From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Claire Kathleen Jones
Date: Monday, 6 May 2024 11:16:40 am
Attachments: 10-pc100-app-8-integreated-transport-assessment_20240506105722.700.pdf

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Claire Kathleen Jones

Organisation name:

Agent's full name:

Email address: fairview2010@gmail.com

Contact phone number:

Postal address:
23 Pitoitoi Drive
Riverhead
Auckland 0820

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address:

Map or maps: Assessment 8 Integrated Transport

Other provisions:
Limited and not workable roading for traffic access to exit the Riverhead area. Need access to Highway 16 to be very much improved before this change can even begin

Do you support or oppose the provisions you have specified? I or we support the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
The traffic provisions for access to the main highway to travel North or South from Riverhead at present are severely stretched now and the local residents have been constantly faced with long queus when trying to travel anywhere. We are really tired of it and we do not need any more local traffic of construction trucks to make the situation worse. There is no provision in this proposal which will address this problem.
last Wednesday I left my home at 9.30AM to go to Henderson for an appointment. I missed the appointment because I sat in a crawling line of cars about 400metres long from Old Railway Rd to the round about on Highway 16 and then really slow to the Coatsville Road intersection and slow to the N W Motorway. it is unacceptable to think what sort of gridlock we would have if this projected plan change were to be approved at this time. We would have constant gridlock

I or we seek the following decision by council: Decline the plan change | 36.1

Submission date: 6 May 2024

Supporting documents
10-pc100-app-8-integreated-transport-assessment_20240506105722.700.pdf

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

New tsunami evacuation map. Check the map today.

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Riverhead Plan Change

Integrated Transport Assessment

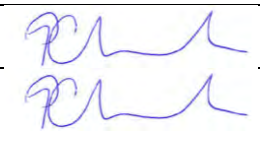
October 2023

flow
TRANSPORTATION SPECIALISTS

flow
TRANSPORTATION SPECIALISTS

Project: Riverhead Private Plan Change
Title: Integrated Transport Assessment
Document Reference: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\Reporting\R1F221212 Riverhead Plan Change.docx
Prepared by: Harry Shepherd
Project Manager Terry Church
Reviewed by: Terry Church

Revisions:

Date	Status	Reference	Approved by	Initials
2 December 2021	Draft to project team	R1A211202	T Church	
8 December 2021	Draft to Auckland Transport to support drawings	R1B211208	T Church	
1 June 2022	Updated draft to project team	R1C220601	T Church	
30 June 2022	Final	R1D220630	T Church	
6 December 2022	Notification draft	R1E221206	T Church	
12 December 2022	For Notification	R1F221212	T Church	
4 October 2023	For Notification post c25 acceptance	R1G231004	T Church	

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SUMMARY OF OUR ASSESSMENT

Riverhead Landowner Group (Applicant) has engaged Flow Transportation Specialists Ltd (Flow) to assess the transport planning and traffic engineering matters relating to a Structure Plan and subsequent Private Plan Change (Proposal) for land zoned Future Urban, located in Riverhead, adjacent to Coatesville-Riverhead Highway and Riverhead Road (Site).

The Structure Plan and Plan Change Proposal includes the following elements that are material to transport matters

- Rezoning the Future Urban Zone land to a variety of zones, including
  - Residential – Mixed Housing Suburban and Terrace Housing and Apartment Buildings[1]
  - Business – Local Centre, providing for a supermarket, ancillary retail, café and offices
  - Business – Neighbourhood Centre, providing a smaller scale retail offering to the local neighbourhood
  - Rural – Mixed Rural
- Enabling of future activities and amenities including a potential school, early childhood centre, and open space.
- Upgrading the transport network within the Plan Change area which provides access to Riverhead and the development area, including
  - Upgrading the surrounding road network within the Plan Change area to improve road safety and provide new separated facilities for pedestrians and cyclists. These upgrades align with those being assessed by Auckland Transport and Te Tupu Ngātahi Supporting Growth for Coatesville-Riverhead Highway. Similar upgrades are also provided for Riverhead Road, with Lathrope Road also being sealed and a pedestrian path provided on the northern side. Upgrades are also included for Cambridge Road fronting the Site, with a pedestrian path also provided for along Queen Street to connect to Coatesville-Riverhead Highway.
  - Anticipated speed limit reductions (through Bylaw changes) by extending the existing 50 km/h speed limits on Coatesville-Riverhead Highway, Riverhead Road and Lathrope Road which front the extended urban area to enable safer speed environments for all road users, and provide new speed threshold treatments.
- Upgrading the following intersections to improve safety and facilitate active modes
  - Coatesville-Riverhead Highway / Riverhead Road – upgrade existing roundabout
  - Coatesville-Riverhead Highway / Riverhead Point Drive / new collector road – upgrade to a roundabout and construct a fourth west leg to provide a collector road into the site

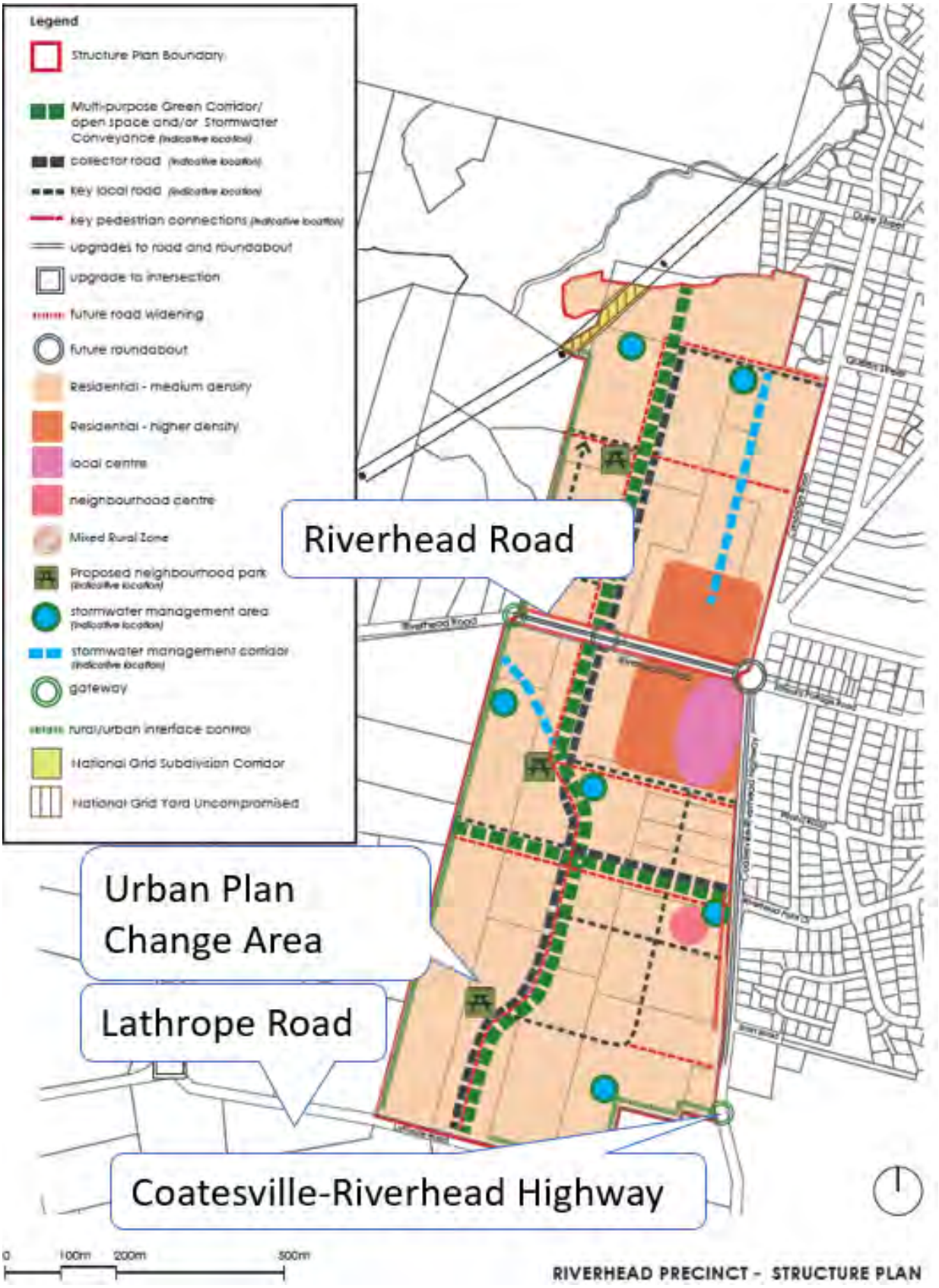
[1] Allowing up to 1,558 residential dwellings, a retirement village with some 310 apartments, 90 aged care beds, a childcare centre, a medical centre and supporting café and retail

- Coatesville-Riverhead Highway / new local road – construct a new local road access onto Coatesville-Riverhead Highway between Riverhead Point Drive and Short Road as a priority-controlled intersection
- Riverhead Road / new collector road – construct a new roundabout west of Coatesville-Riverhead Highway. The new collector road will provide a north and south approach to the roundabout, providing a total of four approaches
- Lathrope Road / Riverhead Road – upgrade the existing priority control intersection. Realign the Lathrope Road access into one point, and provide a right turn bay and a flush median on Riverhead Road
- Right turn bays on Coatesville-Riverhead Highway will be required at the Riverland Road and Old Railway Road intersections.

- Precinct plan provisions, which ensure the necessary infrastructure upgrades are operational prior to relevant development being occupied. This includes the infrastructure upgrades outlined above and tying occupied development to the SH16 / Coatesville-Riverhead Highway intersection upgrade being progressed by Waka Kotahi, given the safety improvements this upgrade provides to all of Riverhead.

A plan showing the Site and general layout is included at Figure ES1.

Figure ES1: Proposed Structure Plan



Based on the analysis described in this report, we conclude that the Structure Plan and proposed Plan Change can enable activities that can operate safely and efficiently from a transportation perspective.

We conclude that

Planning context

- The Plan change aligns well with the Auckland Plan and Auckland Unitary Plan transport objectives by providing people with choices of healthy and sustainable transport modes and encourages a range of activities. A full assessment of the relevant objectives and policies is provided in the section 32 report prepared by Barker & Associates
- The rezoning of Future Urban land will enable a range of complementary activities, including residential dwellings, a local centre, early learning childcare centres and a retirement village complex
- Provision of education options are being provided
- The Plan Change brings the development ahead of the 2028 – 2032 current schedule in the Future Urban Land Supply Strategy by three to four years although that timing is principally based on issues applying to Kumeu and Huapai that do not constrain Riverhead. We note that the roading improvements captured in the Precinct Provisions are all that is required prior to development being occupied.

Local access and roads

- The sections of Riverhead Road and Coatesville-Riverhead Highway that front the plan change area and provide the entry points to Riverhead will receive full corridor upgrades within the vicinity of the Site as part of the Plan Change. This includes providing new dedicated facilities for pedestrians and cyclists on both sides of these roads, which will significantly improve active mode accessibility for existing and future residents of Riverhead
- Lathrope Road will be upgraded and sealed to provide a footpath on the northern side, and allow this road to be used as an external vehicle access route from the Site to Riverhead Road
- An internal road network will be provided to support the activities included in the Plan Change. Several new intersections will be constructed. Existing intersections in the local area will be upgraded. These intersections will be designed in accordance with Vision Zero and designed to safely accommodate all road users. The proposed Precinct Provisions set out the anticipated design elements of local roads, requiring low speed designs that offer a safe outcome to all users
- New footpaths on Queen Street and Cambridge Road will be provided to improve pedestrian connectivity
- Precinct Plan provisions will allow improved public transport facilities to be provided in the future
- It is anticipated that speed limits will be revised (through the Bylaw) on Riverhead Road and Coatesville-Riverhead Highway, as a result of urbanisation of the area. This will provide safety benefits for all road users and align with Vision Zero principles (see Section 6.1.1).

Wider network

- There are existing capacity constraints on the road network, particularly on SH16. The section of SH16 south of the Site has funding to be upgraded by Waka Kotahi NZTA by 2025, which will increase capacity and improve safety from the Plan Change area. The Notice of Requirement for

this project has now been lodged with Auckland Council. The proposed Precinct Provisions include a requirement to ensure that this upgrade is provided before development is occupied

- There will be a noticeable number of trips generated by the development in time, but the impact on the wider network will be reduced by pass-by trips, multi-purpose trips, and trips that can be undertaken locally within Riverhead. All intersections within the Riverhead Plan Change area are anticipated to perform without any noticeable queue lengths or delays with the increased traffic volumes
- The SH16 / Coatesville-Riverhead Highway intersection is predicted to perform well, even when considering the full 100% Plan Change buildout by 2038, due to the Waka Kotahi upgrade
- Coatesville-Riverhead Highway is serviced by a bus route, which connects to the Westgate public transport hub and Albany station. The upgrades proposed on Coatesville-Riverhead Highway will include the provision of public transport infrastructure to support provision of increased services and encourage travel by public transport
- Right turn bays on Coatesville-Riverhead Highway will be required at the Riverland Road and Old Railway Road intersections, noting the Old Railway Road right turn bay is already required.

Overall, we are of the view that the Plan Change will enable development that aligns with or implements transport network upgrades as planned by Waka Kotahi and Auckland Transport. The upgrades proposed as part of the Plan Change will significantly improve accessibility for all transport modes in Riverhead.

We therefore consider that there are no transportation planning or traffic engineering reasons to preclude the implementation of the Plan Change as set out in the proposed Precinct Provisions.

CONTENTS

APPENDICES

1 WHAT THIS REPORT INCLUDES

Riverhead Landowner Group[2] (Applicant) has engaged Flow Transportation Specialists Ltd (Flow) to assess the transport planning and traffic engineering matters relating to a Structure Plan and Private Plan Change (Proposal) for land zoned Future Urban, located in Riverhead, adjacent to Coatesville-Riverhead Highway and Riverhead Road (Site). The Private Plan Change will consist of rezoning land from Future Urban to allow residential and local retail activities.

This Transport Assessment provides the following information

- A description of the Proposal, focussing on the transport matters
- An assessment of the Proposal against the relevant transport planning documents, including the Auckland Plan, Auckland Unitary Plan (Unitary Plan), Future Urban Land Supply Strategy and Future Connect
- The provision of background information to provide context to the transport assessment of the Proposal. This information includes
  - the Site location and immediate surrounding transport network, including traffic volumes
  - a description and assessment of the historic crash record of the immediate transport network
  - a description of the private vehicle, public transport and walking and cycling accessibility of the Site
- An assessment of the Proposal and potential transport effects with regard to
  - vehicle access
  - traffic generation and impacts on the surrounding transport network
  - safety impacts and upgrades
  - active mode and public transport provisions
- Outcomes in relation to the implementation of upgrades, including who is responsible for delivering the upgrade.

[2] Consisting of Fletcher Living, Matvin Group, Neil Group

2 THE PLAN CHANGE PROPOSAL

The Proposal includes the following elements and infrastructure upgrades that are material to transport matters

- Rezoning the Future Urban Zone land to a variety of zones, including
  - Residential – Mixed Housing Suburban and Terrace Housing and Apartment Buildings
  - Business – Local Centre
  - Business – Neighbourhood Centre
  - Rural – Mixed Rural
- This will enable the following activities within the proposed urban zones[3]
  - Some 1,468 residential dwellings including
    - 385 lower density dwellings with the Mixed Housing Suburban zone
    - 775 medium density dwellings with the Mixed Housing Suburban zone
    - 100 dwellings in the Terrace House and Apartment Buildings zone
    - 208 retirement village villas.
  - A local centre, which could contain
    - a supermarket of up to 4,000 m^2
    - ancillary retail of 650 m^2
    - café of 600 m^2
    - offices of up to 1,000 m^2
    - medical centre up to 250 m^2
  - A neighbourhood centre of approximately 300 m^2
  - A retirement village complex, which could contain
    - Some 310 retirement village apartments (158 villas are included in the total number of retirement villas for residential dwellings above, which would bring the total to 468 if included here)
    - 90 aged care / dementia beds
    - A café of 450 m^2
    - Retail of 150 m^2
    - A childcare centre accommodating 100 children
    - A medical centre of 250 m^2
  - A potential school could be provided, with an assumed capacity to accommodate some 1,100 students.

[3] Based on anticipated development implemented over a 5-10 year period

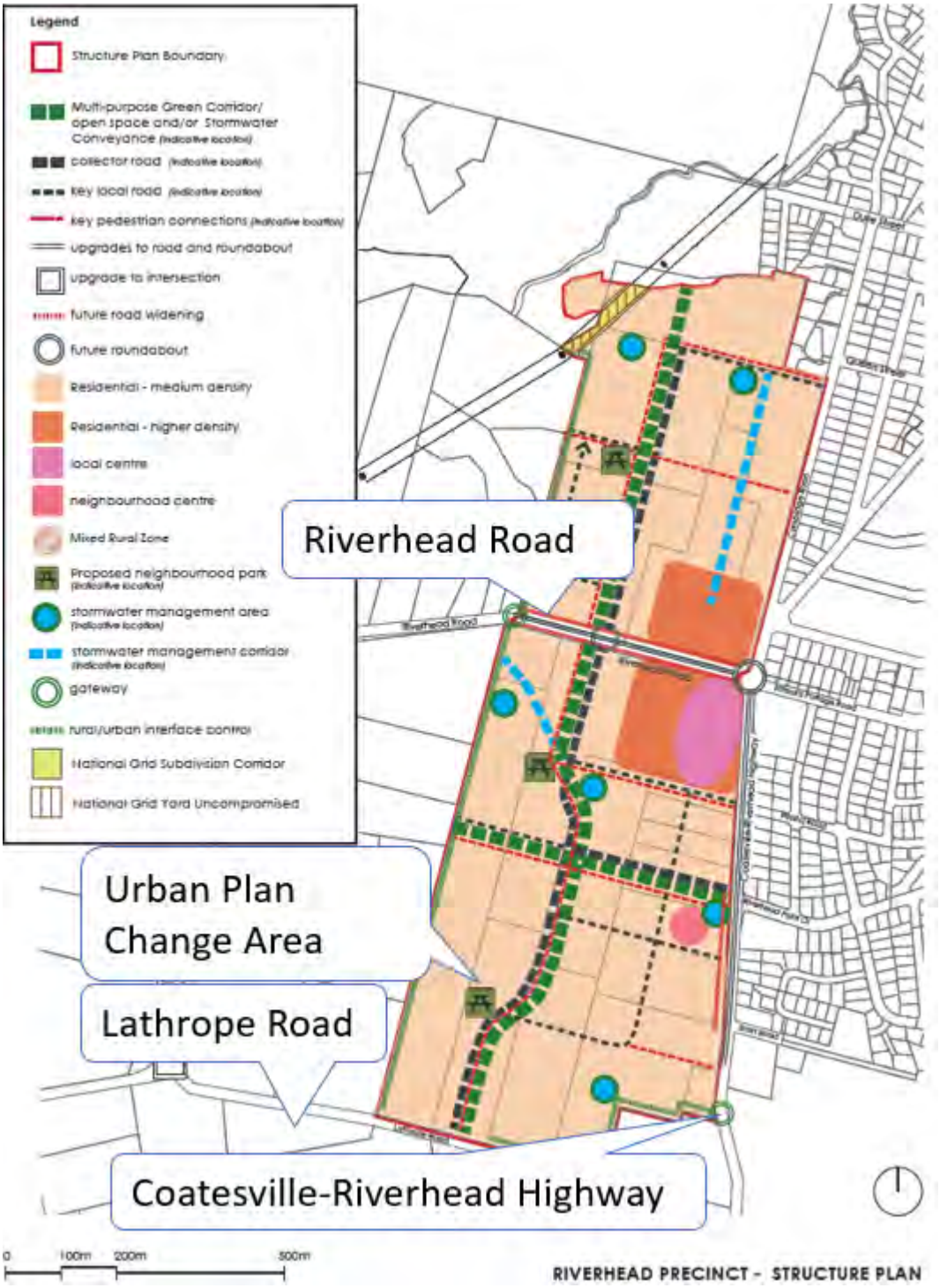
- Anticipated speed limit reductions through the Bylaw process (consistent with those being implemented fronting other new urban areas) on Coatesville-Riverhead Highway, Riverhead Road and Lathrope Road to 50 km/h, enabling safer speed environments for all road users, and provide new speed threshold treatments (referred to as 'gateways' in the Precinct Provisions)
    - Coatesville-Riverhead Highway – extend the existing 50 km/h speed limit further south and relocate the speed threshold treatment south of Short Road
    - Riverhead Road – reduce from 80 km/h to 50km/h in front of the Plan Change Site, and provide a new speed threshold treatment west of the Site
    - Lathrope Road – reduce from 60 km/h to 50 km/h
- Providing the following corridor upgrades to the surrounding road network to improve road safety and provide new separated facilities for pedestrians and cyclists. The Coatesville-Riverhead Highway upgrade aligns with that lodged by Auckland Transport and Te Tupu Ngātahi Supporting Growth, with the Riverhead upgrade being consistent with this design
    - Coatesville-Riverhead Highway – upgrade from Riverhead Road to 80 m south of Short Road to provide separated cycle lanes and pedestrians footpaths on each side
    - Riverhead Road – upgrade from Coatesville-Riverhead Highway to the eastern boundary of 307 Riverhead Road to provide separated cycle lanes and pedestrians footpaths on each side
    - Lathrope Road – upgrade the full length of Lathrope Road to provide a sealed carriageway and a footpath on the northern side
    - Cambridge Road – urbanise Cambridge Road fronting the Site, including a footpath on the western side of Cambridge Road and on the northern side of Queen Street
- Upgrading or constructing the following intersections to improve safety and facilitate active modes
    - Coatesville-Riverhead Highway / Riverhead Road – upgrade existing roundabout
    - Coatesville-Riverhead Highway / Riverhead Point Drive / new collector road – upgrade to a roundabout and construct a fourth west leg to provide a collector road into the site
    - Coatesville-Riverhead Highway / new local road – construct a new local road access onto Coatesville-Riverhead Highway between Riverhead Point Drive and Short Road as a priority-controlled intersection
    - Riverhead Road / new collector road – construct a new roundabout west of Coatesville-Riverhead Highway. The new collector road will provide a north and south approach to the roundabout, providing a total of four approaches
    - Lathrope Road / Riverhead Road – upgrade the existing priority control intersection. Realign the Lathrope Road access into one point, and provide a right turn bay and a flush median on Riverhead Road
    - Right turn bays on Coatesville-Riverhead Highway will be required at the Riverland Road and Old Railway Road intersections.

- Introducing Precinct Plan provisions, which include requirements for specific infrastructure upgrades to be provided prior to development being occupied. This includes the infrastructure upgrades outlined above, and the SH16 / Coatesville-Riverhead Highway intersection upgrade being progressed by Waka Kotahi, given the safety improvements this upgrade provides to all of Riverhead.

The Neighbourhood Design Statement, which forms part of the application provides further details about how the yields for the various activities have been established.

A diagram of the Structure and Plan Change is shown in Figure 1.

Figure 1: Proposed Structure Plan



3 STRATEGIC CONTEXT

3.1 Auckland Plan

The Auckland Plan is a long-term spatial plan for Auckland, with a 2050[4] outlook. It considers how we will address key challenges such as high population growth and shared prosperity.

There are six outcomes of the Auckland Plan, with transport and access being one. Within the transport and access outcome, there are three key directions

- Better connect people, places, goods and services
- Increase genuine travel choices for a healthy, vibrant and equitable Auckland
- Maximise safety and environmental protection.

The Riverhead Plan Change provides opportunity to align with these directions

- New active mode facilities for pedestrians and cyclists will provide genuine travel choices for current and future residents in Riverhead. This will also maximise safety for active modes
- People can be better connected to places, goods and services in Riverhead by providing a mix of new land uses, such as new local and neighbourhood centres, education facilities and residential accommodation for all age groups.

3.2 Auckland Unitary Plan

The Auckland Unitary Plan has the following region-wide transport objectives in Auckland[5]

- Land use and all modes of transport are integrated in a manner that enables
  - the benefits of an integrated transport network to be realised
  - the adverse effects of traffic generation on the transport network to be managed
- An integrated transport network including public transport, walking, cycling, private vehicles and freight is provided for
- Parking and loading support urban growth and the quality compact urban form
- The provision of safe and efficient parking, loading and access is commensurate with the character, scale and intensity of the zone
- Pedestrian safety and amenity along public footpaths are prioritised
- Road/rail crossings operate safely with neighbouring land use and development.

The Riverhead Plan Change align with several transport objectives of the Unitary Plan

- Achieving a quality compact urban form consistent with the Unitary Plan's hierarchy of centres

[4] https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/Pages/default.aspx

[5] https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20E%20Auckland-wide/4.%20Infrastructure/E27%20Transport.pdf

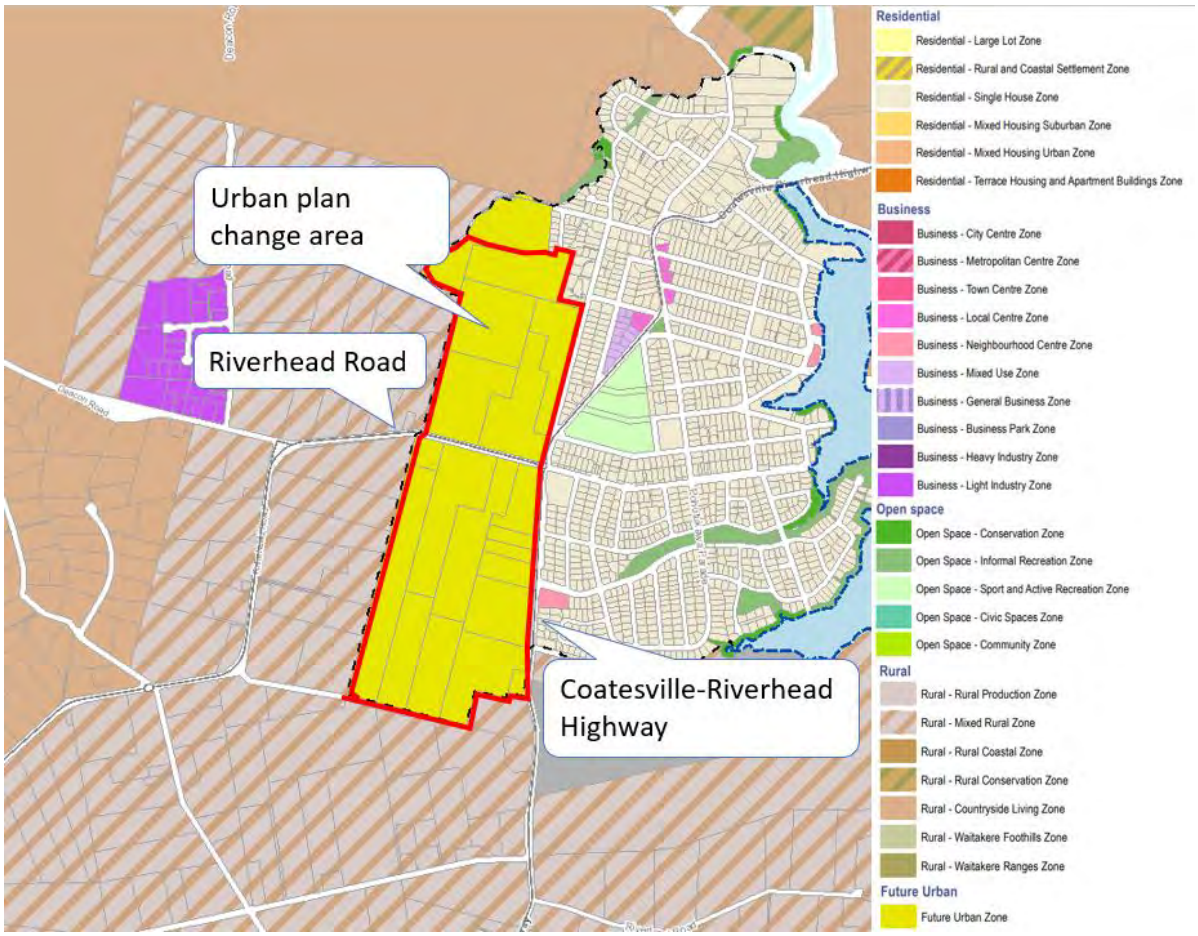
- Providing a mix of land use activities, including local and neighbourhood centres, can ensure that land use is integrated to minimise the need to travel longer distances to other areas
- Adverse effects of trip generation can be managed by providing upgrades to the local road network and providing new activities in Riverhead, allowing existing residents to undertake trips locally
- Providing new and upgraded facilities for walking and cycling can ensure that all modes of transport are provided in an integrated manner, and will increase opportunities for local active mode use
- Pedestrian safety and amenity can be improved by providing new and upgraded facilities.

The Section 32 report by Barker & Associates provides a full assessment against the transport policies and objectives of the Unitary Plan. We also note this Section 32 report provides an assessment against the relevant transport provisions of the National Policy Statement on Urban Development.

3.2.1 Site Context

The Unitary Plan zoning of the Site is shown in Figure 2. The Site is zoned Future Urban Zone.

Figure 2: Unitary Plan zoning[6]



[6] https://unitaryplanmaps.aucklandcouncil.govt.nz/upviewer/

Land to the north, west and south is primarily zoned for rural activities being Mixed Rural and Countryside Living zones. The existing Riverhead settlement is located to the east, which mostly consists of Residential – Single House Zone land.

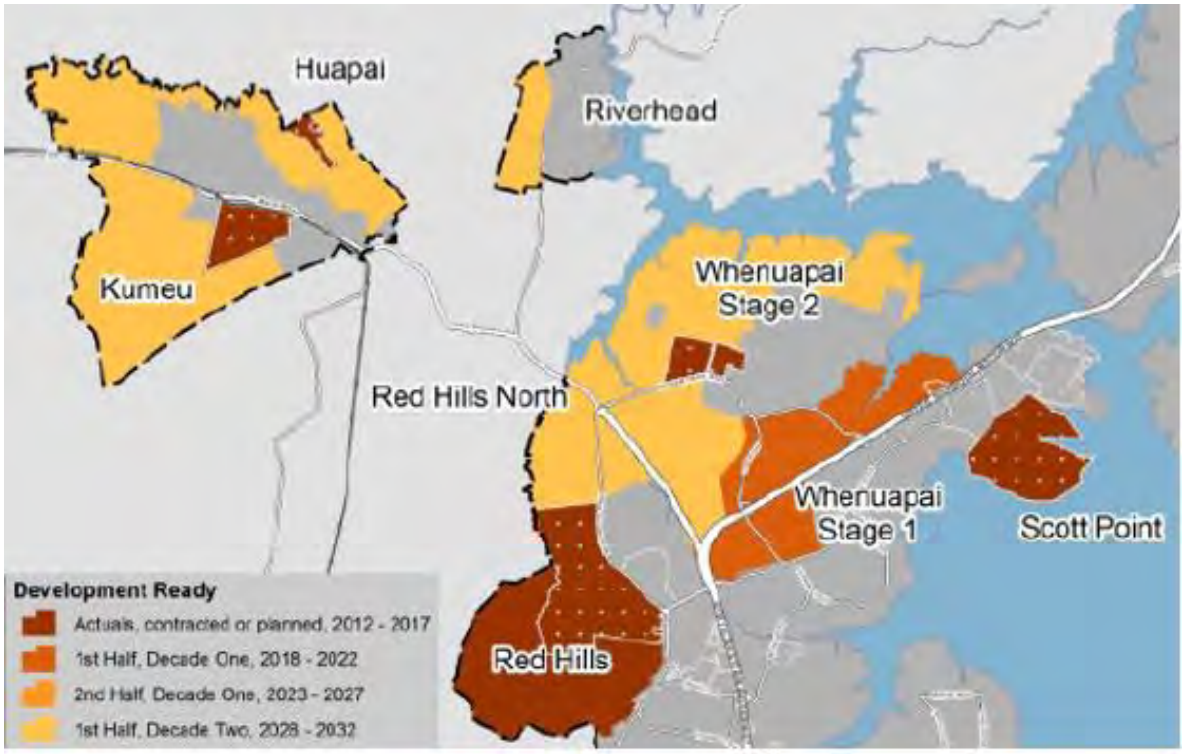
Riverhead Road and Coatesville-Riverhead Highway are classified as Arterial Roads under the Unitary Plan. This means that direct access onto these roads triggers Vehicle Access Restrictions, which is a Restricted Discretionary activity.

3.3 Future Urban Land Supply Strategy

The Future Urban Land Supply Strategy (FULSS)[7] is a non-statutory document which identifies a programme to sequence land over 30 years in Auckland. It is a strategy which assists with the ongoing supply of greenfield land for development. It determines sequencing and timing for when future urban areas will be ready for development to commence which requires necessary underpinning zoning and bulk infrastructure to be in place.

Figure 3 shows a map of the sequencing for Northwest Auckland. Riverhead is identified to be development ready between 2028 – 2032. This Plan Change would effectively bring development in Riverhead forward, ahead of the 2028 – 2032 schedule. However, it is noted that Riverhead is grouped with Kumeu and Huapai, whereas the constraints that are the basis for this schedule as identified in the FULSS, particularly those relating to transport can be appropriately managed as identified in this report. The key transport constraint for this particular area is the SH16 safety and capacity upgrades.

Figure 3: Future Urban Land Supply Strategy – Sequencing of Northwest Auckland



[7] https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/housing-plans/Documents/future-urban-land-supply-strategy.pdf

3.4 Future Connect

Auckland Transport's Future Connect programme sets out the long-term network plan for Auckland's integrated transport system, with the network plan helping to inform the 10-year investment programme. For Riverhead, Future Connect classifies the following for the first decade (2021-2031)

- Cycle and micro-mobility – Coatesville-Riverhead Highway and Riverhead Road as local (supporting) corridors. The network about Riverhead is not considered to be Regional, Major or Connector routes
- Public Transport – Coatesville-Riverhead Highway has a supporting local transit route highlighted, being that which connects Albany Station to Westgate Station. There are no Frequent or Strategic routes planned through Riverhead at this time.
- General Traffic – Coatesville-Riverhead Highway is a Primary Arterial, with Riverhead Road being a (supporting) Secondary Arterial. Both these corridors about the plan change area are proposed to be upgraded, with the upgrades reflecting these classifications
- Walking – Coatesville-Riverhead Highway is classified as being a Primary and Secondary classification fronting the Plan Change site, with Riverhead Road being a supporting tertiary route. Again, the corridor and intersection upgrades proposed will significantly improve the safety and provision for walking about Riverhead.

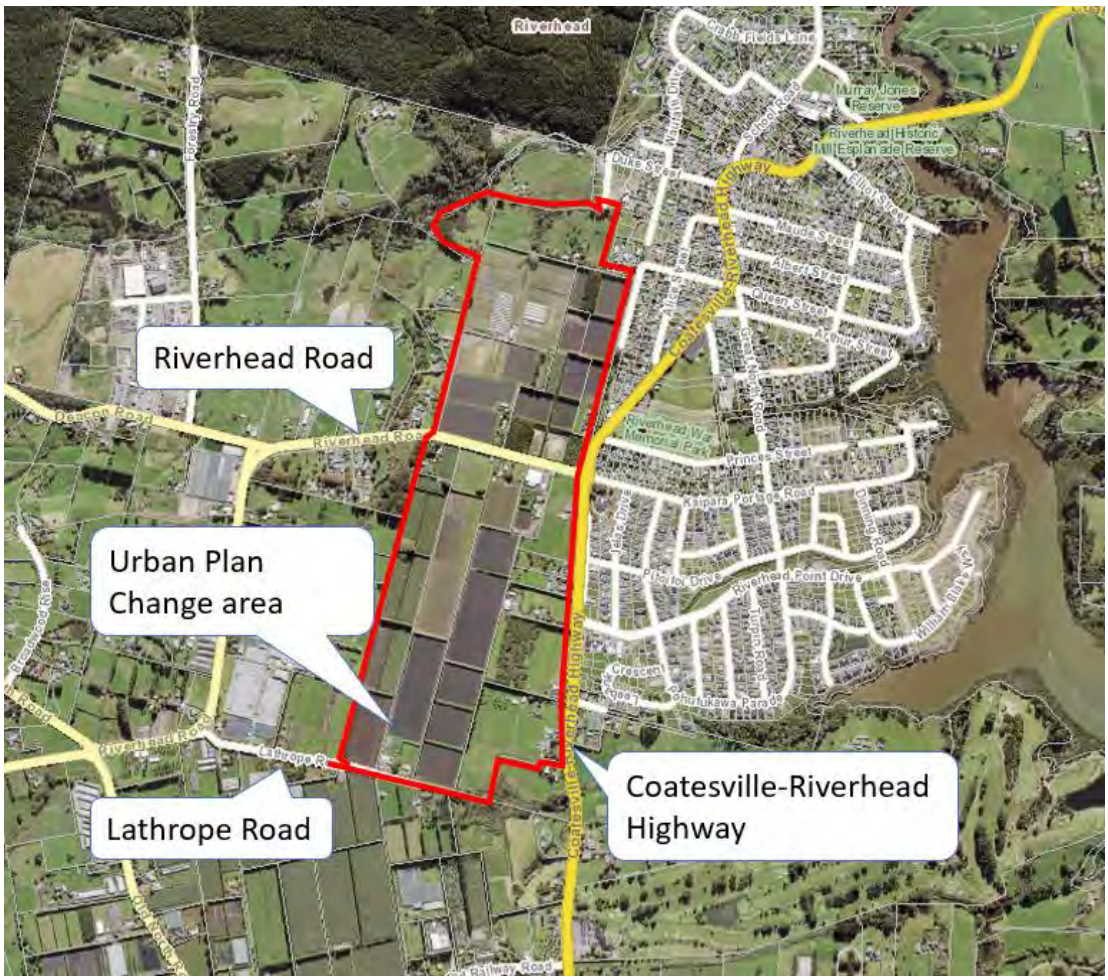
The Plan Change and recommended upgrades align with the network anticipated by Auckland Transport for Riverhead.

4 A DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 The Site and surrounding environment

The extent of the Urban Plan Change area is shown in Figure 4. While the Riverhead Landowner Group own or have rights to the majority of land within the Plan Change boundary, the Site comprises several smaller sites, which currently contain rural activities and some residential dwellings.

Figure 4: The site and immediate surrounds



We note that

- Land to the west and south is primarily rural in nature
- An industrial area is located west of the Site, near Deacon Road and Forestry Road
- The existing Riverhead residential area is located immediately east of the Site, which mostly consists of low density residential houses
- The Riverhead Forest is located north of the Site, which contains walking and cycling tracks
- The Kumeu town centre is located approximately 3-4 km west of the Site
- The Site has access points onto Riverhead Road, Coatesville-Riverhead Highway and Lathrope Road. The northern section of the Site also has access points onto Cambridge Road.

4.2 Existing roads

4.2.1 Coatesville-Riverhead Highway

Coatesville-Riverhead Highway is a 14 km long road which connects SH16 at its southern end to Dairy Flat and Albany to the northeast. It is primarily a two-lane rural road, with no formal footpaths.

Within the existing Riverhead town area and along the Site boundary, Coatesville-Riverhead Highway is constructed to a more urban standard on the eastern edge.

Figure 5 shows a photo of the urbanised section of Coatesville-Riverhead Highway along the Site boundary. There is one traffic lane in each direction separated by a painted flush median. There is no footpath along the west side of the road. Along the east side, a footpath is provided between Riverhead Road and Riverhead Point Drive along Grove Way, which is a frontage road giving access to local properties.

Figure 5: Typical layout of urban section of Coatesville-Riverhead Highway (shown south of Grove Way entrance, looking north)

4.2.2 Riverhead Road

Riverhead Road is currently a rural arterial road which connects Riverhead to Kumeu (via SH16) at its southwest end.

Riverhead Road typically has one traffic lane in each direction, with no dedicated footpaths or cycling facilities.

Figure 6: Typical layout of Riverhead Road (shown west of Coatesville-Riverhead Highway, looking west)

4.2.3 Lathrope Road

A photo of Lathrope Road is shown in Figure 7. Lathrope Road is an unsealed rural road, which has no dedicated footpaths. It currently serves local properties and is a no exit road. Its intersection with Riverhead Road is the only external access point to the wider road network.

Figure 7: Typical layout of Lathrope Road

4.3 Existing traffic conditions

4.3.1 Coatesville-Riverhead Highway and Riverhead Road

Daily and peak hour traffic count information available from the Auckland Transport traffic count database is presented in Table 1.

Table 1: Auckland Transport traffic count data near the Site

Location	Date	Weekday Average Daily Volume (vpd)	Morning Peak Hour Volume (vph)	Afternoon Peak Hour Volume (vph)
Riverhead Road (west of Coatesville-Riverhead Highway)	5/08/2022	6,754	776	794
Coatesville-Riverhead Highway (north of SH16)	5/08/2022	8,598	9271	793

We have obtained the profiles of the Coatesville-Riverhead Highway traffic counts. These traffic profiles for the average weekday, Saturday and Sunday are presented in Figure 8 and Figure 9.

Figure 8: Coatesville-Riverhead Highway hourly traffic volumes, southbound direction

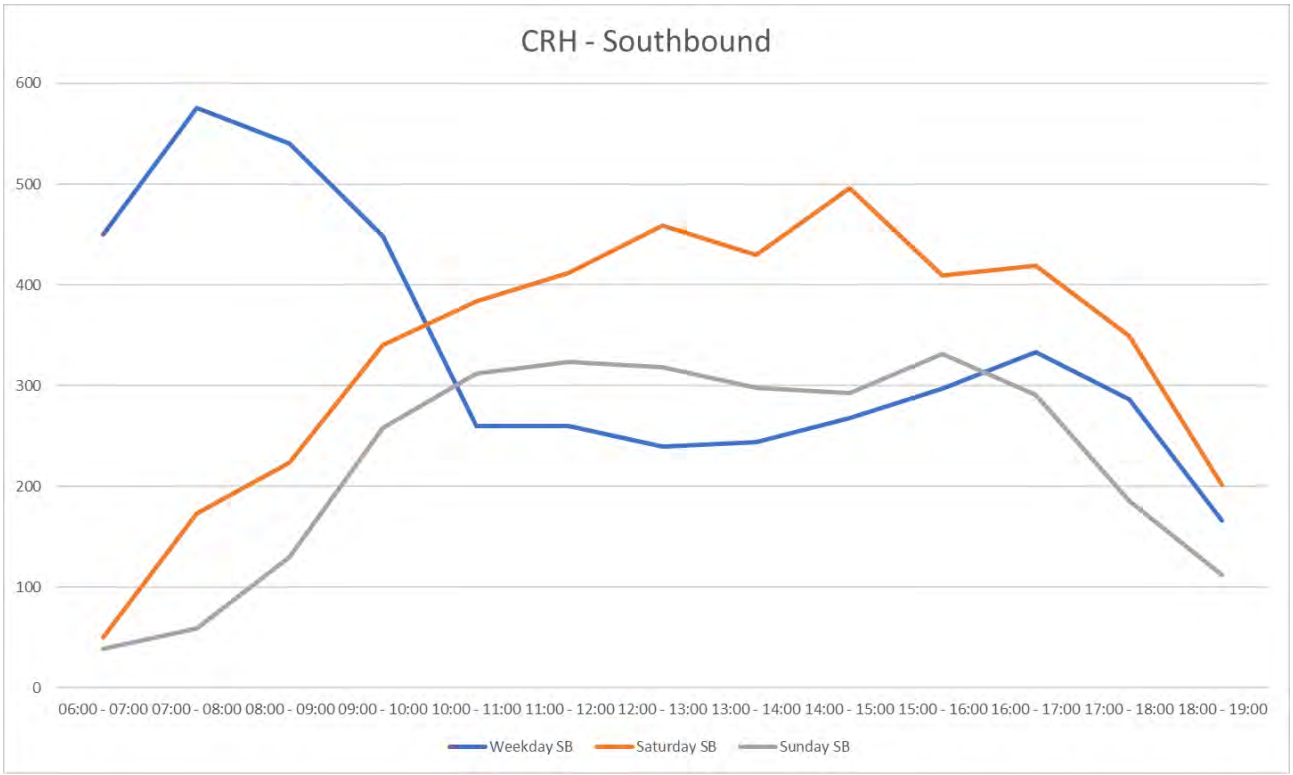
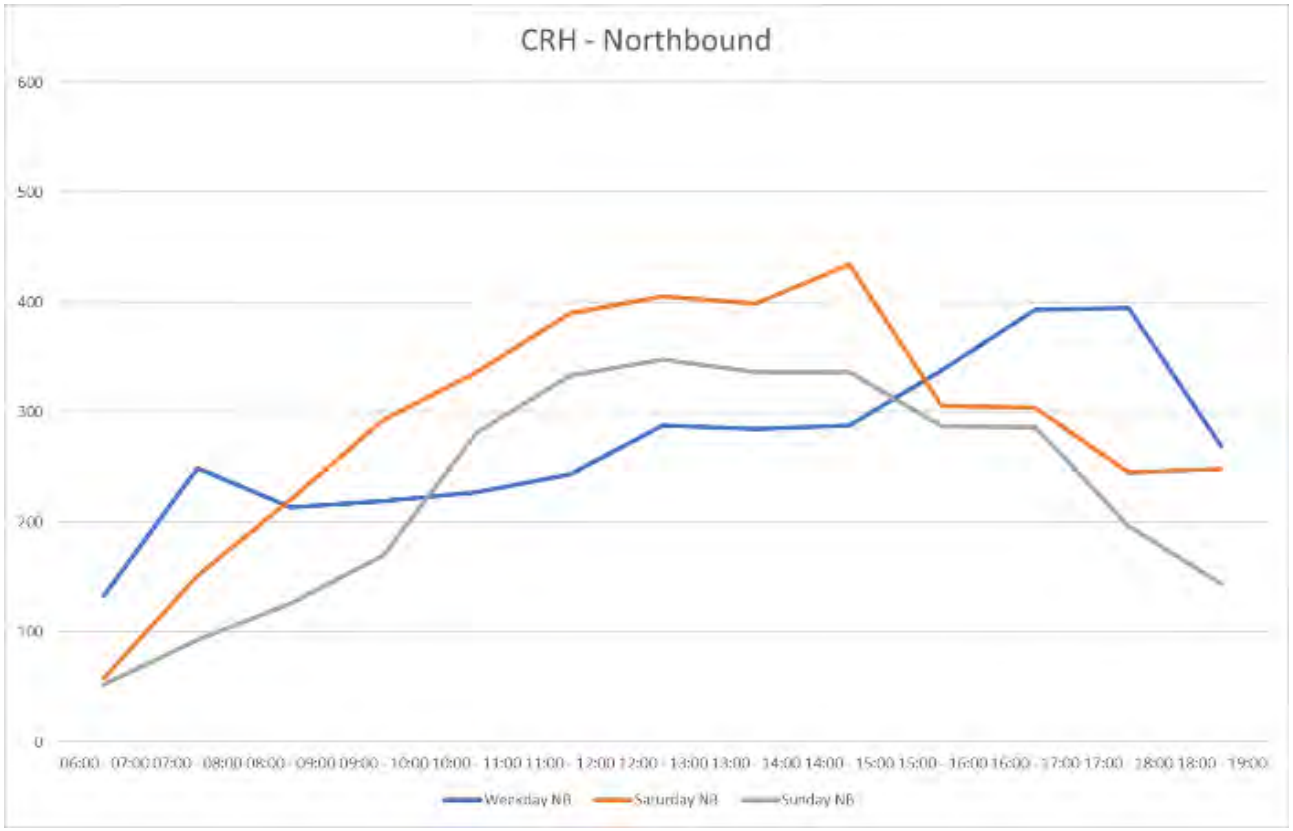


Figure 9: Coatesville-Riverhead Highway hourly traffic volumes, northbound direction



The weekday peak periods are observed to be 7:00 to 8:00 am and 4:00 to 5:00 pm. We note that Saturday volumes on Coatesville-Riverhead Highway (southbound) are higher than the typical weekday (outside of the AM Peak hour), however the AM Peak volume is the busiest southbound volume.

4.3.2 SH16

SH16, between Coatesville-Riverhead Highway and Brigham Creek Road, recorded an average of 22,900 vehicles per day in 2019 based on Waka Kotahi NZTA's traffic count system.

We have obtained traffic counts from Waka Kotahi's Traffic Management System (TMS) for a week, starting Monday 15 August 2022. Waka Kotahi collects traffic volumes on SH16 to the east and west of Coatesville-Riverhead Highway. As such, each of the sites have been assessed, allowing for the constraint at Coatesville-Riverhead Highway to be assessed and accounted for in our assessment.

When viewing the eastbound traffic profile either side of Coatesville-Riverhead Highway, the impact of the existing intersection at Coatesville-Riverhead Highway is evident. The profile of traffic to the west of Coatesville-Riverhead Highway shows the reduction in demand on the approach to Coatesville-Riverhead Highway intersection caused by motorists letting people in and therefore reducing the capacity of SH16 eastbound. Once through the intersection, the profile located to the east of the Coatesville-Riverhead Highway intersection resembles a profile more in keeping with traffic demands along the corridor, as shown in Figure 10 and Figure 11.

Figure 10: SH16 Eastbound traffic flow profile, west of Coatesville-Riverhead Highway

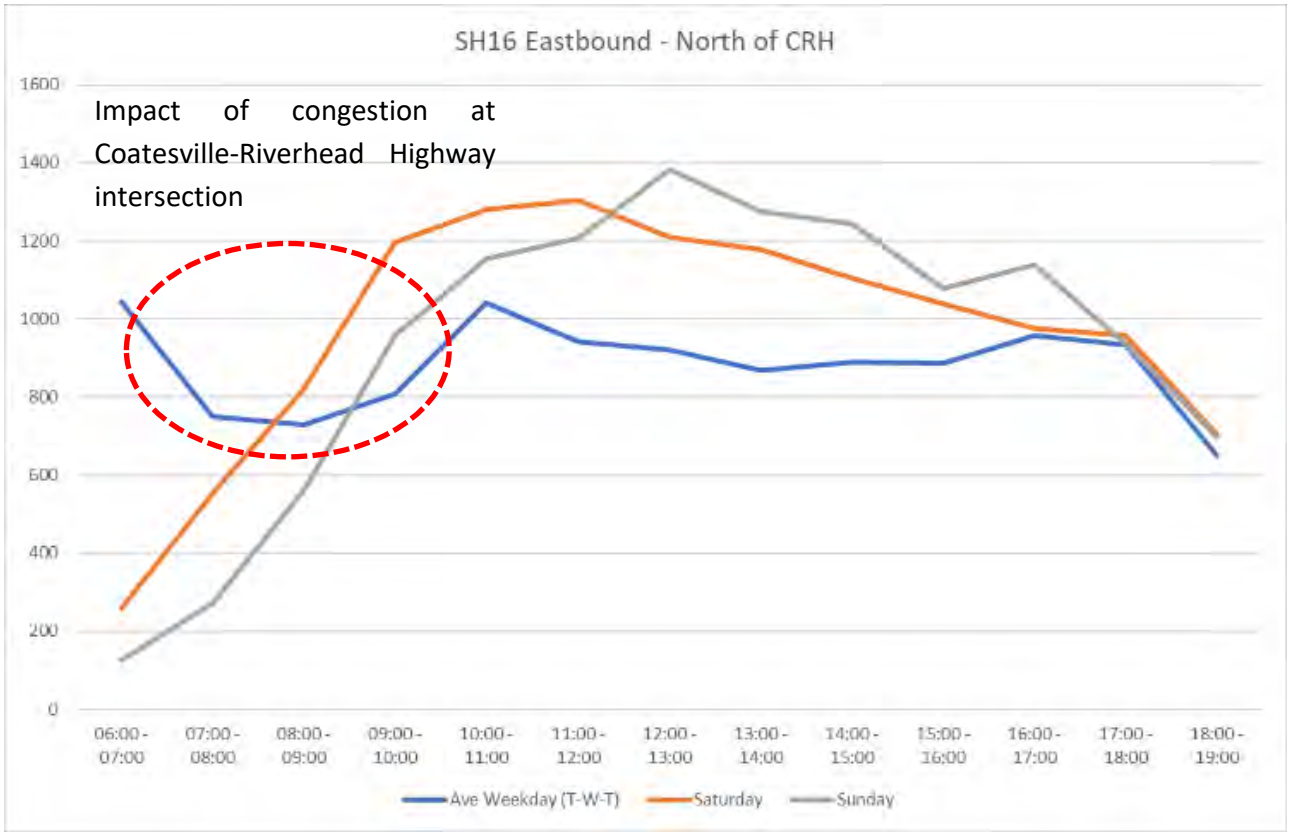
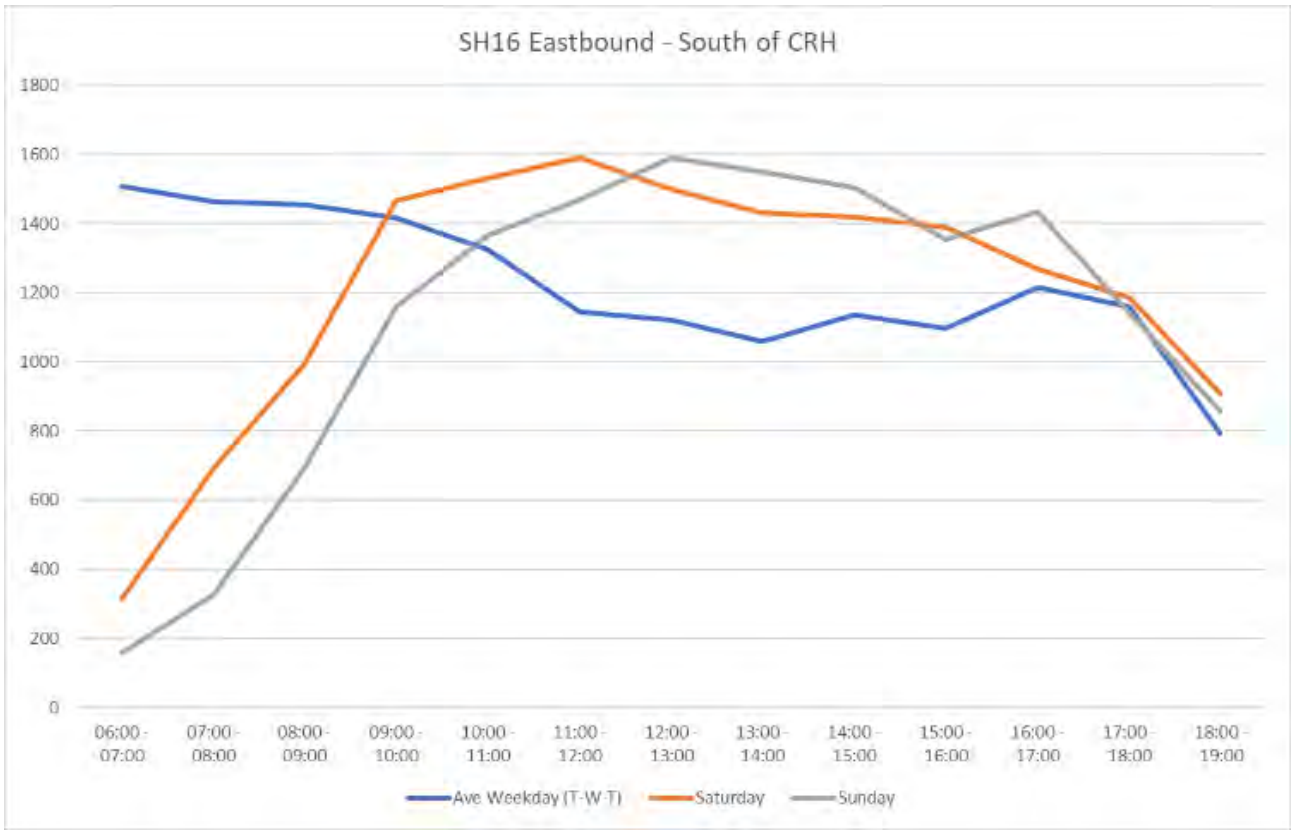


Figure 11: SH16 Eastbound traffic flow profile, east of Coatesville-Riverhead Highway



For the westbound direction, traffic profiles recorded to the west and east of Coatesville-Riverhead Highway are consistent, with the traffic volumes reducing by some 200 vehicles per hour, being the reduction in traffic turning right into Coatesville-Riverhead Highway. Westbound traffic profiles are summarised in Figure 12 (west) and Figure 13 (east), with the westbound traffic demand being 1,600 vehicles per hour.

Figure 12: SH16 Westbound traffic flow profile, west of Coatesville-Riverhead Highway

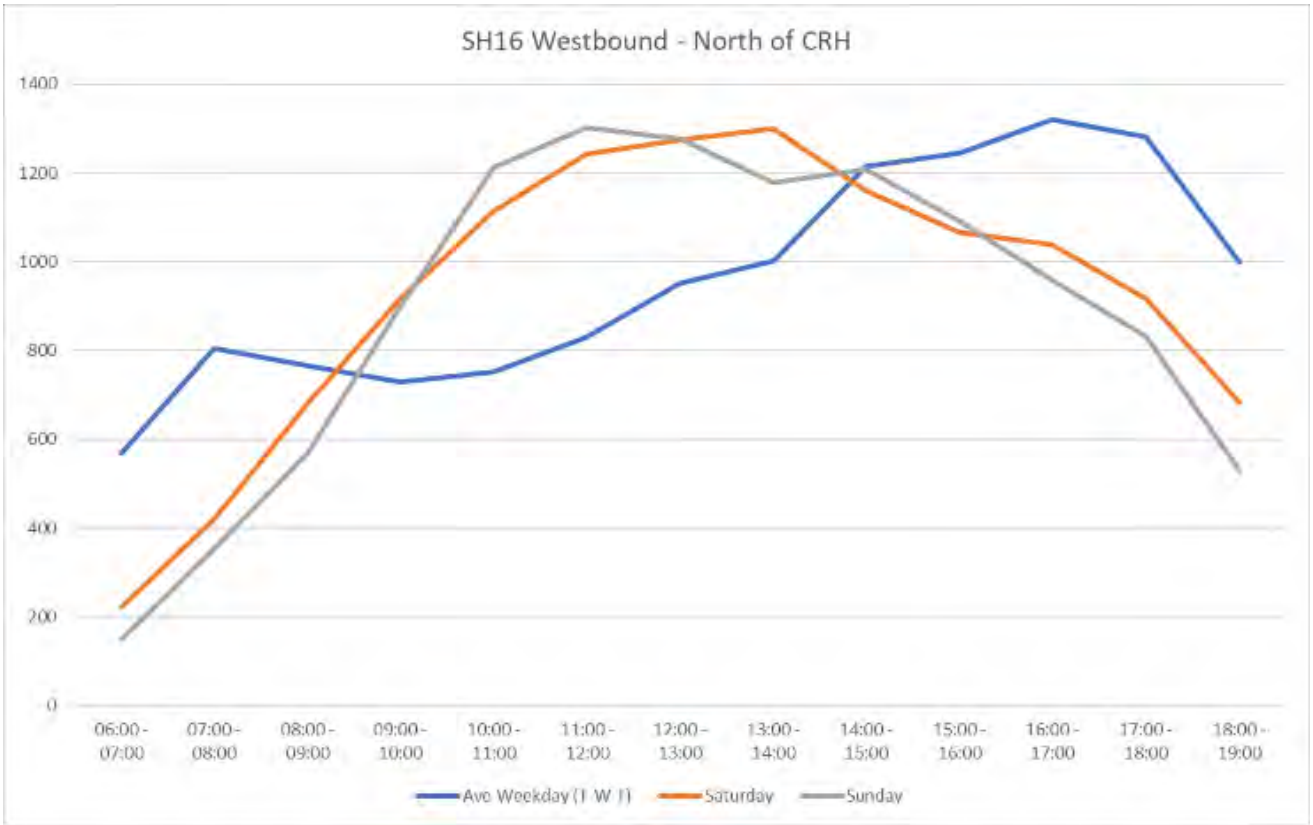
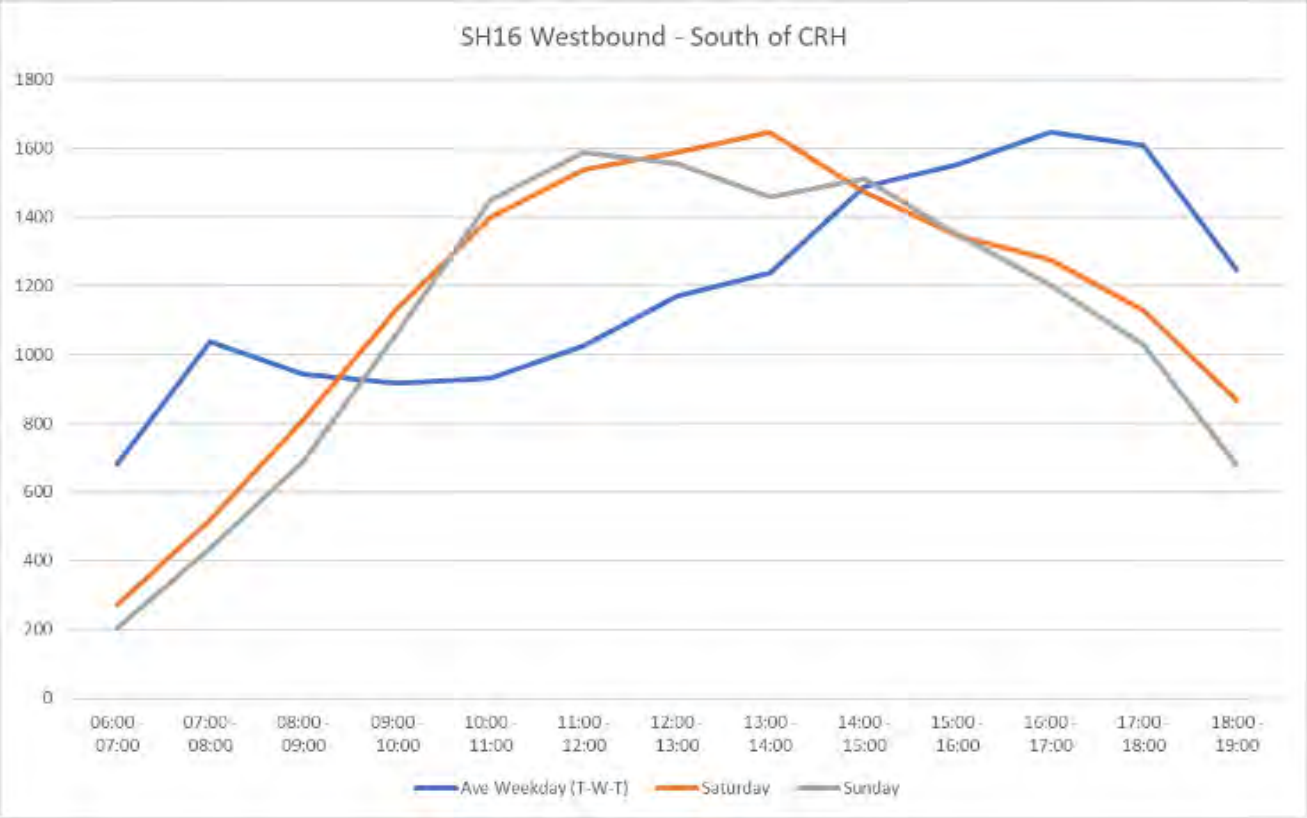


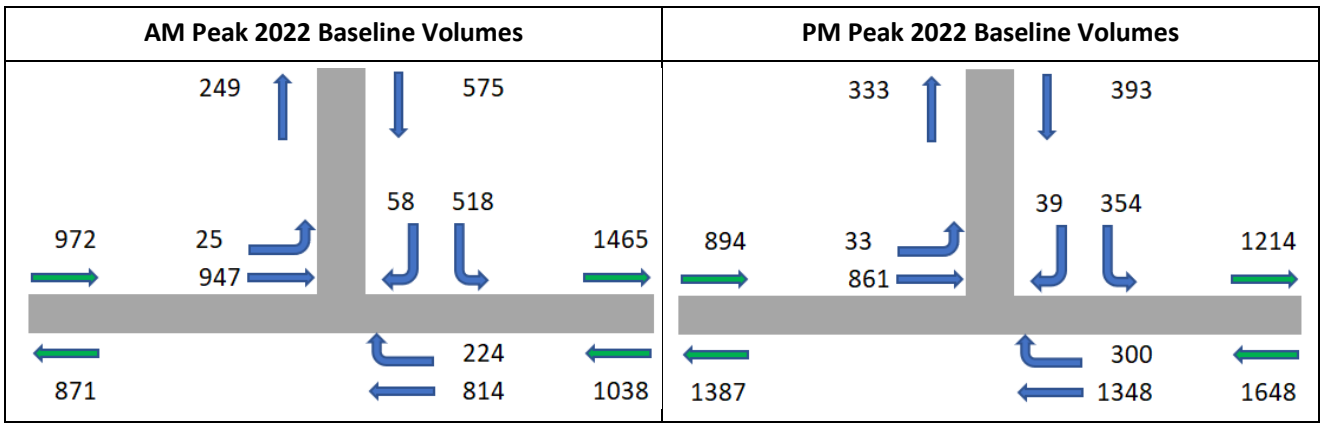
Figure 13: SH16 Westbound traffic flow profile, east of Coatesville-Riverhead Highway



4.4 SH16 / Coatesville-Riverhead Highway intersection

The baseline traffic volumes for the SH16/Coatesville-Riverhead Highway intersection have been based on the above information. While the right turn from Coatesville-Riverhead Highway is currently banned, we have assumed the right turn movement remains open in our analysis, as the upgrade to a roundabout will reintroduce the right turn movement. The 2022 baseline volumes are shown in Figure 14.

Figure 14: 2022 Baseline Traffic Volumes – SH16/Coatesville-Riverhead Highway intersection



4.5 The existing road safety record

4.5.1 Immediate transport network

We have assessed the crash records from 2016 to 2020 (plus all available crashes up to mid/late 2021) for the surrounding roads obtained from the NZTA Crash Analysis System. With Covid restrictions impacting the 5 year sample data, earlier data has been used in this assessment. The search area is shown in Figure 15 and generally includes all the areas within the plan change that could have direct access to the road network.

Figure 15: Crash search history of Riverhead Plan Change Area, 2016 – 2021

A total of 19 crashes were reported, summarised as follows

- There was 1 fatal injury crash, 2 serious injury crashes, 6 minor injury crashes, and 10 non-injury crashes

- The fatal injury crash occurred on Riverhead Road near Deacon Road, where the driver of a car lost control as they travelled around the bend. The car flipped over as it went over a ditch, and collided with a concrete power pole
- 1 of the serious injury crashes occurred when a motorcyclist was travelling on Coatesville-Riverhead Highway and lost control as they drove up onto the grass berm. The driver hit a street pole, and was not wearing a helmet
- The other serious injury crash occurred when a vehicle turning left from Coatesville-Riverhead Highway into Riverhead Point Drive collided with a southbound cyclist
- 2 of the serious injury crashes involved cyclists
- No crashes involved pedestrians
- The most common crash type was loss of control around a bend, which consisted of 7 (37%) of the total 19 crashes
- The next most common crash types were loss of control on a straight section of road and rear-end / obstruction with 4 crashes (21%) each.

The crash history indicates that there are some existing road safety issues within the study area. The rural nature of the roads mean that they have higher vehicle speeds, and below standard facilities for active modes.

The Plan Change provides the opportunity to improve road safety by upgrading these facilities, as Riverhead further urbanises. This can be achieved by intersection and corridor upgrades, and speed limit reductions as are proposed for this Plan Change.

4.5.2 Wider transport network

We have also assessed the crash records from 2016 to 2021 for the wider transport network around Riverhead. The search area is shown in Figure 16, and includes areas to the south of the Plan Change site. This includes Coatesville-Riverhead Highway, Old North Road and Old Railway Road.

Figure 16: Crash search history of wider transport network, 2016 – 2021

A total of 77 crashes were reported, summarised as follows

- There were 0 fatal injury crashes, 12 serious injury crashes, 26 minor injury crashes, and 39 non-injury crashes
- On Old North Road, 4 serious injury crashes were reported. There are also two clusters of crashes on Old North Road at the Old Railway Road intersection and at the horizontal bend 290 m south of this intersection. We note that speed cameras have now been installed on Old North Road, which will bring vehicle speeds down, and therefore reduce crash likelihood and severity
- On Coatesville-Riverhead Highway, 24 crashes were reported. 3 of these crashes were serious injury crashes, although we note that 1 of these is included in the immediate Plan Change area. We assess the intersections along Coatesville-Riverhead Highway and the requirement for right turn bay treatments further below
- 1 of the serious injury crashes involved a cyclist

- No crashes involved pedestrians
- The most common crash type was loss of control around a bend, which consisted of 30 (39%) of the total 19 crashes
- The next most common crash type was crossing / turning crashes, consisting of 28 (37%) of the total 77 crashes.

Like the crash history for the local Riverhead area, the crash history indicates that there are some existing road safety issues within the wider Riverhead network. The rural nature of the roads mean that they have higher vehicle speeds. We have considered these intersections and corridors further in our assessment.

4.5.3 SH16/Coatesville Riverhead Highway Intersection

A key access point to the wider transport network for Riverhead is the SH16/Coatesville Riverhead Highway intersection. This intersection has a poor safety record and presents operational concerns throughout the day. The proposed upgrade to SH16 is discussed further at Section 5.1, with this section summarising the crash history for this site.

While the crash history has been assessed for 2016-2020 (inclusive), we note that there has been a recent change to the intersection layout which includes banning the right turn movement out of Coatesville-Riverhead Highway.

The search area is shown in Figure 17 and extends around 50 m from the approach lanes including the west approach slip lane.

Figure 17: Crash search history of the SH16/Coatesville Riverhead Highway intersection, 2016 – 2020

A total of 17 crashes were reported, summarised as follows

- There was 1 serious injury crash, 5 minor injury crashes, and 11 non-injury crashes
- The serious injury crash occurred in 2016 when a vehicle right turning out of Coatesville-Riverhead Highway collided with a southbound vehicle, 2 non-injury crashes occurred with the same movement
- 1 minor injury crash involved a motorcyclist losing control turning left from Coatesville-Riverhead Highway colliding with a vehicle intending on turning right into Coatesville-Riverhead Highway
- 3 minor injury crashes involved rear end incidents in the lefthand slip lane on Coatesville-Riverhead Highway
- The other minor injury crash involved a driver turning right into Coatesville-Riverhead Highway failing to give way to a motorcyclist although weather conditions were noted as heavy rain
- No crashes involved pedestrians or cyclists
- The most common crash type was rear end crashes, which consisted of 6 (35%) of the total 17 crashes. 1 occurred on SH16 while the other 5 occurred on Coatesville-Riverhead Highway
- The next most common crash types were right turning movements with 3 (18%) crashes.

The improvements being implemented by Waka Kotahi, which is outlined in Section 5.1 will assist in addressing the issues currently experienced at the intersection.

The Precinct Provisions recognise the existing safety issues, with a standard being included that requires the intersection upgrade to be completed prior to development within the Plan Change being occupied. This is to ensure occupied development traffic does not add to an existing problem and that a safe intersection is in place prior to increasing the population of the Riverhead area.

4.6 The Site's transport accessibility

4.6.1 Public transport accessibility

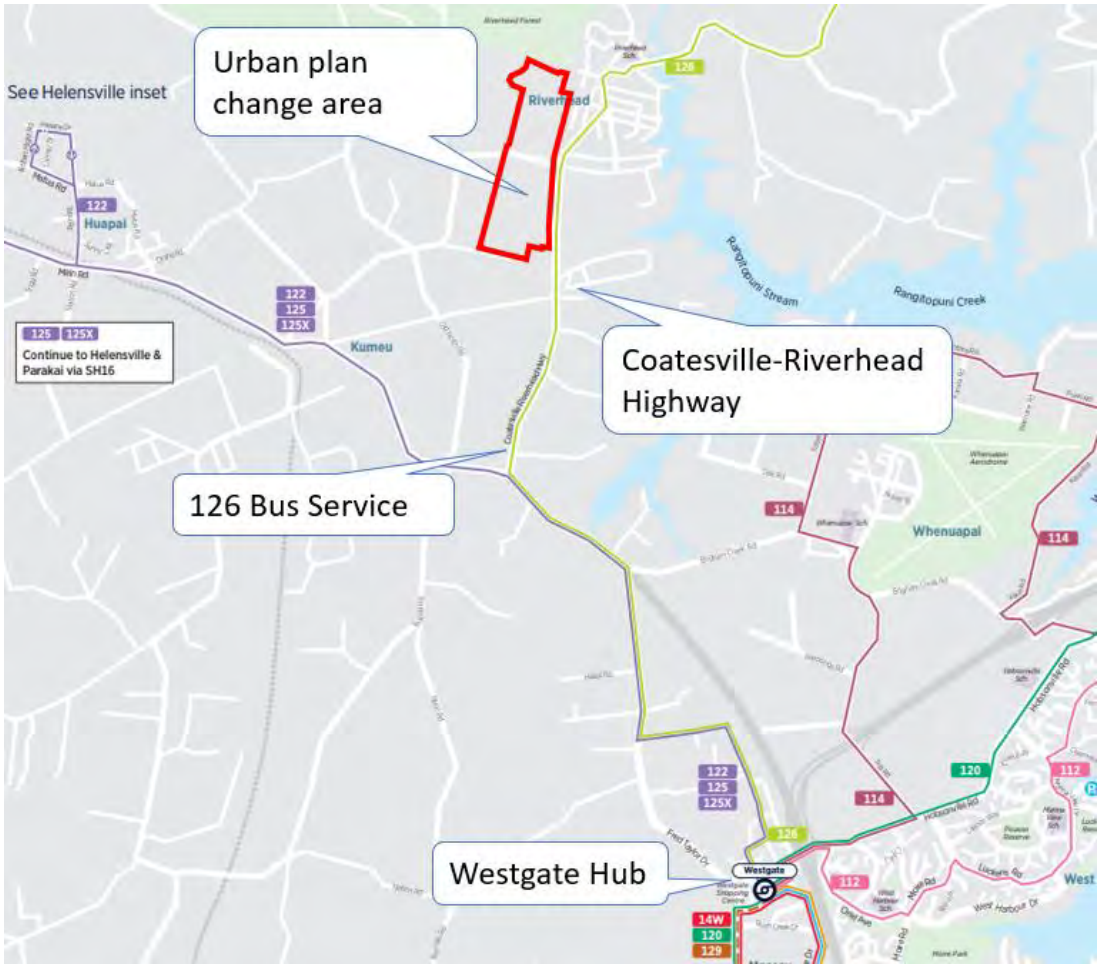
A map of the public transport network about the wider area is shown in Figure 18.

The Site is currently served by the 126 bus service, which connects Albany to Westgate via Riverhead. It typically operates at a frequency of one bus per hour per direction. We understand that Auckland Transport are looking to increase the frequency of this bus service in the future, with the increase in frequency subject to funding.

Based on the timetables, the service typically takes 15 – 20 minutes to travel between Riverhead and Westgate, and 20 – 25 minutes to travel between Riverhead and Albany Station.

This service connects to Westgate, which is a key connection point in the West Auckland public transport network. A number of bus services connect to Westgate, where a person using the 126 service can connect to, providing public transport access to the wider area.

Figure 18: Public transport network in the wider area near the Site



Overall, we consider that the Site will have adequate accessibility to the existing public transport network.

The Plan Change also provides the opportunity to improve public transport facilities, such as bus shelters, near the Site. The Plan Change provides connectivity between the site and Coatesville-Riverhead Highway, ensuring connectivity with existing bus facilities, with the upgrades both internal and external to the Precinct requiring the provision of bus infrastructure.

