Mt Welcome Residential Subdivision

Integrated Transport Assessment

Prepared for:
Pukerua Property Group Limited Partnership

Prepared by:
Stantec New Zealand

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Reviewed by: Jamie Whittaker

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While this is not a matter before the Environment Court, the authors of this report have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code'). The authors have complied with the Code in the preparation of this report.

The data, information, facts and assumptions the authors have considered as part of this report are set out in this report. The reasons for the conclusions of this report are also set out in this report. Unless stated otherwise, this report is within the author's expertise and the authors have not omitted to consider material facts known to them that might alter or detract from the opinions expressed.

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1 Introduction

Stantec has been commissioned by Pukerua Property Group Limited Partnership (PPGLP) to examine and describe the traffic and transport needs and effects of an application to develop a portion of land (the “Site”) known as Mt Welcome to the south of Pukerua Bay, for the creation of approximately 949 residential allotments, as well as a neighbourhood centre and associated infrastructure, including wastewater storage facilities, roading, and improved pedestrian and cycle trails to Pukerua Bay Village. The proposal also includes facilitatory works such as bulk earthworks.

The proposal Site covers approximately 205.6-hectares of land to the south of Pukerua Bay and forms part of Porirua City Council’s (PCC) ‘Northern Growth Development Area’ (NGDA). Following the PCC-led Variation 1 which was approved and adopted in November 2023, the majority of the Site is now zoned ‘medium density residential’ under the recently adopted and now Operative Porirua District Plan 2025 (District Plan).

The project is listed in Schedule 2 of the Fast Track Approvals Act (FTAA) and a substantive application is to be lodged accordingly.

This Integrated Transport Assessment (ITA) has been prepared to accompany the substantive application and provides an overview of the traffic and transportation investigations associated with the proposed development at the Site to deliver approximately 949 new dwellings. It has been progressed with due regard to the transport provisions of the District Plan and other relevant industry standards. Accordingly, this report addresses the following key matters:

- the existing transport environment in the vicinity of the Site, including roading arrangements and traffic flows, public transport amenity and access, as well as active mode networks;
- the proposal plans for developing the Site and its associated new internal transport infrastructure;
- the level of expected traffic generated by the proposed development and its distribution on the surrounding network;
- the proposed access strategy for the Site in connecting to SH59 as well as active mode connections to the wider networks;
- the impact of development traffic on the adjacent road network, including intersection analysis at the Site’s immediate access to State Highway 59 (SH59) and the key Highway roundabout to the south at Plimmerton to determine the road infrastructure performance with the development traffic added; and
- the relevant transport provisions of the District Plan.

By way of summary, this assessment finds that the proposed residential development of the Site can be delivered in a manner that ensures the Site-generated transport demands can be appropriately and safely accommodated, and that potential traffic-related effects arising from the development can be managed by conditions to ensure they are acceptable.

2 Site Context and Location

The Site, which is located to the south of Pukerua Bay and immediately east of SH59, is illustrated in the aerial photograph shown in **Figure 2-1** below along with the surrounding transport environment. The new State Highway 1 (SH1) Transmission Gully Motorway (TGM) alignment, which has superseded SH59 as the key strategic north-south route through the district, is shown to the east.

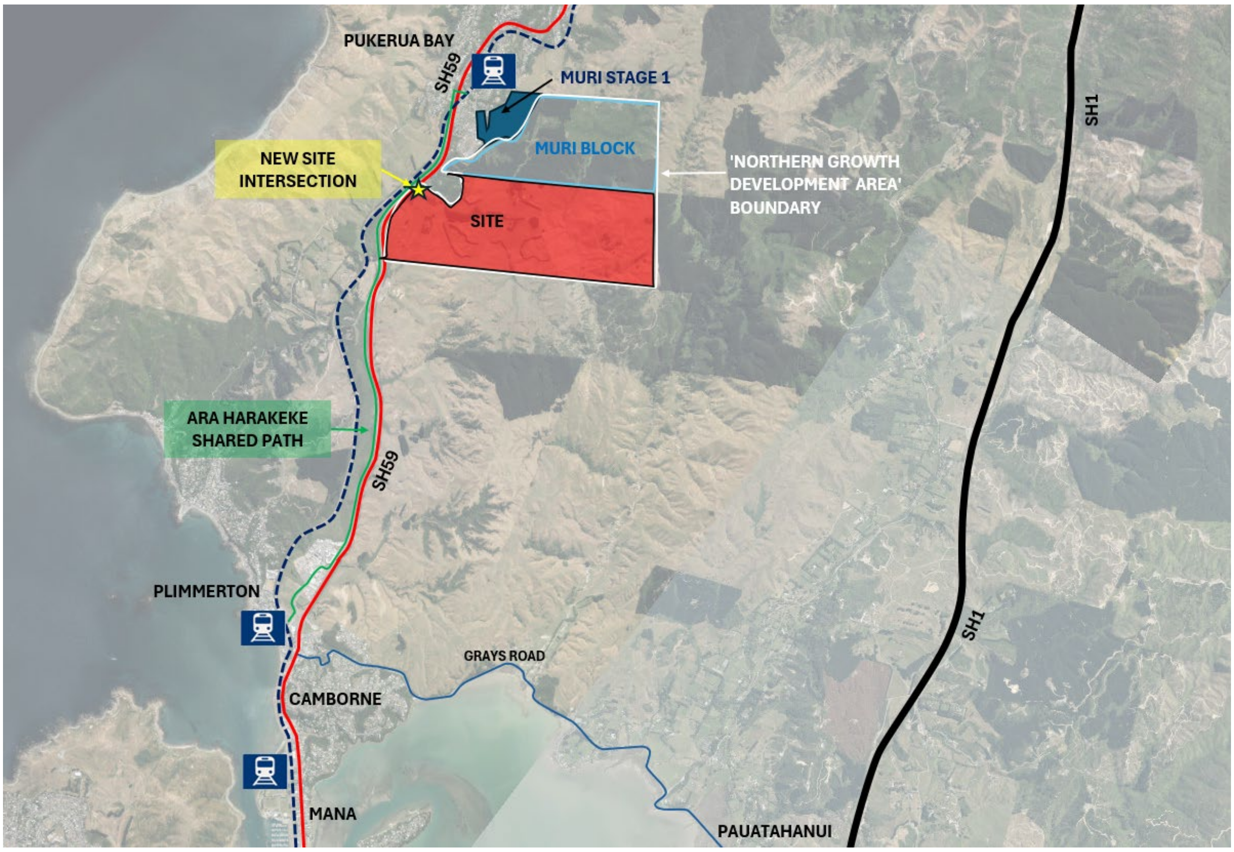

Figure 2-1: Site Location (Source: PCC GIS)

The Site at present is largely farmland except for some lifestyle blocks. Access to these dwellings and the wider property is achieved via a shared driveway connection to SH59, which comprises the only road to which the Site has frontage and legal access to.

As shown in Figure 2-1, the development Site and the adjacent Muri Block are located within the NGDA. The underlying zoning is illustrated in **Figure 2-2**, with the Site predominantly classified as 'Medium Density Residential Zone', with a portion classified as 'Neighbourhood Centre Zone' and the remainder zoned 'Rural Lifestyle Zone'. Further detail on the zoning and NGDA provisions are described later at Chapter 4.

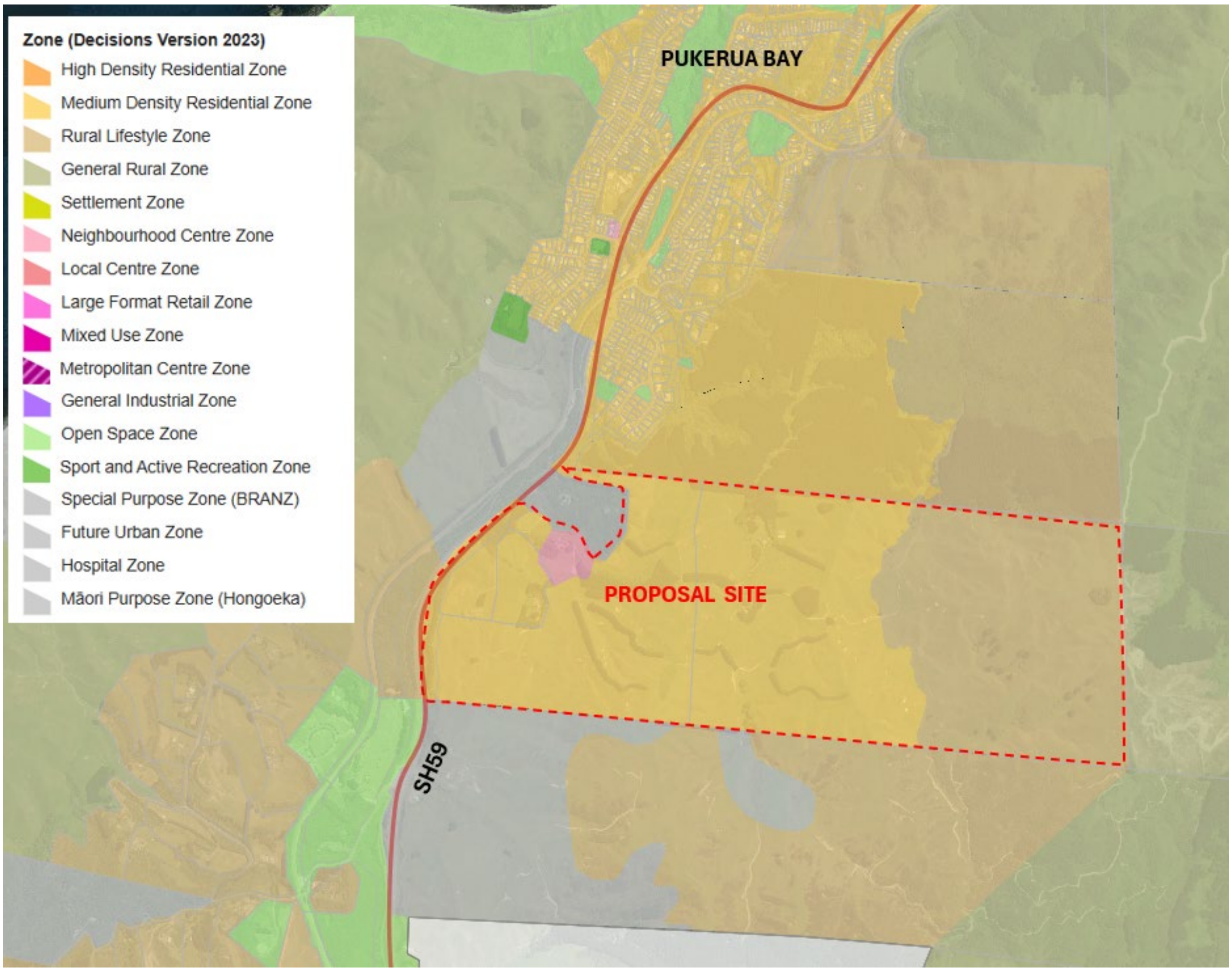

Figure 2-2: District Plan Zoning (Source: PCC District Plan Maps)

3 Existing Transport Environment

3.1 Roading Hierarchy

3.1.1 ONRC Classification

Figure 3-1 below shows the location of the Site in the context of the surrounding road network as defined under the District Plan Schedule 1, noting the District Plan adopts the road network hierarchy and associated road 'classifications' of the New Zealand Transport Agency Waka Kotahi (NZTA) 'One Network Road Classification' (ONRC) system.

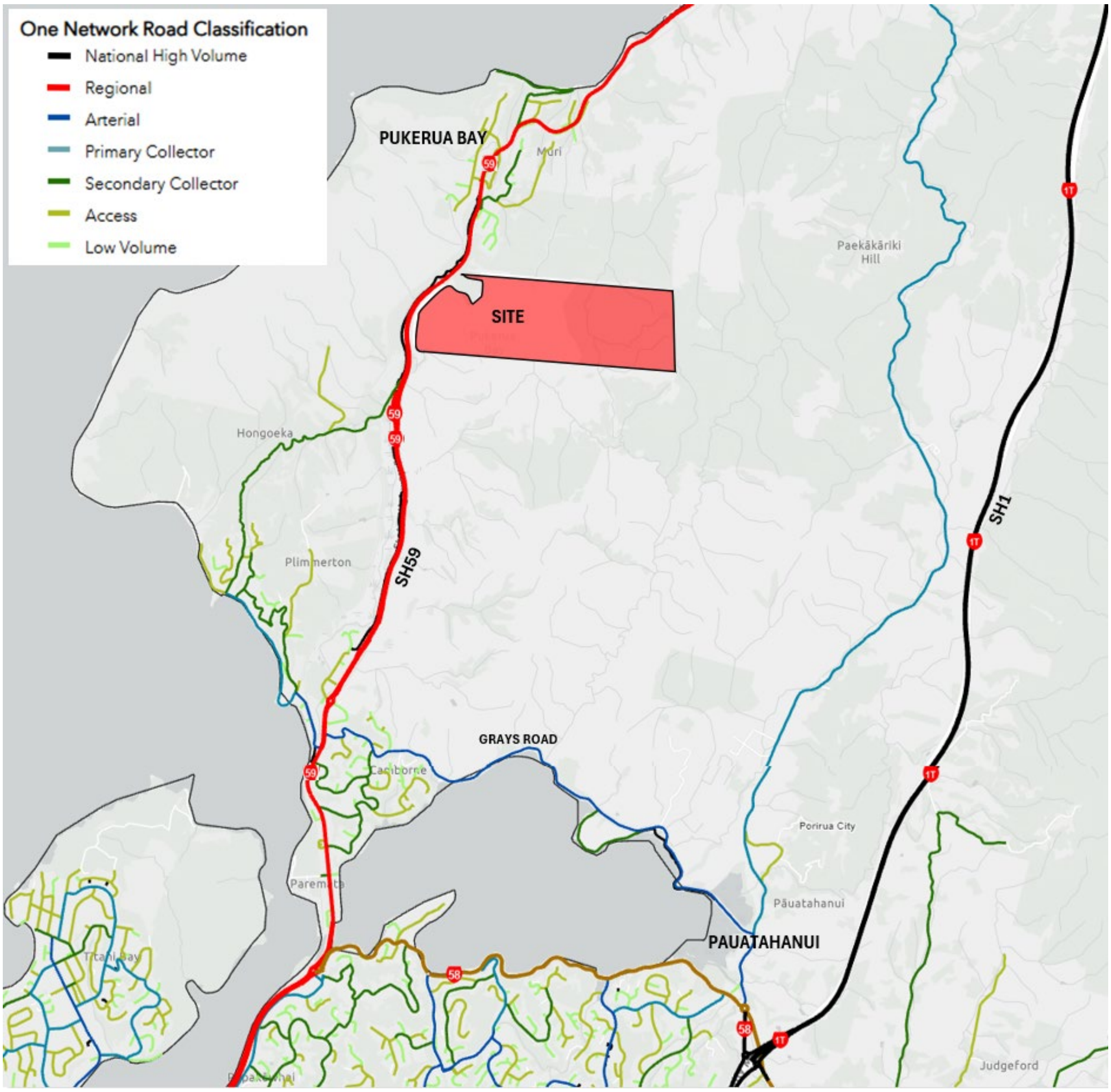

Figure 3-1: Roading Hierarchy

As shown, SH59 (formally SH1) is classified as a 'Regional' route. Such roads serve as major connectors between urban areas as well as linking with the wider primary road network, such as national and high volume routes. As described further below, the function of the road corridor fronting the Site has changed during its transition from SH1 to SH59 (and opening of TGM) which saw an associated significant reduction in traffic volumes. It is understood through engagement with NZTA that no changes are currently proposed to the established road corridor at this time and that it will continue to operate in its present form as well as serving as a resilience route for SH1. Discussions with PCC indicate they are beginning work on a broader masterplan for the wider 'Northern Growth Area' (NGA), which includes the NGDA as well as Plimmerton Farm and the neighbouring Skaiffe Block to the south. This project could include changes to 'urbanise' parts of the SH59 corridor south of Pukerua Bay, presenting opportunities for improved integration with the Site.

Grays Road to the south of the Site is classified as an Arterial Road and provides for traffic access between SH59 and the SH1 / SH58 interchange at Pauatahanui, in turn connecting with Wellington to the south and the Hutt Valley (and SH2) to the east.

SH1 TGM to the east operates as a National High Volume route, and therefore has a predominant function of connecting major population centres and serving as a key freight route. The opening of this inland alignment has, as described further below, triggered a step reduction in traffic along the SH59 route past the Site.

3.1.2 One Network Framework

Whilst the District Plan adopts the ONRC system for classifying roads, NZTA currently uses the more recent 'One Network Framework' (ONF) system. The ONF views roads not just as movement corridors but considers their functions of providing for both 'place' and 'movement' to achieve safe and liveable communities. Under the ONF, SH59 adjacent to the Site is classified as an 'Interregional Connector', which changes to 'Urban Connector' where it reaches the edge of Pukerua Bay to the north.

An Interregional Connector is described under the ONF as having a 'movement' priority with limited access to adjacent land use. The road alignment may be either straight or curved, typically has low levels of roadside activity, can include dual carriageway sections, and is subject to a wide range of safe and appropriate speeds from 60kph to 110kph.

An Urban Connector (which forms the section of SH59 that runs through Pukerua Bay) is again described as having a movement priority function in connecting different parts of an urban area. These roads can include major routes for people cycling and will have safe and appropriate speeds of between 40kph and 60kph, depending on the level of adjacent activity.

As demonstrated by the ONF classifications above, the current 'interregional connector' classification of SH59 adjacent to the Site (and onto which the new internal road network will connect) is reflective of the current rural land use along this portion of the SH59 corridor. A reclassification of the road function and extension of the Urban Connector from Pukerua Bay south towards the Site could deliver a more urbanised corridor and in turn support a reduced speed limit.

Notwithstanding the above, for the purposes of this application the access strategy proposed for the Site has been progressed on the basis of the current SH59 road classification and posted speed limit.

3.2 SH59 Road Environment

The current road environment on SH59 in the vicinity of the Site includes dual northbound and southbound lanes separated by central median island and wire rope barrier. This cross section reduces to a single traffic lane in each direction with painted flush median approximately 100m south of the existing Site access driveway. In this manner, northbound vehicles accessing the Site at present use the flush median to wait for gaps in southbound traffic, before undertaking the right turn in. These existing arrangements are illustrated in the aerial photograph included at **Figure 3-2**.

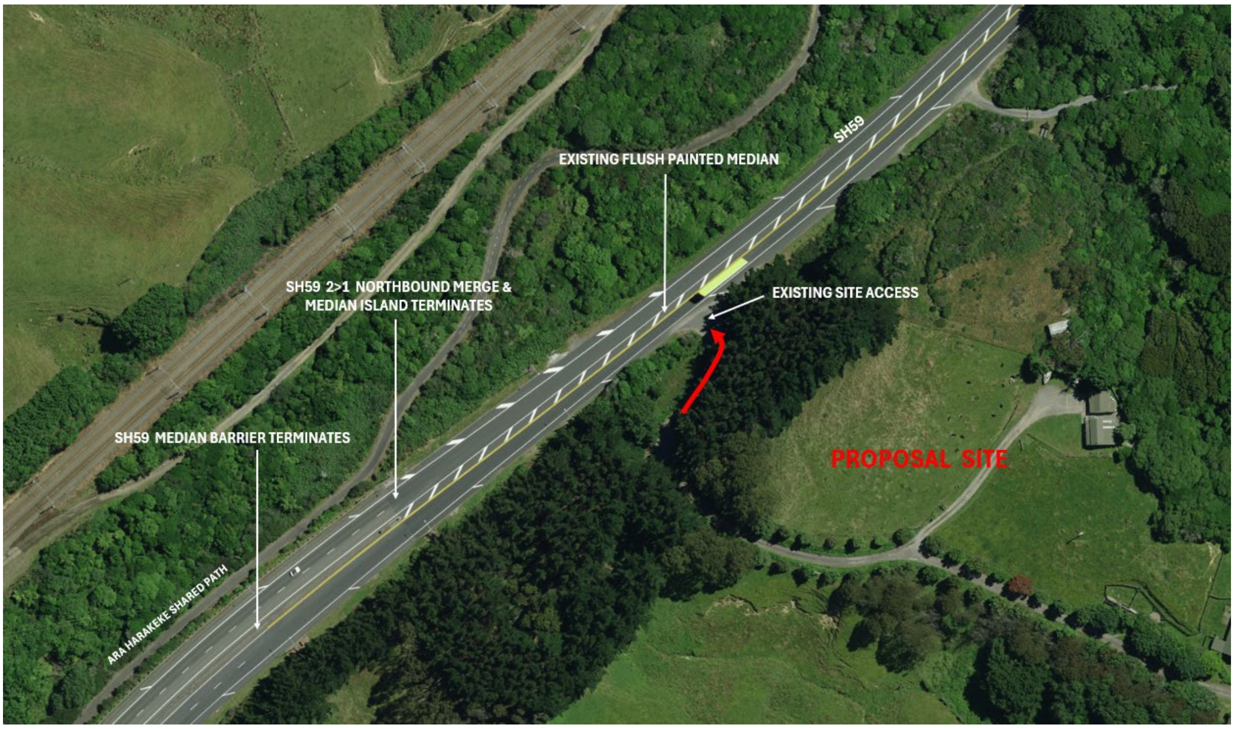

Figure 3-2: Existing Site Access to SH59

The posted speed limit on the Highway adjacent to the Site is 100kph, reducing to an urban 50kph limit at Pukerua Bay approximately 670m to the north of the current Site access driveway.

Given its rural context, there are no footpath or cycle provisions within the Highway corridor. However, the Ara Harakeke shared path (which also forms part of the Araroa trail) to the west of the road alignment provides an off-road walking and cycling connection between Plimmerton to the south and Pukerua Bay to the north, in turn facilitating access to the two rail stations in each of these urban centres.

3.3 Site Access at SH59

An access strategy for connecting the proposed Site development to SH59 is set out later at Chapter 7 and envisages a two-staged approach, involving improvements to formalise the current priority tee-intersection arrangement to facilitate some construction traffic and initial residential development traffic, prior to upgrading to a three-arm roundabout to serve the fuller development Site.

A portion of the adjacent Muri Block development to the north cannot access SH59 via Muri Road and is anticipated to utilise the new internal Site main spine roads and external connection to SH59. The proposed future roundabout has been sized to accommodate the combined traffic loadings as described further at Section 10.3.

