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Ms M Kemp
Campbell Brown
PO Box 147001
Brown Street, Ponsonby
Auckland 1144

19 August 2025

Copy via email: [redacted]

Dear Michelle,

SPECIALIST COMMENTS RESPONSE – RANGITOOPUNI PROJECT - (COUNCIL REFERENCE BUN60449727)

Further to your recent instructions, we have reviewed comments received on 26 June 2025 and have responded to the transport matters raised.

In general sense, it is noted that the site is already zoned 'Rural – Countryside Living' and is thus live zoned, therefore, it is expected that the site could already be generating traffic which is anticipated by the Unitary Plan. The proposal to develop countryside living residential dwellings aligns with the objectives of the Unitary Plan.

Further, Chapter E21 of the AUP details provisions for Treaty Settlement Land, which are applicable to the site. One dwelling per hectare is a permitted activity provided that there are no more than 10 dwellings per Lot. A complying subdivision of 10 ha Lots could be undertaken giving a total of 40 10 ha lots, and thus, a total of 400 dwellings enabled under the AUP. Based on the revised recommended trip rate of 1.1 per dwelling (see item 1.1.1) this activity could provide up to 440 vehicle trips during the peak hour compared to a trip rate of 303 vehicle trips during the peak hour for the proposed development. The proposed development from a traffic perspective is anticipated to result in lower level of traffic for the surrounding network compared to the maximum compliant development of 400 dwellings across 40 10 ha Lots at a trip rate of 1.1 per dwelling that could be undertaken on the site.

1 AUCKLAND TRANSPORT – SIVA

1.1.1 ITEMS A-C – TRIP DISTRIBUTION/GENERATION

Comment:

a) *The trip generation used for the residential component is considered low due to the rural location of the site and proximity to amenities. A more appropriate residential trip generation should be used to assess the traffic effects of the development. Applicant is advised to run a sensitivity test with a higher trip generation rate.*
b) *Trips associated with the existing and future uses of Access 2 for recreational use (as anticipated with the provision of the car park at Access 2 for public use), and potentially for Access 1 if the public is anticipated to use this to access walking tracks should be considered in the assessment, particularly at the site accesses*
c) *Further commentary is required to justify the trip distribution, particularly in relation to the Forestry Road / Deacon Road access and the assignment of traffic at the SH16 intersections at Oraha Road and Riverhead Road.*

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Commute response:

a) *The traffic generation rate has been further reviewed to check their appropriateness. In this regard:*
   a. *A rate of 0.85 per dwellings has been used in the ITA analysis for the AM and PM peak (RTA guideline for dwelling houses)*
   b. *The RTA guide has been recently updated by the TfNSW Guide to Transport Impact Assessment (November 2024)*
      i. *The TfNSW suggests the following trip generation rated for low density residential dwellings (Regional) based on surveys undertaken in 2022:*
         1. *AA Peak – 0.83*
         2. *PM peak – 0.84*

Overall, based on more recent TfNSW guide, the rates in the ITA are considered appropriate.

A sensitivity test has how ever been revised as per Section 1.1.6 item 1. A revised trip rate of 1.1 during the peak hour has been adopted and the revised trip generation can be seen in Table 1.

Table 1: Revised Trip Generation

Activity	Trip Rate	Units	Peak Hour Trips	Daily Trips
Residential Dwellings	1.1 trips per dwelling for peak 9.0 trips per dwelling for daily trips	208	229 trips	1,872 trips
Retirement Village	0.2 trips per dwelling in the peak hour 2 trips per dwelling for daily trips	260	52 trips	520 trips
Retirement Village (Care Suits)	0.6 trips per dwelling in the peak hour 6 trips per dwelling for daily trips	36	22 trips	216
Lot 1 Community Centre	Considered to mainly serve local residential / retirement and thus no additional wider network vehicle movements.			
Total			**303**	**2608**

b) *As highlighted in the ITA negligible trips associated with the community centre at Access 2 is anticipated during the commute peak hours (AM and PM). Due to the rural nature of the surrounding area visitors to the community centre are deemed to be unlikely especially during peak travel hours and have hence not been considered in the analysis. It is further considered that during the peak hours the only potential trips to the community centre would be those already travelling to/from work.*

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A sensitivity test has however also been conducted with additional turning vehicles at the Access 2 driveway. Given there are 70 carparks provided, a sensitivity test of 70 movements has been added to the model (essentially one exit and entry to the site in peak).

c) *Trip distribution has been reviewed among the access locations and throughout the surrounding road network based on the anticipated quickest / most efficient route. The Forestry Road access is the nearest access point for the retirement village and provides a quicker route for some northern countryside living dwellings hence, a greater number of trips are anticipated to be added.*

Regarding Oraha Road and Riverhead Road, a greater number of trips are expected to use this intersection due to the closer proximity to the proposed site and attraction locations such as Kumeu and Huapai.

