hour trips-factored (v/hr)
				Mode share reduction	Internal capture	Multi-purpose trips	Pass by trips	
General Residential	726 dwellings	0.4 per dwelling	290	0%	0%	0%	0%	290
Retail - general	320 m^2 GFA	19.1 per 100 m^2 GFA	61	20%	15%	10%	0%	34
Retail - F&B	2,500 m^2 GFA	12.7 per 100 m^2 GFA	318	20%	15%	10%	0%	175
Commercial Office	1,565 m^2 GFA	1.8 per 100 m^2 GFA	28	20%	0%	0%	0%	23
Commercial general	2,090 m^2 GFA	1.8 per 100 m^2 GFA	38	20%	0%	0%	0%	30
Hotel	78 units	0.6 per unit	47	20%	0%	0%	0%	37
Conference Centre	1,905 m^2 GFA	0 per 100 m^2 GFA	0	20%	0%	0%	0%	0

[12] Data sourced from Waka Kotahi Commuter, available online at https://commuter.waka.app/

Supermarket	2,150 m^2 GFA	21 per 100 m^2 GFA	452	0%	30%	10%	0%	271
Tertiary education	1,445 m^2 GFA	0.2 per student[13]	19	20%	5%	0%	0%	14
Community Centre / Workshop	580 m m^2 GFA	3 per 100 m^2 GFA	17	25%	10%	0%	0%	11
Total			**1270**	**-106.45**	**-194.95**	**-83.01**	**0.00**	**885**

6.2 What scenarios did we test?

We tested three scenarios, which are summarised in Table 6.2.

Table 6.2 Traffic modelling scenarios

Scenario	Modelled year	Land use assumption	Transport network assumptions	Description
Base case	2022	0% development within the site	Existing transport network Existing train frequency	Scenario to establish the operation of the existing network
Threshold case	2026	22% development within the site District wide growth per Council growth assumptions	Closure of the Messines Avenue/Granville Street intersection Existing train frequency	Scenario to test how much development can be enabled without significantly affecting the operation of the existing network. Messines Avenue/Granville Street intersection assumed to be closed to address existing safety issues
Full development	2033	100% development within the site District wide growth per Council growth assumptions	Closure of the Messines Avenue/Granville Street intersection Roundabout at Messines/Seddul Bahr and Messines/Somme Signals at level crossing/ Sutherland/Stafford Doubled train frequency (10min) per the RLTP.	Scenario to test whether to operation of the network with full development, once intersection upgrades are in place at: • Messines Avenue/Seddul Bahr • Messines/Somme • Sutherland/Stafford/level rail crossing

6.3 What does the model indicate?

Messines Avenue/Somme Road intersection

Modelling results for this intersection are summarised as follows:

- In the Base scenario, the right turn out of Somme Road is operating at LOS E in the AM peak
- In the Threshold scenario, delays for the right turn out of Somme Road increase by around 12 seconds and LoS deteriorates to F with a 58 second delay in the AM and PM peaks

[13] We have assumed that there will be 1 student per 15 m^1 GFA

- With the upgrade to a roundabout, the intersection performs well in the Full Development scenario, with minimal delays during the AM and PM peak.

Messines Avenue/Seddul Bahr Road intersection

Modelling results for this intersection are summarised as follows:

- The intersection performs well in all scenarios.

Preliminary testing indicated that when Granville Street is closed and the Messines Avenue/Somme Road roundabout is installed, the Messines Avenue/Seddul Bahr Road intersection must also be upgraded to a roundabout. As such the intersection upgrades are introduced as a package of mitigation works.

Messines Avenue/Sutherland Avenue/Stafford Street intersection

Modelling results for this intersection are summarised as follows:

- The intersection performs well under the Base and Threshold scenarios.
- In the Full Development scenario, the signalised intersection experiences delays for some movements in the AM peak, however this is a conservative assessment as pedestrian phases are assumed to run in every cycle.
- The primary cause of delays at the Stafford/ Messines Ave intersection is the left turn from Stafford St onto Messines Ave and the right turn from Messines Ave onto Stafford St. These are both movements where green time can be impacted by frequent running of pedestrian phases, therefore the modelling is considered to be a worst case scenario.

The primary driver for the signalisation of the Stafford/ Messines Ave intersection is safety, enabling fully protected pedestrian crossings of both corridors. The three intersection upgrades are introduced as a package of mitigation works. Whilst there are delays for some movements in the morning peak period, the through movement on the corridor is largely unimpeded and delays are generally as a result of intergreen time (when lights are amber or red) for minor movements.

