Harrison Transportation

Marsh Private Plan Change

Arawa Road Pongakawa

Transportation Assessment Report

December 2022

PO Box 11557
Palm Beach
Papamoa 3151

Reference: 496 TA v2

Contents

1. Introduction

KA and AD Marsh propose a private plan change to re-zone land on the north-western side of Arawa Road, Pongakawa, from Rural to Residential. This will allow the subdivision of the land to provide up to approximately 120 residential lots. This report has been prepared, at the request of Momentum Planning and Design, to assess the expected transportation effects of the proposed plan change and in particular the effects on SH2. The key transportation issues associated with the proposed plan change and associated residential activity are:

- The level of traffic expected to be generated by the residential activity and the effect that this will have on the adjacent road network.
- The design of the internal road network including the intersection with Arawa Road.
- The design of the intersection of Arawa Road with SH2.

These issues are discussed in this report. By way of a summary it is concluded that, with the recommendations given in this report, the proposed residential subdivision can be readily accommodated within the local transportation environment.

2. The Site

The site is located on the north-western side of Arawa Road, approximately 1.9 km east of Maniatutu Road and 180 m west of Pongakawa School Road. The location of the site is shown on Figure 1.

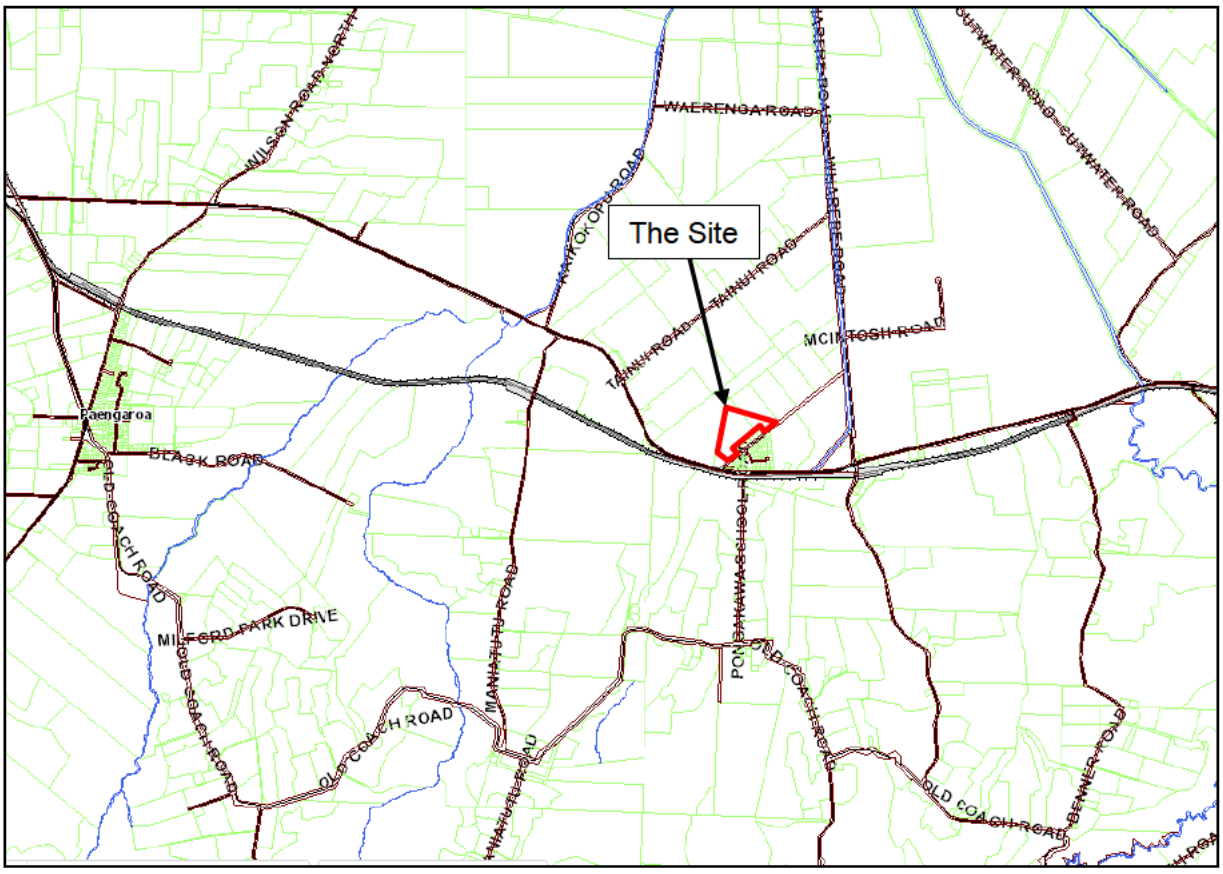


Figure 1: Site Location

The site is presently zoned Rural in the Western Bay of Plenty District Plan.