The transport network in the immediate vicinity of the Site has undergone a significant change following the opening of the TGM in March 2022. The opening of the TGM and transferral of the SH1 status and the majority of north-south regional trips to this new inland motorway, has resulted in daily traffic volumes adjacent to the Site on SH59 reducing by around two-thirds. This step reduction in traffic volumes on the immediate network presents opportunities to accommodate new traffic growth from localised development such as that proposed on the Site.

3.4 Current Traffic Volumes

Daily traffic volume data has been sourced from the NZTA 'Traffic Monitoring System' (TMS) database for the period 2022 to 2025 (capturing before and after TGM opened in early 2022)). The count sites of 05900014 (1km to the south of the Site) and 05900011 (1.6km to the north of the Site) have been analysed, with the respective daily traffic flows illustrated in **Figure 3-3** below.

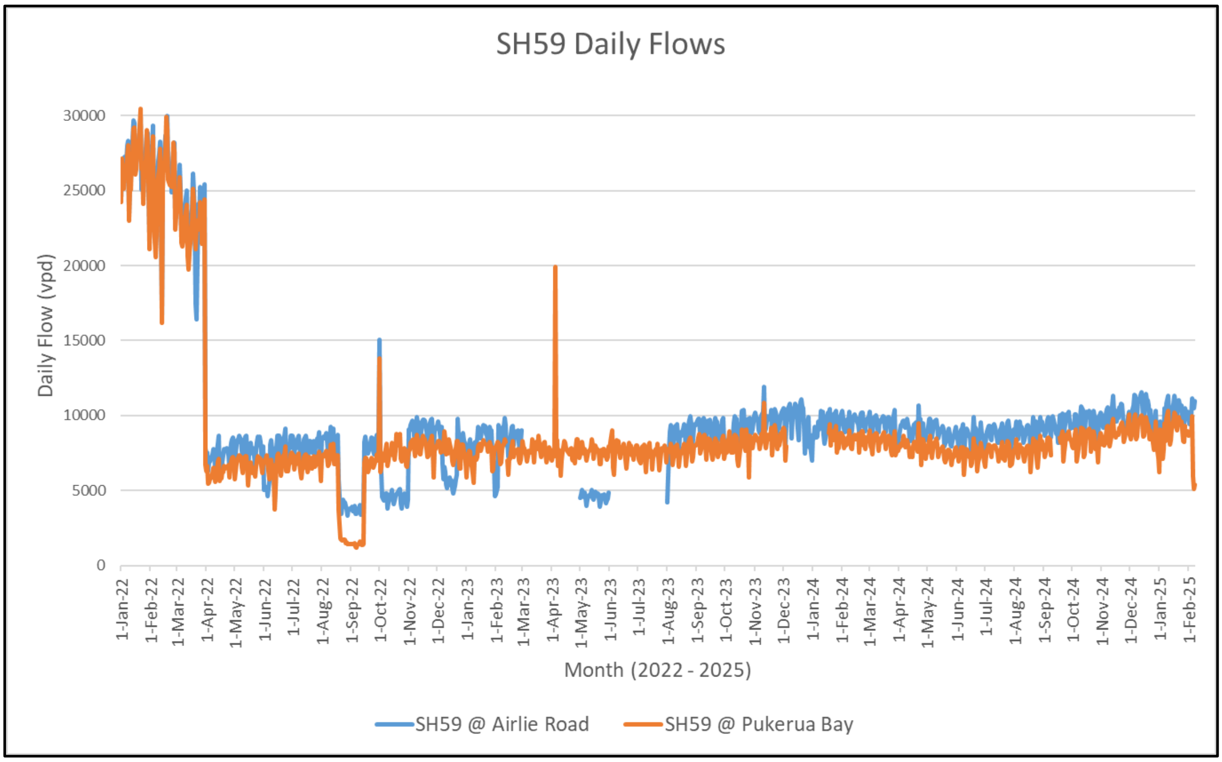

Figure 3-3: Daily Traffic Flows on SH59 at Airlie Road and Pukerua Bay (NZTA TMS)

Whilst there are some data gaps or periods where only one direction of travel appears to have been recorded, Figure 3-3 shows the daily traffic volumes on SH59 prior to TGM opening at the beginning of 2022 involved average daily flows of 25,000-30,000 vehicles per day (vpd) at both Airlie Road and Pukerua Bay count sites. Following the opening of TGM traffic volumes underwent a step change, reducing to 8,000-10,000vpd at these two locations.

Further interrogation of the SH59 TMS data for the Airlie Road count location to the south of the Site indicates an Average Annual Daily Traffic (AADT) volume (7-day) for 2024 of 9,300vpd. Associated hourly traffic profiles at this location are illustrated graphically in **Figure 3-4** below, for both 5-day and 7-day AADT flows.

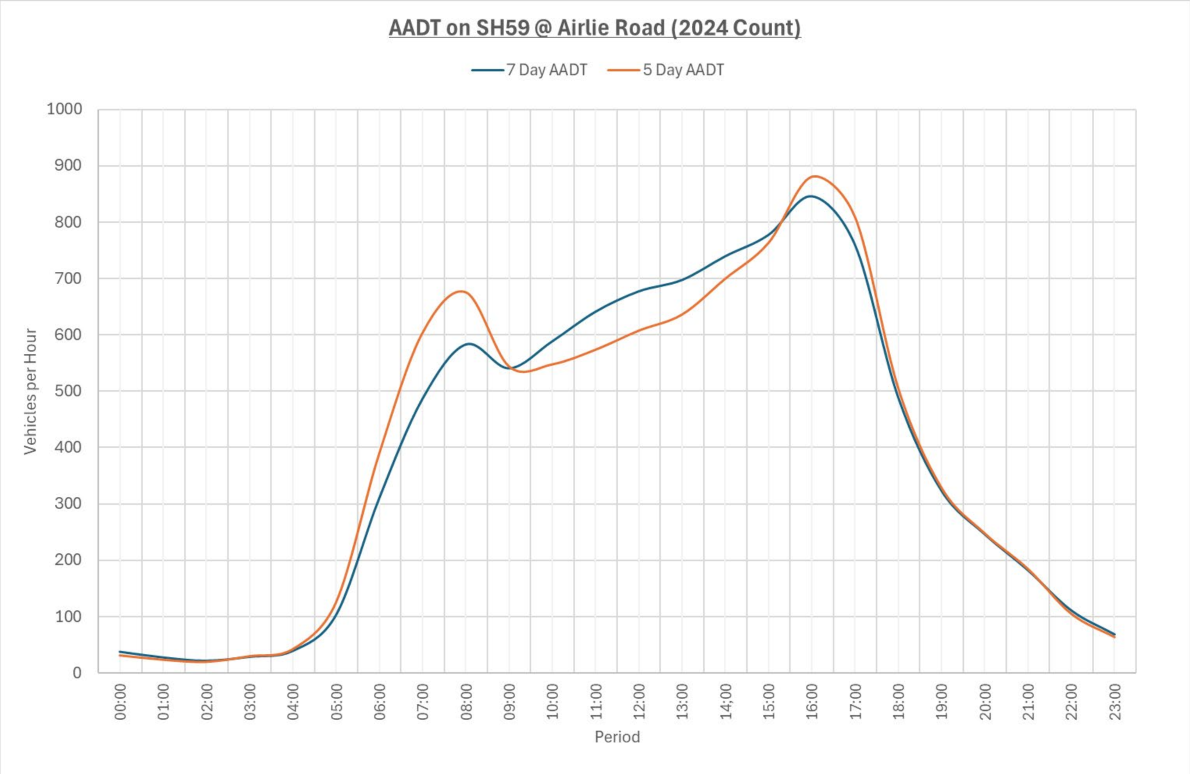

Figure 3-4: Hourly Traffic Flows on SH59 at Airlie Road (NZTA TMS)

As shown, traffic patterns on weekdays (5-day AADT) indicate clear AM and PM commuter peaks of approximately 700 vehicles per hour (vph) and 900vph at around 8am and 5pm, respectively. Traffic volumes through the middle of the day generally range between 550vph and 700vph. A review of the daily weekend traffic volumes on SH59 indicates lower morning and evening peaks but typically more traffic through the middle portion of the day.

3.5 Road Safety

3.5.1 NZTA Safe System Audit

As part of the consent conditions from the TGM 'Board of Inquiry', a road safety audit was required to be undertaken of the SH59 and SH58 alignments, to identify any effects arising from the "*reduced traffic and potentially higher environmental speeds"* post opening of TGM. The '*SH58 & SH59 Porirua Region Existing Road – Safe System Audit Report*[1]' (SSAR) was subsequently prepared in 2023 to address this consent condition. For the section of SH59 between the Plimmerton roundabout (at James Street) and

[1] Prepared by 'Urban Connection' Revision 1, dated March 2023

Pukerua Bay on which development Site traffic will be concentrated, it raises two potential safety risks as follows:

- a section of the Highway extending north past the Site to the urban speed limit change at Pukerua Bay does not have a central wire rope barrier which is assessed as a 'serious' but 'unlikely' risk. It notes there is a wide flush median which will assist in mitigating the risk of head on collisions between opposing vehicles. NZTA, as the Road Controlling Authority (RCA) acknowledged this risk, and noted that 'further long-term median barrier improvements will be assessed and prioritised along with other regional safety projects'. No immediate action was proposed; and
- the layout of the Airlie Road intersection as a priority controlled cross-roads does not currently satisfy Safe Intersection Sight Distances for some movements, whilst the form of the intersection as a cross-roads does not align with the Safe System approach. NZTA, as the RCA, acknowledged this risk and noted that 'further long-term intersection improvements such as signage, markings and vegetation clearance will be assessed and prioritised along with all other regional safety projects'. No immediate action was proposed.

3.5.2 Crash Search

A search of the NZTA 'Crash Analysis System' (CAS) has been undertaken for the purpose of reviewing the road safety record on the local transport network around the Site, for the most recent complete 5-year period (2020-2024), including any crashes recorded to date for 2025. The study area included for the search extends north to the urban edge of Pukerua Bay at Gray Street, and south along the Highway past the end of the Site boundary, as illustrated in **Figure 3-5**.

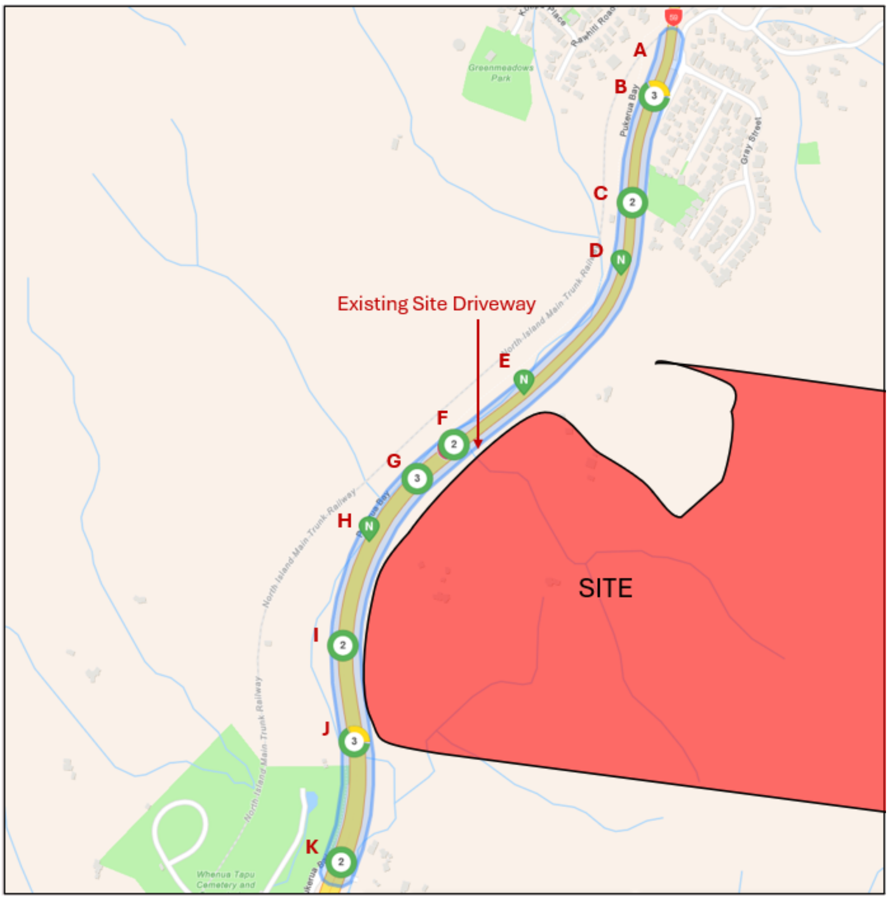

Figure 3-5: Crash Locations Map (NZTA CAS)

A total of 20 crashes have been recorded within the search area, with further details summarised in **Table 3-1** below.

Table 3-1: Crash Record Summary (CAS)

Location	Diagram Ref	Severity	Description
SH59 / Gray Street Intersection	A	-	-
SH59, 150m south of Gray Street	B	2 x Non-injury 1 x Minor-Injury	Northbound vehicle stopped abruptly, causing the three vehicles behind it to rear end each other. Driver travelling northbound has veered off to the left before crashing into bushes on the side of the road. Southbound vehicle on SH59 lost control and veered to the right and collided with a northbound vehicle.
SH59, 300m south of Gray Street	C	2 x Non-Injury	Northbound vehicle on SH59 (evading police) collided with a vehicle in front. Northbound vehicle rear ended vehicle in front due to distraction.
SH59, 400m south of Gray Street	D	1 x Non-Injury	Northbound vehicle experienced a mechanical issue, with the driver pulling to the left side of the road and colliding with the berm.
SH59, 600m south of Gray Street	E	1 x Non-Injury	Driver of a northbound vehicle experienced a medical event and veered left off the road.

Location	Diagram Ref	Severity	Description
SH59, 150m south of the Site driveway	F	2 x Non-Injury	2 x instances of northbound vehicles on SH59 rear ending vehicles in front due to distraction.
SH59, 250m south of the Site driveway	G	3 x Non-Injury	2 instances of northbound vehicles on SH59 losing control (fatigue and medical event) and veered into the central wire rope barrier. Vehicle travelling south on SH59 was rear ended by another vehicle attempting to overtake.
SH59, 500m south of the Site driveway	H	1 x Non-Injury	Northbound vehicle on SH59 changing lanes collided with another vehicle.
SH59, 700m north of the Site driveway	I	2 x Non-Injury	Northbound vehicle on SH59 travelling in the left lane lost control (fatigue) and veered into the right lane, colliding with another vehicle. Northbound vehicle on SH59 changed lanes without checking, colliding with another northbound vehicle.
SH59, 300m north of Airlie Road	J	1 x Non-Injury 1 x Minor 1x Non-Injury	Southbound vehicle on SH59 reversed and hit the front of the vehicle behind. Loss of control (scooter) caused driver to fall sideways. Northbound vehicle on SH59 collided with vehicle on front (loss of control due to fatigue)
Airlie Road / SH59 Intersection	K	2 x Non injury	Vehicle turning right from Airlie Road collided with rear of vehicle in front. Vehicle merging on SH59 collided with vehicle on main line.

Of those crashes recorded, two have involved minor injury with the balance being non-injury (i.e. vehicle damage only).

Of note is that 18 of the crashes recorded above occurred prior to TGM opening, with just two having been recorded since then indicating the associated step reduction in safety which has occurred along this route in response to reduced traffic volumes.

3.6 Sustainable Transport Modes

3.6.1 Walking and Cycling

The available walking and cycling routes within the area surrounding the Site includes the off-road Ara Harakeke shared path, which extends approximately 9.5km from Paremata (to the south) through to Pukerua Bay (to the north), running along the western side of SH59. The path provides connection to a number of rail stations including Pukerua Bay (to the north of the Site), Plimmerton, Mana, and Paremata.

Figure 3-6 below illustrates the local active mode infrastructure and local amenities and relative proximity to the Site.

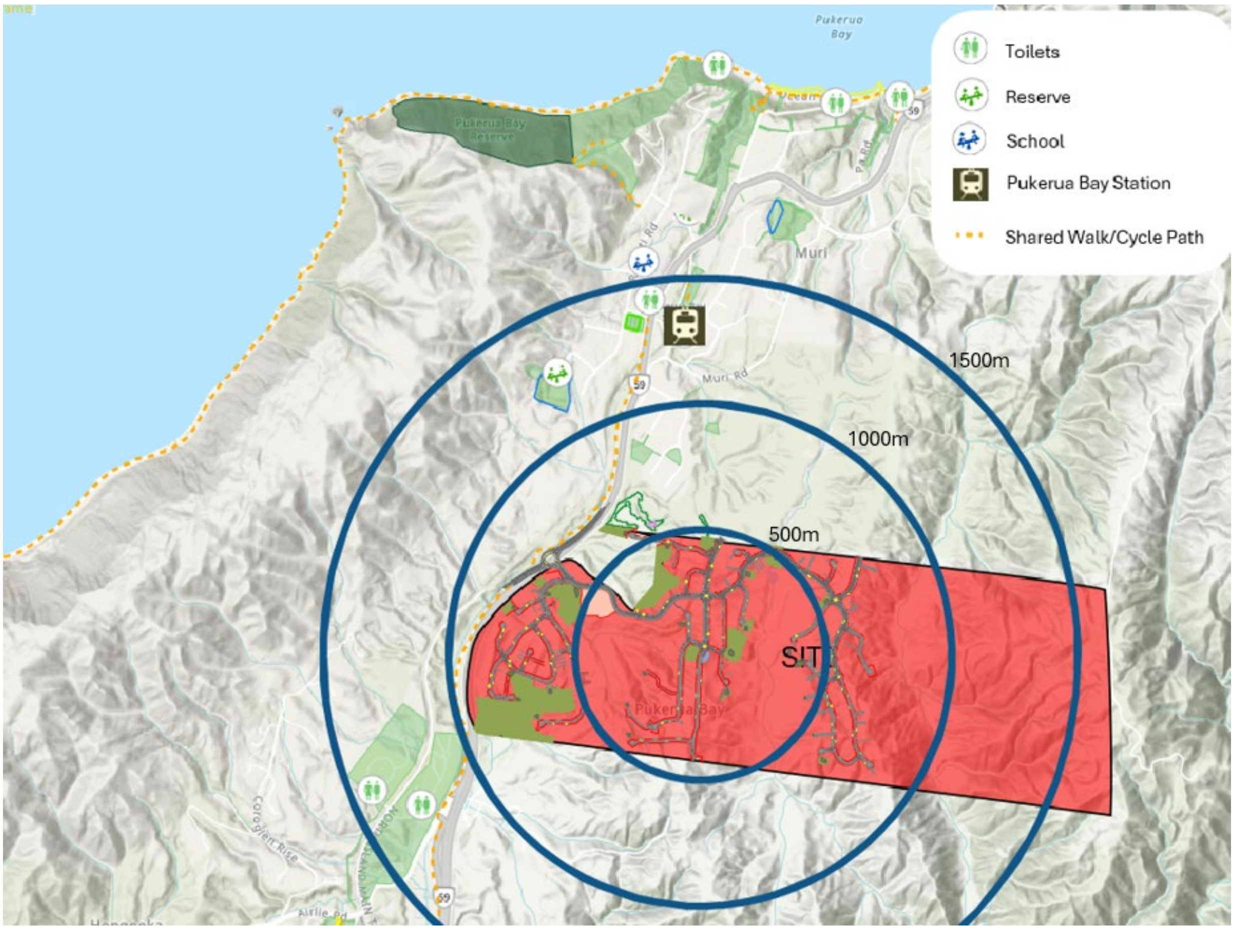

Figure 3-6: Active Mode Infrastructure

Provision for a safe active mode route between the Site and Pukerua Bay to provide walking and cycling access to the local schools and rail station is included as part of the proposal plans via means of a shared path connection through the Muri Block to the north, as described further in Chapter 7.

The Greater Wellington Regional Council (GWRC) "State of Walking Report - Wellington Region" provides information on current commuter trip mode choice. This illustrates a reasonable proportion (approximately 20%) of walking trips in the AM commuter peak to rail stations across the region as a whole involve distances of 1-2km. This demonstrates that people are willing to walk a reasonable distance to access rail services, particularly where there is a frequent train service such as is the case at Pukerua Bay station. In addition, the use of micromobility including cycles / e-scooters for journeys of up to 2.5km (which covers the extent of the development Site) are reported as acceptable 'riding catchments' for accessing public transport stops, as defined by NZTA's design guidance 'People on Bikes and Micromobility.

3.6.2 Public Transport

Whilst there are no current scheduled bus services operating in Pukerua Bay or near the Site, the proposed development's internal roading network has been designed to accommodate a future bus service, should GWRC plan for such, noting the fuller residential growth within the NGDA and wider NGA (which includes Plimmerton Farm and the neighbouring Skaiffe Block to the south), constitutes a sizable new catchment.

Pukerua Bay Rail Station is located on the Kapiti Line and is currently served by 3 train services in each direction every hour through the week, and two trains per hour on weekends. Given the Site's proximity to the Pukerua Bay Rail Station, establishing a safe and convenient shared path connection via the neighbouring Muri Block development is a key element of the proposed development's surface-level access strategy.

4 Planning Context

The PCC 'Growth Strategy 2053' outlines Porirua's vision for managing growth over the next 30 years, anticipating a population increase of over 20,000 people and the need for 10,000 new dwellings. Building on the 2018 strategy, it integrates updated government policies, climate change considerations, and community priorities. The District Plan underpins these goals by enabling higher-density housing, safeguarding natural areas, and guiding development away from hazard-prone zones. The wider NGA extending between Plimmerton and Pukerua Bay was identified by PCC in the 2009 Porirua Development Framework as an area that could support up to 6,000 new homes to provide housing capacity for a portion of the district's forecasted population increase.

The northern part of the area now referred to as the NGDA extending across the Site and adjacent Muri Block (to the north) was originally classified as Future Urban Zone in the District Plan, but was rezoned through Variation 1 for predominantly residential activity to meet PCC's obligations for increased housing supply in accordance with the National Policy Statement for Urban Development 2020.

The associated NGDA Structure Plan which indicates details of this zoning within the Site, along with the anticipated indicative transport network, is included at **Figure 4-1** below.