6.4 What are our conclusions from the modelling results?

Key conclusions from our traffic modelling are as follows:

- The Messines Ave/Granville Street intersection is recommended to be closed prior to development to eliminate through traffic and address potential safety concerns in the vicinity of the level crossing.
- Up to 22% of the development can be enabled without needing upgrades to the existing transport network. This equates to approximately 380 vehicles in the peak 2 hours, or 190 vehicles in the peak 1 hour.
- To enable development above 190 vehicles in the peak hour, the Messines Avenue/Somme Road intersection requires an upgrade to a single lane roundabout. Preliminary model testing indicates that the Messines Avenue/Seddul Bahr Road intersection requires an upgrade to a roundabout in conjunction with the Messines Avenue/Somme Road.
- To enable full development within the site, the Messines Avenue/Seddul Bahr Road intersection requires an upgrade to a single lane roundabout, and the Sutherland Road/Stafford Street intersection requires an upgrade to a signalised intersection to provide safe crossing opportunities and reduce the complexity of vehicle movement in vicinity of the Messines Ave level crossing.
- We recommend that the three intersections improvements are constructed at the same time, to minimise disruption on the transport network during construction.

We recommend that planning provisions are included, which require the upgrade of the Messines Avenue/ Seddul Bahr Road, Messines Avenue/Somme Road, and Sutherland Road/Stafford Street intersections prior to the Trentham Racecourse Development site generating more than 190 veh/hr in the weekday peak hour (any 1 hour period between 7am and 9am, and 4pm and 6pm, weekdays)

7. Strategic Planning Framework

In the following section, commentary is provided as to the alignment of the Plan Change against the Operative Greater Wellington Regional Policy Statement (published 9 December 2022) and Upper Hutt District Plan transport-related policies.

7.1 Greater Wellington Regional Policy Statement 2021

Policies from the RPS that are relevant to transport matters are addressed in Table 7.1.

Table 7.1 Greater Wellington RPS commentary

Policy reference	RPS wording	Abley commentary
Policy 9	**Reducing the use and consumption of non-renewable transport fuels and carbon dioxide emissions from transportation - Regional Land Transport Strategy**. The Wellington Regional Land Transport Strategy shall include objectives and policies that promote a reduction in: (a) the consumption of non-renewable transport fuels; and (b) the emission of carbon dioxide from transportation.	The Plan Change supports Policy 9 by providing for intensification in a location that has excellent access to public transport and is within a comfortable walking and cycling distance of the town centre and amenities.
Policy 10	**Promoting travel demand management - district plans**. District plans and the Wellington Regional Land Transport Strategy shall include policies to promote travel demand management mechanisms that reduce: (a) the use and consumption of non-renewable transport fuels; and (b) carbon dioxide emissions from transportation.	Travel demand management measures can be considered as part of future resource consents for the site. It is likely that the site will achieve a higher non-private vehicle mode share as it has excellent access to non-private vehicle based transport modes
Policy 31	**Identifying and promoting higher density and mixed use development – district plans**. District plans shall: (a) identify key centres suitable for higher density and/or mixed use development; (b) identify locations, with good access to the strategic public transport network, suitable for higher density and/or mixed use development; and (c) include policies, rules and/or methods that encourage higher density and/or mixed use development in and around these centres and locations, so as to maintain and enhance a compact, well designed and sustainable regional form	The Plan Change is consistent with this Policy, as it enables higher density and mixed use development in a location with good access to the strategic public transport network.
Policy 33	**Supporting a compact, well designed and sustainable regional form - Regional Land Transport Strategy**. The Wellington Regional Land Transport Strategy shall contain objectives and policies that support the maintenance and enhancement of a compact, well designed and sustainable regional form.	The Plan Change supports this Policy by enabling greater development within the existing urban area.
Policy 55	**Maintaining a compact, well designed and sustainable regional form – consideration**.	The Plan Changes is consistent with Council's growth strategy, being