The site contains a residential dwelling with associated sheds and is used for farming. Photograph 1 shows the site, viewed from Arawa Road.

Photograph 1: The Site, Viewed From Arawa Road

Adjacent activities along Arawa Road are residential, with rural activities surrounding the residential area.

3. Transportation Environment

Arawa Road is classified in the District Plan as a Local Road. It has a sealed carriageway that varies in width from about 5.2 m to 5.7 m. It has no road markings other than at the intersection with SH2.

Photograph 2 shows Arawa Road looking to the northeast while Photograph 3 shows Arawa Road looking to the southwest.

Photograph 2: Arawa Road Looking Northeast

Photograph 3: Arawa Road Looking Southwest

Arawa Road has a 40 km/h speed restriction.

SH2 is classified in the District Plan as a Strategic Primary Arterial. It has a 13.6 m wide carriageway marked with a 3.0 m wide right turn bay, a 3.5 m wide traffic lane in each direction and 1.8 m wide shoulders.

Photograph 4 shows SH2 looking to the east while Photograph 5 shows SH2 looking to the west.

Photograph 4: SH2 Looking East

Photograph 5: SH2 Looking West

SH2 has a 100 km/h speed restriction.

The intersection of Arawa Road and SH2 is in the form of a Tee intersection, with Give Way control on the Arawa Road approach. Photograph 6 shows the Arawa Road approach to the intersection, while Photograph 7 shows Arawa Road viewed from SH2.

Photograph 6: Arawa Road Approach to SH2 Intersection

Photograph 7: Arawa Road Viewed From SH2

The following Bay Bus routes operate along SH2 adjacent to the site:

- 101 *"Whakatane to Tauranga"*, which operates Monday to Friday.
- 143a *"Whakatane to Tauranga via Paengaroa and Te Puke"*, which operates on Mondays, Tuesdays and Fridays.
- 143b *"Whakatane to Tauranga via Pukehina and Te Puke"*, which operates on Wednesdays, Thursdays and Saturdays.

All three services provide one bus from Whakatane to Tauranga in the morning and then returning in the afternoon or evening. The nearest bus stops are in Matata and Paengaroa.

4. Traffic Data

The latest available traffic count data has been obtained from the Mobile Road website. The average daily traffic (ADT) volumes are given in the following table, together with the peak hour volumes which have been estimated at 10% of the ADT.

Road	ADT (veh/day)	Peak Hour (veh/h)	Heavy Vehicles
Arawa Road	332	33	5%
SH2	6,829	683	13%

Table 1: Traffic Count Data

Table 1 shows very low traffic volumes on Arawa Road, with moderate volumes on SH2.

5. Crash History

A search of the NZTA Crash Analysis System (CAS) has been carried out to identify all reported crashes in the vicinity of the site during the five-year period 2017 to 2021. Available data for 2022 has also been included. The search area consisted of the full length of Arawa Road as well as SH2 between Tainui Road and Pongakawa Station Road. The search identified 14 crashes, as follows:

- One crash was recorded at the intersection of SH2 and Arawa Road. This involved an eastbound vehicle hitting another vehicle head-on and was unrelated to the intersection. This resulted in a minor injury.
- Four crashes were recorded at the intersection of SH2 and Pongakawa Station Road:
    - One involved an eastbound vehicle losing control on a straight road and hitting another vehicle head-on.
    - One involved a northbound vehicle on Pongakawa Station Road hitting the rear of a vehicle stopped for cross traffic.
    - One involved a vehicle turning right out of Pongakawa Station Road failing to give way to an eastbound vehicle on SH2.
    - One involved a vehicle turning right onto Pongakawa Station Road failing to give way to a westbound vehicle on SH2. This resulted in a minor injury.
- Nine mid-block crashes were recorded on SH2:
    - Two involved head-on crashes, one on a straight and the other on a curve, which resulted in a serious injury.
    - Five involved vehicles losing control on a straight road. Two involved eastbound vehicles and three westbound vehicles. One resulted in a minor injury and one a serious injury.
    - Two involved vehicles losing control on curves, one of which resulted in a minor injury.

The reported crashes are shown on Figure 2.