4.6.2 Walking and cycling accessibility

Given the mostly rural nature of the site, there are currently limited active mode facilities available. We note that

- Within the existing Riverhead village, there are typically footpaths on both sides of the road
- Riverhead Road has no footpaths on either side of the road
- On Coatesville-Riverhead Highway, there is a footpath on the eastern side between Riverhead Road and Short Road
- There are no footpaths about the local road network northeast of the Plan Change area, namely those of Cambridge Road and Queen Street
- There are no dedicated cycling facilities in the local area.

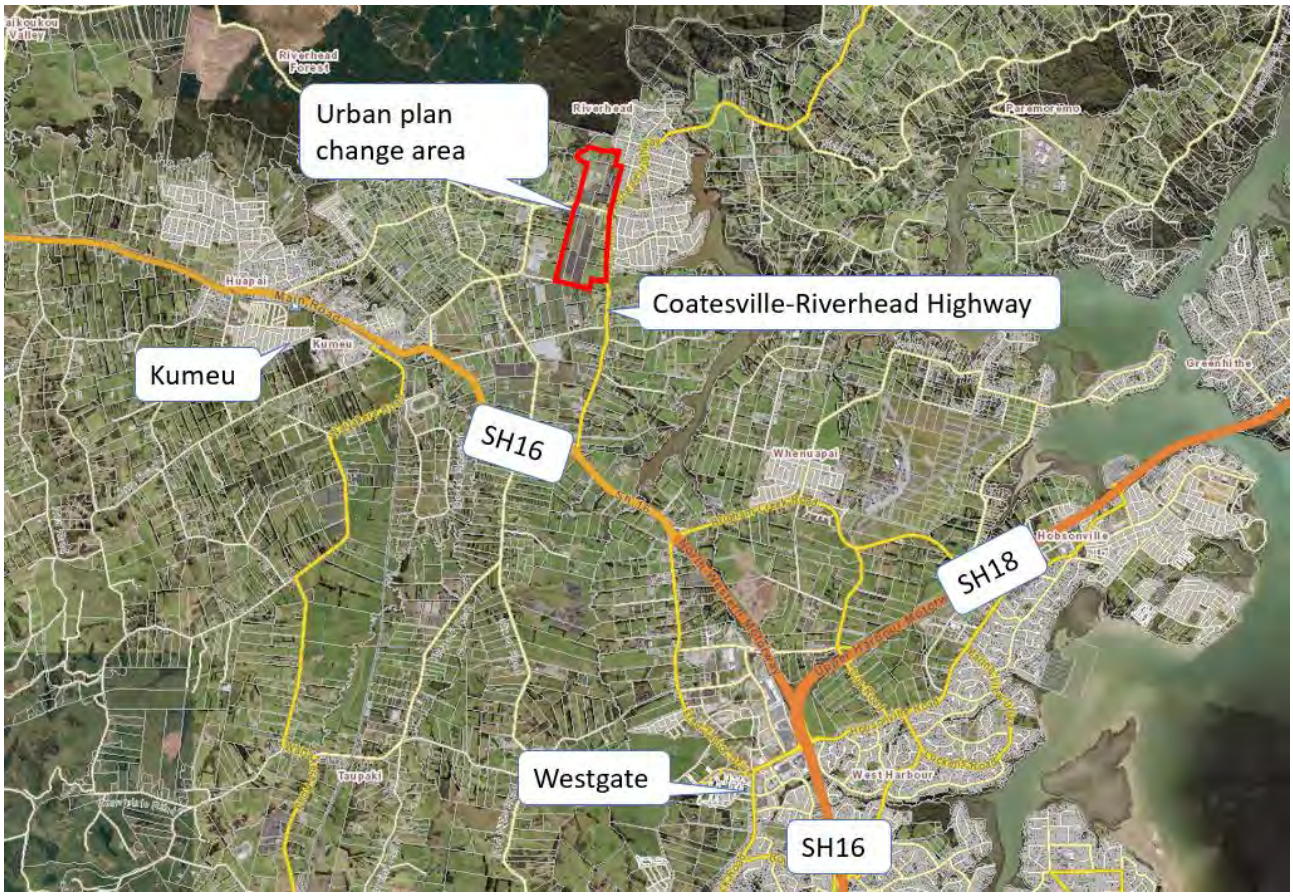
We understand that the Local Board is looking to address the 'gaps' in footpath provision about the surrounding road network to the plan change, with conceptual plans produced. The roads include Cambridge Road, George Street, Duke Street, Princes Street, York Terrace, Alice Street Queen Street, and King Street. We are unsure as to the timing of these upgrades. Importantly however, the Local Board acknowledges the gaps in the existing footpath network which need to be addressed.

4.6.3 Private vehicle accessibility

As shown in Figure 19, the Site is well-located with respect to providing vehicle accessibility to the State Highway network.

- SH16 is located approximately 2 km south of the Site, which can be accessed from the Site via Coatesville-Riverhead Highway, Old North Road or Riverhead Road
- SH16 provides connections to Kumeu to the west, and Westgate to the south
- SH16 connects to SH18 (via Brigham Creek Road or Trig Road) which provides a connection to Albany and the North Shore
- Coatesville-Riverhead Highway and Riverhead Road are arterial roads which provide connections about the local area. Coatesville-Riverhead Highway provides an alternative route to Albany.

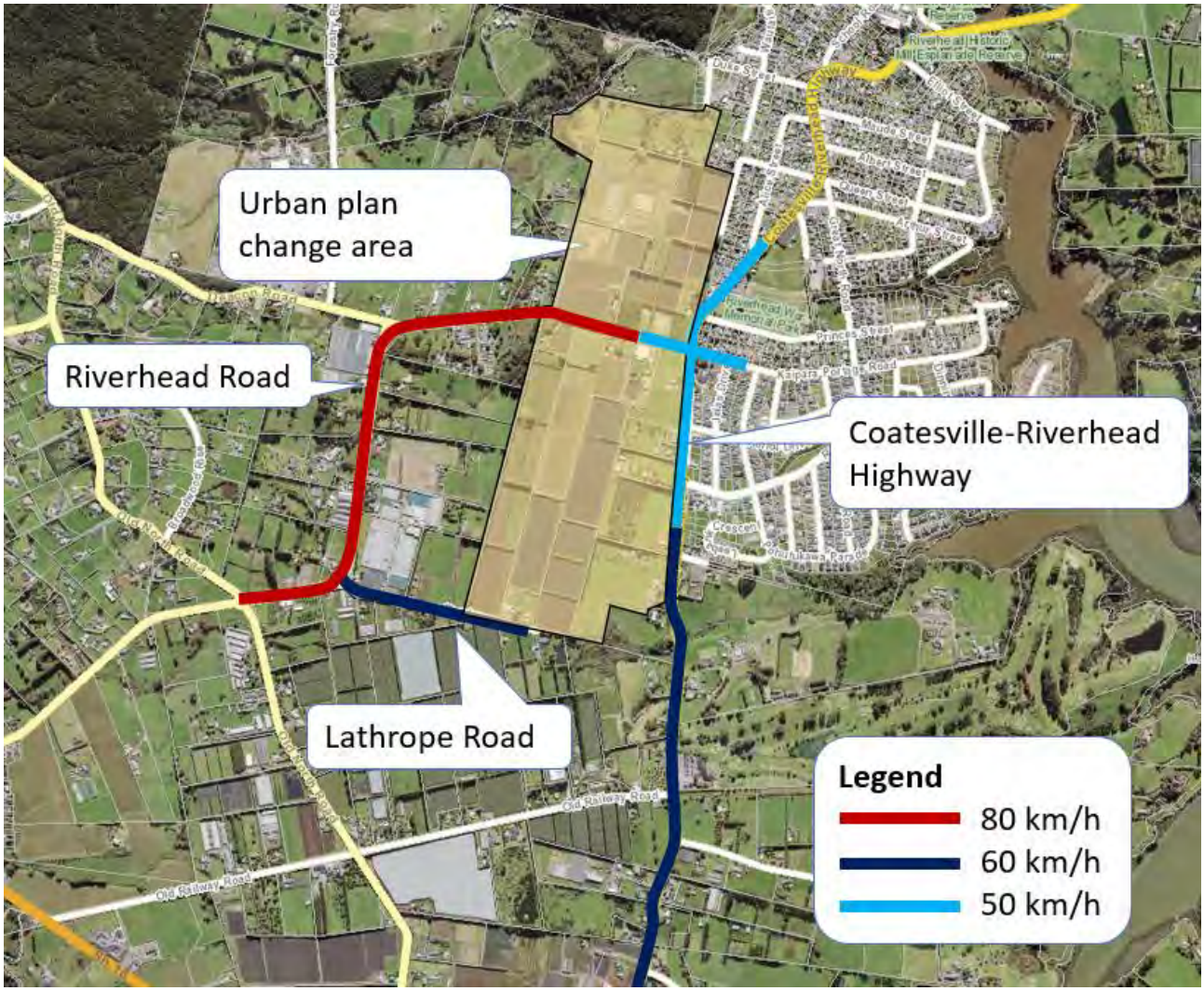
Figure 19: Site location in the strategic transport network



4.7 Existing speed limits

A diagram of the existing speed limits on Riverhead Road, Coatesville-Riverhead Highway and Lathrope Road is shown in Figure 20.

Figure 20: Existing speed limits near the Site



Riverhead Road currently has a posted speed limit of 80 km/h, which reduces to 50 km/h approximately 200 m east of Coatesville-Riverhead Highway. An 80 km/h speed limit requires a design speed environment of 90 km/h.

Coatesville-Riverhead Highway currently has a speed limit of 60 km/h, which reduces to 50 km/h approximately 90 m north of Short Road. This results in a speed environment of approximately 70 km/h and 60 km/h for these two sections respectively.

Lathrope Road has a posted speed limit of 60 km/h. It is an unsealed rural road which provides access to properties. The only connection point to the road network is at Riverhead Road at its west end.

Other roads within the Riverhead village and those that site to the northeast of the Plan Change Site generally have a speed limit of 50 km/h.

5 FUTURE ROAD NETWORK

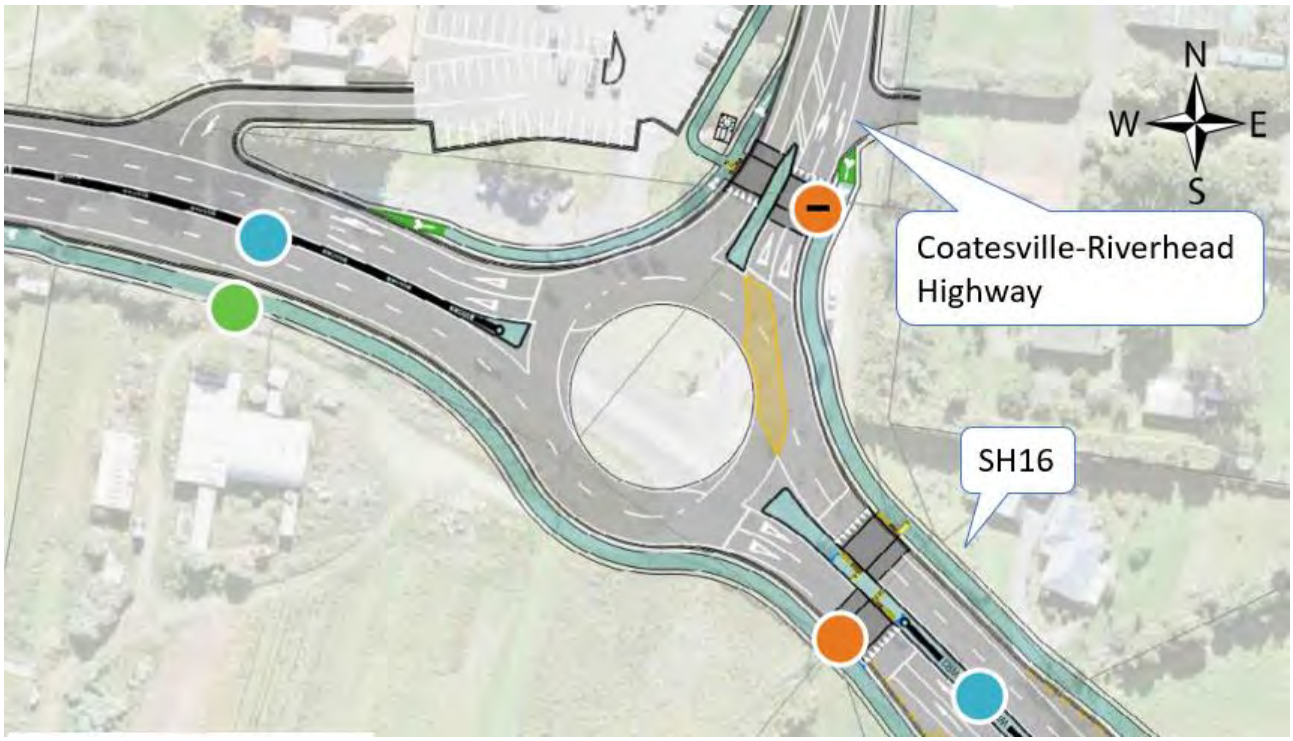
5.1 SH16 Brigham Creek to Waimauku Upgrade

This project, proposed under the Regional Land Transport Plan 2021-2031 (RLTP), will deliver safety and capacity improvements between Waimauku and the end of the North Western Motorway (SH16) at Brigham Creek Road.

The relevant components to the Plan Change include

- Safety improvements, with a new roundabout being located at the Coatesville-Riverhead Highway / SH16 intersection, as shown in Figure 21
- Upgrading the SH16 corridor to four traffic lanes between Brigham Creek Road to the Taupaki Roundabout, therefore removing the bottleneck experienced at the Coatesville-Riverhead Highway intersection citybound during the morning peak, and removing the two to one lane merge west of the SH16 / Brigham Creek Road / Fred Taylor Drive roundabout westbound, which causes congestion during the evening peak
- A shared path from Brigham Creek Road to Kumeu.

Figure 21: SH16/Coatesville-Riverhead Highway Upgrade



These upgrades will improve safety, increase capacity of the road network and alleviate congestion at the SH16/Coatesville-Riverhead Highway intersection, which is the main intersection used to access the state highway network from Riverhead. The planned upgrades along SH16 results in several consecutive roundabouts, being located at the Riverhead Road intersection, Old North Road intersection (existing), Coatesville-Riverhead Highway intersection and the SH16/Brigham Creek Road/Fred Taylor Drive intersection. As per the Waka Kotahi website, the upgrade provides a consistent intersection design,

provides priority to the right and is influenced by incoming traffic, but can also be signalised to adjust priority during peak traffic flows[8].

As shown in the intersection layout in Figure 21, the design of the Coatesville-Riverhead Highway approach contains two southbound lanes on the approach to SH16. This consists of a dedicated left turning lane and a shared left/right turning lane from Coatesville-Riverhead Highway onto SH16, which will increase vehicle capacity from Riverhead.

The 2021 RLTP has this project having 'Priority 1 – Committed and Essential Funding' set out for 2021 to 2025 financial years. The RLTP includes some $137.4 Million for this Waka Kotahi project.

As of late 2022, the detailed design has been completed and the resource consent has been lodged. The Notice of Requirement for Stage Two (Brigham Creek to Kumeu) has now been lodged with Auckland Council.

As this project provides critical safety and capacity upgrades to the external transport network, this upgrade is included within the proposed Precinct Provision as part of the Plan Change. As outlined in Section 8, any development within the Plan Change area undertaken prior to this upgrade would be a Restricted Discretionary Activity. This would ensure effects of any occupied development are appropriate assessed. This recognises the importance of ensuring a safe transport network exists prior to significantly increasing traffic demand about the Riverhead area. We also note that Waka Kotahi has recently implemented a right turn ban at the SH16/Coatesville-Riverhead Highway intersection which again improves safety at the intersection until such time as the roundabout is constructed.

5.2 SH16 Northwest Bus Improvements

This project, also proposed under the RLTP, will deliver infrastructure to allow a new Northwest Express bus service to operate along SH16, connecting Northwest Auckland with the central city. This project has also been classed as Priority 1 – Committed and Essential under the RLTP.

Interim bus interchange facilities are being delivered at Westgate, Lincoln Road and Te Atatu, with improved bus shoulder lanes along the North Western Motorway. A long-term rapid transit solution for the Northwest corridor is expected to follow in the future.

This facility will offer benefits for Riverhead in terms of transport choice and alleviated congestion citybound.

[8] https://www.nzta.govt.nz/assets/projects/sh16-brigham-creek-and-waimauku/SH16-Brigham-Creek-to-Waimauku-Coatesville-1-web.pdf

https://www.nzta.govt.nz/assets/projects/sh16-brigham-creek-and-waimauku/SH16-BC2W-walking-and-biking.pdf

5.3 Te Tupu Ngātahi Supporting Growth Programme

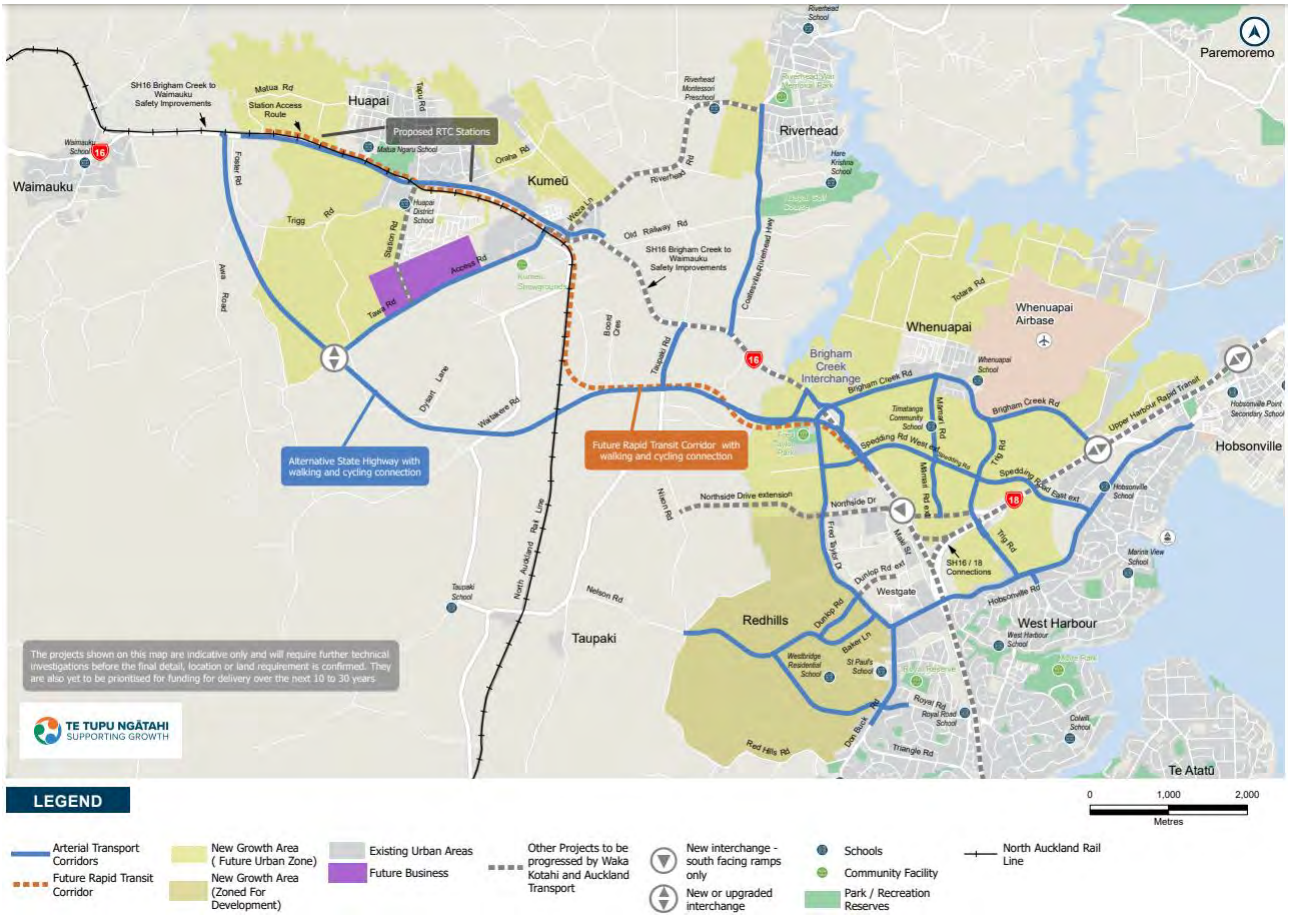
Road improvements as part of the Te Tupu Ngātahi Supporting Growth Programme are identified for Coatesville-Riverhead Highway (between SH16 and Riverhead Road). Safety improvements are also included on Coatesville-Riverhead Highway north of the Riverhead township.

The current designation process (with the designation lodged, notified and hearings underway in September/October 2023) focusses on Coatesville-Riverhead Highway, which includes the frontage of the Site. There are no dates as to when the Coatesville-Riverhead Highway upgrade will occur or what detailed design of the upgrade will consist of, with the current focus being to secure route protection by designation. The designation being sought for Coatesville-Riverhead Highway includes a 20 year lapse period. There is no funding currently allocated for construction.

As noted above, the role of Te Tupu Ngātahi Supporting Growth Programme is to secure the designations that enable the anticipated upgrades (from rural to urban) to occur at a future date. The role is not to construct the upgrades, with this being subject to future processes including funding availability. This Plan Change however presents an opportunity for key components to be delivered by developers, as a means of mitigating effects and ensuring a safe and efficient transport network exists when development comes online. As set out in the Implementation Plan, the developers propose to construct the roading upgrades fronting the Plan Change Site, transitioning the rural environment to urban and providing the infrastructure for future upgrades anticipated along Coatesville-Riverhead Highway to tie into.

A map of the indicative strategic transport network for Northwest Auckland identified by Te Tupu Ngātahi Supporting Growth Programme to support growth in this area is shown in Figure 22.

Figure 22: Supporting Growth Indicative Strategic Transport Network for Northwest Auckland[10]



6 PROPOSED ROAD NETWORK

6.1 Design philosophy

To assist with the design and development of the Plan Change, we have used several guiding documents and guidelines to form the overall design philosophy of the road network. This includes Auckland Transport's Roads and Streets Framework (RASF) and Transport Design Manual (TDM), and the Vision Zero principles.

6.1.1 Vision Zero

Vision Zero is an ethics-based transport safety approach. Developed by Sweden in the late 1990s, responsibility for safety is placed on people who design and operate the transport system. The goal is to provide a safe system which accommodates human beings. It acknowledges that people in the transport system make mistakes, and people are vulnerable to high-impact forces in a crash. The Vision Zero system looks at the whole system to ensure everything works together to protect road users from forces that can cause traumatic injury.

[10] http://www.supportinggrowth.govt.nz/assets/supporting-growth/docs/Northwest-Auckland/North-West-Auckland-Strategic-Connections-Map.pdf

Vision Zero for Tāmaki-Makaurau Auckland is a transport safety vision that states that there will be no deaths or serious injuries on our transport system by 2050[11].

As transport system designers and operators, reducing the likelihood and severity of serious injury crashes from occurring aligns with the goals of Vision Zero. Measures to align with Vision Zero include speed limit reductions, as road users are much less likely to sustain serious injuries at lower speeds. It also encourages designs and intersections which minimise crash likelihood and severity, such as using roundabouts at intersections which reduce the likelihood of head-on crashes.

The proposed Plan Change provides the opportunity to make Riverhead a safer place for all road users by adopting Vision Zero principles. The roading and intersection upgrades proposed achieve this outcome external to the development, with the layout and functions of roads internal to the development presenting safe outcomes for all road users.

6.1.2 Roads and Streets Framework

The RASF is an Auckland Transport strategic planning tool used to guide the future planning and development of Auckland's roads, streets and places. It is used to inform any development design of a road or street and reflects the needs and catchment of the adjoining land use as well as the movement of people, goods and services[12].

The RASF provides an approach for thinking about the movement and place functions of a road and identifies their level of significance in the context of the whole Auckland region. It is used as the first step in a process to identify the issues that must be addressed by a project.

As the Plan Change will provide a new internal road network and upgrade existing road corridors, the RASF is a useful tool to inform the requirements and typology for each road.

We note that the traffic on the internal local roads is expected to be very low, with those living and working in the area predominantly being the only people using the roads. That is, there would be a very low throughput of external traffic. As such, designing for low speed environments, with a focus on place, movement by active modes and safety is a key outcome achieved through the proposed planning provisions.

6.1.3 Transport Design Manual

Auckland Transport's Transport Design Manual (TDM) is a set of guides, codes and specifications that are specifically created for the Auckland region based on international best practice and robust common engineering theory[13].

The TDM has three sections, design principles, engineering standards and specifications. Together, these sections allow end user outcomes, engineering design and construction requirements to be clearly identified and designed.

[11] https://at.govt.nz/projects-roadworks/vision-zero-for-the-greater-good/
[12] https://at.govt.nz/about-us/transport-plans-strategies/roads-and-streets-framework/
[13] https://at.govt.nz/about-us/manuals-guidelines/transport-design-manual/

For the Riverhead Plan Change, the TDM can be used alongside the RASF to provide safe and appropriate transport infrastructure. We have designed our proposed upgrades for the Plan Change in accordance with the TDM, noting that future Resource Consents and Engineering Plan Approval applications will assess the TDM requirements in more detail.

6.2 Proposed speed limits

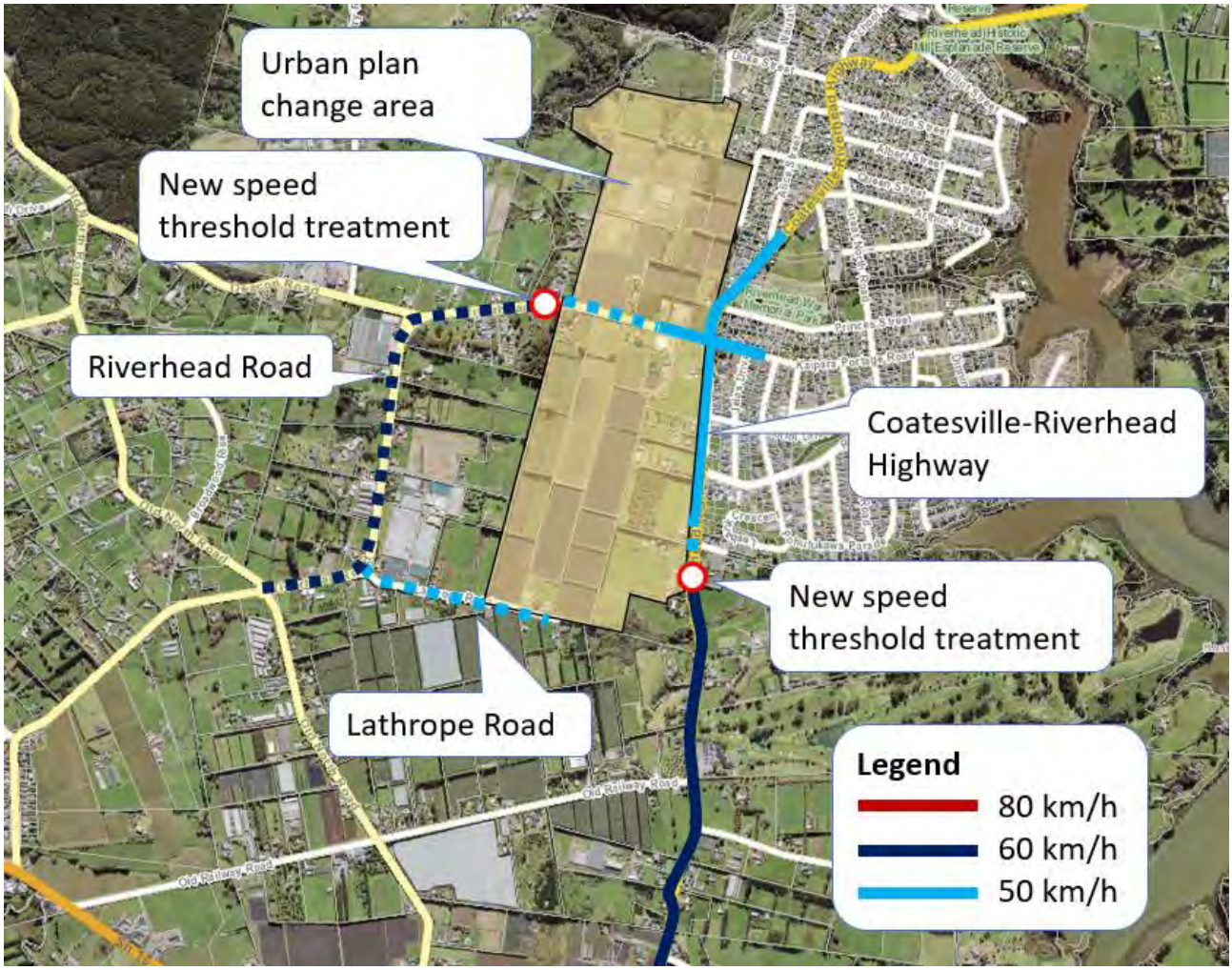
To support the Plan Change, we are proposing a series of speed limit reductions on sections of Riverhead Road, Coatesville-Riverhead Highway, and Lathrope Road. These changes will improve road safety for all users by reducing the likelihood and severity of crashes. They will also allow new intersections and private property access to be constructed in a safer manner.

A diagram of our proposed speed limits is shown in Figure 23. The existing speed limits are outlined in Section 4.7.

We note that each of the roads external to the Site play either an arterial function or a collector function. For the roads fronting the plan change area, while posted speed limits will be 50km/h, treatments will be used to slow vehicles and ensure a safe environment exists for all road users. Roads internal to the plan change area will have a focus on reducing speeds further, with treatments bringing speeds down to 30km/h, using measures consistent with the TDM. These measures will be addressed through future Engineering Plan Approval processes.

We also note that there is a formal bylaw process which Auckland Transport would need to undertake at the appropriate time to change existing external speed limits. This is a common exercise, with a number of speed change about the Region planned over the coming years. The change proposed in this assessment can be captured in future bylaws that align with the roading upgrades.

Figure 23: Proposed speed limits near the Site



The key changes are (shown in dashed lines above)

- Riverhead Road – moving the existing speed threshold treatment west by approximately 300 – 350 m, and reducing the posted speed limit fronting what will be an urban area to 50 km/h. The rural section west of this speed threshold treatment is proposed to be reduced from 80 km/h to 60 km/h.
- Coatesville-Riverhead Highway – moving the existing speed threshold treatment south by approximately 160 – 200 m and reducing the posted speed limit to 50 km/h
- Lathrope Road – lowering the speed limit from 60 km/h to 50 km/h.

These changes are intended to lower vehicle speeds when entering the expanded Riverhead urban area. This will provide safer vehicle speeds for all road users, including pedestrians and cyclists.

The speed limit changes will be accompanied by changes to the road reserve to ensure the road environment is safe and appropriate to the new speed limits.

Internal roads will be designed to a 30 km/h speed limit, which is in accordance with Vision Zero principles of creating survivable speeds for road users.

For Lathrope Road, the intent is to retain the current rural look and feel. While it will be sealed (as outlined later in Section 6.6), a possible outcome would be for the road to include edge beams, with swales and a footpath on the northern side. While taking this form, and based on its length, we consider that a 50 km/h speed is appropriate. This would provide a transition from Riverhead Road (which would be 60 km/h) and the local roads once turning into the Plan Change area, which will be designed to a 30 km/h speed limit.

The gateway treatments are intended to be physical measures. The design of the gateway treatments will take into consideration the transition from a rural to an urban road environment. The treatments will also consider the character of Riverhead as a smaller village with some rural characteristics. While we note that the design of the gateway treatments will be addressed at a subsequent detailed design stage, we anticipate they could include the following measures

- Kerb buildouts to narrow the carriageway width and lower vehicle speeds
- Trees or planting in the kerb buildouts to match Riverheads character
- A different coloured surface treatment of the carriageway, indicating that drivers should slow down
- Signage, displaying the speed limit and 'Riverhead' to ensure advance visibility to drivers.

In summary, the proposed speed limit reductions will improve safety for all existing and future road users in Riverhead. The reduction in speed will reduce the likelihood and severity of serious and fatal injury crashes, in accordance with Vision Zero.

6.3 Overview of the road network

A concept showing the proposed road network within the Site is included in Figure 24. We note

- The Site's proximity to Riverhead Road and Coatesville-Riverhead Highway as arterial roads
- New access points onto the arterial roads are limited through a few new collector roads, which will provide internal access to the wider Site.
- The intersections of the arterial roads and collector roads have been selected to ensure safe sight distances can be provided. The intersections will typically be roundabouts
- Walking and cycling facilities will be provided as part of the proposed road network.

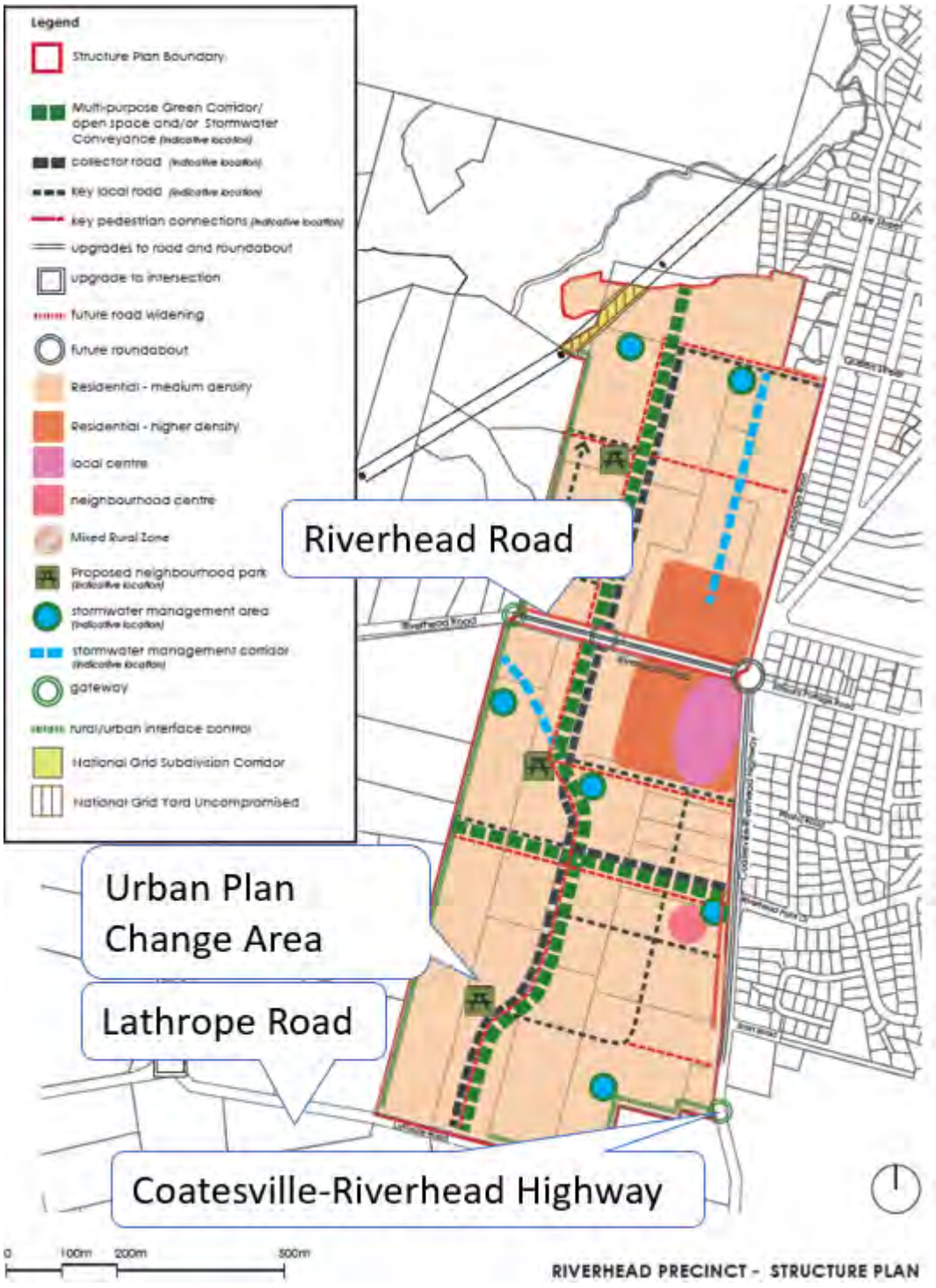
The road network has been designed in accordance with the RASF by providing appropriate road typologies to accommodate their place and movement function within the future Riverhead road network

- Riverhead Road and Coatesville-Riverhead Highway provide higher movement functions, catering for public transport services and general traffic. They also provide the opportunity to provide new walking and cycling connections, as being investigated by Supporting Growth
- The new local and connector roads will generally facilitate trips within the Plan Change area and will have lower place and movement functions due to the smaller catchment of users. There will be some activities within the Site such as the potential school and local centre (containing a supermarket), which would result in a higher place function

- The internal road network has not been designed in detail at the Plan Change level, but the proposal aligns with the guidelines of the RASF and ensures both movement and place are accommodated in Riverhead.

We note that only key local roads are shown. Further local roads will be provided at subsequent detailed design stages, but we consider these are not necessary for the purposes of the Precinct Plan.

Figure 24: Site's proposed road network



6.4 Riverhead Road

The proposed cross-section for Riverhead Road is shown in Figure 25.

The road reserve will be widened from 20 m to 24 m to accommodate the following facilities

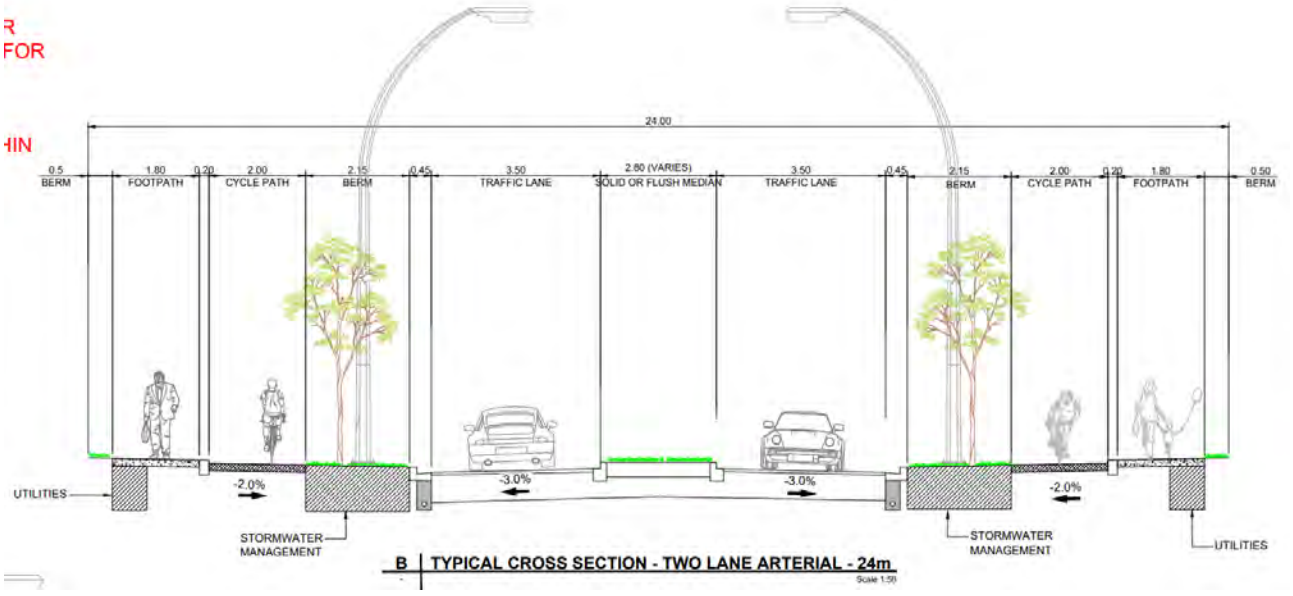
- One traffic lane in each direction, separated by a central median
- Front berms and back berms
- Dedicated 1.8 m footpaths and 2 m cycle paths, both separated from traffic lanes by the front berm.

These facilities will provide significant improvements for active mode accessibility. The upgrade will be applied from the Coatesville-Riverhead Highway roundabout, extending west to the new proposed roundabout on Riverhead Road. West of the new roundabout, the urban road upgrade will include a transition back to a rural environment through a new threshold treatment.

Riverhead Road provides for both local and regional movement as an arterial road. It needs to accommodate vehicle and freight movement, but also provides the opportunity to provide new and safe facilities for active modes. The proposed cross-section caters for these modes.

We understand that there is no expectation for buses to operate along Riverhead Road fronting the development site.

Figure 25: Riverhead Road cross-section



6.5 Coatesville-Riverhead Highway

The proposed upgrades on Coatesville-Riverhead Highway will generally be similar in principle to the upgrades described above for Riverhead Road. Both roads are arterial roads and need to cater for regional freight movements but also local walking and cycling trips in Riverhead. Coatesville-Riverhead Highway also needs to accommodate public transport movements.

Due to the existing layout of Coatesville-Riverhead Highway, a consistent cross-section along the corridor cannot be applied. This is largely due to Grove Way, which acts as a local frontage road to provide access to residential properties.

The layout for Coatesville-Riverhead Highway differs for the northern section (between Riverhead Road and Riverhead Point Drive) and the southern section (between Riverhead Point Drive and Small Road). Each section provides for active mode facilities according to that being investigated by Te Tupu Ngātahi Supporting Growth. We discuss each below.

Northern section (between Riverhead Road and Riverhead Point Road)

Our proposed layout for Coatesville-Riverhead Highway considers the existing layout of Grove Way. On the west side, separated pedestrian footpaths and cycle lanes can be provided, like on Riverhead Road. On the east side of Coatesville-Riverhead Highway, separated footpaths and cycle lanes can be provided through Grove Way. As Grove Way already contains a footpath, the existing grass berm would effectively be substituted with a cycle path.

Wider front berms (2.8m) on the west side can be provided due to the additional width that Grove Way allows. This provides the opportunity to plant more trees and landscaping along the corridor.

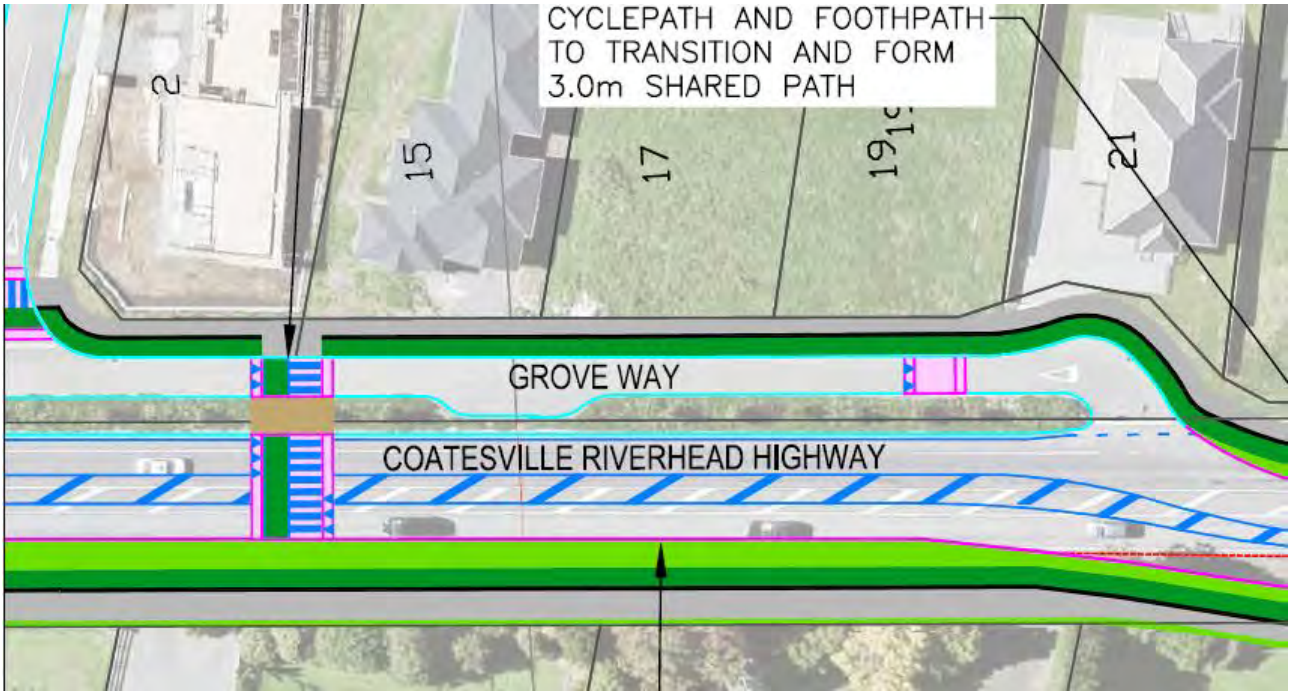
This section of Coatesville-Riverhead Highway may accommodate an access point into the local centre. This detail is not confirmed yet at the Plan Change stage and can be designed in the future to ensure that any access point is safe for all road users.

A raised table zebra crossing for pedestrians and cyclists will be provided south of Pitoitoi Drive. This will provide a new mid-block crossing point for active modes. This will improve accessibility in the area, as the current crossing points are located approximately 230 m north at Riverhead Road and 140 m south at Riverhead Point Drive. It will also provide a more direct connection for residents from Pitoitoi Road into the proposed local centre area. The crossing is located on a straight section of Coatesville-Riverhead Highway, which will allow safe sight distances to be provided for pedestrians.

Figure 26 shows a sample of the Coatesville-Riverhead Highway layout near Grove Way.

We consider that the upgrades will provide significant improvements for pedestrians and cyclists and make efficient use of the existing road corridor width. Providing separated facilities for active modes aligns with the goals of vision zero by isolating vulnerable road users from vehicle movements. As highlighted in the sample upgrade design, the upgrades can be accommodated within the existing road reserve, with localised widening required about key intersections only.

Figure 26: Coatesville-Riverhead Highway proposed upgrade



Southern section (between Riverhead Point Road and Short Road)

We understand that Te Tupu Ngātahi Supporting Growth propose a shared path along Coatesville-Riverhead Highway between SH16 (to the south) and Riverhead. We have therefore incorporated this element into the design, with the tie in point about Short Road. We note that Te Tupu Ngātahi Supporting Growth is classifying this as a shared path as a placeholder to protect land for the facilities via designation. The 4.0 m width allows for separated facilities to be provided in the future (1.8 m footpath + 2.0 m cycle lane + 0.2 m kerb) which would be addressed through detailed design. The width provides flexibility to provide these facilities in the future.

Separated pedestrian and cycle facilities on both sides will be provided up to Short Road. A raised zebra crossing for active modes will be provided north of Short Road to allow pedestrians and cyclists to cross safely. As shown in Appendix C, Crossing Sight Distance can be provided for pedestrians. Due to the vertical geometry on Coatesville-Riverhead Highway, a speed environment of 30 km/h will need to be achieved for this crossing. This could be achieved through the design of the threshold treatment and by raising the zebra crossing. These features can be developed further in the detailed design stage,

Figure 27 and Figure 28 show samples of the Coatesville-Riverhead Highway, south of Riverhead Point Drive. Minor localised widening is required on the western boundary of Coatesville-Riverhead Highway about the new intersections and to tie into the shared path proposed by Te Tupu Ngātahi Supporting Growth.

We consider that the upgrades will provide significant improvements for pedestrians and cyclists and makes efficient use of the existing road corridor width.

Figure 27: Coatesville-Riverhead Highway - proposed upgrade south of Riverhead Point Road, 1 of 2

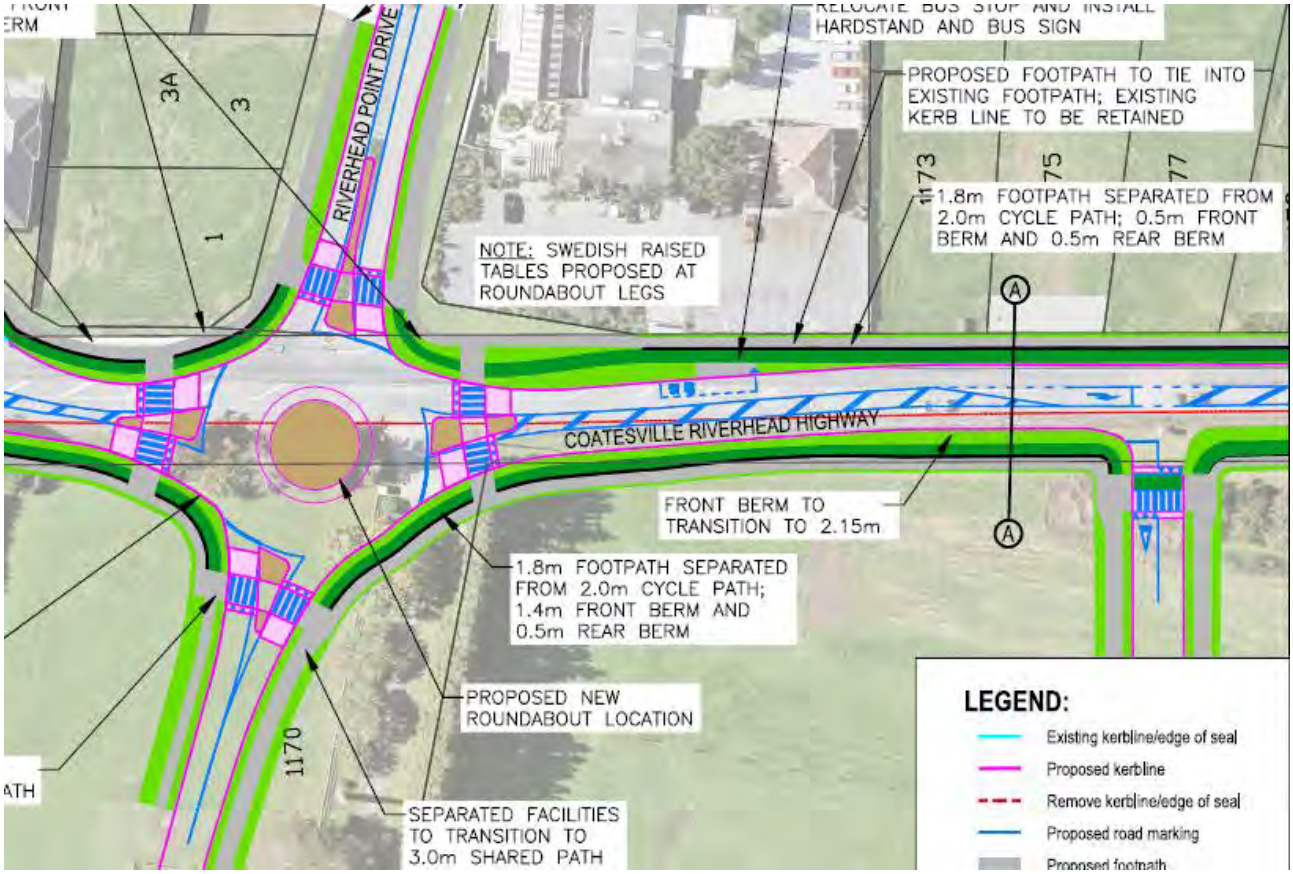
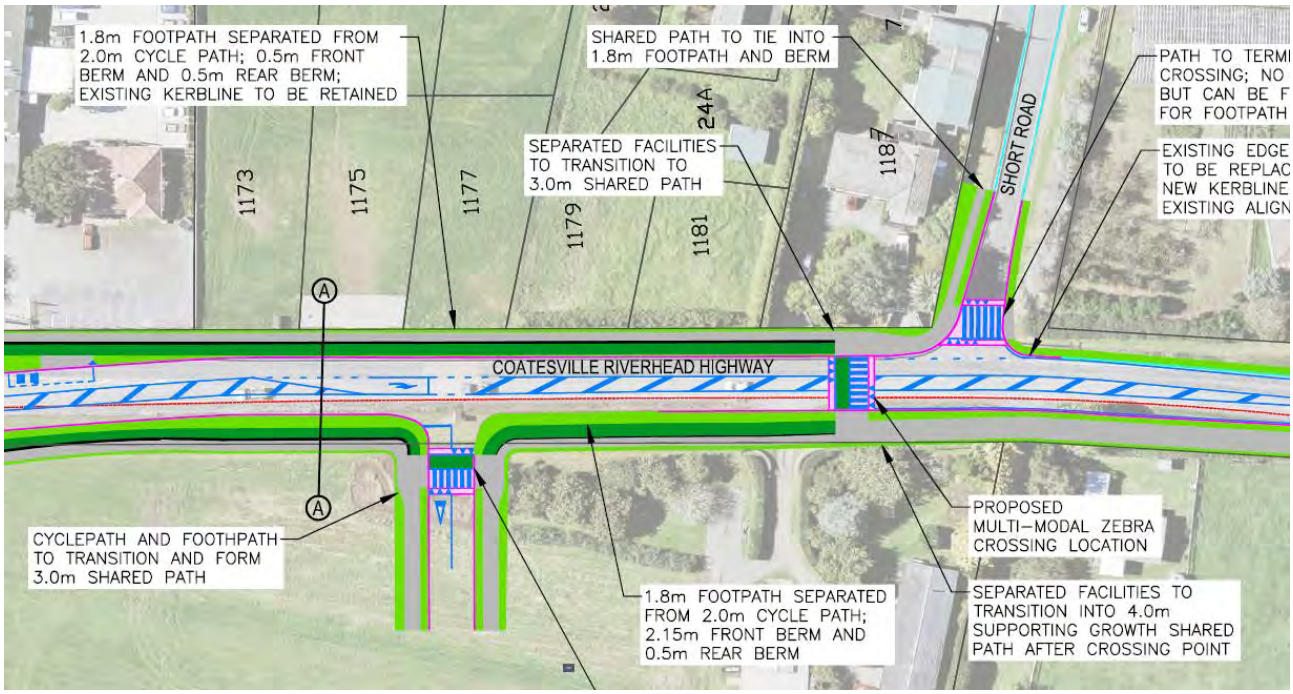


Figure 28: Coatesville-Riverhead Highway - proposed upgrade south of Riverhead Point Road, 2 of 2



Based on information from Auckland Transport, we understand that Coatesville-Riverhead Highway is planned to be an over-dimension route in the future. This can be addressed at the detailed design stage, when designing elements such as the roundabouts. We note that our vehicle tracking currently accommodates a 19.45 m semi-trailer truck.

With buses operating along Coatesville-Riverhead Highway, the existing bus stops will need to be retained or altered slightly to work in with the upgrade proposed. These details can be assessed at detailed design, with the Precinct Provisions highlighting the need to provide for bus infrastructure.

North of Riverhead Road

Outside of the northern and southern sections, a new pedestrian crossing facility will be provided. As outlined in the Precinct Provisions, an additional crossing will be required between Edward Street and Princes Street. The exact location of the crossing will be confirmed at a later consenting stage.

6.6 Lathrope Road

Lathrope Road is an unsealed road. To support the Plan Change, we propose to upgrade Lathrope Road by providing a sealed carriageway, allowing one traffic lane in each direction. This will allow vehicles to use Lathrope Road as a viable access point to reach the wider road network.

There are currently no footpaths provided on Lathrope Road. We propose that the northern side of Lathrope Road will contain a footpath to provide some pedestrian facilities, noting that all of the adjacent properties on Lathrope Road are zoned rural, and there are no activities to connect to. The proposed footpath provides some future proofing of the road for new activities.

As outlined in Section 6.2, we propose that Lathrope Road will have a speed limit reduction from 60 km/h to 50 km/h. The intent is to retain the current rural look and feel. Lathrope Road will effectively provide a transition from Riverhead Road (which would be 60 km/h) and the local roads once turning into the Plan Change area (designed to a 30 km/h).

Auckland Transport have indicated Lathrope Road to be part of a future bus route. The Precinct Provisions acknowledge this and require bus provision to be considered during the design phase of the upgrade. This is specified in the road function and design elements table for external roads, included as Appendix 2 of the Precinct Provisions.

Figure 29: Proposed Lathrope Road layout

6.7 Cambridge Road and Queen Street

Cambridge Road runs alongside the eastern boundary of the site to the north of Riverhead Road. Currently rural in nature, Cambridge Road will be upgraded fronting the Site to ensure it is safe and in keeping with the anticipated development that will be located alongside.

Along the development frontage, Cambridge Road (south of Queen Street) will be upgraded to an urban standard, including

- a 6 m wide carriageway
- vehicle crossings to access activities that front Cambridge Road
- a pedestrian footpath along the development frontage, up to Queen Street.

While the detail of the upgrade can be worked through at detailed design and Engineering Plan Approval, upgrading Cambridge Road similar to that provided along the recently upgraded sections of Duke Street is considered appropriate given the challenging environment presented on the eastern side of Cambridge Road, where the berm sits higher than the road level and rises towards the north.

With Cambridge Road being upgraded and a new pedestrian facility being included on the western side (between Queen Street and Riverhead Road), a pedestrian path is also proposed on the northern side of Queen Street (between Coatesville-Riverhead Highway and Cambridge Road) on the existing grass

berm, connecting the development site to the existing Riverhead area, as well as existing bus stops, War Memorial Park and playground, the existing village and the new local centre.

As mentioned earlier, we understand that the Local Board is looking to address the 'gaps' in footpath provision about the surrounding road network to the plan change, with includes the above road sections. The provisions require the developer to deliver the upgrades discussed above, which in turn reduces the extent of the works the Local Board plans to undertake.

6.8 New internal local roads and collector roads

Internal roads will have road reserve widths ranging between 18 m (local) to 25 m (collector without adjacent open space reserve). The Precinct Provisions include a road function and design elements table (Appendix 1) that sets the key outcomes of each road type internal to the development. We note that the detailed layout for each road will be subject to future resource consent stages, with the Precinct table providing guidance to the outcomes sought.

6.8.1 Local roads

Local roads will be designed to achieve a speed limit of 30 km/h, providing a safe environment for all road users. Local roads will accommodate front and back berms, footpaths and two-way vehicle movement. The front berms can be used for landscaping and street furniture.

With a design speed of 30km/h, there is no requirement for dedicated cycle facilities to be provided on these roads. The Precinct Plan does however indicate routes where key pedestrian and cycling routes pass through the Precinct where safe facilities will be provided.

We note that the local road volumes will generally be very low, with most local roads for this development serving residential traffic only. The potential school would be the only high traffic generator around the new residential development.

The local road and collector road layout is designed in a way that will mean there is limited through traffic internal to the development. Riverhead Road and Coatesville-Riverhead Highway will carry out this function. This will keep the internal local road traffic volumes low, providing a safer environment for all road users. With regard to the local centre, this is located on the periphery of the development, and therefore traffic will generally remain on the outer of the residential streets.

6.8.2 Collector roads

The collector roads will provide separated walking and cycle facilities which connect to the proposed facilities on Riverhead Road and Coatesville-Riverhead Highway.

The design speed is 40km/h and could include two traffic lanes, separated cycle lanes and footpaths on both sides, front berms for street trees, street furniture and optional indented parking bays.

The Precinct Provisions also require bus facilities to be considered during subsequent design phases.

While the proposed collector roads will generally carry low volumes compared to other collector roads in Auckland, they have been designated collector roads for the purposes of ensuring Precinct Plan provisions can be made.

6.9 Intersection designs

The following major intersections are proposed to either be upgraded or constructed to support the Plan Change

- Coatesville-Riverhead Highway / Riverhead Road – upgrade existing roundabout
- Coatesville-Riverhead Highway / Riverhead Point Drive – upgrade to roundabout with fourth leg
- Coatesville-Riverhead Highway / Site access – provide new priority control intersection between Riverhead Point Drive and Short Road
- Riverhead Road / Site access (330 m west of Coatesville-Riverhead Highway) – new intersection with new north and south approach roads
- Riverhead Road / Lathrope Road – update existing priority control intersection.

All of these intersections will involve at least one arterial road. We have considered what the intersection upgrades will possibly include and are designed to accommodate 17.9 m semi-trailer trucks.

Apart from Riverhead Road / Lathrope Road intersection, all intersection upgrades will provide new and separated facilities for pedestrians and cyclists. Swedish table crossing points will be provided on each approach leg of the roundabouts to allow pedestrians and cyclists to safely cross. The permitter of the roundabouts allow the option for either separated pedestrian and cycle lanes, or shared paths. The desired outcome can be addressed during detailed design and Engineering Plan Approval.

The Coatesville-Riverhead Highway / Site access intersection between Riverhead Point Drive and Short Road is proposed to be a priority-controlled intersection. It will cater for a small number of trips within the Site, with the intersection at Riverhead Point Drive being designed as the primary collector road into the site. This intersection will contain a raised table across the Site approach leg to prioritise pedestrians and cyclists that will use the shared path on Coatesville-Riverhead Highway.

Riverhead Road / Lathrope Road is proposed to be upgraded to a priority-controlled intersection based on a lower speed environment discussed earlier. The two existing access points into Lathrope Road will be consolidated into one point, which will provide drivers with improved visibility of Riverhead Road. A right turn bay and median will also be provided on Riverhead Road to facilitate vehicle turning movements. This will allow Lathrope Road to safely accommodate the level of traffic anticipated to use this as an external access point. The current intersection layout is unsuitable for higher volumes of traffic and does not enable safe levels of visibility. The proposed design provides sufficient visibility for vehicles on Riverhead Road, Lathrope Road and the right turn bay given the proposed speed limit changes.

Detailed design and assessments such as road safety audits can be undertaken at future stages.

At the Plan Change level, the intersection designs show that all transport modes can be accommodated within the proposed road reserve boundaries. Localised intersection widening is required, however the

designs have assumed all localised road widening to occur within the current road reserve or within land that sits within the Plan Change boundary.

6.10 Coatesville-Riverhead Highway right turn bay treatments

We have reviewed the requirements for intersection upgrades to include right-turn bays at the Riverland Road intersection and the Old Railway Road intersections on Coatesville-Riverhead Highway.

We have outlined, in the technical note attached as Appendix D, the guidelines and criteria we use to determine the requirement for right-turn bays at intersections as well as indicated if the intersection upgrades are required now according to the current volumes using the intersection (that is, prior to any development within Riverhead), at the 60% development phase and at the 100% development phase.

We reviewed the crashes involving traffic turning right or left, as well as the traffic flows and volumes for these scenarios against Austroads warrants and find the following

- At the Riverland Road intersection, the warrant indicates there is some demand for a channelised turn treatment in the existing scenario however the crash record indicates the current demand for it is low
- At the Old Railway Road intersection, the warrant indicates that the demand for a channelised turn treatment is high in the existing scenario
- In both the 60% development scenario and the 100% development scenario, the predicted increase in traffic flows indicate a high demand for channelised turn treatments at both intersections
- The increase in traffic using Coatesville-Riverhead Highway may also lead to an increase in delays experienced by turning vehicles and therefore an increase in risk to vehicles turning into the side roads.

Therefore, to achieve safe outcomes for each intersection, right-turn bays are recommended for the Old Railway Road intersection pre-development but for the Riverland Road intersection, right-turn bays may be provided at the 60% development scenario.

We note that for the Old Railway Road intersection, Auckland Transport were planning to upgrade this intersection based on the existing conditions. We understand that the associated safety programme has been put on hold due to funding constraints. However, this intersection still requires upgrading due to existing conditions.

Concept plans of the right turn bays are provided in Appendix C.

7 DESCRIPTION AND ASSESSMENT OF THE PROPOSAL

7.1 Access assessment of the proposal

7.1.1 Vehicle access

The road network will provide several new roads and intersections to support the Plan Change. This will provide suitable access for Site users. The roads will also allow existing residents to access the new activities, such as the proposed local centre and education facilities.

The upgrade of Lathrope Road provides a viable access point to travel towards SH16 to the south via Old North Road and Riverhead Road. This will relieve pressure on Coatesville-Riverhead Highway and Riverhead Road as the primary access routes.

7.1.2 Visibility

All intersections and accesses have been designed to achieve the Safe Intersection Sight Distance (SISD) in Austroads. This is based on the revised operating speed limit on the roads recommended earlier within this report. In addition to providing safety benefits, the proposed reduction in speed limits provides more flexibility to safely locate intersections.

The main constraints for visibility are

- On Riverhead Road, the horizontal and vertical curvature 450 m west of the existing Coatesville-Riverhead Highway roundabout
- On Coatesville-Riverhead Highway, the main constraint is the horizontal and vertical curvature south of Short Road.

The proposed intersections comply with the visibility standards, assuming that the speed limits can be reduced to a safe and more appropriate level. We note that the speed limits will need to be amended through the bylaw at the appropriate time.

7.1.3 Vehicle access restrictions

Coatesville-Riverhead Highway and Riverhead Road are classified as arterial roads in the Unitary Plan. This means that vehicle access restrictions will apply, which would trigger restricted discretionary activity criteria for any private vehicle access on these roads.

The Plan Change is not proposing direct vehicle accesses onto the arterial roads. Instead, they will be subject to future resource consents.

The proposed road network is designed to minimise the need for any direct access onto arterial roads, and will instead funnel traffic through new local and collector roads. We note that no specific provisions to restrict access onto collector roads is proposed or considered necessary, given they will be low volume in the context of other collector roads in Auckland.

7.1.4 Pedestrian and cycle access

The following facilities will be provided for pedestrians and cyclists

- Corridor and intersection upgrades on Coatesville-Riverhead Highway and Riverhead Road, providing separated footpaths and cycle lanes and new mid-block crossing facilities (See Section 6.4 and 6.5)
- Footpaths on both sides of all local roads and collector roads. The collector roads will have separated cycle lanes
- Upgraded footpaths on Queen Street and Cambridge Street.

The internal road network will be designed to have low vehicle speeds, to provide safe environments for all users.

These will ensure that both current and future residents will have a range of safe and viable transport choices for travel within Riverhead. The separated facilities align with Vision Zero by minimising conflict points with vehicles.

7.1.5 Public transport access

As outlined in Section 4.6.1, Riverhead is served by one bus route which connects to Albany and Westgate. There are several bus stops on Coatesville-Riverhead Highway along the eastern boundary of the Site.

The Plan Change will support public transport by providing safe and convenient pedestrian connections to the bus stops. Upgrades to public transport shelters can be provided as part of the proposed corridor upgrades on Coatesville-Riverhead Highway, with these being worked through at detailed design. The Precinct Provisions will enable public transport facilities to be provided on Coatesville-Riverhead Highway, Riverhead Road, Lathrope Road and the new internal collector roads.

The increased catchment of residents enabled by the plan change will also support public transport by increasing demand for services, which could result in services becoming more frequent in the future, if additional funding becomes available.

7.2 Trip generation and distribution of the Proposal

7.2.1 Trip generation rates

The following weekday peak hour vehicle trip rates are applicable to this Proposal.

Residential dwellings

The RTA "Guide to Traffic Generating Developments" (RTA Guide) contains trip generation rates for residential dwellings.

- Dwelling houses – 0.85 trips per dwelling
- Medium density residential flat building, larger units or townhouses – 0.5 to 0.65 trips per dwelling.

We have adopted the following rates for the Plan Change, assuming 100% buildout in the long term (by 2038). We note that the calculations are based on a slightly higher residential yield of 1,560 dwellings

which reflects an earlier calculation. As such, the traffic modelling analysis provides a conservative assessment of the predicted effects.

- Lower density dwellings – 0.75 trips per dwelling
- Medium / high density dwellings – 0.60 trips per dwelling.

The trip rates we have adopted are similar to the RTA Guide rates. For the lower density rates, we have used a slightly lower rate of 0.75 trips per dwelling.

- This is because residents in Riverhead will likely travel outside of the peak hours more, given congestion on the wider network.
- It is important to note in responding to this request that the development of Riverhead is going to occur over a number of years (10 years or so)
- We also highlight that our underlying assumptions have retained today's (2022) volumes as background traffic. With the Plan Change introducing employment, including a local centre that offers the opportunity for a major retail offering, such as a supermarket, there is a strong likelihood that an element of existing traffic (which currently leaves Riverhead) will now remain in Riverhead to undertake their daily needs.

We acknowledge that trip rates may be higher in the short term to medium account for the availability of non-private vehicle transport modes. As a result, we have adopted the following trip rates for the residential activities as a sensitivity test

- Lower density dwellings – 0.95 trips per dwelling
- Medium / high density dwellings – 0.70 trips per dwelling.

School

We have adopted the following rates for the potential school. For the purpose of this assessment, we have assumed it will be a primary school

- AM peak – 0.65 trips per student
- PM peak – 0.15 trips per student.

The PM peak rate is lower than the AM rate, as the PM school peak hour occurs at a different time compared to the network PM peak.

Childcare centre

We have adopted rates of 1 trip per child during the peak periods for the childcare centre. The RTA Guide provides trip rates ranging from 0.5 – 1.4 trips per child, so we have adopted the upper mid-range of 1 trip per child.

Supermarket

For the proposed supermarket activity, we have adopted a rate of 11.6 trips per 100 m^2. This is based on the RTA Guide peak hour rate for supermarkets on a Thursday evening and converting from GLFA to

GFA. We note that in reality the AM rate would likely be lower, but we have used this rate conservatively for both peak periods.

Retail

The RTA Guide provides weekday supporting retail trip rates of 5.6 trips per 100 m^2 for weekdays. We have adopted this trip rate for both peak periods, as the proposed retail activities will primarily be small local shops, which will support existing and proposed land uses such as the proposed supermarket.

Offices

We have adopted a trip rate of 2 trips per 100 m^2 for office activities, based on the RTA Guide rates.

Retirement village and aged care facilities

For all of the retirement village and aged care facilities, we have adopted rates of 0.2 trips per unit for both peak hours. This is based on the upper range of the RTA Guide rate of 0.1 – 0.2 trips per unit for housing for aged and disabled persons.

Café

For the café activities, we have adopted a rate of 7.6 trips per 100 m^2. This is based on average trip rates from the NZ Trips Database for the PM peak period.

Medical centre

For the medical centre, we have assumed a flat rate trip assumption of 30 vehicles per hour for both peak hour periods. We note that the medical centre is relatively small and will primarily support the retirement village and aged care facility activities.

Neighbourhood centre

While the neighbourhood centre will consist of approximately 300 m^2 GFA, we have not included it in our modelling assessment. We note that the neighbourhood centre will predominantly serve the local area through convenience retail and services and is not expected to generate external vehicle trips. Given the walking and cycling upgrades that will be provided, many trips to the neighbourhood centre can be taken without a vehicle. Those that are vehicle related, will most likely be pass-by trips.

7.2.2 Trip generation volumes

The anticipated trip generation of the development is shown in Table 2. This shows the total raw number of trips, without any internalisation factors considered.

Table 2: Weekday peak hour trip generation (unfactored)

Activity	Size	Trip rate		Trip generation (vph)	
		AM	PM	AM	PM
Residential – lower dwelling houses	440 units	0.75 / dwelling	0.75 / dwelling	330	330
Residential – medium / higher density	910 units	0.60 / dwelling	0.60 / dwelling	545	545
Primary school	1,100 students	0.65 / student	0.15 / student	715	165
Childcare centre	100 children	1 / child	1 / child	100	100
Supermarket	4,000 m^2	11.6 / 100 m^2	11.6 / 100 m^2	465	465
Retail	650 m^2	5.6 / 100 m^2	5.6 / 100 m^2	35	35
Offices	1,000 m^2	2 / 100 m^2	2 / 100 m^2	20	20
Retirement village	518 units	0.2 / unit	0.2 / unit	105	105
Aged care facility	90 beds	0.2 / unit	0.2 / unit	20	20
Café	600 m^2	7.6 / 100 m^2	7.6 / 100 m^2	45	45
Medical Centre	250 m^2	30 trips	30 trips	30	30
Total				**2,410**	**1,860**

In reality, the number of trips generated external to the Plan Change Site will be lower, due to the following factors

- Internal trips within Riverhead – some trips can be completed internally within Riverhead, which will not generate any traffic on the wider road network. These are trips which can be completed locally due to a range of activities being provided
- Pass-by trips – these are trips where a person stops by at a destination on their way to another destination, meaning the trip is not a new trip added onto the network
- Multi-purpose trips – these are trips where a person can visit multiple destinations in one trip, for example a local centre. This will reduce the number of new trips on the network as one trip can replace several.

Table 3 shows the factors we have adopted for each activity.

Table 3: Peak hour trip generation factors

Activity	Internal trips within Riverhead (%)	Pass-by trips (%)	Multi-purpose trips (%)
Residential – dwelling houses	20%	0%	0%
Residential – medium / higher density	20%	0%	0%
Primary school	80%	0%	0%
Childcare centre	80%	0%	0%
Supermarket	90%	40%	10%
Retail	70%	35%	10%
Offices	20%	0%	0%
Retirement village	20%	0%	0%
Aged care facility	20%	0%	0%
Café	70%	40%	10%
Medical Centre	50%	0%	0%

Multi-purpose factors have only been applied to trips generated by retail type activities within the plan change area, including supermarket, retail and café.

Reference has been made to the ITE Trip Generation Handbook to source typical pass-by trip rates for these uses, with

- Table 5.6 (Land Use 820 – Shopping Centre) having an overall average pass-by rate of 34%. The supporting graph and statistics at Figure 5.5 suggest the smaller the centre, the higher the pass-by percentage
- Table 5.10 (Land Use 850 – Supermarkets) having an overall average pass-by rate of 35%, with the range sitting between 20% and 55%.

While Table 3 provides rates for pass-by trips, our modelling provided no additional volume reductions for pass-by trips for simplicity. This means that the modelling is conservative, as including pass-by trips would result in a reduction in through trips. We have used rates of 35% to 40% for the retail elements of the plan change, noting also that the vast majority of users will be from within Riverhead which doesn't currently have a major supermarket.

Multi-purpose factors have only been applied to trips generated by retail type activities within the plan change area, including supermarket, retail and café. Table 3 of the ITE Journal, dated January 2011 sets out internal capture rates for various land use pairs. We have adopted a 10% value, again only being attributed to the retail component of the plan change, with the ITE noting the following multi-purpose rates

- To Retail, From Residential 10%
- To Retail, From Office 8%

With regard to internal capture percentages, we have assumed percentages based on our judgement. We note that the internal capture percentage still generates traffic that is assigned to the local network, but the traffic is predicted to remain in Riverhead, whether that is for recreation, school pickup and drop off, childcare, shopping, visiting friends etc. External trips are assumed to leave Riverhead and use the wider transport network.

For the purpose of our modelling assessment, we have ignored pass-by trips, noting that these will be only from the supermarket, retail and café activities internal to Riverhead.

Table 4 and Table 5 shows the trip generation volumes, updated with these factors. This shows

- New trips, which accounts for the reduction of multi-purpose trips
- New external trips, which is new trips with that will be generated externally outside of Riverhead. These trips will have an effect on the wider road network.

For the purpose of our modelling assessment, we have ignored pass-by trips, noting that these will be only from the supermarket, retail and café activities internal to Riverhead.

Table 4: Factored peak hour trip generation, AM peak

Activity	Multi-purpose trips	New trips (unfactored minus multi-purpose)	New external trips (new trips reduced by internal trip proportion)
Residential – dwelling houses	0	330	265
Residential – medium density	0	545	435
Primary school	0	715	145
Childcare centre	0	100	20
Supermarket	45	410	40
Retail	5	30	10
Offices	0	20	15
Retirement village	0	105	85
Aged care facility	0	20	15
Café	5	40	10
Medical Centre	0	30	15
Total	**55**	**2,355**	**1,055**

Table 5: Factored peak hour trip generation, PM peak

Activity	Multi-purpose trips	New trips (unfactored minus multi-purpose)	New external trips (new trips reduced by internal trip proportion)
Residential – dwelling houses	0	330	265
Residential – medium density	0	545	435
Primary school	0	165	35
Childcare centre	0	100	20
Supermarket	45	465	40
Retail	5	35	10
Offices	0	20	15
Retirement village	0	105	85
Aged care facility	0	20	15
Café	5	45	10
Medical Centre	0	30	15
Total	**55**	**1,860**	**945**

These factors show that there will be a reasonable reduction of external trips generated by the Plan Change. The number of new external trips is noticeably lower compared to the unfactored trip volumes, which demonstrates that trips can be undertaken locally with the range of proposed activities.