Policy reference	RPS wording	Abley commentary
	When considering an application for a resource consent, or a change, variation or review of a district plan for urban development beyond the region's urban areas (as at March 2009), particular regard shall be given to whether: (a) the proposed development is the most appropriate option to achieve Objective 22; and (b) the proposed development is consistent with the Council's growth and/or development framework or strategy that describes where and how future urban development should occur in that district; and/or (c) a structure plan has been prepared.	within the walkable catchment identified in Plan Change 50[14]. A masterplan has been prepared to guide future development of the site.
Policy 57	**Integrating land use and transportation – consideration**. When considering an application for a resource consent, notice of requirement, or a change, variation or review of a district plan, for subdivision, use or development, particular regard shall be given to the following matters, in making progress towards achieving the key outcomes of the Wellington Regional Land Transport Strategy: (a) whether traffic generated by the proposed development can be accommodated within the existing transport network and the impacts on the efficiency, reliability or safety of the network; (b) connectivity with, or provision of access to, public services or activities, key centres of employment activity or retail activity, open spaces or recreational areas; (c) whether there is good access to the strategic public transport network; (d) provision of safe and attractive environments for walking and cycling; and (e) whether new, or upgrades to existing, transport network infrastructure have been appropriately recognised and provided for.	Traffic generated by the Plan Change can be accommodated by the transport network, when staged with identified transport upgrades. The Plan Change has excellent access to the local public services, employment and retail activity. The Plan Change has excellent access to the strategic public transport network. The Plan Change has provision for safe walking and cycling. Upgrades to the transport network are recognised and provided for.
Policy 58	**Co-ordinating land use with development and operation of infrastructure – consideration**. When considering an application for a resource consent, notice of requirement, or a plan change, variation or review of a district plan for subdivision, use or development, particular regard shall be given to whether the proposed subdivision, use or development is located and sequenced to: (a) make efficient and safe use of existing infrastructure capacity; and/or (b) coordinate with the development and operation of new infrastructure.	The Plan Change makes efficient and safe use of existing infrastructure. Upgrades to the transport network are recognised and provided for.

[14] Draft PC50 Zoning and Engagement, Walkable Catchments, available online at https://pc50-feedback-and-engagement-uhcc.hub.arcgis.com/apps/2e988bd4efa2446e97faae568b91fb3c/explore

7.2 Upper Hutt District Plan

Policies from the operative District Plan, that are relevant to transport matters (at a Plan Change level), are addressed in Table 7.2.

Table 7.2 District Plan objectives and policies

Objective / Policy reference	District Plan wording	Abley commentary
TP-P1	To promote the safe and efficient use and development of the transportation network.	This ITA assesses the potential transport effects of the Plan Change. Provided our recommendations are adopted, we consider that the Plan Change will support the safe and efficient use of the transport network.
TP-P2	To promote accessibility within the City and between the City and neighbouring areas	The Plan Change is consistent with this Policy, by providing for intensification within the existing urban area, in a highly accessible location with ready access to the City centre.
TP-P3	To ensure that the use and development of land is served by safe and adequate access from the roading network	This ITA assesses the potential transport effects of the Plan Change. Provided our recommendations are adopted, we consider that the Plan Change will support the safe and efficient use of the transport network. Specifically, we note our recommendation that the Messines Avenue/Granville Street intersection is closed prior to any development occurring. Refer to our discussion in Section 3.8.
TP-P4	To promote a safe and efficient roading network which avoids, remedies or mitigates the adverse effects of road traffic on residential areas	
TP-P5	To promote a sustainable pattern of development that protects environmental values and systems, protects the potential of resources, and has regard for walking, cycling, public transport and transportation networks.	The Plan Change supports sustainable development of the District by providing for intensification in a location with excellent access to the strategic public transport network.
TP-P6	To promote the development of a safer and more secure environment for the community.	The Plan Change will support environmental amenity of the Trentham train station, by providing more activity in the area. Internal roads can be designed to be consistent with this Policy.
SUB-GEN-P1	To promote a sustainable pattern of subdivision that protects environmental values and systems, protects the potential of resources, and has regard for walking, cycling, public transport and transportation networks.	Subdivision will be subject to future resource consent applications. However, provided our recommendations in Section 8 are adopted, we consider that development can have adequate regard for the transport network.
SUB-GEN-P11	To promote the safe and efficient use and development of the transportation network.	The Plan Change makes efficient and safe use of the transport network. Upgrades to the transport network are recognised and provided for.
SUB-GEN-P12	To ensure that the subdivision, of land is served by safe and adequate access from the roading network	

8. Summary and recommendations

This ITA has been prepared in general accordance with the guidance specified in the Waka Kotahi NZ Transport Agency Research Report 422 published in 2010. To address the potential transport effects of the Plan Change several recommendations are made which are listed in the executive summary.