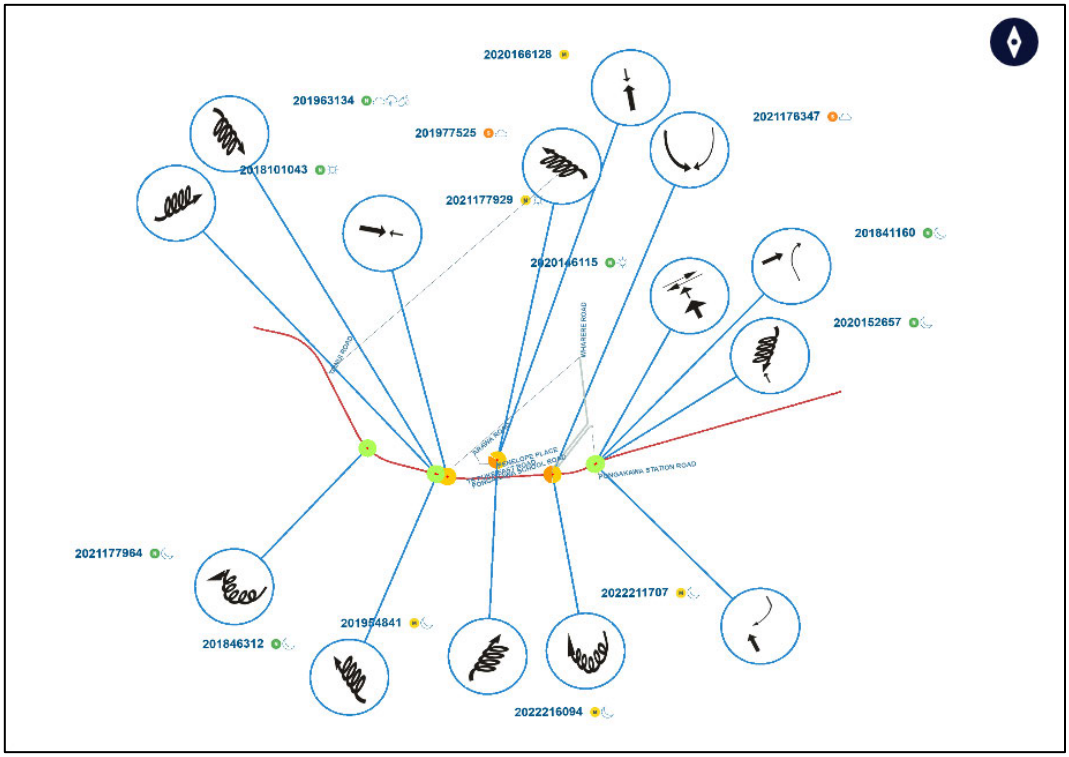


Figure 2: Crash History

Figure 2 shows that some of the crashes on SH2 have incorrect co-ordinates, placing them off the highway.

The crash history has identified a small cluster of crashes at the intersection of SH2 and Pongakawa Station Road, as well as a series of loss of control crashes along SH2. This is consistent with a rural highway with moderate traffic volumes. Overall, the crash history has not identified any specific road safety issues relevant to the proposed plan change.

6. The Proposed Plan Change

There are presently 37 dwellings along Arawa Road with an additional 22 on Penelope Place, giving a total of 59 dwellings with access to Arawa Road. Of these, the eight dwellings on the western side of Arawa Road are zoned Rural, while the other 49 dwellings are zoned Residential. With Proposed Plan Change 92, these zones will not change.

KA and AD Marsh propose a private plan change that will re-zone land on the western side of Arawa Road from Rural to Residential. This will allow the subdivision of the site to provide approximately 120 residential lots.

Internal roads are proposed within the site, with one future intersection onto Arawa Road. There will be no direct access to SH2.

A copy of the proposed structure plan is attached to this report.

7. Traffic Generation

7.1. Traffic Generation

Traffic generation data is available in the NZ Transport Agency Research Report 453 *"Trips and Parking Related to Land Use"* (RR453). This reference provides rates for inner city, suburban, outer suburban and rural dwellings. Given the location of the site, the outer suburban rates are assessed as most appropriate for the proposed subdivision.

As Penelope Place gains access from Arawa Road, the dwellings along Penelope Place have been included as part of the existing development.

The expected traffic generation of both the existing and proposed development, assessed on the basis of the RR453 rates, is given in the following table.

Activity	Number of Units	Traffic Generation Rates		Traffic Generation	
		Daily (veh/day/unit)	Peak Hour (veh/h/unit)	Daily (veh/day)	Peak Hour (veh/h)
Existing Development	59	8.2	0.9	484	53
Proposed Plan Change	120	8.2	0.9	984	108
Total	**179**	**-**	**-**	**1,468**	**161**

Table 2: Expected Traffic Generation

Table 2 shows that the proposed plan change area has an expected daily traffic generation of 984 veh/day, with a peak hour traffic generation of 108 veh/h. With the inclusion of the existing residential development along Arawa Road and Penelope Place, this is expected to increase the total ADT on Arawa Road at the intersection with SH2 to 1,468 veh/day.

7.2. Traffic Distribution

Given the location of the site to the east of Te Puke, it is expected that approximately 75% of generated traffic will be to and from the west, with 25% to and from the east. Using ITE distribution data for the in and out movements gives peak hour turning movements at the intersection of Arawa Road and SH2 as shown in the following figure.