7.2.3 Trip distribution

Appendix A show the trip distribution about the immediate roading network for the AM and PM peak hours. The diagrams show the total volumes of traffic with the Plan Change implemented, for the 2038 year. The volumes in brackets show the anticipated increase due to the trip generation of the Plan Change. While we have undertaken a spreadsheet assessment to distribute traffic, the distributions have been informed by the Northwest SATURN traffic model.

The trips have been grouped and distributed into four quadrants. The quadrants are

- North East – which essentially covers the proposed retirement village and Matvin land holdings
- North West – which is residential development, which is predominantly made up by Neil Group land holdings
- Southern commercial – being the commercial elements that are located south of Riverhead Road
- Southern residential – being the residential development located to the south of Riverhead Road which is predominantly made up by Fletcher land holdings.

External trips to the wider area beyond the immediate Riverhead catchment are based on 'new external trips' in Table 4 and Table 5. For the purposes of our modelling assessment, we have ignored pass-by trips, noting that these will only be from the supermarket, retail and café activities internal to Riverhead.

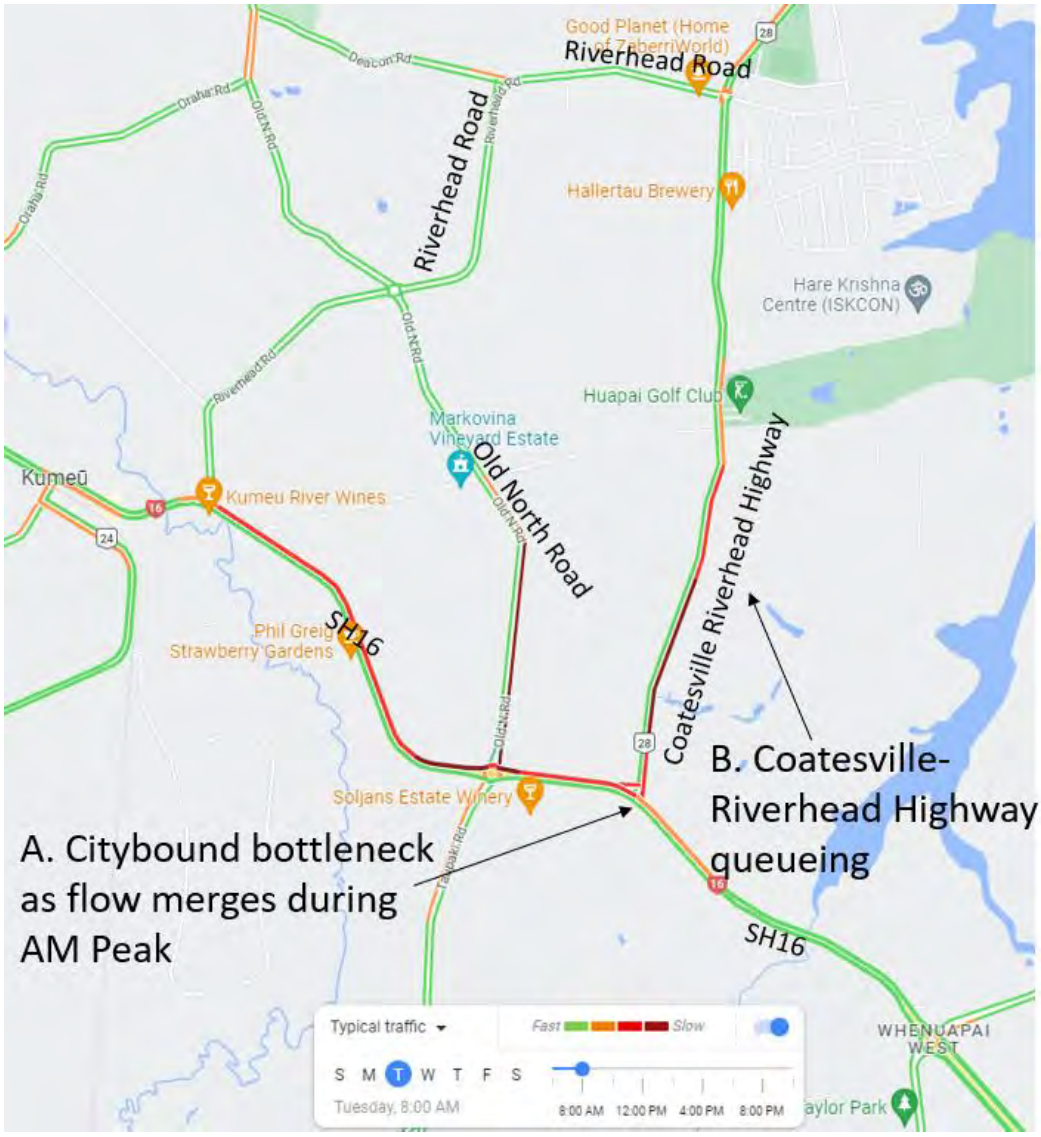
7.3 Existing network operation

Coatesville-Riverhead Highway and Old North Road (via Riverhead Road) connect the Site to SH16, providing access to the east and west. SH16 experiences congestion heading citybound in the morning peak and westbound in the evening peak. Congestion is also experienced during weekend periods, however we anticipate the performance of the network will be improved on weekends following the SH16 upgrade. As the weekend includes a number of discretionary trips, our focus has been on the weekday morning and evening peak periods, where the higher conflicting volumes occur.

During the morning peak, the congestion is caused by two busy traffic streams coming together at the Coatesville-Riverhead Highway intersection with SH16 (labelled "A" on Figure 30). Traffic on SH16 generally allows traffic from Riverhead to join, therefore causing queues that tail back towards Kumeu. Once traffic merges on SH16, traffic speeds increase going towards the city as shown by green in Figure 30 below.

The congestion on SH16 results in queuing on Coatesville-Riverhead Highway (labelled "B" on Figure 30). Based on the typical weekday morning commuter period, the queues reach the Huapai Golf Club, approximately 1.8 km from SH16. On the Coatesville-Riverhead Highway southbound approach, right turns out are restricted, meaning only left turns onto SH16 occur.

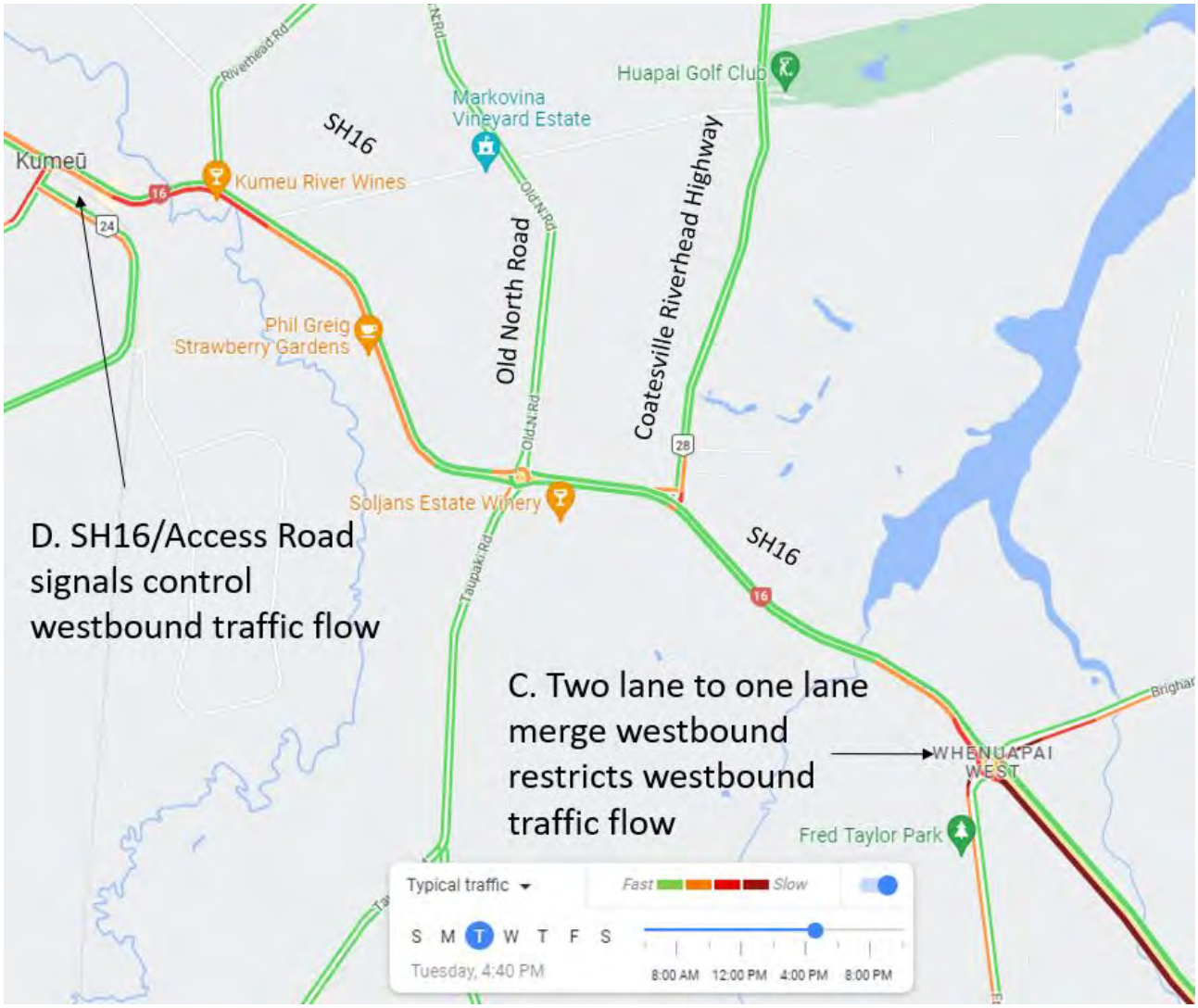
Figure 30: AM Peak Typical Commuter (8:00 am)



During the evening peak, large queues are experienced at the SH16/Brigham Creek Road/Fred Taylor Drive roundabout (labelled "C" on Figure 31), due to the heavy westbound demand. While turning movements between Brigham Creek Road and SH16 west have priority over the SH16 westbound movement, a key constraint at the intersection is the downstream merge from two lanes to one lane.

Once clear, traffic experiences acceptable conditions until approaching Kumeu, where the Access Road/SH16 signalised intersection governs the performance of traffic entering Kumeu and further west (labelled "D" on Figure 31).

Figure 31: PM Peak Typical Commuter (4:40 pm)



7.4 Modelling methodology

7.4.1 Summary of modelling methodology

To assess the traffic effects of the Plan Change, we have assessed the performance of key intersections using the SIDRA intersection modelling software.

We have assessed the following two scenarios in the weekday AM and PM peak hour periods as our primary scenarios

- 2038 base without Plan Change
- 2038 with Plan Change.

As sensitivity tests for the Coatesville-Riverhead Highway intersection, we have also tested the following scenarios (in addition to the primary scenarios above)

- 2031 Plan Change scenario which reflects 60% development complete with sensitivity trip rates
- Full build Plan Change scenario (background traffic for 2038) and reflects sensitivity trip rates for the residential activities, outlined in Section 7.2.1.

We have assessed the following intersections

- SH16 / Coatesville-Riverhead Highway
- Lathrope Road / Riverhead Road
- Riverhead Road / Site collector road
- Coatesville-Riverhead Highway / Riverhead Road
- Coatesville-Riverhead Highway / Riverhead Point Drive / Site collector road
- Coatesville-Riverhead Highway / Site access (south of Riverhead Point Drive)
- Riverhead Road / Old North Road
- Old North Road / Old Railway Road.

The intersection layouts assume all proposed upgrades have been completed in both scenarios.

The SIDRA intersection layouts and movement summary results of the peak periods are provided in Appendix B.

7.4.2 Methodology for network traffic volumes and network assumptions

Forecast traffic volumes have been sourced from Auckland Transport's Supporting Growth Northwest SATURN traffic model. This model relies on inputs from the higher tier Auckland Macro Strategic Model (MSM) which includes forecast land use and infrastructure assumptions (I11.5 land use scenario).

The Northwest SATURN traffic model was obtained from the Auckland Forecast Centre, with various versions being presented. We have used the Reference Case scenario on the basis that the other models provided included infrastructure upgrades, such as the Alternative State Highway (Kumeu Bypass) or Whenuapai Upgrades, being the Spedding Road connection which relieves pressure from the SH16/Brigham Creek Road roundabout.

The roading upgrades included in the 2028 Reference Case include

- SH16 4-laning between Brigham Creek and Old North Road roundabout
- Upgrade of the SH16/Coatesville-Riverhead Highway intersection to a roundabout
- Upgrade of the Main Road/Access Road intersection
- Upgrade of the Main Road/Station Road intersection to traffic signals
- Inclusion of the local road network being established about the Redhills development area.

No changes to the default land use assumptions were made for public transport availability.

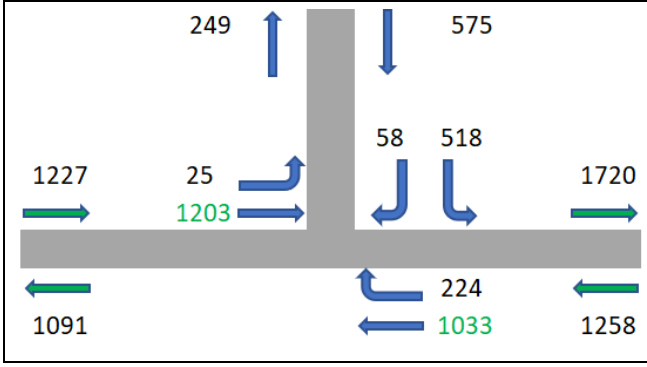
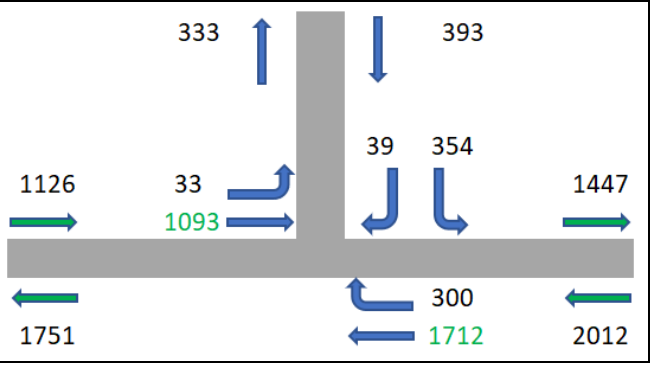
The Northwest SATURN traffic model, and higher tier MSM assumes growth about Kumeu and Huapai, but does not include growth within Riverhead, as the MSM aligns with the Future Urban Land Supply Strategy, which has growth in Riverhead starting in 2028. As such, an increase in housing is not projected until 2033 (being the next defined forecast year). Importantly however, growth is assumed in Kumeu and Huapai, with the volumes in the 2028 and 2038 forecast traffic model on SH16 being (on average) some 3% higher (annual arithmetic growth rate) when referenced against 2022 observed volumes.

Volumes predicted in the Northwest model for Coatesville-Riverhead Highway are very low and are therefore not a reliable source for the purposes of this assessment. That is, for 2028 and 2038, volumes on Coatesville-Riverhead Highway are lighter that 2022 volumes. We also note that the current volumes experience an element of rat running, and as such, the distribution of traffic using Coatesville-Riverhead Highway may reduce slightly when the SH16 constraint is addressed through the upgrade. We however have taken a worst case approach, whereby the existing volume on Coatesville-Riverhead Highway is assumed to remain unchanged.

Using the growth in traffic predicted on SH16 resulting from development further west (Kumeu and Huapai), we have developed a Do Minimum 2031 volume for the SH16/Coatesville-Riverhead Highway intersection. This is the volume predicted to use the intersection should the Riverhead Private Plan Change progress in line with the Future Urban Land Supply Strategy, where traffic associated with consented activities within the plan change area would be expected to be added to the network. The 2031 projected demand also forms as a basis where 60% of the development (ie the land holdings currently controlled by the Riverhead Landowner Group) could be completed by.

The volumes predicted for 2031 are set out in Figure 32, with the growth in through traffic on SH16 (eastbound and westbound) being comparable to the background volumes predicted in 2028 within the Northwest SATURN traffic model.

Figure 32: 2031 Do Minimum Traffic Volumes – SH16/Coatesville-Riverhead Highway intersection

AM Peak 2031 Do Minimum Volumes (excludes Riverhead Private Plan Change)	PM Peak 2031 Do Minimum Volumes (excludes Riverhead Private Plan Change)
	

The westbound volume in the PM Peak has been capped at 1,730 vehicles per hour on the basis that a westbound volume of some 2,400 vehicles per hour is likely to be the maximum hourly volume for traffic passing through the Brigham Creek roundabout located at the end of the Northwest Motorway. The analysis allows some additional 800 vehicles per hour over the current westbound demand, being 1,600 vehicles per hour in the PM Peak.

7.5 Traffic effects – SH16 / Coatesville-Riverhead Highway intersection

The intersection layouts assume a 3-leg roundabout with the proposed Waka Kotahi upgrades. This includes

- Two through traffic lanes from SH16 (east) to SH16 (west)
- Two through traffic lanes from SH16 (west) to SH16 (east)
- Two left turn lanes (with the second left turn lane being shared with the right turn) from Coatesville-Riverhead Highway to SH16 (east). The second lane is understood to be a short lane approximately 40 m long.
- A relatively large internal diameter (30 m) which we assume is required given location of the roundabout on SH16 and the need to allow trucks to circulate together in adjacent lanes.

7.5.1 2031 Do Minimum – Background growth and SH16 upgrade

The 2031 Do Minimum scenario reflects no development within Riverhead but includes growth about Kumeu and Huapai and the upgrade of the intersection to a roundabout consistent with the SH16 Brigham Creek to Waimauku project being completed by Waka Kotahi.

Table 6 summarises the predicted performance of the SH16/Coatesville-Riverhead Highway intersection. The roundabout is predicted to operate well within capacity, with relatively small queues on each of the approaches.

Table 6: 2031 Do Minimum SIDRA Modelling Results – No Riverhead Development

Approach	AM Peak			PM Peak		
	LOS	DoS (v/c)	Queue (m)	LOS	DoS (v/c)	Queue (m)
SH16 (East)	LOS A	0.40	25 m	LOS A	0.63	60 m
Coatesville-Riverhead Highway	LOS B	0.40	15 m	LOS A	0.27	10 m
SH16 (West)	LOS A	0.46	25 m	LOS A	0.45	25 m
Total Intersection	**LOS A**	**0.46**	**25 m**	**LOS A**	**0.63**	**60 m**

7.5.2 2038 Plan Change Scenario – Full Build 100% Plan Change Development

This test assumes the full build (100%) Plan Change scenario. The modelling assumes background growth out to 2038 and reflects long term trip rates.

Table 7 summarises the predicted performance of the SH16/Coatesville-Riverhead Highway intersection. The roundabout is predicted to operate within capacity when accommodating 100% development, with queue lengths queue lengths remaining within 100m for the busier trafficked movements (Coatesville-Riverhead Highway in the AM and SH16 (east) in the PM). The intersection operates at LOS B, with the predicted queues considered satisfactory, such that no concerns are raised with the operation of the roundabout long term.

We also note that this scenario excludes the potential long term Alternative State Highway (also referred to as the Kumeu Bypass) which would remove a large number of vehicles from the intersection.

Table 7: 2038 Plan Change SIDRA Modelling Results – Full Build (100%) Development/Long Term trip rates

Approach	AM Peak			PM Peak		
	LOS	DoS (v/c)	Queue (m)	LOS	DoS (v/c)	Queue (m)
SH16 (East)	LOS A	0.52	40 m	LOS A	0.74	95 m
Coatesville-Riverhead Highway	LOS C	0.88	75 m	LOS B	0.56	30 m
SH16 (West)	LOS B	0.62	50 m	LOS B	0.68	65 m
Total Intersection	**LOS B**	**0.88**	**75 m**	**LOS B**	**0.74**	**95 m**

7.5.3 2031 Plan Change Sensitivity – 60% Plan Change Development

This Plan Change scenario reflects 60% development with sensitivity residential trip rates for the short/medium term.

Table 8 summarises the predicted performance of the SH16/Coatesville-Riverhead Highway intersection. The roundabout is predicted to operate well within capacity when accommodating 60% development, with queue lengths generally increasing by 10-25 m across each approach. The predicted queues are considered satisfactory and do not raise any concerns with the operation of the roundabout.

Table 8: 2031 Plan Change SIDRA Modelling Results – 60% Development/Sensitivity Trip Rates

Approach	AM Peak			PM Peak		
	LOS	DoS (v/c)	Queue (m)	LOS	DoS (v/c)	Queue (m)
SH16 (East)	LOS A	0.47	35 m	LOS A	0.72	85 m
Coatesville-Riverhead Highway	LOS B	0.69	40 m	LOS B	0.44	20 m
SH16 (West)	LOS A	0.54	35 m	LOS B	0.56	40 m
Total Intersection	**LOS A**	**0.69**	**40 m**	**LOS A**	**0.72**	**85 m**

7.5.4 2038 Plan Change Sensitivity Test – Full Build 100% Plan Change Development

This test assumes the full build (100%) Plan Change scenario, with a sensitivity test assuming background growth out to 2038, and higher residential vehicle trip rates being applied to a long term horizon.

Table 9 summarises the predicted performance of the SH16/Coatesville-Riverhead Highway intersection. With the higher trip rates applied to the plan change area, the roundabout is predicted to operate within capacity, with a practicable degree of saturation of 95%. This is still acceptable, with LOS D being predicted for the Coatesville-Riverhead Highway approach during the AM peak. Queue lengths remain satisfactory, such that no concerns are predicted with the operation of the roundabout long term.

As with the previous scenario, we note that this scenario is based on higher trip rates and excludes the potential long term Alternative State Highway (also referred to as the Kumeu Bypass) which would remove a large number of vehicles from the intersection if constructed.

Table 9: 2038 Plan Change Sensitivity SIDRA Modelling Results – Full Build (100%) Development/Sensitivity trip rates

Approach	AM Peak			PM Peak		
	LOS	DoS (v/c)	Queue (m)	LOS	DoS (v/c)	Queue (m)
SH16 (East)	LOS A	0.53	45 m	LOS A	0.76	105 m
Coatesville-Riverhead Highway	LOS D	0.95	125 m	LOS B	0.60	35 m
SH16 (West)	LOS B	0.63	50 m	LOS B	0.72	80 m
Total Intersection	**LOS B**	**0.95**	**125 m**	**LOS B**	**0.76**	**105 m**

7.6 Traffic effects – local Riverhead intersections

7.6.1 Lathrope Road / Riverhead Road

The intersection layout assumes a priority control intersection with a right turn bay on Riverhead Road.

The intersection is anticipated to perform well in both peak periods and scenarios. All approaches are predicted to operate at LOS A and B, which indicates minimal delays being experienced. Queue lengths are expected to be minimal.

7.6.2 Riverhead Road / Site collector road

The intersection layout assumes a 4-leg roundabout with single lane approaches.

All legs are anticipated to operate at LOS A or LOS B, with negligible delays and queue lengths.

7.6.3 Coatesville-Riverhead Highway / Riverhead Road

The intersection layout assumes a 4-leg roundabout with single lane approaches. The geometry of the roundabout reflects the proposed upgrades to this intersection.

The intersection is expected to perform adequately with the plan change.

We note the following of the results

- Most approaches are anticipated to operate well at LOS A to C
- In the AM peak with the plan change, Kaipara Portage Road is predicted to operate at LOS D and E, with approximately 50 seconds of delays
- The 95th percentile queue lengths in the AM peak are predicted to be 120 – 150 m on the Kaipara Portage Road and Coatesville-Riverhead Highway southbound approaches
- We note that our modelling internal to Riverhead is conservative, as we haven't directly accounted for reduction in through traffic due to pass-by trips. These will be largely generated by the retail activities from the centres, which are expected to be close to this intersection. If the pass-by trips are considered, then there would be less traffic at this intersection. Nevertheless, we consider the performance is acceptable given these issues would only be for the AM peak hour, and the delays and queue lengths are not excessive.

7.6.4 Coatesville-Riverhead Highway / Riverhead Point Drive / Site collector road

The intersection layout assumes a 4-leg roundabout with single lane approaches.

All legs are anticipated to operate at LOS A to C, with negligible delays.

The 95th percentile queues are expected to be very minor. In the AM peak period with the Plan Change, the queue length is up to 120 m on the on the Coatesville-Riverhead Highway southbound approach.

7.6.5 Coatesville-Riverhead Highway / Site access (south of Riverhead Point Drive)

The intersection layout assumes a 3-leg priority control intersection with a right turn bay on Coatesville-Riverhead Highway.

With the Plan Change scenario, the Coatesville-Riverhead Highway movements are expected to perform without any issues, with LOS A for all movements on this road. Without the Plan Change, there would be no traffic on the site access road.

Some small delays are expected on the Site access approach with the Plan Change, which has a single lane. In the AM peak periods, LOS F and average delays of around 50 seconds are predicted on this approach. We note that vehicles using this approach have the option of using the Coatesville-Riverhead Highway / Riverhead Point Drive roundabout to avoid potential delays. We consider that this level of delay is acceptable, and will not affect the performance of Coatesville-Riverhead Highway.

7.6.6 Riverhead Road / Old North Road

We have assumed the existing intersection layout, with one lane on each approach and departure.

The intersection is predicted to perform without and issues in the peak periods with the Plan Change, with LOS A and B.

7.6.7 Old North Road / Old Railway Road

We have assumed the existing priority-controlled intersection layout. No turning bays on Old North Road are included. For the Old Railway Road approaches, we have assumed there is short space available for a vehicle to turn left in addition to another vehicle travelling straight or turning right.

The intersection is predicted to perform without and issues in the peak periods with the Plan Change, with LOS A and B on Old North Road.

On the Old Railway Road approaches, some delays of up to 40 seconds are predicted with LOS D or E. We note that the turning volumes on Old Railway Road are predicted to be minimal.

7.7 Summary of modelling results

In summary, all intersections within the Riverhead Plan Change area (and surrounding road network) are anticipated to perform without any noticeable queue lengths or delays with the increased traffic volumes. All intersections have been adequately designed to accommodate the level of traffic anticipated by the Plan Change.

We have also assessed the SH16 / Coatesville-Riverhead Highway intersection across multiple scenarios, including a worse case 100% buildout in 2038 with higher sensitivity trip generation rates. We note that the intersection is predicted to perform well, for each of the scenarios tested.

7.8 Wider network effects

With regard to the wider network, we have considered the safety of intersections further afield which are predicted to experience an increase in traffic volumes as a result of the Plan Change. For Coatesville-Riverhead Highway an additional 550-600 vehicles per hour are predicted (two-way), with some 180-210 vehicles per hour (two-way) predicted for Old North Road.

A summary of the safety outcomes of wider local road intersections is set out in Table 10.

Table 10: Wider intersection assessment

Intersection	Current Layout	Expected change and effect
Coatesville-Riverhead Highway / Short Road	Short Road is a minor cul-de-sac providing access to a small number of properties. There have been two reported crashes, with each related to turning right into Short Road.	The Plan Change proposes moving the threshold treatment and therefore reducing the speed limit fronting Short Road, as well as urbanising Coatesville-Riverhead Highway about the Short Road intersection. Furthermore, a raised crossing is proposed north of Short Road on Coatesville-Riverhead Highway. We expect these changes will slow vehicles about the Short Road intersection and improve safety.
Coatesville-Riverhead Highway / Old Railway Road	There have been 8 crashes at this intersection since 2016, with 3 crashes being serious in nature. We note that the speed limit has recently been reduced for Coatesville-Riverhead Highway and that there have been no reported crashes since Jan 2020.	See Section 6.10 for assessment. A right turn bay is required based on the existing traffic conditions. This is reflected in the Precinct Provisions.
Coatesville-Riverhead Highway / Riverland Road	Riverland Road is a stop-controlled intersection which serves 15 to 20 properties. Three crashes have occurred at the intersection (in 2016 and 2017 – all turning right) With Coatesville-Riverhead Highway having horizontal and vertical curves approaching the intersection, the recent reduction in speed limit on Coatesville-	See Section 6.10 for assessment. A right turn bay is required based on a 60% buildout scenario of the development. This is reflected in the Precinct Provisions.

Intersection	Current Layout	Expected change and effect
	Riverhead Highway provides greater safety for traffic turning into Riverland Road.	
Coatesville-Riverhead Highway / Moontide Road	Moontide Road is a stop-controlled intersection with a formed right turn bay. It serves 10 to 15 properties. Five crashes have occurred at the intersection, with one being a serious crash. No reported crashes have occurred since 2019.	The current intersection design is considered safe and we anticipate the reduced speed limit on Coatesville-Riverhead Highway will assist in catering for the additional traffic expected by the Plan Change through the intersection. We also note this intersection currently includes a right turn bay on Coatesville-Riverhead Highway.
Coatesville-Riverhead Highway / Brigham Lane	Located north of the Coatesville-Riverhead Highway intersection with SH16, the speed of traffic on Coatesville-Riverhead Highway through the intersection is slow, as vehicles either slow for the intersection (when queues are not present) or are queued on the approach to the intersection. A shoulder exists to allow northbound traffic to pass any vehicles turning right. Four crashes have occurred at this intersection since 2016, with 1 being minor injury.	Vehicle speeds on Coatesville-Riverhead Highway are low. We anticipate no change in operation of this intersection as a result of the Plan Change and do not consider any works are required in the immediate future.
Old North Road / Old Railway Road	A number of crashes have occurred at the Old North Road/Old Railway Road, with the current intersection presenting a safety issue. Currently a stop controlled cross road intersection, most crashes are those crossing the intersection. Speed interventions have been located at the intersection, including markings on Old Railway Road (both approaches) and a speed camera on Old North Road.	The Plan Change predicts some additional 180-210 vehicles travelling on Old North Road during the AM and PM peak hours. While good visibility exists at the intersection, the Plan Change is adding traffic to the priority route, rather than the crossing route. The SIDRA results outlined in Section 7.6.7 shows that the intersection will perform sufficiently with the additional traffic included. We would add that the current intersection does have a safety concern, with a longer-term upgrade needing to address the current concern. The footprint of the intersection however is small

Intersection	Current Layout	Expected change and effect
		and will likely require additional land for Auckland Transport to implement the necessary upgrade required.

8 PROPOSED PRECINCT PLAN PROVISIONS

8.1 Precinct Provisions

A Precinct is proposed as part of the Plan Change. The Precinct allows specific standards and assessment criteria to be included in the Unitary Plan, so that development of Riverhead can be managed appropriately.

The Precinct includes provisions that limit any dwellings within the Riverhead Plan Change area from being occupied prior to the SH16 / Coatesville – Riverhead Highway intersection from being upgraded. This is a key transport move in terms of safety and capacity for the Riverhead area. The intersection upgrade is proposed by Waka Kotahi and is currently scheduled to be completed by 2025. The Notice of Requirement has been lodged with Auckland Council. Should the intersection not be upgraded, matters of discretion are included in the precinct provisions such that any occupied development will be required to address the safety of the surrounding transport network, including at the SH16 / Coatesville-Riverhead Highway intersection.

The Precinct Plan provisions includes requirements to upgrade Riverhead Road, Coatesville-Riverhead Highway, Lathrope Road and Cambridge Road fronting the Site prior to any development being completed which would use these roads. Further, the implementation of a footpath on Queen Street is required that connects the plan change area through the existing Riverhead village and public transport facilities at the time development occurs. This will ensure that development will have safe infrastructure available in the local Riverhead area at the time development becomes occupied. As noted above, other localised footpaths are being proposed by the Local Board to address the 'gaps' in the existing network.

Proposed Standards related to transport, as set out in IX6.1 of the precinct provisions include

(1) Prior to occupation of a dwelling within the Riverhead Precinct, the following transport infrastructure must be constructed and operational:

  (a) Upgrade of the Coatesville-Riverhead Highway / Main Road (SH16) intersection to a roundabout, as part of the SH16 Brigham Creek to Waimauku project, led by Waka Kotahi NZ Transport Agency.

(2) Prior to occupation of a building on a site with vehicle access to and/or from Coatesville-Riverhead Highway, the following road infrastructure upgrades must be constructed and operational:

  (a) Upgrade and urbanise Coatesville-Riverhead Highway from 80m south of Short Road to the Coatesville-Riverhead Highway / Riverhead Road roundabout, including walking/cycling infrastructure, gateway treatment and public transport infrastructure in accordance with IX.10.3 Riverhead: Precinct plan 3 and IX.11.2 Appendix 2; and

  (b) Upgrade and urbanise the Coatesville-Riverhead Highway / Riverhead Road roundabout, in accordance with IX.10.3 Riverhead: Precinct plan 3 and IX.11.2 Appendix 2.

(3) Prior to occupation of a building on a site with vehicle access to and/or from Riverhead Road, the following road infrastructure upgrades must be constructed and operational:

  (a) Upgrade and urbanise Coatesville-Riverhead Highway from 80m south of Short Road to the Coatesville-Riverhead Highway / Riverhead Road roundabout, including

walking/cycling infrastructure, gateway treatment and public transport infrastructure in accordance with IX.10.3 Riverhead: Precinct plan 3 and IX.11.2 Appendix 2; and

(b) Upgrade and urbanise the Coatesville-Riverhead Highway / Riverhead Road roundabout, in accordance with IX.10.3 Riverhead: Precinct plan 3 and IX.11.2 Appendix 2; and

(c) Upgrade and urbanise Riverhead Road, from the eastern boundary of 307 Riverhead Road to Coatesville-Riverhead Highway, including walking/cycling infrastructure, gateway threshold treatment, and public transport infrastructure in accordance with IX.10.3 Riverhead: Precinct plan 3.

(4) Prior to occupation of a building on a site with vehicle access to and/or from Lathrope Road, the following road infrastructure upgrades must be constructed and operational:

(a) Upgrade Lathrope Road between Riverhead Road and the new access point, in accordance with IX.10.3 Riverhead: Precinct plan 3 and IX.11.2 Appendix 2; and

(b) Upgrade the Riverhead Road/Lathrope Road intersection to a Give-Way controlled intersection, in accordance with IX.10.3 Riverhead: Precinct plan 3 and IX.11.2 Appendix 2.

(5) Prior to occupation of a building on a site with vehicle access to and/or from Cambridge Road, the following road infrastructure upgrades must be constructed and operational:

(a) A new footpath on the western side of Cambridge Road between Queen Street and Riverhead Road in accordance with IX.10.3 Riverhead: Precinct plan 3;

(b) Upgrade and urbanise the existing carriageway of the formed portion of Cambridge Road south of Queen Street to an urban standard, in accordance IX.10.3 Riverhead: Precinct Plan 3;

(c) A new footpath on the northern side of Queen Street between Coatesville-Riverhead Highway and Cambridge Road in accordance with IX.10.3 Riverhead: Precinct plan 3; and

(d) An additional pedestrian crossing facility on Coatesville-Riverhead Highway between Edward Street and Princes Street.

In addition to the above upgrades, standard IX6.2 includes a road widening requirement of 2m on land adjoining Riverhead Road. This allows the Riverhead Road reserve to be widened from 20m to 24m, providing sufficient space to accommodate the upgrades required.

Localised road widening is required about new intersections on Riverhead Road and Coatesville-Riverhead Highway, with the extent of the widening to be addressed at detailed design. We note that the current Notice of Requirement process being undertaken by Supporting Growth has landed on an extent of designation which allows for the roundabout design discussed in this report. This is captured in Appendix 2 of the Precinct Provisions (refer to the Precinct provisions appended with the Plan Change documentation to review Appendix 2).

8.2 Infrastructure Implementation Plan

A summary of the proposed implementation plan for transport infrastructure is provided in Table 11.

As mentioned previously, it is anticipated that the SH16 / Coatesville-Riverhead Highway upgrade will be completed before any development within the Site occurs. This project is being delivered by Waka Kotahi and is scheduled to be completed by 2025.

The 2025 timeframe aligns with the anticipated date for buildings starting to be occupied on Site, with a development timeframe of 5-10 years (2030-35) for the key stakeholders. Should development come online earlier, the provisions ensure any proposals are adequately assessed, ensuring that a safe transport network exists prior to occupation of buildings.

The proposed corridor and intersection upgrades of Coatesville-Riverhead Highway, Riverhead Road, Lathrope Road, Cambridge Road and supporting footpath connections will be undertaken by the applicant, Riverhead Landowner Group. Each of these upgrades will be undertaken prior to any development connecting to these roads.

Table 11: Infrastructure implementation plan

Infrastructure upgrade	Implementation timing / trigger point	Party responsible
SH16 / Coatesville-Riverhead Highway	2025 –Prior to occupation of a dwelling within Riverhead Precinct	Waka Kotahi
Coatesville-Riverhead Highway corridor and intersections (Riverhead Road to 80 m south of Short Road)	Prior to occupation of a building on a site with a vehicle access to and/or from Coatesville-Riverhead Highway, or Riverhead Road	Riverhead Landowner Group
Riverhead Road corridor and intersections (Coatesville-Riverhead Highway to eastern boundary of 307 Riverhead Road)	Prior to occupation of a building on a site with a vehicle access to and/or from Riverhead Road	Riverhead Landowner Group
Lathrope Road corridor and Lathrope Road / Riverhead Road intersection	Prior to occupation of a building on a site with a vehicle access to and/or from Lathrope Road	Riverhead Landowner Group
Urbanise Cambridge Road fronting the development site and provide a footpath on the western side (between Queen Street and Riverhead Road)	Prior to occupation of a building on a site with a vehicle access to and/or from Cambridge Road	Riverhead Landowner Group
Provide a new footpath on the northern side of Queen Street (Cambridge Road to Coatesville-Riverhead Highway)	Prior to occupation of a building on a site with a vehicle access to and/or from Cambridge Road	Riverhead Landowner Group
Additional pedestrian crossing on Coatesville-Riverhead Highway between Edward Street and Princes Street	Prior to occupation of a building on a site with a vehicle access to and/or from Cambridge Road	Riverhead Landowner Group

Infrastructure upgrade	Implementation timing / trigger point	Party responsible
Coatesville-Riverhead Highway / Old Railway Road and Riverland Road intersections – provide right turn bay upgrades	Prior to occupation of dwellings within Riverhead Precinct	Riverhead Landowner Group

9 CONCLUSIONS

Based on the analysis described in this report, we conclude that the Structure Plan and proposed Riverhead Plan Change can enable activities that can operate safely and efficiently from a transportation perspective. We conclude that

- The Plan change aligns well with the Auckland Plan and Auckland Unitary Plan transport objectives by providing people with choices of healthy and sustainable transport modes, and encouraging a range of activities (assessed in further detail in the Section 32 report by Barkers & Associates)
- The rezoning of Future Urban land will enable a range of complementary activities, including residential dwellings, a local centre, early learning childcare centres and a retirement village complex and provisions support social facilities, including education facilities
- The Plan Change brings the development ahead of the 2028 – 2032 current schedule in the Future Urban Land Supply Strategy, by four or so years although that timing is principally based on issues applying to Kumeu and Huapai that do not constrain Riverhead. We note that the roading improvements captured in the Precinct Provisions are all that required. The Plan Change requires these to be in place prior to development being occupied
- The sections of Riverhead Road and Coatesville-Riverhead Highway that front the plan change area and provide the entry points to Riverhead will receive full corridor upgrades within the vicinity of the Site as part of the Plan Change. This includes providing new dedicated facilities for pedestrians and cyclists on both sides, which will significantly improve active mode accessibility for existing and future residents of Riverhead
- Lathrope Road will be upgraded and sealed to provide a footpath and allow this to be used as an external vehicle access route from the Site
- Anticipated speed limit reductions on Riverhead Road and Coatesville-Riverhead Highway will provide safety benefits for all road users and align with Vision Zero principles
- An internal road network will be provided to support the activities included in the Plan Change. Several new intersections will be constructed, while existing intersections in the local area will be upgraded. These intersections will be designed in accordance with Vision Zero, and designed to safely accommodate all road users. The proposed Precinct Provisions set out the anticipated design elements of local roads, requiring low speed designs that offers a safe outcome to all users
- New footpaths will be provided on Cambridge Road and Queen Street to provide facilities for pedestrians, as no footpaths currently exist along sections of these roads
- Right turn bays on Coatesville-Riverhead Highway will be required at the Riverland Road and Old Railway Road intersections, noting the Old Railway Road right turn bay is already required
- There are existing capacity constraints on the road network, particularly on SH16. The section of SH16 south of the Site has funding to be upgraded by Waka Kotahi NZTA by 2025, which will increase capacity and improve safety to all Riverhead residents. The proposed Precinct Provisions include a standard to ensure that this upgrade is provided before development is occupied
- There will be a noticeable number of trips generated by the development, but the impact on the wider network will be reduced by-pass trips, multi-purpose trips, and trips that can be undertaken

locally within Riverhead. All intersections within the Riverhead Plan Change area are anticipated to perform without any noticeable queue lengths or delays with the increased traffic volumes

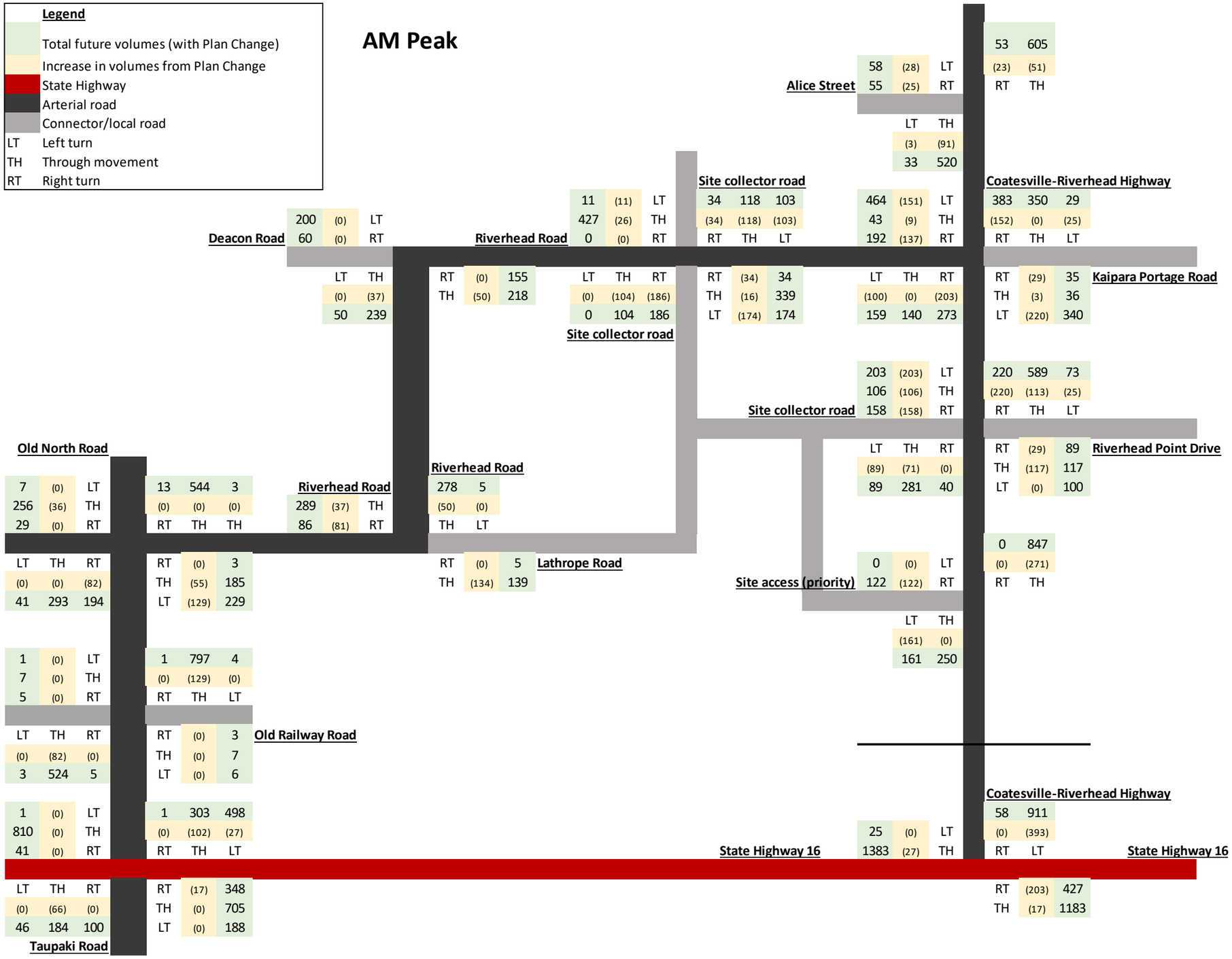
- The SH16 / Coatesville-Riverhead Highway intersection is predicted to perform well, even when considering the full 100% Plan Change buildout by 2038, due to the Waka Kotahi upgrade
- Coatesville-Riverhead Highway is serviced by a bus route, which connects to the Westgate public transport hub and Albany station. The upgrades proposed on Coatesville-Riverhead Highway will include the provision of public transport infrastructure to support and encourage travel by public transport.

Overall, we are of the view that the Plan Change will enable development that aligns with or implements transport network upgrades as planned by Waka Kotahi and Auckland Transport. The upgrades proposed as part of the Plan Change will significantly improve accessibility for all transport modes in Riverhead and will supplement upgrades to SH16 proposed by 2025.

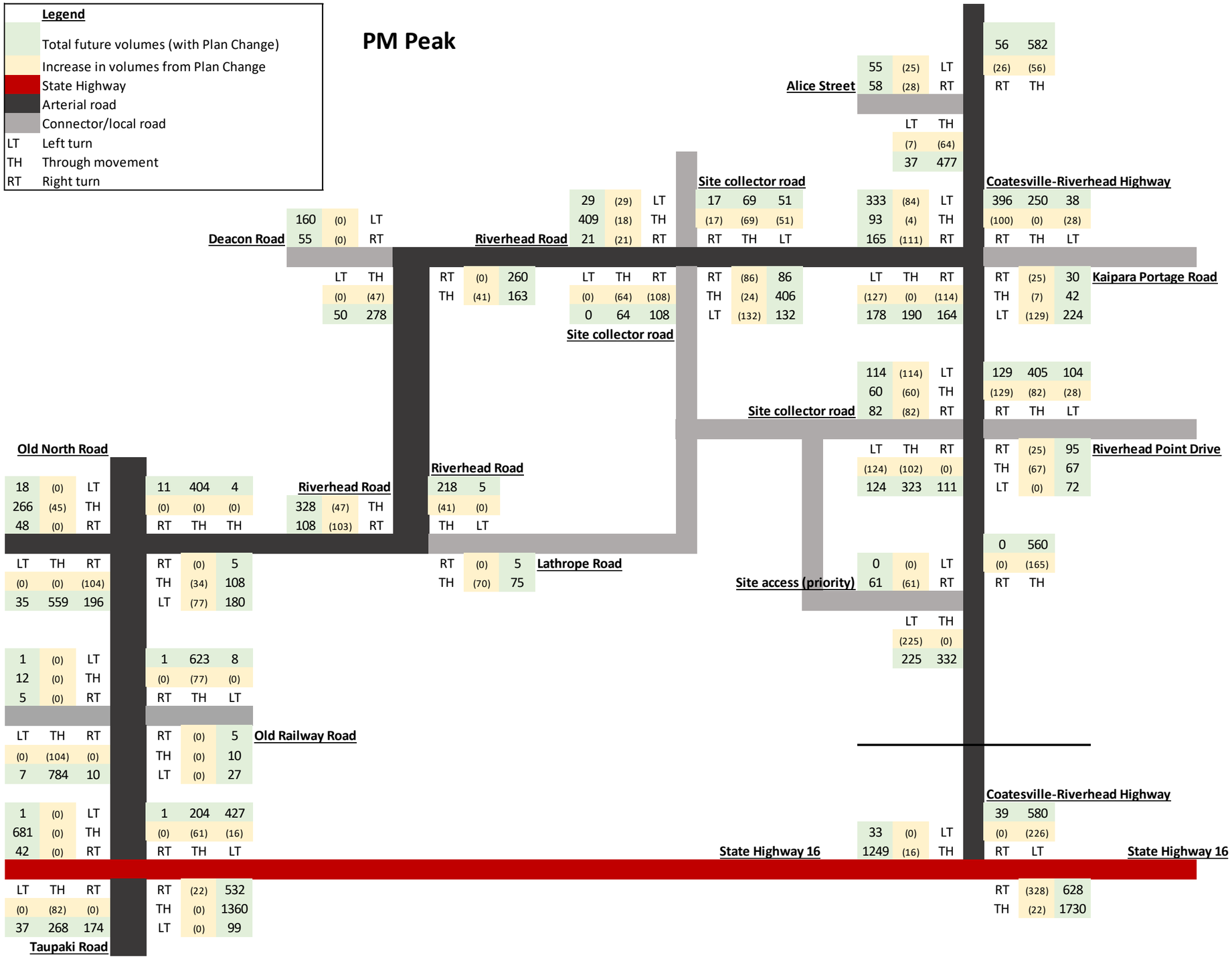
We therefore consider that there are no transportation planning or traffic engineering reasons to preclude the implementation of the Plan Change as intended.

APPENDIX A Trip distribution diagrams

Full Build Trip Distribution Diagram –AM Peak with Plan Change



Full Build Trip Distribution Diagram –PM Peak with Plan Change



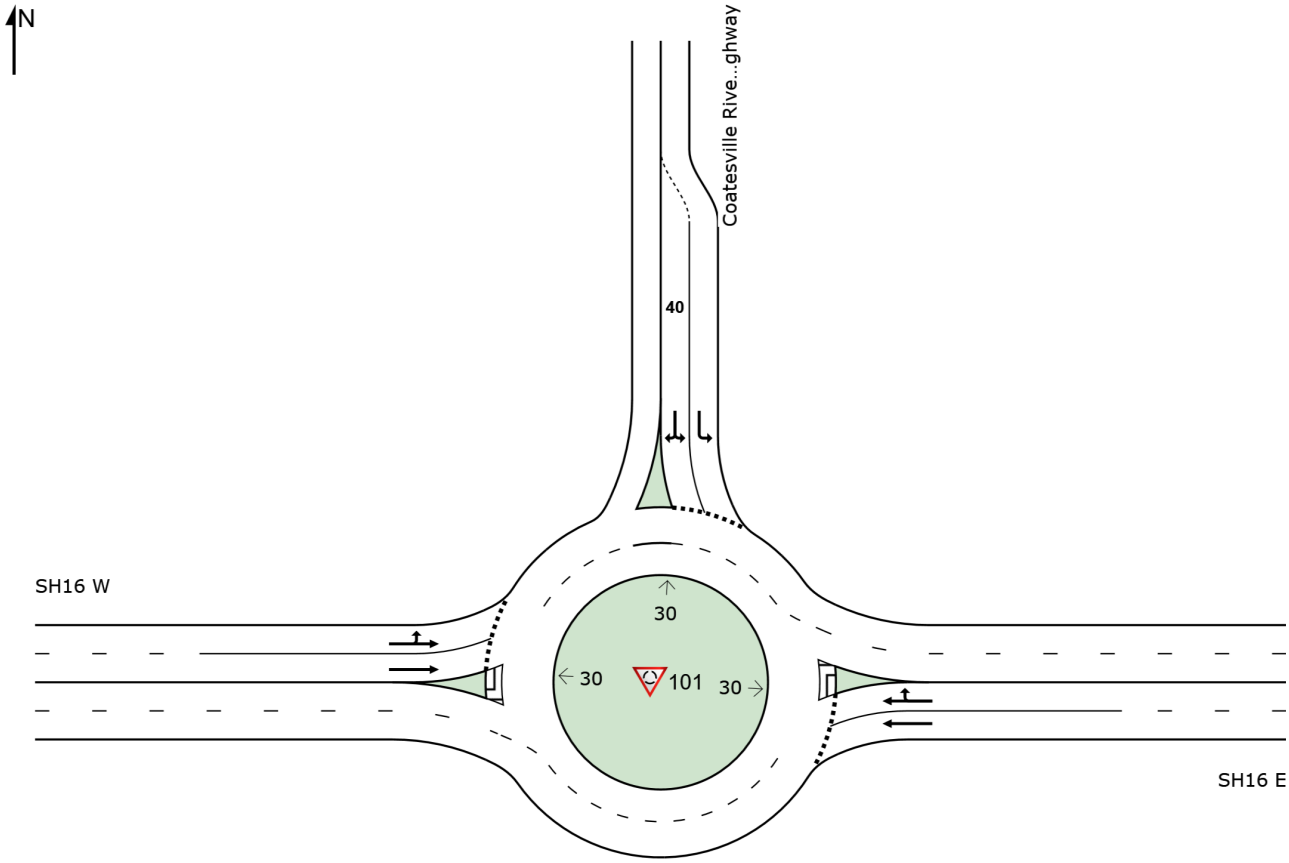
APPENDIX B SIDRA modelling outputs

SITE LAYOUT

Site: 101 [SH16/Coatesville-Riverhead Highway 2031 (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

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



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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville-Riverhead Highway 2031 (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1034	9.0	1034	9.0	0.407	6.4	LOS A	3.5	26.5	0.29	0.48	0.29	65.3
6	R2	224	6.0	224	6.0	0.407	12.2	LOS B	3.4	25.5	0.30	0.54	0.30	64.3
Approach		1258	8.5	1258	8.5	0.407	7.4	LOS A	3.5	26.5	0.29	0.49	0.29	65.1
North: Coatesville Riverhead Highway														
7	L2	518	6.0	518	6.0	0.408	9.8	LOS A	2.3	16.8	0.76	0.92	0.85	61.7
9	R2	58	6.0	58	6.0	0.408	16.9	LOS B	2.1	15.5	0.76	0.93	0.86	61.6
Approach		576	6.0	576	6.0	0.408	10.5	LOS B	2.3	16.8	0.76	0.92	0.85	61.7
West: SH16 W														
10	L2	25	6.0	25	6.0	0.460	6.7	LOS A	3.5	26.2	0.50	0.56	0.50	63.0
11	T1	1203	9.0	1203	9.0	0.460	7.4	LOS A	3.5	26.2	0.52	0.57	0.52	64.3
Approach		1228	8.9	1228	8.9	0.460	7.4	LOS A	3.5	26.2	0.52	0.57	0.52	64.3
All Vehicles		3062	8.2	3062	8.2	0.460	8.0	LOS A	3.5	26.5	0.47	0.61	0.49	64.1

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville-Riverhead Highway 2031 (Site Folder: Base_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1712	9.0	1712	9.0	0.632	6.4	LOS A	7.7	58.2	0.32	0.46	0.32	65.2
6	R2	300	6.0	300	6.0	0.632	12.2	LOS B	7.7	57.7	0.34	0.51	0.34	64.4
Approach		2012	8.6	2012	8.6	0.632	7.2	LOS A	7.7	58.2	0.32	0.47	0.32	65.1
North: Coatesville Riverhead Highway														
7	L2	354	6.0	354	6.0	0.269	8.7	LOS A	1.3	9.9	0.71	0.83	0.71	62.5
9	R2	39	6.0	39	6.0	0.269	15.5	LOS B	1.2	9.1	0.71	0.88	0.71	63.1
Approach		393	6.0	393	6.0	0.269	9.3	LOS A	1.3	9.9	0.71	0.84	0.71	62.5
West: SH16 W														
10	L2	33	6.0	33	6.0	0.449	7.1	LOS A	3.4	25.4	0.57	0.60	0.57	62.6
11	T1	1093	9.0	1093	9.0	0.449	7.8	LOS A	3.4	25.4	0.59	0.61	0.59	63.8
Approach		1126	8.9	1126	8.9	0.449	7.8	LOS A	3.4	25.4	0.59	0.61	0.59	63.8
All Vehicles		3531	8.4	3531	8.4	0.632	7.6	LOS A	7.7	58.2	0.45	0.56	0.45	64.4

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville-Riverhead Highway 60% 2031 (Site Folder: Clause 23 Scenarios_Future_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1049	9.0	1049	9.0	0.468	6.4	LOS A	4.5	34.1	0.32	0.48	0.32	65.0
6	R2	397	6.0	397	6.0	0.468	12.3	LOS B	4.4	32.6	0.33	0.57	0.33	63.0
Approach		1446	8.2	1446	8.2	0.468	8.0	LOS A	4.5	34.1	0.32	0.51	0.32	64.4
North: Coatesville Riverhead Highway														
7	L2	820	6.0	820	6.0	0.688	13.2	LOS B	5.4	39.9	0.89	1.05	1.24	58.5
9	R2	58	6.0	58	6.0	0.688	20.7	LOS C	4.8	35.6	0.88	1.05	1.25	58.4
Approach		878	6.0	878	6.0	0.688	13.7	LOS B	5.4	39.9	0.89	1.05	1.24	58.4
West: SH16 W														
10	L2	25	6.0	25	6.0	0.536	7.8	LOS A	4.4	32.8	0.69	0.65	0.69	61.8
11	T1	1224	9.0	1224	9.0	0.536	8.8	LOS A	4.4	32.8	0.71	0.70	0.73	63.0
Approach		1249	8.9	1249	8.9	0.536	8.8	LOS A	4.4	32.9	0.71	0.70	0.72	63.0
All Vehicles		3573	7.9	3573	7.9	0.688	9.7	LOS A	5.4	39.9	0.60	0.71	0.69	62.4

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville-Riverhead Highway 60% 2031 (Site Folder: Clause 23 Scenarios_Future_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1730	9.0	1730	9.0	0.716	6.4	LOS A	11.2	84.5	0.38	0.46	0.38	64.6
6	R2	553	6.0	553	6.0	0.716	12.3	LOS B	10.9	80.8	0.42	0.53	0.42	62.9
Approach		2283	8.3	2283	8.3	0.716	7.9	LOS A	11.2	84.5	0.39	0.47	0.39	64.2
North: Coatesville Riverhead Highway														
7	L2	537	6.0	537	6.0	0.440	9.7	LOS A	2.7	19.7	0.81	0.93	0.90	61.8
9	R2	39	6.0	39	6.0	0.440	16.7	LOS B	2.5	18.1	0.80	0.95	0.91	62.3
Approach		576	6.0	576	6.0	0.440	10.2	LOS B	2.7	19.7	0.81	0.93	0.90	61.8
West: SH16 W														
10	L2	33	6.0	33	6.0	0.561	9.6	LOS A	5.4	40.5	0.82	0.81	0.91	60.9
11	T1	1107	9.0	1107	9.0	0.561	10.8	LOS B	5.4	40.5	0.83	0.84	0.94	62.1
Approach		1140	8.9	1140	8.9	0.561	10.8	LOS B	5.4	40.5	0.83	0.84	0.94	62.1
All Vehicles		3999	8.1	3999	8.1	0.716	9.0	LOS A	11.2	84.5	0.57	0.64	0.62	63.2

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville Riverhead Highway (Site Folder: Future_AM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1183	9.0	1183	9.0	0.521	6.4	LOS A	5.5	41.8	0.35	0.48	0.35	64.8
6	R2	427	6.0	427	6.0	0.521	12.3	LOS B	5.4	40.0	0.37	0.56	0.37	62.9
Approach		1610	8.2	1610	8.2	0.521	8.0	LOS A	5.5	41.8	0.35	0.50	0.35	64.3
North: Coatesville Riverhead Highway														
7	L2	911	6.0	911	6.0	0.877	23.8	LOS C	10.2	75.1	0.98	1.26	1.99	50.1
9	R2	58	6.0	58	6.0	0.877	32.7	LOS C	8.8	64.4	0.96	1.25	2.01	49.1
Approach		969	6.0	969	6.0	0.877	24.3	LOS C	10.2	75.1	0.98	1.26	2.00	50.0
West: SH16 W														
10	L2	25	6.0	25	6.0	0.621	9.0	LOS A	6.3	47.6	0.77	0.76	0.85	61.2
11	T1	1383	9.0	1383	9.0	0.621	10.1	LOS B	6.3	47.6	0.79	0.79	0.89	62.5
Approach		1408	8.9	1408	8.9	0.621	10.1	LOS B	6.3	47.6	0.79	0.79	0.89	62.4
All Vehicles		3987	7.9	3987	7.9	0.877	12.7	LOS B	10.2	75.1	0.66	0.79	0.94	59.6

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville Riverhead Highway (Site Folder: Future_PM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1730	9.0	1730	9.0	0.740	6.5	LOS A	12.7	96.0	0.41	0.45	0.41	64.4
6	R2	628	6.0	628	6.0	0.740	12.4	LOS B	12.2	90.4	0.45	0.52	0.45	62.5
Approach		2358	8.2	2358	8.2	0.740	8.0	LOS A	12.7	96.0	0.42	0.47	0.42	63.9
North: Coatesville Riverhead Highway														
7	L2	580	6.0	580	6.0	0.557	11.8	LOS B	3.8	28.3	0.89	1.00	1.07	59.8
9	R2	39	6.0	39	6.0	0.557	18.9	LOS B	3.4	25.3	0.87	1.00	1.07	60.1
Approach		619	6.0	619	6.0	0.557	12.3	LOS B	3.8	28.3	0.89	1.00	1.07	59.8
West: SH16 W														
10	L2	33	6.0	33	6.0	0.680	12.7	LOS B	8.7	65.5	0.94	0.96	1.22	59.2
11	T1	1249	9.0	1249	9.0	0.680	14.2	LOS B	8.7	65.5	0.94	1.00	1.25	59.5
Approach		1282	8.9	1282	8.9	0.680	14.2	LOS B	8.7	65.5	0.94	1.00	1.25	59.5
All Vehicles		4259	8.1	4259	8.1	0.740	10.5	LOS B	12.7	96.0	0.64	0.71	0.77	61.9

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville-Riverhead Highway 100%sens2 2038 (Site Folder: Clause 23 Scenarios_Future_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1184	9.0	1184	9.0	0.529	6.4	LOS A	5.7	43.2	0.35	0.48	0.35	64.8
6	R2	449	6.0	449	6.0	0.529	12.3	LOS B	5.6	41.4	0.37	0.57	0.37	62.8
Approach		1633	8.2	1633	8.2	0.529	8.0	LOS A	5.7	43.2	0.36	0.50	0.36	64.2
North: Coatesville Riverhead Highway														
7	L2	978	6.0	978	6.0	0.953	40.4	LOS D	17.1	125.9	0.99	1.57	3.11	40.8
9	R2	58	6.0	58	6.0	0.953	50.8	LOS E	14.3	105.4	0.99	1.55	3.12	39.6
Approach		1036	6.0	1036	6.0	0.953	41.0	LOS D	17.1	125.9	0.99	1.57	3.12	40.8
West: SH16 W														
10	L2	25	6.0	25	6.0	0.634	9.4	LOS A	6.7	50.8	0.80	0.79	0.90	61.1
11	T1	1387	9.0	1387	9.0	0.634	10.6	LOS B	6.7	50.8	0.81	0.82	0.94	62.3
Approach		1412	8.9	1412	8.9	0.634	10.6	LOS B	6.7	50.8	0.81	0.82	0.94	62.3
All Vehicles		4081	7.9	4081	7.9	0.953	17.3	LOS B	17.1	125.9	0.68	0.88	1.26	55.7

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

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MOVEMENT SUMMARY

Site: 101 [SH16/Coatesville-Riverhead Highway 100%sens2 2038 (Site Folder: Clause 23 Scenarios_Future_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: SH16 E														
5	T1	1730	9.0	1730	9.0	0.758	6.5	LOS A	13.9	105.1	0.43	0.45	0.43	64.3
6	R2	686	6.0	686	6.0	0.758	12.4	LOS B	13.2	97.9	0.48	0.52	0.48	62.2
Approach		2416	8.1	2416	8.1	0.758	8.2	LOS A	13.9	105.1	0.44	0.47	0.44	63.6
North: Coatesville Riverhead Highway														
7	L2	615	6.0	615	6.0	0.608	12.8	LOS B	4.4	32.5	0.91	1.02	1.14	58.9
9	R2	39	6.0	39	6.0	0.608	20.0	LOS B	3.9	28.9	0.89	1.02	1.14	59.1
Approach		654	6.0	654	6.0	0.608	13.2	LOS B	4.4	32.5	0.91	1.02	1.14	58.9
West: SH16 W														
10	L2	33	6.0	33	6.0	0.724	15.0	LOS B	10.5	79.0	0.99	1.06	1.42	57.1
11	T1	1251	9.0	1251	9.0	0.724	16.8	LOS B	10.5	79.0	0.99	1.09	1.45	57.2
Approach		1284	8.9	1284	8.9	0.724	16.7	LOS B	10.5	79.0	0.99	1.09	1.45	57.2
All Vehicles		4354	8.1	4354	8.1	0.758	11.5	LOS B	13.9	105.1	0.67	0.74	0.84	60.9

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

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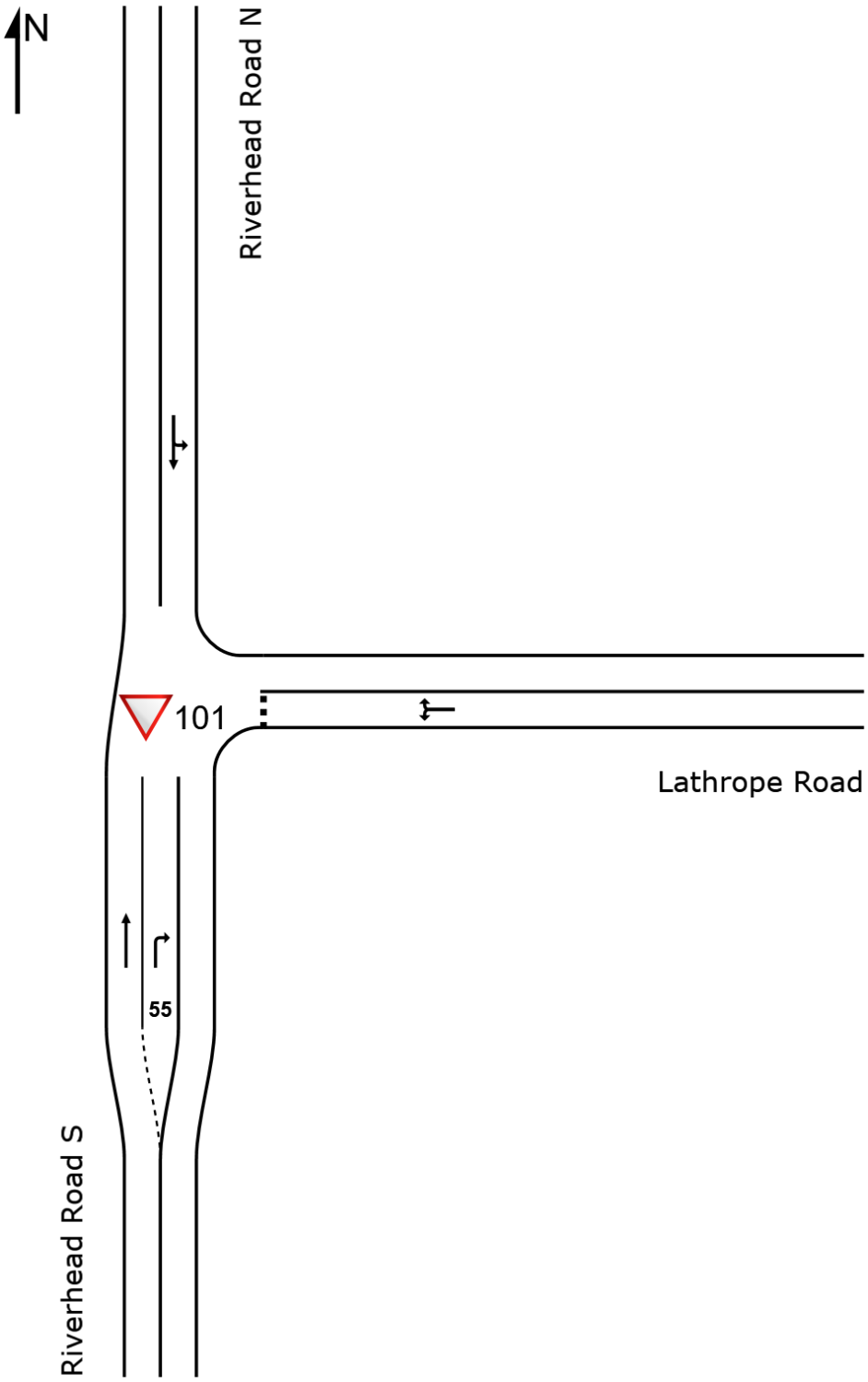
Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

SITE LAYOUT

Site: 101 [Lathrope Road / Riverhead Road (Site Folder: Base_AM)]

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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Organisation: FLOW TRANSPORTATION SPECIALISTS LIMITED | Licence: PLUS / Enterprise | Created: Wednesday, 30 November 2022 2:36:48 PM
Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Lathrope Road / Riverhead Road (Site Folder: Base_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Riverhead Road S														
2	T1	252	6.0	265	6.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	5	0.0	5	0.0	0.004	5.3	LOS A	0.0	0.1	0.34	0.52	0.34	45.5
Approach		257	5.9	271	5.9	0.141	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.6
East: Lathrope Road														
4	L2	5	0.0	5	0.0	0.012	6.3	LOS A	0.0	0.3	0.41	0.60	0.41	52.1
6	R2	5	0.0	5	0.0	0.012	8.9	LOS A	0.0	0.3	0.41	0.60	0.41	51.6
Approach		10	0.0	11	0.0	0.012	7.6	LOS A	0.0	0.3	0.41	0.60	0.41	51.8
North: Riverhead Road N														
7	L2	5	0.0	5	0.0	0.131	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	58.0
8	T1	228	6.0	240	6.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		233	5.9	245	5.9	0.131	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.5
All Vehicles		500	5.8	526	5.8	0.141	0.3	NA	0.0	0.3	0.01	0.02	0.01	59.4

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

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MOVEMENT SUMMARY

Site: 101 [Lathrope Road / Riverhead Road (Site Folder: Base_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Riverhead Road S														
2	T1	282	6.0	297	6.0	0.158	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	5	0.0	5	0.0	0.003	5.1	LOS A	0.0	0.1	0.29	0.51	0.29	45.6
Approach		287	5.9	302	5.9	0.158	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.6
East: Lathrope Road														
4	L2	5	0.0	5	0.0	0.012	6.1	LOS A	0.0	0.3	0.36	0.59	0.36	52.2
6	R2	5	0.0	5	0.0	0.012	8.7	LOS A	0.0	0.3	0.36	0.59	0.36	51.7
Approach		10	0.0	11	0.0	0.012	7.4	LOS A	0.0	0.3	0.36	0.59	0.36	51.9
North: Riverhead Road N														
7	L2	5	0.0	5	0.0	0.102	5.5	LOS A	0.0	0.0	0.00	0.02	0.00	57.9
8	T1	177	6.0	186	6.0	0.102	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
Approach		182	5.8	192	5.8	0.102	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4
All Vehicles		479	5.7	504	5.7	0.158	0.3	NA	0.0	0.3	0.01	0.02	0.01	59.3

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

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MOVEMENT SUMMARY

Site: 101 [Lathrope Road / Riverhead Road (Site Folder: Future_AM - 2038 100%)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Riverhead Road S														
2	T1	289	6.0	304	6.0	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	86	0.0	91	0.0	0.067	5.6	LOS A	0.3	2.1	0.39	0.59	0.39	45.4
Approach		375	4.6	395	4.6	0.163	1.3	NA	0.3	2.1	0.09	0.13	0.09	55.8
East: Lathrope Road														
4	L2	139	0.0	146	0.0	0.128	6.6	LOS A	0.5	3.7	0.39	0.62	0.39	52.4
6	R2	5	0.0	5	0.0	0.128	11.6	LOS B	0.5	3.7	0.39	0.62	0.39	51.9
Approach		144	0.0	152	0.0	0.128	6.8	LOS A	0.5	3.7	0.39	0.62	0.39	52.4
North: Riverhead Road N														
7	L2	5	0.0	5	0.0	0.159	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.0
8	T1	278	6.0	293	6.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		283	5.9	298	5.9	0.159	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.6
All Vehicles		802	4.2	844	4.2	0.163	1.9	NA	0.5	3.7	0.11	0.18	0.11	56.4

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

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MOVEMENT SUMMARY

Site: 101 [Lathrope Road / Riverhead Road (Site Folder: Future_PM - 2038 100%)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Riverhead Road S														
2	T1	328	6.0	345	6.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	108	0.0	114	0.0	0.079	5.4	LOS A	0.4	2.5	0.35	0.57	0.35	45.5
Approach		436	4.5	459	4.5	0.185	1.4	NA	0.4	2.5	0.09	0.14	0.09	55.5
East: Lathrope Road														
4	L2	75	0.0	79	0.0	0.070	6.3	LOS A	0.3	1.9	0.33	0.59	0.33	52.6
6	R2	5	0.0	5	0.0	0.070	11.3	LOS B	0.3	1.9	0.33	0.59	0.33	52.1
Approach		80	0.0	84	0.0	0.070	6.6	LOS A	0.3	1.9	0.33	0.59	0.33	52.6
North: Riverhead Road N														
7	L2	5	0.0	5	0.0	0.125	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	58.0
8	T1	218	6.0	229	6.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.5
Approach		223	5.9	235	5.9	0.125	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.5
All Vehicles		739	4.4	778	4.4	0.185	1.6	NA	0.4	2.5	0.09	0.15	0.09	56.3