If these recommendations are adopted, the safety and efficiency effects of the Trentham Racecourse Development on the transport network can be appropriately managed through the future resource consent application process.

Appendix A.
Trentham Development Microsimulation Modelling Technical Note

Trentham Development

Microsimulation Modelling Technical Note

Prepared for	Upper Hutt City Council
Job Number	UHCC-J002
Revision	A
Issue Date	16 November 2023
Prepared by	Regan Toogood, Graduate Transportation Modeller
Reviewed by	Dave Smith, Technical Director - Transportation Planning

1. Introduction

Following the Upper Hutt Tracks model update undertaken by Abley on behalf of Upper Hutt City Council (UHCC), a Paramics Discovery microsimulation model of the Messines Ave corridor has been developed to assess the traffic effects of the Trentham Racecourse Mixed Use development (the development). This technical note addresses the calibration, validation and options assessment for 2022 morning and evening peak Messines Ave microsimulation model and assesses the impact of future traffic generated by the development.

2. Model Calibration and Validation

2.1 Methodology

There are four data sources used in the calibration and validation of the model, as follows:

- Upper Hutt Tracks 2022 base year models.
- Messines Ave/ Somme Rd intersection and Messines Ave level crossing surveys undertaken by Abley on 31 August 2023.
- Intersections count data sourced from Trentham Mixed Use development report prepared by Beca 15 December 2021
- Tube Counts collected by UHCC on 10 December 2021.

A cordon was extracted from the Upper Hutt Tracks model to get a starting point for a demand matrix for the microsimulation model. It was noted that the survey of Messines Ave/ Somme Rd volumes was significantly lower compared to prior surveys undertaken by Beca as part of the IAF report[1]. Therefore, the turning proportions from the August 2023 survey were applied and were scaled up according to the volumes from the December 2021 tube count collected by UHCC on Somme Rd and the volumes of adjacent intersections from the Beca surveys. This provided a consistent data set for calibration and validation and minimises the risk of under-reporting traffic volumes on the corridor.

[1] Infrastructure Acceleration Funding – Trentham Mixed Use Development Traffic and Transport Assessment, December 2021, BECA

The scatter plot for the calibrated model is given in Figure 2.1 and Figure 2.2 for the morning and evening peaks respectively.