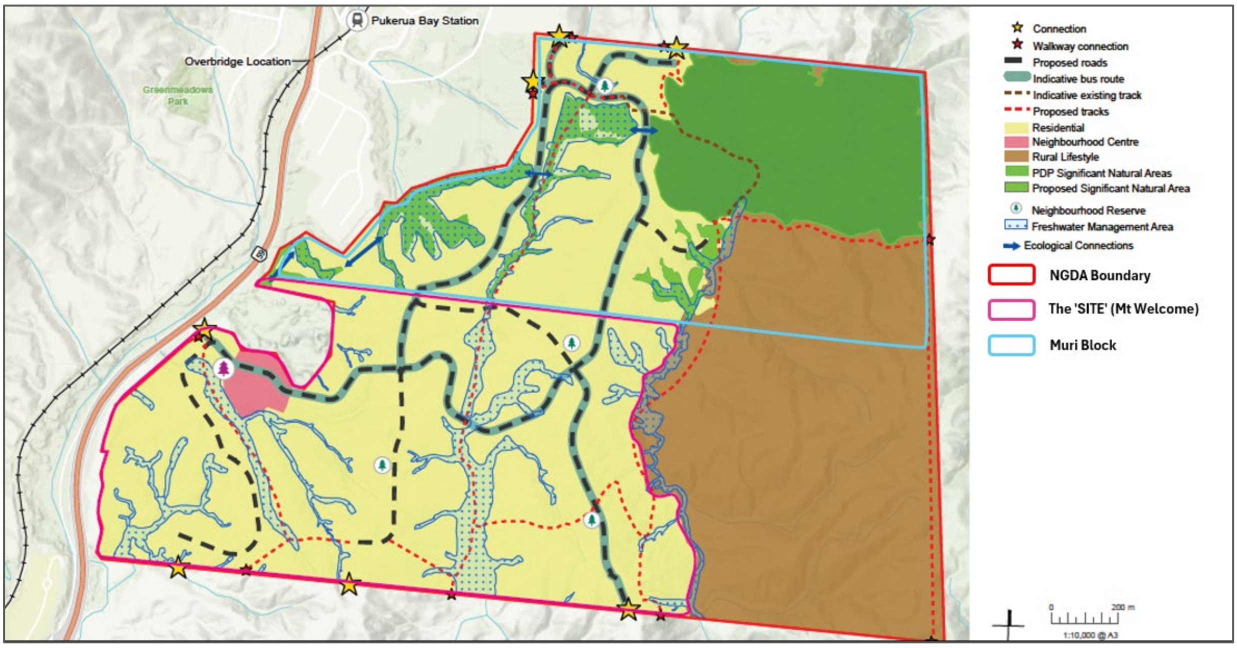

Figure 4-1: NGDA Structure Plan

Land to the immediate north of the Site within the area known as the Muri Block is similarly zoned 'Medium Density Residential', whilst land to east of the Site is classified 'Rural Lifestyle Zone'.

While not shown in Figure 4-1 (but illustrated earlier at Figure 2-2), land to the south of the Site is classified as a mixture of rural lifestyle and 'Future Urban Zone', as is the land on the opposite side of the Highway to the west and north. This demonstrates the longer term intent of expanding the Pukerua Bay residential suburb southwards, in line with population increases set out in the PCC's Growth Strategy.

Supplementary to the above, and as described earlier in Chapter 3, the opening of TGM and subsequent traffic redistribution onto this new SH1 alignment provides a significant opportunity to enable growth in and around the NGDA area through utilisation of existing transport infrastructure in the form of SH59, and without requiring significant roading upgrades or generating adverse impacts in terms of network congestion or delays.

5 Development Proposal

5.1 Existing Site Use

The Site is predominantly farmland that accommodates a small number of lifestyle blocks.

5.2 Proposed Site Development

The proposed subdivision scheme has been progressively refined through collaboration within the project team and workshops with key stakeholders such as PCC, NTZA, GWRC / Metlink, and Te Rūnanga o Toa Rangatira. The development plans target areas of the property deemed suitable for subdivision, with careful consideration given to site-specific constraints including topographical features and ecological sensitivities.

The proposal plans provide for the following:

- 949 new residential allotments to be developed across a number of stages of development; and
- a future local neighbourhood centre which could provide for a small supermarket and other small retail and commercial activities to serve the new residential catchment.

Whilst the neighbourhood centre will be subject to separate resource consents and assessment of traffic engineering compliance, its traffic generation effects have been given consideration as part of the sensitivity allowances included in the development traffic network modelling assessment described in Chapter 10. With the small scale nature of the 'local' commercial activities envisaged for the neighbourhood centre, the majority of associated vehicle trips generated to/from it will be new Site and Muri Block residents.

To support the proposed new development, the following transport infrastructure will be delivered:

- a series of new internal roading connections that provide a clear road network hierarchy, including a primary spine road into the Site from SH59 that connects with a series of further collector routes and access roads serving the various subdivision catchments, and in turn provides links through to the Muri Block land to the north (in line with the NGDA Structure Plan) and Skaiffe Block land to the south;
- a new external Site intersection connection onto SH59 to accommodate the full Site development (and future Muri Block development), along with an interim design to serve construction traffic and the initial stages of residential development;
- an active mode network comprising on-road cycle lanes, footpaths, shared paths and off-road walking and cycling trails that provide more direct connections through the Site and linkage to key destinations including the future neighbourhood centre; and
- provision for an active mode connection through the Muri Block to the north providing access to the Pukerua Bay rail station, as well as future connections to the land to the south of the Site.

The detailed proposal plans are provided in the wider application documentation, whilst the overall Site layout and associated transport network is provided in Appendix A.

The proposed access strategy for the Site includes a single external connection to SH59 to the west, with a proposed upgrading of the current priority tee-intersection arrangement to support some early traffic movements to and from the Site, followed by a new full intersection in the form of a roundabout to support the wider subdivision development. Provision for external road connections with the Muri Block to the north and Skaiffe Block to the south are included.

The new internal movement network has been designed to provide a legible and well-connected development to support both vehicular and active mode trips. The road typologies have been developed based on the District Plan, along with specific consideration for accommodating active modes to promote sustainable transport choices for both internal trips (including to the neighbourhood centre) and external connectivity.

5.3 Stakeholder Liaison

Stantec has consulted with NZTA on the proposed development plans, including in relation to intersection form for connecting the Site at SH59 and the scope of traffic analysis reported in Chapter 10. A concept design for the proposed new roundabout on SH59 providing access to the Site has been shared with NZTA, with subsequent discussions indicating acceptance in principle. Assessment of an interim priority tee-intersection arrangement on SH59 to accommodate some early development prior to the roundabout coming online, has also been shared with NZTA for their review.

Similarly, engagement has also been carried out with PCC's traffic team to ensure this ITA appropriately addresses the key transport matters, and to acquire feedback in developing the internal roading arrangements and Site connections. In response to PCC's comments on Site connectivity with the Skaiffe Block to the south, provision for a future Collector Road has been incorporated into the proposal plans.

Continued liaison with both NZTA and PCC will continue as the detailed design for the Site's transport infrastructure and external connection at SH59 is further refined should consent be granted.

Discussions have also been held with GWRC / Metlink in regard to future public transport services, and to ensure a suitable roading design for the Site is delivered that would not preclude scheduled bus services from being accommodated in the future.

6 District Plan Assessment

An assessment of the proposed residential subdivision development plan's 'compliance' against each of the relevant District Plan infrastructure and transport standards (which have informed the transport design of the subdivision), is set out in **Table 6-1** below. Again, the consent for the specific activities in the local neighbourhood centre is to be undertaken separately from this current application.

Table 6-1: District Plan Compliance Assessment

Reference	Rule	Assessment of Compliance
Infrastructure		
INF-S22	**Classification of Roads**	
1.	National, Regional and Arterial roads must be classified according to the Waka Kotahi New Zealand Transport Agency One Network Road Classification.	**Does not Comply.** The main spine road into the Site is anticipated to be classified as a 'Collector' road. Whilst this will provide access to more than 800 dwellings (which is the upper threshold identified in INF-Table 1 for Collector roads), in practice it will still function as a Collector Road rather than an Arterial Road. By way of demonstrating this, the One Network Road Classification defines Arterial Roads as "*linking regionally significant places, industries, ports or airports*" which does not apply in this case. Instead, the definition of Collector Road as being "*locally important roads that provide a primary distributor/collector function, linking significant local economic areas or population areas*" is interpreted as more appropriate. Further, it is assessed that the proposed Collector Road cross section is capable of accommodating demands associated with the 949 lots at the Site as well as traffic from the Muri Block land to the north in a safe and appropriate manner.
2.	Collector and Access Roads must be classified according to INF-Table 1 (Road design standards).	

Reference	Rule	Assessment of Compliance
INF-S23	**Design of roads**	
1.	Roads must not be permanent no-exit roads except where: a. The anticipated AADT of the road is less than 200; b. The length of the road is less than 100m; and c. The no-exit road does not connect to a road that is itself a no-exit road.	**Does not Comply**. The topography of the Site includes significant gullies and ridges, and the proposed roading layout has been developed in response to this, noting it is not practicable to achieve roads that fully link through the various development areas without including some cul-de-sacs which either extend longer than 100m or will accommodate more than 200 vehicles a day. Further detail on the internal roading design is described at Section 8.2. Internal 'loops' have been provided where feasible to reduce the number of cul-de-sacs, noting where cul-de-sacs are proposed, dedicated walking and cycling trails are included where practicable to provide improved connectivity and shorten travel distances for active modes.
2.	Roads must provide for two-way traffic in accordance with INF-Table 1 (Road design standards).	**Complies**. All roads that are to be vested have been designed to allow two-way traffic, as per INF-Table 1.
3.	Roads must be designed to achieve target operating speeds in accordance with INF-Table 1 (Road design standards).	**Complies**. The combination of road cross sections, vertical and horizontal alignment, along with appropriate traffic calming measures (determined at detailed design) will ensure the operating speeds align with or are less than those set out in INF-Table 1.
4.	The width of any road must comply with the minimum widths in accordance with INF-Table 1 (Road design standards): a. Minimum legal width; b. Minimum carriageway width to provide for: i. Vehicles; ii. Parking; and iii. Cycles; c. Minimum berm width to provide for: i. Pedestrians; ii. Infrastructure; and iii. Street trees	**Does not Comply**. The proposed new Site road typologies have been designed to ensure they satisfy the standards in INF-Table 1 in regard to movements widths for traffic and active modes. The overall legal width for Collector and Local roads deviates slightly from that prescribed (as described further in Section 8.1), however adequate berm space to accommodate services has been appropriately allowed for.
5.	Pedestrian walkways, cycleways and shared paths within a road reserve must be designed in accordance with the Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling (2017) or Waka Kotahi Pedestrian Planning and Design Guide (2009).	**Does not Comply**. The gradients on some roads exceed those recommended in Austroads. Further detail and assessment of this is provided at Chapter 8.
6.	No-exit roads must have a turning head with a minimum radius of 9.5m.	**Complies**. All turning heads on roads to be vested have been designed to a 9.5m radius.

Reference	Rule	Assessment of Compliance

7.	The maximum gradient of roads must be in accordance with INF-Table 1.
	• Collector Road: max 10%
	• Local Road:
	  ○ 20 dwellings or less = max 12.5%
	  ○ Elsewhere = max 10%
		Does not Comply.
		Given the challenging topography within the Site, part of the Collector Road network will be steeper than 10%, whilst some local roads will also exceed the 10% and 12.5% thresholds. These deviations in gradients are not assessed as providing a materially different outcome from an operational perspective and sit within existing collector and local road grades provided elsewhere around the district. Further details on the specific deviations across the Site network are described in Section 8.2.

8.	Roads must be designed to achieve the standards in INF-Table 1 (Road design standards) within the zones specified in INF-Table 1 (Road design standards).	**Does not Comply**. As described in the response to INF-S23.4 above, the legal road widths deviate slightly from INF-Table 1 but will appropriately provide for all necessary underground services within the berm space allowed for. Further detail on where these deviations occur is provided in Section 8.1
9.	Retaining structures must not be constructed within the road reserve.	TBC
10.	Street trees must be provided in accordance with: a. The requirements of INF-Table 1 (Road design standards); b. Street trees must not be planted in the infrastructure berm; c. When street trees are required in accordance with INF-Table 1, they must be provided in accordance with the number of trees per size class at maturity set out in INF-Table 2; d. Street tree planting must meet the requirements set out in INF-Table 2 for the following: i. Horizontal setback distances from underground infrastructure; ii. Horizontal setback distances from structures; iii. Minimum berm width; iv. Minimum topsoil depth; and v. Minimum soil volume.	TBC

Reference	Rule	Assessment of Compliance
11.	Streetlighting must be provided in accordance with the following: a. Streetlighting must be designed in accordance with NZ Transport Agency document M30 Specification and Guidelines for Road Lighting Design (2014); b. Streetlighting bulbs must be on the NZ Transport Agency List of M30 Approved Luminaires (2020); c. Streetlighting columns must be in accordance with the NZ Transport Agency M26:2012 and M26A:2017 Specification for Lighting Columns; and d. Streetlighting columns in Access Roads and Collector Roads must be a minimum of 8m in height.	**Complies.** (see streetlighting design by ibexlighting)
INF-S24	**Parking spaces in roads**	
1.	Car parking spaces in roads must be parallel to the traffic lane and meet the following minimum dimensions: a. Width of 2.1m; and b. Length of: i. 5m for an unobstructed end space; ii. 6.3m for an intermediate space (between other car spaces); or iii. 6.6m for an end-obstructed space.	**Will Comply**. Parking spaces will be developed at detailed design to comply with these layout and dimensional requirements. A condition of consent is proposed to capture these arrangements.
INF-S25	**Intersections**	
1.	Intersections must be designed to ensure safe connectivity of roads for all road users and must take into account the expected traffic flows once development is complete.	**Complies**. The Site intersections have been specifically developed to accommodate full Site traffic levels, including allowance for adjacent future residential activity on the Muri Block to the north. Similarly, the proposed SH59 intersection roundabout concept design has been developed to accommodate full Site traffic including associated future Muri Block development.
2.	Intersections must be formed at 90°.	**Complies**. All Site road intersections have been designed to connect at 90-degrees.
3.	Intersections must not be located within the intersection separation distances set out in INF-Table 4. • An Access or Access Road intersecting with any Access / Access Road = 40m • Access Road connecting with a higher order road = 80m • Any intersections between a Collector Road and a higher order road, or two Collector Roads = 150m.	**Does not Comply**. Noting the constraints imparted by the Site topography, four of the local road connections to Collector Roads do not meet the minimum 80m separation distance. The internal roading layout has however been designed to provide at least 50m separation between intersections, which allows a typical 5-seconds of vehicle travel time (at a 40kph operating speed) between potential turning conflicts at adjacent intersections to ensure suitable decision and reaction times. Further detail on this is provided at Chapter 8.

Reference	Rule	Assessment of Compliance
4.	Minimum sight distances at intersections must be in accordance with Distance X and Distance Y as shown in INF-Figure 1 and INF-Table 3. • 100m for 41-50kph Operating Speed	**Does not Comply**. Whilst the majority of Site intersections will satisfy the 100m sightline requirement specified for a 50kph road, in practice design speeds across the Site will be lower than 50kph. In particular, vehicle speeds at the 5 intersections which do not fully meet the 100m sightline will be constrained by vertical and horizontal geometry to 40kph or less. Further detail and assessment of these of the proposed sightlines is described at Chapter 8.
5.	Intersections must not have more than three approaches.	**Does not Comply**. The proposed internal roading arrangements include some four-way intersections which have been specifically designed in all but one instance (involving low volume approaches on each leg) as roundabouts, in line with the Safe System approach principles of reducing vehicle operating speeds and severity of crashes (by reducing the angle of impact over tee-intersection or crossroad intersections). Further discussion on the Site's internal intersection arrangements is provided in Chapter 8.
6.	Intersections must not include roundabouts or be signalised.	**Does not Comply**. As per the response to INF-S25.5 above, the proposed internal roading arrangements include roundabouts, as does the final design for the Site access at SH59. These intersections have been specifically developed to provide safe operation by reducing vehicle operating speeds and crash severity (as compared with priority tee and crossroad intersections), in line with the Safe System approach. Further discussion on the Site's internal intersection arrangements and external connection to the Highway is provided at Chapters 8 and 7, respectively.
Transport		
TR-S1	**Pedestrian and Cycle Access**	
1.	Access to a single site must have a direct legal road frontage width of at least 1.8m	**Complies.** All individual lots will have either direct frontage to a public street or access via a Joint Owner Access Lot (JOAL) capable of accommodating vehicles and pedestrians i.e. formed to >1.8m width.

Reference	Rule	Assessment of Compliance
2.	Access to two or more sites must have pedestrian and cycling access provided from legal road with a: i. Minimum legal width of 1.8m; ii. Minimum formed width of 1.5m; iii. Maximum average gradient of 1:20; and iv. Maximum gradient of 1:12 for any length as long as it does not exceed 9m.	**Will not Comply.** Whilst all accesses will meet the minimum legal and formed width requirements, the steeper topography in some parts of the Site mean the maximum grades will be exceeded in some instances, as described in response to INF-S23 and further detail in Section 8.2.
3.	A fully reticulated water supply system including hydrants must be available within the road corridor to which the access connects.	**Complies.** A fully reticulated water supply will be provided across the Site.
4.	The pedestrian and cycling access must be no more than 75m in length measured from the road boundary to any existing building or proposed building platform on the site.	**Does not Comply.** Some residential lots located within JOALs will include pedestrian or cycle access that is more than 75m from the road boundary. It is uncertain of the purpose of this Rule, noting that in such cases suitable access for pedestrians and cyclists will be achieved by means of the JOAL.
TR-S2	**Classification of vehicle access**	
	Vehicle access must be classified according to TR-Table 1.	**Complies.** All vehicle accesses serving the proposed lots will be classified in accordance with TR-Table 1.
TR-S3	**Design of vehicle access**	
1.	The vehicle access must be designed to achieve the design speeds, minimum widths, maximum gradients and seal requirements in TR-Table 2	**Does not Comply.** Some of the JOALs deviate from the requirements of TR-Table 2 in terms of overall legal width, or provision of turning where 3 or more lots are accessed. Further details on the specific compliance of the access arrangements for these JOALs is provided in Chapter 8. All individual lot driveways are able to be formed in accordance with Level 1, noting actual gradients of these will need to be confirmed at building consent stage.
2.	Provision for turning in a common area must be designed in accordance with TR-Figure 1.	**Complies**. Turning areas have been designed to align with TR-Figure 1.

Reference	Rule	Assessment of Compliance
3.	A Vehicle Access Level 4 must include streetlighting provided in accordance with the following: a. Streetlighting must be designed in accordance with NZ Transport Agency document M30 Specification and Guidelines for Road Lighting Design (2014); b. Streetlighting bulbs must be on the Waka Kotahi NZ Transport Agency List of M30 Approved Luminaires. c. Streetlighting columns must comply with the Waka Kotahi NZ Transport Agency M26:2012 and M26A:2017 Specification for Lighting Columns. d. Streetlighting columns in Private Ways Level 4 must be a minimum of 8m in height.	**Complies.** (see streetlighting design by ibexlighting)
4.	Pedestrian walkways, cycleways and shared paths in vehicle access areas must comply with the: Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling (2017)	**Does not Comply**. Whilst the JOALs have been designed in accordance with the principles of TR-Table 2 (as per TR-S3.1 above), the gradients on some of the JOALs exceed those recommended in Austroads Part 6. Further detail on the deviations in grade is provided at Chapter 8.
TR-S4	**Firefighting access**	
1.	Any vehicle access to a site located in an area where no fully reticulated water supply system is available, or having a length greater than 75m when connected to a road that has a fully reticulated water supply system including hydrants, must: a. Have a minimum unobstructed width of 4m; b. Have a minimum formed width of 3.5m; c. Have a minimum height clearance of 4m; and d. Be designed to be free of obstacles that could hinder access for emergency service vehicles.	**Complies.** Reticulated water supply will be provided throughout the Site, noting all lots will be within 75m of fire hydrants, which satisfies the NZ Fire Code[2], with the exception of JOALs F and G which include a 5.5m formed carriageway that satisfies provisions a. to d.
TR-S5	**Vehicle Crossings**	
1.	The spacing of vehicle crossings along a road frontage must not be less than the dimensions in TR-Table 3. The number of vehicle crossings along any one road frontage must not exceed the number in TR-Table 4. • <70m Collector and Access roads = 1 per 25m	**Does Not Comply**. The individual residential lot driveways will be designed to these criteria, however it is likely that some driveways won't be able to fully comply, for example in terms of

[2] FENZ Emergency vehicle access F5-02 GD (December 2021)

Reference	Rule	Assessment of Compliance
2.	The length of a vehicle crossing parallel to the road must be no more than: i. 3m for Vehicle Access Level 1; ii. 6m for a Vehicle Access Level 2, 3 or 4; or iii. 9m if heavy vehicles are to be accommodated on the site.	access separation. In such instances a consent condition is recommended requiring the design of the driveway to be developed, for later certification, to a suitable standard in keeping with the suburban setting and frontage street environment.
3.	A vehicle crossing for a site with frontage to two or more roads must connect to the road with the lower road classification.	
4.	The minimum design vehicle used for a vehicle crossing must be a 5.2m x 1.94m vehicle (99th percentile vehicle).	
5.	A vehicle crossing must not be located within 6m of an intersection tangent point as shown in TR-Figure 3. A Vehicle Access Level 1 is exempt from the exclusion in respect of the kerb section marked XY	
6.	A vehicle crossing must provide a clear visibility splay for pedestrian safety from 1.0m above ground level as shown in TR-Figure 2. Where two-way access is provided at the vehicle crossing, the visibility splay is only required on the side adjacent to the exiting vehicle	
7.	The minimum sight distances at a vehicle crossing must be in accordance with TR-Table 5 and measured in accordance with TR-Figure 4.	
8.	A vehicle crossing must not be located within 30m of a railway crossing, measured from the nearest edge of the vehicle crossing to the nearest railway track.	
9.	A vehicle crossing located within a Rural Zone must be formed in accordance with TR-Figure 5.	
10.	A vehicle crossing that crosses a footpath, cycleway or shared path must not exceed a crossfall gradient of 2.5%.	
11.	There must be a minimum separation of 2m along the footpath between crossings serving adjacent sites. Where two crossings on adjacent sites can be combined and where the combined crossings do not exceed a total width of 6m at the property boundary, no minimum separation distance will apply.	
TR-S6	**Design of on-site car parking spaces**	
1.	Where provided on a site, car parking spaces must: a. Comply with the minimum dimensions of TR-Table 6; b. Have a maximum gradient of: i. 5% (1 vertical to 20 horizontal) for surfaces parallel to the angle of parking for non-residential activities; ii. 10% (1 vertical to 10 horizontal) for surfaces parallel to the angle of parking for residential activities; and iii. 6.25% (1 vertical to 16 horizontal) for surfaces at any other direction to the angle of parking; and c. Have a minimum height clearance of 2.3m	**Does not Comply**. Parking spaces in garages or on driveways provided for the individual residential lots will be designed to satisfy these standards where practicable, noting in some instances actual gradients may deviate from the maximums described due to Site topography. In such instances a consent condition is recommended requiring the design of the driveway to be developed, for later certification, to a suitable standard in keeping with the suburban setting and frontage street environment.