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

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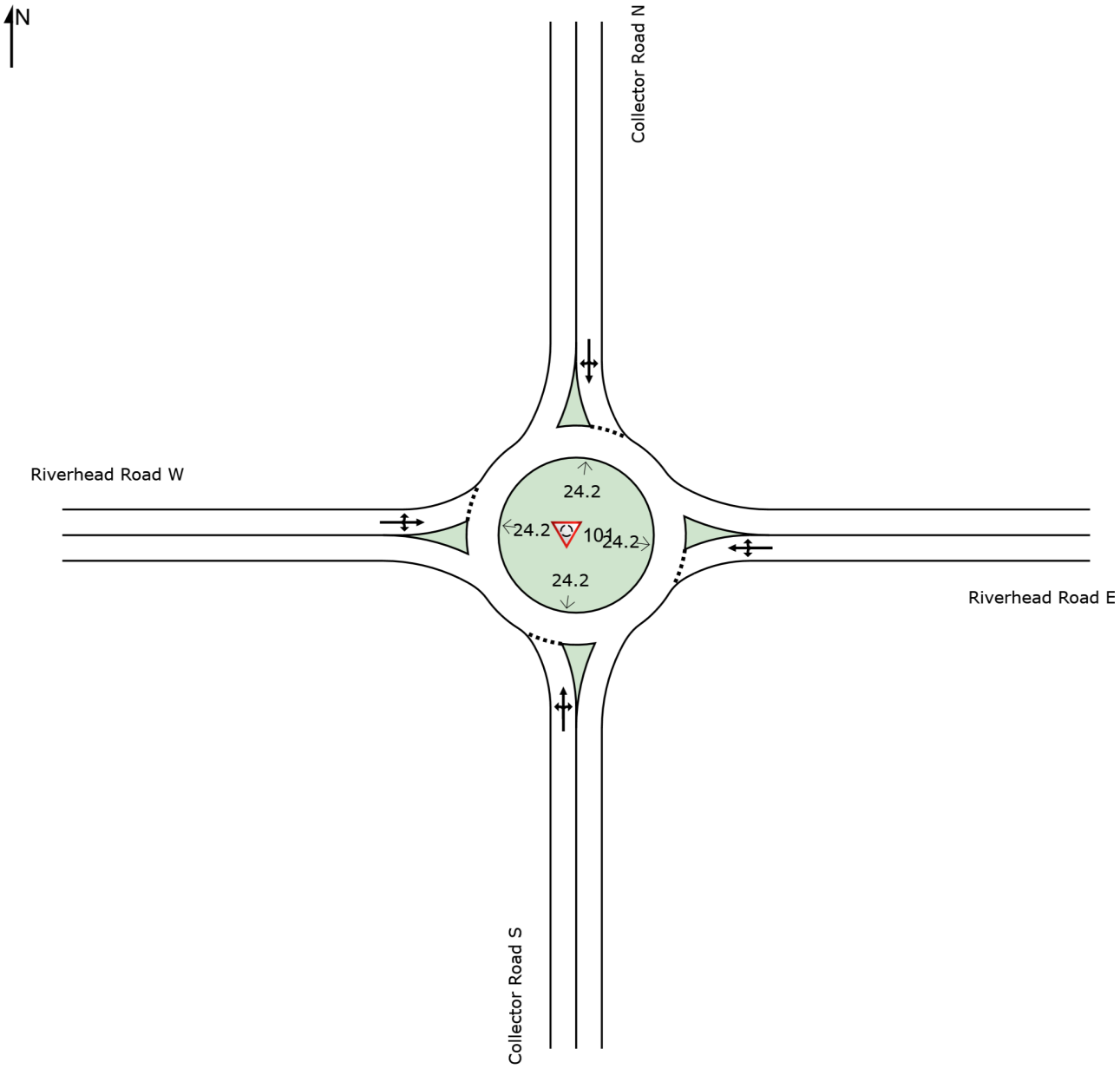
SITE LAYOUT

Site: 101 [Riverhead Road/Site collector road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

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



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MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Site collector road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Collector Road S														
1	L2	1	6.0	1	6.0	0.003	4.1	LOS A	0.0	0.1	0.44	0.46	0.44	46.3
2	T1	1	6.0	1	6.0	0.003	3.9	LOS A	0.0	0.1	0.44	0.46	0.44	47.5
3	R2	1	6.0	1	6.0	0.003	8.9	LOS A	0.0	0.1	0.44	0.46	0.44	47.8
Approach		3	6.0	3	6.0	0.003	5.6	LOS A	0.0	0.1	0.44	0.46	0.44	47.2
East: Riverhead Road E														
4	L2	1	6.0	1	6.0	0.203	2.6	LOS A	1.2	9.0	0.04	0.28	0.04	48.4
5	T1	323	6.0	340	6.0	0.203	2.5	LOS A	1.2	9.0	0.04	0.28	0.04	49.7
6	R2	1	6.0	1	6.0	0.203	7.4	LOS A	1.2	9.0	0.04	0.28	0.04	50.0
Approach		325	6.0	342	6.0	0.203	2.5	LOS A	1.2	9.0	0.04	0.28	0.04	49.7
North: Collector Road N														
7	L2	1	6.0	1	6.0	0.003	4.5	LOS A	0.0	0.1	0.49	0.48	0.49	46.1
8	T1	1	6.0	1	6.0	0.003	4.3	LOS A	0.0	0.1	0.49	0.48	0.49	47.3
9	R2	1	6.0	1	6.0	0.003	9.3	LOS A	0.0	0.1	0.49	0.48	0.49	47.6
Approach		3	6.0	3	6.0	0.003	6.1	LOS A	0.0	0.1	0.49	0.48	0.49	47.0
West: Riverhead Road W														
10	L2	1	6.0	1	6.0	0.251	2.6	LOS A	1.6	11.6	0.04	0.28	0.04	48.4
11	T1	402	6.0	423	6.0	0.251	2.5	LOS A	1.6	11.6	0.04	0.28	0.04	49.7
12	R2	1	6.0	1	6.0	0.251	7.4	LOS A	1.6	11.6	0.04	0.28	0.04	50.0
Approach		404	6.0	425	6.0	0.251	2.5	LOS A	1.6	11.6	0.04	0.28	0.04	49.7
All Vehicles		735	6.0	774	6.0	0.251	2.5	LOS A	1.6	11.6	0.04	0.28	0.04	49.7

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

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MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Site collector road (Site Folder: Base_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Collector Road S														
1	L2	1	6.0	1	6.0	0.003	4.4	LOS A	0.0	0.1	0.47	0.47	0.47	46.2
2	T1	1	6.0	1	6.0	0.003	4.2	LOS A	0.0	0.1	0.47	0.47	0.47	47.4
3	R2	1	6.0	1	6.0	0.003	9.2	LOS A	0.0	0.1	0.47	0.47	0.47	47.7
Approach		3	6.0	3	6.0	0.003	5.9	LOS A	0.0	0.1	0.47	0.47	0.47	47.1
East: Riverhead Road E														
4	L2	1	6.0	1	6.0	0.239	2.6	LOS A	1.5	11.0	0.04	0.28	0.04	48.4
5	T1	382	6.0	402	6.0	0.239	2.5	LOS A	1.5	11.0	0.04	0.28	0.04	49.7
6	R2	1	6.0	1	6.0	0.239	7.4	LOS A	1.5	11.0	0.04	0.28	0.04	50.0
Approach		384	6.0	404	6.0	0.239	2.5	LOS A	1.5	11.0	0.04	0.28	0.04	49.7
North: Collector Road N														
7	L2	1	6.0	1	6.0	0.003	4.5	LOS A	0.0	0.1	0.48	0.48	0.48	46.2
8	T1	1	6.0	1	6.0	0.003	4.3	LOS A	0.0	0.1	0.48	0.48	0.48	47.3
9	R2	1	6.0	1	6.0	0.003	9.3	LOS A	0.0	0.1	0.48	0.48	0.48	47.6
Approach		3	6.0	3	6.0	0.003	6.0	LOS A	0.0	0.1	0.48	0.48	0.48	47.0
West: Riverhead Road W														
10	L2	1	6.0	1	6.0	0.245	2.6	LOS A	1.5	11.4	0.04	0.28	0.04	48.4
11	T1	392	6.0	413	6.0	0.245	2.5	LOS A	1.5	11.4	0.04	0.28	0.04	49.7
12	R2	1	6.0	1	6.0	0.245	7.4	LOS A	1.5	11.4	0.04	0.28	0.04	50.0
Approach		394	6.0	415	6.0	0.245	2.5	LOS A	1.5	11.4	0.04	0.28	0.04	49.7
All Vehicles		784	6.0	825	6.0	0.245	2.5	LOS A	1.5	11.4	0.04	0.28	0.04	49.7

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

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MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Site collector road (Site Folder: Future_AM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Collector Road S														
1	L2	10	6.0	11	6.0	0.333	5.3	LOS A	2.2	16.1	0.66	0.70	0.66	45.0
2	T1	104	6.0	109	6.0	0.333	5.2	LOS A	2.2	16.1	0.66	0.70	0.66	46.1
3	R2	186	6.0	196	6.0	0.333	10.1	LOS B	2.2	16.1	0.66	0.70	0.66	46.3
Approach		300	6.0	316	6.0	0.333	8.3	LOS A	2.2	16.1	0.66	0.70	0.66	46.2
East: Riverhead Road E														
4	L2	174	6.0	183	6.0	0.468	3.8	LOS A	3.9	28.5	0.53	0.46	0.53	46.6
5	T1	339	6.0	357	6.0	0.468	3.6	LOS A	3.9	28.5	0.53	0.46	0.53	47.8
6	R2	34	6.0	36	6.0	0.468	8.6	LOS A	3.9	28.5	0.53	0.46	0.53	48.1
Approach		547	6.0	576	6.0	0.468	4.0	LOS A	3.9	28.5	0.53	0.46	0.53	47.4
North: Collector Road N														
7	L2	103	6.0	108	6.0	0.348	7.2	LOS A	2.4	17.6	0.79	0.80	0.79	45.3
8	T1	118	6.0	124	6.0	0.348	7.0	LOS A	2.4	17.6	0.79	0.80	0.79	46.5
9	R2	34	6.0	36	6.0	0.348	12.0	LOS B	2.4	17.6	0.79	0.80	0.79	46.8
Approach		255	6.0	268	6.0	0.348	7.7	LOS A	2.4	17.6	0.79	0.80	0.79	46.0
West: Riverhead Road W														
10	L2	11	6.0	12	6.0	0.463	5.0	LOS A	3.5	25.4	0.68	0.57	0.68	46.0
11	T1	427	6.0	449	6.0	0.463	4.9	LOS A	3.5	25.4	0.68	0.57	0.68	47.2
12	R2	10	6.0	11	6.0	0.463	9.8	LOS A	3.5	25.4	0.68	0.57	0.68	47.5
Approach		448	6.0	472	6.0	0.463	5.0	LOS A	3.5	25.4	0.68	0.57	0.68	47.2
All Vehicles		1550	6.0	1632	6.0	0.468	5.7	LOS A	3.9	28.5	0.64	0.59	0.64	46.9

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

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Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Site collector road (Site Folder: Future_PM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Collector Road S														
1	L2	10	6.0	11	6.0	0.220	5.8	LOS A	1.4	10.0	0.67	0.72	0.67	44.9
2	T1	64	6.0	67	6.0	0.220	5.6	LOS A	1.4	10.0	0.67	0.72	0.67	45.9
3	R2	108	6.0	114	6.0	0.220	10.6	LOS B	1.4	10.0	0.67	0.72	0.67	46.2
Approach		182	6.0	192	6.0	0.220	8.6	LOS A	1.4	10.0	0.67	0.72	0.67	46.0
East: Riverhead Road E														
4	L2	132	6.0	139	6.0	0.489	3.4	LOS A	4.1	30.4	0.43	0.43	0.43	46.7
5	T1	406	6.0	427	6.0	0.489	3.3	LOS A	4.1	30.4	0.43	0.43	0.43	47.9
6	R2	86	6.0	91	6.0	0.489	8.2	LOS A	4.1	30.4	0.43	0.43	0.43	48.2
Approach		624	6.0	657	6.0	0.489	4.0	LOS A	4.1	30.4	0.43	0.43	0.43	47.7
North: Collector Road N														
7	L2	51	6.0	54	6.0	0.172	5.9	LOS A	1.0	7.7	0.68	0.67	0.68	45.9
8	T1	69	6.0	73	6.0	0.172	5.7	LOS A	1.0	7.7	0.68	0.67	0.68	47.1
9	R2	17	6.0	18	6.0	0.172	10.7	LOS B	1.0	7.7	0.68	0.67	0.68	47.4
Approach		137	6.0	144	6.0	0.172	6.4	LOS A	1.0	7.7	0.68	0.67	0.68	46.7
West: Riverhead Road W														
10	L2	29	6.0	31	6.0	0.437	4.5	LOS A	3.1	23.1	0.59	0.51	0.59	46.3
11	T1	409	6.0	431	6.0	0.437	4.3	LOS A	3.1	23.1	0.59	0.51	0.59	47.5
12	R2	21	6.0	22	6.0	0.437	9.3	LOS A	3.1	23.1	0.59	0.51	0.59	47.8
Approach		459	6.0	483	6.0	0.437	4.6	LOS A	3.1	23.1	0.59	0.51	0.59	47.4
All Vehicles		1402	6.0	1476	6.0	0.489	5.0	LOS A	4.1	30.4	0.54	0.52	0.54	47.3

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

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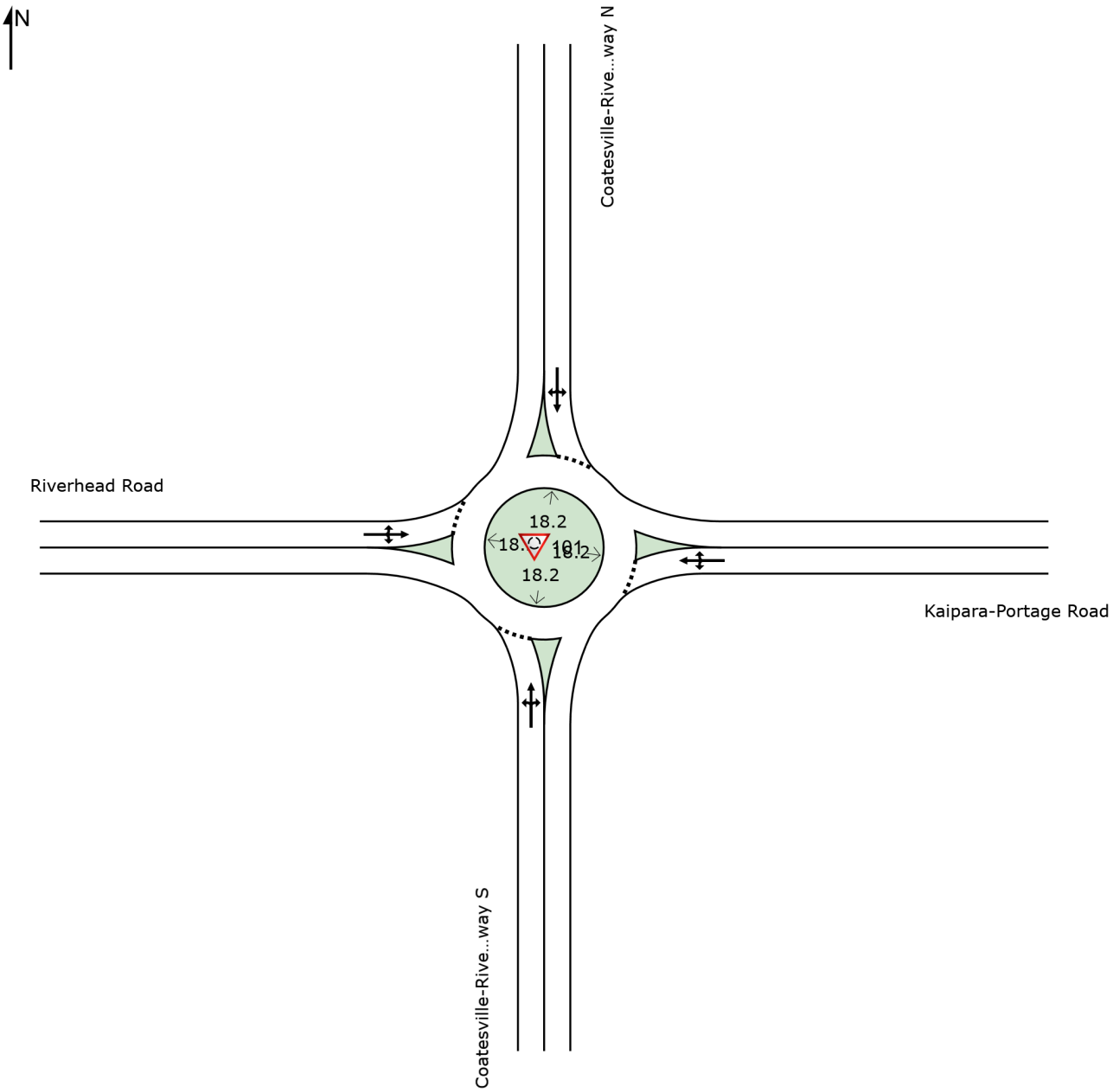
SITE LAYOUT

Site: 101 [Coatesville-Riverhead Highway/Riverhead Road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

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



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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	60	6.0	63	6.0	0.276	4.8	LOS A	1.7	12.5	0.53	0.59	0.53	45.8
2	T1	140	6.0	147	6.0	0.276	4.7	LOS A	1.7	12.5	0.53	0.59	0.53	46.8
3	R2	70	6.0	74	6.0	0.276	9.1	LOS A	1.7	12.5	0.53	0.59	0.53	46.9
Approach		270	6.0	284	6.0	0.276	5.9	LOS A	1.7	12.5	0.53	0.59	0.53	46.6
East: Kaipara-Portage Road														
4	L2	120	6.0	126	6.0	0.231	7.5	LOS A	1.5	10.8	0.75	0.77	0.75	45.2
5	T1	33	6.0	35	6.0	0.231	7.5	LOS A	1.5	10.8	0.75	0.77	0.75	46.2
6	R2	6	6.0	6	6.0	0.231	11.8	LOS B	1.5	10.8	0.75	0.77	0.75	46.3
Approach		159	6.0	167	6.0	0.231	7.7	LOS A	1.5	10.8	0.75	0.77	0.75	45.4
North: Coatesville-Riverhead Highway N														
7	L2	4	6.0	4	6.0	0.504	4.3	LOS A	3.9	29.0	0.51	0.56	0.51	45.6
8	T1	350	6.0	368	6.0	0.504	4.3	LOS A	3.9	29.0	0.51	0.56	0.51	46.6
9	R2	231	6.0	243	6.0	0.504	8.6	LOS A	3.9	29.0	0.51	0.56	0.51	46.7
Approach		585	6.0	616	6.0	0.504	6.0	LOS A	3.9	29.0	0.51	0.56	0.51	46.6
West: Riverhead Road														
10	L2	313	6.0	329	6.0	0.383	4.5	LOS A	2.7	19.6	0.53	0.58	0.53	46.3
11	T1	35	6.0	37	6.0	0.383	4.5	LOS A	2.7	19.6	0.53	0.58	0.53	47.3
12	R2	54	6.0	57	6.0	0.383	8.8	LOS A	2.7	19.6	0.53	0.58	0.53	47.4
Approach		402	6.0	423	6.0	0.383	5.1	LOS A	2.7	19.6	0.53	0.58	0.53	46.5
All Vehicles		1416	6.0	1491	6.0	0.504	5.9	LOS A	3.9	29.0	0.55	0.59	0.55	46.4

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Road (Site Folder: Base_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	51	6.0	54	6.0	0.317	5.3	LOS A	2.0	15.0	0.61	0.63	0.61	45.7
2	T1	190	6.0	200	6.0	0.317	5.3	LOS A	2.0	15.0	0.61	0.63	0.61	46.7
3	R2	50	6.0	53	6.0	0.317	9.6	LOS A	2.0	15.0	0.61	0.63	0.61	46.8
Approach		291	6.0	306	6.0	0.317	6.0	LOS A	2.0	15.0	0.61	0.63	0.61	46.5
East: Kaipara-Portage Road														
4	L2	95	6.0	100	6.0	0.191	7.0	LOS A	1.2	8.8	0.73	0.73	0.73	45.4
5	T1	35	6.0	37	6.0	0.191	7.0	LOS A	1.2	8.8	0.73	0.73	0.73	46.4
6	R2	5	6.0	5	6.0	0.191	11.3	LOS B	1.2	8.8	0.73	0.73	0.73	46.5
Approach		135	6.0	142	6.0	0.191	7.2	LOS A	1.2	8.8	0.73	0.73	0.73	45.7
North: Coatesville-Riverhead Highway N														
7	L2	10	6.0	11	6.0	0.504	4.6	LOS A	4.0	29.2	0.56	0.60	0.56	45.2
8	T1	250	6.0	263	6.0	0.504	4.5	LOS A	4.0	29.2	0.56	0.60	0.56	46.2
9	R2	296	6.0	312	6.0	0.504	8.9	LOS A	4.0	29.2	0.56	0.60	0.56	46.3
Approach		556	6.0	585	6.0	0.504	6.8	LOS A	4.0	29.2	0.56	0.60	0.56	46.2
West: Riverhead Road														
10	L2	249	6.0	262	6.0	0.389	4.8	LOS A	2.7	20.1	0.57	0.60	0.57	46.1
11	T1	89	6.0	94	6.0	0.389	4.7	LOS A	2.7	20.1	0.57	0.60	0.57	47.1
12	R2	54	6.0	57	6.0	0.389	9.1	LOS A	2.7	20.1	0.57	0.60	0.57	47.2
Approach		392	6.0	413	6.0	0.389	5.4	LOS A	2.7	20.1	0.57	0.60	0.57	46.5
All Vehicles		1374	6.0	1446	6.0	0.504	6.3	LOS A	4.0	29.2	0.59	0.62	0.59	46.3

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Road (Site Folder: Future_AM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	159	6.0	159	6.0	0.678	9.8	LOS A	7.8	57.2	0.92	0.99	1.14	43.1
2	T1	140	6.0	140	6.0	0.678	9.8	LOS A	7.8	57.2	0.92	0.99	1.14	43.9
3	R2	273	6.0	273	6.0	0.678	14.1	LOS B	7.8	57.2	0.92	0.99	1.14	44.0
Approach		572	6.0	572	6.0	0.678	11.9	LOS B	7.8	57.2	0.92	0.99	1.14	43.7
East: Kaipara-Portage Road														
4	L2	340	6.0	340	6.0	0.888	47.8	LOS D	16.6	122.5	1.00	1.69	2.56	30.1
5	T1	36	6.0	36	6.0	0.888	47.7	LOS D	16.6	122.5	1.00	1.69	2.56	30.6
6	R2	35	6.0	35	6.0	0.888	52.1	LOS E	16.6	122.5	1.00	1.69	2.56	30.6
Approach		411	6.0	411	6.0	0.888	48.1	LOS D	16.6	122.5	1.00	1.69	2.56	30.2
North: Coatesville-Riverhead Highway N														
7	L2	29	6.0	29	6.0	0.899	23.8	LOS C	20.8	153.4	1.00	1.51	2.10	37.1
8	T1	350	6.0	350	6.0	0.899	23.8	LOS C	20.8	153.4	1.00	1.51	2.10	37.7
9	R2	383	6.0	383	6.0	0.899	28.1	LOS C	20.8	153.4	1.00	1.51	2.10	37.8
Approach		762	6.0	762	6.0	0.899	25.9	LOS C	20.8	153.4	1.00	1.51	2.10	37.7
West: Riverhead Road														
10	L2	464	6.0	464	6.0	0.815	14.2	LOS B	13.3	97.6	1.00	1.17	1.49	41.3
11	T1	43	6.0	43	6.0	0.815	14.2	LOS B	13.3	97.6	1.00	1.17	1.49	42.1
12	R2	192	6.0	192	6.0	0.815	18.5	LOS B	13.3	97.6	1.00	1.17	1.49	42.2
Approach		699	6.0	699	6.0	0.815	15.4	LOS B	13.3	97.6	1.00	1.17	1.49	41.6
All Vehicles		2444	6.0	2444	6.0	0.899	23.4	LOS C	20.8	153.4	0.98	1.32	1.78	38.4

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Road (Site Folder: Future_PM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	178	6.0	187	6.0	0.693	10.8	LOS B	8.2	60.0	0.94	1.04	1.22	42.9
2	T1	190	6.0	200	6.0	0.693	10.8	LOS B	8.2	60.0	0.94	1.04	1.22	43.8
3	R2	164	6.0	173	6.0	0.693	15.1	LOS B	8.2	60.0	0.94	1.04	1.22	43.8
Approach		532	6.0	560	6.0	0.693	12.1	LOS B	8.2	60.0	0.94	1.04	1.22	43.5
East: Kaipara-Portage Road														
4	L2	224	6.0	236	6.0	0.603	15.8	LOS B	6.0	44.0	1.00	1.15	1.33	40.9
5	T1	42	6.0	44	6.0	0.603	15.8	LOS B	6.0	44.0	1.00	1.15	1.33	41.7
6	R2	30	6.0	32	6.0	0.603	20.1	LOS C	6.0	44.0	1.00	1.15	1.33	41.7
Approach		296	6.0	312	6.0	0.603	16.3	LOS B	6.0	44.0	1.00	1.15	1.33	41.1
North: Coatesville-Riverhead Highway N														
7	L2	38	6.0	40	6.0	0.803	13.5	LOS B	12.5	92.3	0.99	1.14	1.45	41.1
8	T1	250	6.0	263	6.0	0.803	13.5	LOS B	12.5	92.3	0.99	1.14	1.45	41.9
9	R2	396	6.0	417	6.0	0.803	17.8	LOS B	12.5	92.3	0.99	1.14	1.45	42.0
Approach		684	6.0	720	6.0	0.803	16.0	LOS B	12.5	92.3	0.99	1.14	1.45	41.9
West: Riverhead Road														
10	L2	333	6.0	351	6.0	0.695	9.3	LOS A	8.3	61.2	0.91	0.95	1.12	43.7
11	T1	93	6.0	98	6.0	0.695	9.3	LOS A	8.3	61.2	0.91	0.95	1.12	44.6
12	R2	165	6.0	174	6.0	0.695	13.6	LOS B	8.3	61.2	0.91	0.95	1.12	44.7
Approach		591	6.0	622	6.0	0.695	10.5	LOS B	8.3	61.2	0.91	0.95	1.12	44.1
All Vehicles		2103	6.0	2214	6.0	0.803	13.5	LOS B	12.5	92.3	0.96	1.06	1.28	42.8

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

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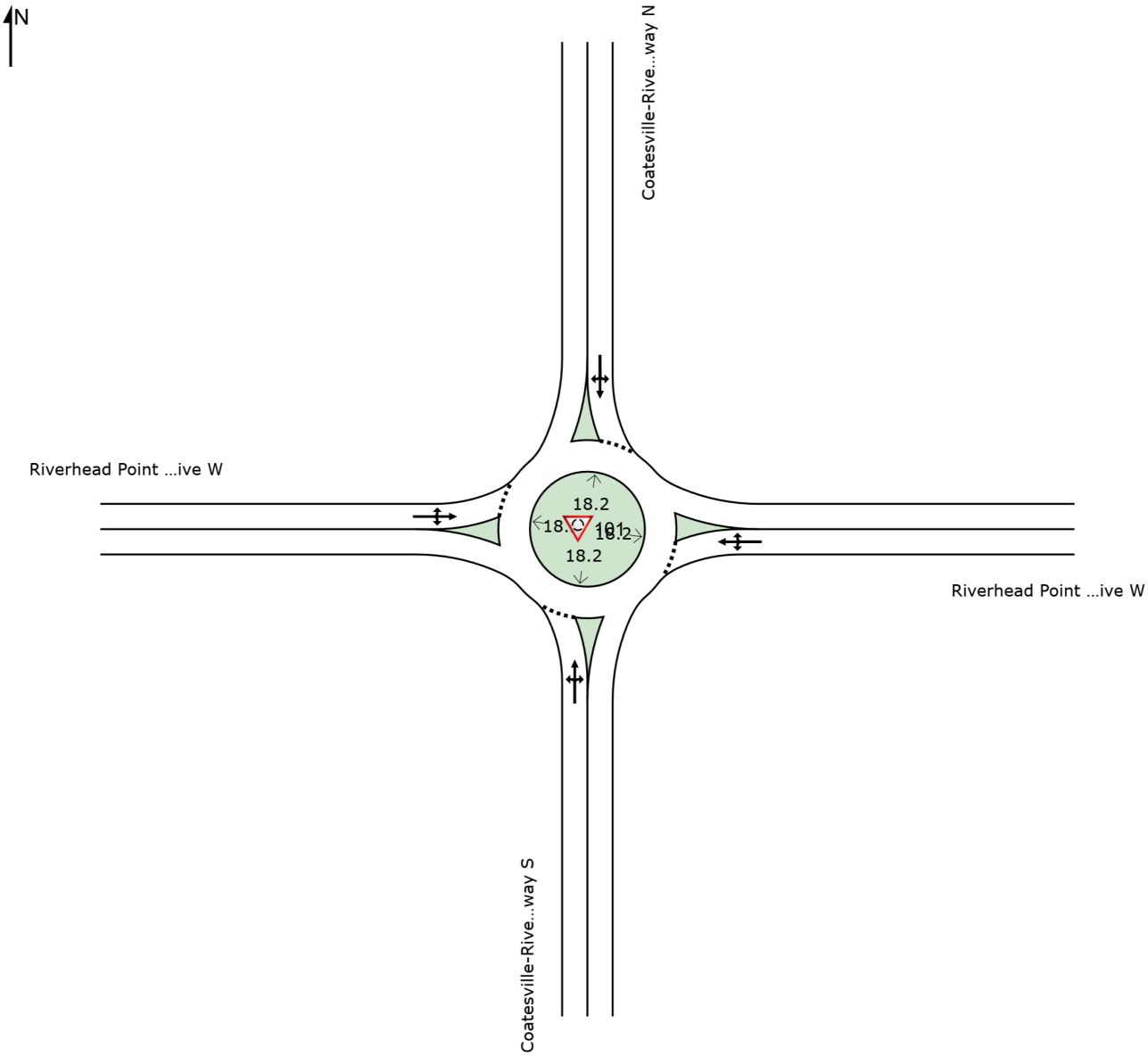
SITE LAYOUT

Site: 101 [Coatesville-Riverhead Highway/Riverhead Point Drive/Site collector road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

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



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Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Point Drive/Site collector road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	1	6.0	1	6.0	0.197	3.3	LOS A	1.2	9.1	0.25	0.40	0.25	46.8
2	T1	210	6.0	221	6.0	0.197	3.3	LOS A	1.2	9.1	0.25	0.40	0.25	47.8
3	R2	40	6.0	42	6.0	0.197	7.6	LOS A	1.2	9.1	0.25	0.40	0.25	47.9
Approach		251	6.0	264	6.0	0.197	4.0	LOS A	1.2	9.1	0.25	0.40	0.25	47.8
East: Riverhead Point Drive W														
4	L2	100	6.0	105	6.0	0.191	6.0	LOS A	1.1	8.0	0.62	0.70	0.62	45.2
5	T1	1	6.0	1	6.0	0.191	6.0	LOS A	1.1	8.0	0.62	0.70	0.62	46.2
6	R2	60	6.0	63	6.0	0.191	10.3	LOS B	1.1	8.0	0.62	0.70	0.62	46.3
Approach		161	6.0	169	6.0	0.191	7.6	LOS A	1.1	8.0	0.62	0.70	0.62	45.6
North: Coatesville-Riverhead Highway N														
7	L2	48	6.0	51	6.0	0.377	3.2	LOS A	2.6	19.5	0.21	0.35	0.21	47.2
8	T1	476	6.0	501	6.0	0.377	3.2	LOS A	2.6	19.5	0.21	0.35	0.21	48.3
9	R2	1	6.0	1	6.0	0.377	7.6	LOS A	2.6	19.5	0.21	0.35	0.21	48.4
Approach		525	6.0	553	6.0	0.377	3.2	LOS A	2.6	19.5	0.21	0.35	0.21	48.2
West: Riverhead Point Drive W														
10	L2	1	6.0	1	6.0	0.003	4.5	LOS A	0.0	0.1	0.45	0.48	0.45	45.9
11	T1	1	6.0	1	6.0	0.003	4.4	LOS A	0.0	0.1	0.45	0.48	0.45	47.0
12	R2	1	6.0	1	6.0	0.003	8.8	LOS A	0.0	0.1	0.45	0.48	0.45	47.0
Approach		3	6.0	3	6.0	0.003	5.9	LOS A	0.0	0.1	0.45	0.48	0.45	46.6
All Vehicles		940	6.0	989	6.0	0.377	4.2	LOS A	2.6	19.5	0.29	0.42	0.29	47.6

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

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Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Point Drive/Site collector road (Site Folder: Base_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	1	6.0	1	6.0	0.261	3.4	LOS A	1.7	12.5	0.28	0.46	0.28	46.3
2	T1	221	6.0	233	6.0	0.261	3.4	LOS A	1.7	12.5	0.28	0.46	0.28	47.4
3	R2	111	6.0	117	6.0	0.261	7.7	LOS A	1.7	12.5	0.28	0.46	0.28	47.4
Approach		333	6.0	351	6.0	0.261	4.8	LOS A	1.7	12.5	0.28	0.46	0.28	47.4
East: Riverhead Point Drive W														
4	L2	72	6.0	76	6.0	0.151	4.9	LOS A	0.8	6.2	0.52	0.63	0.52	45.5
5	T1	1	6.0	1	6.0	0.151	4.9	LOS A	0.8	6.2	0.52	0.63	0.52	46.5
6	R2	70	6.0	74	6.0	0.151	9.2	LOS A	0.8	6.2	0.52	0.63	0.52	46.6
Approach		143	6.0	151	6.0	0.151	7.0	LOS A	0.8	6.2	0.52	0.63	0.52	46.1
North: Coatesville-Riverhead Highway N														
7	L2	76	6.0	80	6.0	0.330	3.7	LOS A	2.1	15.7	0.35	0.42	0.35	46.8
8	T1	323	6.0	340	6.0	0.330	3.7	LOS A	2.1	15.7	0.35	0.42	0.35	47.8
9	R2	1	6.0	1	6.0	0.330	8.0	LOS A	2.1	15.7	0.35	0.42	0.35	47.9
Approach		400	6.0	421	6.0	0.330	3.7	LOS A	2.1	15.7	0.35	0.42	0.35	47.6
West: Riverhead Point Drive W														
10	L2	1	6.0	1	6.0	0.003	5.0	LOS A	0.0	0.1	0.51	0.50	0.51	45.7
11	T1	1	6.0	1	6.0	0.003	5.0	LOS A	0.0	0.1	0.51	0.50	0.51	46.7
12	R2	1	6.0	1	6.0	0.003	9.3	LOS A	0.0	0.1	0.51	0.50	0.51	46.8
Approach		3	6.0	3	6.0	0.003	6.4	LOS A	0.0	0.1	0.51	0.50	0.51	46.4
All Vehicles		879	6.0	925	6.0	0.330	4.7	LOS A	2.1	15.7	0.35	0.47	0.35	47.3

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Point Drive/Site collector road (Site Folder: Future_AM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	89	6.0	89	6.0	0.455	6.2	LOS A	3.2	23.8	0.72	0.72	0.72	45.4
2	T1	281	6.0	281	6.0	0.455	6.1	LOS A	3.2	23.8	0.72	0.72	0.72	46.4
3	R2	40	6.0	40	6.0	0.455	10.5	LOS B	3.2	23.8	0.72	0.72	0.72	46.5
Approach		410	6.0	410	6.0	0.455	6.6	LOS A	3.2	23.8	0.72	0.72	0.72	46.2
East: Riverhead Point Drive W														
4	L2	100	6.0	100	6.0	0.722	26.6	LOS C	8.5	62.2	1.00	1.27	1.62	36.3
5	T1	117	6.0	117	6.0	0.722	26.6	LOS C	8.5	62.2	1.00	1.27	1.62	36.9
6	R2	89	6.0	89	6.0	0.722	30.9	LOS C	8.5	62.2	1.00	1.27	1.62	37.0
Approach		306	6.0	306	6.0	0.722	27.8	LOS C	8.5	62.2	1.00	1.27	1.62	36.7
North: Coatesville-Riverhead Highway N														
7	L2	73	6.0	73	6.0	0.845	11.9	LOS B	15.9	117.1	1.00	1.03	1.35	42.5
8	T1	589	6.0	589	6.0	0.845	11.8	LOS B	15.9	117.1	1.00	1.03	1.35	43.4
9	R2	220	6.0	220	6.0	0.845	16.2	LOS B	15.9	117.1	1.00	1.03	1.35	43.5
Approach		882	6.0	882	6.0	0.845	12.9	LOS B	15.9	117.1	1.00	1.03	1.35	43.3
West: Riverhead Point Drive W														
10	L2	203	6.0	203	6.0	0.513	6.6	LOS A	4.1	30.2	0.75	0.79	0.79	44.9
11	T1	106	6.0	106	6.0	0.513	6.6	LOS A	4.1	30.2	0.75	0.79	0.79	45.9
12	R2	158	6.0	158	6.0	0.513	10.9	LOS B	4.1	30.2	0.75	0.79	0.79	46.0
Approach		467	6.0	467	6.0	0.513	8.1	LOS A	4.1	30.2	0.75	0.79	0.79	45.5
All Vehicles		2065	6.0	2065	6.0	0.845	12.8	LOS B	15.9	117.1	0.89	0.95	1.14	43.2

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

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Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Riverhead Point Drive/Site collector road (Site Folder: Future_PM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville-Riverhead Highway S														
1	L2	124	6.0	131	6.0	0.567	5.8	LOS A	4.8	35.4	0.70	0.70	0.73	45.4
2	T1	323	6.0	340	6.0	0.567	5.8	LOS A	4.8	35.4	0.70	0.70	0.73	46.4
3	R2	111	6.0	117	6.0	0.567	10.1	LOS B	4.8	35.4	0.70	0.70	0.73	46.4
Approach		558	6.0	587	6.0	0.567	6.7	LOS A	4.8	35.4	0.70	0.70	0.73	46.1
East: Riverhead Point Drive W														
4	L2	72	6.0	76	6.0	0.346	7.6	LOS A	2.4	17.5	0.81	0.83	0.81	44.3
5	T1	67	6.0	71	6.0	0.346	7.6	LOS A	2.4	17.5	0.81	0.83	0.81	45.3
6	R2	95	6.0	100	6.0	0.346	11.9	LOS B	2.4	17.5	0.81	0.83	0.81	45.3
Approach		234	6.0	246	6.0	0.346	9.4	LOS A	2.4	17.5	0.81	0.83	0.81	45.0
North: Coatesville-Riverhead Highway N														
7	L2	104	6.0	109	6.0	0.616	5.8	LOS A	5.7	42.1	0.71	0.68	0.74	45.3
8	T1	405	6.0	426	6.0	0.616	5.7	LOS A	5.7	42.1	0.71	0.68	0.74	46.3
9	R2	129	6.0	136	6.0	0.616	10.1	LOS B	5.7	42.1	0.71	0.68	0.74	46.4
Approach		638	6.0	672	6.0	0.616	6.6	LOS A	5.7	42.1	0.71	0.68	0.74	46.2
West: Riverhead Point Drive W														
10	L2	114	6.0	120	6.0	0.341	6.8	LOS A	2.3	16.8	0.75	0.78	0.75	44.9
11	T1	60	6.0	63	6.0	0.341	6.8	LOS A	2.3	16.8	0.75	0.78	0.75	45.8
12	R2	82	6.0	86	6.0	0.341	11.1	LOS B	2.3	16.8	0.75	0.78	0.75	45.9
Approach		256	6.0	269	6.0	0.341	8.2	LOS A	2.3	16.8	0.75	0.78	0.75	45.4
All Vehicles		1686	6.0	1775	6.0	0.616	7.3	LOS A	5.7	42.1	0.73	0.72	0.75	45.9

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

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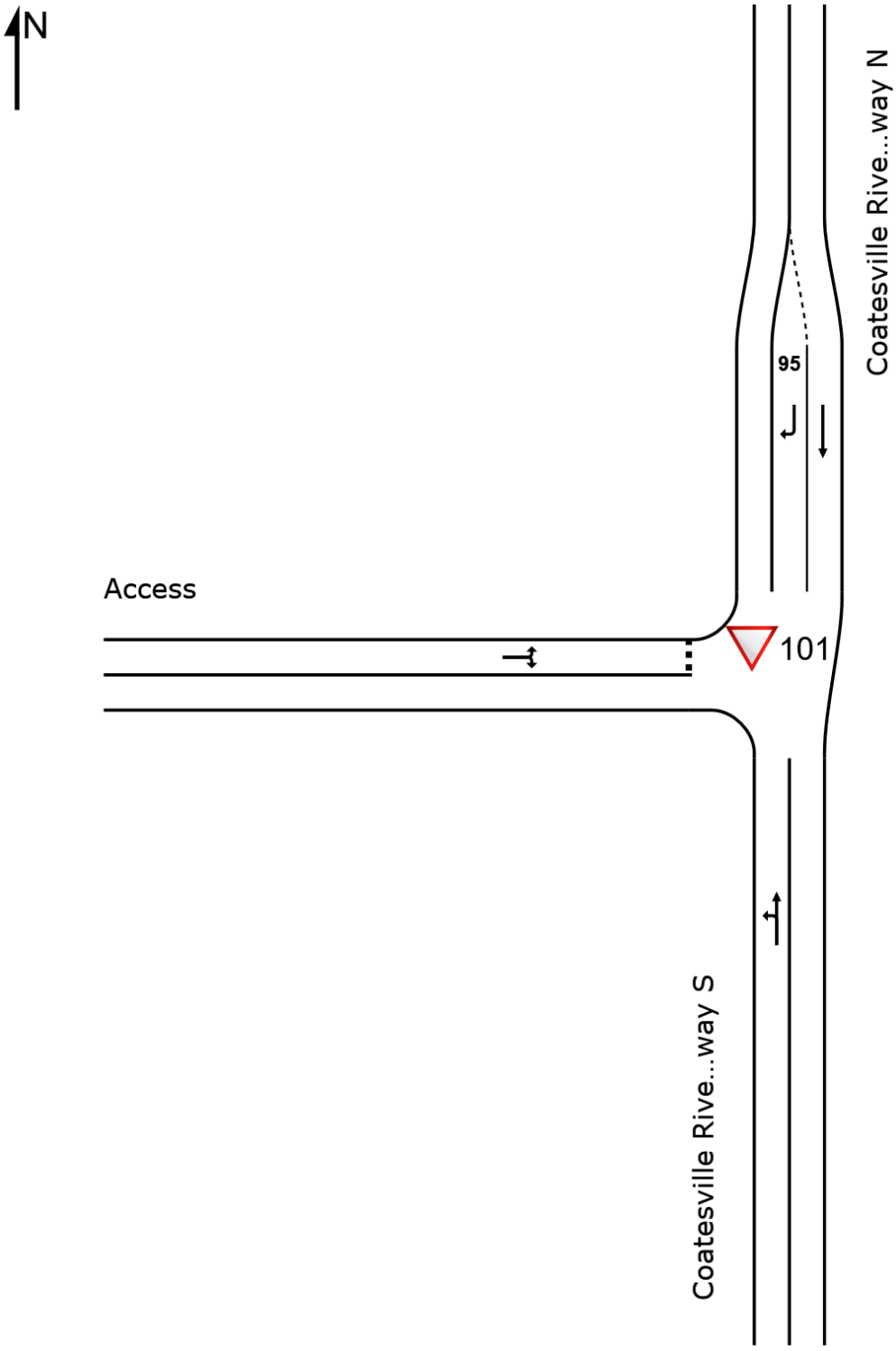
SITE LAYOUT

Site: 101 [Coatesville-Riverhead Highway/Site access (priority) (Site Folder: Base_AM)]

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: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Site access (priority) (Site Folder: Base_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville Riverhead Highway S														
1	L2	1	6.0	1	6.0	0.141	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
2	T1	250	6.0	263	6.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		251	6.0	264	6.0	0.141	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Coatesville Riverhead Highway N														
8	T1	576	6.0	606	6.0	0.323	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
9	R2	1	6.0	1	6.0	0.001	5.4	LOS A	0.0	0.0	0.36	0.50	0.36	45.3
Approach		577	6.0	607	6.0	0.323	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.8
West: Access														
10	L2	1	6.0	1	6.0	0.004	5.5	LOS A	0.0	0.1	0.51	0.59	0.51	43.7
12	R2	1	6.0	1	6.0	0.004	14.0	LOS B	0.0	0.1	0.51	0.59	0.51	43.3
Approach		2	6.0	2	6.0	0.004	9.7	LOS A	0.0	0.1	0.51	0.59	0.51	43.5
All Vehicles		830	6.0	874	6.0	0.323	0.1	NA	0.0	0.1	0.00	0.00	0.00	49.8

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Site access (priority) (Site Folder: Base_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville Riverhead Highway S														
1	L2	1	6.0	1	6.0	0.187	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
2	T1	332	6.0	349	6.0	0.187	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		333	6.0	351	6.0	0.187	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Coatesville Riverhead Highway N														
8	T1	395	6.0	416	6.0	0.222	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
9	R2	1	6.0	1	6.0	0.001	5.8	LOS A	0.0	0.0	0.42	0.51	0.42	45.2
Approach		396	6.0	417	6.0	0.222	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
West: Access														
10	L2	1	6.0	1	6.0	0.004	5.8	LOS A	0.0	0.1	0.52	0.59	0.52	44.3
12	R2	1	6.0	1	6.0	0.004	11.5	LOS B	0.0	0.1	0.52	0.59	0.52	43.9
Approach		2	6.0	2	6.0	0.004	8.7	LOS A	0.0	0.1	0.52	0.59	0.52	44.1
All Vehicles		731	6.0	769	6.0	0.222	0.1	NA	0.0	0.1	0.00	0.00	0.00	49.9

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Site access (priority) (Site Folder: Future_AM - 2038 100%)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville Riverhead Highway S														
1	L2	161	6.0	161	6.0	0.224	4.7	LOS A	0.0	0.0	0.00	0.21	0.00	48.2
2	T1	250	6.0	250	6.0	0.224	0.1	LOS A	0.0	0.0	0.00	0.21	0.00	48.7
Approach		411	6.0	411	6.0	0.224	1.9	NA	0.0	0.0	0.00	0.21	0.00	48.5
North: Coatesville Riverhead Highway N														
8	T1	847	6.0	847	6.0	0.451	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
9	R2	5	6.0	5	6.0	0.004	6.1	LOS A	0.0	0.1	0.45	0.56	0.45	45.2
Approach		852	6.0	852	6.0	0.451	0.2	NA	0.0	0.1	0.00	0.00	0.00	49.7
West: Access														
10	L2	5	6.0	5	6.0	0.751	28.0	LOS D	3.8	28.1	0.94	1.25	1.90	29.2
12	R2	122	6.0	122	6.0	0.751	52.2	LOS F	3.8	28.1	0.94	1.25	1.90	29.0
Approach		127	6.0	127	6.0	0.751	51.2	LOS F	3.8	28.1	0.94	1.25	1.90	29.0
All Vehicles		1390	6.0	1390	6.0	0.751	5.4	NA	3.8	28.1	0.09	0.18	0.17	46.3

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

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MOVEMENT SUMMARY

Site: 101 [Coatesville-Riverhead Highway/Site access (priority) (Site Folder: Future_PM - 2038 100%)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coatesville Riverhead Highway S														
1	L2	225	6.0	237	6.0	0.319	4.7	LOS A	0.0	0.0	0.00	0.22	0.00	48.1
2	T1	332	6.0	349	6.0	0.319	0.1	LOS A	0.0	0.0	0.00	0.22	0.00	48.6
Approach		557	6.0	586	6.0	0.319	2.0	NA	0.0	0.0	0.00	0.22	0.00	48.4
North: Coatesville Riverhead Highway N														
8	T1	560	6.0	589	6.0	0.314	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
9	R2	5	6.0	5	6.0	0.006	7.2	LOS A	0.0	0.2	0.54	0.62	0.54	44.6
Approach		565	6.0	595	6.0	0.314	0.2	NA	0.0	0.2	0.00	0.01	0.00	49.8
West: Access														
10	L2	5	6.0	5	6.0	0.278	7.5	LOS A	1.0	7.5	0.82	0.95	0.94	38.6
12	R2	61	6.0	64	6.0	0.278	21.8	LOS C	1.0	7.5	0.82	0.95	0.94	38.3
Approach		66	6.0	69	6.0	0.278	20.7	LOS C	1.0	7.5	0.82	0.95	0.94	38.3
All Vehicles		1188	6.0	1251	6.0	0.319	2.2	NA	1.0	7.5	0.05	0.16	0.05	48.3

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

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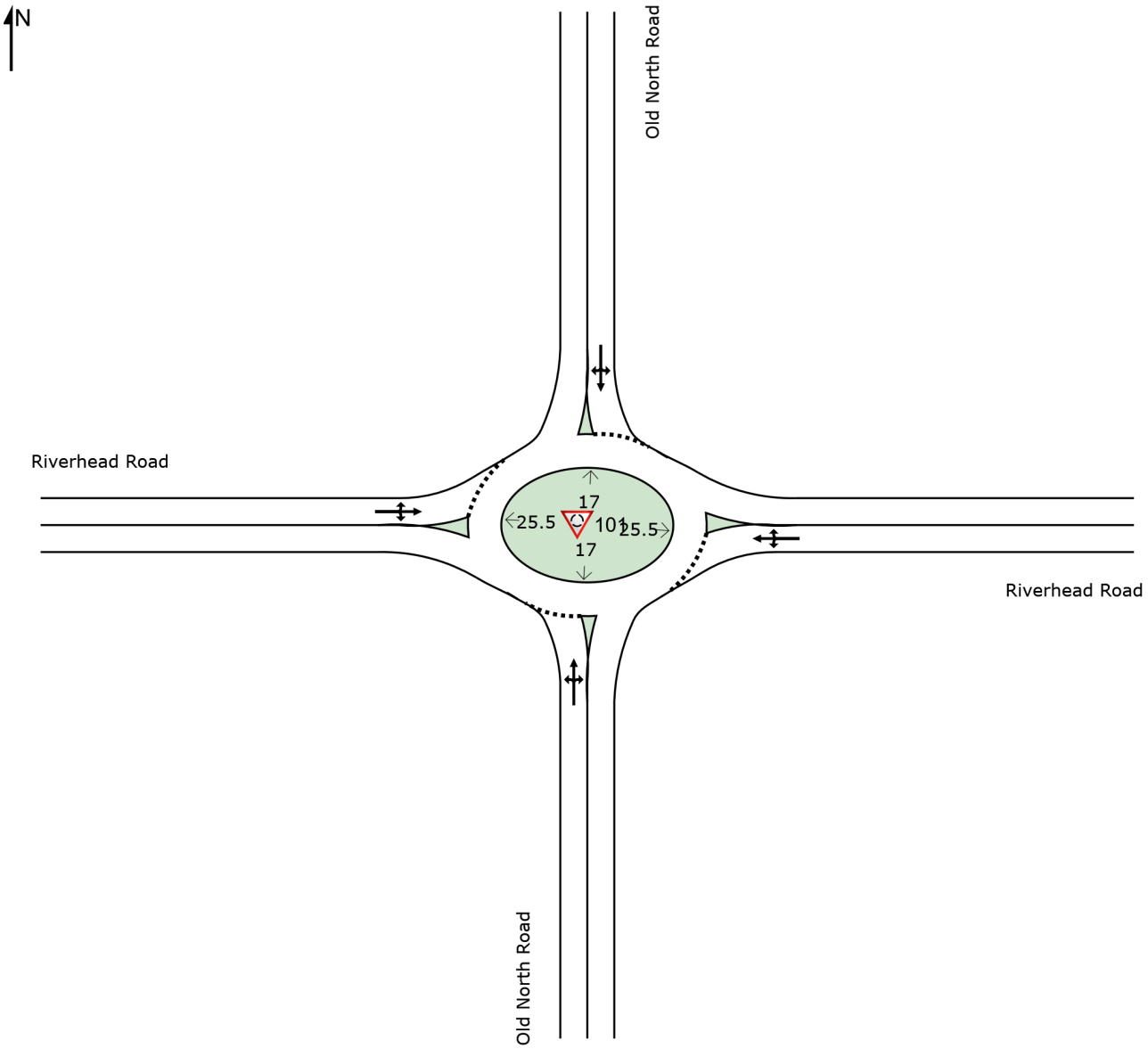
SITE LAYOUT

Site: 101 [Riverhead Road/Old North Road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

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



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Project: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Old North Road (Site Folder: Base_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	41	6.0	43	6.0	0.398	4.1	LOS A	3.0	22.2	0.48	0.50	0.48	45.9
2	T1	293	6.0	308	6.0	0.398	3.7	LOS A	3.0	22.2	0.48	0.50	0.48	47.2
3	R2	112	6.0	118	6.0	0.398	8.4	LOS A	3.0	22.2	0.48	0.50	0.48	47.2
Approach		446	6.0	469	6.0	0.398	4.9	LOS A	3.0	22.2	0.48	0.50	0.48	47.1
East: Riverhead Road														
4	L2	100	6.0	105	6.0	0.329	6.6	LOS A	2.3	17.1	0.80	0.78	0.80	45.7
5	T1	130	6.0	137	6.0	0.329	6.8	LOS A	2.3	17.1	0.80	0.78	0.80	46.6
6	R2	3	6.0	3	6.0	0.329	11.5	LOS B	2.3	17.1	0.80	0.78	0.80	47.0
Approach		233	6.0	245	6.0	0.329	6.8	LOS A	2.3	17.1	0.80	0.78	0.80	46.2
North: Old North Road														
7	L2	3	6.0	3	6.0	0.629	8.0	LOS A	6.3	46.2	0.80	0.82	0.93	45.1
8	T1	544	6.0	573	6.0	0.629	7.6	LOS A	6.3	46.2	0.80	0.82	0.93	46.3
9	R2	13	6.0	14	6.0	0.629	12.3	LOS B	6.3	46.2	0.80	0.82	0.93	46.3
Approach		560	6.0	589	6.0	0.629	7.7	LOS A	6.3	46.2	0.80	0.82	0.93	46.3
West: Riverhead Road														
10	L2	7	6.0	7	6.0	0.287	5.2	LOS A	1.8	13.4	0.64	0.63	0.64	46.0
11	T1	221	6.0	233	6.0	0.287	5.3	LOS A	1.8	13.4	0.64	0.63	0.64	46.8
12	R2	29	6.0	31	6.0	0.287	10.0	LOS B	1.8	13.4	0.64	0.63	0.64	47.2
Approach		257	6.0	271	6.0	0.287	5.8	LOS A	1.8	13.4	0.64	0.63	0.64	46.9
All Vehicles		1496	6.0	1575	6.0	0.629	6.4	LOS A	6.3	46.2	0.68	0.69	0.73	46.6

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

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MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Old North Road (Site Folder: Base_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	35	6.0	37	6.0	0.544	3.9	LOS A	5.1	37.5	0.44	0.44	0.44	46.2
2	T1	559	6.0	588	6.0	0.544	3.5	LOS A	5.1	37.5	0.44	0.44	0.44	47.5
3	R2	92	6.0	97	6.0	0.544	8.1	LOS A	5.1	37.5	0.44	0.44	0.44	47.6
Approach		686	6.0	722	6.0	0.544	4.1	LOS A	5.1	37.5	0.44	0.44	0.44	47.5
East: Riverhead Road														
4	L2	103	6.0	108	6.0	0.219	5.4	LOS A	1.4	10.2	0.67	0.66	0.67	46.4
5	T1	74	6.0	78	6.0	0.219	5.5	LOS A	1.4	10.2	0.67	0.66	0.67	47.3
6	R2	5	6.0	5	6.0	0.219	10.2	LOS B	1.4	10.2	0.67	0.66	0.67	47.6
Approach		182	6.0	192	6.0	0.219	5.6	LOS A	1.4	10.2	0.67	0.66	0.67	46.8
North: Old North Road														
7	L2	4	6.0	4	6.0	0.484	6.1	LOS A	3.6	26.7	0.72	0.68	0.73	45.5
8	T1	404	6.0	425	6.0	0.484	5.8	LOS A	3.6	26.7	0.72	0.68	0.73	46.7
9	R2	11	6.0	12	6.0	0.484	10.4	LOS B	3.6	26.7	0.72	0.68	0.73	46.7
Approach		419	6.0	441	6.0	0.484	5.9	LOS A	3.6	26.7	0.72	0.68	0.73	46.7
West: Riverhead Road														
10	L2	18	6.0	19	6.0	0.405	7.8	LOS A	2.9	21.2	0.83	0.84	0.84	44.9
11	T1	221	6.0	233	6.0	0.405	7.9	LOS A	2.9	21.2	0.83	0.84	0.84	45.8
12	R2	48	6.0	51	6.0	0.405	12.6	LOS B	2.9	21.2	0.83	0.84	0.84	46.1
Approach		287	6.0	302	6.0	0.405	8.7	LOS A	2.9	21.2	0.83	0.84	0.84	45.8
All Vehicles		1574	6.0	1657	6.0	0.544	5.6	LOS A	5.1	37.5	0.61	0.60	0.62	46.9

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

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MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Old North Road (Site Folder: Future_AM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	41	6.0	43	6.0	0.507	4.7	LOS A	4.3	31.7	0.63	0.58	0.63	45.3
2	T1	293	6.0	308	6.0	0.507	4.3	LOS A	4.3	31.7	0.63	0.58	0.63	46.6
3	R2	194	6.0	204	6.0	0.507	9.0	LOS A	4.3	31.7	0.63	0.58	0.63	46.6
Approach		528	6.0	556	6.0	0.507	6.1	LOS A	4.3	31.7	0.63	0.58	0.63	46.5
East: Riverhead Road														
4	L2	229	6.0	241	6.0	0.603	10.0	LOS B	6.1	45.0	0.94	1.02	1.16	44.1
5	T1	185	6.0	195	6.0	0.603	10.1	LOS B	6.1	45.0	0.94	1.02	1.16	44.9
6	R2	3	6.0	3	6.0	0.603	14.8	LOS B	6.1	45.0	0.94	1.02	1.16	45.2
Approach		417	6.0	439	6.0	0.603	10.1	LOS B	6.1	45.0	0.94	1.02	1.16	44.5
North: Old North Road														
7	L2	3	6.0	3	6.0	0.712	11.9	LOS B	8.5	62.9	0.92	1.05	1.25	43.0
8	T1	544	6.0	573	6.0	0.712	11.5	LOS B	8.5	62.9	0.92	1.05	1.25	44.2
9	R2	13	6.0	14	6.0	0.712	16.2	LOS B	8.5	62.9	0.92	1.05	1.25	44.2
Approach		560	6.0	589	6.0	0.712	11.7	LOS B	8.5	62.9	0.92	1.05	1.25	44.2
West: Riverhead Road														
10	L2	7	6.0	7	6.0	0.360	6.0	LOS A	2.5	18.3	0.74	0.72	0.74	45.6
11	T1	256	6.0	269	6.0	0.360	6.1	LOS A	2.5	18.3	0.74	0.72	0.74	46.5
12	R2	29	6.0	31	6.0	0.360	10.8	LOS B	2.5	18.3	0.74	0.72	0.74	46.8
Approach		292	6.0	307	6.0	0.360	6.5	LOS A	2.5	18.3	0.74	0.72	0.74	46.5
All Vehicles		1797	6.0	1892	6.0	0.712	8.8	LOS A	8.5	62.9	0.81	0.85	0.96	45.3

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

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MOVEMENT SUMMARY

Site: 101 [Riverhead Road/Old North Road (Site Folder: Future_PM - 2038 100%)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	35	6.0	37	6.0	0.659	4.4	LOS A	7.2	53.1	0.61	0.51	0.61	45.5
2	T1	559	6.0	588	6.0	0.659	4.0	LOS A	7.2	53.1	0.61	0.51	0.61	46.8
3	R2	196	6.0	206	6.0	0.659	8.6	LOS A	7.2	53.1	0.61	0.51	0.61	46.8
Approach		790	6.0	832	6.0	0.659	5.2	LOS A	7.2	53.1	0.61	0.51	0.61	46.7
East: Riverhead Road														
4	L2	180	6.0	189	6.0	0.359	5.7	LOS A	2.5	18.6	0.74	0.71	0.74	46.2
5	T1	108	6.0	114	6.0	0.359	5.8	LOS A	2.5	18.6	0.74	0.71	0.74	47.1
6	R2	5	6.0	5	6.0	0.359	10.6	LOS B	2.5	18.6	0.74	0.71	0.74	47.5
Approach		293	6.0	308	6.0	0.359	5.9	LOS A	2.5	18.6	0.74	0.71	0.74	46.6
North: Old North Road														
7	L2	4	6.0	4	6.0	0.563	9.2	LOS A	5.1	37.3	0.85	0.91	1.00	44.5
8	T1	404	6.0	425	6.0	0.563	8.8	LOS A	5.1	37.3	0.85	0.91	1.00	45.6
9	R2	11	6.0	12	6.0	0.563	13.4	LOS B	5.1	37.3	0.85	0.91	1.00	45.7
Approach		419	6.0	441	6.0	0.563	8.9	LOS A	5.1	37.3	0.85	0.91	1.00	45.6
West: Riverhead Road														
10	L2	18	6.0	19	6.0	0.559	12.4	LOS B	5.3	39.0	0.96	1.08	1.21	42.6
11	T1	266	6.0	280	6.0	0.559	12.5	LOS B	5.3	39.0	0.96	1.08	1.21	43.4
12	R2	48	6.0	51	6.0	0.559	17.2	LOS B	5.3	39.0	0.96	1.08	1.21	43.7
Approach		332	6.0	349	6.0	0.559	13.2	LOS B	5.3	39.0	0.96	1.08	1.21	43.4
All Vehicles		1834	6.0	1931	6.0	0.659	7.6	LOS A	7.2	53.1	0.75	0.74	0.83	45.8

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

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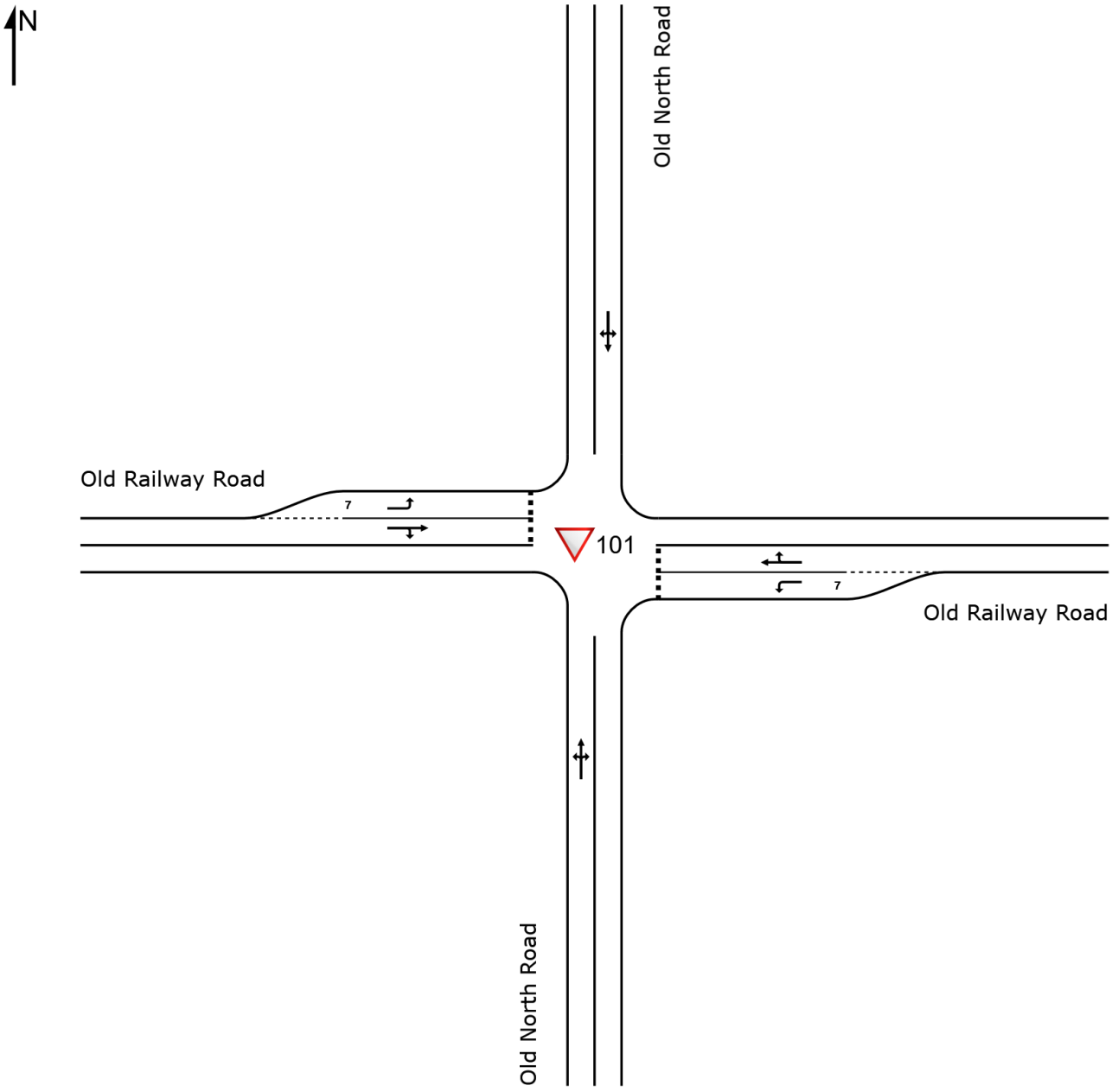
SITE LAYOUT

Site: 101 [Old North Road/Old Railway Road (Site Folder: Base_AM)]

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: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\SIDRA\Riverhead Sidra 221129.sip9

MOVEMENT SUMMARY

Site: 101 [Old North Road/Old Railway Road (Site Folder: Base_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	3	6.0	3	6.0	0.257	8.9	LOS A	0.1	1.0	0.03	0.01	0.03	57.2
2	T1	442	6.0	465	6.0	0.257	0.1	LOS A	0.1	1.0	0.03	0.01	0.03	69.4
3	R2	5	6.0	5	6.0	0.257	10.0	LOS A	0.1	1.0	0.03	0.01	0.03	56.9
Approach		450	6.0	474	6.0	0.257	0.3	NA	0.1	1.0	0.03	0.01	0.03	69.1
East: Old Railway Road														
4	L2	6	6.0	6	6.0	0.009	9.2	LOS A	0.0	0.2	0.57	0.69	0.57	50.7
5	T1	7	6.0	7	6.0	0.045	15.7	LOS C	0.1	1.0	0.81	0.91	0.81	40.8
6	R2	3	6.0	3	6.0	0.045	21.7	LOS C	0.1	1.0	0.81	0.91	0.81	42.8
Approach		16	6.0	17	6.0	0.045	14.4	LOS B	0.1	1.0	0.72	0.83	0.72	44.5
North: Old North Road														
7	L2	4	6.0	4	6.0	0.378	5.4	LOS A	0.0	0.2	0.00	0.00	0.00	57.5
8	T1	668	6.0	703	6.0	0.378	0.0	LOS A	0.0	0.2	0.00	0.00	0.00	69.8
9	R2	1	6.0	1	6.0	0.378	7.9	LOS A	0.0	0.2	0.00	0.00	0.00	57.2
Approach		673	6.0	708	6.0	0.378	0.1	NA	0.0	0.2	0.00	0.00	0.00	69.7
West: Old Railway Road														
10	L2	1	6.0	1	6.0	0.001	6.4	LOS A	0.0	0.0	0.46	0.53	0.46	45.5
11	T1	7	6.0	7	6.0	0.056	15.8	LOS C	0.2	1.2	0.82	0.91	0.82	39.8
12	R2	5	6.0	5	6.0	0.056	21.0	LOS C	0.2	1.2	0.82	0.91	0.82	39.4
Approach		13	6.0	14	6.0	0.056	17.1	LOS C	0.2	1.2	0.79	0.88	0.79	40.0
All Vehicles		1152	6.0	1213	6.0	0.378	0.5	NA	0.2	1.2	0.03	0.03	0.03	68.4

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

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MOVEMENT SUMMARY

Site: 101 [Old North Road/Old Railway Road (Site Folder: Base_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	7	6.0	7	6.0	0.398	8.2	LOS A	0.3	2.1	0.04	0.01	0.05	57.1
2	T1	680	6.0	716	6.0	0.398	0.2	LOS A	0.3	2.1	0.04	0.01	0.05	69.2
3	R2	10	6.0	11	6.0	0.398	9.4	LOS A	0.3	2.1	0.04	0.01	0.05	56.8
Approach		697	6.0	734	6.0	0.398	0.4	NA	0.3	2.1	0.04	0.01	0.05	68.8
East: Old Railway Road														
4	L2	27	6.0	28	6.0	0.034	8.2	LOS A	0.1	0.9	0.52	0.70	0.52	51.4
5	T1	10	6.0	11	6.0	0.086	19.7	LOS C	0.3	1.9	0.86	0.93	0.86	38.9
6	R2	5	6.0	5	6.0	0.086	26.9	LOS D	0.3	1.9	0.86	0.93	0.86	40.7
Approach		42	6.0	44	6.0	0.086	13.2	LOS B	0.3	1.9	0.64	0.78	0.64	46.4
North: Old North Road														
7	L2	8	6.0	8	6.0	0.312	5.7	LOS A	0.0	0.3	0.01	0.01	0.01	57.4
8	T1	546	6.0	575	6.0	0.312	0.0	LOS A	0.0	0.3	0.01	0.01	0.01	69.6
9	R2	1	6.0	1	6.0	0.312	10.7	LOS B	0.0	0.3	0.01	0.01	0.01	57.1
Approach		555	6.0	584	6.0	0.312	0.1	NA	0.0	0.3	0.01	0.01	0.01	69.4
West: Old Railway Road														
10	L2	1	6.0	1	6.0	0.002	8.2	LOS A	0.0	0.0	0.57	0.60	0.57	44.5
11	T1	12	6.0	13	6.0	0.098	19.7	LOS C	0.3	2.1	0.86	0.93	0.86	38.2
12	R2	5	6.0	5	6.0	0.098	27.1	LOS D	0.3	2.1	0.86	0.93	0.86	37.8
Approach		18	6.0	19	6.0	0.098	21.1	LOS C	0.3	2.1	0.85	0.91	0.85	38.4
All Vehicles		1312	6.0	1381	6.0	0.398	1.0	NA	0.3	2.1	0.06	0.05	0.06	67.3

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

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MOVEMENT SUMMARY

Site: 101 [Old North Road/Old Railway Road (Site Folder: Future_AM - 2038 100%)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	3	6.0	3	6.0	0.305	11.6	LOS B	0.2	1.5	0.04	0.01	0.04	57.2
2	T1	524	6.0	552	6.0	0.305	0.2	LOS A	0.2	1.5	0.04	0.01	0.04	69.3
3	R2	5	6.0	5	6.0	0.305	12.9	LOS B	0.2	1.5	0.04	0.01	0.04	56.9
Approach		532	6.0	560	6.0	0.305	0.4	NA	0.2	1.5	0.04	0.01	0.04	69.0
East: Old Railway Road														
4	L2	6	6.0	6	6.0	0.012	10.7	LOS B	0.0	0.3	0.66	0.76	0.66	49.7
5	T1	7	6.0	7	6.0	0.072	24.1	LOS C	0.2	1.5	0.89	0.95	0.89	37.0
6	R2	3	6.0	3	6.0	0.072	32.7	LOS D	0.2	1.5	0.89	0.95	0.89	38.6
Approach		16	6.0	17	6.0	0.072	20.7	LOS C	0.2	1.5	0.80	0.88	0.80	41.3
North: Old North Road														
7	L2	4	6.0	4	6.0	0.451	5.9	LOS A	0.0	0.3	0.00	0.00	0.01	57.5
8	T1	797	6.0	839	6.0	0.451	0.0	LOS A	0.0	0.3	0.00	0.00	0.01	69.8
9	R2	1	6.0	1	6.0	0.451	9.5	LOS A	0.0	0.3	0.00	0.00	0.01	57.2
Approach		802	6.0	844	6.0	0.451	0.1	NA	0.0	0.3	0.00	0.00	0.01	69.7
West: Old Railway Road														
10	L2	1	6.0	1	6.0	0.001	6.9	LOS A	0.0	0.0	0.50	0.55	0.50	45.2
11	T1	7	6.0	7	6.0	0.090	24.3	LOS C	0.3	1.9	0.89	0.95	0.89	36.0
12	R2	5	6.0	5	6.0	0.090	32.3	LOS D	0.3	1.9	0.89	0.95	0.89	35.7
Approach		13	6.0	14	6.0	0.090	26.0	LOS D	0.3	1.9	0.86	0.92	0.86	36.4
All Vehicles		1363	6.0	1435	6.0	0.451	0.7	NA	0.3	1.9	0.03	0.02	0.04	68.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Old North Road/Old Railway Road (Site Folder: Future_PM - 2038 100%)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Old North Road														
1	L2	7	6.0	7	6.0	0.457	9.7	LOS A	0.4	2.8	0.04	0.01	0.06	57.1
2	T1	784	6.0	825	6.0	0.457	0.2	LOS A	0.4	2.8	0.04	0.01	0.06	69.1
3	R2	10	6.0	11	6.0	0.457	11.3	LOS B	0.4	2.8	0.04	0.01	0.06	56.8
Approach		801	6.0	843	6.0	0.457	0.4	NA	0.4	2.8	0.04	0.01	0.06	68.8
East: Old Railway Road														
4	L2	27	6.0	28	6.0	0.038	8.9	LOS A	0.1	1.0	0.55	0.74	0.55	50.9
5	T1	10	6.0	11	6.0	0.132	29.0	LOS D	0.4	2.7	0.91	0.96	0.91	35.1
6	R2	5	6.0	5	6.0	0.132	38.9	LOS E	0.4	2.7	0.91	0.96	0.91	36.5
Approach		42	6.0	44	6.0	0.132	17.3	LOS C	0.4	2.7	0.68	0.82	0.68	44.1
North: Old North Road														
7	L2	8	6.0	8	6.0	0.356	6.4	LOS A	0.1	0.4	0.01	0.01	0.01	57.4
8	T1	623	6.0	656	6.0	0.356	0.0	LOS A	0.1	0.4	0.01	0.01	0.01	69.6
9	R2	1	6.0	1	6.0	0.356	13.4	LOS B	0.1	0.4	0.01	0.01	0.01	57.1
Approach		632	6.0	665	6.0	0.356	0.1	NA	0.1	0.4	0.01	0.01	0.01	69.4
West: Old Railway Road														
10	L2	1	6.0	1	6.0	0.002	9.4	LOS A	0.0	0.0	0.65	0.64	0.65	43.9
11	T1	12	6.0	13	6.0	0.151	29.3	LOS D	0.4	3.1	0.92	0.96	0.92	34.3
12	R2	5	6.0	5	6.0	0.151	40.0	LOS E	0.4	3.1	0.92	0.96	0.92	34.1
Approach		18	6.0	19	6.0	0.151	31.2	LOS D	0.4	3.1	0.90	0.94	0.91	34.7
All Vehicles		1493	6.0	1572	6.0	0.457	1.1	NA	0.4	3.1	0.06	0.04	0.07	67.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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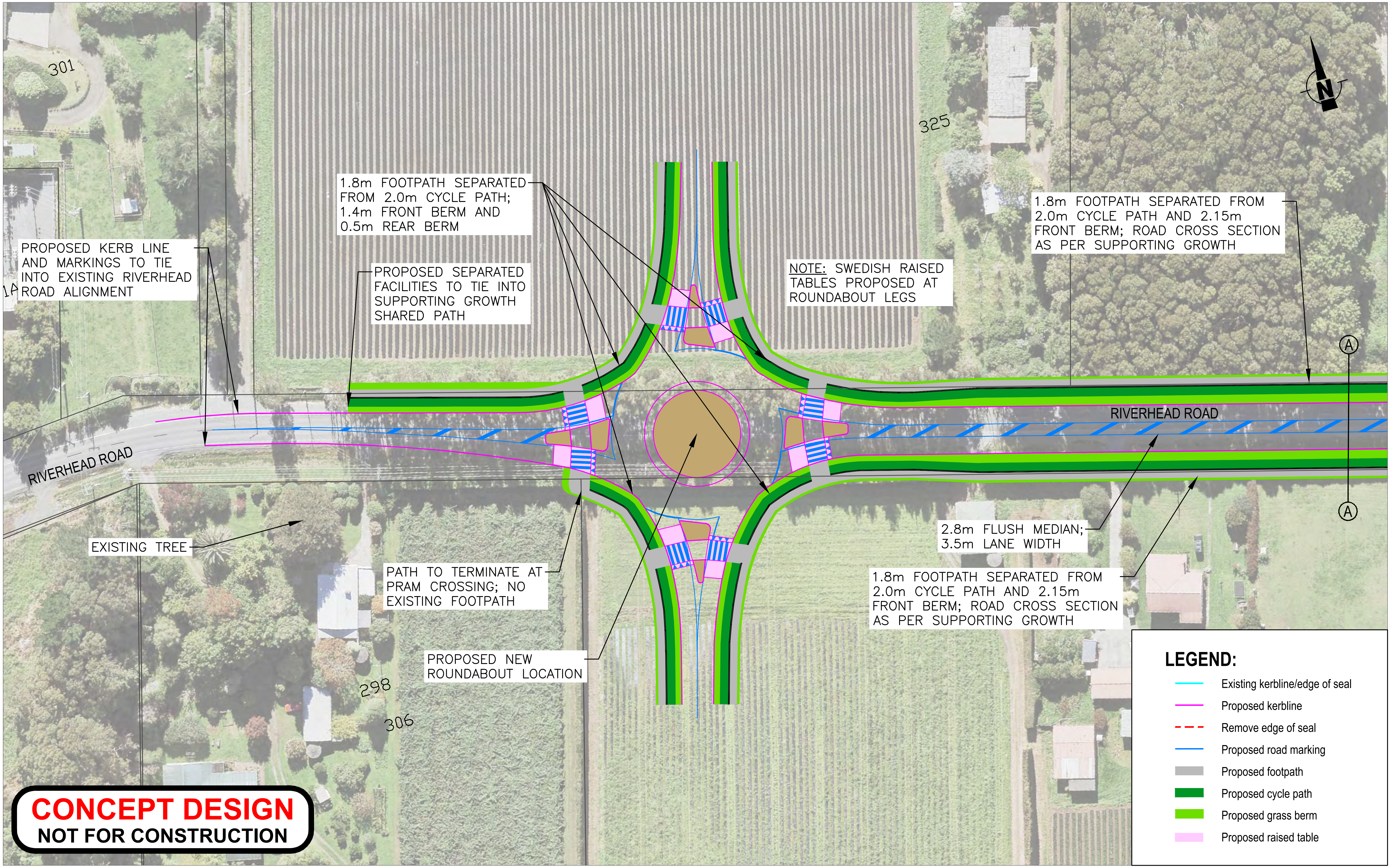
APPENDIX C Road layout plans