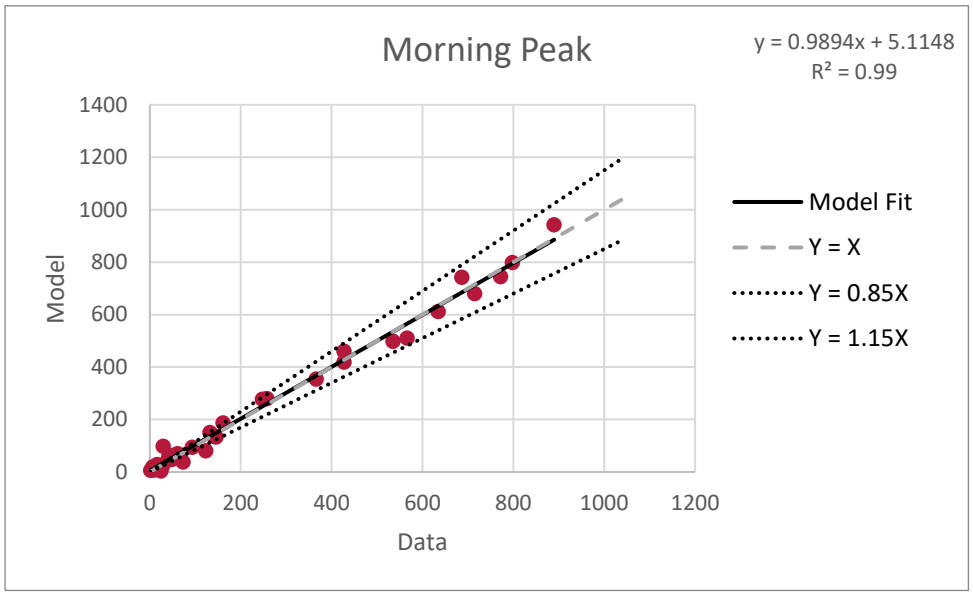

Figure 2.1 Scatter Plot for Calibrated Morning Peak Model

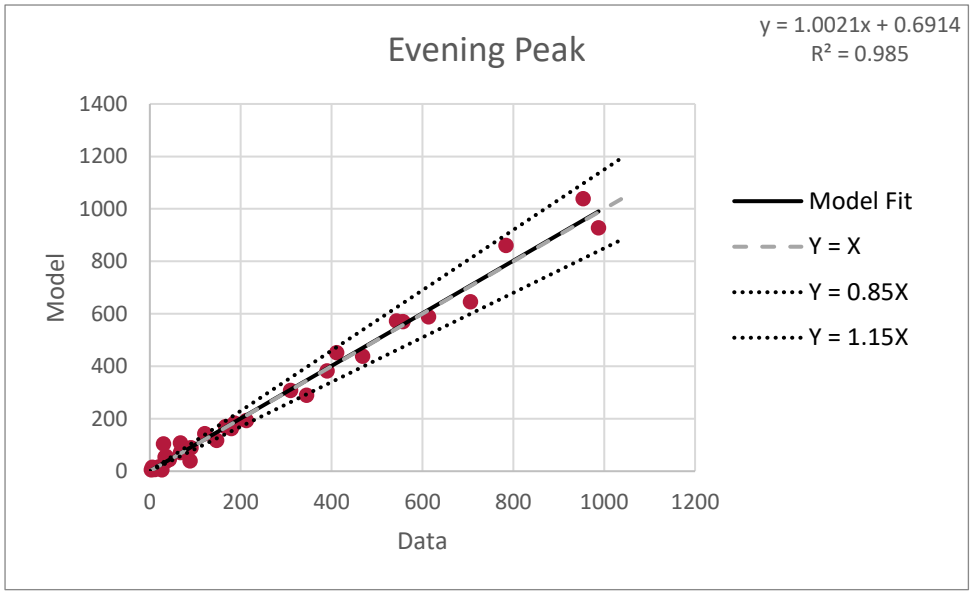

Figure 2.2 Scatter Plot for Calibrated Evening Peak Model

This is a mix of calibrated and validated traffic counts and is considered to meet or exceed the Waka Kotahi Transport Model Development guidelines. An additional feature of the model is the Messines Ave level crossing which has been calibrated to match on-site observations of train movements, level crossing closure lengths and resultant vehicle queuing lengths based on 31 August 2023 surveys.

3. Vehicle trip generation

We have calculated the number of peak hour vehicle trips that are expected to be generated by the site, using NZTA Research Report 453 and a draft update to trip generation rates in Waka Kotahi NZTA's Planning and Policy Manual (prepared by Ably). We have then applied trip reduction factors:

- Mode share reduction, to reflect the excellent access to public transport that the site has we have adopted a mode share rate of 20% for non-residential activities (noting that the trip rate for residential activities already reflects a reduction for public transport use). For context, commuter public transport mode share data for rapid transit station catchments in Auckland[2] are:
  - New Lynn: 20%
  - Kingsland: 17%
  - Newmarket: 26%
- Internal capture and multipurpose trips, due to the mix of uses proposed within the site. We have applied these reductions to retail activities.
- Pass by trips. While this is a reduction factor that is often applied, we have not applied it to the site as it is unlikely to attract trips that are already on the Messines Avenue corridor.

After applying these reduction rates, we estimate that at full buildout the development will generate around 900 vehicle trips in the peak hour, with detail of this provided in Table 3.1.

[2] Data sourced from Waka Kotahi Commuter, available online at https://commuter.waka.app/

Table 3.1 Trentham Racecourse Plan Change, peak 1 hour vehicle trip generation

Land use	Quantity	Peak hour vehicle trip generation rate	Peak hour trips - unfactored (v/hr)	Trip reduction factors				Peak hour trips - factored (v/hr)
				Mode share reduction	Internal capture	Multipurpose trips	Pass by trips	
General Residential	726 dwellings	0.4 per dwelling	290	0%	0%	0%	0%	290
Retail - general	320 m^2 GFA	19.1 per 100 m^2 GFA	61	20%	15%	10%	0%	34
Retail - F&B	2,500 m^2 GFA	12.7 per 100 m^2 GFA	318	20%	15%	10%	0%	175
Commercial Office	1,565 m^2 GFA	1.8 per 100 m^2 GFA	28	20%	0%	0%	0%	23
Commercial general	2,090 m^2 GFA	1.8 per 100 m^2 GFA	38	20%	0%	0%	0%	30
Hotel	78 units	0.6 per unit	47	20%	0%	0%	0%	37
Conference Centre	1,905 m^2 GFA	0 per 100 m^2 GFA	0	20%	0%	0%	0%	0
Supermarket	2,150 m^2 GFA	21 per 100 m^2 GFA	452	0%	30%	10%	0%	271
Tertiary education	1,445 m^2 GFA	0.2 per student[3]	19	20%	5%	0%	0%	14
Community Centre / Workshop	580 m m^2 GFA	3 per 100 m^2 GFA	17	25%	10%	0%	0%	11
		Total (v/hr)	**1270**	**-106**	**-195**	**-83**	**0**	**885**