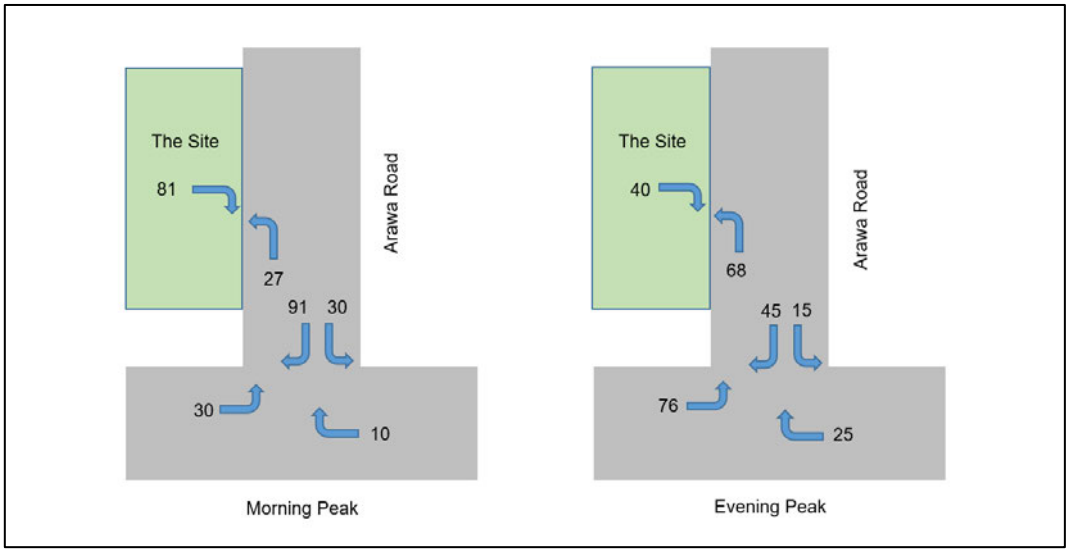


Figure 3: Peak Hour Turning Movements

Figure 3 shows that the predominant movements are expected to be the right turn out of Arawa Road in the morning peak and the left turn into Arawa Road during the evening peak. It is noted that the turning movements shown at the site access are for the proposed plan change only, whereas the turning movements at the intersection with SH2 are inclusive of the existing residential development.

8. Traffic Effects

8.1. Road Carriageways

The expected increase in traffic on the adjacent roads is given in the following table. For this assessment, as the traffic count data for Arawa Road may pre-date some of the recent residential development on Penelope Place, the expected ADT on Arawa Road as given in Table 2 has been adopted for this assessment.

Road	Location	Existing ADT	Expected Increase	Expected ADT
Arawa Road	North of SH2	484	984	1,468
SH2	East of Arawa Road	6,829	246	7,075
	West of Arawa Road	6,829	738	7,567

Table 3: Expected Increase in Daily Traffic (veh/day)

Table 3 shows an expected ADT on Arawa Road of 1,468 veh/h. For urban roads with an ADT of between 1,000 veh/day and 2,500 veh/day, the District Plan specifies a minimum carriageway width of 8.5 m. It is recommended that Arawa Road, between SH2 and the intersection providing access to the subdivision, be widened in accordance with this requirement.

The ADT on SH2 to the west of the site is expected to increase to 7,567 veh/day, an increase of approximately 11%. For rural highways with an ADT greater than 3,000 veh/day, the Austroads *"Guide to Road Design Part 3: Geometric Design"* recommends a carriageway with two, 3.5 m wide traffic lanes and 1.5 m wide sealed shoulders, giving a total sealed carriageway width of 10.0 m. The existing 3.5 m wide traffic lanes with 1.8 m wide shoulders exceed this minimum requirement. It is therefore assessed that the expected increase in traffic is able to be accommodated on the existing SH2 carriageway with minimal effects.

8.2. Intersection of Arawa Road and SH2

Recommendations for the provision of auxiliary turning lanes at intersections are given in the Austroads *"Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings"*. An assessment of the warrant for the provision of auxiliary lanes at the intersection of Arawa Road and SH2 during the evening peak, when the majority of the vehicle movements are expected to be inbound, is given in the following figure.