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revision: D	date: 13/12/2022	checked:	TC

rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
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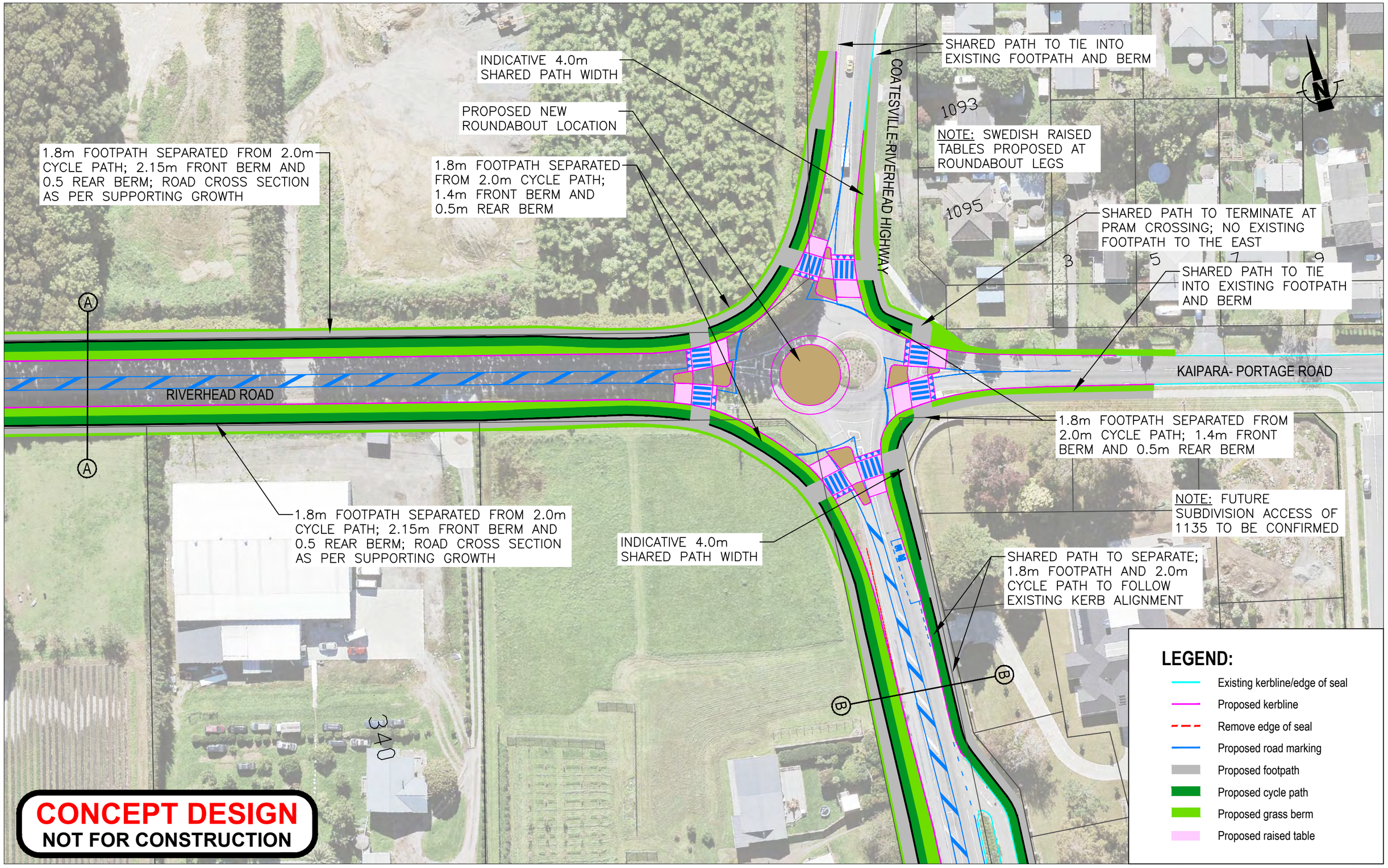

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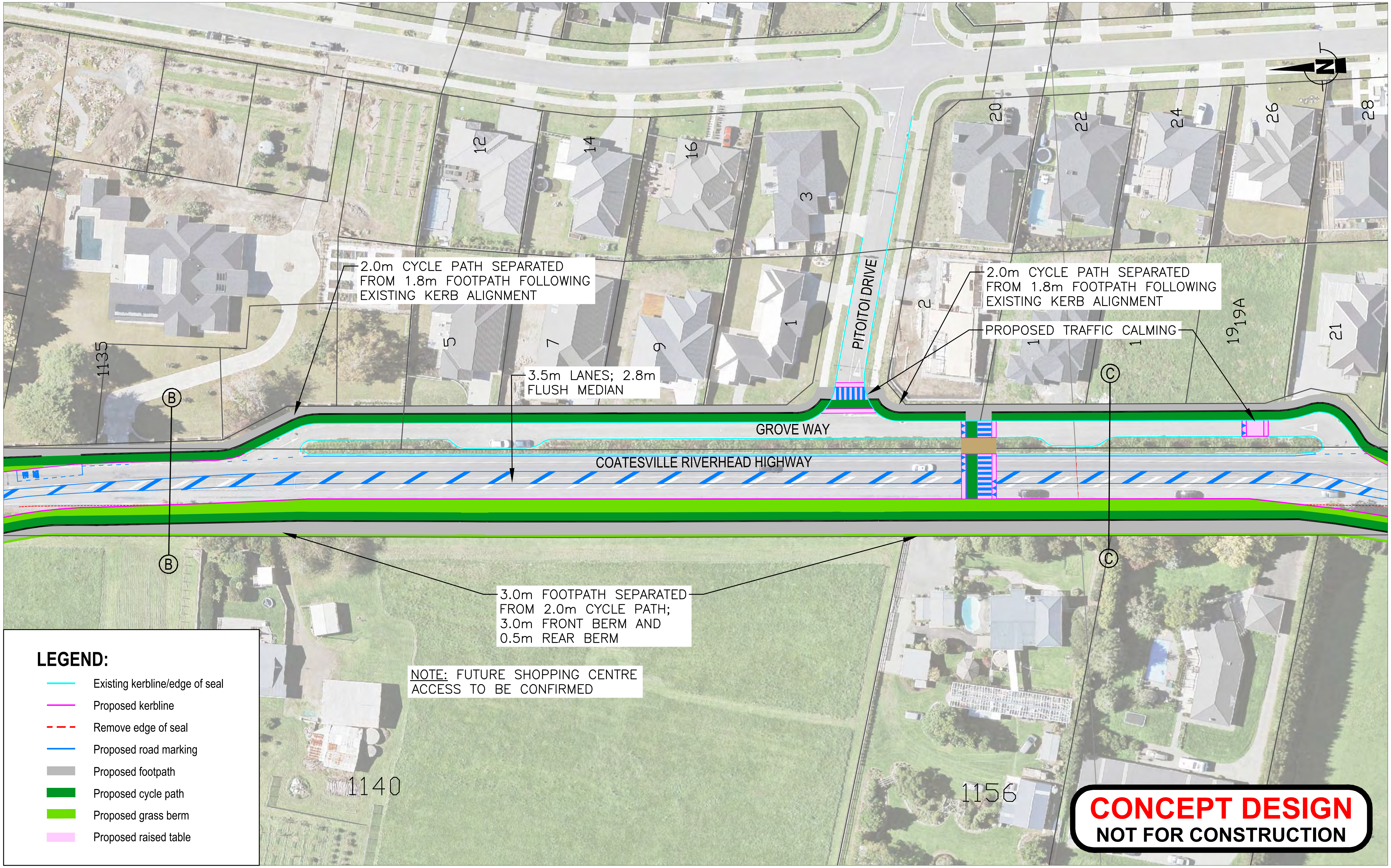

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rev	status	issued
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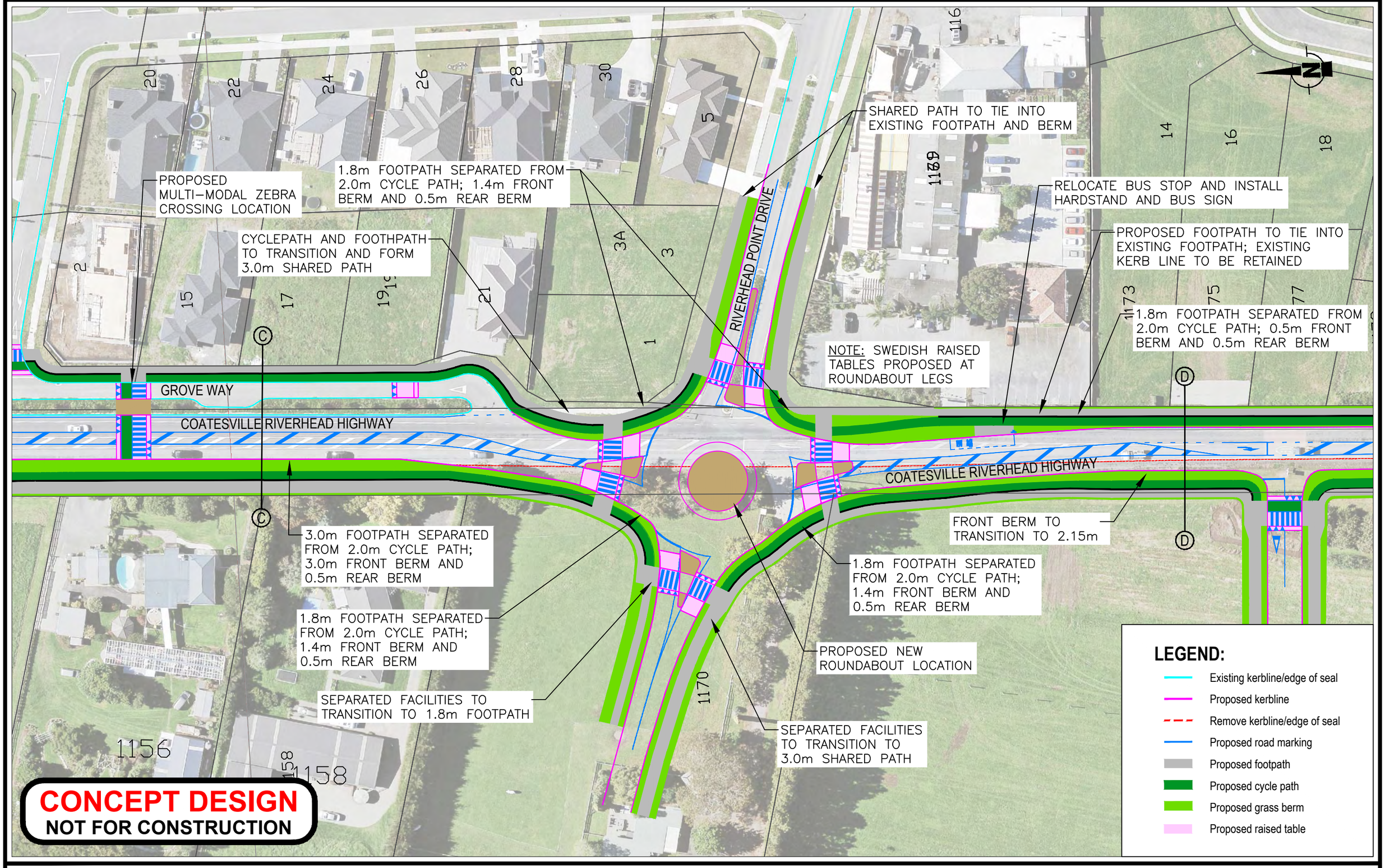

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A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

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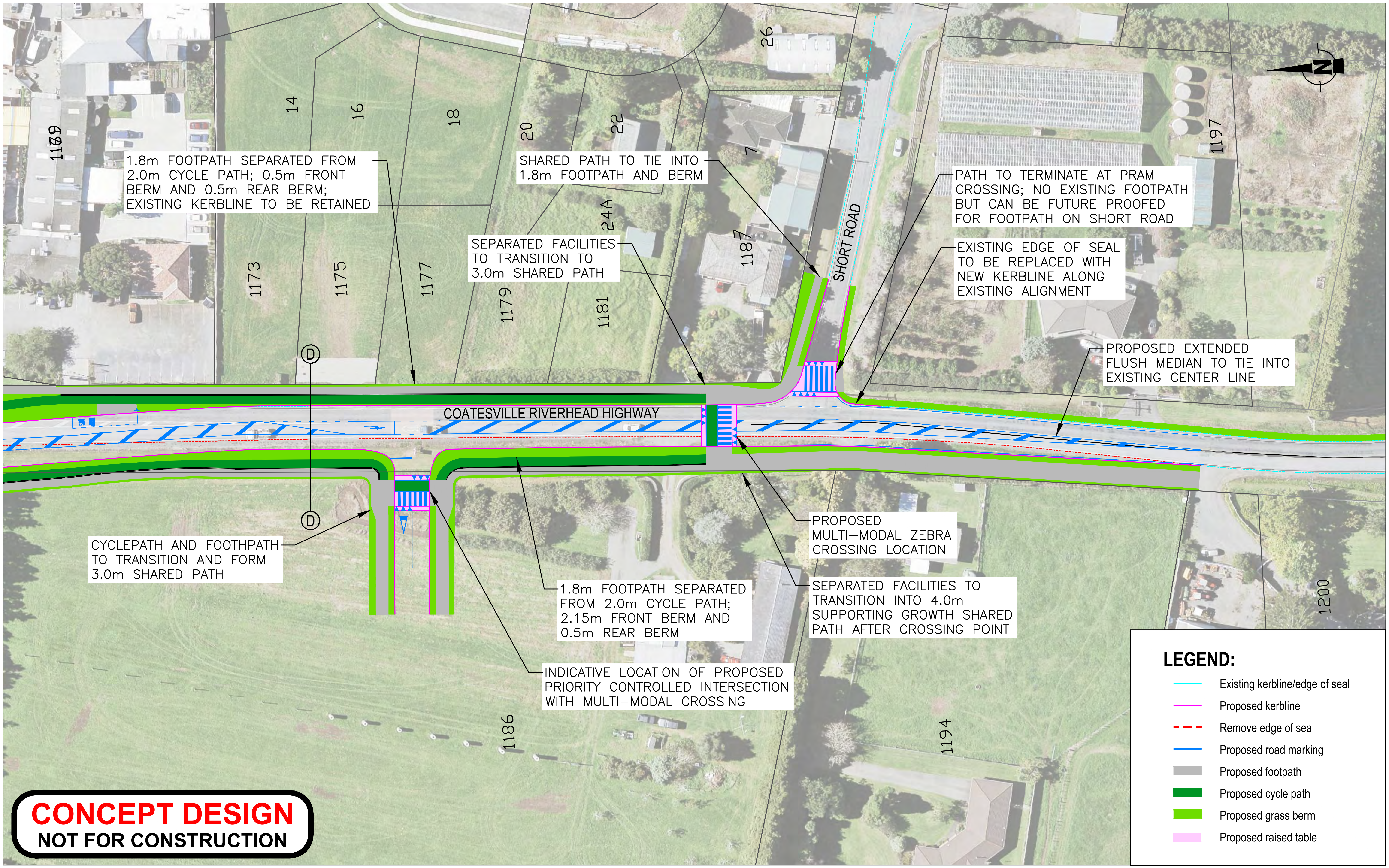

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rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
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C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
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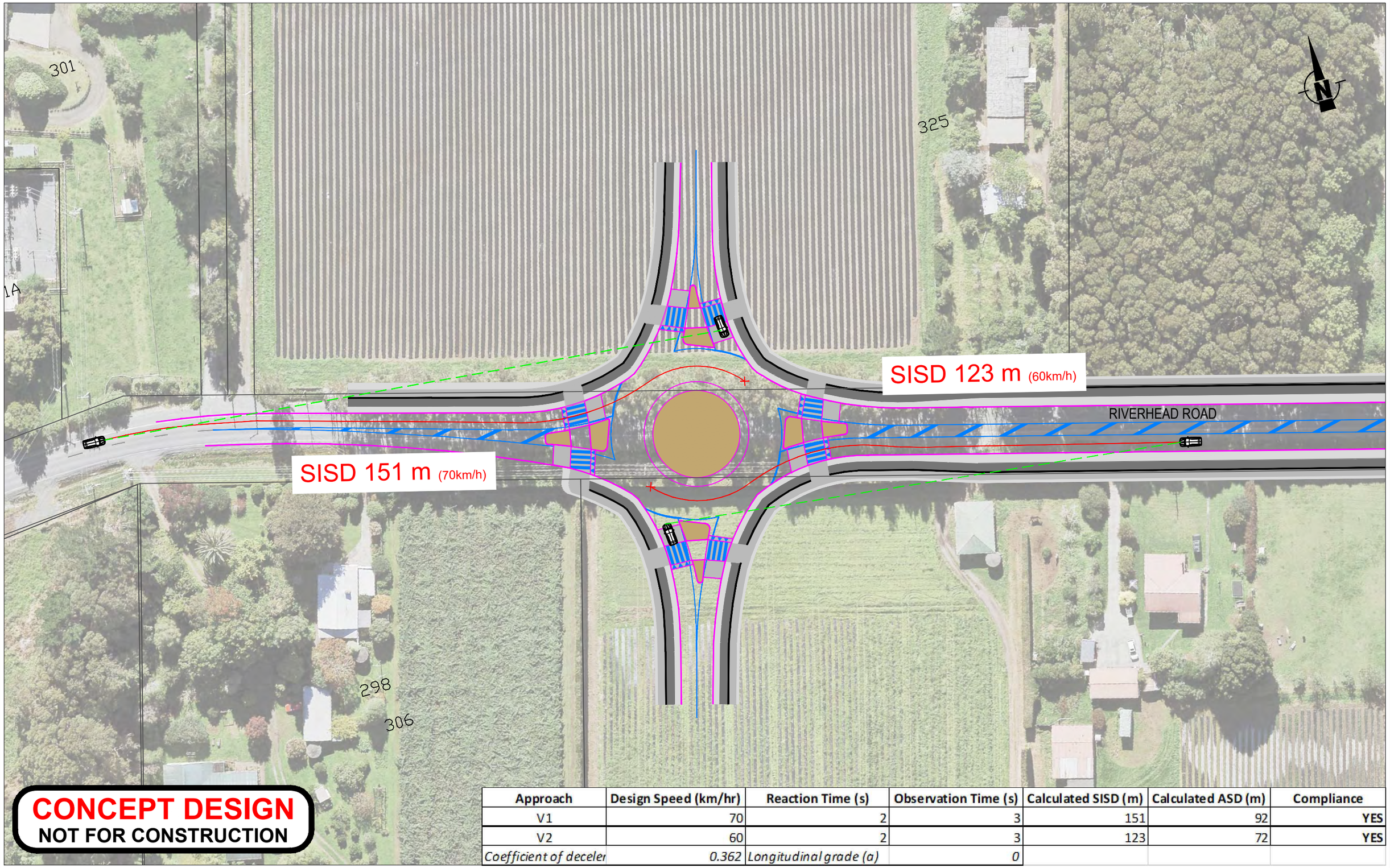

CONCEPT DESIGN
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Approach	Design Speed (km/hr)	Reaction Time (s)	Observation Time (s)	Calculated SISD (m)	Calculated ASD (m)	Compliance
V1	70	2	3	151	92	YES
V2	60	2	3	123	72	YES
Coefficient of deceler	*0.362*	*Longitudinal grade (a)*	*0*			

0 32 m

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ref:	FRLX015-D-010	drawn:	CS
revision: D	date: 13/12/2022	checked:	TC

rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
Riverhead Road Roundabout SISD

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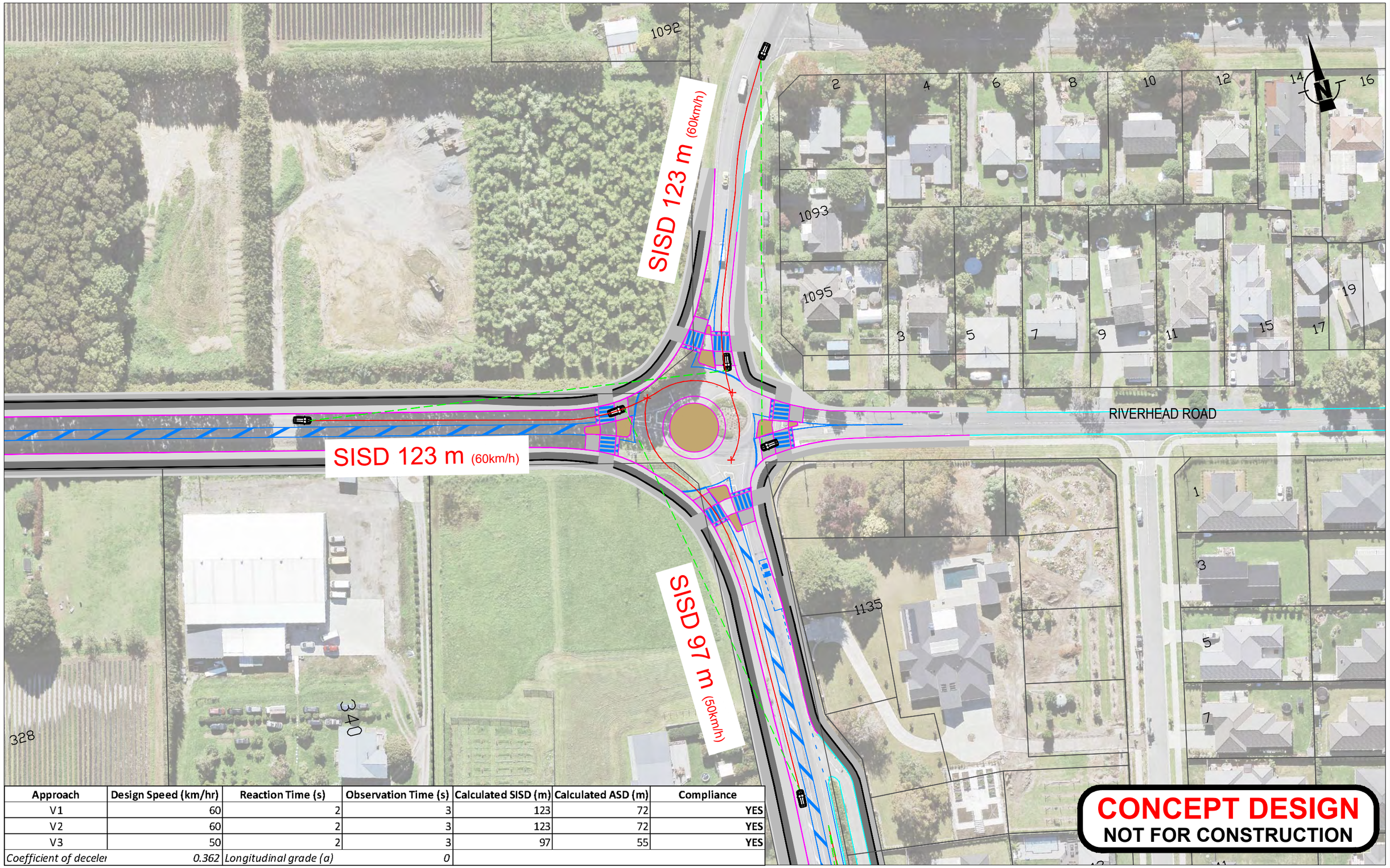

Approach	Design Speed (km/hr)	Reaction Time (s)	Observation Time (s)	Calculated SISD (m)	Calculated ASD (m)	Compliance
V1	60	2	3	123	72	YES
V2	60	2	3	123	72	YES
V3	50	2	3	97	55	YES
Coefficient of decele	*0.362*	*Longitudinal grade (a)*	*0*			

CONCEPT DESIGN
NOT FOR CONSTRUCTION

0 32 m

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scale: 1:800A3 design: CS
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rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
CVR Highway and Riverhead Road SISD

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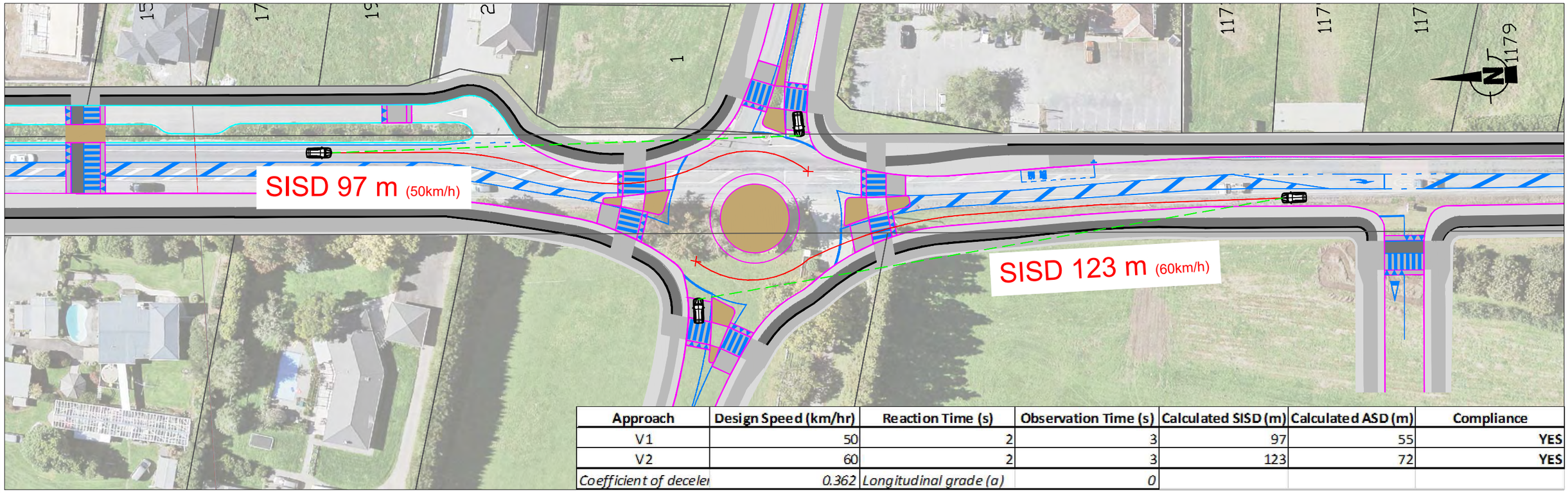
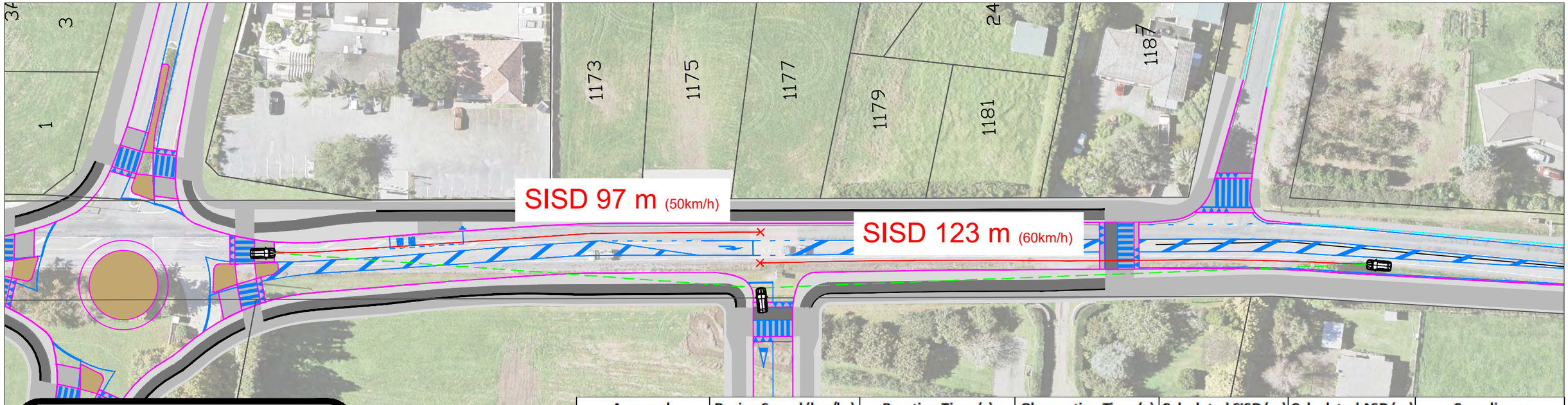


Approach	Design Speed (km/hr)	Reaction Time (s)	Observation Time (s)	Calculated SISD (m)	Calculated ASD (m)	Compliance
V1	50	2	3	97	55	YES
V2	60	2	3	123	72	YES
Coefficient of decele	*0.362*	*Longitudinal grade (a)*	*0*			



Approach	Design Speed (km/hr)	Reaction Time (s)	Observation Time (s)	Calculated SISD (m)	Calculated ASD (m)	Compliance
V1	60	2	3	122	72	YES
V2	50	2	3	98	55	YES
Coefficient of decele	*0.362*	*Longitudinal grade (a)*	*0*			

CONCEPT DESIGN
NOT FOR CONSTRUCTION

0 32 m

08 of 15 sheets

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ref: FRLX015-D-010 drawn: CS
revision: D date: 13/12/2022 checked: TC

rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
CVR Highway Intersection SISD

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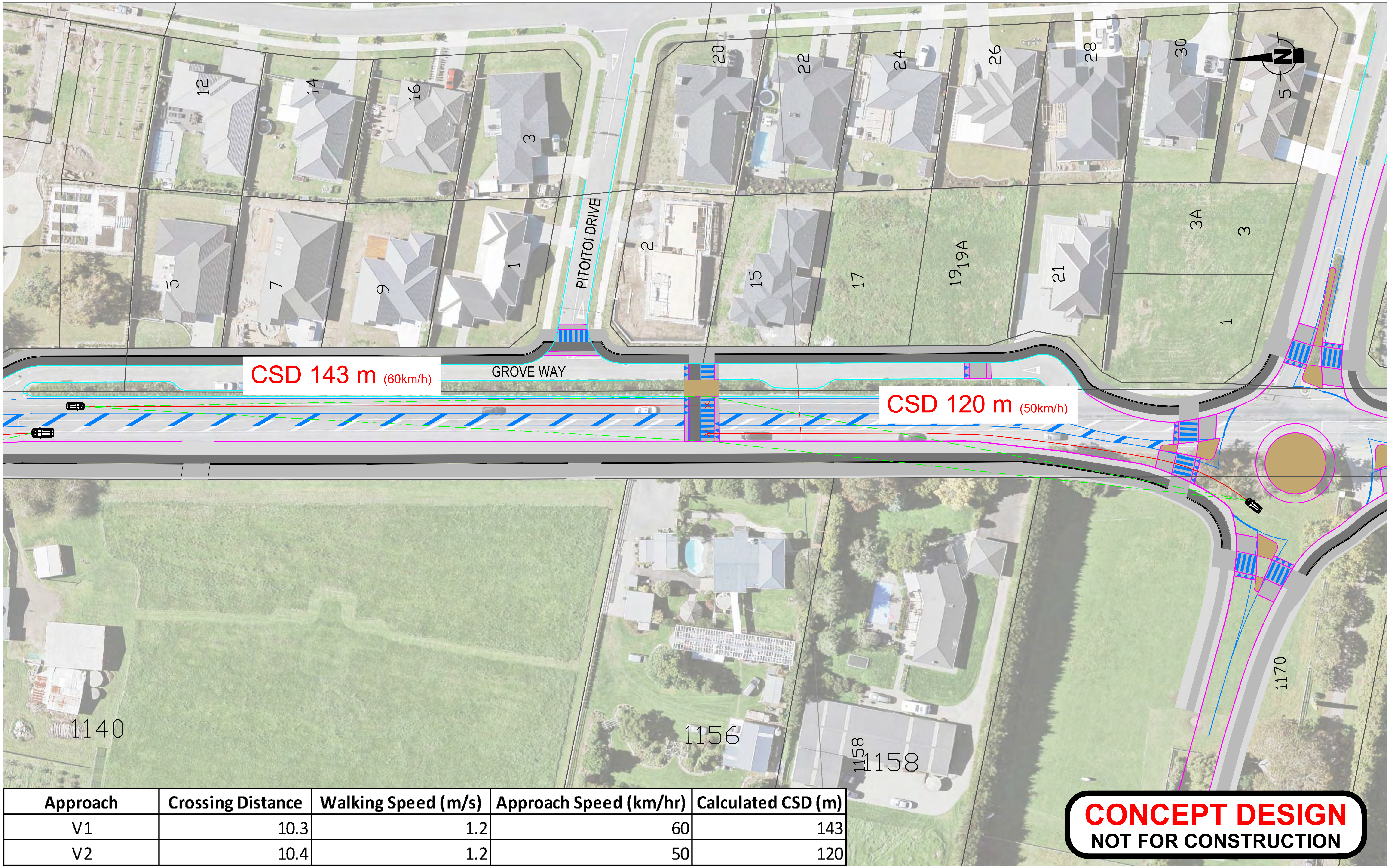

Approach	Crossing Distance	Walking Speed (m/s)	Approach Speed (km/hr)	Calculated CSD (m)
V1	10.3	1.2	60	143
V2	10.4	1.2	50	120

0 32 m

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scale: 1:800A3 design: CS
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revision: D date: 13/12/2022 checked: TC

rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
Pedestrian Crossing Sight Distance (CSD)

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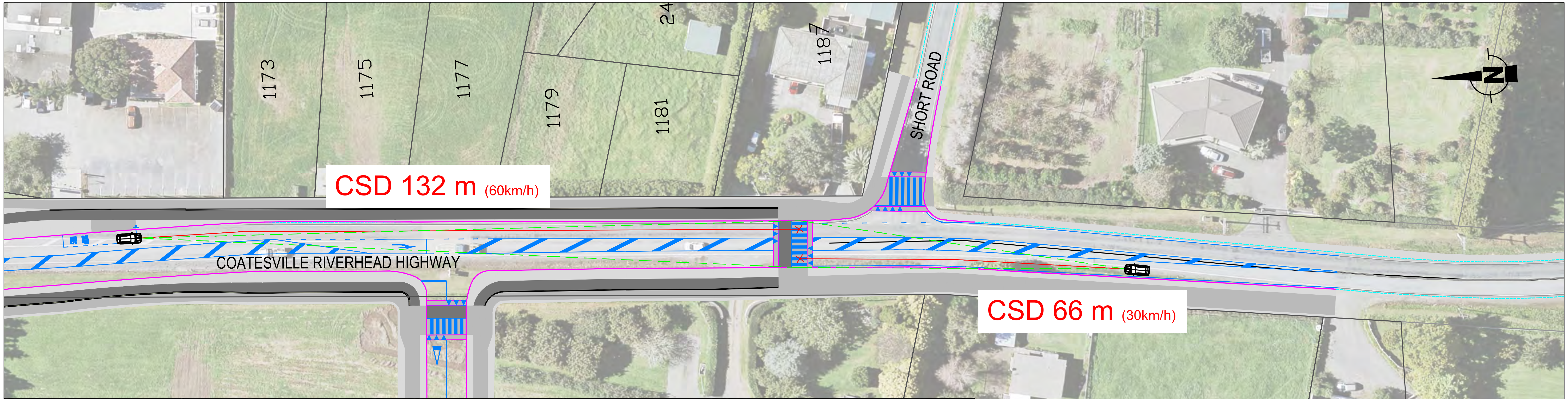
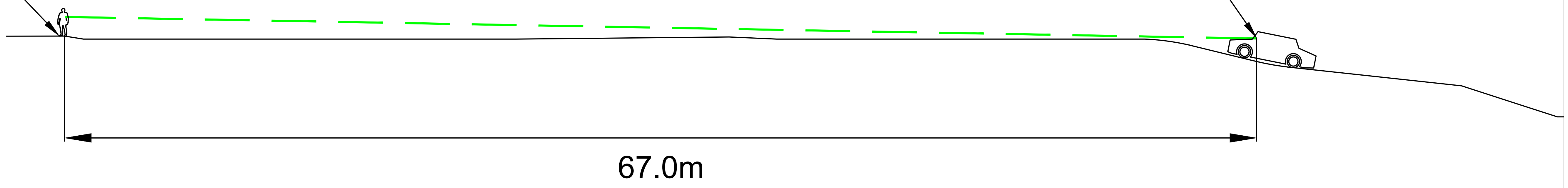


Approach	Crossing Distance	Walking Speed (m/s)	Approach Speed (km/hr)	Calculated CSD (m)
V1	9.5	1.2	60	132
V2	9.5	1.2	30	66

VERTICAL PROFILE OF COATESVILLE RIVERHEAD HIGHWAY



CONCEPT DESIGN
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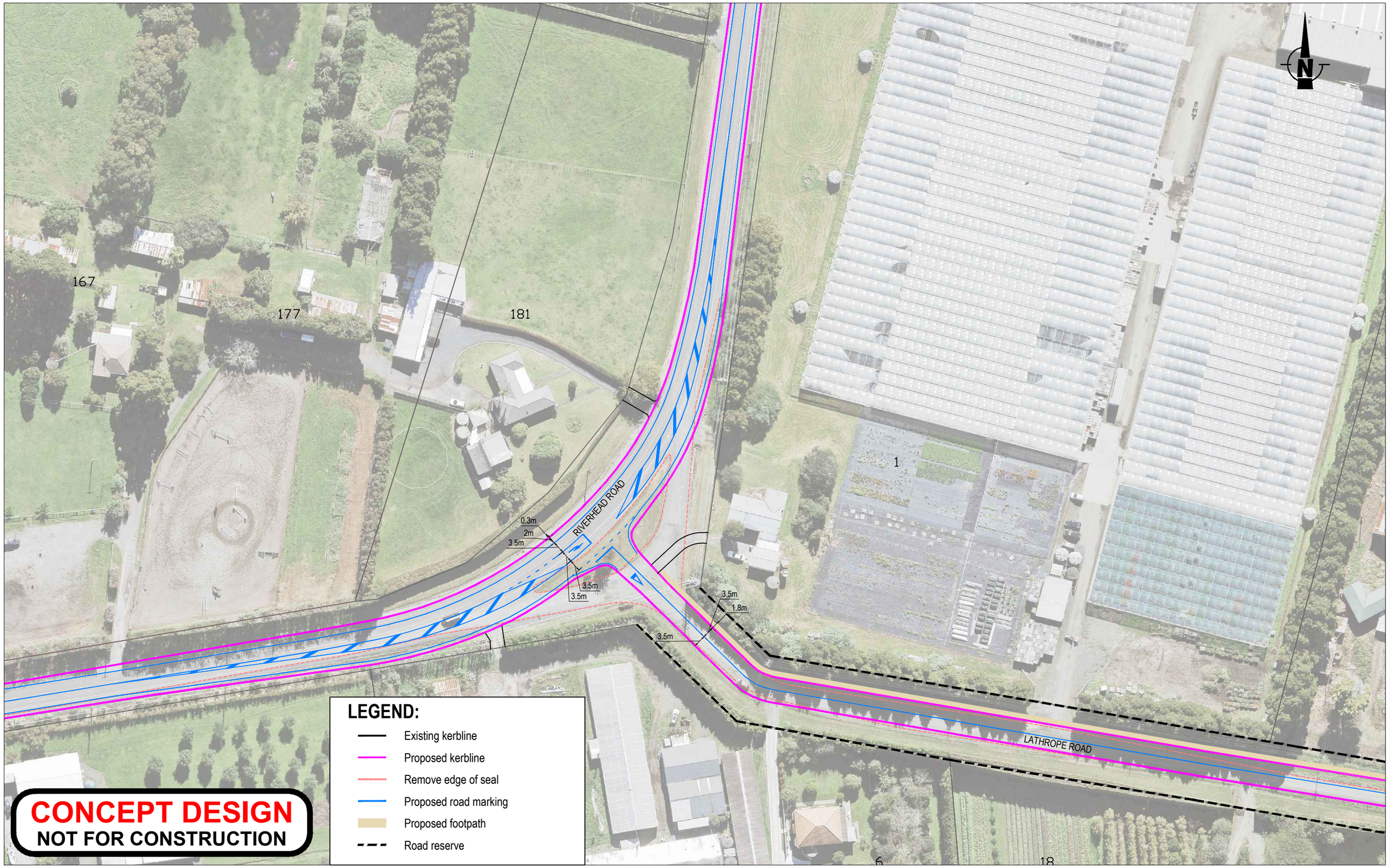
ref: FRLX015-D-010 drawn: CS
revision: D date: 13/12/2022 checked: TC

rev	status	issued
A	First Issue- Draft Issue to AT	03/11/2021
B	Issue to Fletchers	14/02/2022
C	Revised Issue	29/09/2022
D	Issue for TA	13/12/2022

Riverhead Plan Change
Pedestrian Crossing Sight Distance (CSD)

flow
TRANSPORTATION SPECIALISTS
Level 1, 11 Blake Street, Ponsonby, Auckland | PO Box 47497 Ponsonby
p 09 970 3820 | f 09 970 3890 | www.flownz.com



0 20m

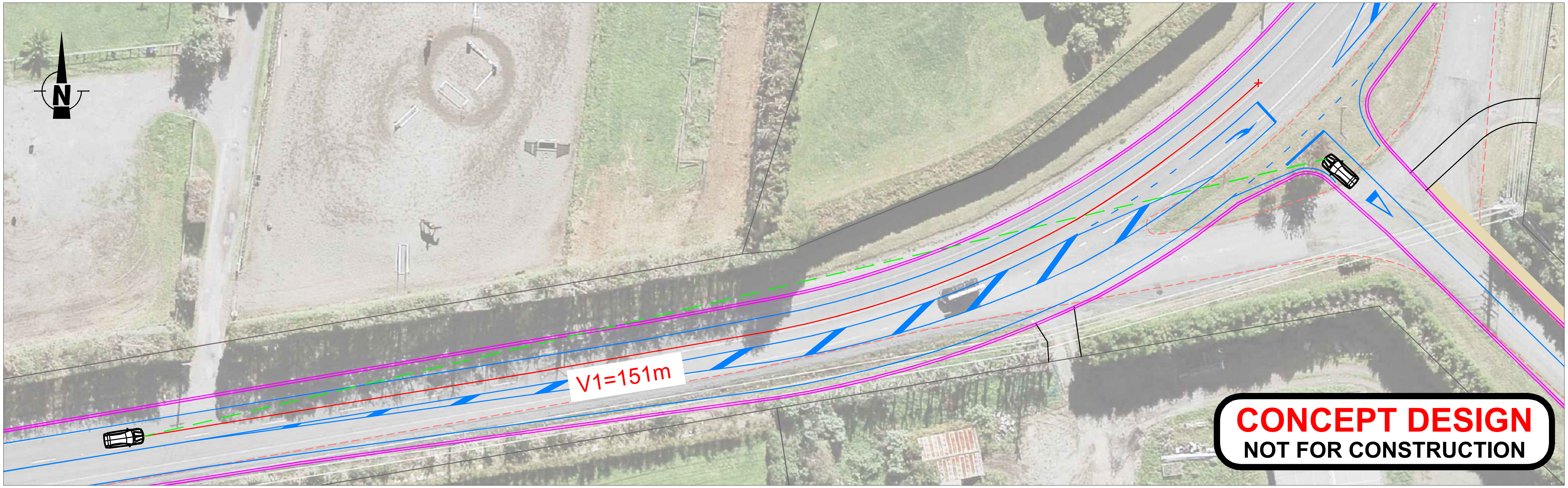
11 of 15 sheets

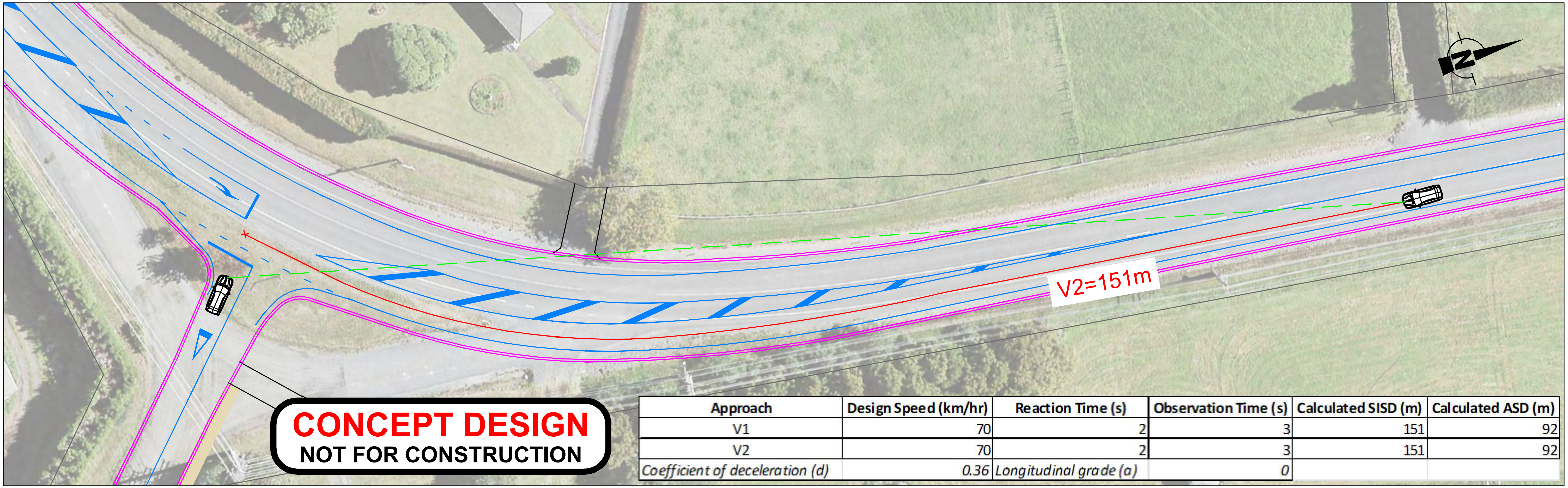
scale:	1:500 @A3	design:	CS
ref:	FRLX015-D-004	drawn:	CS
revision:	B	checked:	HS

rev	status	issued
A	First Issue	01/03/2022
B	Second Issue	13/12/2022

Riverhead Plan Change
Lathrope Road Intersection Concept Design

flow
TRANSPORTATION SPECIALISTS
Level 1, 11 Blake Street, Ponsonby, Auckland | PO Box 47497 Ponsonby
p 09 970 3820 | e [redacted] | flownz.com





Approach	Design Speed (km/hr)	Reaction Time (s)	Observation Time (s)	Calculated SISD (m)	Calculated ASD (m)
V1	70	2	3	151	92
V2	70	2	3	151	92
Coefficient of deceleration (d)	*0.36*	*Longitudinal grade (a)*	*0*		

0 20m

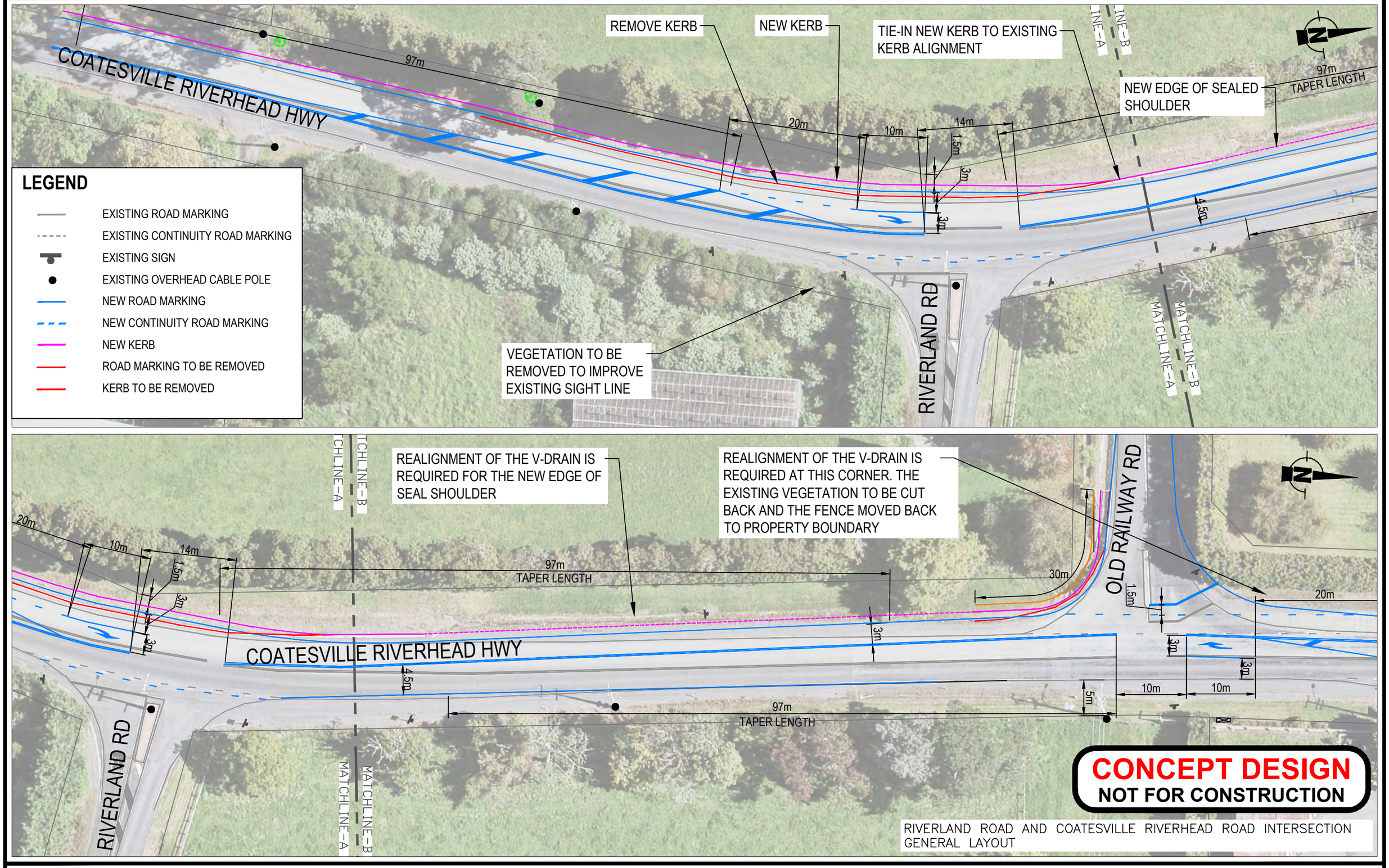
12 of 15 sheets

scale: 1:500 @A3	design: CS		
ref: FRLX015-D-004	drawn: CS		
revision: B	checked: HS		

rev	status	issued
A	First Issue	01/03/2022
B	Second Issue	13/12/2022

Riverhead Plan Change
Lathrope Road Intersection Concept Design

flow
TRANSPORTATION SPECIALISTS
Level 1, 11 Blake Street, Ponsonby, Auckland | PO Box 47497 Ponsonby
p 09 970 3820



RIVERLAND ROAD AND COATESVILLE RIVERHEAD ROAD INTERSECTION GENERAL LAYOUT

0 40m

RevA

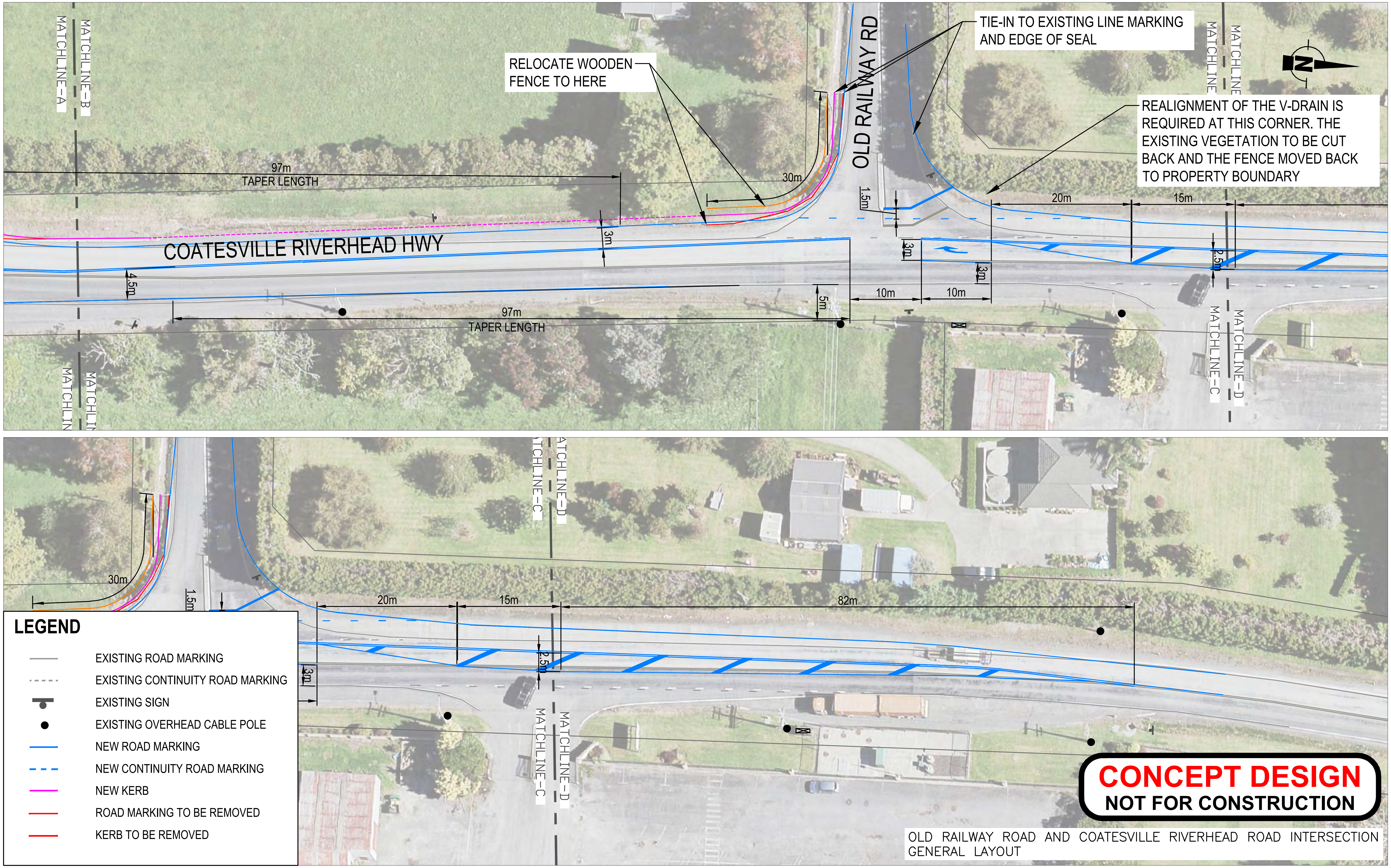
13 of 15 sheets

scale:	1:1,000 @A3	design:	MK
ref:	FRLX15-RIV-CD-02	drawn:	MK
revision:	A	checked:	SC

rev	status	issued
A	First Issue	13/12/2022

Riverhead Plan Change
Riverland Rd and Old Railway Rd Right Turn Bay

flow
TRANSPORTATION SPECIALISTS
Level 1, 11 Blake Street, Ponsonby, Auckland | PO Box 47497 Ponsonby
p 09 970 3820 | e admin@flownz.com | flownz.com



0 40m RevA

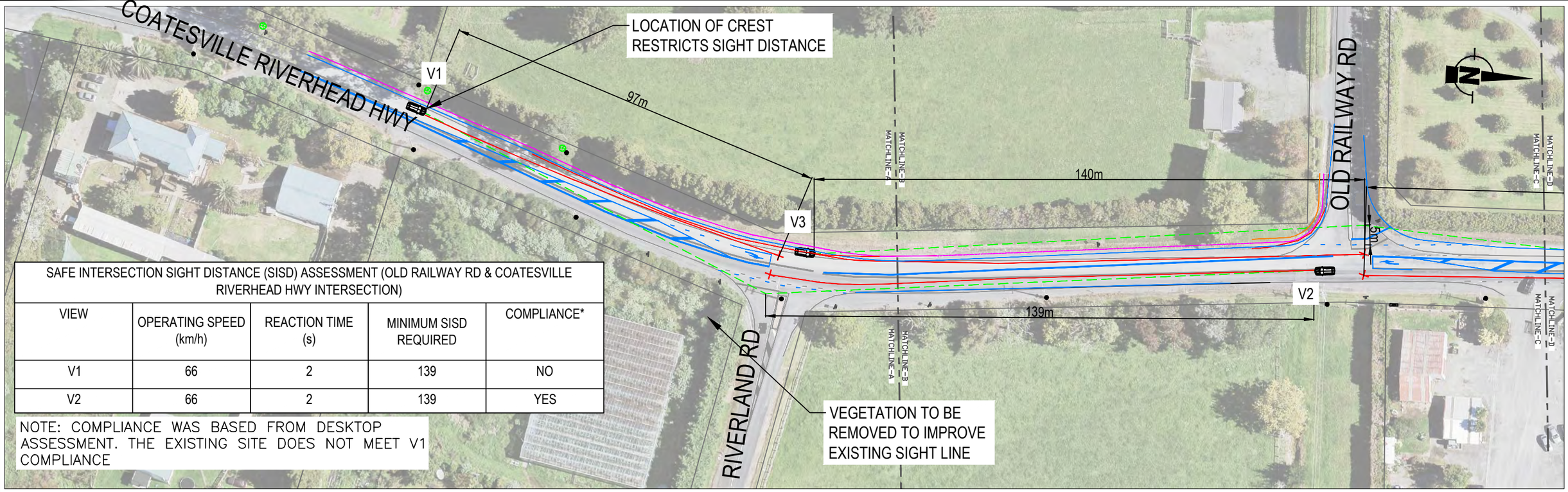
14 of 15 sheets

scale:	1:1,000 @A3	design:	MK
ref:	FRLX15-RIV-CD-03	drawn:	MK
revision:	A	checked:	SC

rev	status	issued
A	First Issue	13/12/2022

Riverhead Plan Change
Riverland Rd and Old Railway Rd Right Turn Bay

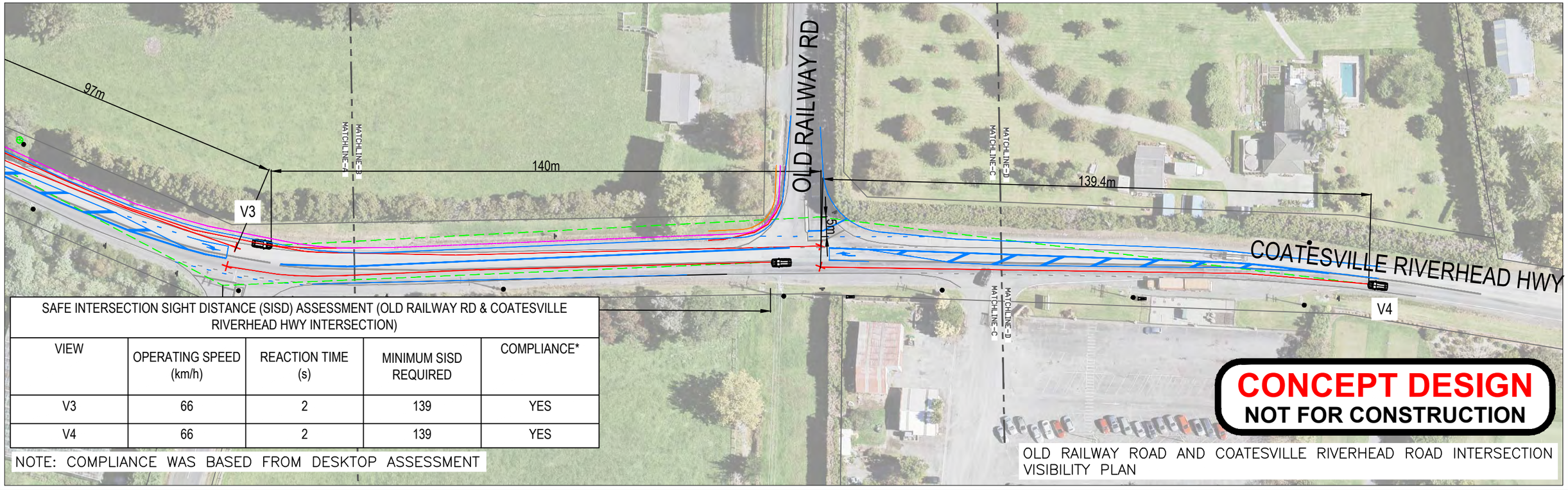
flow
TRANSPORTATION SPECIALISTS
Level 1, 11 Blake Street, Ponsonby, Auckland | PO Box 47497 Ponsonby
p 09 970 3820 | f 09 970 3890 | www.flownz.com



SAFE INTERSECTION SIGHT DISTANCE (SISD) ASSESSMENT (OLD RAILWAY RD & COATESVILLE RIVERHEAD HWY INTERSECTION)

VIEW	OPERATING SPEED (km/h)	REACTION TIME (s)	MINIMUM SISD REQUIRED	COMPLIANCE*
V1	66	2	139	NO
V2	66	2	139	YES

NOTE: COMPLIANCE WAS BASED FROM DESKTOP ASSESSMENT. THE EXISTING SITE DOES NOT MEET V1 COMPLIANCE



SAFE INTERSECTION SIGHT DISTANCE (SISD) ASSESSMENT (OLD RAILWAY RD & COATESVILLE RIVERHEAD HWY INTERSECTION)

VIEW	OPERATING SPEED (km/h)	REACTION TIME (s)	MINIMUM SISD REQUIRED	COMPLIANCE*
V3	66	2	139	YES
V4	66	2	139	YES

NOTE: COMPLIANCE WAS BASED FROM DESKTOP ASSESSMENT

CONCEPT DESIGN
NOT FOR CONSTRUCTION

OLD RAILWAY ROAD AND COATESVILLE RIVERHEAD ROAD INTERSECTION VISIBILITY PLAN

0 40m

RevA

15 of 15 sheets

scale: 1:1,000 @A3 design: MK
ref: FRLX15-RIV-CD-04 drawn: MK
revision: A checked: SC

rev	status	issued
A	First Issue	13/12/2022

Riverhead Plan Change
Riverland Rd and Old Railway Rd Right Turn Bay

flow
TRANSPORTATION SPECIALISTS
Level 1, 11 Blake Street, Ponsonby, Auckland | PO Box 47497 Ponsonby
p 09 970 3820 | e admin@flownz.com | flownz.com

APPENDIX D Coatesville-Riverhead Highway right turn bay assessment

flow TRANSPORTATION SPECIALISTS

technical note

PROJECT	**RIVERHEAD PRIVATE PLAN CHANGE**
SUBJECT	**RIGHT TURN BAY TREATMENT REQUIREMENT**
TO	**KELSEY BERGIN, DARREN SOO (FLETCHERS)**
FROM	SHARMIN CHOUDHURY
REVIEWED BY	TERRY CHURCH
DATE	18 NOVEMBER 2022

1 PURPOSE OF NOTE

The Riverhead Landowner Group (RLG) is proposing a Private Plan Change that covers the Future Urban Zoned land in Riverhead. To respond to feedback received from Auckland Transport, Flow has reviewed the requirements for intersection upgrades to include right-turn bays at the Riverland Road intersection and the Old Railway Road intersection.

We have outlined, in this technical paper, the guidelines and criteria we use to determine the requirement for right-turn bays at intersections as well as indicated if the intersection upgrades are required now according to the current volumes using the intersection (that is, prior to any development within Riverhead), at the 60% development phase and at the 100% development phase.

2 SAFETY ISSUE

2.1 Safety issues with turning movements

Rear-ending crashes and side-impact crashes are the two typical crash types that take place when turning left and right at priority controlled intersections.

When vehicles slow down to turn, there is a risk that the following vehicle hits the rear of the turning vehicle (rear-ending crashes). The severity of these crashes increase as traffic volumes increase or the approach speed of the vehicle behind increases.

When vehicles turn right, there is a risk of the right-turning vehicle getting hit on the side, by a vehicle in the opposing direction (right-turn-against or side-impact crashes). Again, the severity of side-impact crashes increases in response to an increase in traffic volumes, or as the approach speed of the oncoming vehicle increases.

2.1.1 Crashes at the Riverland Road intersection and the Old Railway Road intersection

The crash records of the past 5 years (2016 to 2021) indicate there have been 4 rear-end crashes involving vehicles turning right from Coatesville-Riverhead Highway into Old Railway Road, and 1 rear-end crash involving a vehicle turning right from Coatesville-Riverhead Highway into Riverland Road. Two of the rear-end crashes at the Old Railway Road intersection resulted in serious injuries.

From the crash records, we note the following

- **Right-turning** - All crashes that are related to turning movements from Coatesville-Riverhead Highway to either Riverland Road or Old Railway Road involved vehicles wanting to turn right into the side road
- **Left-turning** - There has been no record of rear-end crashes for vehicles turning left into Riverland Road or Old Railway Road
- **Side-impact crashes** - There have been no side-impact crashes at either intersection
- **Speed limit lowered** - There have been no turning movement crashes since the speed limit on Coatesville-Riverhead Highway (between SH16 and Riverhead village) was reduced to 60km/h.

Based on the above, we conclude the following

- **Rear-end crashes for left and right turning movements**. At the time of the crashes at the Riverland Road intersection and the Old Railway Road intersection, the posted speed limit on Coatesville-Riverhead Highway was higher (at 80km/h) which worsened the severity of the crashes. As the speed limit on Coatesville-Riverhead Highway adjacent to the intersections is now reduced to 60km/h, we expect that the frequency and severity of rear-end crashes will reduce and should they occur, will have a reduced severity.
- **Side impact crashes for right-turning movements**. When the traffic volumes increase along the Coatesville-Riverhead Highway (as a result of development), there is a risk that vehicles waiting to turn right, in trying not to cause further delay to the vehicles behind, would make unsafe right turn manoeuvres when there may be insufficient gaps within oncoming traffic. The angle of the crash, and the operational speed of around 65-70km/h, means there is a risk of a high severity of side-impact crashes.

With no inherent safety concern existing for left turning traffic, **our focus in this technical note is only on right-turn movements** with the objective to determine the requirement and timing for right-turn treatment at the Riverland Road intersection and the Old Railway Road intersection.

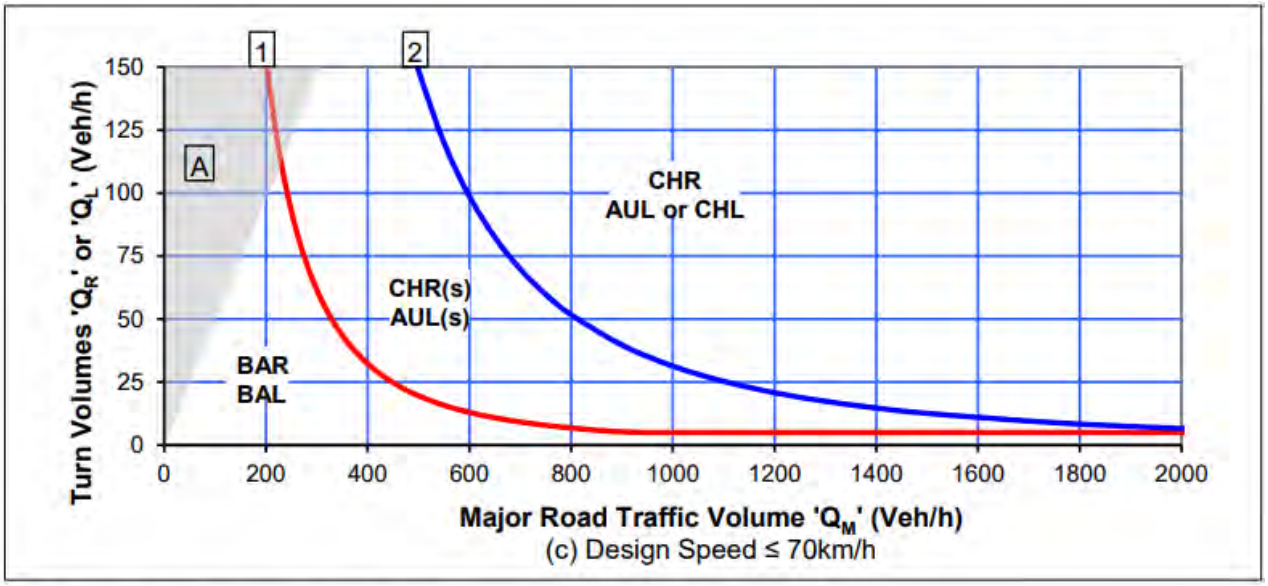
3 WARRANT FOR RIGHT TURN BAY TREATMENT

We refer to the Austroads' Guide to Traffic Management Part 6 which provides the warrants we use to determine the requirement for turn treatments at intersections. The warrants are for both urban and rural roads and apply to turning movements from the major road only (the road with priority) which in this case, is Coatesville-Riverhead Highway.

The warrants are typically based on the construction of intersections on new roads, however, they are also used as a reference for intervention levels when upgrading existing intersection turn treatments although it is also recognised that many existing intersections (particularly those on low-volume lower-order roads) are of a lower standard.

Considering the current speed limit is 60km/h along the Coatesville-Riverhead Highway, we have assumed a design speed of 70km/h. The warrant for turn treatments on roads at a design speed of 70km/h is shown in Figure 1.

Figure 1 – Warrant for turn treatments



Note: the minimum right-turn treatment for multilane roads is a CHR(s).

Source: TMR (2016a).

The warrant in the above figure above considers three types of right-turn treatments

- A basic right-turn treatment (BAR) provides a widened shoulder on the major road that allows through-movement vehicles, having slowed, to pass to the left of turning vehicles
- A channelised right-turn treatment with short lane (CHR(s)) separates the conflicting vehicle travel paths and provides a short length for the deceleration lane by assuming there is a 20% speed reduction at the start of the taper[1]
- A channelised right-turn treatment (CHR) provides a full-length deceleration lane by assuming no speed change across the intersection.

In the above figure, curve 1 (red) represents the boundary between a BAR and a (CHR(S)) turn treatment on two-lane two-way roads. Curve 2 (blue) represents the boundary between a CHR(S) and a CHR turn treatment.

[1] Austroads 2021: Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, Section 5.2.1

4 PROPOSED DEVELOPMENT

4.1 Intersection assessment

The two intersections Auckland Transport has requested a safety assessment for and the location of both relative to the Riverhead Private plan Change are shown in Figure 2.

Figure 2 – Private plan change site and location of intersections under consideration

4.2 The intersections

Old Railway Road and Riverland Road intersect with Coatesville-Riverhead Highway and are located south of the Private Plan Change site. Each intersection currently operate as stop-controlled T-intersections with no medians, shoulder widening, or right turn bays on Coatesville-Riverhead Highway, as shown in Figure 3.