Reference	Rule	Assessment of Compliance
2.	For any blind aisle, the aisle must extend 1m beyond the last parking space the aisle provides access to.	**Does not Apply**. No off-street carparks (other than driveways serving individual residential lots) are included in this application.
TR-S7	**On-site vehicle manoeuvring areas for sites with vehicle access**	
1.	Where a site has vehicle access provided, on-site manoeuvring areas must be provided so that vehicles can enter and exit the site in a forward direction, except where: a. The access serves a single residential unit; b. The road is an Access Road or Collector Road; and c. The distance to or from the road frontage where a vehicle is required to reverse is no more than 30m.	**Complies**. The application only includes lots, that will access to roads of a Collector status or lower.
2.	On-site vehicle manoeuvring areas must provide for a 4.91m x 1.87m vehicle (85th percentile vehicle) as shown in TR-Figure 9 Manoeuvring, including additional width of 300mm per affected side	**Does not Apply**. As per response to TR-S7 above, only individual residential lots and associated driveways are proposed, noting these will be designed to accommodate B85 vehicles in each case.
3.	On-site manoeuvring areas must not be located on: a. The public road reserve; or b. Areas provided for parking, servicing, loading or storage purposes.	
4.	On-site manoeuvring areas must not include ramps, turntables, car lifts, or stackers.	
TR-S8	**On-site loading spaces for non-residential or mixed-use buildings**	
1.	Loading spaces for non-residential or mixed-use buildings must be provided on-site and comply with TR-Table 7 and TR-Table 8.	**Does not Apply.** This application does not include any non-residential or mixed-use buildings.
2.	Loading spaces must include sufficient additional width where the service vehicle is loaded or unloaded from the ground, including by forklift, to provide for the anticipated loading and unloading requirements of the activity.	
3.	Loading spaces must provide for loading and unloading to occur within the site and in a manner that does not impede access to parking spaces or areas within the site required for vehicle manoeuvring and circulation.	
4.	On-site manoeuvring areas must be provided so that vehicles can enter and exit the site in a forward direction to and from National, Regional, Arterial and Collector Roads.	
5.	Loading spaces must have a maximum gradient of 1:25.	
6.	Where access to a loading area is restricted by a gate, sufficient space must be provided to: i. Accommodate the largest truck visiting the site within the site; and ii. Allow for queuing between the site's vehicle crossing and the gate.	

Reference	Rule	Assessment of Compliance
7.	Where there are multiple tenants on a site, each tenant must provide the number of loading spaces required by their activities, except where: i. The site is under single ownership or management; and ii. Shared facilities or equivalent capacity is provided.	
TR-S9 On-site waste storage and loading facilities for rubbish collection from residential apartments of seven or more residential units		
1.	Residential apartment buildings with seven or more residential units must provide an on-site waste storage and loading facility for rubbish collection vehicles.	**Does not Apply** The proposal plans do not include any residential apartments buildings.
2.	The on-site waste storage and loading facility must accommodate a minimum design vehicle of a Medium Rigid Truck in accordance with AS 2890.2:2002 Parking facilities Part 2: Off-street commercial vehicle facilities	
3.	Sufficient area must be provided on-site to allow the minimum design vehicle to enter and exit the site in a forward direction to and from National, Regional, Arterial and Collector Roads.	
TR-S10 On-site bicycle parking spaces		
1.	New buildings and activities must provide bicycle parking in accordance with TR-Table 9 below.	**Does not Apply**. There are no minimum cycle parking standards in TR-Table 9 for individual residential lots. Notwithstanding, storage for bikes within individual lots will be available either within garages or garden sheds.
2.	Bicycle parking spaces must meet the following minimum specifications: a. Bicycle stands must be sized and spaced to accommodate bicycle dimensions of 1200mm high, 1800mm long and 600mm wide. b. Stands must be securely anchored to an immovable object. c. Stands must allow the bicycle frame and at least one wheel to be secured. d. Bicycle parking facilities must be available during the activity's hours of operation and must not be impeded by any structure, storage of goods, landscape planting or other use. e. Bicycle parking facilities must be located: i. To be easily accessible for users; ii. To not impede pedestrian thoroughfares including areas used by people whose mobility or vision is restricted; iii. To be clear of vehicle parking or manoeuvring areas; and iv. No more than 25m from the main public entrance to the main building on the site, when the facilities are for public use. f. Bicycle parking facilities for staff must be located: i. In a covered area; and ii. In an area where public access is excluded.	
TR-S11 Trip generation		
	An activity must not exceed the trip generation thresholds set out in TR-Table 10. • Residential activity: 60 residential units enabled by any residential development or subdivision	The proposed subdivision will exceed this threshold, therefore this Integrated Transport Assessment report has been prepared accordingly.

The District Plan compliance assessment set out in the table above demonstrates the proposal plans alignment with the District Plan Transport provisions, noting the nature of the Site's topographical constraints dictates that in some instances the roading arrangements deviate from the standards (including in respect of minimum legal width, maximum gradient, and intersection separation and sightlines), and individual lot driveways may not fully comply with the Permitted Activity vehicle access standards. The plans also deviate from INF-S25.5 and INF-S25.6 by including 'roundabouts' and '4-arm cross-roads'. Further commentary and assessment on these specific non-compliances is included in Chapter 8.

Whilst parking minimums no longer apply to land use, the development plans have been designed to provide an appropriate balance of car parking (both off-street and on-street) to accommodate the expected parking demands generated by the scale and type of residential activity proposed.

7 Site Access and Connectivity

As part of developing the access arrangements for the Site at SH59, Stantec has engaged with NZTA to work through the proposed arrangements and potential intersection form required to appropriately accommodate the type and scale of development proposed. These discussions have informed the resultant access strategy as set out below.

7.1 Connection to SH59

7.1.1 Site Access Location

A review of the potential access locations for connecting the Site along the SH59 frontage shows an access in close proximity to the current driveway position serving the established lifestyle lots on the property (which also aligns with the indicative road access shown within the NGDA Structure Plan) as the most favourable, for the following reasons:

- the horizontal alignment on the Highway at this point is generally straight whilst the vertical alignment grades down gently from north to south, providing good sightlines for traffic turning to / from an upgraded Site access road / new intersection;
- there are no other existing side road intersections or access points in proximity that might create adverse safety impacts or vehicle turning conflicts associated with establishing an upgraded Site access road or intersection in this location;
- the Highway comprises a single northbound and southbound lane at this point which reduces safety risks by simplifying turning at an upgraded Site access road, and provides flexibility for tie-in of a future new intersection; and
- the topographical constraints along the balance of the Site frontage mean achieving a suitable connection to the Site's proposed internal Site roading layout at other locations (in turn constrained by topographical and ecological features) is not practicable.

In the short term, access is proposed to be achieved via the existing Site road connection to SH59, which would be upgraded to provide a dedicated right turn lane for northbound traffic entering the Site, along with improved sightlines (through vegetation clearance along SH59) and realignment of the current Site access road to connect at a more perpendicular angle, again to assist sightlines and traffic egress movements.

Development of a new SH59 intersection to support continued development of the Site would then be progressed, with the design informed by both safety and capacity considerations, to appropriately accommodate the full Site development traffic as well as a portion of the future Muri Block residential traffic accessing through the Site, as described in more detail in the section below.

7.1.2 Assessment of Intersection Options (Full Site Development)

Considering the current 100kph posted speed limit environment on SH59 where the Site access would connect, there are a number of opportunities and constraints which serve to influence the intersection arrangement, which have been discussed with NZTA. These are summarised in **Table 7-1** below.

Table 7-1: SH59 Intersection Options

Intersection Form	Opportunities	Constraints
Upgraded Priority Tee-intersection	• Formalise the current turning movement arrangements by providing marked right turn bay and adjusting the northbound merge on SH59 to terminate earlier (to allow safe access to the new right turn bay for vehicles accessing the Site)	• Provides an 'interim' design only, with a suitable traffic threshold trigger identified at Chapter 11, beyond which a fuller intersection design would need to be implemented
Signalised Intersection	• Allows for safe and convenient at-grade active mode crossing of the Highway (under signal control) to connect Site residents with the existing Ara Harakeke shared path • Smaller footprint and therefore lesser impact on adjacent ecological areas as compared to a larger footprint intersection such as a roundabout • Less impact on Highway traffic during shorter construction period, as compared to other larger more complex intersection layouts such as a roundabout	• NZTA do not consider traffic signals are appropriate from safety perspective under the current high-speed Highway conditions, although a lower speed limit in future could support an appropriate design
Roundabout	• Can be designed to either the current or a reduced speed environment	• Challenging design solution to enable active mode connectivity across the Highway • Significant intersection footprint which encroaches into the adjacent watercourse on the western side of the Highway • Larger and more complex build would result in longer construction period and associated disruptions to Highway traffic

Based on the above and engagement with NZTA around an intersection form in keeping with the Safe System Approach of minimising crash risk and injury severity, concept designs have been developed for a new Site access roundabout for both the existing 100kph posted speed limit, as was well as a reduced speed limit environment on the Highway (indicative 60kph), in the event that a reduced speed along the corridor was achieved between Pukerua Bay and the Site. In each case, two lane approaches on all arms and two circulating lanes have been allowed for to provide sufficient capacity and future-proofing for full Site development (including the adjacent Muri Block trips), for a future year traffic analysis of development Site trips on SH59 described later in Chapter 10.

Indicative concept designs for these 100kph and 60kph posted speed limit roundabouts are shown in **Figure 7-1** below. A more detailed plan for the 100kph roundabout is included at Appendix B.

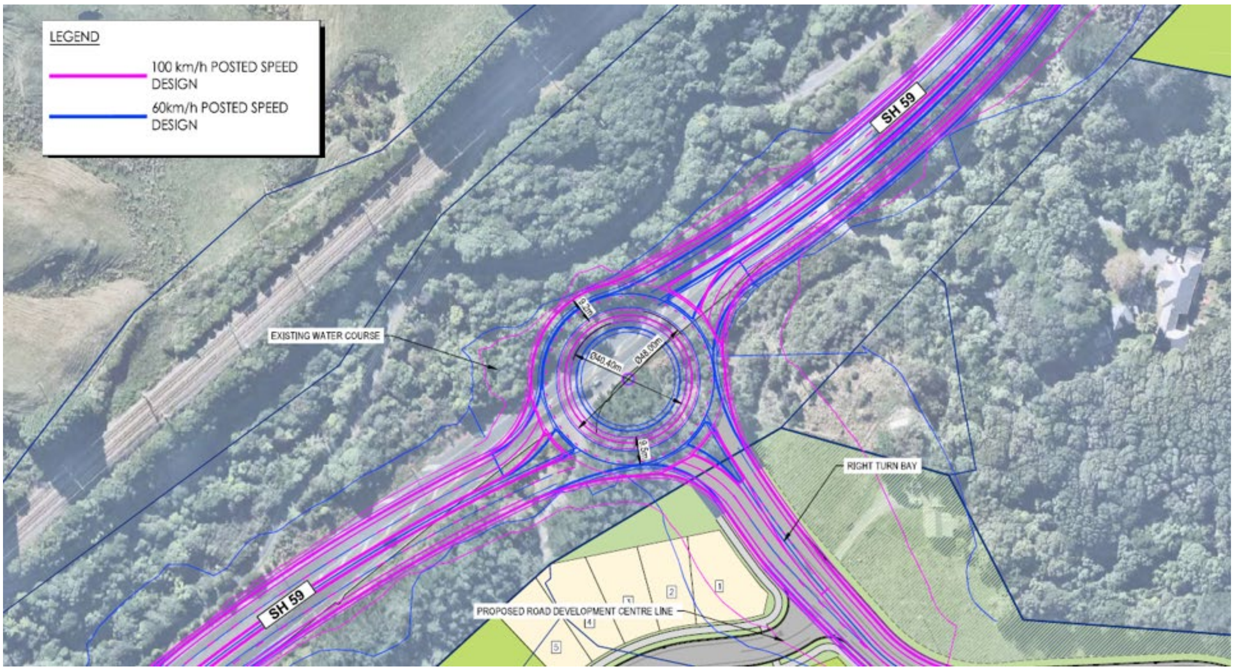

Figure 7-1: Concept Roundabout Designs for Site Access SH59

Due to the current 100kph posted speed limit on the Highway, the proposed roundabout solution would preclude the ability to provide a safe ‘at grade’ crossing of SH59 between the Site and the Ara Harakeke shared path. On this basis, the only viable options for active mode connection from the Site to the Ara Harakeke shared path are grade separation involving either an underpass or overbridge. Both of these options present significant challenges, including ecological, flooding and stormwater impacts along with Crime Prevention through Environmental Design considerations with an underpass, and clear height / span requirement impacts on ramp access and lengths for an overbridge. As described earlier in Section 3, future reclassification of SH59 adjacent to the Site along with a reduced speed limit could enable an at grade crossing and connection to the Ara Harakeke path to be realised.

7.1.3 Interim Access Design (Construction Traffic and Initial Lots)

In addition to the roundabout designs described above, a concept design for formalising the current priority arrangement at the established Site driveway has been developed by way of an indicative ‘interim’ intersection layout to accommodate some construction related traffic and an initial number of residential dwellings on the Site, prior to the roundabout being constructed. Potential for this option has been discussed with NZTA. Detailed assessment of the arrangements from a traffic operation, safety perspective and the level of traffic it could support is described in in Chapter 11.

7.2 Connectivity within NGDA

The overall Site plan is shown below at **Figure 7-2**. The proposed internal Site movement network includes two Collector Road links through to the Muri Block to the north, providing the opportunity for a ‘loop’ road through these adjoining sites, with these routes designed to accommodate a public bus should such a service be implemented in the future. These arrangements align with the NGDA Structure Plan (included earlier at Figure 4-1).

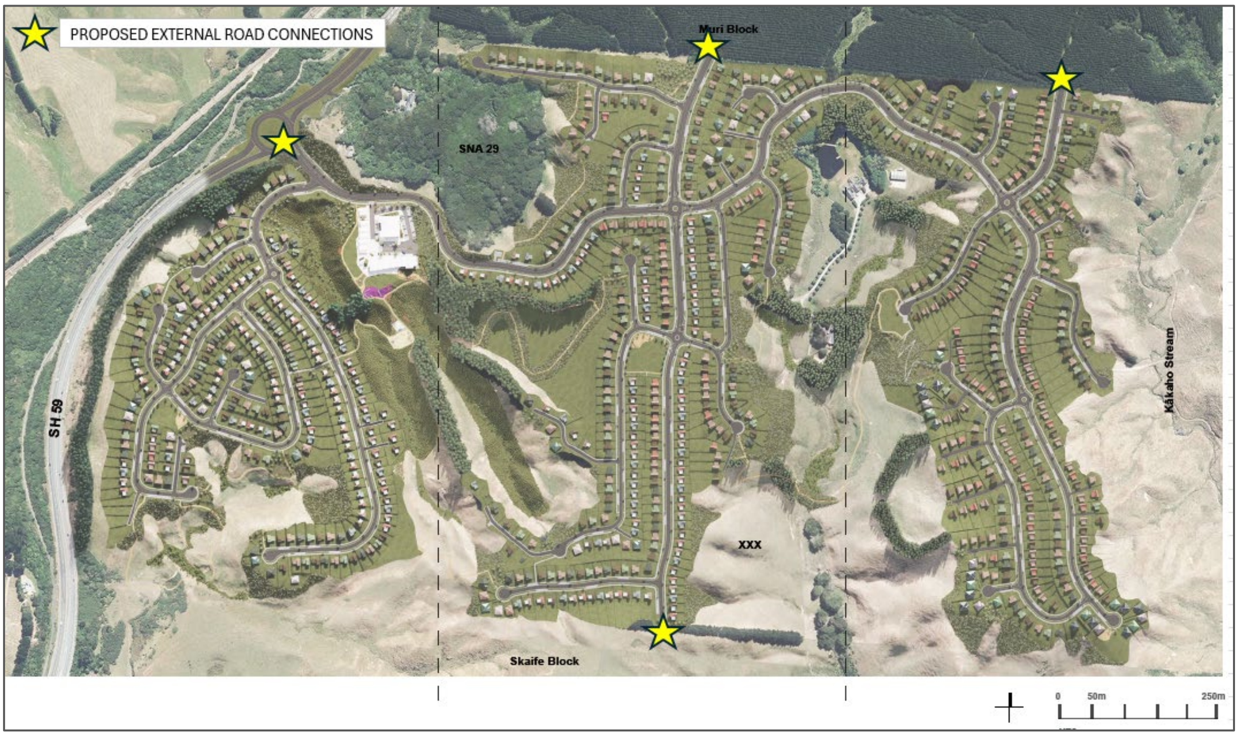

Figure 7-2: Site Roading Layout and External Connections

Whilst the NGDA Structure Plan envisages multiple roading connections with the Skaiffe Block land to the south, the topographical and ecological constraints in this part of the Site and over the boundary within the Skaiffe Block makes the realisation of multiple Collector Roads extremely challenging, particularly in lieu of any detailed investigations or available masterplanning for the Skaiffe Block to inform any potential practicable alignments. Notwithstanding, and on the request of PCC, the development plans include provision for a Collector Road connection with the Skaiffe block to the south that could accommodate a future bus route. Again, given the unknowns within the Skaiffe block site, a feasibility assessment of forming this Collector Road extension through this neighbouring land falls outside of this Application.

The external connections described above will ensure appropriate connectivity between the Site and the balance of the NGDA.

7.3 Active Mode Connection

The active mode network within the Site includes on-road cycle lanes, footpaths, shared paths and a series of off-road walkways and trails which connect local areas and provide convenient access through the Site. This is consistent with the NGDA, noting the proposed Collector Road shared path which will link to and through the Muri Block to the north will provide Site residents with access to Pukerua Bay community and the rail station, as well as connection to the Skaiffe Block to the south. The external shared path connections to the Site boundary to the north, south and west are illustrated in Figure 7-2 above (by the yellow stars), noting supplementary off-road trails will provide additional connectivity at the boundary as described in more detail at Section 8.3.

8 Internal Movement Network

The Site's proposed internal transport infrastructure has been developed to align with the District Plan infrastructure roading classifications, and to ensure a legible and connected network to support trips to/from and within the Site, that provides:

- a clear roading hierarchy of Collector routes and Access roads;
- the intent of the Structure Plan in connecting with the balance of NGDA land to the north to and south to deliver appropriate internal and external connectivity with the wider transport network;
- a high-quality streetscape that serves to constrain speeds through adoption of appropriate carriageway widths, kerbside parking, and landscaping; and
- on-road cycle lanes, footpaths / off-road recreational paths for walking and cycling to support active mode trips within the Site, as well as external connection to destinations including Pukerua Bay (via the Muri Block to the north).

The proposed movement network has been developed for the Site to take account of these outcomes and is illustrated in **Figure 8-1**.

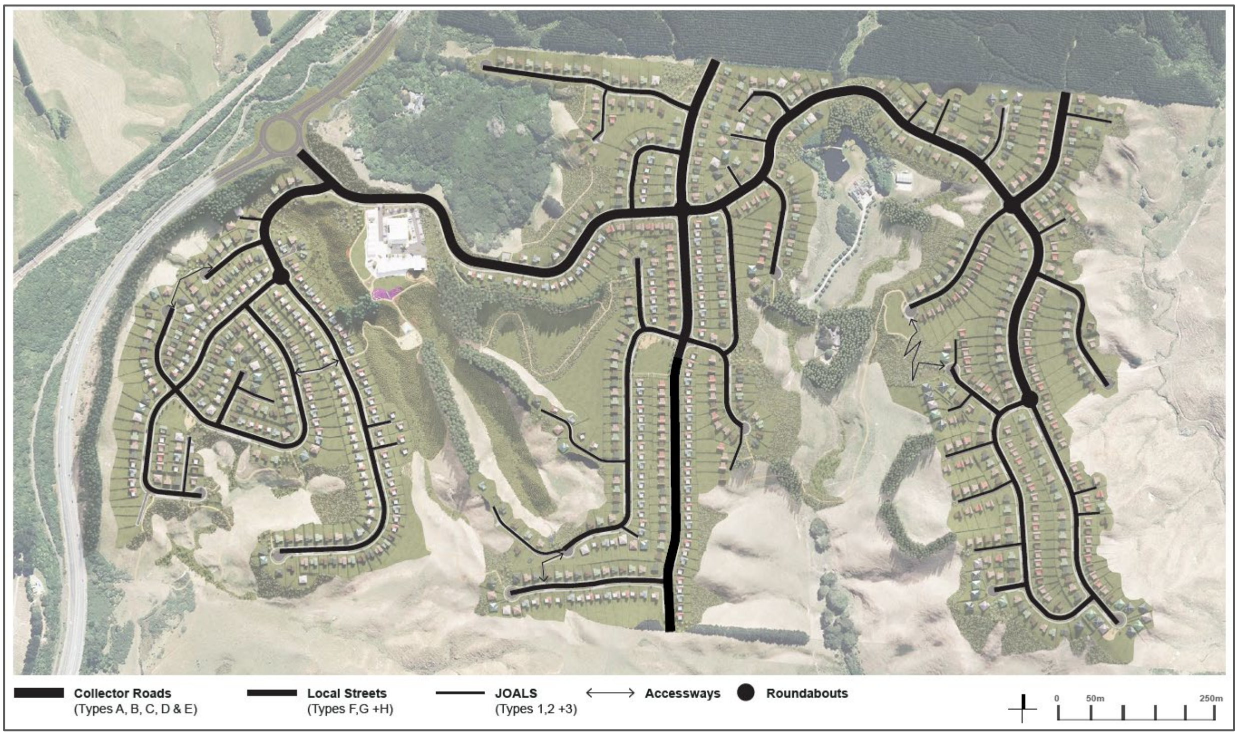

Figure 8-1: Site Roading Layout

To ensure the functional requirements of the future Site internal network are appropriately met, specific road typologies have been developed to facilitate movement within the Site, including 'collector' and 'access' roads. Variants to these typologies have been designed to be cognisant of localised constraints that restrict achievable width whilst maintaining appropriate movement space and suitable provision for underground services.