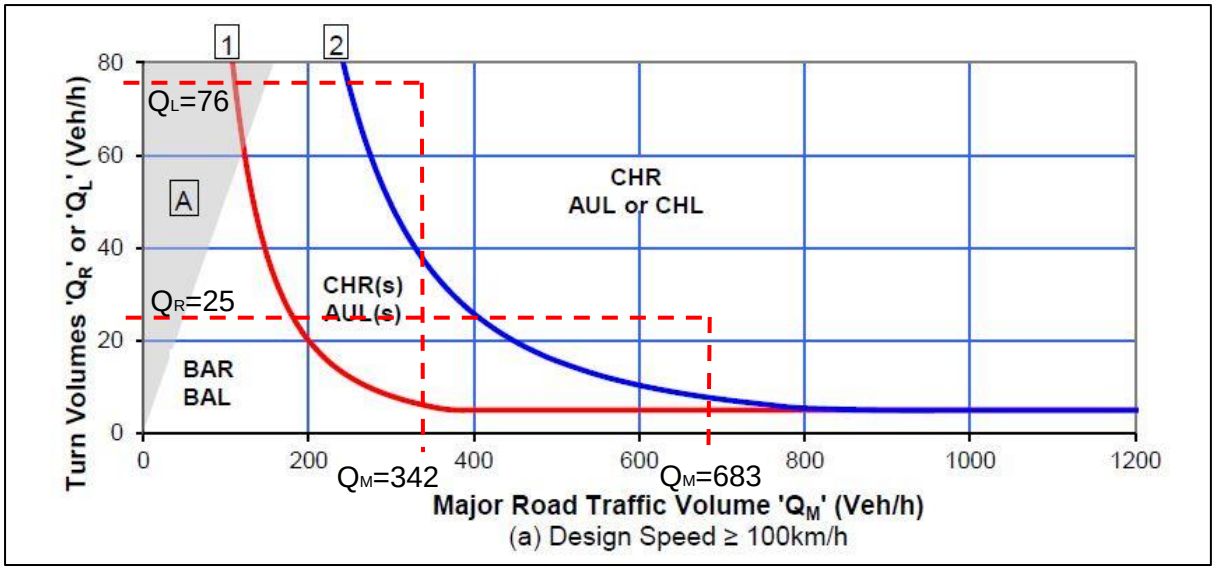


Figure 4: Warrants for Turn Treatments

Figure 4 shows that the provision of both left and right turn auxiliary lanes are warranted. A right turn bay is presently provided, however there is no left turn lane.

Requirements for the design of left and right turn lanes are given in the Austroads *"Guide to Road Design"* series of guides as well as the NZTA *"Manual of Traffic Signs and Markings"*. NZTA has noted that the existing right turn bay appears to have non-standard road markings and that this should be upgraded. The right turn bay has been recently installed by NZTA and it is unclear why non-standard markings have been provided. Given the relatively close spacing between the intersections of Arawa Road and Pongakawa School Road, the marking of a short section of flush median incorporating the two intersections is considered appropriate.

The preliminary design of the intersection of SH2 and Arawa Road is shown on the attached Drawing 01. This shows the right turn bay re-marked in accordance with the relevant MOTSM requirements.

The standard design for a left turn lane, as given in MOTSAM, is shown in the following figure.