Figure 3 – Existing Layout of intersections

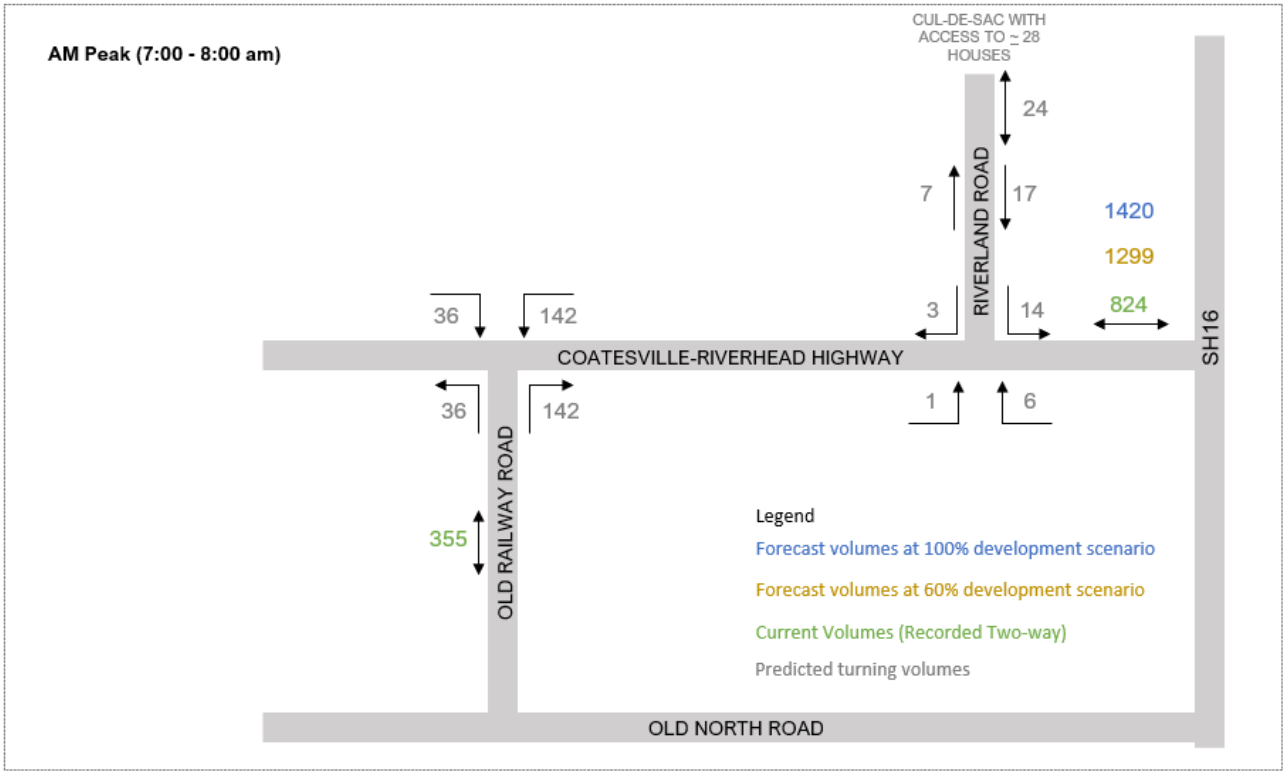
Old Railway Road intersection

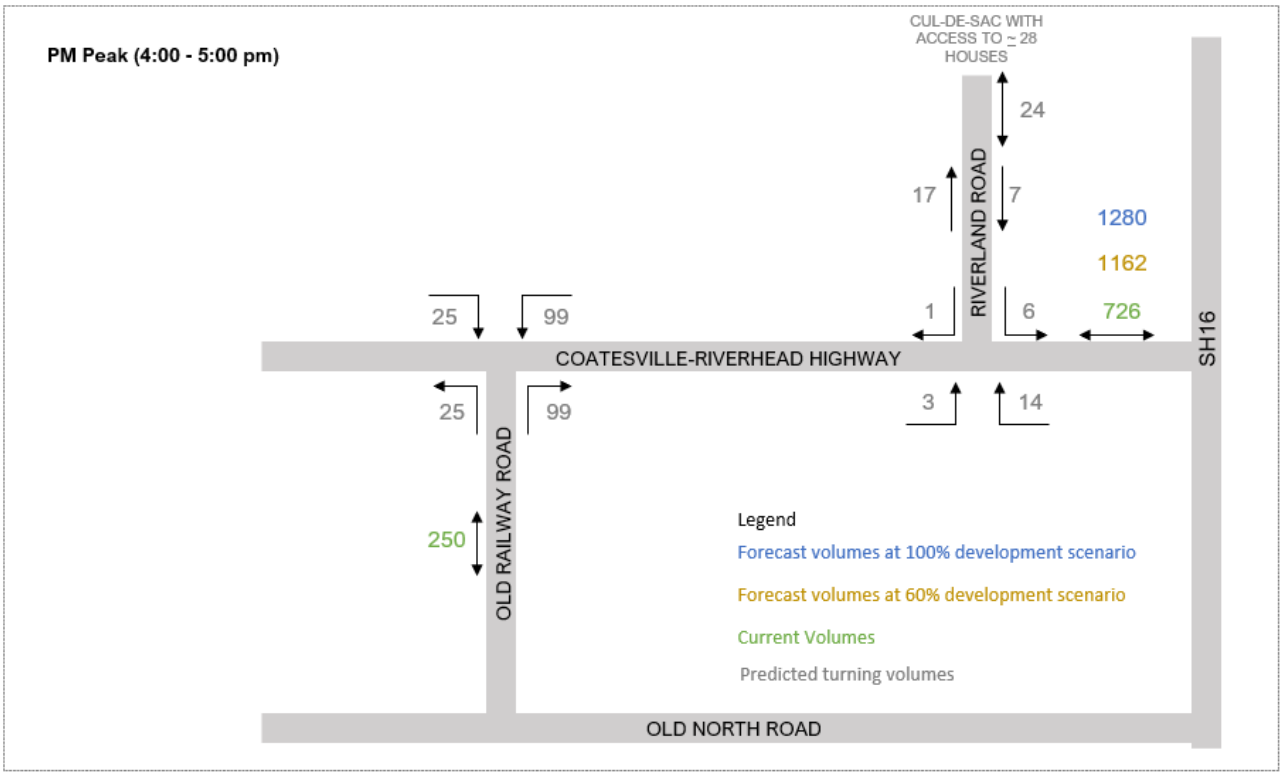
Riverland Road intersection

4.3 Traffic flows

The existing traffic flows along Coatesville-Riverhead Highway in the existing scenario, the 60% development phase, and the 100% development phase have been mapped in Figure 4 below.

Figure 4 – Peak hour traffic flows per scenario





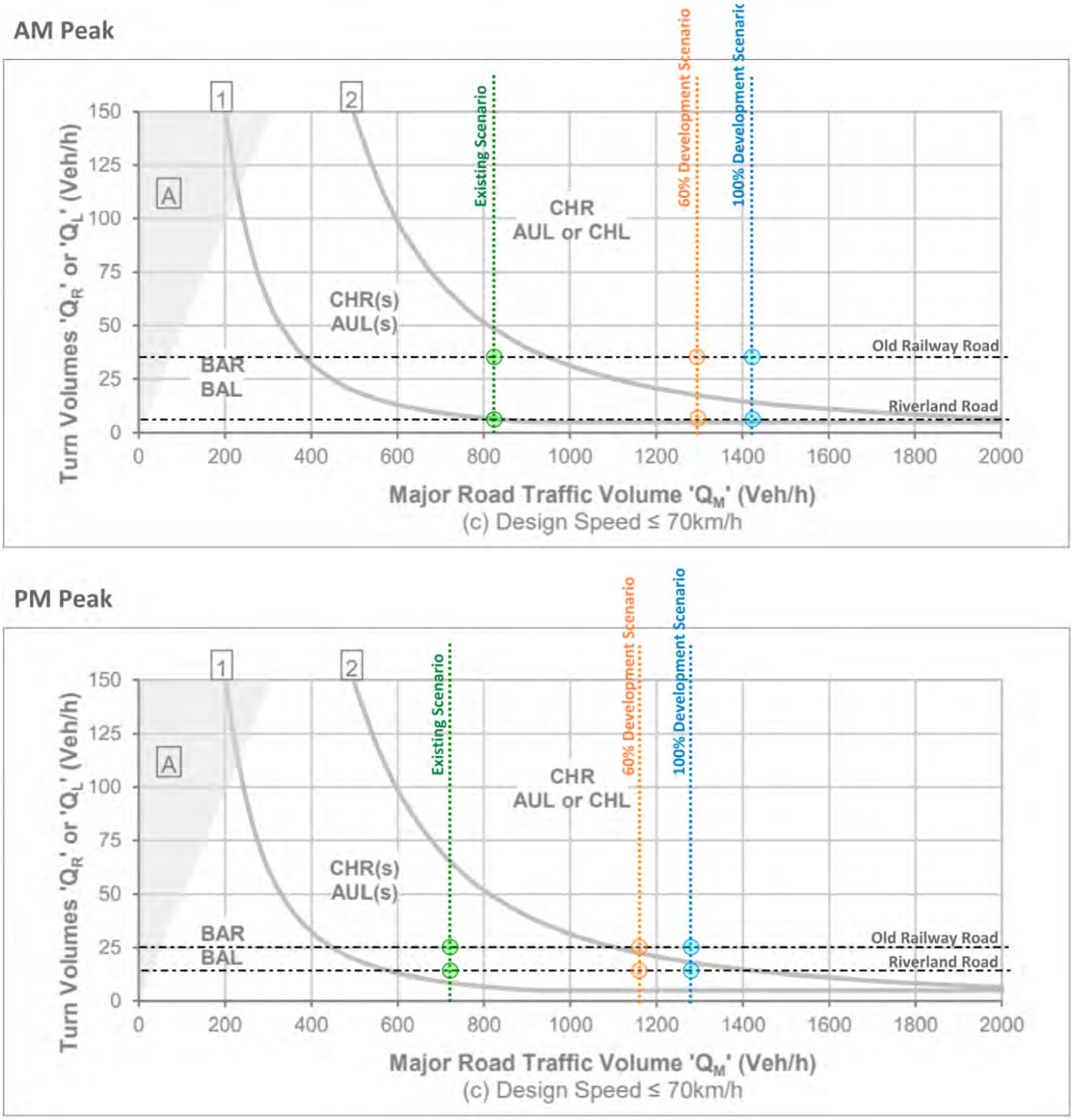
We have based the traffic volumes shown in the figure above on the following assumptions:

- Coatesville-Riverhead Highway volumes are based on Auckland Transport's traffic count data in May 2022, with forecast volumes being based on development yields associated with the Private Plan Change
- Old Railway Road volumes are based on Auckland Transport's traffic count data in March 2021 for Old Railway Road between Old North Road and Coatesville Riverhead Highway
- Volumes for Riverland assume a trip rate of 0.85 per dwelling. We have estimated 24 dwellings
- A 50% directional split is assumed along Old Railway Road and Riverland Road
- Riverland Road will experience 70% of its traffic going towards Coatesville-Riverhead Highway in the AM peak and vice-versa in the PM peak
- 80% of vehicles from the side roads will turn towards SH16 and the remainder will turn towards Riverhead.

4.4 The warrant for turn treatments

The current and predicted traffic volumes for each scenario (current, 60% development and 100% development) have been mapped onto the warrant as shown in Figure 5.

Figure 5 – Warrant maps for each scenario for both intersections



The warrant indicates that

- for the existing scenario, there is a requirement for a channelised turn treatment at the intersection with Riverland Road albeit the traffic demand is very low. There is however a high demand for a channelised treatment at the Old Railway Road intersection
- when increasing traffic volumes on Coatesville-Riverhead Highway (resulting from the uptake of development), the demand for a channelised turn treatment significantly increases.

5 SUMMARY

We have reviewed the requirement for right-turn bay treatments at the Coatesville-Riverhead Highway intersections with Old Railway Road and Riverland Road. Our review is based on the Austroads' Guide to Traffic Management Part 6 which provides the warrants for both urban and rural roads. The warrants are typically based on the construction of intersections on new roads, (greenfield sites) however, they are also used as a reference for intervention levels when upgrading existing intersection turn treatments. The guide recognises that many existing intersections are of a lower standard.

We reviewed the crashes involving traffic turning right or left, as well as the traffic flows and volumes for the existing scenario (no development), a 60% development scenario, and a 100% development scenario against the warrant and find the following

- At the Riverland Road intersection, the warrant indicates there is some demand for a channelised turn treatment in the existing scenario however the crash record indicates the current demand for it is low
- At the Old Railway Road intersection, the warrant indicates that the demand for a channelised turn treatment is high in the existing scenario
- In both the 60% development scenario and the 100% development scenario, the predicted increase in traffic flows indicate a high demand for channelised turn treatments at both intersections
- The increase in traffic using Coatesville-Riverhead Highway may also lead to an increase in delays experienced by turning vehicles and therefore an increase in risk to vehicles turning into the side roads.

Therefore, to achieve safe outcomes for each intersection, right-turn bays are recommended for the Old Railway Road intersection pre-development but for the Riverland Road intersection, right-turn bays may be provided at the 60% development scenario.

This technical note is focused solely on the safety implications due to the planned development, for right turn movements from Coatesville-Riverhead Highway to Old Railway Road and Riverland Road.

Reference: P:\frlx\015 Fletchers Riverhead Masterplan and Private Plan Change\Reporting\TN6A221118_Right turn bay assessment.docx - Sharmin Choudhury

From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Jeremy Quiding
Date: Monday, 6 May 2024 4:16:02 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Jeremy Quiding

Organisation name:

Agent's full name:

Email address: jquiding@hotmail.com

Contact phone number:

Postal address:

Auckland

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address: the FUZ zone in its entirety

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we support the specific provisions identified

Do you wish to have the provisions you have identified above amended? No

The reason for my or our views are:
Given the recent flooding events, and traffic issues that have been identified locally and the public admittance that public entities do not have sufficient resource or funds to complete the works in a meaningful timeframe. The proposal provided by the applicant will resolve a number of the local issues including stormwater management and traffic management at no cost to the public and in a much accelerated timeframe which will benefit all residents of the community.

I or we seek the following decision by council: Approve the plan change without any amendments

37.1

Details of amendments:

Submission date: 6 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

No

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Danni-Lee Corkery
To: Unitary Plan
Subject: Concerns Regarding Proposed Subdivision in Riverhead Community
Date: Monday, 6 May 2024 4:23:11 pm

To Whom It May Concern,

I am writing to express my concerns and submit my objections to the proposed subdivision in our Riverhead community. While I understand the need for development and growth, it is crucial that any expansion is accompanied by forward-thinking planning and consideration for the existing infrastructure and resources.

One of my primary concerns is the strain on our community's amenities and services. As it stands, our local school is already struggling to meet the needs of its students. There is a severe shortage of teachers and classrooms, evidenced by the use of portable buildings to accommodate the overflow. The field area is being steadily taken over by portable buildings. The addition of more housing will only exacerbate this issue. Furthermore, the lack of high school options is a major problem for further residential development. It's almost unbelievable that there dirt is not already being turned in the Kumeu area for a new high school given the development that has already occurred in the last 10 years. We urgently require another primary and high school to alleviate the pressure on the existing facilities.

The increased population resulting from the proposed subdivision will undoubtedly worsen the traffic congestion in our area. The current road infrastructure is inadequate to support the existing population, let alone the influx of new residents. We must address these roadways' capacity and safety concerns before proceeding with further development.

In addition to education and transportation, we must also consider the availability of essential services such as shops, recreational facilities such as swimming pools and gyms, and medical facilities. The influx of new residents will place additional strain on these resources, potentially leading to shortages and longer wait times for essential services.

While I am supportive of growth and progress, it must be managed responsibly to ensure the well-being and sustainability of our community. I urge the authorities to carefully consider building out the infrastructure in advance of the new development, in a complete manner so the area is ready for this development before it commences. 38.1

I trust that the council will factors and prioritise the long-term interests of both existing and future residents in any decisions regarding the proposed subdivision.

Thank you for considering my submission.

Sincerely,

Danni-Lee Corkery

From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Thomas Osborne
Date: Monday, 6 May 2024 5:15:49 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Thomas Osborne

Organisation name:

Agent's full name: Tom Osborne

Email address: tom.osborne@gmail.com

Contact phone number:

Postal address:
239 Muriwai Valley Road
RD1
Muriwai
Muriwai 0881

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
n/a

Property address: Riverhead Road

Map or maps: n/a

Other provisions:
n/a

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
The existing transport infrastructure, including both that in place, that proposed or planned by Waka Kotahi, and that proposed under the plan change, in manifestly insufficient in scope and scale to support 80.5ha of re-zones land being pushed into development, particulally when nearly 40ha are controlled by a major residential developer who will push for profitable housing over development within sustainable levels. Any development should be considered, and adequate discussions held, after the completion of associated / required infrastructure, including the mooted RTC and Kumeu bypass.

I or we seek the following decision by council: Decline the plan change

39.1

Submission date: 6 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

No

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Scott page
Date: Monday, 6 May 2024 6:15:46 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Scott page

Organisation name:

Agent's full name:

Email address: scottypage@gmail.com

Contact phone number:

Postal address:
731e ridge road
Riverhead
Auckland 0793

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
rezone 6 ha of land in Riverhead from Future Urban to Rural-Mixed Rural zone and 75.5 ha to a mix of Residential – Mixed Housing Suburban, Residential – Terrace Housing and Apartment Building, Business – Local Centre and Business – Neighbourhood Centre zones with associated precinct provisions.

Property address:

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? No

The reason for my or our views are:
We already have issues with limited school capacity that will not keep up with demand, flooding issues that are unresolved and will only be exacerbated by further intensification. Transport links out of riverhead cannot cope with current population let alone more

I or we seek the following decision by council: Decline the plan change | 40.1

Submission date: 6 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Monte Neal
Date: Monday, 6 May 2024 6:30:44 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Monte Neal

Organisation name:

Agent's full name: Monte Neal

Email address: nealsorchard@xtra.co.nz

Contact phone number:

Postal address:
PO Box 62
KUMEU
AUCKLAND 0891

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
PC 100 (Private): Riverhead

Property address:

Map or maps: https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/04-pc100-app-2-pc-zoning-map.pdf

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
The Township of Riverhead lacks infrastructure i.e ,Artier Routes in and out of Riverhead ,Roading ,Schools, Cycleways . To allow any more Housing or other building to take place before these things esp Roading would be a very unwise decision

I or we seek the following decision by council: Decline the plan change, but if approved, make the amendments I requested 41.1

Details of amendments: Decline the plan change, but if approved, make the amendments I requested 41.2

Submission date: 6 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

No

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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Legend

- Riverhead Precinct Boundary
- Terrace Housing and Apartment Zone
- Mixed Housing Suburban Zone
- Local Centre Zone
- Neighbourhood Centre Zone
- Mixed Rural Zone

Duke Street
Queen Street
Cambridge Road
Riverhead Road
Riverhead Road
Kaipara Portage Road
Coatesville-Riverhead Highway
Pitoitoi Road
Riverhead Point Dr
Short Road
Lathrope Road

0 100m 200m 500m

RIVERHEAD PRECINCT - ZONING PLAN

From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - FANG YANG
Date: Monday, 6 May 2024 7:30:44 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: FANG YANG

Organisation name:

Agent's full name:

Email address: 888fangyang@gmail.com

Contact phone number: 0211888208

Postal address:
34 manor park sunnyhills
pakuranga
auckland 2010

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address: 97 Old Railway Road

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we support the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
I wish the property can become Mixed Housing zone

I or we seek the following decision by council: Approve the plan change without any amendments

42.1

Details of amendments:

Submission date: 6 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? Yes

Would you consider presenting a joint case at a hearing if others have made a similar submission? Yes

Declaration

Could you gain an advantage in trade competition through this submission? Yes

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Ari King
Date: Tuesday, 7 May 2024 8:15:07 am

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Ari King

Organisation name: Local Riverhead community

Agent's full name:

Email address: ari.davies@live.com

Contact phone number: 0273386149

Postal address:
59 Diamond Lane
Riverhead
Auckland 0793

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address: Multiple addresses purchased by Fletchers to be developed

Map or maps: Riverhead

Other provisions:
A major residential development in Riverhead is planned to go ahead without any commitment to necessary and long overdue roading infrastructure upgrades.

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
The roads around Riverhead are already far over subscribed, the population has multiples several times over in the last decade and yet zero roading capacity increases have been taken forward by Auckland Transport or NZTA. This new major development will add further more burden on the local roaring network that will be unworkable. The infrastructure must come before more major development.

I or we seek the following decision by council: Approve the plan change with the amendments I requested | 43.1

Details of amendments: Deliver road capacity increases both west and north from Riverhead. Deliver stormwater and electricity capacity increases | 43.2 43.3

Submission date: 7 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? Yes

Would you consider presenting a joint case at a hearing if others have made a similar submission? Yes

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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email may be those of the individual sender and may not necessarily reflect the views of Council.

From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - NIcholas McKay
Date: Wednesday, 8 May 2024 8:30:49 am

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: NIcholas McKay

Organisation name:

Agent's full name:

Email address: nickmckay@outlook.co.nz

Contact phone number:

Postal address:
31 Pitoitoi Drive
Riverhead
Auckland 0820

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address: 31 Pitoitoi Drive Riverhead

Map or maps: All

Other provisions:
All

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? No

The reason for my or our views are:
Roads & schooling need improving. Also placing it on a flood plain what do you think will happen?

I or we seek the following decision by council: Decline the plan change

44.1

Submission date: 8 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Glenn Gowthorpe
Date: Wednesday, 8 May 2024 9:45:51 am

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Glenn Gowthorpe

Organisation name:

Agent's full name: Glenn Gowthorpe

Email address: gupmyster@gmail.com

Contact phone number:

Postal address:
22 Domain Crescent
Waimauku
Waimauku 0881

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
Private plan change request to rezone 80.5 ha of land in Riverhead from Future Urban to a mix of Residential – Mixed Housing Urban, Residential – Terrace Housing and Apartment Building, Business – Local Centre and Business – Neighbourhood Centre zones with associated precinct provisions.

Property address:

Map or maps: as per the documention on the Auckland Council website here
https://infocouncil.aucklandcouncil.govt.nz/Open/2023/05/20230504_PEPCC_AGN_11305_files/20230504_PEPCC_AGN_11305_Attachment_92771_2.PDF

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? No

The reason for my or our views are:
The traffic network in the area cannot handle the current volumes of traffic and will be significantly negatively impacted if a development of the proposed size occurs. I dont oppose development but do oppose development without FIRST increasing the necessary infrastructure (state highway and not just local roading) to support development. My life is negatively impacted by the current SH16 traffic and will be further negatively impacted by adding a further development of 1450 - 1750 dwellings in Riverhead.

Furthermore, the trip generation detail in the application is flawed as it uses 2022 data which is significantly out of whack with current traffic volumes - given that immediatly post covid there were large numbers working from home who have now been forced to return to the office. The modelling is therefore assessed as being based on false data.

I or we seek the following decision by council: Decline the plan change

45.1

Submission date: 8 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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Riverhead

Private Plan Change Request

Section 32 Assessment Report

12 December 2022

B&A
Urban & Environmental

Prepared for:
Riverhead Landowner Group

B&A Reference:

18369

Status:

Final Revision 2

Date:

12 December 2022

Prepared by:

Rebecca Sanders

Associate, Barker & Associates

Kasey Zhai

Senior Planner, Barker & Associates

Sarah Rendle

Associate, Barker & Associates

Reviewed by:

Karl Cook

Director, Barker & Associates Limited

Contents

Appendices

1.0 Applicant and Property Details

To:	Auckland Council
Site Location:	Riverhead Road, Coatesville-Riverhead Highway, Cambridge Road, and Duke Street, Riverhead
Applicant Name:	Riverhead Landowner Group
Address for Service:	Barker & Associates Ltd PO Box 1986 Shortland Street Auckland 1140 Attention: Karl Cook / Sarah Rendle
Plan Change Area:	Approximately 80.5ha
Unitary Plan:	Auckland Unitary Plan (Operative in Part) ('**AUP**')
AUP Zoning:	Future Urban
Locality Diagram:	Refer to **Figure 3**.
Brief Description of Proposal:	Private plan change request to rezone 80.5 ha of land in Riverhead from Future Urban to a mix of Residential – Mixed Housing Urban, Residential – Terrace Housing and Apartment Building, Business – Local Centre and Business – Neighbourhood Centre zones with associated precinct provisions.

2.0 Executive Summary

The Riverhead Landowner Group ('**RLG**') is applying for a plan change to the Auckland Unitary Plan (Operative in Part) ('**AUP**') to rezone approximately 80.5ha of land in Riverhead from Future Urban to a mix of residential zones with a small Local Centre and Neighbourhood Centre, consistent with the Riverhead Structure Plan. The rezoning proposal provides capacity for approximately 1500-1800 dwellings.

The Plan Change also includes a precinct, which details refined residential density standards for the Residential Terrace Housing and Apartment Building and Residential – Mixed Housing Urban zones and in response to the locational attributes of the Plan Change area. The precinct also details the indicative road and open space network, stormwater management, provisions to recognise Mana Whenua values including the provision of a cultural landscape map, and ensure that development progresses with the availability of infrastructure.

The Future Urban Land Supply Strategy ('**FULSS**') identifies Kumeu, Huapai and Riverhead together as being collectively 'development ready' in 2028-2032, with potential to accommodate 6,600 new dwellings. The FULSS is a non-statutory document and is a high-level staging plan for Auckland's future urban areas. The more detailed analysis undertaken as part of this proposal supports an earlier release of Riverhead for development. The reasons for this are summarised as follows:

- The FULSS assumes that Riverhead is subject to the same infrastructure constraints as Kumeu and Huapai, when there is generally sufficient infrastructure capacity to accommodate future development in Riverhead now, without the need for significant upgrades;
- The entities which form the RLG (Fletcher Residential Limited, The Neil Group, and Matvin Group) have an established track record in commercial and residential development and are uniquely placed to deliver a significant volume of housing in Riverhead at pace and to a high standard;
- The technical analysis undertaken in support of this Plan Change, in particular the Integrated Transport Assessment and Water and Wastewater Servicing Strategy, demonstrates that the land can be developed with targeted upgrades in place; and
- Rules are included within the Plan Change to coordinate the release of development capacity within the Plan Change area with the delivery of required transport infrastructure. Additionally, assessment criteria will ensure development can be serviced by water and wastewater infrastructure. This allows much needed residential capacity to be available in the short to medium term. It also allows for consenting and development for preliminary works to proceed without creating any additional demand on infrastructure.

For these reasons, and in the context of the staging criteria set out in Appendix 1 of the FULSS and Appendix 1 of the Regional Policy Statement ('**RPS**'), the proposal is consistent with sound resource management practice and Part 5 of the Resource Management Act ('**RMA**').

Further, the proposed Plan Change responds to the specific characteristics of the site and the surrounding area, with reference to the regional context and gives effect to the relevant planning documents for the following reasons:

- A variety of residential typologies and densities would be enabled and these respond to locational attributes and constraints. Generally higher residential densities are proposed

close to the Local Centre and the intersection between Coatesville-Riverhead Highway and Riverhead Road;

- The Local Centre is located within a walkable distance and will provide for the day to day needs of the local community that will establish in the proposed residential areas;
- The zoning pattern enables a connected and high-quality road network to be established that provides appropriately for all modes of transport, including walking and cycling;
- The adverse effects of urban development on the natural environment, including the stream and wetlands within and near the site, can be effectively managed and key natural features within the Plan Change area will be maintained and enhanced; and
- The Plan Change area is able to be serviced by infrastructure, with appropriate upgrades ensured through the proposed Plan Change provisions.

For these reasons, the proposal is consistent with sound resource management practice and Part 5 of the RMA. Therefore, the Council can accept the Plan Change for processing.

The proposed land uses have been assessed to be the most optimal to achieve the objectives of the Unitary Plan, and the purpose of the RMA, in this location. The zoning layout is consistent with the Riverhead Structure Plan. The detailed site and context analysis completed as part of this Plan Change demonstrates that the proposed use will be an efficient and effective method for achieving the sustainable management purpose of the RMA and the Regional Policy Statement.

On this basis, it is considered that the proposed zonings are the most appropriate uses for the land.

3.0 Introduction

3.1 Background

Riverhead Landowner Group ('**RLG**') is comprised of Fletcher Residential Limited, The Neil Group, and Matvin Group, who collectively own (or are prospective purchasers) of the majority of the landholdings within the Plan Change area, as shown in **Figure 1** below.

The RLG have an established track record in commercial and residential development.

RLG seeks to rezone approximately 80.5ha of land in Riverhead from Future Urban to a mix of residential zones with a small Local Centre and Neighbourhood Centre, along with provision for future open space areas. RLG envisages that the Plan Change will provide quality, compact neighbourhoods adjacent to the existing Riverhead rural/coastal town. The proposed zoning pattern will encourage a range of housing choice with the more intensive housing development located around the proposed Local Centre.

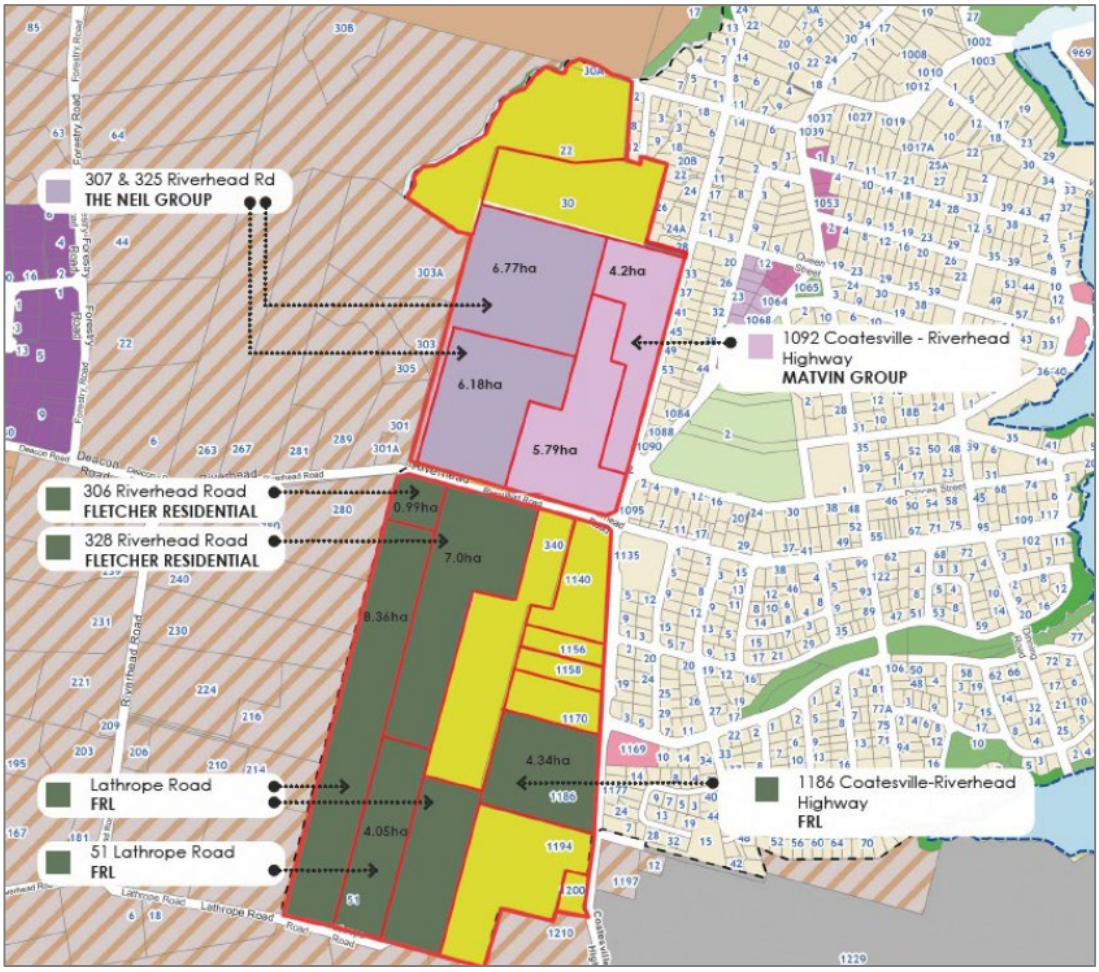


Figure 1: RLG landholdings within Riverhead Precinct.

3.2 Site Location and Description

3.2.1 Site Description

The Plan Change area consists of 80.5ha of Future Urban zone land within the rural coastal settlement of Riverhead. Riverhead is located in the North West of Auckland 30km/30min drive from Auckland's City Centre. **Figure 2** shows Riverhead in a wider regional context.

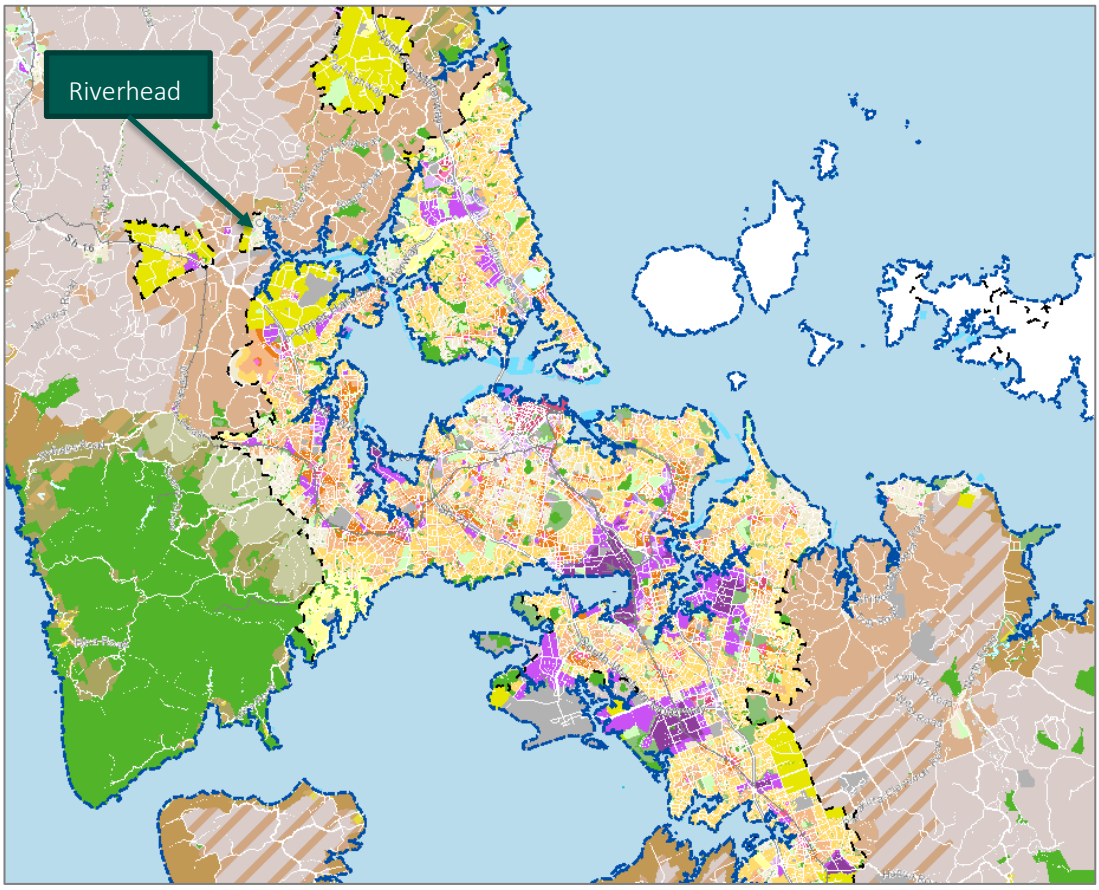


Figure 2: Riverhead's location within the wider Auckland region.

The Plan Change area is a physically well-defined area bound by Coatesville-Riverhead Highway and Cambridge Road to the east, the Rangitopuni Stream to the north, and rural-zoned land to the west and south. The Plan Change area is regular in shape, with individual land parcels creating a geometric pattern of shelterbelts and other farm boundary definitions. A locality plan of the Plan Change area is included as **Figure 3** below.

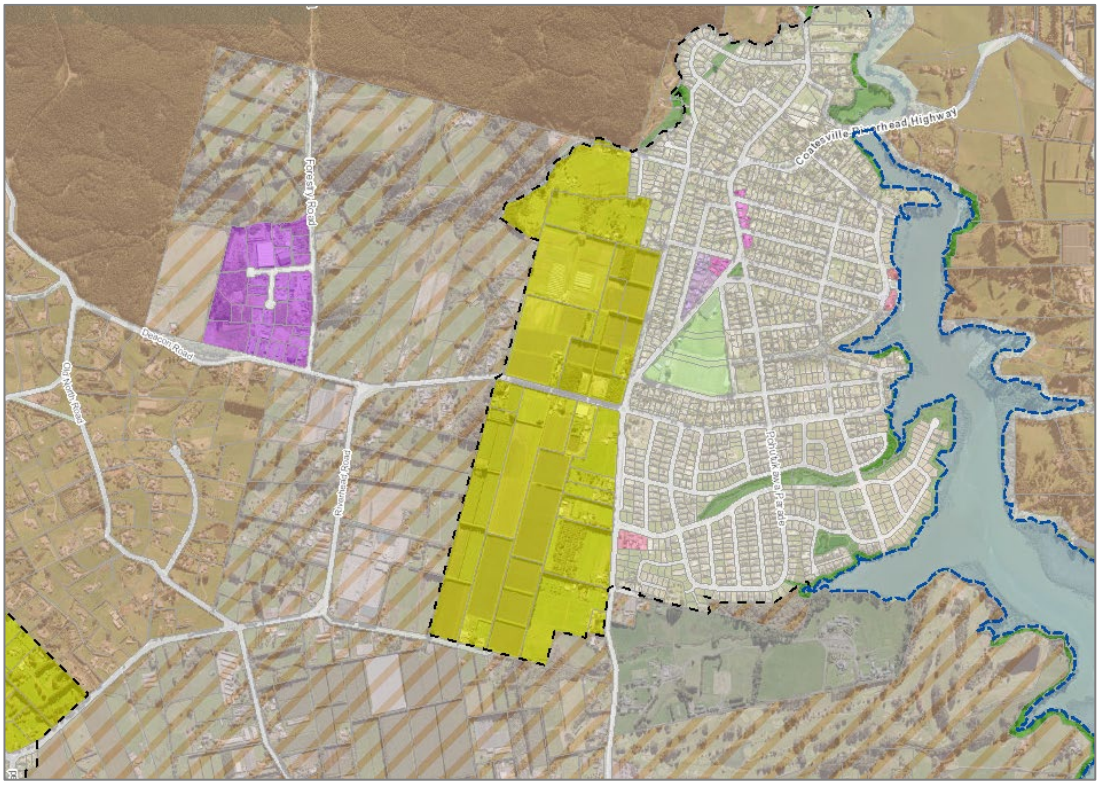


Figure 3: Zoning map of the Structure Plan area.

The current land use within the Plan Change area is predominantly horticulture with some agriculture (grazing). Various residential and commercial (horticulture-related) buildings are present across the Plan Change area.

The topography of the Plan Change area is largely flat with the land in the northern portion of the Plan Change area sloping gently towards the north. Horticultural and past farming activities have removed all existence of indigenous vegetation from the Plan Change area. The few native trees or shrubs that exist have either been self-sown by birds or wind, or have been planted as part of amenity plantings associated with dwellings. There are no significant ecological areas mapped within the Plan Change area.

Waterbodies are concentrated within the northern portion of the Plan Change area where there is a large historic wetland across the extensive flat northern terrace, which would have once been a river floodplain. Vegetation within the wetland comprises of exotic species and native purei. In addition, there are two small wetlands to the north-east of the Plan Change area, both are dominated by a single native wetland plant and are botanically simplistic. There is one extensively modified intermittent stream on the site which receives flow from the northern-central part of the site and directs it to the northern low-lying floodplain/wetland area. The stream discharges from the wetland to the unnamed tributary of the Rangitopuni Stream, which sits just outside the northwest boundary of the Structure Plan area, via an excavated drain (which is also classed as intermittent stream).

There are a number of overland flow paths that traverse the Plan Change area. In addition, the northern portion of the Plan Change area is subject to flooding.

SH16 is located approximately 2km south of the Plan Change area and can be accessed via Coatesville-Riverhead Highway, Old North Road or Riverhead Road. SH16 provides connections to

Kumeu to the west, and Westgate to the south. It also provides a connection to SH18 (via Brigham Creek Road or Trig Road) which provides a connection to Albany and the North Shore.

There is a bus service that operates along the Coatesville-Riverhead Highway connecting Riverhead to the Westgate and Albany Metropolitan Centres. The SH16 Northwest Bus Improvements project will also improve public transport accessibility from Westgate to the City Centre.

3.2.2 Surrounding Area and Local Context

In terms of land use and built form in the immediate locality, the surrounding area is characterised by a mix of activities and building types. To the west and the south of the Plan Change area are large rural landholdings. To the north is the Riverhead State Forrest. The existing Riverhead township is located to the east.

Riverhead township has a current population of approximately 3,000 people, and is predominantly comprised of lower-density suburban residential properties. The northern part of the existing township, north of the Riverhead War Memorial Park, is an older and more established area with allotments typically around 800m² or larger and single-storey detached dwellings. To the east and south of the park, development is more recent, but the pattern of development is also typically 800m² sections with single-storey detached dwellings.

In the wider context, the Plan Change area forms part of the extensive growth area in Auckland's North-West. In particular, Riverhead is located to the east of Kumeu/Huapai and west of Whenuapai which have both experienced significant growth in recent years transforming from small settlements into large residential communities with a range of housing densities. Kumeu/Huapai and Whenuapai will continue to transform as both settlements are surrounded by significant areas of land zoned for Future Urban use. There are opportunities to leverage from infrastructure to support development within these significant growth areas within Riverhead.

In terms of employment opportunities, the Plan Change area is strategically located in proximity to several major business hubs in the north west of Auckland. Massey/Westgate is the nearest metropolitan centre, located approximately 10km to the south, via State Highway 16.

The Plan Change area is also accessible to a range of social infrastructure including Waitakere Hospital within a 15 km radius. Riverhead School is within a 2-3 km distance of the Plan Change area, as well as a series of community facilities including Early Learning Centres, community hall, open spaces and amenities.

4.0 Description of the Plan Change Request

4.1 Description of the Proposal

4.1.1 Approach to the Planning Framework with Riverhead

The intention of the Plan Change is to rely largely on standard zones and Auckland-wide provisions to manage the way in which the Plan Change area is used and developed.

Consistent with other greenfield precincts within the AUP, the proposed precinct also includes place-based provisions that create a spatial framework for development. The precinct provisions are appropriately focused on the layout of development necessary to achieve the objectives of the AUP, including:

- Recognising Mana Whenua values, including the provision of a cultural landscape map;
- Achieving an appropriate urban layout;
- Providing an integrated and connected street network;
- Enhancing the riparian margins of streams;
- Ensuring the built form character integrates with the existing Riverhead settlement and the surrounding rural land; and
- Ensuring development coordinates with the required infrastructure upgrades.

On balance, this approach enables the Plan Change area to develop to a scale and intensity which is broadly consistent with areas of similar zoning patterns across the region. The precinct will, however, include some variation to the standard Auckland-wide and zone provisions to introduce more tailored standards, matters of discretion and assessment criteria. This will support the development of a quality built environment within this locality that creates a distinctive sense of place.

4.1.2 Overview of the Proposed Zoning

This Plan Change seeks to rezone approximately 80 hectares of Future Urban zoned land for urban development, which will comprise approximately:

- 1.8ha Business – Local Centre zone;
- 0.7ha Business – Neighbourhood Centre zone;
- 4.3ha Residential – Terrace Housing and Apartment Building zone; and
- 74ha Residential – Mixed Housing Urban zone.

The proposed zoning pattern is shown in **Figure 4** below. The intention of the proposed zoning is to provide for the establishment of a new residential area in Riverhead that offers more housing choice than the current settlement, which is predominantly low density residential. At the same time the zoning pattern seeks to respond to the local rural and low density context.

Residential – Terrace Housing and Apartment Building zone has been applied surrounding the Local Centre zone to reinforce the village heart. It would accommodate the proposed Botanic Retirement Village. The Residential – Terrace Housing and Apartment Building ('**THAB**') zone provides the opportunity for a wide variety of housing typologies including low rise walk ups and apartments within a walkable distance to the centre.

The Residential – Mixed Housing Urban ('**MHU**') zone has been applied around the periphery of the THAB zone in order to enable three-storey development, transitioning down to two-storeys throughout the remainder of the plan change area.

The MHU zone has been applied throughout the remainder of the residential area, but with a two-storey (8m) height limit (achieved by way of a sub-precinct). This is to enable two-storey suburban development with a similar built character to the existing Riverhead settlement while enabling greater density and housing choice to use greenfield land more efficiently.

Two centres are proposed to serve the plan change area as well as offer the existing village residents greater choice and convenience. The Local Centre zone is applied at the intersection of Riverhead Road and Coatesville-Riverhead Highway as this location has the highest visibility and

passing trade. It is also the most appropriate from a traffic perspective and reinforces the memorial park as the centre of Riverhead.

A neighbourhood centre is proposed along Coatesville-Riverhead Highway, close to the Hallertau Brewery and a future key east-west connection.

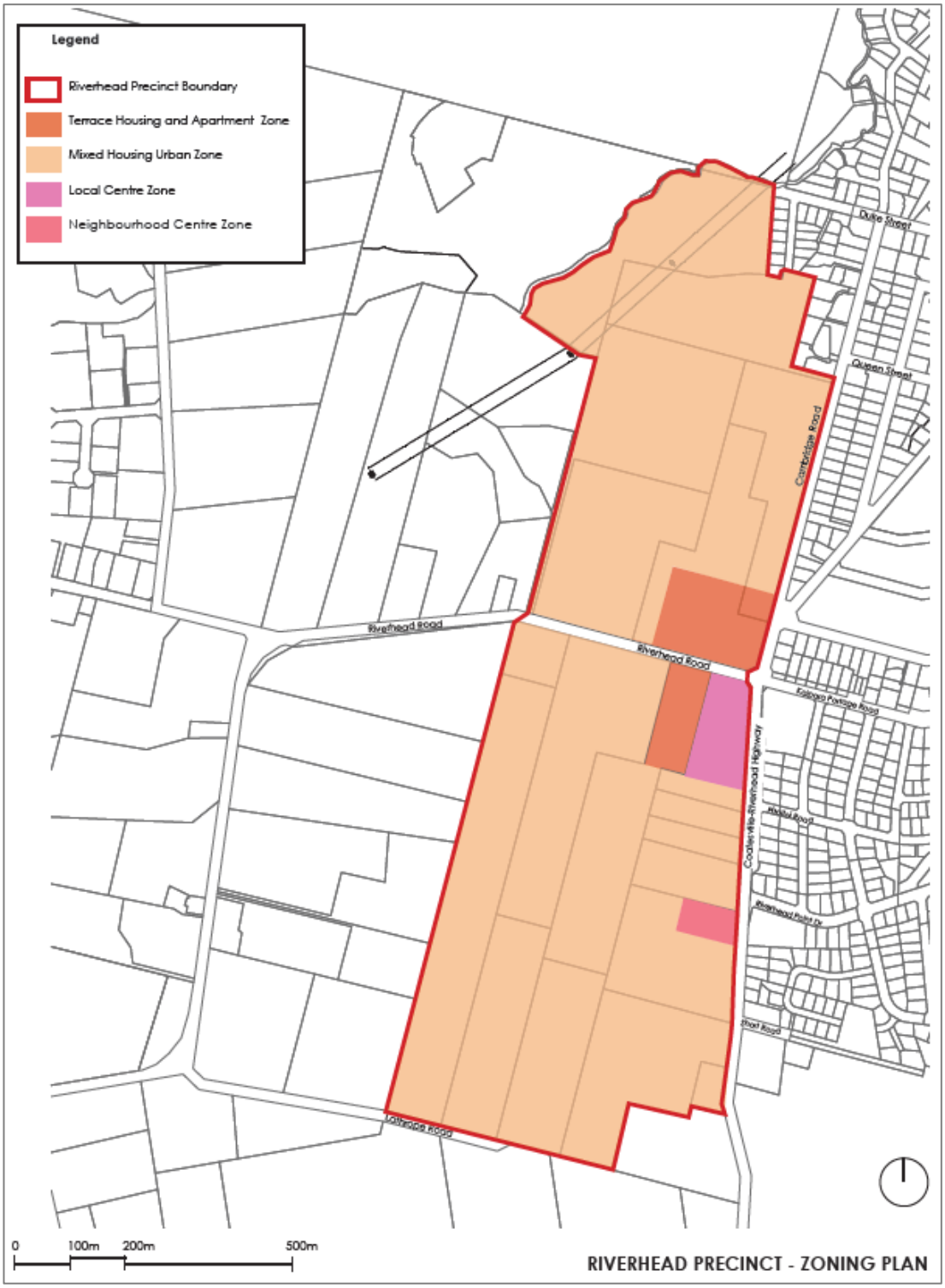


Figure 4: Proposed zoning.

4.1.3 Other Unitary Plan Controls

In relation to stormwater, it is proposed to apply the Stormwater Management Area Control – Flow 1 ('SMAF 1') across the majority of the Plan Change area to manage the increase in stormwater discharge to sensitive stream environments. The SMAF 1 control is not applied to 1170 and 1186 Coatesville-Riverhead Highway, as shown in Figure 5 below, because this area is not proposed to discharge to streams (instead it is part of the Riverhead Point Drive network which is a piped network with secondary conveyance via overland flow within Riverhead Point Drive road).

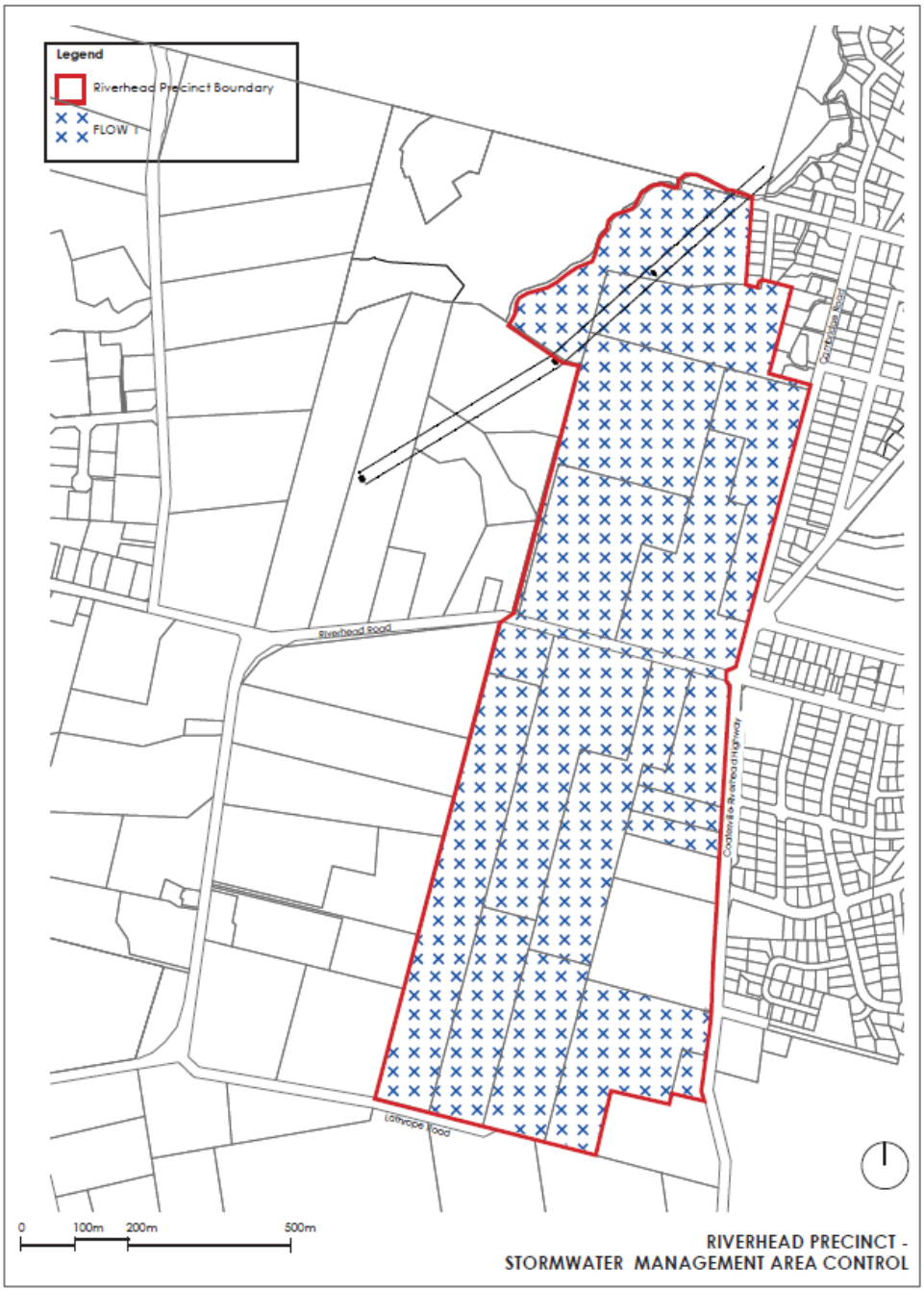


Figure 5: Proposed SMAF 1 control.

Additionally, the Council's recently approved Network Discharge Consent includes requirements to prepare a Stormwater Management Plan ('SMP') and meet defined outcomes. This requirement will be triggered as part of future consent processes.

4.1.4 Proposed Precinct Provisions

RLG propose to apply the 'Riverhead Precinct' to the Plan Change area to manage the effects of urbanisation on the local environment and to ensure that a quality built environment is achieved. The 'Riverhead Precinct' comprises two sub-precincts summarised below, and shown on the Riverhead Precinct Plan at Figure 6:

- Sub-Precinct A is zoned Residential - Terrace Housing and Apartment Building and provides for the greatest height and residential densities at a key intersection adjacent to the Local Centre Zone and public transport facilities. A wider range of non-residential activities is provided for at ground floor; and
- Sub-Precinct B is zoned Residential – Mixed Housing Urban and provides for a transition in building height between Sub-Precinct A and the surrounding Mixed Housing Urban area where height has been limited to two storeys to respond to the existing built character of the Riverhead settlement.

A package of provisions, including policies, activity standards, development standards, and associated matters of discretion and assessment criteria are proposed to achieve the objectives of the precinct and the wider Unitary Plan. The full set of provisions is set out within Appendix 1 however a summary is provided below:

- More permissive activity statuses for restaurants, cafes, retail, and healthcare facilities within the Residential – Terrace Housing and Apartment Building zone;
- A transport infrastructure staging rule to coordinate the occupation of buildings with the delivery of required infrastructure;
- A road widening setback rule along Riverhead Road to provide for future widening;
- A riparian planting rule requiring a 10m native vegetation riparian buffer each side of a permanent or intermittent stream to mitigate the effects of urbanisation on water;
- A stormwater quality rule to ensure impervious areas are treated and that development incorporates inert building materials to increase the quality of stormwater runoff;
- A rural interface setback rule to provide a buffer between residential activities within the precinct and the neighbouring Mixed Rural zone;
- A fencing rule to require lower height/greater permeability fences where adjoining publicly accessible open space, to ensure development positively contributes to the visual quality and interest of those spaces;
- A height rule that limits height within the majority of the Mixed Housing Urban zone to 8m (two-storeys) to respond to the existing Riverhead settlement, with three storey development adjoining the Terrace Housing and Apartment Building zone and the Local Centre zone to enable a transition in height between the five and two storey development in the adjacent areas;
- Additional assessment criteria to ensure there is adequate wastewater/water supply infrastructure to service development;

- Additional assessment criteria for open space to ensure that the open space network integrates with natural features and delivers the multi-purpose green corridor: a key structuring element for the precinct and required for stormwater conveyance purposes;
- Additional assessment criteria for the layout and design of roads to ensure a highly connected street layout that integrates with the wider Riverhead area and provides for all modes of transport; and
- Additional assessment criteria to recognise and the spiritual connections and key views of cultural significance to of Te Kawerau a Maki and Ngāti Whātua o Kaipara and other interested iwi to ensure hononga to ancestors, the connection and leadership, and whakapapa are all preserved to honour the special significance of this cultural history.

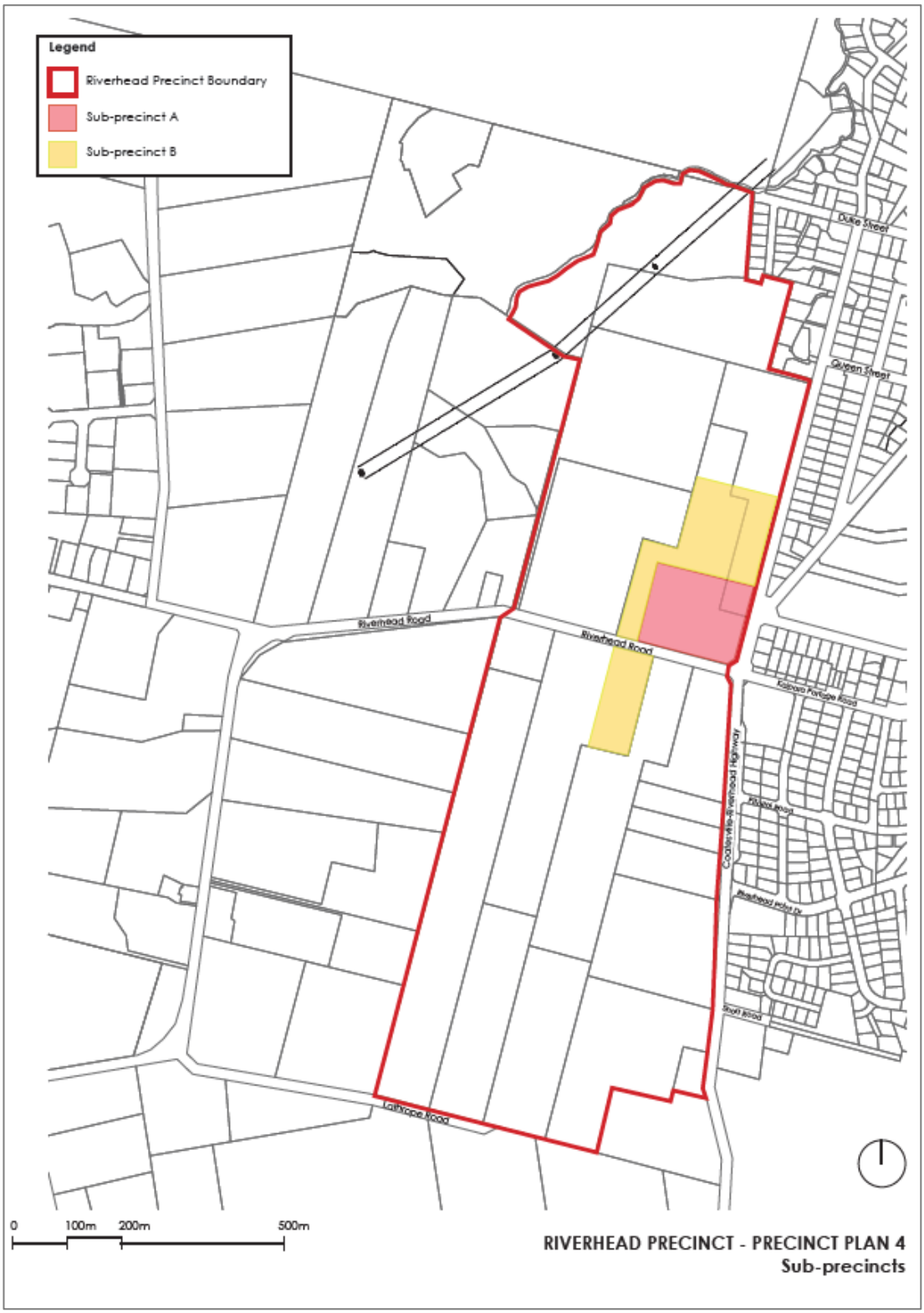


Figure 6: Riverhead Precinct Plan.

4.2 Purpose and Reasons for the Plan Change

Clause 22(1) of the RMA requires that a Plan Change request explains the purpose of, and reasons for the proposed plan change.

The purpose of the Plan Change is to enable the provision of additional housing in Riverhead along with a Local Centre, a Neighbourhood Centre and a network of open spaces. The Applicant is the majority owner of the Plan Change area and intends to develop their landholdings in a manner consistent with the proposed zoning framework, which this Plan Change request will enable.

The Plan Change is consistent with the objectives of the Council's planning documents and, in this regard, the reasons for the Plan Change are justified and consistent with sound resource management practice.

5.0 The Riverhead Structure Plan

5.1 Structure Planning

The RPS and the AUP provisions support and require a structure planning process to assess whether land is suitable for urbanisation. The structure plan process is embedded within the FULSS provisions and Appendix 1 of the AUP. Accordingly, as a prerequisite to enabling the urbanisation of Riverhead, RLG has undergone a detailed structure planning process to enable the release of land for growth. The Structure Plan covers the same area as the Plan Change.

As part of the Structure Planning process, a comprehensive assessment of the land has been undertaken to determine the constraints and opportunities within the Plan Change area and to identify the most logical and desirable development pattern. This process has resulted in the Riverhead Structure Plan (refer **Appendix 4**).

The Riverhead Structure Plan provides indicative collector and key local roading patterns, positioning of key access points, roading connections and public open spaces and distribution of land use activities. The proposed zoning pattern for the Plan Change area and the Riverhead Precinct Plans have been informed by the Riverhead Structure Plan to ensure that the outcomes sought for Riverhead are able to be successfully implemented.

The structure planning process requires consideration as to whether the land is adequately serviced (or can be serviced) by infrastructure (including transport), and achieves appropriate environmental, social, cultural and economic planning outcomes. Further, this assessment analyses impacts on the transport network and whether urbanisation can be accommodated within the existing transport network or whether transport improvements are required.

The Riverhead Structure Plan has confirmed that there are infrastructure solutions to service urbanisation of the land. These infrastructure solutions are either existing funded projects, are otherwise necessary upgrades based on existing conditions, or are localised upgrades which can be funded and delivered by the applicant without requiring funding from Auckland Council. A breakdown of the infrastructure cost and funding details has been provided within this Structure Plan.

Wastewater will be serviced by an extension of the existing pressure sewer system servicing Riverhead Village, with interim upgrades as development progresses if required to provide additional capacity prior to proposed separation of the Kumeu / Huapai wastewater system from

the Riverhead WWPS. In relation to water supply, the existing main has immediate capacity, however a second main will be required and two options for this second main have been identified. In terms of transport infrastructure, only localised improvements and upgrades to the transport network are required and these improvements will be fully funded and delivered by the applicant. Other upgrades are otherwise already funded projects or are necessary based on existing conditions.

The FULSS identifies Riverhead as being development ready in Decade 2 (2028-2032). Investigations into infrastructure availability and demand through the structure plan process however, have confirmed that capacity exists to commence in advance of 2028, subject to sequencing. The Structure Plan proposes to base the sequencing of development within the Riverhead Structure Plan area to align with the timing of transport improvements needed to address safety and capacity issues on State Highway 16, and the completion of the Northern Interceptor. These are both funded projects due to be complete in 2025. Beyond 2025 the Structure Plan indicates that development within the Structure Plan area can be progressed in a coordinated manner with the completion of localised infrastructure upgrades to service development. The proposed plan change includes rules to stage development with these required upgrades.

Structure Plan process is the means by which this growth is enabled and planned for. The Council describes structure planning as to “refine the staging and timing of development and identify the mix and location of housing, employment, retail, commercial and community facilities” (source: Auckland Plan 2050 website).

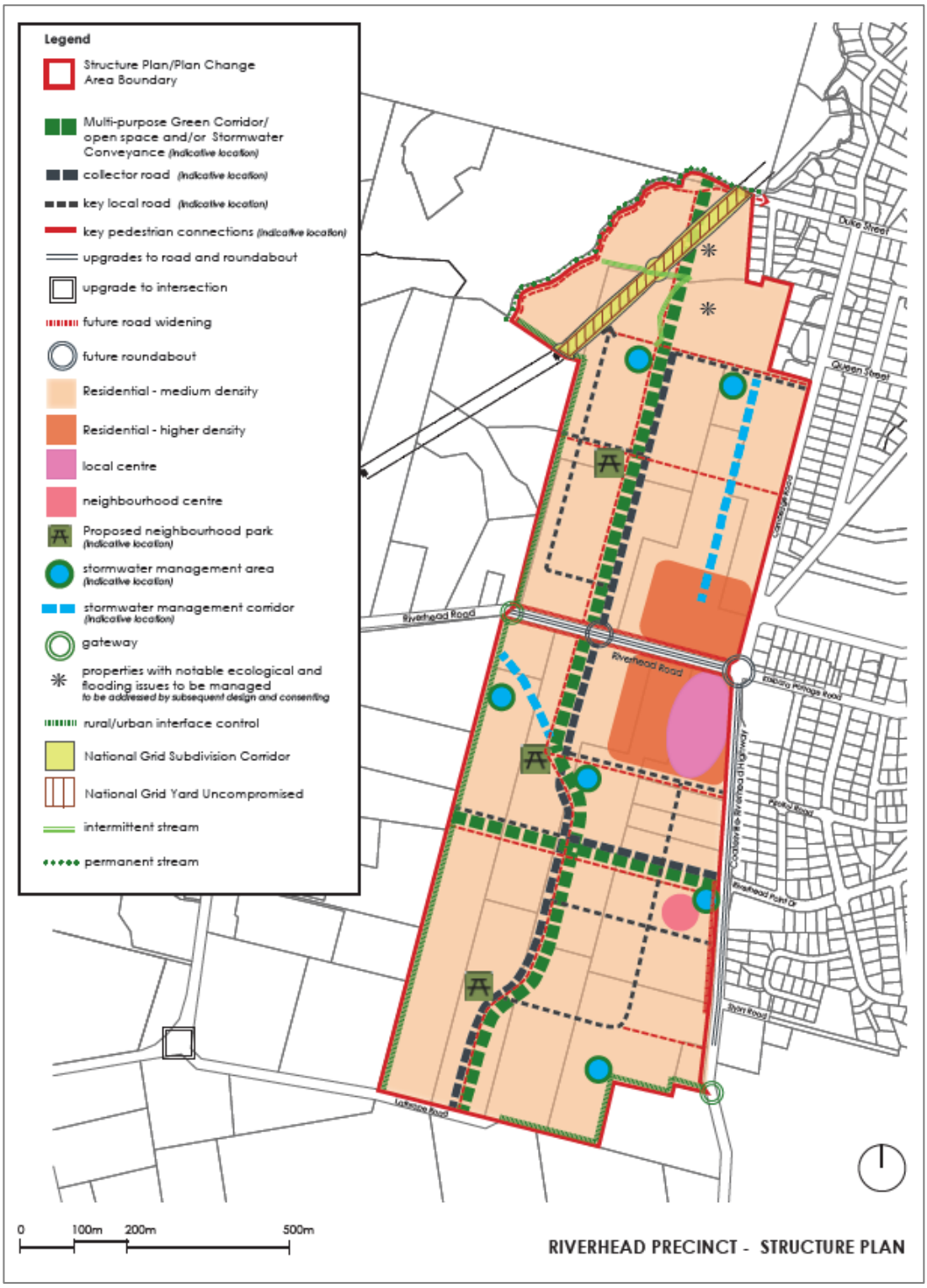


Figure 7: Riverhead Structure Plan.

5.2 Consultation and Engagement

The Structure Plan and Plan Change were subject to extensive engagement with a number of persons/organisations. These include the following:

- Auckland Council and its Controlled Organisations, including Plans and Places, the Development Planning Office, Parks, Auckland Transport, Healthy Waters and Watercare Services Limited;
- The Local Board;
- Waka Kotahi NZ Transport Agency and Te Tupu Ngātahi (the Supporting Growth Alliance);
- Mana Whenua groups, including Te Kawerau ā Maki and Ngāti Whātua o Kaipara in particular;
- The Ministry of Education;
- The local community and general public, including the Riverhead Community Association; and
- Landowners within the Plan Change area.

A report summarising the consultation undertaken to-date is provided as Appendix 18.

In respect of Mana Whenua, engagement correspondence was sent to 19 iwi groups were contacted in September and October 2021. Six iwi groups responded confirming their interest in being involved: Te Kawerau a Maki; Ngāti Whātua o Kaipara; Te Rūnanga o Ngāti Whātua; Te Ākitai Waiohua; Ngāti Manuhiri; and Ngāti Whanaunga.

Several hui have been held with Te Kawerau a Maki and Ngāti Whātua o Kaipara, as well as the other iwi (either via hui or further email correspondence). In summary:

- Extensive engagement was carried out with Te Kawerau a Maki and Ngāti Whātua o Kaipara via several hui. Through their input, the Cultural Landscape map was developed as well as the associated Precinct provisions.
- The other four iwi, Te Rūnanga o Ngāti Whātua; Te Ākitai Waiohua; Ngāti Manuhiri; and Ngāti Whanaunga, did express interest in the proposal and a summary of their engagement is provided in section 5.0 of the consultation report (Appendix 18).

The key matters identified as being of importance to iwi are addressed through the proposed Precinct provisions, including the objectives, policies, standards, matters and criteria relating to the following:

- Respecting Mana Whenua cultural values and their relationship associated with the Māori cultural landscape, including ancestral lands, water, sites, waahi tapu, and other taonga;
- Managing stormwater quality, including through riparian planting and stormwater treatment; and
- Protecting ecological values of the wetland and stream habitats, including by riparian planting.

In terms of public consultation, two public drop-in sessions (referred to as 'community days') were held at the Riverhead School Hall on Friday 6th and Saturday 7th May 2022. The purpose of the sessions was to gain feedback on the proposed land use scenarios, infrastructure and roading initiatives, development concepts, and to provide opportunities to better understand views of

the local Riverhead community. A series of 12 panels were displayed on the day, to set out key information for the public. Attendees were able to view the displays boards and discuss any issues or aspects of the project with the RLG and key consultants including traffic, urban design, and planning consultants.

While different views are held within the community, the following key themes have come through in the consultation had to-date:

- The significance of transport and roading upgrades prior to development, and concerns for increased traffic congestion on Coatesville-Riverhead Highway and State Highway 16;
- The significance of general infrastructure upgrades, including the management of stormwater and flooding;
- There were concerns about multi-storey buildings;
- A desire to retain the character of 'old' Riverhead;
- The importance of creating green corridor connections to existing walkways; and
- Strong support for additional education facilities, including primary and secondary schools.

The ways in which it is considered that this feedback has been incorporated into the Plan Change are described in section 7.4 the consultation report (Appendix 18).

Consultation has been wide ranging and RLG will continue to work with stakeholders as the project progresses.

5.3 Accepting the Plan Change Request (Clause 25)

The Council has discretion to accept or reject a Plan Change request in accordance with Clause 25 of Schedule 1 of the RMA, subject to the matters set out in Clause 25(4)(a)-(e). Given that the AUP has now been operative for more than two years, the Council is able to reject the Plan Change request only on the following grounds:

- The Plan Change request is frivolous or vexatious (clause 25(4)(a));
- The Plan Change request is not in accordance with sound resource management practice (clause 25(4)(c)); or
- The Plan Change request would make the plan inconsistent with Part 5 – Standards, Policy Statements and Plans (clause 25(4)(d)).

In relation to (a), considerable technical analysis has been undertaken to inform the Plan Change, which is detailed in the report below. For this reason, the proposal cannot be described as frivolous or vexatious.

In relation to (c), 'sound resource management practice' is not a defined term under the RMA, however, previous case law suggests that the timing and substance of the Plan Change are relevant considerations. This requires detailed and nuanced analysis of the proposal that recognises the context of the Plan Change area and its specific planning issues.

In this context, the Plan Change is considered to be in accordance with sound resource management practice for the following reasons:

- The proposed zoning supports a compact urban form and integrated urban development;

- While the proposed timing of the rezoning differs from Council's current proposed staging set out in the FULSS, the more detailed technical analysis undertaken as part of this proposal and as detailed throughout this report, demonstrates that there is no planning reason for preventing development occurring earlier;
- All necessary statutory requirements have been met, including an evaluation in accordance with S32 of the RMA with supporting evidence, and consultation with interested iwi is on-going; and
- The Plan Change is considered to be consistent with the sustainable management purpose of the RMA as discussed in the report below.

The RPS places a strong emphasis on ensuring that urban development delivers a compact urban form and integrated urban development (B2.2.1(2)). The proposed zoning pattern will contribute to a compact urban from through ensuring that future urban growth is contiguous with the urban area and within close proximity to public transport. The technical analysis prepared to support this Plan Change demonstrates that the area can be serviced with targeted infrastructure upgrades in place. In terms of funding as outlined above, the required upgrades are either existing funded or necessary projects or localised upgrades which can be funded and delivered by the applicant without requiring funding from Auckland Council.

Rules are included within the Plan Change to stage the development within the Plan Change area with the delivery of required local transport upgrades. This approach to releasing the land for urbanisation is very common throughout the AUP and has been used in many greenfield precincts including at Redhills, Puhinui and Wainui Precincts to name a few.

In relation to (d), given that the Plan Change area has been identified for future residential use in the Council's FULSS, then the proposed zoning is not inconsistent with Part 5.

On this basis, the merits of the proposal should be allowed to be considered through the standard Schedule 1 process.

6.0 Strategic Planning Framework

A number of strategic and statutory planning documents have informed the Plan Change process. This section provides a summary of those documents.

6.1 Resource Management Act

The Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 is designed to improve housing supply in New Zealand's five largest cities by speeding up implementation of the National Policy Statement on Urban Development ('NPS-UD') and enabling more medium density homes. Tier 1 urban authorities are required to apply the medium density residential standard ('MDRS') to all relevant residential zones.

Auckland Council notified Plan Change 78 ('PC 78') in August 2022 to give effect to the Amendment Act. The key proposed zoning amendments within PC 78 include the following:

- The Terrace Housing and Apartment Building zone is proposed to be amended to enable six storey development within walkable catchments from centres and the existing and proposed rapid transit network;

- The MDRS are proposed to be incorporated into the Mixed Housing Urban zone. This zone would become the most widespread residential zone, covering most of Auckland outside of walkable catchments;
- The Single House zone and Mixed Housing Suburban zones are proposed to be retained for settlements of less than 5,000 people in rural or coastal locations, where, as discussed below, the MDRS do not have to be applied; and
- A new zone, the Low Density Residential zone, is proposed to be introduced to areas with Qualifying Matters (effectively replacing the Single House and Mixed Housing Suburban zones in main urban areas).

The Amendment Act gives Tier 1 urban authorities discretion whether to apply the MDRS to settlements predominantly urban in character with a population under 5,000[1], as these are not captured by the definition of a "relevant residential zone". This discretion applies to Riverhead which at the 2018 Census, had a population of 2,802[2]. Under PC78 the Council is proposing to retain the current zoning of smaller settlements (less than 5,000 population)[3]. The stated explanation is that the smaller settlements are separated from the main urban area, where public transport is limited and increased density of development will add to vehicle travel distances and associated greenhouse gas emissions. As such, the MDRS are not proposed to be applied to 23 settlements across the Auckland region, including settlements such as Maraetai, Kawakawa Bay, Omaha, and Clevedon. MDRS are proposed to apply to the four settlements of Pukekohe, Waiuku, Beachlands, and Warkworth.

It is noted that the submissions period closed on 28 September, and the plan change is still to proceed through the hearings process. A number of submitters have sought that the MDRS be implemented across these settlements.

While the legislation currently provides for discretion as to the application of the MDRS within Riverhead, the development of the Plan Change area will increase the population of Riverhead to over the 5,000 population threshold for the application of the MDRS. Notwithstanding this, the structure planning process that has informed the Plan Change has demonstrated that the density enabled by the MDRS is appropriate within the Plan Change area:

- Development enabled by the Plan Change can be serviced existing infrastructure with targeted upgrades in place;
- Riverhead is currently serviced by a bus service that operates along the Coatesville- Riverhead Highway connecting Riverhead to the Westgate and Albany Metropolitan Centres. There are opportunities for services to increase in frequency with a greater population to service; and
- The scale of development enabled by the Plan Change will enable social amenities such as schools, open spaces, ecological corridors, a retirement village and a village centre to be established. This creates opportunities for residents to live and work closer to home, thereby reducing the need for travel to nearby centres for both residents of the existing settlement and future residents within the Plan Change area.

[1] As recorded at the time of the 2018 Census.
[2] Stats.govt.nz https://www.stats.govt.nz/tools/2018-census-place-summaries/riverhead
[3] Pages 32-33 of IPI Section 32 Overview Report, version 5, 10 August 2022

In this case, noting the above, it is considered appropriate to apply an MHU zoning to the Plan Change area, with specific provisions to assist in integrating the built environment with the existing settlement.

6.2 National Policy Documents

6.2.1 The National Policy Statement – Urban Development

The National Policy Statement on Urban Development 2020 ('**NPS-UD**') came into force on 20 August 2020 and replaced the National Policy Statement on Urban Development Capacity 2016. The NPS-UD has assessed all the local authorities within the country and classified them as either Tier 1, Tier 2 or Tier 3, with Tier 1 referencing the largest local authorities in New Zealand (including Auckland Council). The NPS-UD provides direction to decision-makers under the RMA on planning for urban environments.

Well-Functioning Urban Environment

Under Policy 1 planning decisions must contribute to well-functioning urban environments. Policy 1 defines this as follows (**emphasis added**):

*(a) have or **enable a variety of homes** that:*

(i) meet the needs, in terms of type, price, and location, of different households; and

(ii) enable Māori to express their cultural traditions and norms; and

*(b) have or **enable a variety of sites that are suitable for different business sectors** in terms of location and site size; and*

*(c) have **good accessibility for all people** between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport; and*

*(d) support, and **limit as much as possible adverse impacts on, the competitive operation of land and development markets**; and*

*(e) support **reductions in greenhouse gas emissions**; and*

*(f) are **resilient to the likely current and future effects of climate change**.*

The components of a well-functioning urban environment that the Riverhead Precinct will support include:

- Enabling a variety of housing choices across the Plan Change area, including medium density housing within the Mixed Housing Urban zone and more intensive forms of housing like apartments in accessible areas, like those close to the Local Centre, where there are employment opportunities and public transport connections;
- Respecting Mana Whenua values associated including the key views and connections identified on the Mana Whenua cultural landscape map;
- Promoting good accessibility between housing, jobs, community services and open spaces by enabling more people to live in accessible locations close to public and active transport, which also supports a reduction in greenhouse gas emissions through reduced car dependence;

- Supporting the competitive operation of land and development markets by providing a broadly enabling zone framework and providing flexibility for the market to take up those opportunities; and
- Being resilient through the likely current and future effects of climate change through flooding and promoting a compact and efficient urban form.