[3] We have assumed that there will be 1 student per 15 m^1 GFA

4. Scenarios & Options Summary

Table 4.1 shows a summary of each scenario. The inbound and outbound movement split is shown in Table 4.2 and is representative of the mixed-use nature of the proposal.

The modelling methodology assesses the current performance of the network (Base scenario), then determines the first year where any Messines Ave intersection approach performs at LoS E or worse (Threshold scenario). Then a model with the full development traffic and mitigation along the Messines Ave corridor is presented (Full Development scenario) with the specific threshold point and mitigation identified through preliminary assessment. The following mitigation is recommended:

- Closure of the Messines Avenue/Granville Street intersection – included in Threshold and Full Dev scenarios so is recommended to be undertaken prior to any development.
- Upgrade of Messines Avenue/Somme Road intersection to a single lane roundabout – Full Dev scenario and required after approx. 22% of development established.
- Upgrade of Messines Avenue/Seddul Bahr Road intersection to a single lane roundabout – Full Dev scenario and required after approx. 22% of development established.
- Upgrade of Messines Avenue/Sutherland Road/Stafford Road intersection to a signalised intersection – Full Dev scenario and required after approx. 22% of development established.

It is important to note, that for all of the future years, background growth on the corridor is assumed to be either negligible OR entirely offset by a decrease in traffic on the corridor due to Alexander Road being planned to be decreased from 80 to 80 km/h by 31st December 2027. Decreasing the speed on Alexander Road would push more traffic along Ferguson Dr and off Alexander Rd/ Messines Ave.

As a further robustness check on the performance of the Messines Ave corridor, 10 minute train frequencies in each direction are assumed in the 2033 model. This is consistent with the Regional Land Transport Plan, which has 10min frequencies programmed by 2031[4]

Table 4.1 Description of Scenarios and Options

Model Name	Year	% of development undertaken	Additional peak 2 hour trips	Granville Closed	Infrastructure Upgrades	Higher Train Frequencies
Scenario 0: Base	2022	0%	0	×	×	×
Scenario 1: Threshold	2026	22%	385	✓	×	×
Scenario 3: Full Dev	2033	100%	1749	✓	✓	✓

Table 4.2 Split of traffic in vs out of the development

Direction	AM	PM
Inbound	58%	45%
Outbound	42%	55%

[4] RLTP 2021, Priority 4 Rail Capacity step change, available online at https://www.gw.govt.nz/assets/Documents/2021/10/Wellington-Regional-Land-Transport-Plan-2021web.pdf

5. Model Results

The performance of each intersection and scenario is shown by turning movement in Figure 5.1 to Figure 5.6. Level of service (LoS) delay thresholds are shown in Table 5.1which are consistent with Austroads Guide to Traffic Management Part 3 Table 7.7.

Table 5.1 Intersection LoS delay thresholds (sec)

LoS	Average delay per vehicle (d) in seconds		
	Unsignalised intersections	Roundabouts	Signalised intersections
A	d ≤ 10	d ≤ 10	d ≤ 10
B	10 < d ≤ 15	10 < d ≤ 20	10 < d ≤ 20
C	15 < d ≤ 25	20 < d ≤ 35	20 < d ≤ 35
D	25 < d ≤ 35	35 < d ≤ 50	35 < d ≤ 55
E	35 < d ≤ 50	50 < d ≤ 70	55 < d ≤ 80
F	50 < d	70 < d	80 < d

5.1 Messines Avenue/Somme Road intersection

Modelling results for this intersection are shown in Figure 5.1 and Figure 5.2for AM and PM peaks respectively. The results are summarised as follows:

- In the Base scenario, the right turn out of Somme Road is operating at LOS E in the AM peak
- In the Threshold scenario, delays for the right turn out of Somme Road increase by around 12 seconds and LoS deteriorates to F with a 58 second delay in the AM and PM peaks
- With the upgrade to a roundabout, the intersection performs well in the Full Development scenario, with minimal delays during the AM and PM peak.