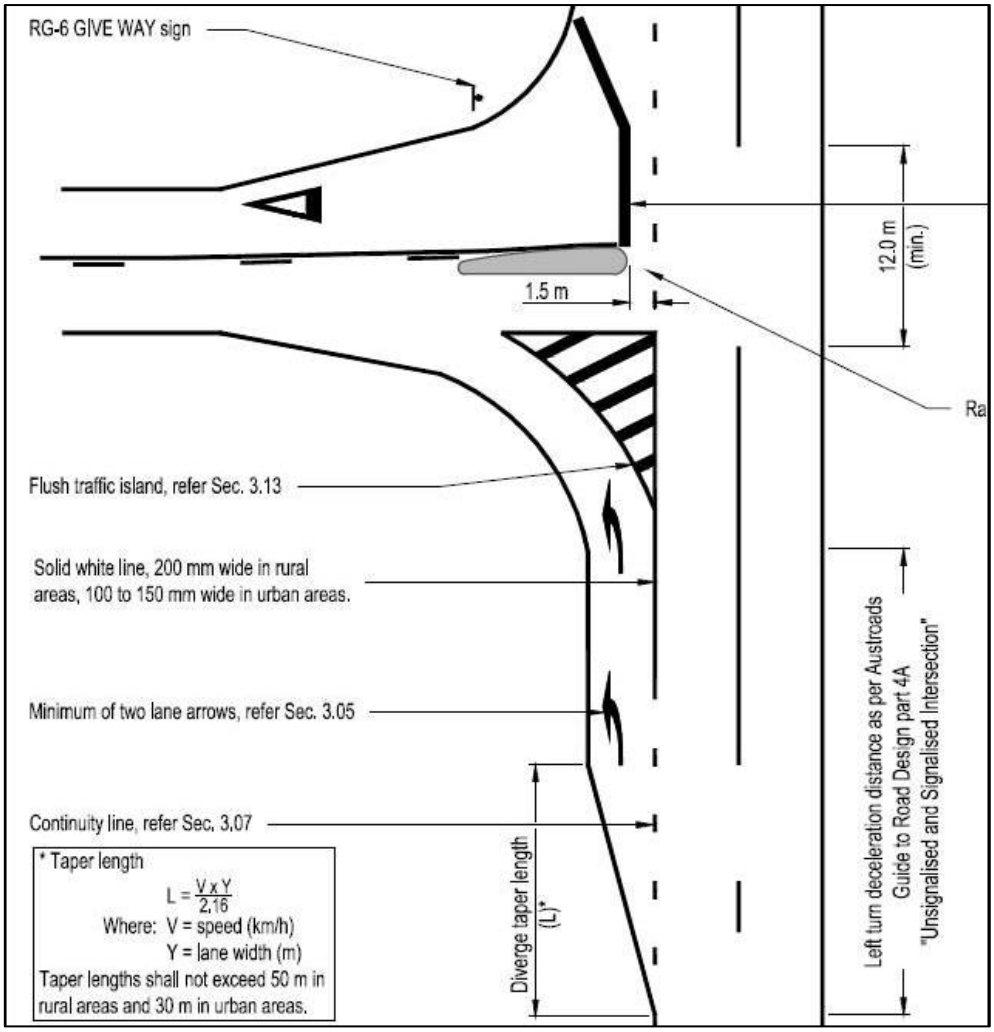


Figure 5: Standard Design for a Left Turn Lane

For a design speed of 100 km/h along SH2, with a speed of 20 km/h to negotiate the turn into Arawa Road, a minimum deceleration length of 150 m is required, inclusive of a 33 m long diverge taper.

NZTA has noted that a parallel left turn lane may result in left turning vehicles obscuring visibility of through traffic, but that providing additional separation to reduce masking will be difficult given the culvert and property boundaries. A shorter taper length has been suggested. The attached Drawing 01 shows the proposed design of the intersection with a shorter left turn deceleration lane. The following points are noted:

- The design is based on an approach speed of 70 km/h, so will require a left turning vehicle to slow down in advance of entering the left turn lane. Any following vehicles will also need to slow to 70 km/h, potentially reducing the severity of any JA or LB type crashes.
- NZTA Research Report 644 *"The crash performance of seagull intersections and left turn slip lanes"* provides some research data on the crash history of left turn slip lanes and provides crash prediction models, however, provides no detailed design advice. The proposed design has therefore been designed in accordance with the current Austroads and MOTSAM requirements, however with the reduced approach speed.

- It is understood that the SH2 Paengaroa to Gisborne corridor, which includes the section of highway adjacent to the site, has been identified for speed management review within the 2021 - 24 National Land Transport Programme. If a reduced speed is implemented, then the speed differential between through vehicles and left turning vehicles will be reduced and the shorter deceleration length may be more appropriate.

It is recommended that the final design of the intersection be developed in accordance with NZTA requirements.

8.3. Intersection Sight Distances

For a vehicle operating speed of 100 km/h, the Austroads Guide requires a minimum safe intersection sight distance (SISD) of 248 m to be provided. The compliance of the available sight distances with these requirements is given in the following table.

Road	Direction	Sight Distance (m)		Complies?
		Required	Available	
SH2	To the East	248	259	Yes
	To the West	248	>300	Yes

Table 4: Sight Distances at the Intersection of Arawa Road and SH2

Table 4 shows that the available sight distances at the intersection comply with the Austroads requirements. The available sightlines are shown in the following photographs.

Photograph 8: Sightline to the East

Photograph 9: Sightline to the West

The photographs show that clear lines of sight are available.

8.4. Intersection Operational Performance

The expected operational performance of the intersection of Arawa Road and SH2 is given in the following table. This assessment uses the turning movement volumes given in Figure 3 of this report with the SH2 left turn lane as recommended in Section 8.2.

Peak Hour	Approach	Movement	Degree of Saturation	Average Delay (s)	Level of Service	Queue (veh)
Morning Peak	SH2 East	Through	0.198	0.0	A	0.0
		Right	0.011	9.4	A	0.0
	Arawa Road	Left	0.312	6.4	A	1.3
		Right	0.312	14.7	B	1.3
	SH2 West	Left	0.017	7.9	A	0.0
		Through	0.198	0.0	A	0.0
Evening Peak	SH2 East	Through	0.198	0.0	A	0.0
		Right	0.030	9.7	A	0.1
	Arawa Road	Left	0.164	5.3	A	0.6
		Right	0.164	13.7	B	0.6
	SH2 West	Left	0.043	7.9	A	0.0
		Through	0.198	0.0	A	0.0

Table 5: Intersection Operational Performance

Table 5 shows that the intersection is expected to operate efficiently with low delays, a high level of service and negligible queues. It is noted that, while a delay of approximately 15

seconds has been identified for the right turn out of Arawa Road in the morning peak, this consists of both geometric and stop line delay. The stop line delay is approximately 7 seconds while the stop line delay is approximately 8 seconds.