Development Capacity

Under Policy 2 Tier 1 authorities are required to provide at least sufficient development capacity to meet expected demand for housing and for business land over the short term, medium term, and long term. The Plan Change will enable the development of an additional 1500-1800 dwellings (including a retirement village) and additional commercial and retail capacity, significantly adding to Auckland's development capacity within the North-West. The propensity for this development to occur is markedly higher because it is being proposed, planned and project managed by a group of nationally recognised, credible developers who have a track record of delivering new large-scale communities. Therefore, the Plan Change will make a significant contribution to realisable development capacity and competitive land markets. This will better enable the Council to meet Policy 2 given that the current progress in releasing greenfield land to provide additional capacity is falling behind with many of the live zoned greenfield areas and Future Urban zone areas that are planned to be 'development ready' in 2018-2022 not progressing. This is discussed further at Section 6.3.2 below.

Planned Urban Built Form and Amenity Values

Objective 4 states that New Zealand's urban environments develop and change over time in response to diverse and changing needs of people, communities and future generations. Section 7(c) of the RMA requires particular regard to be had to the maintenance and enhancement of amenity values. Policy 6 of the NPS-UD now clarifies s7(c) of the RMA through focusing on the amenity values of the wider community and future generations and acknowledging that significant change within an area is not in itself an adverse effect.

The Plan Change will enable development of greater height and density throughout Riverhead than what has previously been provided for. This will result in significant change over time in the built character and may detract from the current amenity values currently enjoyed by some residents, related to the spacious and suburban qualities of Riverhead. The Plan Change will enable a different set of amenity values to be realised over time, when compared to those currently associated with suburban environments. In particular, the amenity values offered within medium and higher density urban environments include more vibrant areas with additional amenities which residents able to access amenities easily and largely via active modes of transport. Policy 6 essentially recognises and gives weight to these changing amenity values.

Responsive Planning

Local authority decisions are required to ensure development is integrated with infrastructure planning and funding as well as being responsive, particularly in relation to proposals that would add significantly to development capacity and add to well-functioning urban environments even if the development capacity is unanticipated by RMA planning documents or is out of sequence with planned land release (Objective 5 and Policy 6). As discussed in Section 6.3.2, the urbanisation of land within the Plan Change area is out of sequence with the FULSS however, there is a need to

urbanise this land now to overcome growth challenges and there is funded infrastructure available to service the Plan Change area.

Reduction in Greenhouse Gas Emissions

Objective 8 supports a reduction in greenhouse gas emissions and resilience to the current and future effects of climate change. The subject land forms an extension of Riverhead; a satellite town in the north-west of Auckland. The Plan Change area is currently zoned Future Urban and therefore has already been identified by Council as being appropriate for urbanisation through its Future Urban zoning. Therefore, in respect of how the proposed zone and precinct provisions will facilitate urban development that achieved Objective 8 of the NPS-UD, the following is noted:

- The Plan Change proposes a comprehensive and integrated development over a large land holding that is contiguous with existing urban development on the opposite side of Coatesville Riverhead Highway. This scale of development will enable social amenities such as schools, open spaces, ecological corridors, a retirement village and a village centre to be established. This creates opportunities for residents to live and work closer to home, thereby reducing the need for travel to nearby centres for both residents of the existing settlement and future residents within the Plan Change area; and
- The Plan Change will result in a street network that provides for walking and cycling infrastructure, as well as improving connectivity to the existing settlement such as by completing the Duke Street footpath and adding additional pedestrian crossings on Coatesville-Riverhead Highway.

Summary

Overall, it is considered that the Riverhead Structure Plan gives effect to the NPS:UD.

6.2.2 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement 2010 ('**NZCPS**') contains objectives and policies relating to the coastal environment to achieve the purpose of the RMA. The NZCPS is applicable to this Structure Plan as the Waitemata Harbour is the ultimate receiving environment for the streams which drain the Structure Plan area.

This Structure Plan and development of the identified area for urban land uses will give effect to the NZCPS in that any future land use activities will need to comply with the Auckland-wide stormwater quality and stormwater management provisions which will manage sediment and contaminant runoff, which could make its way into the coastal receiving environment. Further mitigation measures will be considered as part of a future resource consent process via the certification requirements of the Council's regional-wide Network Discharge Consent.

6.2.3 National Policy Statement for Freshwater Management

The National Policy Statement for Freshwater Management 2020 ('**NPS-FM**') sets a national policy framework for managing freshwater quality and quantity. Of relevant to the proposed plan change, the NPS-FM seeks to:

- *Manage freshwater in a way that 'gives effect to Te Mana o te wai through involving tangata whenua, and prioritising the health and wellbeing of water bodies, then the essential needs of people, followed by other uses.*

- *Improve degraded water bodies.*
- *Avoid any further loss or degradation of wetlands and streams.*
- *Identify and work towards target outcomes for fish abundance, diversity and passage and address in-stream barriers to fish passage over time.*

It is proposed to apply the Stormwater Management Area Control – Flow 1 ('SMAF 1') across the Plan Change area to manage the increase in stormwater discharge to sensitive stream environments. Accordingly, an integrated stormwater management approach has been proposed and a number of best practicable options have been identified in the SMP included at Appendix 10. The SMP incorporates a range of measures to manage potential effects on water quality and quantity associated with the proposed change in land use.

The intermittent stream and wetlands present within the Plan Change area have been identified by RMA Ecology (refer to Appendix 9) and are largely concentrated within the northern portion of the Plan Change area and are highly degraded. Key structuring elements are identified within proposed Precinct Plan 1, including roads, pedestrian connections, and open spaces. These features are located clear of existing freshwater bodies and it is anticipated that the delivery of works will not result in the loss of extent or value associated with the stream and wetland within the Plan Change area. Existing waterbodies will also be protected in accordance with the provisions of Chapter E3 Lakes, rivers, streams and wetlands and relevant regulations of the National Environmental Standard for Freshwater Management ('NES-FW'). The Plan Change will also enhance streams as Riparian enhancement along the identified streams is required under the proposed Riverhead Precinct.

As the proposed plan change excludes works that would result in a loss of freshwater body extent or value, and stormwater runoff will be appropriately managed it is considered that the implementation of the proposed stormwater strategy in conjunction with the enhancement of riparian margins will be sufficient to manage the potential adverse effects associated with changes in water quality and provide for enhancement of ecological values.

6.2.4 National Policy Statement on Electricity Transmission 2008

The National Policy Statement on Electricity Transmission ('NPS-ET') sets out the objective and policies to manage the effects of the electricity transmission network. The NPS-ET recognises the importance of the National Grid network by enabling its operation, maintenance, and upgrade, and establishing new transmission resources to meet future needs.

The National Grid Corridor overlay applying under the AUP gives effect to the NPS by controlling the location of activities, and the extent of subdivision and development near the National Grid Line. The north-western portion of the Plan Change area is traversed by the National Grid Corridor overlay and a 110kv Transpower Transmission Line, and the measures in D26 National Grid Corridor Overlay will be adhered to in order to avoid reverse sensitivity effects on the National Grid Corridor.

6.2.5 National Policy Statement for Highly Productive Land

The National Policy Statement for Highly Productive Land ('NPS-HPL') came into effect on 17 October 2022. The purpose of the proposed NPS-HPL is to improve the way that highly productive land is managed under the RMA. It does not provide absolute protection of highly productive land, but rather it requires local authorities to proactively consider the resource in their region or district

to ensure it is available for present and future primary production. The proposal does not impact on existing urban areas and land that councils have identified as future urban zones in district plans.

As the Plan Change area is currently within the Future Urban Zone, the policies contained within the NPS-HPL do not apply.

6.2.6 National Planning Standards

The National Planning Standards came into effect on 5 April 2019. These codify the structure, mapping, definitions and noise/vibration metrics of District, Regional and Unitary Plans. Auckland Council has 10 years to implement these changes. This Plan Change applies the standard AUP zone and rule framework to the Plan Change area, which is broadly consistent with the planning standards.

6.2.1 Proposed National Policy Statement for Indigenous Biodiversity

The Government has consulted on a proposed National Policy Statement for Indigenous Biodiversity ('**NPS-IB**') which sets out the objectives and policies to identify, protect, manage and restore indigenous biodiversity under the RMA.

In broad terms, the NPS-IB requires every territorial authority to undertake a district-wide assessment in accordance with Appendix 1 of the NPS-IB to determine if an area is significant indigenous vegetation and/or significant habitat of indigenous fauna; and, if it is:

- Classify areas of significant indigenous vegetation and /or significant habitat of indigenous fauna as either High or Medium, in accordance with Appendix 2 of the NPS-IB;
- Local authorities are also required to avoid the loss of significant natural areas and manage all adverse effects of a new subdivision, use or development on significant natural areas; and
- A Biodiversity Strategy is also required to be developed by local authorities in addition to a monitoring programme related to this.

The Riverhead Plan Change area is currently an active horticultural site. Land within the site has been intensively worked for many years and all past existence of indigenous vegetation has long since been removed.

6.2.2 National Environmental Standards

The National Environmental Standards ('**NES**') that are relevant to this Plan Change include:

- NES for Assessing and Managing Contaminants in Soil to Protect Human Health 2011('**NESCS**'); and
- NES for Freshwater 2020 ('**NES-FW**').

These NES documents have been taken into account in the preparation of the relevant expert reports and are further discussed in Section 9 of the report below. Assessments undertaken to date confirm that the NESCS will apply at the time of development to manage contaminated land, to be appropriately addressed as part of future resource consent processes. As discussed above, the delivery of key structuring elements within the Plan Change area is unlikely to require resource consent under the NES-FW, however the relevant regulations will apply at the time of future development and will also be appropriately assessed through future resource consent processes.

6.3 Auckland Council Strategic Plans

6.3.1 The Auckland Plan 2050

The Auckland Plan is the key strategic document which sets the Council's social, economic, environmental and cultural objectives. A key component of the Auckland Plan is the Development Strategy which sets out how future growth will be accommodated up to 2050. The Auckland Plan focusses new development in existing urban areas and provides for 'managed expansion' in future urban areas. This managed expansion is with reference to structure planning processes.

In terms of the form of development, the Auckland Plan takes a quality compact approach to growth and development. The Auckland Plan defines this as:

- Most development occurs in areas that are easily accessible by public transport, walking and cycling;
- Most development is within reasonable walking distance of services and facilities including centres, community facilities, employment opportunities and open space;
- Future development maximises efficient use of land; and
- Delivery of necessary infrastructure is coordinated to support growth in the right place at the right time.

The proposed residential zoning pattern at Riverhead will provide quality, compact neighbourhoods adjacent to the existing Riverhead settlement. The proposed zoning pattern will encourage a range of housing choice with the more intensive housing development adjoining and adjacent to the Local Centre, and overlooking public open spaces. The proposed Terrace housing and Apartment Building and Mixed Housing Urban zoning, along with the proposed precinct provisions, will make efficient use of greenfield land while ensuring appropriate transitions to the surrounding land uses.

The Plan Change introduces a planning framework that seeks to achieve quality urban design outcomes for the Plan Change area. To ensure development is consistent with the overall design strategy and the land use anticipated through the Structure Plan, the precinct incorporates a package of development standards that control residential built form, onsite amenity and the amenity of adjoining sites. The provisions also seek to integrate development with the surrounding land use and built form.

The precinct also includes provisions to ensure development and subdivision provides the collector and local road networks, cycle and pedestrian networks, open spaces and riparian margins as envisioned in the Structure Plan. The activity status of some land uses are proposed to be modified in Sub-Precinct A, to enable greater non-residential use to provide local amenities.

Riverhead is currently serviced by public transport. There is a bus service that operates along the Coatesville- Riverhead Highway connecting Riverhead to the Westgate and Albany Metropolitan Centres. The SH16 Northwest Bus Improvements project will also improve public transport accessibility from Westgate to the City Centre.

The future road network within the precinct will accommodate all modes of transport to promote walkability and cycling.

New open spaces to serve the new residential neighbourhoods will be developed in accordance with the provisions in E38 Subdivision – Urban.

Infrastructure upgrades are required to service the Riverhead precinct. As previously discussed, these upgrades are either funded or otherwise necessary based on existing conditions, or localised upgrades that will be funded by the developers. To ensure that the upgrades are in place prior to development occurring the Plan Change contains provisions to ensure that development progresses in a coordinated manner with the required upgrades.

These strategic objectives of the Auckland Plan are reflected in the AUP objectives and policies, which are assessed in detail below.

6.3.2 Future Urban Land Supply Strategy 2017

The FULSS, refreshed in July 2017, implements the Auckland Plan and gives effect to the NPS on Urban Development Capacity by identifying a programme to sequence future urban land over 30 years. The strategy relates to greenfield land only and ensures there is 20 years of supply of development capacity at all times and a seven year average of unconstrained and ready to go land supply. 'Ready to go' land is land with operative zoning and bulk services in place such as the required transport and water infrastructure.

The FULSS identifies Riverhead/Huapai and Kumeu as having capacity to accommodate approximately 6,600 dwellings and centres. It stages development in Riverhead for Decade 2 (2028-2032) to time with transport improvements needed to address safety and capacity issues on State Highway 16, and the completion of the Northern Interceptor. The FULSS states that alternative staging may be considered appropriate through the structure planning process[4]. This illustrates an intent by Council to be open to new development opportunities, subject to more detailed analysis and evaluation through a future structure planning process.

The detailed analysis that has occurred through the Riverhead Structure Plan supports bringing the staging of the Plan Change area forward relative to the timing in the FULSS. This is largely due to the fact that the key bulk infrastructure upgrades which determined the staging originally to 2028 are either not required for development of the Riverhead Structure Plan area or will be complete by 2025 (SH16 improvements and Northern Interceptor Stage 2). The localised upgrades that are required can be funded by the developer.

In addition, commencing the development of the Riverhead Structure Plan area will provide much needed greenfield development capacity in Auckland's north-west. Figure 8 below shows Council's progress with zoning Future Urban land in Auckland. This illustrates that many of the live-zoned greenfield areas and Future Urban zone areas that are planned to be 'development ready' in 2018-2022 are, in fact, not. For example, land at Whenuapai and Paerata (outside of Paerata Rise) which was planned for 2018-2022, has not been rezoned. In the case of Paerata, there do not appear to be any plans on the horizon for this to occur. Of the 2018-2022 FULSS areas, only parts of Warkworth North and Drury West have been rezoned and these have been privately initiated. The lack of progress being made to implement the FULSS, in addition to the demand for additional housing in the northwest FUZ, is creating a growth challenge.

[4] Future Urban Land Supply Strategy Page 10

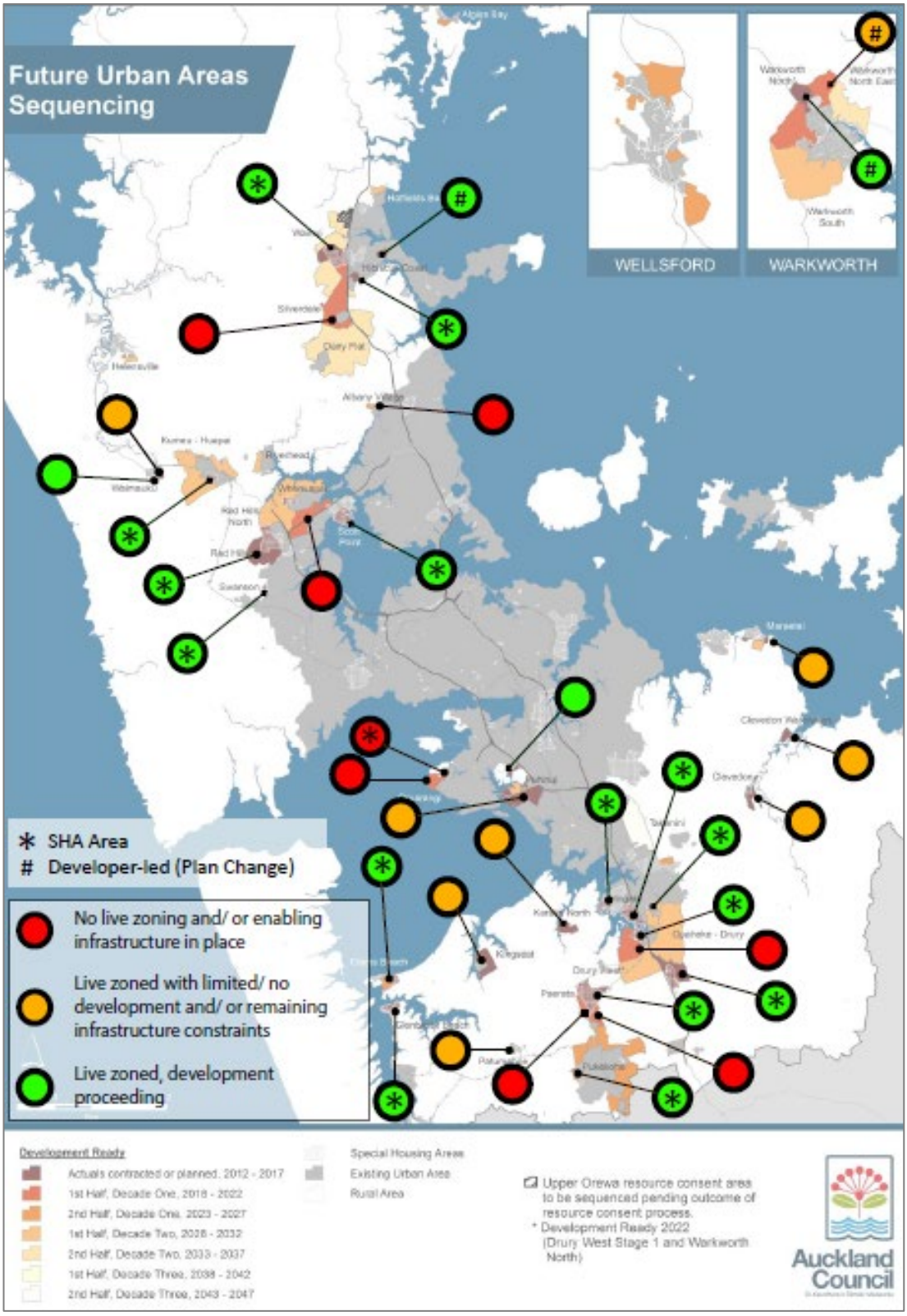


Figure 8: Showing the Council's progress with live-zoning land in line with the FULSS.

6.3.3 Open Space and Community Facilities

6.3.3.1 Rodney Greenways Plan

The aim of the Rodney Greenways Local Paths Plan for Kumeu, Huapai, Waimauku and Riverhead (December 2016), is to '*provide cycling and walking connections which are safe and pleasant, while also improving local ecology and access to recreational opportunities*'.

The proposed Structure Plan is generally consistent with this objective and the Greenways Plan which is shown in Figure 9 below:

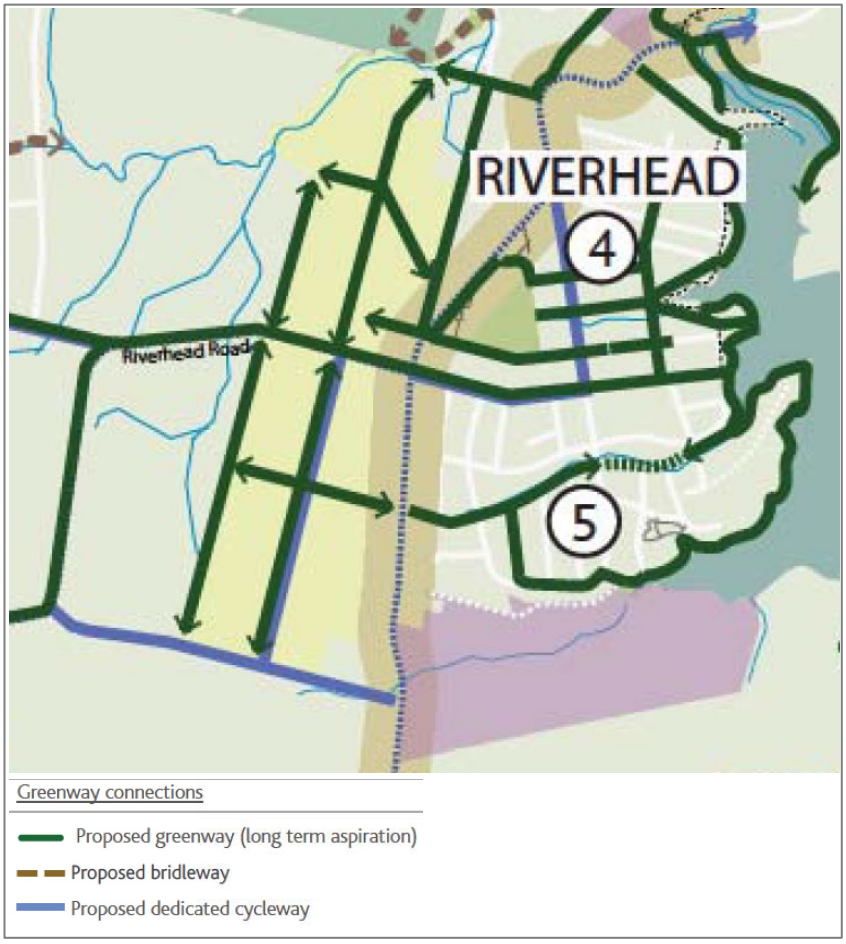


Figure 9: Greenway connection aspirations for Riverhead.

The central north-south multi-purpose green corridor is a key structuring component in both the Greenways Plan and the proposed Structure Plan. Along with the collector road, this green corridor accommodates both passive and active open spaces, footpaths and dedicated cycleways. It also incorporates an existing intermittent stream.

The proposed east-west green corridor aligns with Riverhead Point Drive as indicated by the Greenways Plan and both the proposed Structure Plan and the Greenways Plan show connection to Duke Street and Riverhead Forest in the north. Two key east-west pedestrian connections are also proposed north of Riverhead Road.

In line with the Greenways Plan, dedicated cycleways are anticipated along Riverhead Road and Coatesville Riverhead Highway and the proposed Plan Change provides for road widening to enable this to be delivered.

The following is noted in respect of inconsistencies with the above Greenways Plan:

- No direct greenway connection is provided within the Structure Plan to Princes Street/Memorial Park, although the retirement village proposes a pedestrian link from the end of the Cambridge Road/Princes Street intersection through to a central landscaped corridor and thereafter through to the rest of the northern plan change area. As noted above, this would include a public access easement for day-time access;
- Although Cambridge Road lies outside the Plan Change area, the Plan Change does include an upgrade to the road (from rural to urban profile) and includes a new footpath;
- No greenway is proposed along the western boundary of the Plan Change area which is the rural-urban interface. Future development is likely to "back on" to this boundary and provide privacy and security fencing which is unlikely to provide adequate surveillance/safety of a pedestrian/cycle route. There is also no existing ecological corridor in this location nor desire lines to existing or proposed destinations; and
- The Greenways Plan proposes a dedicated cycleway along the southern boundary of the Plan Change area, along Lathrope Road and connecting to Coatesville-Riverhead Highway. Due to topographical constraints in this area which render this linkage unfeasible, the Structure Plan proposes a more accessible and safer linkage within the southern portion of the plan change area.

It is noted that the Greenways Plan was likely prepared with a lesser understanding of the existing constraints across the site, whereas the Plan Change has been developed with these in mind. In this way, the intent of the Greenways Plan is considered to have been achieved within the Structure Plan and the proposed Precinct.

6.3.3.2 General Policies and Action Plans

The Council has prepared various policies and action plans regarding the provision of community facilities and open space in Auckland, including:

- Open Space Provision Policy 2016;
- Parks and Open Space Acquisition Policy 2013; and
- Community Facilities Network and Action Plan 2015.

These policies have been taken into account in preparing the open space strategy for the Plan Change area and determining future community facility needs. This is discussed further in Section 9 of the report below.

6.4 Regional Policy Statement and Plans

6.4.1 Auckland Unitary Plan (Operative in Part)

The AUP is the primary statutory planning document for Auckland. It is comprised of the Regional Policy Statement, Regional Coastal Plan, Regional Plan and District Plan. The AUP provides the regulatory framework for managing Auckland's natural and physical resources while enabling growth and development and protecting matters of national importance.

The RPS sets out the overall strategic statutory framework to achieve integrated management of the natural and physical resources of the Auckland Region. The RPS broadly gives effect to the

strategic direction set out in the Auckland Plan. Section 75(3)(c)16 states that a District Plan must give effect to any Regional Policy Statement and Section 75(4)(b)17 states that a District Plan must not be inconsistent with a Regional Plan for any matter specified in Section 30(1)18.

A comprehensive assessment of the proposed rezoning against the relevant objectives and policies of the RPS are provided at **Appendix 5**. This demonstrates that the proposed rezoning will give effect to the RPS.

Of particular relevance to this Plan Change is section B2 of the RPS, which identifies the issues, objectives and policies governing urban growth and form within the Auckland Region. In particular, sections B2.2 and B2.6 which set out provisions relating to urban growth and rural and coastal towns and villages. A detailed assessment of these objectives and policies is provided below:

6.4.2 B2.2 Urban Growth and Form

B2.2.1 Objectives

(1) A quality compact urban form that enables all of the following:

- *(a) a higher-quality urban environment;*
- *(b) greater productivity and economic growth;*
- *(c) better use of existing infrastructure and efficient provision of new infrastructure;*
- *(d) improved and more effective public transport;*
- *(e) greater social and cultural vitality;*
- *(f) better maintenance of rural character and rural productivity; and*
- *(g) reduced adverse environmental effects.*

(2) Urban growth is primarily accommodated within the urban area 2016 (as identified in Appendix 1A).

(3) Sufficient development capacity and land supply is provided to accommodate residential, commercial, industrial growth and social facilities to support growth.

(4) Urbanisation is contained within the Rural Urban Boundary, towns, and rural and coastal towns and villages.

(5) The development of land within the Rural Urban Boundary, towns, and rural and coastal towns and villages is integrated with the provision of appropriate infrastructure.

B2.2.2 Policies

Development capacity and supply of land for urban development

(1) Include sufficient land within the Rural Urban Boundary that is appropriately zoned to accommodate at any one time a minimum of seven years' projected growth in terms of residential, commercial and industrial demand and corresponding requirements for social facilities, after allowing for any constraints on subdivision, use and development of land.

(2) (a)-(i) Not applicable

(3) Enable rezoning of future urban zoned land for urbanisation following structure planning and plan change processes in accordance with Appendix 1 structure plan guidelines.

Quality compact urban form

(4) Promote urban growth and intensification within the urban area 2016 (as identified in Appendix 1A), enable urban growth and intensification within the Rural Urban Boundary, towns and rural and coastal towns and villages, and avoid urbanisation outside these areas.

(5) Enable higher residential intensification:

(a) in and around centres;

(b) along identified corridors; and

(c) close to public transport, social facilities (including open space) and employment opportunities.

(6) Identify a hierarchy of centres that supports a quality compact urban form:

(a) at a regional level through the city centre, metropolitan centres and town centres which function as commercial, cultural and social focal points for the region or sub-regions; and

(b) at a local level through local and neighbourhood centres that provide for a range of activities to support and serve as focal points for their local communities.

(7) Enable rezoning of land within the Rural Urban Boundary or other land zoned future urban to accommodate urban growth in ways that do all of the following:

(a) support a quality compact urban form;

(b) provide for a range of housing types and employment choices for the area;

(c) integrate with the provision of infrastructure; and

(d) follow the structure plan guidelines as set out in Appendix 1.

(8) Enable the use of land zoned future urban within the Rural Urban Boundary or other land zoned future urban for rural activities until urban zonings are applied, provided that the subdivision, use and development does not hinder or prevent the future urban use of the land.

(9) Not applicable

The Plan Change is considered to give effect to the above relevant Urban Growth and Form objectives and policies for the following reasons:

- The Plan Change supports a quality compact urban form, by enabling urbanisation of land that is immediately adjacent to the existing Riverhead urban area and contained within the existing Rural Urban boundary. The proposed zoning pattern will enable provision of a range of housing types, and the proposed centres will provide local employment opportunities;
- The Plan Change has been informed by the Riverhead Structure Plan which has been developed in accordance with the structure plan guidelines set out in Appendix 1 and therefore gives effect to policy B2.2.7(d);
- The Plan Change includes infrastructure-related provisions to ensure the provision of infrastructure is coordinated with development and therefore gives effect to policy B2.2.7(c);
- The proposal will facilitate improved social outcomes through including provisions that enable the establishment of neighbourhood and local centres, open spaces, a variety of housing types (which will result in a variety of occupants ranging from families with children and working professionals as well as empty nesters and the elderly). This in turn will lead to greater social and cultural vitality. This gives effect to Objective B2.2.1(1)(e) and Policy B2.2.2(2)(e); and

- The development will provide for greater productivity and economic growth through providing for residential growth and commercial activities. Residential growth would be provided for adjacent to an existing residential area and the proposed neighbourhood and local centres would provide local services for the community. This gives effect to Objective B2.2.1(1)(b) and Policy B2.2.2(5) and (6).

6.4.3 B2.6 Rural and Coastal Towns and Villages

B2.6.1 Objectives

(1) Growth and development of existing or new rural and coastal towns and villages to be enabled in ways that:

(a) avoid natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage or special character unless growth and development protects or enhances such values; and:

The potential development of the land does not affect any scheduled items, any significant ecological areas or Mana Whenua sites. The development will enhance and retain non-scheduled natural and physical resources of the site including the streams, wetlands and a beech tree at 298 Riverhead Road with recognised amenity value. The land is not located within immediate proximity to the coastal marine area.

(b) avoid elite soils [LUC 1] *and where practicable prime soils* [LUC 2 or 3] *which are significant for their ability to sustain food production:*

The subject land is identified as being Land Use Capability ('LUC') 2 soil or 'prime soil'[5], however it is currently already zoned as Future Urban and located within the Rural Urban boundary. The appropriateness of the urbanisation of this land was considered at the time it was zoned Future Urban by Council, in accordance with Policy B2.2.2 which requires that the location of the Rural Urban Boundary identifies land for urbanisation that avoids prime soils 'where practicable'.

(c) avoid areas with significant natural hazard risks:

A geotechnical assessment and flood assessment (refer to Appendix 15 and Appendix 10) have been undertaken as part of the technical evaluation of the Plan Change area. To the extent that natural hazard risks have been identified on the land that is to be developed under this PPC (particularly the northern land), the provisions in E36 of the AUP will ensure such risks of development are appropriately managed.

With regard to general geotechnical matters, the assessments to date confirm that structural stability construction methodologies will ensure any structures are safely constructed and therefore natural hazard risk can be avoided.

With regard to potential flooding and overland flow natural hazards, the stream, watercourse and overland flow channels proposed as part of future development will ensure such events are minimised. The proposed Stormwater Management Plan confirms this.

Therefore, it is considered that any areas with significant natural hazard risks are avoided and other natural hazard risks are appropriately addressed.

[5] NZLRI Land Use Capability 2021 website.

(d) are consistent with the local character of the town or village and the surrounding area; and

The current Riverhead township is characterised by suburban detached dwellings on single lots. The Plan Change will enable a variety of building height and form for new residential and commercial development. The proposed zoning and precinct standards for height have been coordinated to ensure complementarity to the character of the existing town while also enabling opportunities for greater housing capacity and choice to promote efficient use of greenfield land. The Neighbourhood Design Assessment prepared for the Plan Change (refer to Appendix 6) confirms that the proposed development outcomes will integrate with the character of Riverhead and will result in positive design outcomes for not only the Plan Change land but also the wider locality.

(e) enables development and use of Mana Whenua resources for their economic well-being.

Refer to section 5.2 above.

(2) Rural and Coastal towns and villages have adequate infrastructure.

The technical analysis to inform the Plan Change confirms that there are infrastructure solutions that can service the Plan Change area. These infrastructure solutions are either existing funded/necessary projects or localised upgrades which can be funded and delivered by the applicant without requiring funding from Auckland Council. Wastewater will be serviced by an extension of the existing pressure sewer system servicing Riverhead Village, with interim upgrades as development progresses if required to provide additional capacity prior to proposed separation of the Kumeu / Huapai wastewater system from the Riverhead Wastewater Pump Station. In relation to water supply the existing main has immediate capacity however, a second main will be required and two options for this second main have been identified. The proposed Riverhead Precinct includes additional assessment criteria to ensure there is adequate wastewater/water supply infrastructure to service development.

In terms of transport infrastructure, only localised improvements and upgrades to the transport network are required and these improvements will be fully funded and delivered by the applicant. The proposed Riverhead Precinct includes rules to stage development with the required transport infrastructure upgrades.

B2.6.2 Policies

(1) Require the establishment of new or expansion of existing rural and coastal towns and villages to be undertaken in a manner that:

(a) maintains or enhances the character of any existing town or village

(b) incorporates adequate provision for infrastructure

(c) avoids locations with significant natural hazard risks where those risks cannot be adequately remedied or mitigated

(d) avoids elite soils [LUC 1] *and avoids where practicable prime soils* [LUC 2 and LUC 3] *which are significant for their ability to sustain food production*

(e) maintains adequate separation between incompatible uses

(f) is compatible with natural and physical characteristics including the coastal environment

(g) provides access to the town or village through a range of transport options including walking and cycling

The majority of the above policies give effect to the matters raised in objectives relating to urban growth of rural towns, that are addressed above. The Plan Change provisions and analysis undertaken within the associated technical reports ensure the above policy outcomes are achieved. The Plan Change provisions and plans identify individual sub-precincts, proposed land use zoning, pedestrian and roading networks, as well as the proposed and indicative open space network.

Additionally, the above policy requires consideration of access through a range of transport options. Transport options such as improved roads and enhanced walking/cycling facilities have been considered (in addition to roading upgrades) and form part of the Integrated Transport Assessment (refer to Appendix 8) and are included in the Plan Change.

The Plan Change also ensures adequate separation distances are provided for potentially incompatible uses. For example, urban development is adequately separated from streams and their margins. Specific methodologies will be employed to ensure any construction-related effects (including erosion and sediment management measures) and stormwater discharges are avoided, remedied or mitigated to ensure the protection of sensitive receiving environments and habitats.

The provision of yard standards to the western edge of the Plan Change, adjoining the Mixed Rural zone, will establish adequate separation between potentially incompatible rural and urban uses, and reverse sensitivity issues.

(2) Avoid locating new or expanding existing rural and coastal towns and villages in or adjacent to areas that contain significant natural and physical resources, that have been scheduled, unless growth and development protects or enhances such resources by including any of the following measures:

(a) the creation of reserves

(b) increased public access

(c) restoration of degraded environments

(d) creation of significant new areas of biodiversity

(e) enablement of papakainga, customary use, cultural activities and appropriate commercial activities.

There are no scheduled items within or in proximity to the land that is proposed to be rezoned for urbanisation. Regardless, the Plan Change includes provision for the measures listed in this policy, by providing for reserves and the potential for increased public access including public roads/footpaths/cycle paths over land that is currently private property.

Further, from an ecological perspective, the AUP, NPS-FM and NES-FW include provisions to ensure that identified streams and riparian margins are protected, with the Plan Change including provisions for native planting in riparian margins to ensure they are restored and enhanced as part of the development of the land. The restoration of these areas will create significant new areas of biodiversity through the removal of pests and weeds, replanting, maintenance and protection.

(3) Enable the establishment of new or significant expansions of existing rural and coastal towns and villages through the structure planning and plan change process in accordance with Appendix 1 Structure Plan guidelines.

The Riverhead Structure Plan is attached to this Plan Change request (refer to **Appendix 4**) and it addresses the structure planning requirements set out in Appendix 1 of the AUP. The Structure Plan maps and technical reports address the Appendix 1 Structure Plan guidelines and support the expansion of the Riverhead town. The Plan Change is in accordance with the Structure Plan and provides additional detailed technical assessment that supports the expansion of the Riverhead township and ensures the required infrastructure and transport upgrades are coordinated with development within the precinct.

(4) Enable small scale growth of and development of rural and coastal towns without structure planning.

Small scale growth is not proposed within the Plan Change and therefore this policy does not apply.

Summary

Overall, in terms of the relevant objectives and policies of B2.6, it is considered that an expansion of the Riverhead town gives effect to these RPS provisions. The policies enable significant expansions to existing rural towns through the structure plan process and subsequent plan changes. This approach is being followed for Riverhead. Therefore, it is concluded that the urbanisation of Riverhead as proposed within this Plan Change is consistent with the RPS and will give effect to it.

6.5 Other Plans

6.5.1 Iwi Planning Documents

As described in section 5.2 above, engagement correspondence was sent to 19 iwi groups were contacted in September and October 2021. Six iwi groups responded confirming their interest in being involved: Te Kawerau ā Maki; Ngāti Whātua o Kaipara; Te Rūnanga o Ngāti Whātua; Te Ākitai Waiohua; Ngāti Manuhiri; and Ngāti Whanaunga. Several hui have been held with Te Kawerau a Maki and Ngāti Whātua o Kaipara, as well as the other iwi (either via hui or further email correspondence).

Of these six interested iwi, none have publicly available iwi management plans or planning documents. Notwithstanding this, the feedback received during the consultation process, in particular from Te Kawerau a Maki and Ngāti Whātua o Kaipara who have engaged more extensively, has been taken into account in the Structure Plan and Plan Change.

7.0 Assessment of Effects

Section 76 of the RMA states that in making a rule, the territorial authority must have regard to the actual or potential effect on the environment of activities including, in particular, any adverse effect. This section details the actual and potential effects that the proposed plan change provisions may have on the environment. This assessment is based on analysis and reporting undertaken by various experts, which are attached as appendices to this report.

7.1 Urban Form

An Urban Design Statement has been prepared by Urban Acumen and is included as **Appendix 6** of this report. The following structuring elements are identified within the proposed precinct plan and will determine the built urban form within the Plan Change area:

- A north-south and east-west oriented multi-purpose green corridors which will integrate the provision of open space and stormwater management features. The north-south corridor will align with a key collector road, and their location will reflect a potential portage routh of cultural significance and to promote views to high points in Riverhead Forest; The policy framework proposed in the precinct sets out the desired outcomes for this corridor;
- The identification of key collector and local roads where they provide for key connectivity outcomes, including internal connectivity within the Plan Change area and integration with the existing road network. The identified road networks are predominantly north south oriented and will promote good solar orientation for future development; and
- The provision of a focal point at the centre of Riverhead, supported by the proposed local centre and Terraced Housing and Apartment Building ('**THAB**') zoning. This focal point will complement existing neighbourhood scale business activities within the Riverhead township.

The proposed precinct assessment criteria seek to ensure that the above key features and elements are delivered at the time of future subdivision and development. Overall, it is considered that the proposed plan change will enable the development of positive urban form outcomes that contribute to a quality compact urban form and well-functioning urban environment.

7.2 Centres Hierarchy

A Centres Assessment for the plan change has been undertaken by Property Economics and this is enclosed as **Appendix 7.**

In terms of commercial growth, the Riverhead Retail catchment generates around $100m in annual retail expenditure. Based on the future development of Riverhead Precinct (plus expected growth elsewhere in the catchment), retail spending is expected to grow to $161m by 2038. A significant portion of the retail expenditure is expected to occur in higher order centres such as Westgate, which is well positioned to service the higher-order shopping needs of Riverhead. In this regard, any retail development within Riverhead is considered to be complementary to these centres and the overall centres hierarchy.

The Economic Assessment also states that the following is sustainable within Riverhead:

- Approximately 6,850m² GFA of retail and commercial services (including a 3,200m² supermarket) with a supermarket;
- Approximately 3,970m² GFA of retail and commercial services without a supermarket; and
- Approximately 1-1.5 hectares of business zoned land to accommodate the above.

Based on this advice, the most appropriate zone for the Riverhead Centre is Local Centre because this often takes the form of a small to medium sized centre anchored by an appropriately-sized supermarket. This would provide for the development of mainly convenience retail and commercial services and some office activity.

Overall, it is considered that the proposed Business – Local Centre and Business – Neighbourhood centre zoning of the Village Centre of Riverhead is considered to be consistent with the centres hierarchy of the AUP and will not compromise the economic viability of the existing business centres or result in an out of context centre. The limited size of the centre within the plan change area will ensure that it remains complementary to the centres hierarchy and will not grow to a size that creates future inconsistencies challenging the centres approach of the AUP.

7.3 Visual Amenity

Zoning within the Plan Change area includes Business – Local Centre and Business – Neighbourhood Centre to support local business development and Residential – THAB and Residential – Mixed Housing Urban within residential areas. A Landscape and Visual Assessment ('LVA') has been prepared by Boffa Miskell (refer Appendix 16) and a Neighbourhood Design Statement has been prepared by Urban Acumen (refer Appendix 6).

The Local Centre is proposed at the intersection of Riverhead Road and Coatesville-Riverhead Highway and the Neighbourhood Centre is proposed at along Coatesville-Riverhead Highway, opposite Riverhead Point Drive and the existing Neighbourhood Centre within the Riverhead township. Existing standards within the AUP Local Centre and Neighbourhood Centre zones will apply, including total building heights of 18m and 13m respectively. THAB zoning is proposed to the east of the Plan Change area adjacent to Cambridge Road and Riverhead Road and the proposed local centre. The remainder of the Plan Change areas is proposed to be zoned Mixed Housing Urban. The proposed precinct standards include heights of up to 18m in the Local Centre zone, , 16m in the THAB zone, 11m in the Mixed Housing Urban zone immediately adjoining THAB, and 8m plus 1m roof height in the remainder of the Mixed Housing Urban zone (Sub-precinct B).

While greater heights will be permitted in the proposed local centre and THAB zones when compared to the existing Riverhead township, this area will act as a focal point within Riverhead, providing for variation in building height and form. The LVA finds that this area will act as an appropriate landmark to signify the centre of the Riverhead township, with the enabled built form contributing positively to visual interest, diversity, and legibility. The proposed neighbourhood centre is considered to be viewed as a logical extension to the existing neighbourhood centre within the Riverhead township.

As discussed above, the location of the THAB zone will complement the proposed local centre as a focal point within the Plan Change area and has also been located within close proximity to existing public transport networks. The THAB zone will enable a variety of housing choice and typologies, including a retirement village for which a separate resource consent is being sought concurrently. Where the THAB and Local Centre zones interface with the Coatesville-Riverhead Highway, the width of the road corridor in conjunction with zoning provisions will provide an appropriate transition between The Site and residential properties to the east of the Coatesville-Riverhead Highway.

The remainder of the Plan Change area is proposed to be zoned Mixed Housing Urban with varying height limits. Immediately around the THAB, the underlying zone height limit of 11m will apply, while the remainder of the zone is subject to an 8m height limit (through Sub-Precinct B), which responds to the existing built character of the Riverhead Settlement. This approach to height enables a transition in height from the THAB and Local Centre down to the two-storey. The MHU zone is considered to enable the efficient use of greenfield land and support a greater variety of

housing choice within Riverhead, while also responding to the existing Single House and rural zoning adjacent to the Plan Change area.

Overall, it is acknowledged that the Plan Change will introduce visual change to the Riverhead township and adjacent rural environment. In particular, the LVA concludes that visual effects within the immediate vicinity of the Plan Change area will be low-moderate while views from the wider context will be low to very low. Having regard to the analysis, conclusions, and recommendations of the LVA and Urban Design Statement, it is considered that the potential built form outcomes that will be enabled by the plan change will not create significant adverse visual amenity effects and will be appropriate in the context of the existing surrounding Single House and Mixed Rural zones environment, and national direction to enable housing choice and diversity.

7.4 Natural Character and Landscape

The LVA prepared by Boffa Miskell considers the potential effects of development within the Plan Change area on natural character and landscape values.

The LVA finds that the Plan Change area does not contain any areas or features that are considered to be of high landscape value. In addition, there are no outstanding natural features or landscapes as identified under the AUP within the Plan Change area, with the closest being the Paremoremo Escarpment landscape feature located over four kilometres to the east.

Natural features identified within the Plan Change area include the stream and associated riparian vegetation located to the eastern side, a tree with intrinsic age, health, and character attributes located on the western side, pastoral grassland, and shelter belts that have been established within the existing rural environment. Proposed Precinct 1, which identifies the indicative location of key structural elements provides the opportunity to retain the existing stream and tree with identified value. In addition, the proposed precinct standards will provide for enhancement planting within the riparian margins of the stream (10m either side). The LVA concludes that the pastoral grasslands and shelter belts are not considered to have high natural character values. While development within the Plan Change area will result in visual changes and the clearance of some existing natural features, it is considered that this can be anticipated as Future Urban zoned land is utilised to accommodate urban development.

In terms of landscape character, it is acknowledged that that the development of the Plan Change area will change the existing character of the landscape, which is currently rural in character and includes a number of rural production activities including horticulture, and some rural lifestyle blocks. In particular, development will include earthworks which will alter the undulating nature of the topography urban built features, including roading open spaces, and residential and commercial buildings. While these changes will be visible to viewing audiences within the immediate vicinity of the existing Riverhead township and road users passing the site, they are considered to be in keeping with the development of greenfield land and will not be out of character within a Future Urban zoned environment. As discussed above, visual effects associated with development of the Plan Change area have been assessed to range for very low to low-moderate.

With regard to the wider landscape context, of significance is the Riverhead Forest is located to the north. While greater building heights and densities will be enabled within the proposed THAB and centre zones and have the potential to restrict views towards the Riverhead Forest, it is noted that there are limitations to existing views due to the relatively flat landscape. Some views will also

be retained through the north south oriented multi-purpose green corridor identified within proposed Precinct Plan 1, which has been positioned to reflect a potential portage routh of cultural significance and to promote views to high points in Riverhead Forest. It is considered that the Riverhead Forest will provide a well-defined landscape and visual backdrop that is complementary to the development of the Plan Change area.

Overall, having regard to the analysis of the LVA, the development outcomes that will be enabled by the proposed Plan Change are considered to be appropriate in terms of effects on natural character and landscape values.

7.5 Cultural Values

As discussed in Section 5.2 above and set out in the consultation report provided as **Appendix 18**, engagement correspondence was made to 19 iwi groups and a hui was subsequently held with Te Kawerau a Maki and Ngāti Whātua o Kaipara to develop a cultural landscape map for the Riverhead Structure Plan area. The following features were identified to be of cultural significance:

- Viewshafts to high points in Riverhead Forest to the north;
- Viewshafts to high points near Kumeu to the west; and
- Three east west orientated potential original portage routes.

These features have been incorporated into proposed Precinct Plan 1 through the identification and orientation of key local and collector roads and the multi-purpose green corridor. The proposed precinct provisions including objectives, policies, standards, matters of discretion, and assessment criteria also address the identified matters of importance to mana whenua and cultural values.

The proposed precinct provisions were discussed with Te Kawerau ā Maki and Ngāti Whātua o Kaipara at a hui held on 9 June 2022. Te Kawerau ā Maki have since been involved with drafting the precinct provisions which relate to managing the effects of the proposed plan change and future development on cultural values. Feedback provided by Te Kawerau ā Maki has informed the proposed precinct provisions, particularly with regard to managing the effects and impacts of future development on values associated with the Māori cultural landscape. It is anticipated that engagement with Te Kawerau ā Maki and Ngāti Whātua o Kaipara will be ongoing as the proposed plan change and precinct provisions are further developed.

7.6 Transport

An Integrated Transport Assessment ('**ITA**') has been prepared by Flow Transportation for the Plan Change and is included as **Appendix 8** to this report.

The ITA identifies a number of transportation upgrades to enable development within the Plan Change area, has regard to potential trip generation, and provides an assessment on the appropriateness of internal road network with regard to roading hierarchy and design.

These matters are addressed in turn below.

7.6.1 Transportation Upgrades

A number of localised transportation measures and upgrades are identified within the ITA. In summary, these include:

- Riverhead Road: updates including widening of the road reserve to accommodate berms and dedicated footpaths and cycle paths. Detailed design will be determined at the time of resource consent, having regard to the layout of other existing roads.
- Coatesville-Riverhead Highway: upgrades including localised widening of the road reserve in places, to accommodate berms, dedicated footpaths and cycle paths, and public transport infrastructure. Detailed design will be determined at the time of resource consent, having regard to the layout of other existing roads.
- Lathrope Road: upgrades to provide a sealed carriageway and a footpath on the northern side.
- Cambridge Road: upgrades along the frontage of the Plan Change area (western side of Cambridge Road), including providing a formed sealed carriageway, and a new footpath on the western side of the road, in front of the Plan Change area.
- Queen Street and Duke Street: a new footpath is also proposed on the northern side of Queen Street between Cambridge Road and Coatesville-Riverhead Highway, and on the southern side of Due Street between the Plan Change area and Cambridge Road
- Intersection upgrades: a number of intersection upgrades are proposed at existing intersections, as well as a new intersection, where access will be provided to the Plan Change area. The upgrade works include, but are not limited to, the provision of separated pedestrian and cycle paths, widening, and new priority controls.
- Speed limit reductions: speed limit reductions are proposed on Riverhead Road, Coatesville-Riverhead Highway, and Lathrope Road, including 50km/hour and 60km/hour along sections of Riverhead Road, and 50km/hour along sections of Lathrope Road and Coatesville Riverhead Highway. Speed limited reductions will lower vehicle speeds when entering the Plan Change Area and the existing Riverhead Village, providing a safer environment for existing and future road users, including pedestrians and cyclists. It is noted that the Speed Bylaw will apply to speed limit reductions at the time of development. The lower speed philosophy across and around the Plan Change area has been discussed with Auckland Transport and agreed to in principle.
- Right-turn bays: the intersections of Coatesville-Riverhead Highway / Old Railway Road and also Riverland Road require upgrading to include right-turn bays within Coatesville-Riverhead Road. As noted in the ITA, Auckland Transport were planning to upgrade the Old Railway Road intersection as the right-turn bays are required based on existing conditions. The funding of these upgrades is addressed in the Structure Plan.

The above transportation works will also align with the aspirations of the Te Tupu Ngātahi Supporting Growth Programme, which identifies roading and safety improvements for Coatesville-Riverhead Highway between State Highway 16 and Riverhead.

The following transportation works are also planned and funded within the surrounding area, creating additional transportation benefits for Riverhead in terms of improving roading safety, capacity, alleviating congestion, and increasing mode choice:

- State Highway 16 Brigham Creek to Waimauku upgrade: this project is proposed under the Regional Land Transport Plan 2021-2031 ('RLTP') and will deliver a range of safety and capacity improvements between Waimauku and the end of State Highway 16 at Brigham

Creek Road. This is a fully-funded project, and the Notice of Requirement was lodged with Auckland Council in late 2022; and

- State Highway Northwest Bus Improvements: this project is also proposed under the RLTP and will allow a new express bus service to operate along State Highway 16, connecting Northwest Auckland to the city centre.

7.6.2 Trip Generation

The ITA includes modelling of the expected traffic generation predicted as a result of development within the Plan Change area.

The ITA finds that while the proposed Plan Change will generate new trips, a number of trips will be local and internal within Riverhead due to the range of activities provided in the existing Riverhead township and Plan Change area.

The effects of the proposed Plan Change on the wider roading network are assessed in ITA relative to key intersections surrounding the Plan Change area. In summary, it is anticipated that all intersections are able to perform well, without significant queue lengths or delays. In particular, the SH16 / Coatesville-Riverhead Highway intersection has been tested across multiple scenarios, including a worse case 100% buildout in 2038, with higher sensitivity trip generation rates and the intersection is predicted to perform well for all of the scenarios tested.

Taking the above into account, it is considered that the trip generation effects at this intersection will be acceptable.

7.6.3 Internal Road Network

The proposed new roads include a series of local and connector roads to facilities trips within the Plan Change area, acknowledging that Riverhead Road and Coatesville-Riverhead Highway are existing arterial roads which provide higher movement functions, including catering for public transport services and general traffic.

Access to the Plan Change area from Riverhead Road and Coatesville-Riverhead Highway will be provided through new collector roads, which are proposed at locations to ensure safe sight distances and are identified on proposed Precinct Plan 1 to ensure that an integrated and connected movement network can be achieved. The proposed precinct provisions will also provide guidance on the key roading design outcomes of each road type, while the detailed design layout of roads will be determined at future resource consent stages.

7.6.4 Transport Summary

The effects of the Plan Change on the existing and future transport network have been assessed in the ITA and are determined to be acceptable. The ITA has demonstrated that the extent of urban development enabled by the proposed Plan Change can be accommodated within the surrounding road network, subject to the proposed transportation upgrades.

The proposed precinct provisions include specific standards, matters of discretion and assessment criteria to ensure that the required transportation upgrades are provided in an integrated manner at the time of future development. An appropriate roading hierarchy is proposed within the Plan Change area in accordance with Auckland Transport's Roads and Streets Framework to support their intended place and movement functions and the location of key routes have been identified.

Overall, it is considered that the proposed Plan Change will not create significant adverse effects on the transportation network.

7.7 Infrastructure and Servicing

The proposed stormwater management strategy and SMP is set out in the stormwater management assessment prepared by CKL, included as **Appendix 10** of this report.

The wastewater and water supply servicing strategy within the Plan Change area is set out in the water and wastewater servicing strategy prepared by GHD, included as **Appendix 11** of this report.

7.7.1 Stormwater Management

The proposed SMP sets out the best practicable options for managing stormwater within the Plan Change area and confirms that the proposed maximum allowable impervious area is appropriate, being 65% in residential areas and 90% in business areas.

It is proposed that the SMP will be adopted into the region-wide stormwater Network Discharge Consent and provisional approval for the SMP will be sought during the plan change process.

The identified requirements for managing stormwater quality and flow within the Plan Change include:

- Water quality treatment (90th percentile event) for all impervious areas; and
- Stormwater Management Area Flow ('**SMAF**') 1 retention and detention for all impervious areas other than those located within 1170 and 1186 Coatesville-Riverhead Highway (part of the Riverhead Point Drive catchment) as these areas are not proposed to discharge to a stream receiving environment.

A stormwater management strategy for the Plan Change area has been developed to address the above requirements. The stormwater management strategy demonstrates the overarching principles of how stormwater is to be managed, and has the objective of minimising or mitigating any detrimental effects of urban development on the receiving environment.

The stormwater management strategy includes:

- Installation of new piped networks for the primary conveyance of the 10% Annual Exceedance Probability ('**AEP**') flows;
- Directing overland flows to roads for the secondary conveyance of the 1% AEP flows;
- Communal and centralised devices, including raingardens and swales;
- The use of inert roofing and cladding materials for buildings; and
- Appropriate design of discharge outlets.

Overall, it is considered that the above methods will be sufficient to achieve hydrological mitigation of the effects of stormwater runoff generated by increased impervious areas enabled by the proposed plan change.

7.7.2 Water Supply

GHD's assessment identifies that there is capacity within an existing reservoir that services the existing Riverhead township to service the Plan Change area in the short term. A second supply

main to the existing reservoir would be constructed to provide for capacity and ensure resilience. GHD's assessment identifies two available options to facilitate this upgrade. The later stages of development will require an upgrade to the transmission main and reservoir to provide sufficient water supply.

7.7.3 Wastewater Servicing

Modelling undertaken by GHD confirms that there is capacity within the existing Riverhead wastewater pump station to service the Plan Change area in the short term. In the long term, the planned diversion Kumeu and Huapai from the Riverhead system will also provide sufficient capacity to service the entirety of the Plan Change area. Should development within the Plan Change area occur prior to this diversion, the GHD assessment identifies a number of available options to provide for additional capacity, including both localised upgrades relative to the Plan Change area and the construction of a new wastewater pump station.

7.7.4 Other Utilities

In terms of telecommunications, Chorus has confirmed that the Plan Change area can be serviced by the existing fibre network.

Communications with Vector confirm that the Plan Change area can be serviced by Vector's reticulated electrical unit, subject to the installation of new cables and equipment which will provide the Plan Change area with points of supply.

Correspondence with Chorus and Vector in relation to the Plan Change area is included at Appendix 12.

7.7.5 Infrastructure and Servicing Summary

It has been demonstrated that infrastructure solutions for three waters servicing and utilities are available to service the immediate development of the Plan Change area. In terms of water supply, wastewater, and electricity, upgrades to provide additional capacity would be required as development progresses, and several suitable options to facilitate these upgrades have been identified.

The detailed design of infrastructure provision will therefore be determined at the time of future development, noting that the AUP Auckland-wide chapters and provision for infrastructure servicing and stormwater management will apply. Appropriate provision has also been made within the proposed Precinct matters of discretion and assessment criteria to consider whether appropriate arrangements are in place for infrastructure servicing at the time of subdivision and development.

7.8 Existing Infrastructure

There are Transpower Transmission Lines which traverse the northern portion of the Plan Change area. These lines are covered by the National Grid Yard Overlay under the AUP which will restrict the location of new structures, extent of land disturbance, including earthworks and the operation of construction machinery in relation to those transmission lines. It is therefore considered that the effects of future development within the Plan Change area can be appropriately managed with respect to existing nationally significant infrastructure.

7.9 Ecology

An Ecological Assessment prepared by RMA Ecology has been undertaken to support the Plan Change and is included at Appendix 9 to this report. This includes an assessment of ecological values of freshwater and terrestrial ecosystems. A combination of desktop assessments and site visits were carried out for the Plan Change area, during which, key terrestrial and aquatic habitat features were identified across the site. An arboriculture assessment of existing trees within the Plan area has also been carried out by Greenscene and is included at Appendix 17 of this report.

7.9.1 Terrestrial Ecology

The Plan Change area is predominantly worked in pasture, with no presence of indigenous vegetation or species recognised to be threatened or at risk. A copper beech tree meeting the criteria to be nominated as a notable tree under the AUP is located at the western side of the Plan Change area at 298 Riverhead Road, Riverhead. This tree has been assessed by Greenscene to have a score of 23, where a score of 20 is needed to meet the threshold for nomination in accordance with Auckland Council guidelines.

The proposed precinct provisions provide recognition of the copper beech tree through identification in proposed Precinct Plan 2 and as a distinctive site feature in the proposed precinct policies and assessment criteria, which will apply to future consideration of the overall layout and design of development and provide opportunities to retain the tree.

The Ecological Assessment finds that native wildlife across the Plan Change area is reflective of historic modification to the land, and comprises predominantly of exotic bird and lizard specifies. Native copper skinks are likely to be present in the northern parts of the site where there are a greater number of farming activities and farming debris that provide habitat. Due to the significantly modified nature of the land form, it is considered that the effects of future development on terrestrial ecological and biodiversity values can be appropriately managed under the existing provisions Auckland wide provisions of the AUP (OP) for land disturbance and any modification to or removal of vegetation.

7.9.2 Freshwater Ecology

Waterbodies are concentrated within the northern portion of the Plan Change area where there is an intermittent stream and four wetlands. The intermittent stream flows to an unnamed tributary of the Rangitopuni Stream, running along the northern boundary of the Structure Plan Area, and has been assessed as having been highly modified, and having moderate ecological values. The four wetlands vary in size and quality, with the two smallest wetlands being botanically simplistic and the largest having been degraded by an extensive drain system, historic stock access, and exotic weeds.

The proposed Precinct Plans demonstrate that key roading connection through the Plan Change area can be accommodated while avoiding the reclamation of and works in and around streams and natural wetlands. In particular, key infrastructure, including roads and pedestrian access connections are located clear of the stream and all natural wetlands. The intermittent stream and a number of low-lying wetlands have also been incorporated into the multi-purpose green corridor, which forms one of the key structuring elements identified in the proposed precinct provisions, providing for the protection of these waterbodies. In addition, the proposed precinct provisions include a standard that provides for the protection and restoration of riparian margins, which will ensure positive effects as the land is developed. It is therefore considered that any

future works that may affect streams and natural wetlands can be appropriately managed under the existing statutory framework with respect to freshwater and ecological values, including Chapter E3 Lakes, Rivers, Streams, and Wetlands under the AUP (OP), the NES-FW, and the NPS-FM.

The proposed stormwater management approach has been assessed by RMA Ecology to be appropriate in terms of stream and wetland values with regard to improving water quality and managing the quantity of discharge.

Overall, it is considered that the effects of the urbanisation of land within the Plan Change area can be appropriately managed with regard to the ecological values of freshwater bodies.

7.10 Natural Hazards – Flooding

The Plan Change area is subject to flood plains, flood prone areas, and overland flow paths.

A flood risk assessment has been prepared by CKL, and is included as Appendix 10 of this report. The modelling considers pre and post-development scenarios and has accounted for the proposed impervious area coverages proposed within the Precinct Provisions.

In summary, this assessment includes modelling undertaken in relation to three downstream catchments being 'Riverhead Point Drive', 'Southern Stream', and 'Riverhead Forest Stream'. The modelling results indicate that urban development within the Plan Change area will not exacerbate existing flood hazards or create new flood hazards within the sub-catchments discharging to 'Riverhead Point Drive' and 'Southern Stream'. It has been assessed that new development is likely to impact the Riverhead Forest Stream sub-catchment due to existing flooding issues that have the potential to be exacerbated by additional development and insufficient capacity within the existing Riverhead Road culvert. CKL identify that flood risks and hazards within this sub-catchment can be appropriately managed through the upgrade of the Riverhead Road culvert.

Overall, there is a high degree of confidence that potential flood hazards associated with development within the Plan Change area can be appropriately managed at the time of development and subject to detailed design. It is also noted that the provisions in Chapter E36 Natural Hazards and Flooding of the AUP would also apply to any development within identified flood plains and overland flow paths, which would manage the effects associated with new development in within flood hazards.

7.11 Natural Hazards – Geotechnical

With regard to geotechnical constraints, the Plan Change area is considered to be generally near-level, with moderate slopes on the edge of erosional gully features located to the south east. A preliminary geotechnical assessment has been prepared by Soil and Rock and a copy is included as Appendix 15 of this report.

The geotechnical assessment has considered the suitability of the Plan Change area for urban development with regard to soil qualities and the condition of topsoil and fill areas, groundwater, slop stability, and expansivity. Overall, it is concluded that the Plan Change area will be able to accommodate future urban development in accordance with the proposed zoning. In particular, no areas of significant geotechnical hazards that would require a lower intensity of development were identified. Detailed geotechnical investigations will be required as part of future resource

consent applications regarding the management of earthworks, groundwater, and building foundation design.

Based on these findings, it is considered that the land conditions are generally suitable for urban development and can be appropriately managed through the resource consent process and the provisions of Chapter E36 Natural Hazards and Flooding of the AUP (OP).

7.12 Land Contamination

A Detailed Site Investigation ('**DSI**') has been undertaken by Soil and Rock for the Plan Change Area, and is included at **Appendix 14** of this report. This DSI confirms the presence of contaminants exceeding acceptable concentrations include heavy metals (arsenic, metal, zinc) and asbestos within the Plan Change area. The regulations of the National Environmental Standard for Assessing and Managing Contaminants in the NESCS therefore apply.

Resource consent requirements under the NESCS and AUP would ensure that a Site Management Plan is prepared at the time of resource consent for subdivision or development to demonstrate how the works will be managed to ensure that any land disturbance and urban use of the land avoid and mitigate adverse effects on the environment and human health.

The DSI concludes overall that the Plan Change area is suitable for future residential and commercial development, and there is no evidence to suggest that the presence of contamination would prevent the proposed rezoning of land as sought in the plan change.

Overall, it is considered that there is a high level of confidence that the Plan Change area can be remediated and that the potential adverse effects of land contamination associated with land disturbance and the change of use of the site can be appropriately managed through the existing statutory framework with respect to the NES regulations and AUP for any discharges.

7.13 Heritage and Archaeology

An assessment of the archaeological and heritage values of the Plan Change area has been undertaken by Clough & Associates, and their report is included as **Appendix 13** of this report. While there are no existing records of archaeological or other historic heritage sites being recorded within the Structure Plan area, a detailed field survey identified two archaeological sites relating to early European settlement.

These sites include the mid-19th century Riverhead Mill water race at Lot 20 DP 499876 and the former late 19th century Ellis house at Lot 1 DP 164978. Clough and Associates have assessed the significance of these places in accordance with the AUP criteria. In this case, the assessment of the relevant criteria identifies significance evaluations of 'little' for the majority of the criteria, with 'moderate' for several. None of the classifications are 'considerable' or 'outstanding'. Therefore, it is considered that the objectives and policies of RPS B5.2 are not applicable as these sites are not 'significant historic heritage places'. As such, additional protection of these sites with 'little' or 'moderate' value is not required. Although there are no present known features or structures of significance in relation to these sites, there is the possibility that subsurface remains of archaeological value due to their information potential are located during land development.

In the event that subsurface remains are uncovered during future development, the archaeological provisions of the Heritage New Zealand Pouhere Taonga Act 2014 ('**HNZPTA**') will apply. It is also anticipated that standard accidental discovery protocols in the AUP will be implemented in the

event that any archaeological material is uncovered during excavation works. The Precinct provisions include a Special Information Requirement which states that any future application for land modification on 22 Duke Street (the location of the mill race) must be accompanied by an archaeological assessment, including a survey. The purpose of this assessment would be to evaluate the effects on archaeological values associated with the Waitemata Flour Mill/Riverhead Paper Mill site R10_721 prior to any land disturbance, and to confirm whether the development will require an Authority to Modify under the Heritage New Zealand Pouhere Taonga Act 2014.

The assessment prepared by Clough and Associates confirms that these measures under the HNZPTA and AUP are appropriate to manage and mitigate the potential adverse effects on archaeology values associated with future development within the Plan Change Area.

7.14 Reverse Sensitivity

The Plan Change area adjoins land that is zoned Mixed Rural to the south and west, which has the potential to create reverse sensitivity effects. The proposed Plan Change locates THAB zoning away from the Mixed Rural zone, and proposes the lower intensity Mixed Housing Urban zoning at this interface. The Neighbourhood Design Statement (refer Appendix 6) recommends that a greater side and rear yard setback than that currently required in the Mixed Housing Urban zone is applied. A greater yard setback will provide separation between future development and existing rural activities, as well as provide opportunities for future land owners to implement additional buffers and screening. The proposed precinct standards will require any Mixed Housing Urban zoned site within the Plan Change area immediately adjoining the Mixed Rural zone to apply a 5m side and rear yard setback from common boundaries with this zone.

With regard to the potential for reverse sensitivity effects, it is noted that the purpose of the Mixed Rural zone is to provide for rural production and other non-residential activities at a scale that is compatible with typically smaller site sizes. In this case, the adjacent rural land uses include horticulture (greenhouses), lifestyle living, open pasture that is grazed, and a motor camp. The extent of land available for intensive rural production activities adjacent to the Plan Change area is also constrained by an existing permanent stream, which traverses the Mixed Rural zone in a north south direction. It is therefore considered that the proposed zoning pattern and Precinct Provisions provide appropriate opportunities within the Plan Change area to manage reverse sensitivity issues between residential and rural land.

7.15 Summary of Effects

The actual and potential effects of the proposed Plan Change have been considered above, based on extensive reporting and analysis undertaken by a wide range of technical experts. On the basis of this analysis, it is considered that the area is suitable for urban development, the proposed mix of uses will result in positive effects on the environment in terms of the social and economic well-being of the community, and the development can be serviced by existing infrastructure with appropriate upgrades in place. Where adverse effects are anticipated, the proposed policies and rules of the Plan Change, in addition to those in the Auckland-wide and zone provisions, will ensure they are appropriately avoided, remedied or mitigated.

8.0 Section 32 Analysis

8.1 Appropriateness of the Proposal to achieve the purpose of the Act

Section 32(1)(a) of the RMA requires an evaluation to examine the extent to which the objectives of the proposed plan change are the most appropriate way to achieve the purpose of the RMA.

8.1.1 Objectives of the Plan Change

The purpose or overarching objective of the plan change is to deliver a comprehensively developed residential environment through the expansion of the existing Riverhead settlement to primarily provide additional land for housing. The plan change will achieve medium and high density residential activities serviced by a local centre to provide for local convenience needs and some limited employment opportunity. A smaller neighbourhood centre is proposed along Coatesville-Riverhead Highway to provide for daily needs within a walkable catchment. The plan change will also achieve a connected multi-modal transport network which integrates with the existing settlement. In addition, the plan change will retain and enhance key ecological features to improve ecological outcomes, and respect Mana Whenua values. Overall, the plan change is considered to be complementary to the Riverhead Structure Plan.

The proposed precinct incorporates objectives to guide development within the Plan Change area to achieve the following outcomes:

- The extension of Riverhead rural town to create a comprehensively developed residential environment that integrates with the existing settlement, the natural environment and respects Mana Whenua values;
- Development provides a variety of housing types and sizes, including Integrated Residential Development, to meet demand;
- Local employment opportunity is provided in the Local Centre and Neighbourhood Centre, while complementing higher order centres;
- Development is coordinated with the provision of infrastructure, transport upgrades and social facilities;
- Adverse effects on receiving waterbodies are minimised or mitigated;
- The protection, restoration, enhancement and maintenance of ecological habitats within the Plan Change area including riparian margins is achieved; and
- The relationship of Mana Whenua with the Māori cultural landscape is recognised, protected, and enhanced.

The proposed precinct objectives enable a comprehensive and integrated urban development outcome whilst also achieving positive environmental outcomes. The requirement for growth and transport/infrastructure upgrades to be developed together will also ensure development progresses in a coordinated manner.

8.1.2 Assessment of the Objectives against Part 2

In accordance with Section 32(1)(a), **Table 1** below provides an evaluation of the objectives of the plan change.

Table 1: Assessment of Objectives against Part 2 of the RMA.

Objective	RMA S5 Purpose	RMA S6 Matters of National Importance	RMA S7 Other Matters	RMA S8 Treaty of Waitangi
Theme 1: Well-functioning Urban Environment				
(2) A variety of housing types and sizes that respond to: (a) Housing needs and demand; and (b) The neighbourhoods planned urban built character. (3) Activities in Business – Local Centre zone do not compromise the function, role and amenity of the City Centre Zone, Business – Metropolitan Centre Zone and Business – Town Centre Zone.	These objectives seek to enable future communities of Riverhead to meet their social, economic, and cultural well-being by: • Ensuring that a selection of housing is available to meet the diverse needs of the community; and • Providing opportunity for local employment while respecting the higher order centres and the role these have within the wide community.	This objective does not compromise the recognition of, or the provision of the relevant matters of national importance. The PPC and the AUP contain a suite of objectives which will appropriately manage matters of national importance within the Plan Change area.	This objective does not compromise the recognition of, or the provision of other matters.	These objectives will not offend against the principles of the Treaty of Waitangi.
Theme 2: Coordinating the development of land with infrastructure in Riverhead				
(5) Subdivision and development are coordinated with the supply of sufficient transport, water, energy and telecommunications infrastructure. (8) Development is supported by social facilities, including education and healthcare facilities.	The alignment of social and physical infrastructure and land use planning will ensure development occurs in a sustainable manner through ensuring that there is adequate infrastructure to service staged growth and mitigate the adverse effects of development on the receiving environment.	This objective does not compromise the recognition of, or the provision of these matters of national importance. The AUP contains existing objectives that manages any potential conflict between matters of national importance and infrastructure and social facilities.	These objectives do not compromise the recognition of, or the provision of other matters. In particular the alignment of infrastructure and land use planning will ensure development makes efficient use of land where there are funded infrastructure solutions available.	These objectives will not offend against the principles of the Treaty of Waitangi.
Theme 3: Achieving integrated and quality development				
(1) Riverhead is a well-functioning urban environment that integrates with the existing Riverhead settlement, the natural environment and respects Mana Whenua values. (4) Access to and from the precinct occurs in a safe, effective and efficient manner for all modes of transport.	The emphasis of the proposed objectives on achieving a connected development which integrates with the existing settlement will enable future communities of Riverhead to meet their social, economic, and cultural well-being.	This objective does not compromise the recognition of, or the provision of these matters of national importance. The AUP contains existing objectives that manages matters of natural importance.	The objectives have regard to the maintenance and enhancement of amenity values and the quality of the environment through ensuring development is connected and integrated with the existing Riverhead development and the natural environment.	These objectives are consistent with the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).
Theme 4: Natural Environment				
(7) Identified ecological values within wetland and stream habitats are protected, restored and enhanced. (6) Stormwater is managed to avoid, as far as practicable, or otherwise minimise or mitigate adverse effects on the receiving environment.	The emphasis of the proposed objectives on the protection and enhancement of natural and ecological features as well as the adverse effects on receiving water bodies will ensure that the natural resources within the Plan Change area are sustained for future generations.	The objectives recognise and provide for the preservation of the natural character of wetlands and rivers and their margins through ensuring the maintenance and enhancement of the ecological values within stream, and wetland habitats.	The objectives have regard to the intrinsic value of ecosystems and the maintenance and enhancement of the quality of the environment through ensuring the maintenance and enhancement of the ecological values within stream, and wetland habitats. Additionally, the objectives have particular regard to the effects of the quality of receiving waters through ensuring that	The precinct is framed by two awa which have cultural value to mana whenua. These objectives recognise that guiding principles for enables Te Kawerau a Maki and Ngati Whatua Kaipara identified through ongoing engagement on the PPC include the protection of taonga and the restoration of mana to taonga. These objectives are consistent with the

Objective	RMA S5 Purpose	RMA S6 Matters of National Importance	RMA S7 Other Matters	RMA S8 Treaty of Waitangi
			stormwater quality is managed to avoid, minimise or mitigate effects.	principles of the Treaty of Waitangi (Te Tiriti o Waitangi).
Theme 5: Mana Whenua Cultural Landscape				
(9) Mana Whenua cultural values and their relationship associated with the Māori cultural landscape, including ancestral lands, water, sites, waahi tapu, and other taonga, in the Riverhead Precinct are identified, recognised, protected, and enhanced.	Recognising and protecting the Māori cultural landscape enables Te Kawerau a Maki and Ngati Whatua Kaipara to meet their own cultural well-being while ensuring these resources are sustained for future generations.	The Riverhead area is notable for its continued association with Te Kawerau a Maki and Ngati Whatua Kaipara and other iwi since pre-European times. Fundamental guiding principles for mana whenua include the protection of taonga, the restoration of mana to taonga and the retention of wahi tapu and sites of cultural significance. These objectives recognise and protect these values and therefore provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga as matter of national importance.	These objectives will support the recognition of, or the provision of other matters. In particular the recognition and protection of the Māori cultural landscape is consistent with kaitiakitanga.	These objectives recognise the Māori cultural landscape plan which has been developed in partnership with Te Kawerau a Maki and Ngati Whatua Kaipara consistent with the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

8.2 Appropriateness of the Provisions to Achieve the Objectives

8.2.1 The Objectives

Section 32(1)(b) of the RMA requires an evaluation to examine whether the provisions (i.e. policies and methods) of the proposed Plan Change are the most appropriate way to achieve its objectives by:

- Identifying other reasonably practicable options for achieving the objectives;
- Assessing the efficiency and effectiveness of the objectives; and
- Summarising the reasons for deciding on the provisions.

As the proposed Plan Change is amending the AUP (District Plan), the above assessment must relate to the provisions and objectives of the proposed Plan Change, and the objectives of the AUP to the extent that they are relevant to the proposed Plan Change and would remain if the Plan Change were to take effect[6].