5.2 Messines Avenue/Seddul Bahr Road intersection

Modelling results for this intersection are shown in Figure 5.3 and Figure 5.4 for AM and PM peaks respectively. The results are summarised as follows:

- The intersection performs well in all scenarios.

Preliminary testing indicated that when Granville Street is closed and the Messines Avenue/Somme Road roundabout is installed, the Messines Avenue/Seddul Bahr Road intersection must also be upgraded to a roundabout. As such the intersection upgrades are introduced as a package of mitigation works

5.3 Messines Avenue/Sutherland Avenue/Stafford Street intersection

Modelling results for this intersection are shown in Figure 5.5 and Figure 5.6 for AM and PM peaks respectively. The results are summarised as follows:

- The intersection performs well under the Base and Threshold scenarios.

- In the Full Development scenario, the signalised intersection experiences delays for some movements in the AM peak, however this is a conservative assessment as pedestrian phases are assumed to run in every cycle.
- The primary cause of delays at the Stafford/ Messines Ave intersection is the left turn from Stafford St onto Messines Ave and the right turn from Messines Ave onto Stafford St. These are both movements where green time can be impacted by frequent running of pedestrian phases, therefore the modelling is considered to be a worst case scenario.

The primary driver for the signalisation of the Stafford/ Messines Ave intersection is safety, enabling fully protected pedestrian crossings of both corridors. The three intersection upgrades are introduced as a package of mitigation works. Whilst there are delays for some movements in the morning peak period, the through movement on the corridor is largely unimpeded and delays are generally as a result of intergreen time (when lights are amber or red) for minor movements.

Messines Avenue (North)

	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
	Right turn			Through		
S0	448	13	B	625	2	A
S1	448	17	B	730	2	A
S2	450	8	A	1109	9	A

Overall intersection performance

	Vol (v/hr)	Delay (s)	LoS
S0	2638	30	D
S1	2834	43	E
S2	3565	9	A

Somme Road

	Vol (v/hr)	Delay (s)	LoS	
S0	344	18	C	Left turn
S1	342	29	C	
S2	348	3	A	

	Vol (v/hr)	Delay (s)	LoS	
S0	292	44	E	Right turn
S1	312	58	F	
S2	396	4	A	

	Left turn			Through		
	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
S0	520	0	A	409	1	A
S1	555	0	A	447	1	A
S2	678	2	A	585	2	A

Messines Avenue (South)

Figure 5.1 Messines Avenue/Somme Road intersection summary AM peak

Messines Avenue (North)

	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
				Right turn		
S0	300	14	B	429	1	A
S1	299	20	C	549	2	A
S2	302	9	A	980	10	B

Somme Road

	Vol (v/hr)	Delay (s)	LoS	
S0	413	16	C	Left turn
S1	412	33	D	
S2	416	9	A	

	Vol (v/hr)	Delay (s)	LoS	
S0	407	34	D	Right turn
S1	424	58	F	
S2	490	10	A	

	Left turn			Through		
	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
S0	458	0	A	634	1	A
S1	520	0	A	703	1	A
S2	742	3	A	952	4	A

Messines Avenue (South)

Overall intersection performance

	Vol (v/hr)	Delay (s)	LoS
S0	2640	25	C
S1	2907	46	E
S2	3881	10	A

Figure 5.2 Messines Avenue/Somme Road intersection summary PM peak

Overall intersection performance

	Vol (v/hr)	Delay (s)	LoS
S0	1925	8	A
S1	2148	10	B
S2	3183	4	A

Messines Avenue (North)

	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
	Through			**Left**		
S0	676	0	A	240	0	A
S1	672	0	A	368	1	A
S2	863	1	A	828	0	A

Seddul Bahr Road

		Vol (v/hr)	Delay (s)	LoS
Right turn	**S0**	148	10	A
	S1	220	13	B
	S2	478	4	A
		Vol (v/hr)	**Delay (s)**	**LoS**
Left turn	**S0**	60	2	A
	S1	82	3	A
	S2	169	3	A