9. Parking

While the District Plan has no minimum on-site parking requirements, the Plan has a policy that activities should be established and operate in a manner which ensures safe and effective on-site and off-site vehicle parking. RR453 gives an expected parking demand for outer suburban dwellings of 1.8 spaces per unit.

Given that only a plan change is proposed at this stage, the details of the on-site parking are not known. It is recommended that this be considered as part of the subdivision consent.

10. Internal Road Design

The Development Code specifies the road design requirements for urban subdivisions. Given that only a plan change is proposed at this stage, details of the design of the internal roads, the internal intersections and the intersection with Arawa Road are not yet known. It is recommended that these also be considered as part of the subdivision consent.

The NZTA *"Planning Policy Manual"* (PPM) has no specific requirement for the separation distance between a local road intersection and a State highway intersection. Private vehicle entrances however require a minimum separation of 60 m, measured from the State highway boundary to the centre of the access. Similarly, the Development Code also requires a minimum separation of 60 m, however measured centre to centre. The proposed intersection location on Arawa Road will provide a separation distance of approximately 165 m, measured from the State highway boundary to the centre of the intersection, which exceeds the minimum requirements of both the PPM and the Development Code.

The separation distance between the proposed new intersection on Arawa Road and the existing intersection with Penelope Place is approximately 82 m, measured centre to centre, which also exceeds the minimum intersection spacing specified in the Development Code, so also complies.

11. Property Access

The Development Code specifies requirements for the location, design and sight distances at vehicle entrances. Again, given that only a plan change is proposed at this stage, the details of the internal layout of the subdivision and the access to each individual lot are not known. It is recommended that these also be considered as part of the subdivision consent.

12. Multi-Modal Travel

The site is located within an essentially rural area. As such there are no pedestrian footpaths or other facilities. It is however understood that footpaths will be provided within the subdivision and that an area will be allocated for commercial activities, such as a community store. This will provide some services within the site, reducing the need for external vehicle trips.

While there are presently no bus stops located within walking distance of the site, the proposed increase in residential dwellings will improve the viability of providing bus stops.

13. Conclusion

KA and AD Marsh propose a private plan change to re-zone land on the north-western side of Arawa Road, Pongakawa, from Rural to Residential. This will allow the subdivision of the land to provide up to approximately 120 additional residential lots.

The expected daily traffic generation of the additional dwellings is assessed at 984 veh/day, with a peak hour traffic generation of 108 veh/h. This is expected to increase the ADT on Arawa Road at the SH2 intersection to 1,468 veh/day. Approximately 75% of generated traffic is expected to travel to and from the west, with 25% to and from the east.

For the forecast ADT on Arawa Road, the District Plan specifies a minimum carriageway width of 8.5 m. It is recommended that Arawa Road, between SH2 and the intersection providing access to the subdivision, be widened in accordance with this requirement.

The ADT on SH2 to the west of the site is expected to increase by approximately 11%. The existing design of SH2 exceeds the minimum required by the relevant Austroads Guide. It is therefore assessed that the expected increase in traffic is able to be accommodated on the existing carriageway with minimal effects.

At the intersection of Arawa Road and SH2, the provision of both left and right turn auxiliary lanes are warranted. A right turn bay is presently provided, however there is no left turn lane. It is recommended that a left turn deceleration lane be provided, with the final design of the intersection developed in accordance with NZTA requirements.

The available sight distances at the intersection of Arawa Road and SH2 comply with the relevant Austroads requirements. The intersection is expected to operate efficiently with low delays, a high level of service and negligible queues.

Given that the proposed plan change is in the preliminary stages, it is recommended that the on-site parking, internal road and intersection design, the intersection with Arawa Road and the access to individual properties be considered as part of the subdivision consent stage.

The proposed location of the intersection on Arawa Road will provide separation distances between the SH2 and Penelope Place intersections that exceed the relevant minimum requirements of both the PPM and the Development Code.

In summary it is recommended that:

- The Arawa Road carriageway, between SH2 and the intersection providing access to the subdivision, be widened to 8.5 m.
- At the intersection of Arawa Road and SH2, a left turn deceleration lane be provided, with the design of the intersection developed in accordance with NZTA requirements.
- The on-site parking, internal road and intersection design, the intersection with Arawa Road and the access to individual properties be considered as part of the subdivision consent stage.

It is concluded that, with the above recommendations, the proposed private plan change and associated residential development can be accommodated within the local transportation environment.