In addition to the objectives of the proposed Plan Change which are outlined above, the AUP objectives with particular relevance to this plan change are summarised below:

Within the RPS:

- A quality compact urban form that enables a higher quality urban environment, better use of existing infrastructure and efficient provision of new infrastructure, improved public transport and reduced adverse effects (B2.2.1(1));
- Ensure there is sufficient development capacity to accommodate growth and require the integration of land use planning with the infrastructure to service growth (B2.2.1(3) and B2.2.1(5));
- Urbanisation is contained within the Rural Urban Boundary, towns and rural and coastal towns and villages (B2.2.1(4));
- A quality-built environment where subdivision, use and development respond to the intrinsic qualities and physical characteristics of the area, reinforce the hierarchy of centres and corridors, contribute to a diverse mix of choice and maximise resource and infrastructure efficiency (B2.3.1(1));
- Ensure residential intensification supports a quality compact urban form and land within and adjacent to centres and corridors or in close proximity to public transport is the primary focus for residential intensification (B2.4.1(1) and B2.4.1(3));
- An increase in housing capacity and the range of housing choice which meets the varied needs and lifestyles of Auckland's diverse and growing population (B2.4.1(4));
- Ensure employment and commercial and industrial opportunities meet current and future demands (B2.5.1(1));
- Ensure growth and development of existing or new rural and coastal towns and villages is enabled in ways that avoid natural and physical resources that have been scheduled, avoid elite soils and avoid where practicable prime soils, avoid areas with significant natural hazard

[6] RMA s32(3)

risks, are consistent with the local character of the town or village and the surrounding area and enables the development and use of Mana Whenua's resources for their economic well-being (B2.6.1(1));

- Ensure rural and coastal towns and villages have adequate infrastructure (B2.6.1(2));
- Ensure recreational needs of people and communities are met through the provision of a range of quality open spaces and recreation facilities and that public access to streams is maintained and enhanced (B2.7.1(1) and B2.7.1(2));
- Ensure the mauri of, and the relationship of Mana Whenua with, natural and physical resources including freshwater, geothermal resources, land, air and coastal resources are enhanced overall (B6.3.1(2));
- Indigenous biodiversity is maintained through protection, restoration and enhancement in areas where ecological values are degraded, or where development is occurring (B7.2.1(2));
- Auckland's lakes, rivers, streams and wetlands are restored, maintained or enhanced (B7.3.2(5)); and
- Indigenous biodiversity is restored and enhanced in areas where ecological values are degraded, or where development is occurring (B7.2.1(1)).

Within the Residential Zones:

- Within the Terrace Housing and Apartment Building zone - land adjacent to centres and near the public transport network is efficiently used to provide high-density urban living that increases housing capacity and choice and is in keeping with the planned urban character of predominantly five, six or seven storey buildings in a variety of forms (H6.2(1) and H6.2(2)); and
- Within the Mixed Housing Urban zone - enable a range of housing types and in a manner that is in keeping with the planned urban built character of the zone (H5.2(1) and H5.2(2)).

Within the Business Zones:

- Provide a strong network of centres that are attractive environments and attract ongoing investment, promote commercial activity, and provide employment, housing and goods and services, all at a variety of scales (H12.2(1) and (H11.2(1)); and
- Ensure business activity is distributed in locations, that is accessible and is of a form and scale that provides for the community's social and economic needs (H12.2(4) and (H11.2(4)).

Within the Auckland-wide Provisions:

- Auckland-wide objectives relating to lakes, rivers, streams and wetland, water quality, stormwater, land disturbance and vegetation management and biodiversity seek to avoid adverse effects where possible but recognise the need to use land identified for future urban land uses efficiently;
- Auckland-wide objectives relating to subdivision seek to ensure that subdivision has a layout which is safe, efficient, convenient and accessible and that Infrastructure supporting subdivision and development is planned and provided for in an integrated and comprehensive manner; and

- Auckland-wide objectives relating to transport seek to ensure that an integrated transport network including public transport, walking, cycling, private vehicles and freight, is provided for.

The objectives and provisions of the Plan Change and the relevant objectives of the AUP can be categorised into the following themes:

- Theme 1: Timing of urbanisation and land use pattern;
    - Theme 1.1: Timing of Development in Riverhead;
    - Theme 1.2: Residential land use pattern;
    - Theme 1.3: Commercial land use pattern;
- Theme 2: Coordinating the development of land with infrastructure;
- Theme 3: Achieving integrated and quality development;
- Theme 4: Natural Environment; and
- Theme 5: Mana Whenua Cultural Landscape.

The following sections address the matters set out in Schedule 1 and Section 32 of the RMA on the basis of the themes listed above.

8.3 Other Reasonably Practicable Options for Achieving the Objectives

8.3.1 Theme 1: Timing of Urbanisation and Land Use Pattern

The existing AUP objectives and proposed precinct objectives which have particular relevance for Theme 1 include:

- B2.2.1(1): A quality compact urban form that enables a higher quality environment, better use of existing infrastructure and efficient provision of new infrastructure, improved public transport and reduced adverse effects;
- B2.2.1(3): Sufficient development capacity and land supply is provided to accommodate residential, commercial, industrial growth and social facilities to support growth;
- B2.2.1(4): Urbanisation is contained within the Rural Urban Boundary, towns, and rural and coastal towns and villages;
- B2.2.1(5) The development of land within the Rural Urban Boundary, towns, and rural and coastal towns and villages is integrated with the provision of appropriate infrastructure.
- B2.3.1(1): A quality built environment where subdivision, use and development do all of the following: (a) respond to the intrinsic qualities and physical characteristics of the site and area, including its setting; (b) reinforce the hierarchy of centres and corridors; (c) contribute to a diverse mix of choice and opportunity for people and communities; (d) maximise resource and infrastructure efficiency; (e) are capable of adapting to changing needs; and (f) respond and adapt to the effects of climate change;
- B2.4.1(1): Residential intensification supports a quality compact urban form;

- B2.4.1(3): Land within and adjacent to centres and corridors or in close proximity to public transport and social facilities (including open space) or employment opportunities is the primary focus for residential intensification;
- B2.4.1(4): An increase in housing capacity and the range of housing choice which meets the varied needs and lifestyles of Auckland's diverse and growing population;
- B2.4.1(5): Non-residential activities are provided in residential areas to support the needs of people and communities;
- B2.5.1(1): Employment and commercial and industrial opportunities meet current and future demands;
- B2.6.1(1): Growth and development of existing or new rural and coastal towns and villages is enabled in ways that: (a) avoid natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage or special character unless growth and development protects or enhances such values; and (b) avoid elite soils and avoid where practicable prime soils which are significant for their ability to sustain food production; and (c) avoid areas with significant natural hazard risks; (d) are consistent with the local character of the town or village and the surrounding area; and (e) enables the development and use of Mana Whenua's resources for their economic well-being;
- B2.6.1(2): Rural and coastal towns and villages have adequate infrastructure;
- H6.2 (1): Land adjacent to centres and near the public transport network is efficiently used to provide high-density urban living that increases housing capacity and choice and access to centres and public transport;
- H5.2(1) Land near centres, high-density residential areas and close to the public transport network is efficiently used for higher density residential living and to provide urban living that increases housing capacity and choice and access to public transport;
- H11.2(4) & H12.2(4): Business activity is distributed in locations, and is of a scale and form, that: (a) provides for the community's social and economic needs; (b) improves community access to goods, services, community facilities and opportunities for social interaction; and (c) manages adverse effects on the environment, including effects on infrastructure and residential amenity.

In accordance with Section 32(1)(a) and (1)(b), Table 2 below provides an evaluation of options in respect of the timing of live-zoning of the land.

Table 2: Evaluation of Provisions – Theme 1.1: Timing of Development in Riverhead.

	Option 1 – Do nothing (wait for Council to rezone the land in accordance with the FULSS)	Option 2 – Proposed plan change Live zone the entire FUZ area
Description of Option	This option involves retaining the Future Urban zone and waiting for the Council to initiate a Plan Change to rezone the Plan Change area in accordance with the FULSS.	This option brings forward the release of land for urban development in Riverhead in accordance with the Plan Change.

	Option 1 – Do nothing (wait for Council to rezone the land in accordance with the FULSS)	Option 2 – Proposed plan change Live zone the entire FUZ area
Benefits		
Environmental	This option will maintain the existing rural character of the Plan Change area. There is no change to the AUP provisions proposed through this option. Existing rules will apply.	This option provides an opportunity to take a holistic view on urban growth and form of Riverhead providing the essential elements that contribute to a successful rural town consistent with the planning framework of the Regional Policy Statement. The Riverhead Structure Plan has assessed the suitability of the Plan Change area for urbanisation and the Plan Change is consistent with the Structure Plan. Infrastructure solutions are available and funded and therefore there are no significant constraints to urban development of the Plan Change area.
Economic	There is no economic benefit for this option.	Enables the staged development of the Plan change area as infrastructure is available, providing additional business and residential capacity from the short term. Provides greater certainty for the council, community, developers and landowners about the nature, extent and pace of development of Riverhead.
Social	This option does not facilitate any improved social outcomes.	This option proposes a comprehensive and integrated development over a large land holding that is contiguous with existing urban development on the opposite side of Coatesville Riverhead Highway. This scale of development will enable social amenities such as schools, open spaces, ecological corridors, a retirement village and a village centre to be established.
Cultural	This option defers further intensification and development of land where there is cultural, spiritual and historical values and associated with the Māori cultural landscape.	This option has been developed in in consultation with Te Kawerau a Maki and Ngati Whatua Kaipara includes precinct provisions that will holistically recognise and protect the cultural landscape

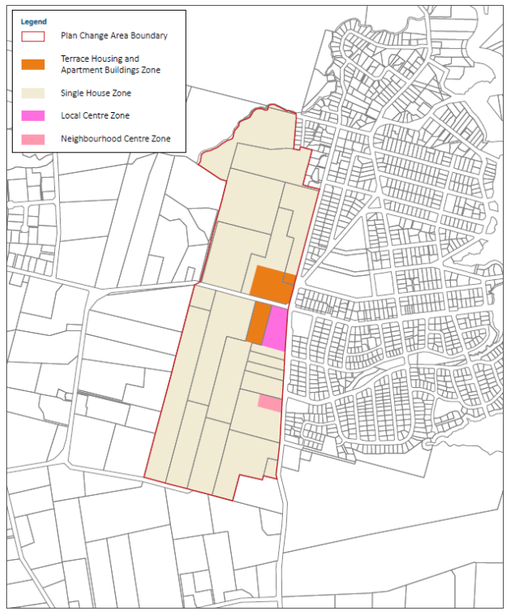
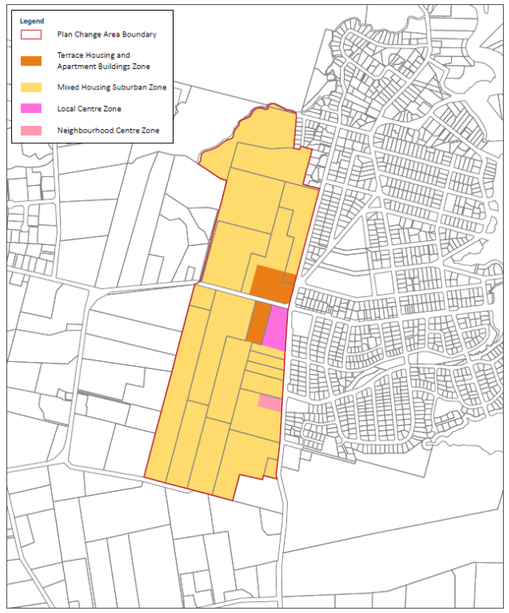
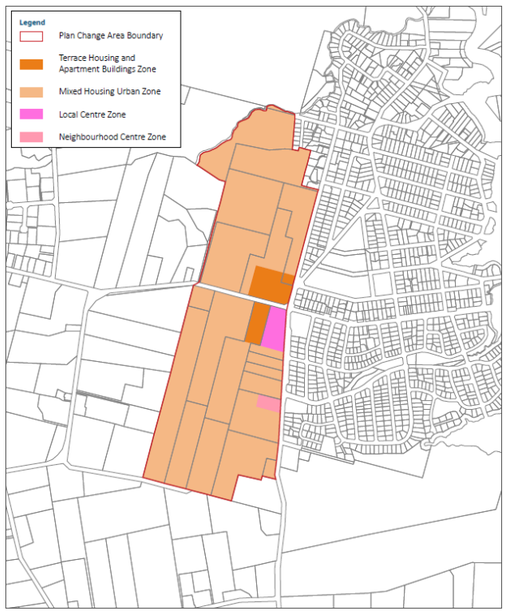
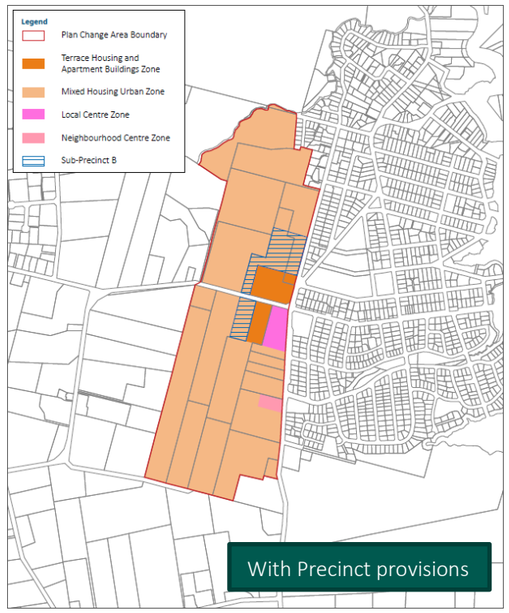
	Option 1 – Do nothing (wait for Council to rezone the land in accordance with the FULSS)	Option 2 – Proposed plan change Live zone the entire FUZ area
Costs		
Environmental	This option is less likely to result in the environmental improvements provided for through Option 2, including the protection and restoration of riparian margins. Environmental impacts associated with ongoing rural use and on-going uncontrolled sediment discharge to the CMA.	Potential effects on adjoining properties and surrounding land uses as a result of urban development at a greater height and density than currently provided for within Riverhead.
Economic	This option does not make efficient use of land where there are funded infrastructure and transport solutions to service growth. Does not add to Auckland's housing and business land supply to accommodate growth in the short term and is therefore likely to have a negative impact on economic growth and employment.	Costs involved in undertaking the development and delivery of infrastructure.
Social	This option does not provide for any additional community facilities or open spaces to meet the diverse demographic and cultural needs of the future and existing Riverhead community.	The scale of development delivered through this option may be considered by some members of the community to be not in keeping with the community's expectations given the current Single House zoning throughout Riverhead.
Cultural	There is no change to the cultural environment through this option. However, has the potential to result in rural use which may compromise cultural landscape values. Option 2 includes precinct provisions that will recognise and protect the cultural landscape.	May result in development of land where there is cultural, spiritual and historical values to mana whenua, however, the mana whenua cultural landscape is recognised and protected through proposed precinct provisions.
Efficiency & Effectiveness	This option is not efficient or consistent with B2.2.1(3) and the requirements of the NPS-UD as no additional business and residential capacity is enabled in the short – mid-term despite analysis being prepared to show that the Plan Change it is consistent with the RPS, particularly, B2.6(1) and B2.2.1(1).	This option is efficient and effective at achieving B2.6(1) as the potential development of the land does not affect any scheduled items and natural hazards. Additionally, the effects of built form enabled by the Plan Change are largely consistent with and complementary to the local character of Riverhead with interface controls to manage the relationship with the higher density development and existing

	Option 1 – Do nothing (wait for Council to rezone the land in accordance with the FULSS)	Option 2 – Proposed plan change Live zone the entire FUZ area
		single house development along Coatesville Riverhead Highway. Precinct provisions are also proposed to protect the mana whenua cultural landscape. This option is efficient and effective at achieving B2.6(2) as analysis undertaken as part of this Plan Change request confirms there are infrastructure solutions available and able to be funded. This option is efficient and effective at achieving B2.2.1(1) as it supports a high quality environment that is integrated with public transport use and reduce adverse effects. This option is efficient and effective at achieving B2.2.1(3) as it will enable the development of 1,500-1800 dwellings which represents a significant opportunity to increase residential development capacity within the short term.
Summary	Option 2 is preferred. The extension of the settlement at Riverhead within the Plan Change area is consistent with B2.6.1. Analysis undertaken as part of this Plan Change request confirms there are infrastructure solutions available and able to be funded, without reliance on funding from Council. Furthermore, this option is efficient and effective at achieving B2.2.1(3) as it will enable the development of 1,500-1800 dwellings increasing residential development capacity.	

In accordance with Section 32(1)(a) and (1)(b), the below tables provide an evaluation of options in respect to land use pattern:

- Table 3 addresses the lower density residential zoning;
- Table 4 addresses the higher density residential zoning; and
- Table 5 addresses the commercial zoning.

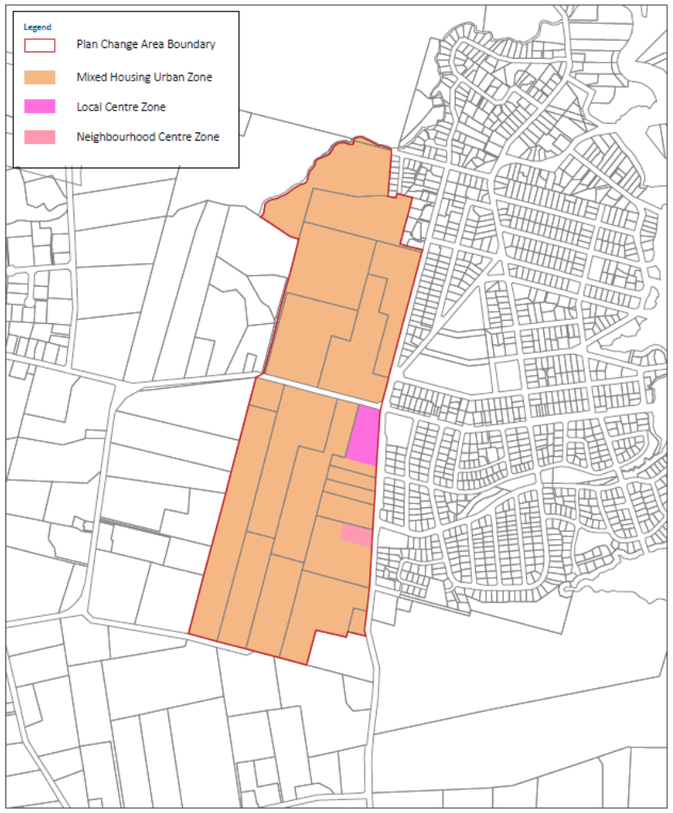
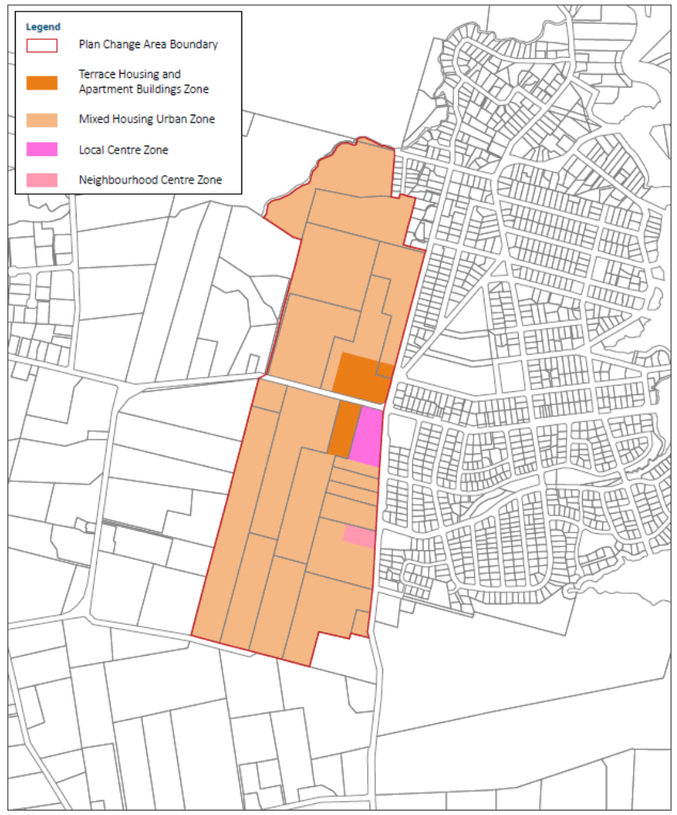
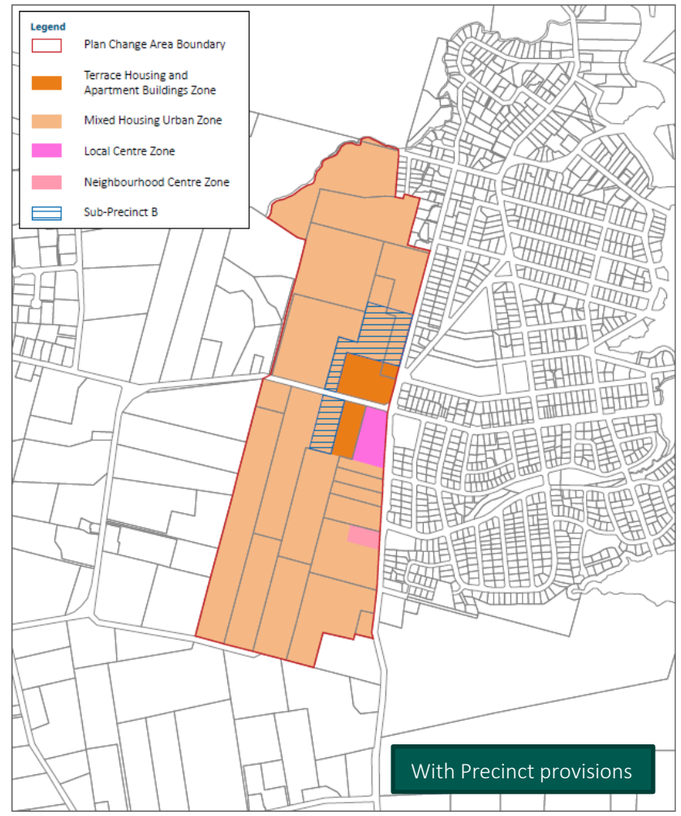
Table 3: Evaluation of Provisions – Theme 1.2: Residential Land Use Pattern – Lower Density Residential Area.

	Option 1 – Single House Zone	Option 2 – Mixed Housing Suburban Zone	Option 3 – Mixed Housing Urban Zone	Option 4 – Proposed Plan Change
Description of Option	This option involves applying the Single House zone to enable residential development at lower densities. 	This option involves applying the Mixed Housing Suburban zone to enable medium density residential development while retaining a suburban built character of predominantly two storeys. 	This option involves applying the Mixed Housing Urban zone to enable medium density residential development while retaining a urban built character of predominantly three storeys throughout the lower density area. 	This option involves a refined zoning approach to enable medium density residential development by applying the Mixed Housing Urban zone with a reduced height that will while retain a suburban built character of predominantly two storeys, and providing for three storeys adjacent to the higher density residential areas only. 
Benefits				
Environmental	This option retains the low-density nature of the existing development within Riverhead.	This option retains the suburban character of Riverhead while allowing greater capacity and choice.	This option will provide the greatest capacity for residential development however, the extent of the MHU zoning has not been sized to align with the provision of infrastructure which could lead to a dispersed pattern of residential development. Other benefits include greater proximity of residential to support the Local Centre.	This proposed zoning layout includes opportunities for different housing types and intensity that are complementary to the residential character of the area and has been informed by a structure planning exercise. This option makes efficient use of greenfield land through enabling medium density development. Sub-Precinct B provides for a three-storey height limit to enable a transition in building height between the higher density THAB land and the surrounding Mixed Housing Urban area, where height has been limited to two storeys to respond to the existing built character of the Riverhead settlement.

	Option 1 – Single House Zone	Option 2 – Mixed Housing Suburban Zone	Option 3 – Mixed Housing Urban Zone	Option 4 – Proposed Plan Change
Economic	This option will provide for in the least residential capacity within Riverhead compared with the other options and is likely to result in a dispersed pattern of residential development.	This option will provide the opportunity for increased housing typologies such as duplexes and terraces which will enable housing for different price points.	This option will provide for the greatest level of residential capacity of all the options, supporting competitive development markets. However, a dispersed and lower density pattern of development is likely to arise due to insufficient infrastructure provision.	This option will provide the opportunity for increased housing typologies, such as duplexes and terraces, which will enable housing for different price points.
Social	This option will not provide the range of housing typologies and choice provided for through option 2 - 4.	This option provides for a range of housing typologies and choice to meet the diverse needs of the Riverhead population.	This option provides for a range of housing typologies and choice to meet the diverse needs of the Riverhead population. It will enable development yields that can support the development of additional community facilities. The scale of development will increase the long-term population and consequently the social benefits associated with intensification and use of community facilities.	This option provides for a range of housing typologies and choice to meet the diverse needs of the Riverhead population. It will enable development yields that can support the development of additional community facilities.
Cultural	There are no cultural benefits associated with this option.	There are no cultural benefits associated with this option.	There are no cultural benefits associated with this option.	There are no cultural benefits associated with this option.
Costs				
Environmental	The proposed zoning layout will result in low density residential development which is an inefficient use of land, particularly in areas of the Plan Change area that are within walking distance to the proposed local centre.	The proposed zoning layout will result in medium density residential development which is a greater density than the existing Riverhead area however, the similarities in the core development standards will ensure that development results in a suburban character which is in keeping. This option provides less certainty around the environmental outcomes resulting from the zone provisions give, Auckland Council is about to notify an Intensification Planning Instrument in August which will alter the zone package.	This proposed zoning layout provides for development at an intensity and scale which is different to the residential character of the existing Riverhead area.	Potential effects on adjoining properties and surrounding land uses as a result of urban development at a greater height (within Sub-Precinct B) and density than currently provided for within Riverhead.
Economic	This option will limit the range of housing types and price points available within Riverhead. Costs involved in undertaking the development and delivery of infrastructure.	Costs involved in undertaking the development and delivery of infrastructure.	This option will result in the application of residential zones that have not been sized to meet the short-medium term market demand and infrastructure availability. Costs involved in undertaking the development and delivery of transport infrastructure necessary to service a higher density lived zoned residential area.	Costs involved in undertaking the development and delivery of infrastructure.
Social	This option does not make efficient use of land and therefore may not result in the development yields to support the development of additional community facilities to support the growing population within Riverhead.	The scale of development delivered through this option may be considered by some members of the community to not be in keeping with the community's expectations given the current single house zoning.	While this zoning pattern that enables the greatest density of development compared to the other options, the scale of development will actually be of a reduced density due to infrastructure limitations and consequentially reduce the long-term population. This	The scale of development delivered through this option may be considered by some members of the community to not be in keeping with the community's expectations, given the current Single House zoning of the existing settlement.

	Option 1 – Single House Zone	Option 2 – Mixed Housing Suburban Zone	Option 3 – Mixed Housing Urban Zone	Option 4 – Proposed Plan Change
			will reduce social benefits associated with intensification.	
Cultural	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.
Efficiency & Effectiveness	This option is not efficient and effective at achieving B2.3.1 (1) as the zoning pattern is not consistent with the Riverhead Structure Plan and therefore does not respond to the intrinsic qualities and physical characteristics of the site and area. This option does not efficiently use land within a walkable catchment to the proposed local centre and therefore is not consistent with B2.3.1 (1).	This option is efficient and effective at achieving B2.3.1 (1) as the zoning has been informed by a structure plan however, not to the same degree as Option 4 where the zoning has been more specifically tailored to respond to the intrinsic qualities and physical characteristics of the site and area.	This option is not efficient and effective at achieving B2.3.1(1)) as applying the three-storey development enabled by the Mixed Housing Urban throughout the Plan Change area is not in keeping with the existing Riverhead settlement.	This option will effectively and efficiently achieve B2.3.1(1)as the two storey development enabled by the refined Mixed Housing Suburban zone is in keeping with the existing Riverhead settlement. This option is efficient and effective at achieving B2.3.1 (1) as the refined zoning has been informed by a structure plan and therefore responds to the intrinsic qualities and physical characteristics of the site and area. This option will efficiently and effectively achieve B2.4.1 (4) as it enables the development of 1500-1800 dwellings and a variety of typologies to support greater housing capacity and choice.
Summary	Option 4 is preferred. The proposed zoning layout has been informed by a structure plan to respond to the characteristics of the Plan Change area and enables two-storey development in keeping with the existing Riverhead settlement, while delivering additional residential capacity.			

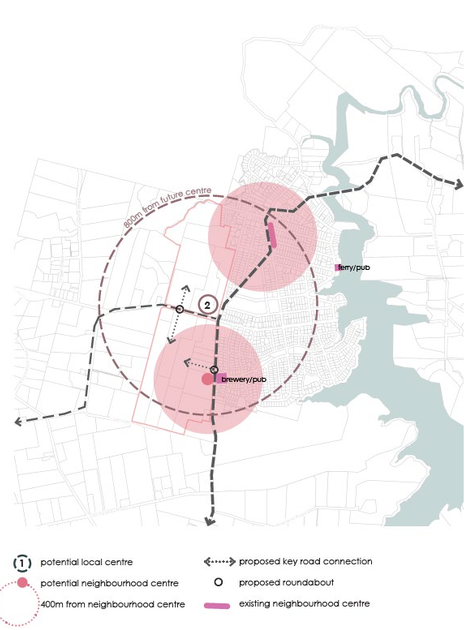
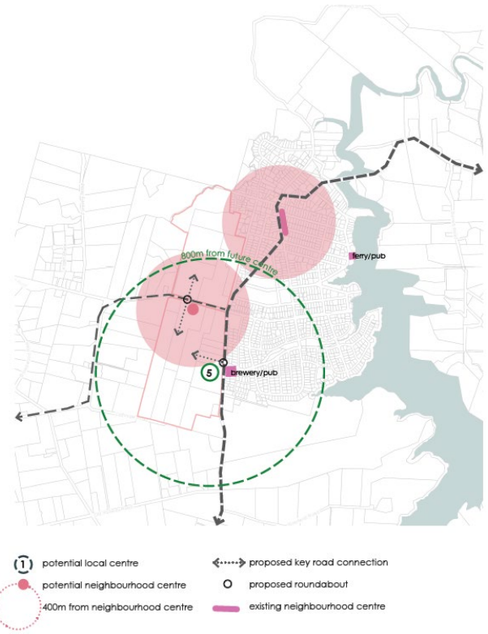
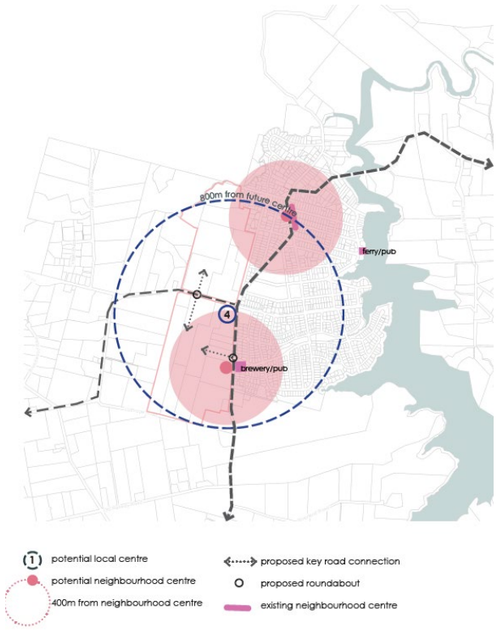
Table 4: Evaluation of Provisions – Theme 1.3: Residential Land Use Pattern – Higher Density Residential Area

	Option 1 – Mixed Housing Urban Zone	Option 2 – Terrace Housing and Apartment Buildings Zone	Option 3 – Proposed Plan Change
Description of Option	This option involves applying the Mixed Housing Urban zone to enable residential development at medium density. 	This option involves applying the Terrace Housing and Apartment Building zone to enable residential development at higher densities, with an urban built character of 16m. 	This option involves applying a refined set of provisions to enable residential development at higher densities, with an urban built character of 16m-18m. 
Benefits			
Environmental	This option provides for medium density development close to the proposed centre which is more in keeping with existing Riverhead settlement.	This option provides for high density development to make efficient use of land in close proximity to the proposed local centre and public transport. This proposal enables high density development around the local centre, while applying the MHU zone to land adjacent to existing properties along Cambridge Road to minimise effects on the Single House zoned properties.	This option provides for high density development to make efficient use of land in close proximity to the proposed local centre and public transport. This proposal enables high density development around the local centre, while applying the MHU zone to land adjacent to existing properties along Cambridge Road to minimise effects on the Single House zoned properties. This option provides for a transition in height between the THAB zone and the surrounding Mixed Housing Urban zoned land subject to the proposed two storey height limit to manage amenity and built form effects.
Economic	This option will provide for the least residential capacity within Riverhead compared with the other options.	This option will provide for the greatest level of residential capacity of all the options, supporting competitive development markets.	This option provides for a range of housing typologies that will result will result in a range of housing prices, some of which will be affordable for the area.

	Option 1 – Mixed Housing Urban Zone	Option 2 – Terrace Housing and Apartment Buildings Zone	Option 3 – Proposed Plan Change
Social	This option will provide some opportunity for terraces and walk-up apartments within the Mixed Housing Urban zone however, it will not provide the range of housing typologies and choice provided for through Option 2 or 3.	This option provides for a range of housing typologies and choice to meet the diverse needs of the Riverhead population. It will enable a package of provisions that can support the development of a retirement village and development yields that can support the development of additional community facilities. The scale of development will increase the long-term population with a greater area of high density residential zoning, and consequently the social benefits associated with intensification and use of community facilities.	This option provides for a range of housing typologies and choice, including a retirement village, to meet the diverse needs of the Riverhead population. It will enable development yields that can support the development of additional community facilities.
Cultural	There are no cultural benefits associated with this option.	There are no cultural benefits associated with this option.	There are no cultural benefits associated with this option.
Costs			
Environmental	The proposed zoning layout will result in medium density residential development which is an inefficient use of land in areas of the Plan Change area that are within walking distance to the proposed local centre and public transport.	This option does not provide for a transition in height between the THAB zone and the surrounding Mixed Housing Urban zoned land subject to the proposed two storey height limit. This could result in adverse amenity and built form effects.	Potential effects on adjoining properties and surrounding land uses as a result of urban development at a greater height and density than what is currently provided for within Riverhead but not to the same extent as Option 2. The extent of THAB adjacent to the existing Riverhead settlement has been limited in order to manage the interface to Single House development along Cambridge Road.
Economic	This option will limit the range of housing types and price points available within Riverhead. Costs involved in undertaking the development and delivery of infrastructure.	This option will result in the application of residential zones that have not been sized to meet the short to medium-term market demand and infrastructure availability. Costs involved in undertaking the development and delivery of transport infrastructure necessary to service a higher density lived zoned residential area.	Costs involved in undertaking the development and delivery of infrastructure.
Social	This option will limit the range of housing types including the ability to develop a retirement village to meet the community's diverse needs within Riverhead.	The scale of development delivered through this option may be considered by some members of the community to not be in keeping with the community's expectations, given the Single House zoning that currently applies within Riverhead.	The scale of development delivered through this option may be considered by some members of the community to not be in keeping with the community's expectations given the Single House zoning that currently applies within Riverhead. This scale of development is potentially not as great as Option 2 and the extent of THAB adjacent to the existing Riverhead settlement has been limited in order to manage the interface to Single House development along Cambridge Road.
Cultural	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.
Efficiency & Effectiveness	This option is not efficient and effective at achieving B2.3.1 (1) as the zoning pattern has not been informed by a Structure Plan and therefore does not respond to the intrinsic qualities and physical characteristics of the site and area. This option does not efficiently use land within an 800m walkable catchment to the proposed local centre and therefore is not consistent with B2.3.1 (1).	This option is not efficient and effective at achieving B2.3.1 (1) as the zoning pattern has not been informed by a masterplan and therefore does not respond to the intrinsic qualities and physical characteristics of the site and area.	This option is efficient and effective at achieving B2.4.1 (1) and B2.4.1 (3) as the THAB zone has been applied to support the efficient use of land within an 800m walkable catchment to the proposed local centre and public transport. This will support quality compact urban form outcomes. This option is efficient and effective at achieving B2.3.1 (1) as the zoning pattern has been informed by a masterplan and therefore responds to the intrinsic qualities and physical characteristics of the site and area. This option will efficiently and effectively achieve B2.4.1 (4) as it enables the development of a variety of typologies to support greater housing capacity and choice.

	Option 1 – Mixed Housing Urban Zone	Option 2 – Terrace Housing and Apartment Buildings Zone	Option 3 – Proposed Plan Change
Summary	Option 3 is preferred. The proposed zoning layout has been informed by a Structure Plan to respond to the characteristics of the Plan Change area and enables efficient use of land around the proposed Local Centre, supporting transport mode shift and quality compact outcomes while delivering additional residential capacity.		

Table 5: Evaluation of Provisions – Theme 1.3: Commercial Land Use Pattern

	Option 1 – Rely on the existing Riverhead Local Centre and a new Neighbourhood Centre	Option 2 – Establish a Local Centre north of Riverhead Road and a Neighbourhood Centre on Coatesville-Riverhead Highway	Option 3 – Establish a Local Centre opposite Hallertau and a Neighbourhood Centre on Riverhead Road.	Option 4 – Proposed Plan Change – Establish a Local Centre south of Riverhead Road and a Neighbourhood Centre on Coatesville-Riverhead Highway
Description of Option	This option involves relying largely on the existing Local Centre within Riverhead (possibly expanded) to service the Plan Change area, with the addition of a Neighbourhood Centre. 	This option involves applying a Local Centre within the Plan Change area to the north of Riverhead Road, with a supporting Neighbourhood Centre on Coatesville-Riverhead Highway. 	This option involves applying a Local Centre within the Plan Change area opposite Hallertau, with a supporting Neighbourhood Centre on Riverhead Road. 	This option involves applying a Local Centre within the Plan Change area to the south of Riverhead Road, with a supporting Neighbourhood Centre on Coatesville-Riverhead Highway. 
Benefits				
Environmental	This option will utilise the existing Local Centre which is visible to passers-by, has on-street parking and is part of the existing community; within good proximity to Riverhead Tavern, the existing community hall and the coastal environment.	Most of the Plan Change area falls into an accessible 800m walkable catchment to the Local Centre and Neighbourhood Centre. The centres can access the upgraded walking network and cycleways which will be delivered as part of the Plan Change.	This option will enable the development of a Local Centre that can be accessed via pedestrian and cycle paths to be delivered as part of the Plan Change.	Most of the Plan Change area falls into an accessible 800m walkable catchment to the Local Centre and Neighbourhood Centre. The centres can access the upgraded walking network and cycleways which will be delivered as part of the Plan Change.
Economic	Future development will support the existing centre within Riverhead, however there is limited opportunity for growth and economic analysis undertaken in	A full size centre can be planned/accommodated as well as a future Neighbourhood Centre to service growth within the Plan Change area. The sizing of the centre may, however, in reality, be limited within this	A full size centre can be planned/accommodated as well as future Neighbourhood Centre to service growth within the Plan Change area.	A full size centre can be planned/accommodated as well as future Neighbourhood Centre to service growth within the Plan Change area.

	Option 1 – Rely on the existing Riverhead Local Centre and a new Neighbourhood Centre	Option 2 – Establish a Local Centre north of Riverhead Road and a Neighbourhood Centre on Coatesville-Riverhead Highway	Option 3 – Establish a Local Centre opposite Hallertau and a Neighbourhood Centre on Riverhead Road.	Option 4 – Proposed Plan Change – Establish a Local Centre south of Riverhead Road and a Neighbourhood Centre on Coatesville-Riverhead Highway
	support of this Plan Change identified the need for an additional Local Centre.	location due to the presence of the planned retirement village.		
Social	The current Local Centre is within close proximity to existing social facilities, including the childcare facility. There is an established sense of place within the existing Local Centre.	The Local Centre has been sized to meet the needs of the local community, however, in reality, the size of the centre may be limited within this location due to the proposed retirement village.	The Local Centre has been sized to meet the needs of the local community. This option co-locates the centre with the Hallertau Brewery which is an existing landmark within Riverhead, to foster a sense of place and identity.	The Local Centre has been sized to meet the needs of the local community. This option is adjacent to a proposed retirement village increasing the accessibility to retail and commercial services for elderly residents.
Cultural	There are no cultural benefits associated with this option.	There are opportunities within a new centre to incorporate Te Aranga design principles into the design of publicly accessible spaces.	There are opportunities within a new centre to incorporate Te Aranga design principles into the design of publicly accessible spaces.	There are opportunities within a new centre to incorporate Te Aranga design principles into the design of publicly accessible spaces.
Costs				
Environmental	The existing Local Centre within Riverhead is not within an 800m walkable catchment of the southern portion of the Plan Change area, resulting in increased car reliance and associated environmental costs. The existing centre is not connected to cycleways and upgraded walking network which will be delivered as part of the Plan Change.	The roundabout at Coatesville- Riverhead Highway and Riverhead Road will need to be designed to prioritise the safety of pedestrians accessing the centre.	The northern portion of the Plan Change area is not within an accessible catchment to the proposed Local Centre, resulting in increased car reliance and associated environmental costs.	The roundabout at Coatesville- Riverhead Highway and Riverhead Road will need to be designed to prioritise the safety of pedestrians accessing the centre.
Economic	The current Local Centre is constrained, and economic analysis undertaken in support of this Plan Change identified the need for an additional Local Centre.	The sizing of the Local Centre may be limited due to the planned retirement village on this site. Therefore, it is unlikely the Local Centre will meet the size requirements for Riverhead as indicated in the economic analysis (**Appendix 7**) within this location.	The existing Local centre may decline, however it is currently constrained and economic analysis undertaken in support of this Plan Change identified the need for an additional Local Centre to service growth within the Riverhead catchment.	The existing Local centre may decline, however it is currently constrained and economic analysis undertaken in support of this Plan Change identified the need for an additional Local Centre to service growth within the Riverhead catchment.
Social	The current Local Centre is constrained, and therefore there will be less opportunity for supporting social facilities to establish within the centre. Expansion would occupy land currently used for residential purposes.	The ability to achieve the required size of the Local Centre specified within the economic report is constrained within this location. Therefore, there will be less opportunity for supporting social facilities to establish within the centre.	The Local Centre within this option is less accessible for the proposed retirement village residents.	This option does not co-locate the proposed Local Centre with existing community facilities or landmarks and therefore will not benefit from an established sense of place.
Cultural	There is less opportunity to incorporate Te Aranga design principles into the design of publicly accessible spaces within the centre.	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.	There are no cultural costs associated with this option.
Efficiency & Effectiveness	This option is inefficient as the commercial zones are not sized to meet current and future demands (B2.5.1(1)). This option is less effective at achieving H11.2(4) and H12.2(4) than the other options as the existing Local Centre is not within an 800m walkable catchment for the southern portion of the Plan Change area.	This option is inefficient as the proposed retirement village will constrain the development of a Local Centre to a size that is not sufficient to meet current and future demands (B2.5.1 (1)).	This option is not as effective at achieving H11.2(4) and H12.2(4) as the other options, as the proposed Local Centre is not within an 800m walkable catchment for the northern portion of the Plan Change area.	This option is efficient as the proposed Local Centre zone has been sized to meet current and future demands (B2.5.1(1)). This option is effective at achieving H11.2(4) and H12.2(4) as most of the Plan Change area falls into an accessible 800m walkable catchment to the Local Centre and Neighbourhood Centre.

	Option 1 – Rely on the existing Riverhead Local Centre and a new Neighbourhood Centre	Option 2 – Establish a Local Centre north of Riverhead Road and a Neighbourhood Centre on Coatesville-Riverhead Highway	Option 3 – Establish a Local Centre opposite Hallertau and a Neighbourhood Centre on Riverhead Road.	Option 4 – Proposed Plan Change – Establish a Local Centre south of Riverhead Road and a Neighbourhood Centre on Coatesville-Riverhead Highway
Summary	Option 4 is preferred. The proposed zoning layout has been informed by a Structure Plan to respond to the characteristics of the Plan Change area. The Local Centre zone has been sized to meet current and future demands (B2.5.1(1)) and most of the Plan Change area falls within an accessible 800m walkable catchment to improve community access to good, services and community facilities in accordance with H11.2(4) and H12.2(4).			

8.3.2 Theme 2: Coordinating the development of land with transport and three waters infrastructure

The existing AUP objectives and proposed precinct objectives which have particular relevance for Theme 2 include:

- B2.2.1(5): The development of land within the Rural Urban Boundary, towns, and rural and coastal towns and villages is integrated with the provision of appropriate infrastructure;
- B3.2.1(5): Infrastructure and land use planning are integrated to service growth efficiently;
- B3.3.1(1)(b): Effective, efficient and safe transport that integrates with and supports a quality compact urban form;
- E27.2(1): Land use and all modes of transport are integrated in a manner that enables: (a) the benefits of an integrated transport network to be realised; and (b) the adverse effects of traffic generation on the transport network to be managed; and
- IX.2(5): Subdivision and development are coordinated with the supply of sufficient transport, water, energy and communications infrastructure.

Table 6: Evaluation of Provisions Theme 2: Coordinating the development of land with transport and three waters infrastructure in Riverhead.

	Option 1 – Do nothing – no staging provisions	Option 2 - Deferred zoning – when all the local infrastructure upgrades are operational	Option 3 – Proposed Plan Change
Description of Option	This option involves putting in place urban zoning and coordinating the development of land with transport and three waters infrastructure through processes and agreements which sit outside of the AUP.	This option involves putting in place urban zonings with a precinct that applies the Future Urban Zone provisions until a certain date from which the urban zone provisions will take effect. The date will be based on the point in time when all required local infrastructure upgrades are projected to be complete.	This option coordinates development with the delivery of required infrastructure within the AUP through: • Transport infrastructure staging rules to coordinate the occupation of buildings with the delivery of required infrastructure; and • A road widening setback rule along Riverhead Road to provide for future widening; and • Additional assessment criteria to ensure there is adequate wastewater/water supply infrastructure to service development.
Benefits			
Environmental	Potentially avoids the complexity in the planning provisions associated with Options 2-3, although relying on existing operative zone provisions will also add complexities	This option will ensure that no development occurs prior to the necessary infrastructure being in place to service growth.	This option provides for interim development to increase residential and commercial capacity which can be serviced without the final infrastructure upgrades required to support a full build out of the Plan Change area.
Economic	Removes the cost of developing rules for the applicant.	The administration of this rule is less complex than Option 3.	This option enables consenting to progress for land modification or development, which would will reduce unnecessary delays in the development process. This option allows for staged development to proceed, providing associated economic benefits.
Social	Existing rules are retained and community expectations are maintained.	This option provides more certainty to the community than option 1 as there is assurance that development cannot occur until infrastructure is in place.	This option provides the most certainty to the community as the scale of development is tied to specific infrastructure upgrades. This option allows for staged development to proceed, providing associated social benefits, including the potential provision of a school and other social facilities.
Cultural	There is no change to the cultural environment through this option.	There is no change to the cultural environment through this option.	There is no change to the cultural environment through this option.
Costs			
Environmental	The lack of recognition within the AUP of the required infrastructure may result in significant environmental costs if development was to proceed the required infrastructure upgrades. Management of environmental issues would be reliant on the requirement for an ITA under clause E27.3(2) and E27.9(5) and three waters issues under criteria E38.11.2(2)(6)(a)(ii), E38.11.2(2)(7)(b)(i), H6.8.2(2)(a)(j), and H4.8.2(2)(h) and provides less certainty than Options 2 and 3.	This option does not provide for interim development to increase residential and commercial capacity despite the traffic modelling determining the timing of the transport infrastructure upgrades and how these can be coordinated with the release of residential, retail, light industrial and commercial development capacity. This option does not provide for interim development to increase residential and commercial capacity despite the engineering analysis identifying a number of solutions for three water infrastructure.	This option is informed by transport modelling that has determined the timing of the transport infrastructure upgrades and how these can be coordinated with the occupation of residential, retail, light industrial and commercial buildings. This option is informed by engineering analysis identifying a number of solutions for three water infrastructure.

	Option 1 – Do nothing – no staging provisions	Option 2 - Deferred zoning – when all the local infrastructure upgrades are operational	Option 3 – Proposed Plan Change
Economic	This option is heavily reliant on infrastructure/funding agreements that sit outside the AUP. There is nothing in the AUP to tie the release of development capacity with the delivery of transport infrastructure.	This option is blunt and does not enable consenting to progress for land modification or development, which would create unnecessary delays in the development process.	This is a more complex set of provisions which will require greater monitoring by Council than Options 1 & 2. Although there are risks with this approach Council has the ability and technology to monitor this it will just be a matter of putting a system in place.
Social	This option provides no certainty to the community as there is no transparency within the AUP regarding when development will occur.	This option will result in costs to the community as the future urban zoning will not facilitate the development of community facilities to service the existing or future community which can be serviced without the final infrastructure upgrades required to support a full build out of the Plan Change area.	Some members of the community may be disappointed with an increase in traffic volumes. This issue will ultimately arise however, with all options.
Cultural	There is no change to the cultural environment through this option.	There is no change to the cultural environment through this option.	There is no change to the cultural environment through this option.
Efficiency & Effectiveness	This option is ineffective as there are no provisions within the plan to decline applications for development which cannot be serviced by infrastructure, which would not achieve B2.21(5), B3.2.1(5), B3.3.1(1)(b) or E27.2(1).	This option is highly inefficient as traffic modelling shows that the release of residential and commercial development capacity can be coordinated with the transport infrastructure upgrades required to service this growth Therefore, as this option allows for no additional capacity in the interim prior to the completion of the complete infrastructure upgrades it is not in keeping with B3.2.1(5).	This option will efficiently coordinate development with infrastructure and achieve the policy direction of B2.21(5), B3.2.1(5) and B3.3.1(1)(b), because the provisions stage the occupation of buildings with the delivery of required infrastructure.
Summary	Option 3 is preferred. Coordinating the occupation of buildings within the precinct with the delivery of required infrastructure through the inclusion of a transport staging rule and servicing assessment criteria is the most appropriate mechanism for achieving the objectives of the AUP. The proposed provisions will stage the release of development capacity with the delivery of required infrastructure and therefore is consistent with B2.21(5), B3.2.1(5) and B3.3.1(1)(b).		

8.3.3 Theme 3: Achieving Integrated and Quality Development

The existing AUP objectives and proposed precinct objectives which have particular relevance for Theme 3 include:

- B2.3.1(1): A quality built environment where subdivision, use and development do all of the following: (a) respond to the intrinsic qualities and physical characteristics of the site and area, including its setting; (b) reinforce the hierarchy of centres and corridors; (c) contribute to a diverse mix of choice and opportunity for people and communities; (d) maximise resource and infrastructure efficiency; (e) are capable of adapting to changing needs; and (f) respond and adapt to the effects of climate change;
- B2.3.1(3): The health and safety of people and communities are promoted;
- B3.3.1(1): Effective, efficient and safe transport that: (a) supports the movement of people, goods and services… (e) facilitates transport choices, recognises different trip characteristics and enables accessibility and mobility for all sectors of the community;
- E27.2(2): An integrated transport network including public transport, walking, cycling, private vehicles and freight, is provided for;
- E27.2(5): Pedestrian safety and amenity along public footpaths is prioritised;
- E38.2(6) Subdivision has a layout which is safe, efficient, convenient and accessible;
- IX.2(1) Riverhead is a well-functioning urban environment that integrates with the existing Riverhead settlement, the natural environment and respects Mana Whenua values.
- IX.2(2) A variety of housing types and sizes that respond to: (a) Housing needs and demand; and (b) The neighbourhood's planned urban built character.
- IX.2(4) Access to and from the precinct occurs in a safe, effective and efficient manner for all modes of transport.

Table 7: Evaluation of Provisions Theme 3: Achieving Integrated and Quality Development

	Option 1 – Rely on Auckland-Wide and Zone Provisions	Option 2 – Proposed Plan Change
Description of Option	The street network and the provision of open spaces are controlled by the development standards, matters of discretion and assessment criteria in the underlying Auckland-wide provisions (E38 Subdivision – Urban, E27 Transport). This option does not include bespoke provisions to manage the interface between the existing rural environment and development within the Plan Change area. This option does not include bespoke provisions to manage the relationship of development within the Plan Change area to the built character of the existing Riverhead settlement.	The proposed Riverhead Precinct includes a bespoke set of provisions to guide the development of buildings, roads and open spaces within the precinct: • Assessment criteria and precinct plans that guide the layout and design of key structuring elements including the street network and open space. • A policy that encourages the provision of a continuous and connected multi-purpose green corridor through the Plan Change area that integrates stormwater management, passive recreation opportunities and active transport mode connections, to promote the efficient use of land; provides additional amenity for the key north-south and east-west movement networks; promotes ecological linkages through the Precinct; and co-locates smaller open spaces along the multi-purpose green corridor to achieve a connected network of open space; • A policy that encourages higher buildings which will act as marker buildings at the Coatesville-Riverhead Highway and Riverhead intersection, support the legibility of a new centre and reinforce the role of Memorial Park as the heart of the settlement; • A policy that provides for three-storey development within Sub-Precinct B to enable a transition in height between the five and two storey development in the adjacent areas; and enables three storey development within the Mixed Housing Urban zone where sites overlook public open space to take advantage of amenity and outlook of public open spaces and promote passive surveillance;

	Option 1 – Rely on Auckland-Wide and Zone Provisions	Option 2 – Proposed Plan Change
		• More permissive activity statuses for restaurants, cafes, retail, and healthcare facilities within the Residential – Terrace Housing and Apartment Building zone; • A height rule that limits height within the majority of the Mixed Housing Urban zone to 8m (two-storeys) to respond to the existing Riverhead settlement, with three storey development adjoining the Terrace Housing and Apartment Building zone and the Local Centre zone to enable a transition in height between the five and two-storey development in the adjacent areas; • A rural interface setback rule to provide a buffer between residential activities within the precinct and the neighbouring Mixed Rural zone; • Additional assessment criteria for open space to ensure that the open space network integrates with natural features and delivers the north-south and east-west multi-purpose green corridors which are a key structuring element for the precinct and required for stormwater conveyance purposes; and • Additional assessment criteria for the layout and design of roads to ensure a highly connected street layout that integrates with the wider Riverhead area and provides for all modes of transport.

	Option 1 – Rely on Auckland-Wide and Zone Provisions	Option 2 – Proposed Plan Change
Benefits		
Environmental	The street network, the provision of open spaces and the design and layout of development are controlled by the development standards, matters of discretion and assessment criteria in the underlying Auckland-wide and zone provisions.	The precinct provisions implement key structuring elements of the Riverhead Structure Plan, which has been developed to ensure a high-quality development outcome result. The tailored precinct provisions and assessment criteria which implement the Riverhead Structure Plan will result in a built form which reinforces the unique sense of place within Riverhead. The planned open spaces and connected street network will support transport mode shift to active transport modes, as they provide safe and convenient movement to and through the precinct.
Economic	A less complex set of planning provisions will apply within the Plan Change area.	The Plan Change will deliver variety of housing types, which supports competitive markets.
Social	Existing rules are retained and community expectations are maintained.	Expectations and requirements of key stakeholders, landowners and land developers can be clearly set out within the proposed precinct. The provisions increase the amenity values of the Plan Change area as the future residents will enjoy the planned open spaces and connected street network which offers safety to pedestrians and cyclists.
Cultural	This option does not facilitate any improved cultural outcomes.	The precinct provisions implement key structuring elements of the Riverhead Structure Plan which has been informed by ongoing engagement with Te Kawerau a Maki and Ngati Whatua Kaipara.
Costs		
Environmental	No requirement to implement the key structuring element of the Riverhead Structure Plan which responds to the specific characteristics of the Plan Change area and the unique sense of place.	This option will not result in any environmental costs.

	Option 1 – Rely on Auckland-Wide and Zone Provisions	Option 2 – Proposed Plan Change
Economic	Landowners, developers, the Council and community will not have clear expectations about where the future street and open space network will be located.	Cost to future applicants to prepare resource consent applications assessing additional planning provisions and implementing the requirements.
Social	Reduced amenity values as the provisions will not achieve an integrated and quality-built environment which responds to the characteristics of the Plan Change Area to the same extent as Option 2.	This option will not result in any social costs.
Cultural	Reduced cultural values as the provisions will not implement the key structuring elements of the Riverhead Structure Plan which has been informed by ongoing engagement with Te Kawerau a Maki and Ngati Whatua Kaipara.	This option will not result in any cultural costs.
Efficiency & Effectiveness	Ineffective as the indicative primary road network and open space network are not shown in the plan, so piecemeal and ad hoc development may occur. Without the guidance of a precinct, the Plan Change area is unlikely to be developed in a comprehensive and coordinated manner. Area-specific approaches are not considered, which is less effective in achieving B2.3.1(1)(a).	This option is effective as the provisions seek to ensure adequate provision of public open space in accordance with B2.7.1(1). This option is effective as the provisions seek to ensure development provides a connected street network which promotes safe cycling and a walkable urban form, in accordance with B3.3.1(1) and B2.3.1(3). The proposed precinct meets B2.3.1(1)(a) as it ensures that subdivision, use and development will respond to the intrinsic qualities and physical characteristics of the site.
Summary	Option 2 is the preferred option. The inclusion of a refined set of provisions to implement the structuring elements of the Riverhead Structure Plan and require quality-built form outcomes that respond to the unique sense of place enables the Plan Change to efficiently and effectively achieve B2.7.1(1), B3.3.1(1), B2.3.1(3) and B2.3.1(1)(a).	

8.3.4 Theme 9: Natural Environment

The existing AUP and proposed precinct objectives which have particular relevance for Theme 4 include:

- B7.2.1(2): Indigenous biodiversity is maintained through protection, restoration and enhancement in areas where ecological values are degraded, or where development is occurring;
- E3.2(2): Auckland's lakes, rivers, streams and wetlands are restored, maintained or enhanced;
- E15.2(2): Indigenous biodiversity is restored and enhanced in areas where ecological values are degraded, or where development is occurring;
- IX.2(6): Stormwater is managed to avoid, as far as practicable, or otherwise minimise or mitigate adverse effects on the receiving environment; and
- IX.2(7): Identified ecological values within wetland and stream habitats are protected, restored, maintained and enhanced.

Table 8: Evaluation of Provisions Theme 4: Natural Environment

	Option 1 – Rely on Auckland-wide and Zone Provisions	Option 2 – Proposed Plan Change
Description of Option	The natural environment and stormwater quality are controlled by the development standards, matters of discretion and assessment criteria in the underlying Auckland-wide provisions.	The proposed Riverhead Precinct includes provisions to enhance the natural environment: • The requirement of a planted riparian margin along permanent and intermittent streams; • A stormwater quality rule to ensure impervious areas are treated and that development incorporates inert building materials to increase the quality of stormwater runoff; and • Additional assessment criteria for open space to ensure that the open space network integrates with natural features and delivers the north-south and east-west multi-purpose green corridors which provide a green connection between the two riparian and coastal environments.

	Option 1 – Rely on Auckland-wide and Zone Provisions	Option 2 – Proposed Plan Change
Benefits		
Environmental	It is possible to achieve good environmental outcomes under this approach but this will rely largely on non-statutory mechanisms.	This option will enhance the ecological values of streams through requiring planted riparian margins along both sides of permanent and intermittent streams and is consistent with the rule included in other greenfield precincts within the AUP. The requirement to improve stormwater quality will enhance the water quality of receiving environments.
Economic	Less costs associated with developing along streams as there is no requirement to provide riparian planting. A less complex set of planning provisions will apply within the Plan Change area.	This option will not result in any economic benefits.
Social	Existing rules are retained and community expectations are maintained.	Increased aesthetic and amenity values for communities as a result of riparian planting along streams.
Cultural	This option does not facilitate any improved cultural outcomes.	This option will enhance Mana Whenua values associated with water and the natural environment.
Costs		
Environmental	No requirements to provide riparian planting along streams within the Plan Change area and therefore the ecological values of streams will not be enhanced. No requirement to improve stormwater quality could result in the degradation of ecological values of receiving environments.	This option will not result in any environmental costs.
Economic	This option will not result in any economic costs.	The requirement for riparian planting will increase the costs when developing along streams. The requirement to manage stormwater quality through treating impervious areas and incorporating inert building material will increase development costs.

	Option 1 – Rely on Auckland-wide and Zone Provisions	Option 2 – Proposed Plan Change
Social	Reduced aesthetic and amenity values for communities from a lack of riparian planting along streams.	This option will not result in any social costs.
Cultural	Reduced cultural values associated with a lack of indigenous biodiversity along streams.	This option will not result in any cultural costs.
Efficiency & Effectiveness	This option is not efficient or effective and will not achieve B7.2.1(2), E3.2(2) and E15.2(2) as there is no requirement to plant riparian margins along streams and therefore there is no assurance that indigenous biodiversity along streams will be restored to enhance the ecological values of streams.	This option is efficient at achieving B7.2.1(2), E3.2(2) and E15.2(2) as they ensure that indigenous biodiversity along streams is restored to enhance the ecological values of streams while maintaining flexibility for appropriate development of cycle and pedestrian paths.
Summary	Option 2 is the preferred option. The inclusion of a bespoke set of provisions to enhance the natural environment enables the PPC to efficiently and effectively achieve B7.2.1(2), E3.2(2), E15.2(2), IX.2(6) and IX.2(7).	

8.3.5 Theme 5: Mana Whenua Cultural Landscape

The existing AUP and proposed precinct objectives which have particular relevance for Theme 4 include:

- B2.6.1(1): The mauri of, and the relationship of Mana Whenua with, natural and physical resources including freshwater, geothermal resources, land, air and coastal resources are enhanced overall; and
- IX.2(9): Mana Whenua cultural values and their relationship associated with the Māori cultural landscape, including ancestral lands, water, sites, wāhi tapu, and other taonga, in the Riverhead Precinct are identified, recognised, protected, and enhanced.

Table 9: Evaluation of Provisions Theme 5: Mana Whenua Cultural Landscape

	Option 1 – Rely on Auckland-wide and Zone Provisions	Option 2 – Proposed Plan Change
Description of Option	The Mana Whenua Cultural Landscape within the precinct is controlled by the development standards, matters of discretion and assessment criteria in the underlying Auckland-wide provisions.	The proposed Riverhead Precinct includes a bespoke set of provisions to enhance the Mana Whenua Cultural Landscape: • The Riverhead precinct recognises and respects these values of Te Kawerau a Maki and Ngati Whatua Kaipara by incorporating an objective, policy, assessment criteria and precinct plan seeking to recognise and protect the Mana Whenua cultural landscape; and • The Cultural Landscape Plan on Precinct Plan 1 recognises spiritual connections and key views of cultural significance to Te Kawerau a Maki and Ngāti Whatua Kaipara.
Benefits		
Environmental	There is no change to the AUP provisions proposed through this option. Existing rules will apply which will not cover any additional features identified by Te Kawerau a Maki and Ngati Whatua Kaipara on Precinct Plan 1.	This option will protect additional features identified by Te Kawerau a Maki and Ngāti Whatua Kaipara on Precinct Plan 1 not currently protected through the AUP provisions.
Economic	A less complex set of planning provisions will apply within the Plan Change area.	The maintenance and enhancement of many of the values recognised through the Cultural Landscape Plan, such as key views, are likely to have wider benefits in terms of establishing a unique sense of place which will contribute to the identity of Riverhead, attracting visitors into the area.
Social	Existing rules are retained and community expectations are maintained.	The maintenance and enhancement of many of the values recognised through the Cultural Landscape Plan, such as key views, are likely to have wider social benefits.

	Option 1 – Rely on Auckland-wide and Zone Provisions	Option 2 – Proposed Plan Change
Cultural	This option does not facilitate any improved cultural outcomes.	The Riverhead area is notable for its continued association with Te Kawerau a Maki and Ngāti Whatua Kaipara. Fundamental guiding principles for Mana Whenua include the protection of taonga, the restoration of mana to taonga and the retention of wahi tapu and sites of cultural significance. This option recognises and protect these values, resulting in much greater cultural benefits than Option 1.
Costs		
Environmental	This option will not result in any environmental costs.	This option will not result in any environmental costs.
Economic	This option will not result in economic costs.	A more complex set of planning provisions will apply within the Plan Change area. The provisions may restrict development within some areas or result in a more complex design process.
Social	The maintenance and enhancement of many of the values recognised through the Cultural Landscape Plan, such as key views, are likely to have wider social benefits which this option does not provide for.	This option will not result in any social costs.
Cultural	This option does not specifically provide for the protection of taonga, the restoration of mana to taonga and the retention of wahi tapu and sites of cultural significance to Mana Whenua within the Plan Change area to the same extent as Option 2.	This option will not result in any cultural costs.
Efficiency & Effectiveness	This option is not efficient or effective and will not achieve B2.6.1 (1), and IX.2(9) as there is no recognition and protection of the Mana Whenua Cultural Landscape unique to Riverhead.	This option is efficient and effective at achieving B2.6.1 (1), and IX.2(9) as it will ensure Mana Whenua cultural, spiritual and historical values with local history and whakapapa is recognised, protected.
Summary	Option 2 is preferred as it will ensure Mana Whenua cultural, spiritual and historical values with local history and whakapapa is recognised, protected and enhanced and it is most efficient and effective at achieving B2.6.1 (1) and IX.2(9).	

8.4 Risk of acting or not acting

In this case, there is sufficient information about the subject matter of the provisions to determine the range and nature of environmental effects of the options set out in the report above. For this reason, an assessment of the risk of acting or not acting is not required.

8.5 Section 32 Analysis Conclusion

On the basis of the above analysis, it is concluded that:

- The proposed objectives in the Riverhead Precinct are considered to be the most appropriate way to achieve the purpose of the RMA by applying a comprehensive suite of planning provisions to enable appropriate urbanisation of the site;
- The proposed provisions are considered to be the most efficient and effective means of facilitating the use and development of the subject land into the foreseeable future; and
- The proposed provisions are the most appropriate way to achieve the objectives of the AUP and the proposed precinct, having regard to their efficiency or effectiveness and the costs and benefits anticipated from the implementation of the provisions.

9.0 Conclusion

This report has been prepared in support of the RLG's request for a Plan Change to the provisions of the AUP to rezone 80.5 hectares of land to the west of the existing Riverhead settlement for urban activities.

The request has been made in accordance with the provisions of Schedule 1 and Section 32 of the Resource Management Act 1991, and the preparatory work has followed Appendix 1 of the AUP – Structure Plan Guidelines.

Based on an assessment of environmental effects and specialist assessments, it is concluded that the proposed Plan Change will have positive effects on the environment in terms of the social and economic well-being of the community as well as the enhancement and protection of waterways. Other potential effects are able to be managed through the application of the AUP zone and Auckland-wide provisions.

An assessment against the provisions of section 32 of the RMA is provided in section 7.0 of the report. This includes an analysis with respect to the extent to which the objectives of the plan change are the most appropriate to achieve the purpose of the RMA and an examination of whether the provisions of the plan change are the most appropriate way to achieve the objectives.

For the above reasons, it is considered that the proposed Plan Change accords with the sustainable management principles outlined in Part 2 of the RMA and should be accepted and approved.

From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Eanna Geoghegan
Date: Wednesday, 8 May 2024 8:01:00 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Eanna Geoghegan

Organisation name:

Agent's full name:

Email address: eannag@hotmail.co.uk

Contact phone number:

Postal address:
16 Jelas Drive
Riverhead
Auckland 0820

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address: 16 Jelas Drive, Riverhead, Auckland 0820

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
The existing roading and water infrastructure in Riverhead would be unable to cope causing the residents untold stress.
The roads leaving Riverhead are back logged from before 6a.m. on a daily basis, adding an untoward amount of additional traffic would lead to total gridlock both during development and thereafter.
No changes should proceed until the infrastructure has been addressed - the new round about at Boric and Brigham Creek completed.
The current wording is very lose and subject to interpretation meaning the developer could change it and proceed without these integral works being completed.
The sewerage and water systems here are also substandard and outdated and could not withstand this amount of development - again these are prerequisites which must be completed prior to work commencing.
These need to be detailed in the plan in such a manner that it cannot be subject to change.
The above are absolutely non negotiables for the existing residents and without them will cause

undue distress.
Another factor not being addressed is the lack of a high school in the area - all in zone high schools are now at capacity and the lotteries for North Shore schools increasingly limited. 46.1

I or we seek the following decision by council: Approve the plan change with the amendments I requested 46.2 46.3 46.4

Details of amendments: Eanna Geoghegan

Submission date: 8 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Anthony Smith
Date: Friday, 10 May 2024 4:45:35 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Anthony Smith

Organisation name:

Agent's full name:

Email address: antsmith119@gmail.com

Contact phone number:

Postal address:

Auckland

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:

Property address:

Map or maps:

Other provisions:
Entire Plan change

Do you support or oppose the provisions you have specified? I or we support the specific provisions identified

Do you wish to have the provisions you have identified above amended? No

The reason for my or our views are:
This area is the perfect location for growth and is an extension of an existing community. Fully support.

I or we seek the following decision by council: Approve the plan change without any amendments | 47.1

Details of amendments:

Submission date: 10 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

No

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Michael Brent
Date: Sunday, 12 May 2024 8:31:05 am

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Michael Brent

Organisation name:

Agent's full name:

Email address: Michael.brent@washtech.co.nz

Contact phone number:

Postal address:

0793

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
Zone change

Property address:

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
Local infrastructure in the NW including schools and the roading network is already insufficient for the number of current residential properties build and under construction and should be extensively upgraded PRIOR to further housing intensification being added.

I or we seek the following decision by council: Decline the plan change, but if approved, make the amendments I requested | 48.1

Details of amendments: Require significant upgrades to SH16 between Brigham Creek and Kumeu, and ensure adequate primary (keep upgrading) and secondary (build one finally) schools in the NW. | 48.2 48.3

Submission date: 12 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? No

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

No

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Allyson Shepherd
Date: Sunday, 12 May 2024 4:01:07 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Allyson Shepherd

Organisation name:

Agent's full name: Allyson Shepherd

Email address: allyson.shepherd@xtra.co.nz

Contact phone number: 02102756042

Postal address:
12 george street
Riverhead
Riverhead 0820

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
Transport Infrastructure

Property address:

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
I strongly object to the private plan change which aims to rezone 6 ha of land in Riverhead from Future Urban to Rural-Mixed Rural zone and 75.5 ha to a mix of Residential – Mixed Housing Suburban, Residential – Terrace Housing and Apartment Building, Business – Local Centre and Business – Neighbourhood Centre zones with associated precinct provisions

I have lived in Riverhead since 2008 and have seen it change hugely. There have been positive changes but many negative ones and I fear that allowing this development will have a further negative impact on Riverhead and the surrounding areas.

My main concern is a transport/traffic based one. The traffic volume has increased massively since I moved here. There has been masses of residential development, yet the road infrastructure is unchanged since I moved here all those years ago.

The sheer volume of traffic is unbelievable. In the building phase this heavy vehicle activity will affect our already poor roads. The proposal is for limited local road ‘upgrades’. But, to only deliver these in a fragmented staged way. The upgrades do not have to be in place prior to construction (when the first traffic impacts start) but rather linked to when development occurs adjacent to specific roads. I think this is dreadful. All upgrades should be in place before the main site earthworks begin.

Significantly, the project relies upon a roundabout at the (CRH)/ Main Road (SH16) intersection to be constructed by Waka Kotahi NZ Transport Agency. Whilst this upgrade has been a long time coming it only addresses safety at the intersection. We have been waiting for a roundabout for many many years. You only have to look at the traffic jams reaching beyond Hallertau to see how inadequate the infrastructure is. Huapai kumeu traffic (also due to new development without a thought for road quality) also adds to the mix. No road upgrades are proposed to deal with capacity of the local or wider road network. The result will be increased congestion making getting around even more dysfunctional than it is now.

The state of Riverhead has made me desperate to leave Auckland. I love Riverhead but the traffic amount and congestion has really had a negative impact on my well being. I tend to avoid going out on weekends unless I leave very early. If I don’t then the traffic queues to merely leave Riverhwad can be quite awful.

The effects will be felt locally, but also in the wider district. Traveling during peak times from Huapai, Waiuku, Muriwai, Helensville, Kaukapakapa, Coatesville and beyond will get significantly worse due to construction traffic and then when the dwellings are occupied. What about the potential large retirement village, the consent is in place but this hasn’t been considered in the plans.

Also I think it is important to consider schooling. Riverhead does not have a nearby high school, students are required to use public transport (one bus an hour) school buses or parents to get to school, which is either Massey (zoned) or schools on the north shore. Students are very reliant on walking to CRH for public transport. A comprehensive and safe overall footpath network is needed. This does not exist in Riverhead.

No local high school and a primary school that is already running out of space. When my kids went there there were about 280 students. Now there are close to 500. All these new families and the road network is the same as it has been for decades. If more houses are built, where will they go to school? How will they get there? Not on our already pathetic road infrastructure. All the extra cars, all the extra pollution. I am amazed that I am having to make this submission at all. Quite honestly I am appalled by the lack of future proof planning.

I or we seek the following decision by council: Decline the plan change

49.1

Submission date: 12 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? Yes

Would you consider presenting a joint case at a hearing if others have made a similar submission? Yes

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

No

I accept by taking part in this public submission process that my submission (including personal

details, names and addresses) will be made public.

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From: Unitary Plan
To: Unitary Plan
Subject: Unitary Plan Publicly Notified Submission - Plan Change 100 (Private) - Shanley Joyce
Date: Sunday, 12 May 2024 6:16:07 pm

The following customer has submitted a Unitary Plan online submission.

Contact details

Full name of submitter: Shanley Joyce

Organisation name:

Agent's full name:

Email address: shanleyjoyce@hotmail.com

Contact phone number: 0211454806

Postal address:
10 Floyd Road
Riverhead
Auckland 0820

Submission details

This is a submission to:

Plan change number: Plan Change 100 (Private)

Plan change name: PC 100 (Private): Riverhead

My submission relates to

Rule or rules:
I have concerns about the proposed plan changes for the following reasons:
- lack of planning for adequate roading and stormwater management infrastructure
- lack of planning to ensure the new plans reflect the current community.

Property address:

Map or maps:

Other provisions:

Do you support or oppose the provisions you have specified? I or we oppose the specific provisions identified

Do you wish to have the provisions you have identified above amended? Yes

The reason for my or our views are:
The current stormwater infrastructure does not cope with the rainfall we have, this was evident in the floodings around Riverhead in 2023. The current Ecoflow sewerage systems do not cope with any significant rainfall, their alarms regularly go off with significant rainfall. The proposed plan changes do not provide any faith that there will be better, more suitable systems in place to avoid flooding.

Coatesville Riverhead Highway (CRH) is nearly always congested with traffic heading out onto SH16 between the hours of 6:30-8am. In the weekends, the traffic can be backed up all the way to the golf club. By adding hundreds more houses into the area, this traffic is only going to become worse.

In the plans, I would have expected to see better planning for walkways/footpaths/bike paths to support our children walking/biking to school. CRH is such a dangerous road for our kids to be travelling along and by adding more housing and therefore traffic, this will be an even more dangerous route for them to take.

The current footpath, parking situation around the Riverhead Memorial Park is not sufficient as it is, at peak times on weeknights or in the weekends it is a real struggle to find a park and a lot of the time you need to park over ditches in roads, this can become problematic. Again, better planning for this needs to be evident in the proposed plan changes.

Lastly, I have real concerns that the new plan does not reflect the current community with green spaces, large existing trees, and single housing plans. Surely the planning should try to marry the new subdivisions with the existing Riverhead community. This is not currently evident and needs to change.

I or we seek the following decision by council: Decline the plan change, but if approved, make the amendments I requested

50.1
50.2
50.3
50.4
50.5

Details of amendments: See above.

Submission date: 12 May 2024

Attend a hearing

Do you wish to be heard in support of your submission? Yes

Would you consider presenting a joint case at a hearing if others have made a similar submission? Yes

Declaration

Could you gain an advantage in trade competition through this submission? No

Are you directly affected by an effect of the subject matter of this submission that:

- Adversely affects the environment; and
- Does not relate to trade competition or the effects of trade competition.

Yes

I accept by taking part in this public submission process that my submission (including personal details, names and addresses) will be made public.

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