	Through			Right		
	Vol (v/hr)	**Delay (s)**	**LoS**	**Vol (v/hr)**	**Delay (s)**	**LoS**
S0	725	1	A	76	6	A
S1	721	1	A	85	9	A
S2	727	4	A	118	3	A

Messines Avenue (South)

Figure 5.3 Messines Avenue /Seddul Bahr Road intersection summary AM peak

Overall intersection performance

	Vol (v/hr)	Delay (s)	LoS
S0	2055	6	A
S1	2408	9	A
S2	4076	8	A

Messines Avenue (North)

	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
S0	562	0	A	273	1	A
S1	562	0	A	410	0	A
S2	966	1	A	903	1	A
	Through			**Left**		

	Through			Right		
	Vol (v/hr)	**Delay (s)**	**LoS**	**Vol (v/hr)**	**Delay (s)**	**LoS**
S0	906	1	A	77	5	A
S1	905	1	A	100	7	A
S2	910	8	A	173	8	A

Messines Avenue (South)

Seddul Bahr Road

		Vol (v/hr)	Delay (s)	LoS
Right turn	**S0**	143	9	A
	S1	176	13	B
	S2	744	5	A

		Vol (v/hr)	Delay (s)	LoS
Left turn	**S0**	93	2	A
	S1	155	2	A
	S2	380	3	A

Figure 5.4 Messines Avenue /Seddul Bahr Road intersection summary PM peak

Overall intersection performance

	Vol (v/hr)	Delay (s)	LoS
S0	1974	12	B
S1	2115	14	B
S2	2640	73	E

Sutherland Road

	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
S0	797	7	A	54	2	A
S1	893	8	A	54	2	A
S2	1236	30	D	54	13	B
	Through			**Left**		

Stafford Street

		Vol (v/hr)	Delay (s)	LoS
Right turn	**S0**	94	6	A
	S1	94	7	A
	S2	94	38	D
		Vol (v/hr)	**Delay (s)**	**LoS**
Left turn	**S0**	278	14	B
	S1	287	16	C
	S2	324	83	F

	Through			Right		
	Vol (v/hr)	**Delay (s)**	**LoS**	**Vol (v/hr)**	**Delay (s)**	**LoS**
S0	612	2	A	139	10	A
S1	646	2	A	141	12	B
S2	780	6	A	153	55	E

Messines Avenue

Figure 5.5 Messines Avenue /Sutherland Avenue / Stafford Street intersection summary AM peak

Overall intersection performance

	Vol (v/hr)	Delay (s)	LoS
S0	1941	8	A
S1	2129	9	A
S2	2814	38	D

Sutherland Road

	Vol (v/hr)	Delay (s)	LoS	Vol (v/hr)	Delay (s)	LoS
S0	570	7	A	77	1	A
S1	680	7	A	77	1	A
S2	1069	32	C	77	12	B
	Through			**Left**		

Stafford Street

		Vol (v/hr)	Delay (s)	LoS
Right turn	**S0**	89	7	A
	S1	88	7	A
	S2	89	18	B
		Vol (v/hr)	**Delay (s)**	**LoS**
Left turn	**S0**	162	9	A
	S1	172	10	B
	S2	213	46	D

	Through			Right		
	Vol (v/hr)	**Delay (s)**	**LoS**	**Vol (v/hr)**	**Delay (s)**	**LoS**
S0	862	1	A	182	6	A
S1	919	2	A	194	8	A
S2	1130	5	A	237	40	D

Messines Avenue

Figure 5.6 Messines Avenue /Sutherland Avenue / Stafford Street intersection summary PM peak

6. Conclusions

Key conclusions from our traffic modelling are as follows:

- The Messines Ave/Granville Street intersection is recommended to be closed prior to development to eliminate through traffic and address potential safety concerns in the vicinity of the level crossing.
- When traffic generation associated with the development reaches 190 two-way vehicle trips in peak hour, the performance of the Messines Avenue/Somme Road intersection deteriorates and a roundabout upgrade is recommended.
- Preliminary modelling demonstrated that when the Somme/ Messines roundabout is installed, the Seddul Bahr/ Messines intersection must also be upgraded to a roundabout to provide satisfactory LoS at both intersections.
- The Stafford/ Messines intersection is recommended to be upgraded to signals with full pedestrian protection to enable safe crossing of both corridors for pedestrians, and to minimise potential road safety issues in the direct vicinity of the level crossing. It is recommended that the signals and the rail level crossing control be fully integrated.

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