Report Prepared by:

Bruce Harrison
Harrison Transportation
9 December 2022

Reference: 496 TA v2

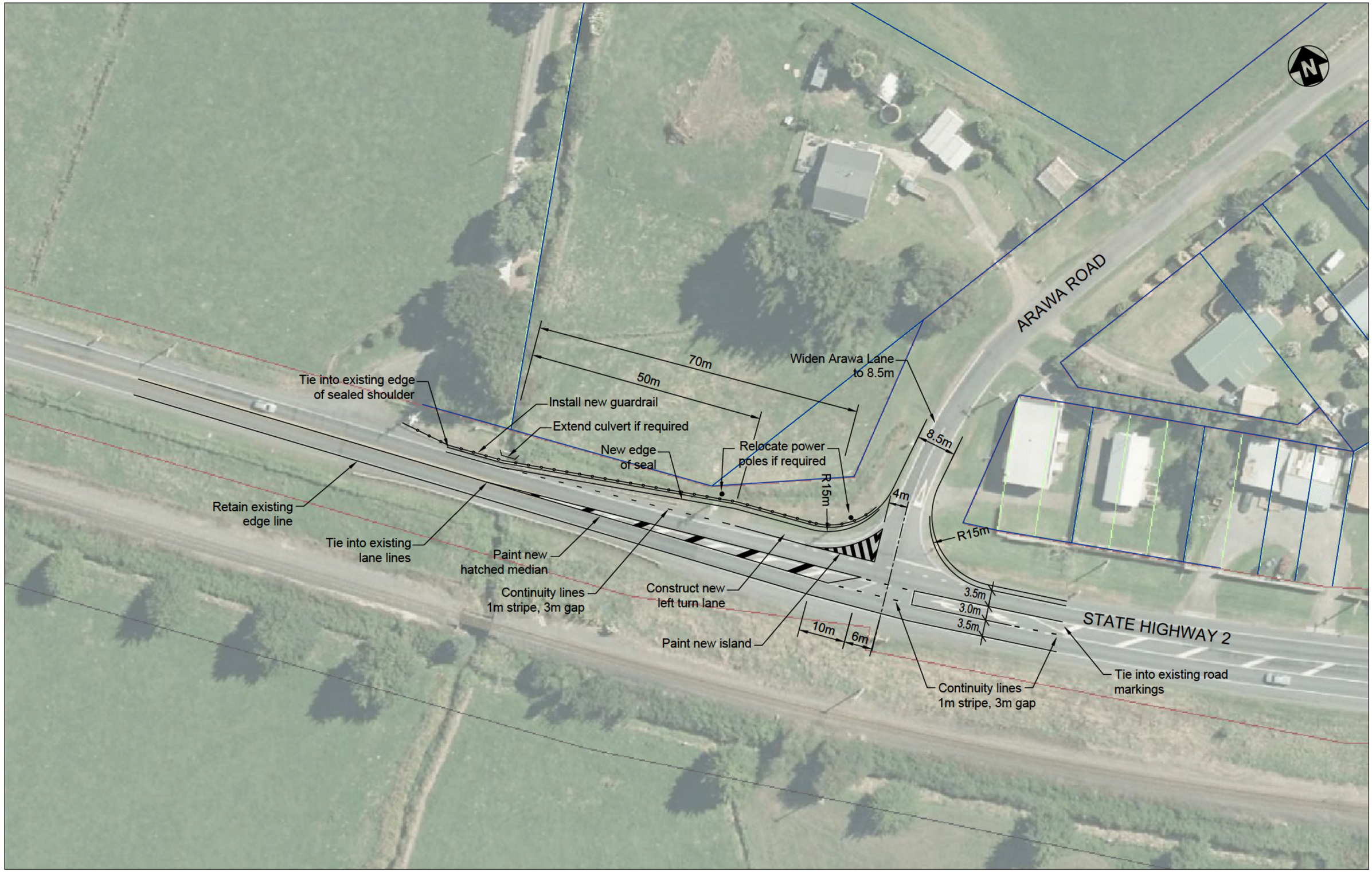
Pencarrow Estate - Structure Plan

LEGEND

- Affordable/Higher-Density Housing
- Low-Density Housing
- Commercial Use
- Residential Height Restriction Area
- Pedestrian Connection
- * Proposed Playground
- Plan Change Area
- Overland Flowpath
- New 100mm Water Main

Date: 08.12.2022
Scale: 1:2000 @ A3
Drawing: Pencarrow Estate - Structure Plan
Drawn: JS

MOMENTUM
PLANNING AND DESIGN



No	DESCRIPTION	DATE	CHK

KA & AD MARSH, ARAWA ROAD, PONGAKAWA
INTERSECTION RECONFIGURATION
OPTION 2 - SHORT LEFT TURN DECELERATION LANE

Harrison Transportation
PO Box 11557, Papamoa 3151
Phone: 07 576 6737
s 9(2)(a)

Design	BH	Job No.			
Drawn	JM	496	CAD File	22–205	
Checked	BH		Plot Date	14/10/22	
Date	21/09/22	Drawing No.		Rev.No.	
Drawing	1 of 1	496–02			

DRAWING No 01

SCALE 1:750 @A3