8.1 Site Road Typologies

In drawing from the District Plan road classifications, the roading typologies that have been adopted for the Site are summarised in **Table 8-1**.

Table 8-1: Proposed Road Typologies

Classification	Typology	Description	Total Road Width	Carriageway Width	Active Mode Provision
Collector Road	Type A & B	7m wide carriageway, 1.8m wide on-road cycle lanes, 2.5m wide kerbside parking (Type A) or berm (Type B), 2.5m wide shared path on one side and 2m footpath on the other.	21.7m	7m (2 x 3.5m lanes)	On-road cycle lanes, shared path on one side and footpath on the other
	Type C	*Collector Road where it abuts steep topography on the entry to the Site.* 7m wide carriageway, 1.8m wide on-road cycle lanes both sides, 2m berm on one side along with 2.5m wide shared path, and 3.5m and berm on the other.	19.7m	7m (2 x 3.5m lanes)	On-road cycle lanes, shared path on one side
	Type D & E	*Collector Road providing potential future access for bus route to Skaiffe Block land to the south.* 7m wide carriageway, 2.5m wide kerbside parking (Type D) or berm (Type E), 2.5m wide shared path on one side and 2m footpath on the other.	18.6m	7m (2 x 3.5m lanes)	Shared path on one side and footpath on the other side
Local Access Road	Type F	6m wide carriageway with an indented 2.5m wide kerbside parking lane or berm on both sides, 1.8m wide footpath on both sides and rear berms	16.7m	6m	Footpath on both sides of the road
	Type G & H	*Access Road where it abuts steep topography, lots are only provided on one side, or only a small number of lots served (i.e. < 20)* 6m wide carriageway with an indented 2.5m wide kerbside parking lane (Type G) or berm (Type H) and 1.8m wide footpath on one side only	14.5m	6m	Footpath on one side of the road
Private JOAL	Type 1	5.5m carriageway, 1-2m wide berm on either side.	8m	5.5m	Shared in movement lane

Classification	Typology	Description	Total Road Width	Carriageway Width	Active Mode Provision
	Type 2	5.5m carriageway with 1-1.5m berm on either side, 1.8m footpath	8.5m	5.5m	Footpath on one side
	Type 3	3.5m carriageway with 1m berm on either side	5.5m	3.5m	Shared in movement lane

These road typology cross sections are illustrated diagrammatically in Appendix C.

As shown in Table 8-1, with the exception of the private JOALs serving a small number of lots (4 or fewer), the internal road typologies each allow for two-way traffic flow (i.e. one traffic lane in each direction) with indented kerbside parking separated by landscaped buildouts.

Allocation of the road typologies described above across the internal Site network is shown in **Figure 8-2**, including locations where variants to the primary cross section are proposed.

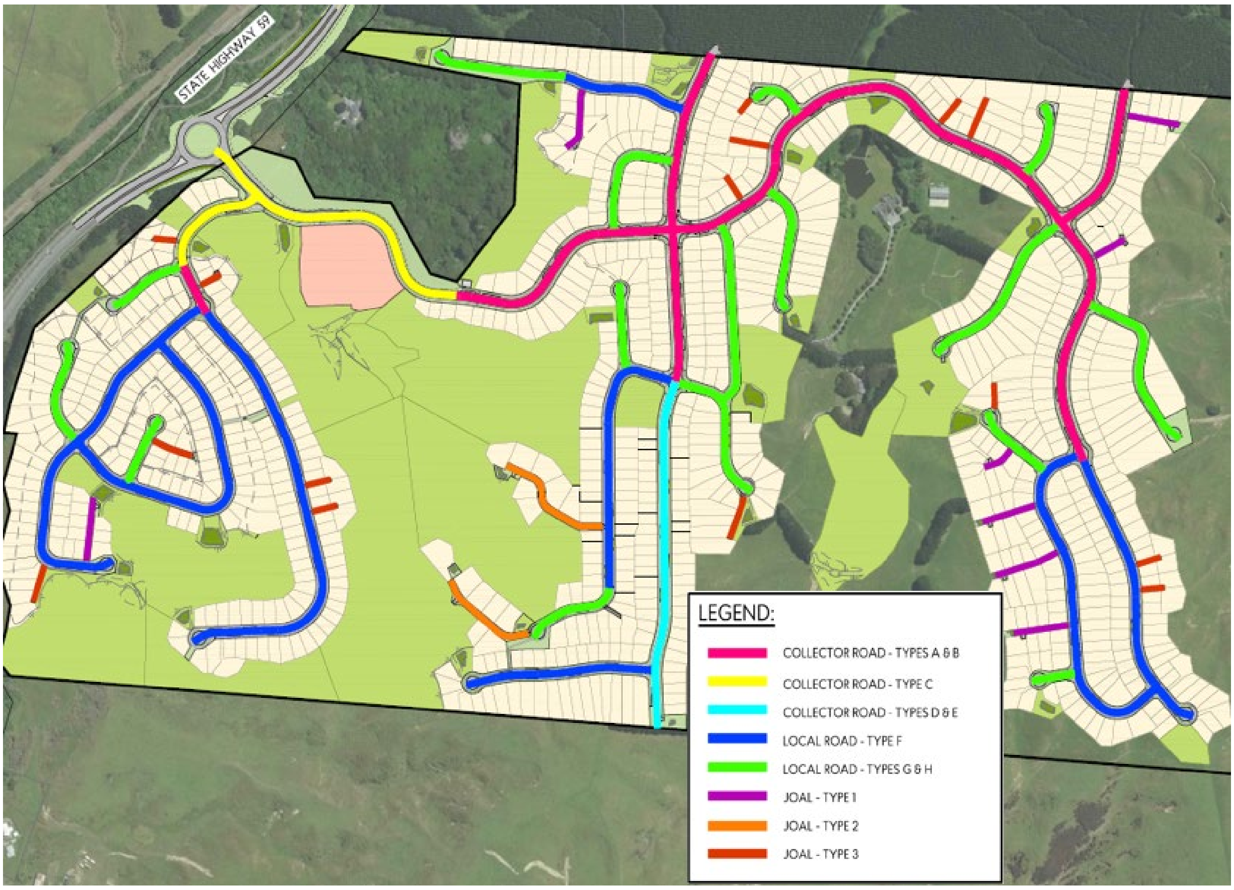

Figure 8-2: Site Roading Typologies

Whilst the Collector Road typologies described above deviate slightly from that identified in the District Plan INF-S23.4 in terms of an overall minimum 'legal width' of 22.8m, the associated movement widths for traffic and active mode routes have been designed to align. This includes providing a 7m carriageway to suitably accommodate two-way traffic, along with appropriate provision for active modes. The small reduction in the balance of road space will not materially impact the ability to accommodate all the required services within the available berms. Specific details of the Collector Road typologies deviation from the District Plan are set out below:

- typology A & B: this typology, which captures the majority of the Collector Road network within the Site, has a proposed 21.7m legal width which is marginally narrower than the 22.8m included in the District Plan. Notwithstanding, the associated movement widths for traffic lanes and active mode routes still fully comply with the District Plan. Further, the proposed 21.7m legal width exceeds the recommended 20m included in the industry standard NZS4404:2010 'Land Development and Subdivision Infrastructure' (NZS4404) for collector roads;
- typology C: this section of Collector Road abuts steep topography near the entry to the Site. As such, a narrower 19.7m legal width is needed, but again the movement space satisfies the component parts of the District Plan with the exception that kerbside parking and a path is provided on one side of the road only. This is assessed as not generating any material adverse effects since there will be no development on the opposite side where the topography is steep (and land is not able to be developed due to QEII covenants), and therefore no parking or pedestrian demand will be generated; and
- typology D & E: this section of Collector Road forms the potential future connection into the Skaiffe Block to the south, and so provision has been made for a 7m wide carriageway and indented parking to provide appropriate width for a potential future bus route. For active modes, a shared path is provided on one side and a footpath on the other, with more confident cyclists able to either share the carriageway, in line with the principles set out in NZS4404.

In a similar manner to the above, the Local Access Road typologies G & H include a slightly narrower legal width of 14.5m (versus the District Plan 15.2m), noting these typologies typically only serve smaller catchments of 20 lots or less, and the movement space for traffic and pedestrians fully meet the standard, albeit with a footpath on one side of the road only. For those roads where this typology has been adopted and more than 20 lots are accessed (which includes 'Road 8' - 26 lots; 'Road 25' - 21 lots; and 'Road 29' - 22 lots), the additional number of lots over and above the 20 is not assessed as generating significantly greater pedestrian demands that warrant the addition of a footpath on both sides.

All proposed roads will be vested to PCC, with the exception of the JOALs which are to be retained in private ownership. Where vested roads are formed as cul-de-sacs, appropriate turning heads have been provisioned for in line with good practice that allows for a medium rigid truck design vehicle to turnaround. Further commentary on service vehicles and practices is provided later in Chapter 12.

<u>JOALs</u>

Under TR-S3 the District Plan sets out a number of design criteria for vehicle accesses including in relation to legal and formed width, provision for active modes, maximum gradient and turning space.

As described above in Table 8-1, three typologies for JOALs have been developed which take account of the Site conditions and topography and provide access to between 2 and 8 lots.

Under the District Plan, design for vehicle access Levels 1 and 2 serving 'up to 6 lots' can be constructed to a single lane carriageway width, with passing places provided every 50m. The next access Level 3 design provides for up to 20 lots and anticipates a minimum 5.5m carriageway width, thereby allowing for two-way vehicle flow throughout the length of the JOAL.

The design approach adopted for the Site JOALs where more than 4 or more lots are served is to apply JOAL Type 1 or 2, which include a 5.5m carriageway allowing for opposing vehicles to pass each other. This approach aligns with the intent of the District Plan (and NZS4404) access Level 2 and 3 designs by facilitating two-way traffic.

The overall legal width adopted for JOAL Types 1 and 2 is proposed at 8m to 8.5m, which aligns with the District Plan 'Level 2' access for up to 6 lots of '4.5m width + allowance for passing bay', but deviates from the District Plan access Level 3 requirement of 11m (for JOALs serving up to 20 lots). Whilst there are 6 JOALs serving >6 lots which therefore deviate from the District Plan legal width requirement of 11m, it is assessed that these will in practice function in a very similar manner to the District Plan access Level 2, and that the minor additional traffic generated by the 1-2 additional lots (over and above the 6 lots anticipated for a Level 2 access in the District Plan) would not have a material effect on the safe and efficient operation.

Where JOALs extend over 100m (i.e. JOAL F and G), a footpath has been provided to accommodate pedestrians, separate from the carriageway.

For JOALS serving up to 3 lots, JOAL Type 3 has been adopted which includes a 3.5m formed carriageway within an overall 5.5m legal width, which complies with the District Plan requirement of minimum overall width of 3.6m for an access Level 1 (serving up to 3 lots).

For some JOALs, common turning areas are provided whilst in others, visitors and courier vans etc will be able to use driveways in order to turn and exit in a forward direction. JOALs O and Q each serve 3 lots whilst JOALs I, K, L, M, N, P and W each serve 4 lots, and therefore under the District Plan are required to provide a common turning area. In each case these JOALs are formed to 50m or less with a generally straight alignment, noting as above there will be opportunities to turn around within localised widening adjacent to lot driveways, ensuring non-residents can turn and exit in a forward direction.

With respect to gradients for active mode routes on accessways, the District Plan points to Austroads Part 6 'Paths for Walking and Cycling'. This guidance acknowledges that whilst flatter grades are best suited for walking and cycling (with desirable grades of 12.5% or less and applied on shorter sections only), this is not always achievable for paths that follow streets or accessways in steeper terrain. Each of the JOALs meet the 12.5% with the exception of JOAL G, which includes a section at -16% where it provides access to approximately 6 lots. Whilst this exceeds the 12.5% grade, it sits within the industry guidance AS/NZS2890.1 for access design with respect to maximum grade for circulation routes in public parking areas (16.7%).

8.1.1 Parking

The proposal plans have been developed to provide an appropriate balance of car parking through both off-street (i.e. within individual residential lots) and on-street provision to accommodate the expected demands generated by the scale and nature of the new subdivision. On-street parking is provided in the form of indented parking bays that will be distributed throughout the development, whilst the generous lot sizes proposed (averaging 523m²) will, in most cases, enable at least two off-street carparks to be provided for each dwelling.

8.1.2 Future Bus Stops

Discussions have been held with Metlink around potential bus stops within the Site, should a bus service be introduced by GWRC in the future. Given the expected traffic volumes on the Site Collector Roads where future buses would route, in-lane bus stops (rather than indented) have been confirmed by Metlink as appropriate. In addition, there is adequate width within the adjacent berm areas to provide bus shelters, should these be required.

8.2 Design Layout

The internal roading network has been developed to achieve a design speed of 40kph or less by adopting suitable carriageway widths that are not overwide (which might encourage higher operating speeds), as well as using curved alignments and intersection forms including roundabouts to manage vehicle speeds. The plans provide for side roads to connect at 90-degrees, as shown within the detail of **Figure 8-3**.

Figure 8-3: Site Roading Layout and Road Numbering

Those areas where the proposed internal transport network deviates from the District Plan (as identified earlier in Table 6-1) are described and assessed in turn below.

<u>No Exit Roads / Cul-de-sacs</u>

Under INF-S23.1, the District Plan sets out an expectation that new developments avoid the use of long cul-de-sacs, which can limit internal accessibility.

The proposed subdivision roading layout has been designed to respond to the topography of the Site, which includes significant gullies and ridges. It is not therefore practicable to achieve roads that fully link through the various development areas (given the level differences) without including some cul-de-sacs, which either extend longer than 100m or will accommodate more than 200 vehicles a day. Where possible, internal 'loops' have been provided to reduce the number of cul-de-sacs. Roads 3, 7, 8, 10-13, 21, 26 and 32 deviate from this standard, whilst Roads 2, 5 and 24 are shown as no exit streets but facilitate future connections with land to the north and south. Where cul-de-sacs are proposed, and to mitigate effects on travel distance for active modes specifically, dedicated walking and cycling trails are included where practicable to provide improved connectivity and shorten travel distances, including for Roads 7, 8, 10, 21 and 32 (see Figure 8-4 below).

Overall, the proposed transport infrastructure demonstrates a balanced approach to addressing the Site's complex topography and ecological sensitivities, and includes a purposefully designed active mode network to support local neighbourhood travel by modes other than private vehicles.

Gradients

Under INF-S23.7, the District Plan sets out maximum road gradients at 10% for Collector Roads, and 12.5% for Local Access Roads serving up to 20 dwellings or 10% where more than 20 dwellings are served.

Owing to the Site topography, portions of Collector Road 1 and 20 include an 11% grade. Whilst these roads form part of what could be a potential future bus loop through the Site, the small difference in grade will not preclude access by buses, noting many existing bus routes within hill suburbs around Wellington traverse steeper grades than 11%. Road 26 (also a Collector but unlikely to form part of a bus route) includes a localised section at 12.5%, which again is not assessed as materially impacting on the road function or operation.

The following Local Access Roads incorporate grades steeper than anticipated in the District Plan: Road 7 (14%), Road 10 (12.5%), Road 25 (12.5%), Road 25 (12.5%), Road 27 (14.3%), Road 28 (12.5%) and Road 32 (12.5%). As shown, the majority include maximum grades of 12.5%, which are identified in NZS4404 as being in keeping with a local road design. For Roads 7 and 27 which include localised steeper grades of around 14%, such differences compared to 12.5% would be difficult to distinguish and are not assessed as introducing any material adverse effects, noting again such grades are characteristic of many hill suburbs throughout Porirua and the Wellington region. The overall road design and Local Access Road typology which avoids over-wide carriageways will ensure vehicle speeds remain low and can function in a safe and efficient manner.

Intersection Separation and Sightlines

Under INF-S25.3, the District Plan sets out minimum intersection separation distances for local access roads connecting with local access roads of 40m, and local access roads connecting to Collectors roads of 80m. Noting the constraints imparted by the Site topography, a total of 4 local roads (Roads 6, 7, 15, and 31), which connect to a Collector Road deviate from this standard. In each case, a minimum separation distance of 50m is achieved, which allows a typical 5-seconds of vehicle travel time (at a 40kph operating speed) between potential turning conflicts at adjacent intersections to ensure safe decision and reaction times.

Further, for Roads 6, 15 and 31 which connect via a priority tee-intersection with the Collector Road, the adjacent intersection is a roundabout, which will have the effect of slowing traffic (as vehicles negotiate the geometry at the roundabout), further mitigating any potential conflicts. The proposed arrangements are therefore assessed as not giving rise to any adverse safety outcomes, noting intersection spacings of 50m are typical of residential suburbs.

Under INF-S25.4, minimum intersection sight distances are identified as 75m for operating speeds of 31-40kph, and 100m for 41-50kph. In again noting that a minimum 50m separation distance is provided between intersections, in cases where sightlines extend to an adjacent roundabout on the priority road, sightlines are assessed as adequately meeting the minimum since operating speeds for vehicles traversing the roundabouts will be slower.

Of the proposed internal Site intersections, five deviate from the 100m minimum for the ‘posted speed’ limit of 50kph (being Roads 4, 12, 14, 15 and 29) and 3 from the 75m 40kph ‘design’ speed (being Roads 14, 15 and 29). Roads 15 and 29 each achieve a minimum sight distance of 70m in one direction, with sightlines in the opposite direction extending approximately 50m to the adjacent roundabouts. Given the horizontal alignment of the road geometry in each case, speeds of approaching traffic will be <40kph, noting the associated 75m minimum sightline is only marginally greater than the available sight distance. The effects of this minor shortfall are assessed as negligible.

Sightlines for vehicles exiting Road 14 at Road 13 extend 55m to the west and >100m to the east. Whilst this available sightline to the west deviates from the District Plan, it fully satisfies the Austroads Stopping Site Distance[3] for both 40kph and 50kph design speeds of 40m and 55m, respectively. Noting traffic volumes on Road 13 where it intersects with Road 14 will be very low, given the small catchment of around 20 lots that it serves, it is assessed the available sightlines will enable it to operate safely and efficiently. Notwithstanding, and given the predominant exit movement will be a right turn out, a stop control is recommended for traffic exiting Road 14.

<u>Intersection Form (use of roundabouts or four-way priority cross roads)</u>

Under INF-S25.5 and S25.6 the District Plan specifies intersections must not have more than 3 approaches or include roundabouts.

The proposed internal roading arrangements include some four-way intersections which have been specifically designed in all but one instance as roundabouts, in line with the Safe System approach principles of reducing vehicle operating speeds through the Site and minimising crash severity by reducing the angle of impact over other priority intersections arrangements. A total of five internal Site roundabouts are proposed, with each having been designed to accommodate appropriate tracking of design vehicles including a GWRC bus and large rigid truck (such as those used by removal companies). Splitter islands are included on Collector Road approaches to the roundabouts, which include pedestrian refuges to enable staged crossing of the carriageway. Where on road cycle lanes are provided on approaches to the roundabouts, cycle ramps are included to allow cyclists to exit the carriageway and utilise the shared path to navigate around the roundabout, clear of the traffic circulation lane.

[3] Austroads Part 3: Geometric Design: Stopping Sight Distance is the distance to enable a normally alert driver, travelling at the design speed on a wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road. Distances quoted assume a 2s reaction time.

The intersection of Road 11, 12 and 14 has been designed as a four-way priority intersection, and will be developed at detailed design to include suitable traffic controls (i.e. raised platforms on the approaches and use of colour delineation) to ensure it operates safely, noting the low traffic volumes it will accommodate given the small catchment it serves.

Individual Lot Access and Parking

Under TR-S5 'Vehicle Crossings', the District Plan sets out a number of criteria that the Site's individual residential lot driveways need will be designed to. At this stage individual vehicle crossings have not been defined for all the 949 lots, and whilst the majority will be able to satisfy the relevant standards, it is likely that some driveways won't be able to fully comply, for example in terms of access separation. In such instances a consent condition has been recommended requiring the design of the driveway to be developed, for later certification, to a suitable standard in keeping with the suburban setting and frontage street environment, including in relation to maximising access separation as far as practicable. In this manner, the positioning of driveways will form part of PCC's certification process.

TR-S6 sets out specific standards for onsite parking spaces. In a similar manner to above, the specific design details of individual lot parking driveways and garages is not currently known and, whilst most will be designed to satisfy these standards where practicable, in some instances actual gradients may deviate from the maximums described due to Site topography. A consent condition is therefore recommended requiring the design of a driveways to be developed, for later certification by PCC, to a suitable standard in keeping with the suburban setting and frontage street environment.

Overall, the proposed Site movement network and associated road typologies have been designed to provide an appropriate movement system for all travel modes. The combination of proposed winding alignments and specifically chosen intersection forms which include roundabouts at key nodes, will ensure that a safe operating speed is achieved within the Site. Whilst the arrangements deviate from some District Plan standards as dictated by the topography, the proposal plans will deliver a transport system capable of accommodating the generated demands safely and efficiently.

8.3 Active Modes

The proposal provides a purposefully designed active mode network within the Site which includes on-road marked cycle lanes and a shared path along the Collector roads, which form the subdivision access spine routes and connect with the future neighbourhood centre. All roads have generous footpaths on at least one side of the street.

To supplement the footpaths and shared paths within the proposed roading corridors, additional off-road provision for pedestrians and cyclists is provided in the form of a series of off-road trails which connect local catchments with recreational areas and reserves, and provide shorter and more convenient linkages through the Site for active mode users, including to and from the future local neighbourhood centre. Details of the Site's active mode network and external connections at the Site boundary are illustrated within **Figure 8-4**.

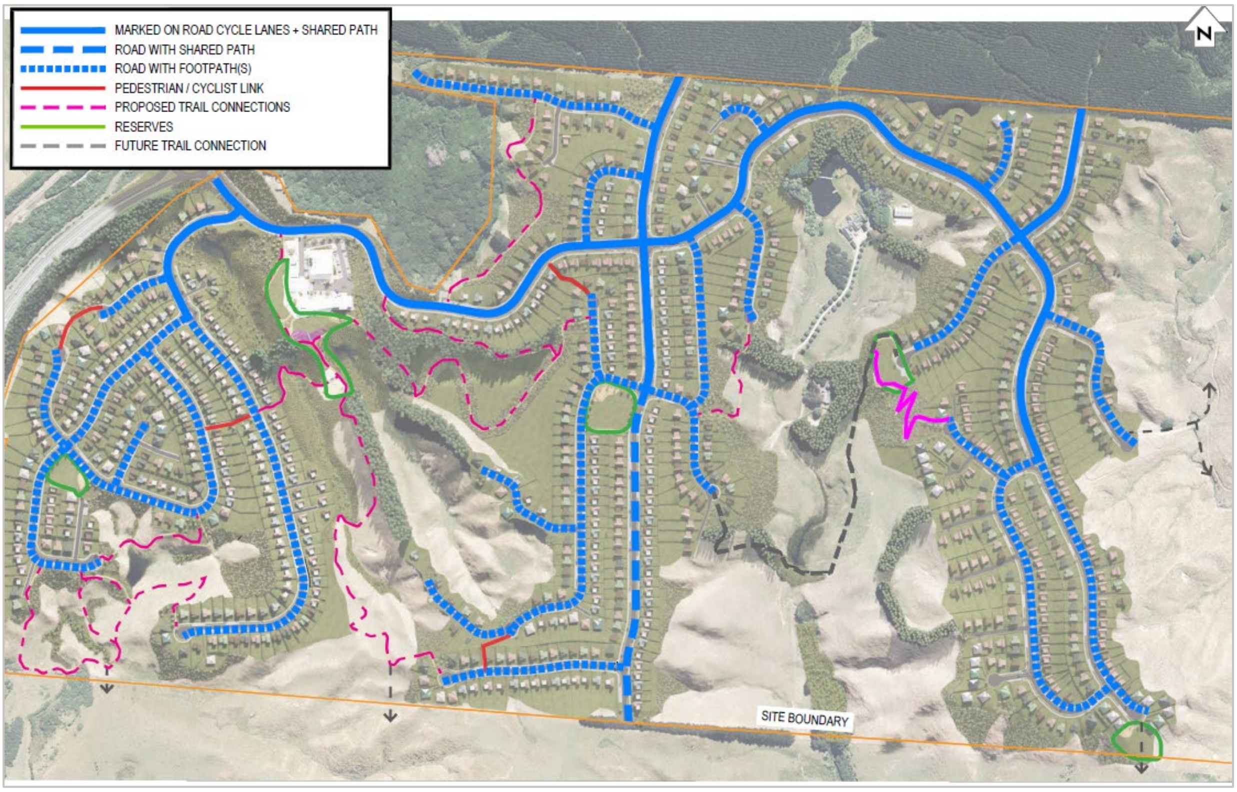

Figure 8-4: Active Mode Network

9 Development Site Traffic

9.1 Proposed Site Residential Activity

As described earlier, a total of 949 dwellings are proposed across the Site. Surveys of households reported within the NZTA Research Report 453 Trips and Parking Related to Land Use 2011 (RR453) indicates daily trip generation rates for 'Outer Suburban' residential activities typically average around 8.2vpd per dwelling, with associated peak hour movements of 0.9vph. It is noted that the data supporting these trip rates in the 2011 publication is now very dated.

Residential dwelling trip rates reported in the 'RMS Guide to Traffic Generating Developments' (RMS) indicate peak hour trip rates of 0.85vph, noting these were adopted for the traffic analysis undertaken for the consented Plimmerton Farm Site Stage 1 development to the south. More recent data collected for household trips across the Wellington region[4] indicates levels of 0.6-0.8 per dwelling during the peak hours. Whilst such lesser rates are now more typically likely to occur in practice, a figure of 0.85vph per dwelling has been adopted in this case, consistent with the rates accepted for consented development at Plimmerton Farm as well as the traffic assessment[5] informing the now operative PCC-led 'NGDA Variation 1'.

For the purposes of assessing the effects of the Site's residential component traffic generation on the surrounding road network, the adopted peak hour traffic generation rate of 0.85vph has been applied to the proposed 949 dwellings, with the resultant traffic generation and directional splits for inbound / outbound trips[6] summarised in **Table 9-1**.

Table 9-1: Site Residential Activity Traffic Generation

	AM Peak*	PM Peak**
Inbound Trips	242	484
Outbound Trips	565	323
Total	807	807

**AM Peak: 70% departures, 30% arrivals*
***PM Peak: 60% arrivals, 40% departures*

In addition, and in response to direction from NZTA to use a higher trip generation rate than that described above for assessment of development traffic effects on the external network, a 'sensitivity' scenario has been assessed which adopts a significantly higher rate of 1.3vph per dwelling. This trip

[4] Trip generation rates for established suburbs in the Wellington region including Riverstone Terraces and Totara Park in Upper Hutt
[5] Porirua Northern Growth Areas Pukerua Bay South – Variation 'Integrated Transport Assessment', prepared on behalf of Porirua City Council by Tim Kelly Transportation Planning Ltd (July 2022)
[6] Derived from surveys of existing residential subdivisions around the Wellington Region, and the Institute of Transportation Engineers (ITE) guidelines

rate figure comes from the recent NZTA Planning Policy Manual[7] (PPM) (which in turn draws from data informing RR453, again noting this is now very dated), and is well above what is anticipated to occur at the Site. Notwithstanding, and as demonstrated by the modelling analysis reported later at Chapter 10, the network is able to accommodate these generous traffic flows without triggering the need for external network mitigation (beyond the Site access intersection at SH59).

A small neighbourhood centre is also proposed for the new subdivision (which sits outside of the current Application and will be consented separately) providing a future commercial use including a small local supermarket offering and adjoining small retail / commercial activities which will cater primarily for the needs of the new residential catchment, rather than generate external trips. That said, it may attract some trips from the neighbouring Pukerua Bay residential catchment given the limited retail opportunities currently provided there, although such trips would not be significant, mainly involving people diverting from an existing trip on the Highway. These trips are able to be adequately accommodated by the proposed new roundabout at the Site access on SH59, as covered by the sensitivity allowances described above and included in the development traffic network modelling assessment described in Chapter 10. In practice, development of the local neighbourhood centre will likely lead to some potential overall reduction in trips from Site residents and those in Pukerua Bay to Plimmerton and Mana retail destinations, if this centre can satisfy their needs instead.

9.2 Consented Development Nearby

As previously indicated, there are some consented developments in the vicinity of the Site that will load traffic onto the local SH59 network, as follows:

- Plimmerton Farm Stage 1: 600 new residential dwellings consented, with access via James Street to the SH59 roundabout in Plimmerton; and
- Muri Block stage 1: approximately 150 new residential dwellings accessing via Muri Road and connecting with SH59 at Gray Street.

These consented developments have been accounted for in the future ‘Do Minimum’ assessment of Site traffic described in the following chapter, using the associated trips rates adopted for the Site to determine forecast traffic generation on the wider network.

9.3 Traffic Distribution

The directional distribution and assignment of traffic generated by the proposed development has been determined using a combination of the district traffic models, including the Wellington Northern Area SATURN model and the Wellington Transport Analytics Unit’s Porirua AIMSUN model. This indicates a Site traffic distribution of around 10% of the trips to and from the north and 90% to and from the south.

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[7] NZTA Planning Policy Manual Access onto the State Highway from Private Property (26 September 2025)

10 Network Traffic Effects Assessment

This chapter summarises the adopted approach for assessing the impact of the development Site traffic on the adjacent road network, and specifically at the following intersections which were identified by NZTA as forming the study area extent for the project (as shown in Figure 10-1 below):

- SH59 / James Street / Ulric Street / St Andrews Road roundabout;
- SH59 / Mt Welcome roundabout (Proposed Site Access); and
- SH59 / Gray Street.

For the purposes of assessing the change in intersection performance, a cut-down version of the Porirua AIMSUN model was used. The AIMSUN software has the ability to simulate interactions between vehicles and closely spaced intersections or infrastructure. Furthermore, the modelling is represented visually so constraints within the network can be easily identified.

Use of the wider-area Porirua AIMSUN model was considered but due to the model not being suitably calibrated at the SH59 / James Street / Ulric Street roundabout, it was deemed appropriate to instead create a separate model which relies on distribution patterns of the wider model, traffic generations of the zones representing Airlie Road and Gray Street, and growth rates on SH59 between 2023 and 2033.

The model which has been developed for the assessment covers two-hours in the morning and evening peak periods, at 15-minute intervals.

10.1 Model Network Extent

The study area extent of the model is shown in **Figure 10-1**.

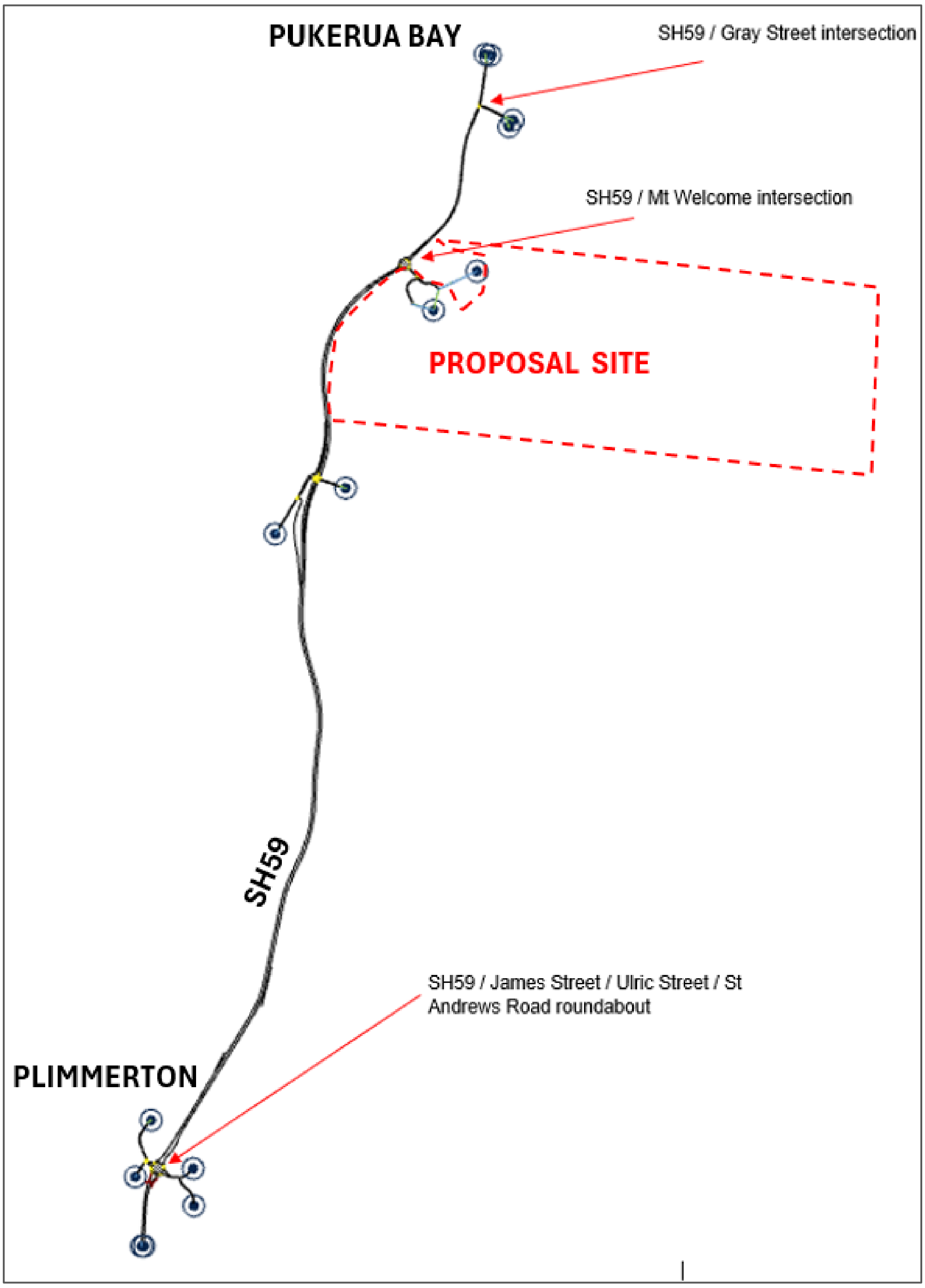

Figure 10-1: Model Extent

10.2 Background Traffic Growth

The wider area model assumes an approximate 2% growth per annum on SH59 and as such, allowance for this has been made for the 10-year future year scenarios onto which development Site traffic has then been added.

Separate allowance has been made for development traffic generated by the already consented lots (at Plimmerton Farm Stage 1 and Muri Block Stage 1) described in Section 9.2, for which an equivalent traffic generation rate and distribution pattern as that developed for the application Site traffic has been adopted.

10.3 Modelled Scenarios

To provide a comparative baseline and to appropriately account for other consented developments in the vicinity whilst also considering the effects of the Site itself, four traffic scenarios have been modelled and these are discussed below:

10.3.1 Scenario 1 – Base

Scenario 1 represents the existing situation and relies on surveyed turn count data collected at the SH59 / James Street / Ulric Street roundabout[8].

10.3.2 Scenario 2 – Future with nearby Consented Development

Scenario 2 is as per Scenario 1 and additionally includes:

- background traffic growth of 2% per annum (for ten years) on SH59;
- an upgraded SH59 / James Street / Ulric Street roundabout to include two approach lanes from James Street and a signalised pedestrian crossing on SH59 / St Andrews Road south of the roundabout, in line with the consented Plimmerton Farm development;
- a total of 600 consented dwellings within the Plimmerton Farm Stage 1 site; and
- a total of 150 consented dwellings within the Muri Block Stage 1 development which connects to SH59 from Gray Street in Pukerua Bay.

10.3.3 Scenario 3 – Future With the Project Site Traffic

Scenario 3 is as per Scenario 2 and additionally includes:

- traffic from 949 dwellings within the Mt Welcome Site; and
- a new roundabout on SH59 with an additional access off the roundabout to serve the development.

10.3.4 Scenario 4 – Future With the Project Site Traffic + Sensitivity Test

Scenario 4 is as per Scenario 3 plus traffic from a total of 500 additional dwellings anticipated (but not yet consented) within the future Muri Block development with access via the new roundabout off SH59, as a sensitivity test, and to confirm the new Site access roundabout is adequately future-proofed to accommodate these demands. This sensitivity scenario also serves to address the request from NZTA to test a much higher than anticipated trip generation rate of 1.3vph per dwelling for the proposed 949 dwellings on the Site.

[8] Turn count undertaken in 2022

10.4 Intersection Performance

Intersection performance has been assessed on the basis of delays (in seconds per vehicle) and Level of Service[9] (LoS), which is a graduated scale from A to F where A generally typifies free-flow conditions and F indicates flow breakdown. In addition, journey times data has also been reported to provide a comparison for travel times through the SH59 corridor both without and with Site traffic added in the future.

10.4.1 Modelling Results

The associated LoS and average delay outputs from the AIMSUN model for the SH59 / James Street / Ulric Street roundabout are summarised in **Table 10-1** below, along with the overall intersection delays and LoS averaged across all movements.

[9] Level of Service (LoS) is a six-level grading system for intersection performance (A to F), where Level A represents totally uncongested operation and minimal delays and queues, and Level F represents highly congested operation with long delays and extensive queuing.

Table 10-1: AIMSUN Output Summary: SH59 / James Street / Ulric Street

Period	Approach	Mvmt	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
			Avg Del	LoS	Avg Del	LoS	Avg Del	LoS	Avg Del	LoS
AM Peak	SH59 South	Left	1	A	5	A	6	A	6	A
		Through	1	A	5	A	5	A	6	A
		Right	1	A	6	A	6	A	7	A
		U-Turn	1	A	6	A	7	A	7	A
	James Street	Left	3	A	4	A	9	A	18	B
		Through	7	A	9	A	15	B	20	B
		Right	5	A	8	A	14	B	19	B
		U-Turn	0	A	0	A	0	A	0	A
	SH59 North	Left	4	A	4	A	8	A	17	B
		Through	5	A	6	A	11	B	21	C
		Right	5	A	7	A	12	B	21	C
		U-Turn	5	A	0	A	6	A	2	A
	Ulric Street	Left	3	A	2	A	4	A	6	A
		Through	6	A	7	A	11	B	13	B
		Right	6	A	7	A	11	B	13	B
		U-Turn	0	A	0	A	0	A	0	A
Overall Intersection delay (LoS)			3 (A)		6 (A)		9 (A)		15 (B)	
PM Peak	SH59 South	Left	1	A	5	A	5	A	6	A
		Through	1	A	4	A	5	A	6	A
		Right	1	A	5	A	5	A	6	A
		U-Turn	1	A	4	A	6	A	6	A
	James Street	Left	2	A	2	A	3	A	4	A
		Through	0	A	0	A	0	A	0	A
		Right	6	A	6	A	7	A	9	A
		U-Turn	0	A	0	A	0	A	0	A
	SH59 North	Left	3	A	4	A	6	A	7	A
		Through	3	A	6	A	8	A	9	A
		Right	6	A	4	A	7	A	10	B
		U-Turn	6	A	0	A	0	A	14	B
	Ulric Street	Left	6	A	7	A	14	B	19	B
		Through	12	B	11	B	65	E	66	E
		Right	11	B	21	C	42	D	70	E
		U-Turn	0	A	0	A	0	A	0	A
Overall Intersection delay (LoS)			3 (A)		6 (A)		9 (A)		11 (B)	

As indicated by the model results, the SH59 / James Street / Ulric Street roundabout is expected to operate well for all scenarios. The Ulric Street approach is anticipated to come under some pressure in the evening peak for Scenarios 3 and 4, but the overall intersection performance remains at LoS A or B. This is considered to be acceptable from a traffic engineering perspective for the peak hours.

The modelled performance of the SH59 / Gray Street intersection for all four scenarios is summarised in **Table 10-2**.

Table 10-2: AIMSUN Output Summary: SH59 / Gray Street

Period	Approach	Mvmt	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
			Avg Del	LoS	Avg Del	LoS	Avg Del	LoS	Avg Del	LoS
AM Peak	SH59 South	Through	1	A	1	A	2	A	2	A
		Right	7	A	9	A	10	A	9	A
	Gray Street	Left	3	A	5	A	5	A	5	A
		Right	4	A	6	A	7	A	7	A
	SH59 North	Left	3	A	3	A	3	A	3	A
		Through	0	A	1	A	1	A	1	A
Overall Intersection delay (LoS)			7 (A)		9 (A)		10 (A)		9 (A)	
PM Peak	SH59 South	Through	3	A	4	A	4	A	4	A
		Right	8	A	11	B	11	B	12	B
	Gray Street	Left	3	A	4	A	4	A	4	A
		Right	6	A	12	B	12	B	14	B
	SH59 North	Left	3	A	3	A	3	A	3	A
		Through	0	A	0	A	0	A	0	A
Overall Intersection delay (LoS)			8 (A)		12 (B)		12 (B)		14 (B)	

The modelling results indicate that the SH59 / Gray Street intersection is anticipated to operate well for all scenarios.

Table 10-3 summarises the modelled outputs for the SH59 / Mt Welcome access for Scenarios 3 and 4.

Table 10-3: AIMSUN Output Summary: SH59 / Mt Welcome Site Access Roundabout

Period	Approach	Mvmt	Scenario 3		Scenario 4	
			Avg Del	LoS	Avg Del	LoS
AM Peak	SH59 South	Through	6	A	6	A
		Right	6	A	6	A
		U-Turn	3	A	9	A
	Mt Welcome Access	Left	7	A	7	A
		Right	8	A	9	A
		U-Turn	0	A	0	A
	SH59 North	Left	9	A	12	B
		Through	10	A	12	B
		U-Turn	0	A	0	A
Overall Intersection delay (LoS)			8 (A)		8 (A)	
PM Peak	SH59 South	Through	8	A	9	A
		Right	8	A	9	A
		U-Turn	0	A	8	A
	Mt Welcome Access	Left	4	A	4	A
		Right	5	A	5	A
		U-Turn	0	A	0	A
	SH59 North	Left	12	B	19	B
		Through	12	B	19	B
		U-Turn	0	A	0	A
Overall Intersection delay (LoS)			8 (A)		10 (A)	

As indicated above, the forecast modelling shows the SH59 / Mt Welcome roundabout will operate very well at LoS A or B on all approaches for all scenarios.

10.4.2 Journey time Analysis

Peak hour travel times were extracted from the model for the four scenarios between the SH59 / James Street / Ulric Street roundabout and the SH59 / Gray Street intersection. The total distance between the two intersections is around 5.7km. The modelled travel times (in seconds) are summarised in **Table 10-4** below, together with the comparative increases between Scenarios 3 and 4 with Scenario 2.

Table 10-4: AIMSUN Journey Time (Seconds) Summary

Period	Scenario	Journey Time (Seconds)		Journey Time 'Difference' (Seconds) against Future Base Scenario 2	
		Northbound	Southbound	Northbound	Southbound
AM Peak	Scenario 1	239	243	-	-
	Scenario 2	245	252	-	-
	Scenario 3	253	268	+8	+16
	Scenario 4	254	281	+9	+29
PM Peak	Scenario 1	242	239	-	-
	Scenario 2	250	247	-	-
	Scenario 3	261	264	+11	+17
	Scenario 4	264	272	+14	+25

As shown, with the development traffic included, the travel times in the northbound direction in the peak hours are anticipated to increase by at most 14 seconds per vehicle and by around 29 seconds per vehicle in the southbound direction, noting some of this will be associated with the introduction of a new intersection in the form of a roundabout at the Site access.

Overall, this assessment demonstrates that from a traffic operation perspective, and with the proposed new roundabout at the Mt Welcome access intersection with SH59, the development demands can be appropriately accommodated by the external road network without giving rise to adverse capacity effects.

11 Interim Site Access Assessment

As described earlier in Section 7.1.3, a concept design for formalising the current priority arrangement at the established Site driveway has been developed by way of demonstrating an indicative 'interim' intersection layout. The purpose of this interim option is to accommodate an initial level of occupied dwellings on the Site, along with some construction related traffic (in combination with traffic controls and procedures through a Construction Traffic Management Plan) prior to the roundabout option being advanced.

Drawing from other comparable subdivision developments with a balanced earthworks quantity (such as proposed here), typical daily construction traffic volumes at the Site are expected to involve the following:

- 4-6 truck visits (i.e. 8-12 movements);
- approximately 20 staff including contractors / earthworks crew generating around 50-60 movements; and
- total 60-70 vehicle movements per day.

Assessment of a suitable threshold for Site staging has been determined using a combination of SIDRA intersection capacity analysis along with evaluation of the anticipated safety performance, as summarised in turn below.

11.1 Capacity Analysis

To determine the performance of the proposed upgraded tee-intersection with a right turn bay, it has been modelled using the SIDRA intersection software, for the AM, Inter-Peak (IP) and PM periods. The IP period has been included to capture some construction truck movements to/from the Site (which would be timed to avoid the peak hours) that are anticipated for day-to-day operations. Such volumes are expected to involve up to 4-6 visits per day (i.e. 8-12 movements), noting specific phases of construction activity at the Site involving significant truck volumes will be accommodated under an approved TMP.

The modelling assessment undertaken to test the capacity of the interim tee-intersection on SH59 has adopted the following assumptions:

- background traffic growth of 2% per annum on SH59 for two years (representing a 2-3 year period before the roundabout would come online);
- a total of 150 consented dwellings within the Muri Block Stage 1 development which connects to SH59 from Gray Street in Pukerua Bay;
- testing of the following scenarios for dwellings on the Site in line with the current yields included in the initial Site Stages 1-3:
  - Scenario 1: 47 Lots (Stage1)
  - Scenario 2: 123 Lots (Stages 1 & 2)
  - Scenario 3: 183 Lots (Stages 1,2 & 3)
- Construction traffic volumes involving 20 light vehicle (staff) movements during each of the AM and PM peaks, with 10 'light vehicle' and 4 'truck' movements during the IP (conservatively assuming half the daily truck movements occur over the IP period).

The SIDRA outputs for Scenarios 1-3 are summarised in **Table 11-1**, whilst a 'sensitivity' test which allows for a 15% increase in all Site related trips is reported in **Table 11-2**.

Table 11-1: SIDRA Output Summary for SH59 / Site Access Interim Priority Tee-intersection

Period	Approach	Mvmt	Scenario 1		Scenario 2		Scenario 3	
			Avg Del	LoS	Avg Del	LoS	Avg Del	LoS
AM Peak	SH59 South	Through	-	A	-	A	-	A
		Right	9.2	A	9.9	A	10.2	B
	Mt Welcome Access	Left	7.5	A	7.7	A	7.8	A
		Right	14.8	B	15.3	C	15.8	C
	SH59 North	Left	7.9	A	7.9	A	7.9	A
		Through	-	A	-	A	-	A
Inter Peak	SH59 South	Through	-	A	-	A	-	A
		Right	8.3	A	8.7	A	8.7	A
	Mt Welcome Access	Left	6	A	5.9	A	5.9	A
		Right	10.5	B	10.7	B	10.9	B
	SH59 North	Left	7.8	A	7.8	A	7.8	A
		Through	-	*A*	-	A	-	A
PM Peak	SH59 South	Through	0.1	A	0.1	A	0.1	A
		Right	9.0	A	9.1	A	9.1	A
	Mt Welcome Access	Left	5.9	A	5.9	A	6.0	A
		Right	22.8	C	24.1	C	25.3	D
	SH59 North	Left	7.9	A	7.9	A	7.9	A
		Through	-	A	-	A	-	A

Table 11-2: SIDRA Output Summary for SH59 / Site Access Interim Priority Tee-intersection 'Sensitivity Test

Period	Approach	Mvmt	Scenario 1		Scenario 2		Scenario 3	
			Avg Del	LoS	Avg Del	LoS	Avg Del	LoS
AM Peak	SH59 South	Through	-	A	-	A	-	A
		Right	9.2	A	9.9	A	10.2	A
	Mt Welcome Access	Left	7.5	A	7.7	A	7.8	A
		Right	14.9	B	15.5	C	16.0	C
	SH59 North	Left	7.9	A	7.9	A	7.9	A
		Through	-	A	-	A	-	A
Inter Peak	SH59 South	Through	-	A	-	A	-	A
		Right	8.3	A	8.7	A	8.8	A
	Mt Welcome Access	Left	6	A	5.9	A	5.9	A
		Right	10.5	B	10.8	B	11.0	B
	SH59 North	Left	7.8	A	7.8	A	7.8	A
		Through	-	*A*	-	A	-	A
PM Peak	SH59 South	Through	0.1	A	0.1	A	0.1	A
		Right	9.0	A	9.1	A	9.1	A
	Mt Welcome Access	Left	5.9	A	6.0	A	6.0	A
		Right	22.9	C	24.4	C	25.7	D
	SH59 North	Left	7.9	A	7.9	A	7.9	A
		Through	-	A	-	A	-	A

The SIDRA modelling shows development traffic associated with an initial yield anticipated under Scenarios 1-3 'plus' allowance for construction traffic, can be accommodated with the right turn out of the Site operating at LoS C during the PM under Scenarios 1 & 2, and LoS D under Scenario 3, with all other movements operating at LoS A or B. Overall, the increase in delay for traffic turning out of the Site during the PM peak between Scenario 1 and 3 is small, at <3 seconds. With a sensitivity applied to traffic volumes entering and exiting the Site, any associated delay increases are minor at <1 second for any movement.

The modelling assessment above demonstrates that from a capacity perspective the traffic associated with the first three stages of development at the Site (and allowing for construction traffic) can be accommodated by the upgraded priority tee-intersection, without vehicles experiencing long delays that might lead to drivers taking shorter / less appropriate gaps when turning at the Highway. Further commentary on the safety risk of the intersection arrangement is described below.

11.2 Safety Risk Analysis

It is noted that no crashes (injury or otherwise) involving turning movements at the existing shared driveway have been recorded in the 40+ year period covered by the Crash Analysis System (CAS). As there are no recorded incidents here (including prior to traffic volumes reducing significantly following the opening of TGM), an assessment has been undertaken using the NZTA 'Crash estimation compendium[10]' guidance for intersections on rural highways.

Table 11-3 below provides the calculated annual crash rates for the existing Site driveway access versus a priority tee-intersection[11] with right turn bay[12] (as proposed under the interim Site access arrangement), and a roundabout (future connection form). In each case the results are reported for all 'injury' crashes as well as 'Death and Serious Injury (DIS) Only' crashes. The analysis is based on the following assumptions:

- development traffic additions for Stages 1-3 as per Section 11.1 above;
- a 'daily trip rate' of 8.5vpd 'per dwelling' has been applied, noting this sits above the 8.2vpd data for outer suburban dwellings identified in RR453 (as described earlier at Section 9.1) and rates recorded for established residential areas around the Wellington region of 7-7.5vpd, to provide a robust assessment;
- estimated 60-70 vehicle movements per day associated with construction vehicles; and
- parameters as per the 'Crash Estimation Compendium'.

Table 11-3: Crash Risk Assessment for Priority Tee-intersection with Right Turn Bay and Roundabout

Scenario	Dev lots	Injury Crash Rate			DSI Crash Rate		
		Existing Access	Priority Tee with RTB	Roundbt	Existing Access	Priority Tee with RTB	Roundbt
Existing Use	-	0.024	-	-	0.008	-	-
Scenario 1	63	0.059	0.035	0.093	0.019	0.011	0.009
Scenario 2	123	0.094	0.057	0.098	0.030	0.018	0.011
Scenario 3	183	0.117	0.070	0.101	0.037	0.022	0.010

The results above indicate a priority tee-intersection with right turn bay returns the lowest crash rate across the three options when considering 'all injury' crashes, for each of the development Scenarios 1-3. When considering just DSI the roundabout returns the lowest crash rate, hence the intention for a roundabout to serve the fuller Site, noting under Scenario 1 the DSI crash rate for the roundabout is only marginally lower that the priority tee-intersection with right turn bay. Under Scenario 2 and 3 with the priority tee-intersection and right turn bay in place, the predicted crash rate indicates just one DSI crash in 45-55 years, noting this interim arrangement would only be in place for 2-3 years before the roundabout comes online. Further, it is likely that this interim access arrangement will be concurrent with temporary traffic management controls needed for construction access, including temporary speed controls on the highway that will have the effect of reducing this predicted risk.

[10] NZ Transport Agency Waka Kotahi Crash estimation compendium guidance New Zealand crash risk factors guideline (26 May 2025)
[11] Crash Compendium: Rural T-intersection $A_T = 3.31E\text{-}4 * U^{0.18} * V^{0.57}$
[12] Crash Compendium: 40% crash reduction with right turn bay

In addition to the above, the PPM provides guidance on the principles of intersection form on rural highways to minimise the risk of death and serious injury crashes. The crash risk boundaries for priority tee-intersections with a right turn bay on rural roads with speeds of 80kph or higher[13] are shown in **Figure 11-1** below.

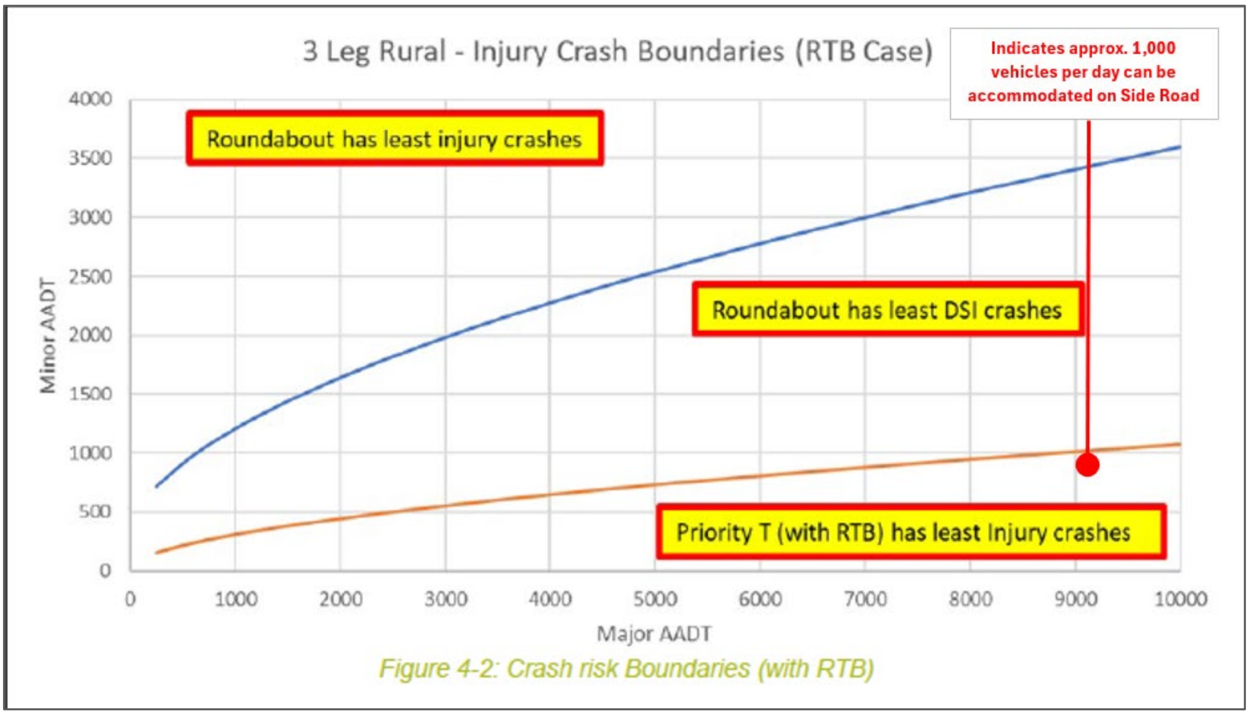

Figure 11-1: Planning Policy Manual Tee-Intersection / Roundabout Thresholds

The PPM guidance graph in Figure 11-1 identifies traffic volumes on the side road of around 1,000vpd (equivalent to around 110 occupied dwellings or the majority of Scenario 2 development traffic loadings at the Site (incorporating Stages 1 & 2)) are capable of being accommodated by a priority tee-intersection with a right turn bay.

An indicative concept design for the interim tee-intersection is included at Appendix D which incorporates the following design elements:

- new right turn bay provided for SH59 NB traffic accessing the Site;
- the current SH59 NB 2>1 lane merge is moved south so as to terminate well before the new right turn bay taper commences. In response to feedback from NZTA, the 2>1 merge has been moved south to provide a 5-second travel time[14] (155m) between the end of the merge taper and the start of the proposed right turn bay formation;

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[13] NZTA Planning Policy Manual Appendix A Section 4.1 (Figure 4-2)
[14] The 5-second travel time has been based on Section 2.4 of the *Main Roads Supplement to Austroads Guide to Road Design Part 4C: Interchanges (August 2025),* which recommends a minimum separation equivalent to 4 seconds of travel time at the design speed 'between' successive decision points

- realignment of the existing Site access road to provide a 90-degree approach angle to the Highway, to assist sightlines and vehicle tracking; and
- some vegetation clearance on the eastern side of the Highway, south of the access, to ensure 'Safe Intersection Sight Distances' are achieved for all traffic movements to / from the Site.

With the adoption of the design as proposed, it is assessed that traffic associated with around 110 occupied dwellings or the majority of the initial two stages of development, can be appropriately accommodated from a capacity and safety perspective prior to the fuller Site roundabout coming online.

12 Servicing

Servicing requirements for residential development proposed under this application are typically limited to refuse and recycling collection, and to occasional household deliveries. Accordingly, the Site's proposed internal roading network, including access roads, have been designed to enable tracking of a standard 8m rigid truck with localised widening on the bends.

Waste collection is expected to be primarily undertaken by PCC's standard kerbside pickup. For lots accessed through private JOALs, waste will either be placed at the kerbside along the frontage roads for PCC collection or managed by a private waste contractor using a small collection vehicle suitable for restricted access conditions.

Future development and separate consenting of the Site's proposed neighbourhood centre commercial area will identify the associated servicing requirements, noting the Collector Road connection from SH59 into the Site has been designed to accommodate larger service vehicles, as well as public buses accessing to and from the adjacent Muri Block, including through the new Site Collector Road roundabouts.

Fire appliances can be positioned within the Sites publicly vested road network to allow a hose run of not more than 75m to each dwelling, or in the case of JOALs F and G can access via these suitably designed carriageways, as required by the Fire and Emergency New Zealand guidance.

Accordingly, the Site layout has been developed to be cognisant of the associated servicing requirements generated by the proposed activity, with the transport system having been designed to appropriately accommodate these vehicles and demands in a safe and efficient manner.

13 Construction Traffic Activity

A detailed Construction Management Plan (CMP) addressing the phasing and construction of the Site development will be prepared and submitted to PCC in due course.

In this respect, it is noted that the proposed development will be undertaken in stages, with design details and construction scheduling able to be finalised after resource consent is granted and contractors have been appointed. It is worth noting that the proposed earthworks strategy has sought to achieve a cut / fill balance, therefore significantly reducing the number of heavy vehicle trips through the earthwork's phases.

As part of the CMP, a Construction Traffic Management Plan (CTMP) will be prepared and provided to PCC for certification prior to works commencing on the Site. A condition of consent is offered that requires the preparation of a CTMP for certification by PCC and approval by NZTA, in advance of any Site works commencing. The CTMP will set out details of the work phases, associated forecast construction traffic volumes for each phase, and related management.

Vehicle access to the Site during earthworks and construction will be via SH59, with a proposed upgrading of the current access road priority arrangement at the Highway to create a formal right turn bay for traffic entering the Site from the south (as described in Chapter 11), along with improvements to sightlines for exiting vehicles to ensure these fully meet the minimum Safe Intersection Sight Distance requirements. This interim access will include a temporary internal road alignment to facilitate the construction of the new permanent internal Site Collector Road connection to the SH59 roundabout, located immediately to the north. This interim alignment is designed to ensure uninterrupted access to and from the Site until the roundabout and new Site connection leg comes online.

The Site itself will be laid out to allow all vehicles to access and egress in a forward direction, removing the need for any reverse manoeuvres. On occasion, when specialist machinery is being delivered or collected from the Site, or when works are being undertaken close to the SH59 Site frontage, or within the Highway itself, it will be necessary to implement temporary controls under a Traffic Management Plan (TMP).

These and other specific details will be documented in the CTMP to be prepared in due course. The actual content of the Plan will include details of:

- the timing of specific work phases;
- key activities during each work phase;
- anticipated traffic levels, truck movements, and access arrangements for each work phase;
- provision for maintaining safe active mode movements on the Ara Harakeke shared path in the vicinity of the new roundabout when this is under construction;
- details on worksite staff parking;
- wheel washing requirements for Site vehicles;
- route restrictions, for both large trucks and any over-sized vehicles;
- any restrictions around heavy vehicle movements during peak hours;
- arrangements for TTM, including with regard to any temporary speed control requirements on SH59; and
- contact telephone number for key Site staff.

Safety of all users will be an important practice in the implementation of the CTMP, and appropriate works signage and active traffic control (including on SH59), will be implemented in accordance with the latest industry guidance on temporary traffic management, through means of approved TMPs for specific works phases.

14 Conclusion

A detailed assessment of the transport-related effects of a proposal to develop land known as Mt Welcome to the south of Pukerua Bay for residential subdivision involving approximately 949 dwellings, has been undertaken in accordance with the District Plan and other relevant industry standards.

The Site benefits from strategic positioning adjacent to SH59, which has experienced a significant reduction in traffic volumes following the opening of TGM. This change has created an opportunity to accommodate new development through the recently rezoned land within the NGDA without requiring substantial upgrades to the existing roading infrastructure.

The proposed access strategy includes a staged approach, beginning with an interim priority tee-intersection to support early construction and residential development, followed by a full roundabout intersection designed to accommodate all future traffic volumes, including those from the adjacent Muri Block, with traffic modelling confirming the concept roundabout design for connecting to SH59 will operate at very good levels of service into the future.

Internally, the subdivision layout has been designed to deliver a legible and connected movement network, incorporating Collector and Access Roads, private JOALs, and active mode infrastructure. While some deviations from District Plan standards are necessary due to topographical constraints, the proposed road typologies and intersection arrangements have been developed to ensure safe and efficient operation. The inclusion of active mode connections to Pukerua Bay rail station further supports sustainable transport outcomes.

An assessment of the existing transport network's ability along SH59 to accommodate forecast development Site traffic in the vicinity shows the adjacent intersections can continue to operate well, with minimal queues and delays overall.

A number of consent conditions (that where necessary will be secured through a consent notice) are proposed to ensure further design of certain Site components align with the intent of the District Plan provisions, as follows:

Consent Conditions that require the following:

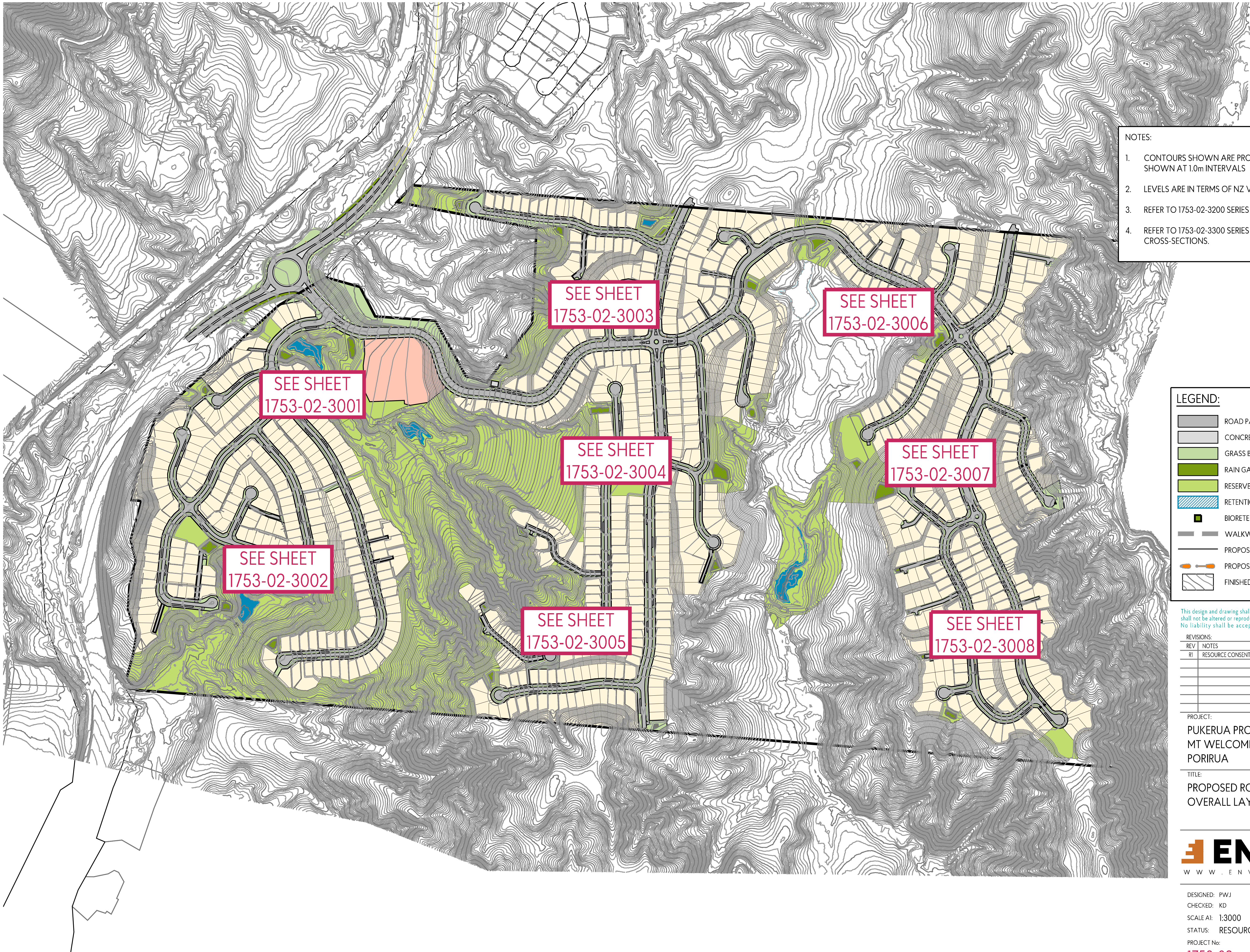
- preparation of a Construction Traffic Management Plan to be submitted to the road controlling authorities for certification and approval, prior to works on Site commencing;
- following occupation of 110 dwellings on the Site, the connecting intersection to SH59 shall be upgraded from the 'interim' design to the 'full' development Site intersection, to the satisfaction of NZTA. This intersection would take the form of a roundabout in general accordance with the concept plan included in Appendix B, unless changes to the road corridor occur in the interim and an alternative arrangement becomes acceptable to NZTA;
- on-street parking spaces within road reserves to be designed in accordance with the standards under INF-S24;
- individual lot vehicle crossings to be designed in accordance with the standards included under TR-S5. Where vehicle crossings cannot fully meet the specific standards, for example in relation to minimum separation distances, these should be located so as to maximise separation as far as practicable; and
- parking within individual lots to be designed in accordance with the standards under TR-S6.

In addition to the above, it is recommended that the intersection of Road 14 with Road 13 be marked and signed as a stop control tee-intersection.

Overall, and with the adoption of the proposed transport connections and infrastructure, it is assessed that development of the Site to provide for a new residential subdivision activity would not cause the function, safety or capacity of the surrounding road network to be compromised, and that an appropriate transportation outcome for all modes and users can be delivered.

Appendices

Appendix A Proposal Plans



NOTES:

1. CONTOURS SHOWN ARE PROPOSED FINISHED GROUND LEVELS SHOWN AT 1.0m INTERVALS
2. LEVELS ARE IN TERMS OF NZ VERTICAL DATUM 2016
3. REFER TO 1753-02-3200 SERIES PLANS FOR ROAD LONG-SECTIONS.
4. REFER TO 1753-02-3300 SERIES PLANS FOR ROAD TYPICAL CROSS-SECTIONS.

LEGEND:

- ROAD PAVING
- CONCRETE FOOTPATH
- GRASS BERM
- RAIN GARDEN / SWALE
- RESERVE TO VEST
- RETENTION WETLAND AREA
- BIORETENTION DEVICE
- WALKWAY
- PROPOSED LOT BOUNDARY
- PROPOSED STREETLIGHTS
- FINISHED CONTOURS SHOWN AT 1.0m INTERVALS

REVISIONS:

REV	NOTES	BY	DATE
R1	RESOURCE CONSENT ISSUE	PWJ	12-11-2025

PROJECT:

PUKERUA PROPERTY GROUP LP
MT WELCOME - PUKERUA BAY
PORIRUA

TITLE:

PROPOSED ROADING
OVERALL LAYOUT PLAN

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: PWJ
DRAWN: PWJ
CHECKED: KD
PLOT DATE: 12-11-2025
SCALE A1: 1:3000
SCALE A3: 1:6000
STATUS: RESOURCE CONSENT

PROJECT No: 1753-02
DRAWING No: 3000
REVISION: R1

Appendix B SH59 Concept Roundabout Design

PLAN

SCALE - 1:750

1:750 15 0 15 30 A1
1:1500 A3

Notes

A CONCEPT DESIGN	GM		2025.09.XX
Issued/Revision	By	Appd	YYYY.MM.DD

Issue Status

A1
AUTHORIZED FOR CONCEPT DESIGN

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Coordinate System

Datum

Colour Disclaimer

This drawing has been documented in colour. This drawing is required to be printed in colour. Failure to do so may result in loss of information. Black and white printing may be used if specific black and white documents have been obtained from Stantec.

Stantec

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

Client/Project Logo

Client/Project
CLASSIC DEVELOPMENTS
MT WELCOME SUBDIVISION DEVELOPMENT
ROUNDABOUT DESIGN

Location

GM — Drawn
WD — Designed

Title GENERAL ARRANGEMENT PLAN

Project No. 310206500
Scale at A1 1:750
Revision A
Drawing No. **310206500-STN-01-000-DR-CI-000100**

ORIGINAL SHEET - ISO A1

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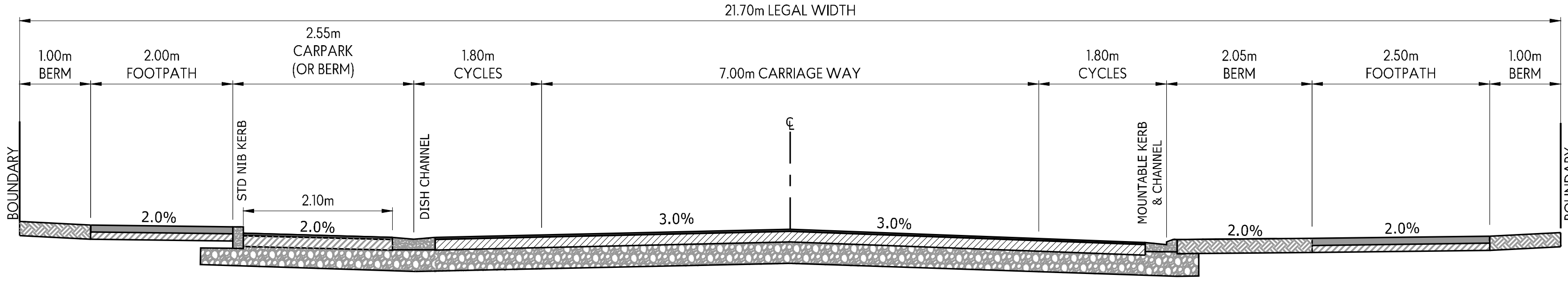
Plotted: Mkandla, Georgia Date: 17/10/2025 3:51:38 pm

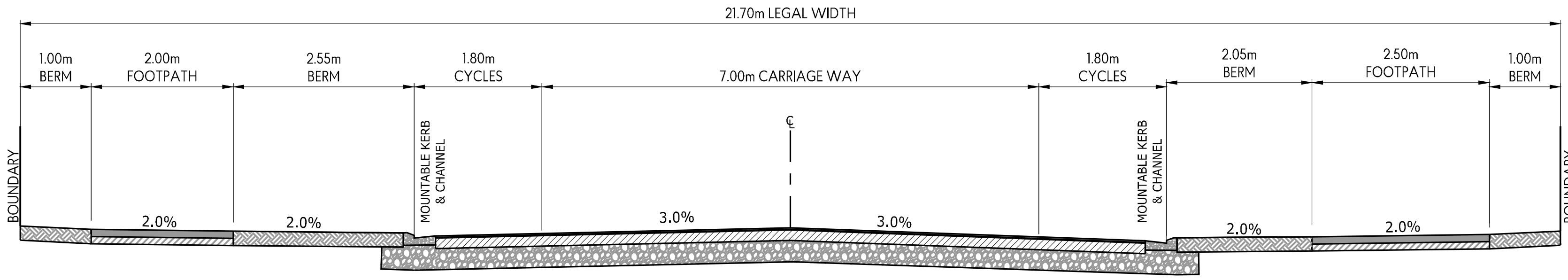
Appendix C Proposed Road Typology Cross Sections

NOTES:

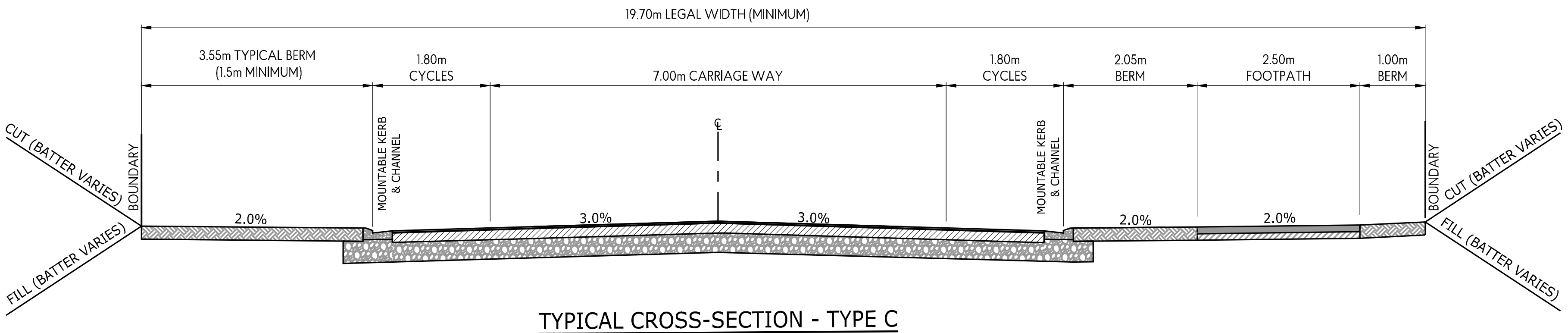
1. CARPARKS AND BERMS ARE INTERCHANGEABLE WHERE REQUIRED. EITHER: KERB & CHANNEL (450mm WIDE) WITH 2.40m BERM OR DISH CHANNEL (600mm WIDE) WITH 2.10m CARPARK & 150mm WIDE STD KERB
2. ALL METAL DEPTHS AND TESTING REQUIREMENTS TO BE CONFIRMED AT ENGINEERING APPROVAL STAGE.
3. BERMS TO HAVE A MINIMUM OF 150mm COMPACTED DEPTH OF LOAM TOPSOIL
4. BERM WIDTHS ARE TYPICAL AND MAY VARY FOR DIFFERENT JOAL'S OR ROADS



TYPICAL CROSS-SECTION - TYPE A
COLLECTOR ROAD- 21.7m
WITH CYCLEWAY AND CARPARK
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - TYPE B
COLLECTOR ROAD - 21.7m
WITH CYCLEWAY AND BERM
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - TYPE C
COLLECTOR ROAD - 19.7m
WITH CYCLEWAY
SCALE: 1:50-A1
1:100-A3

REVISIONS:

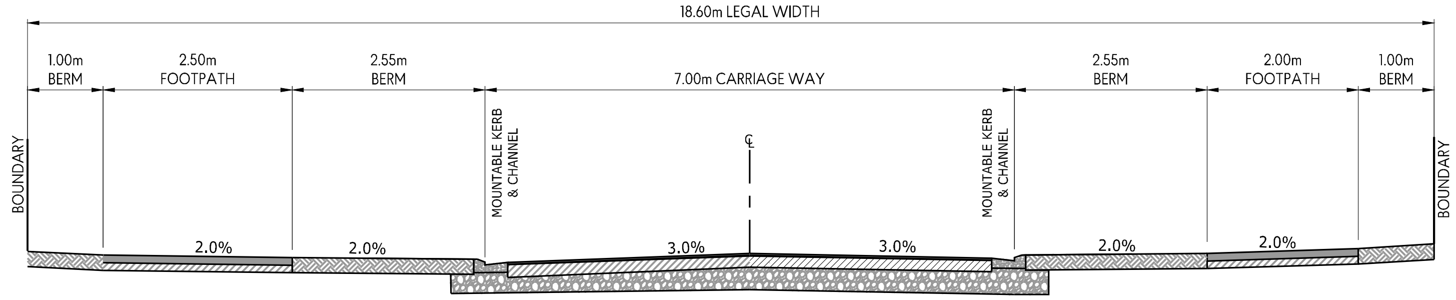
REV	NOTES	BY	DATE
R1	RESOURCE CONSENT ISSUE	PWJ	12-11-2025

PROJECT:
PUKERUA PROPERTY GROUP LP
MT WELCOME - PUKERUA BAY
PORIRUA

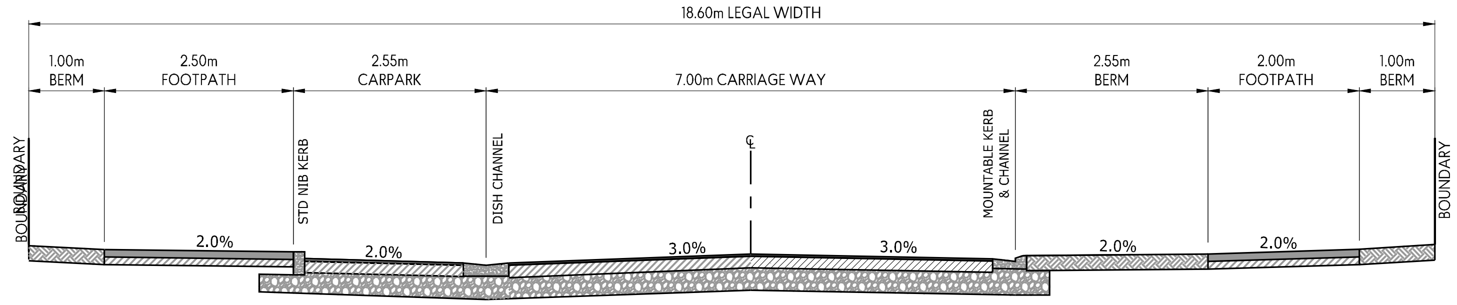
TITLE:
PROPOSED ROADING
TYPICAL ROAD CROSS-SECTIONS
SHEET 1 OF 3

ENVELOPE
W W W . E N V E L O P E - E N G . C O . N Z

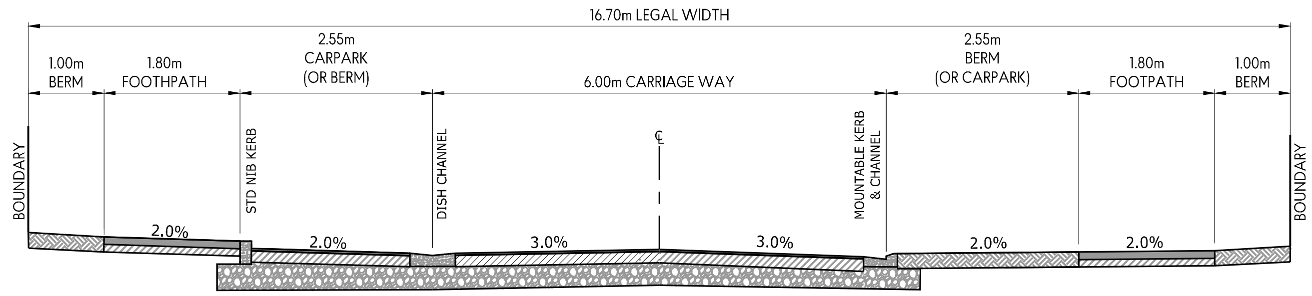
DESIGNED: PWJ
DRAWN: LB
CHECKED: KD
PLOT DATE: 12-11-2025
SCALE A1: AS SHOWN
SCALE A3: AS SHOWN
STATUS: RESOURCE CONSENT
PROJECT No: 1753-02
DRAWING No: 3301
REVISION: R1



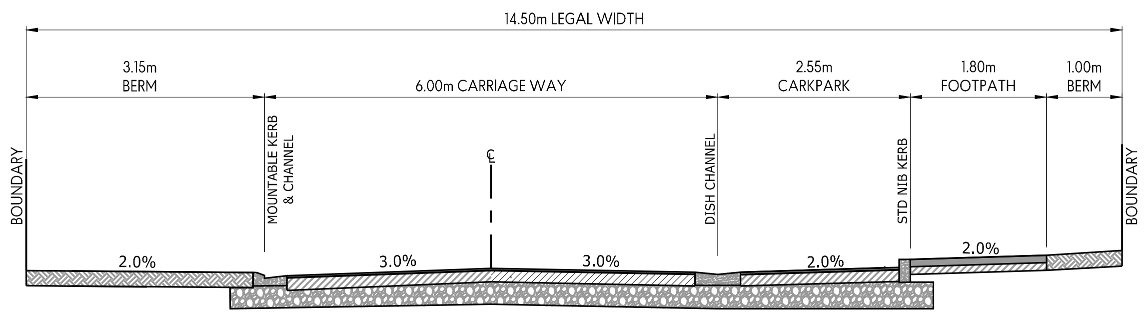
TYPICAL CROSS-SECTION - TYPE D
COLLECTOR ROAD - 18.6m
WITH BERM
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - TYPE E
COLLECTOR ROAD - 18.6m
WITH BERM & CARPARK
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - TYPE F
LOCAL ROAD - 16.7m
WITH PARALLEL CARPARK AND STREET BERM
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - TYPE G
LOCAL ROAD - 14.5m
WITH CARPARK
SCALE: 1:50-A1
1:100-A3

NOTES:

1. CARPARKS AND BERMS ARE INTERCHANGEABLE WHERE REQUIRED. EITHER: KERB & CHANNEL (450mm WIDE) WITH 2.40m BERM OR DISH CHANNEL (600mm WIDE) WITH 2.10m CARPARK & 150mm WIDE STD KERB
2. ALL METAL DEPTHS AND TESTING REQUIREMENTS TO BE CONFIRMED AT ENGINEERING APPROVAL STAGE.
3. BERMS TO HAVE A MINIMUM OF 150mm COMPACTED DEPTH OF LOAM TOPSOIL
4. BERM WIDTHS ARE TYPICAL AND MAY VARY FOR DIFFERENT JOAL'S OR ROADS

REVISIONS:

REV	NOTES	BY	DATE
R1	RESOURCE CONSENT ISSUE	PWJ	12-11-2025

PROJECT:
PUKERUA PROPERTY GROUP LP
MT WELCOME - PUKERUA BAY
PORIRUA

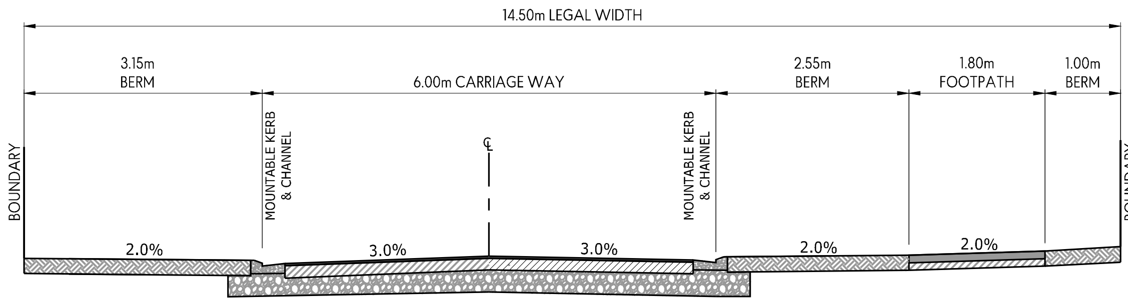
TITLE:
PROPOSED ROADING
TYPICAL ROAD CROSS-SECTIONS
SHEET 2 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

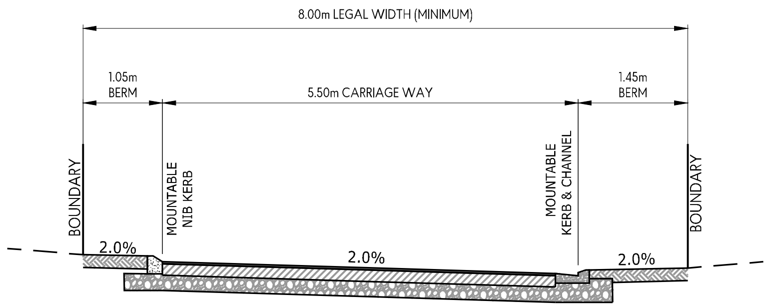
DESIGNED: PWJ
DRAWN: LB
CHECKED: KD
PLOT DATE: 12-11-2025
SCALE A1: AS SHOWN
SCALE A3: AS SHOWN
STATUS: RESOURCE CONSENT
PROJECT No: 1753-02
DRAWING No: 3302
REVISION: R1

NOTES:

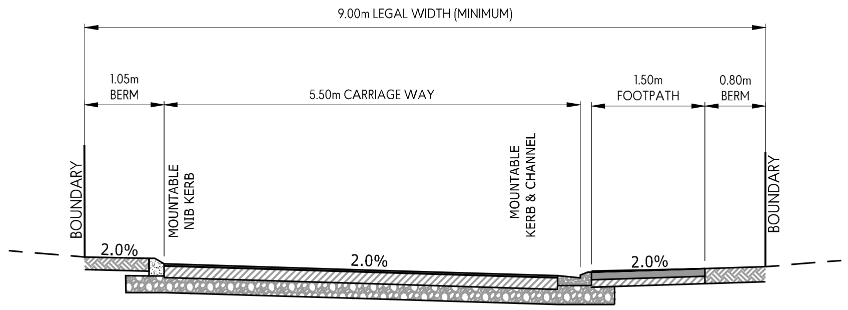
1. CARPARKS AND BERMS ARE INTERCHANGEABLE WHERE REQUIRED. EITHER: KERB & CHANNEL (450mm WIDE) WITH 2.40m BERM OR DISH CHANNEL (600mm WIDE) WITH 2.10m CARPARK & 150mm WIDE STD KERB
2. ALL METAL DEPTHS AND TESTING REQUIREMENTS TO BE CONFIRMED AT ENGINEERING APPROVAL STAGE.
3. BERMS TO HAVE A MINIMUM OF 150mm COMPACTED DEPTH OF LOAM TOPSOIL
4. BERM WIDTHS ARE TYPICAL AND MAY VARY FOR DIFFERENT JOAL'S OR ROADS



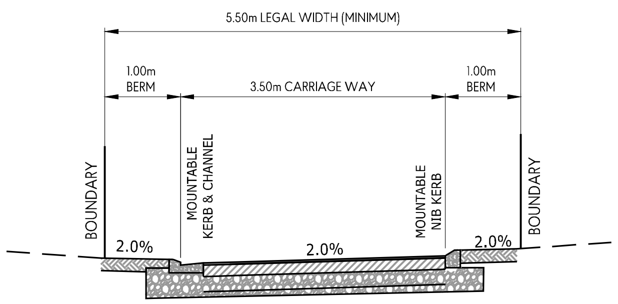
TYPICAL CROSS-SECTION - TYPE H
LOCAL ROAD - 14.5m WITH BERM
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - JOAL TYPE 1
8.0m (5.0m)
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - JOAL TYPE 2
8.5m (5.0m)
SCALE: 1:50-A1
1:100-A3



TYPICAL CROSS-SECTION - JOAL TYPE 3
5.5m (3.5m)
SCALE: 1:50-A1
1:100-A3

REVISIONS:

REV	NOTES	BY	DATE
R1	RESOURCE CONSENT ISSUE	PWJ	12-11-2025

PROJECT:
PUKERUA PROPERTY GROUP LP
MT WELCOME - PUKERUA BAY
PORIRUA

TITLE:
PROPOSED ROADING
TYPICAL ROAD CROSS-SECTIONS
SHEET 3 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: PWJ
DRAWN: LB
CHECKED: KD
PLOT DATE: 12-11-2025
SCALE A1: AS SHOWN
SCALE A3: AS SHOWN
STATUS: RESOURCE CONSENT
PROJECT No: 1753-02
DRAWING No: 3303
REVISION: R1

Appendix D Temporary Site Tee-intersection Design

WORKING PLOT

REV	DATE	DRN	DESCRIPTION

MT WELCOME SUBDIVISION DEVELOPMENT

TEMPORARY SITE ACCESS

CLIENT LOGO

Stantec

SCALE: 1:1250 @ A1
DRAWN:
DATE:
DESIGN:

FIGURE No.
OF
A

C:\Users\rsali\OneDrive - Stantec\Projects\Mount Welcome Subdivision\3_drawings\310206500-STN-01-SK-000-RTB-Opt 3.dwg

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

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