Section 1.1.2 provides further analysis / clarification.

*Revised trip distributions have been revised and can be seen in **Appendix D** to reflect the trip generation changes and minor trip distribution changes.*

1.1.2 ITEM D – TRAFFIC MOVEMENTS

Comment:

d) *There appears to be various errors with some traffic movements reporting zero development where volumes would be expected, including at the SH16 / Coatesville-Riverhead Highway intersection and these errors have been carried over into the other diagrams. Furthermore, it is not clear how development traffic has been assigned to the SH16 Riverhead Road and the Oraha Road intersection. Errors in the "Generated trip distribution" diagrams in the ITA Appendix C should be corrected and consequential errors in the other diagrams.*

Commute response:

Refer to ITA for a more detailed description of traffic movements. Traffic development has been allocated to the intersections which are the most convenient for residents. In this case the SH 16 / Coatesville-Riverhead Highway, this intersection / route is not the most efficient route for residents; hence why there was no development added on this approach to SH16.

Figure 1 below highlights travel routes from the proposed site onto SH 16, using Old North Road to access SH 26 is 900m shorter (~2 minute time save) compared to using Coatesville-Riverhead highway; therefore, as highlighted above it is anticipated that residents are more likely to make use of Old North Road as it provides a more efficient journey.

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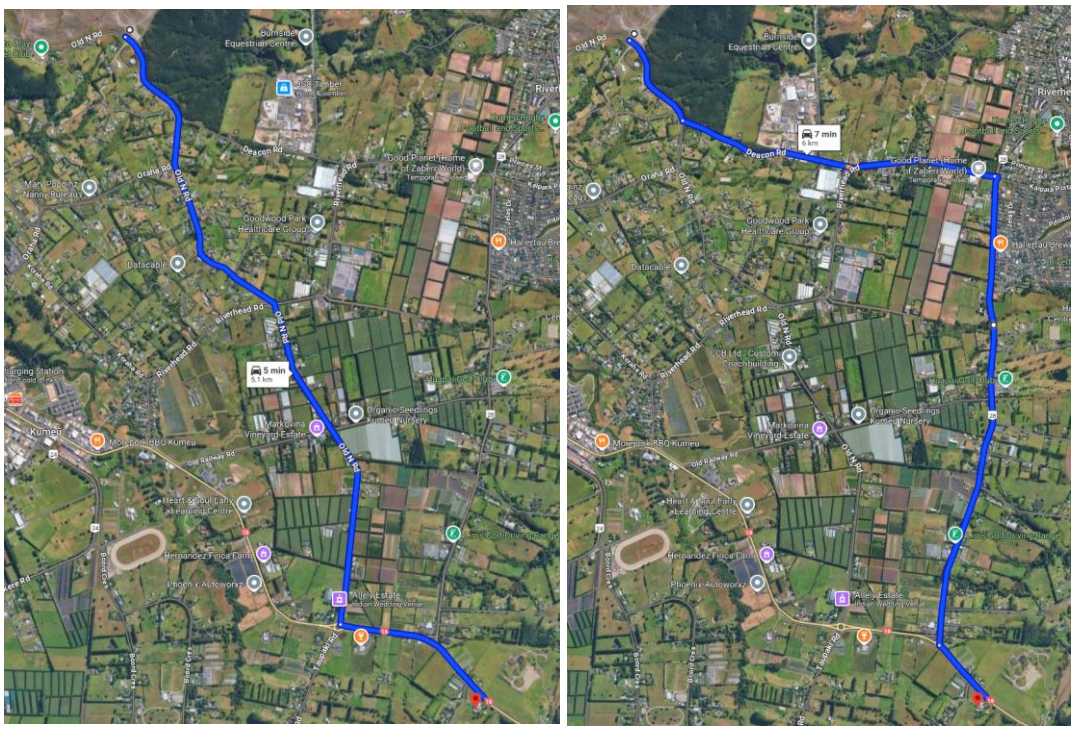
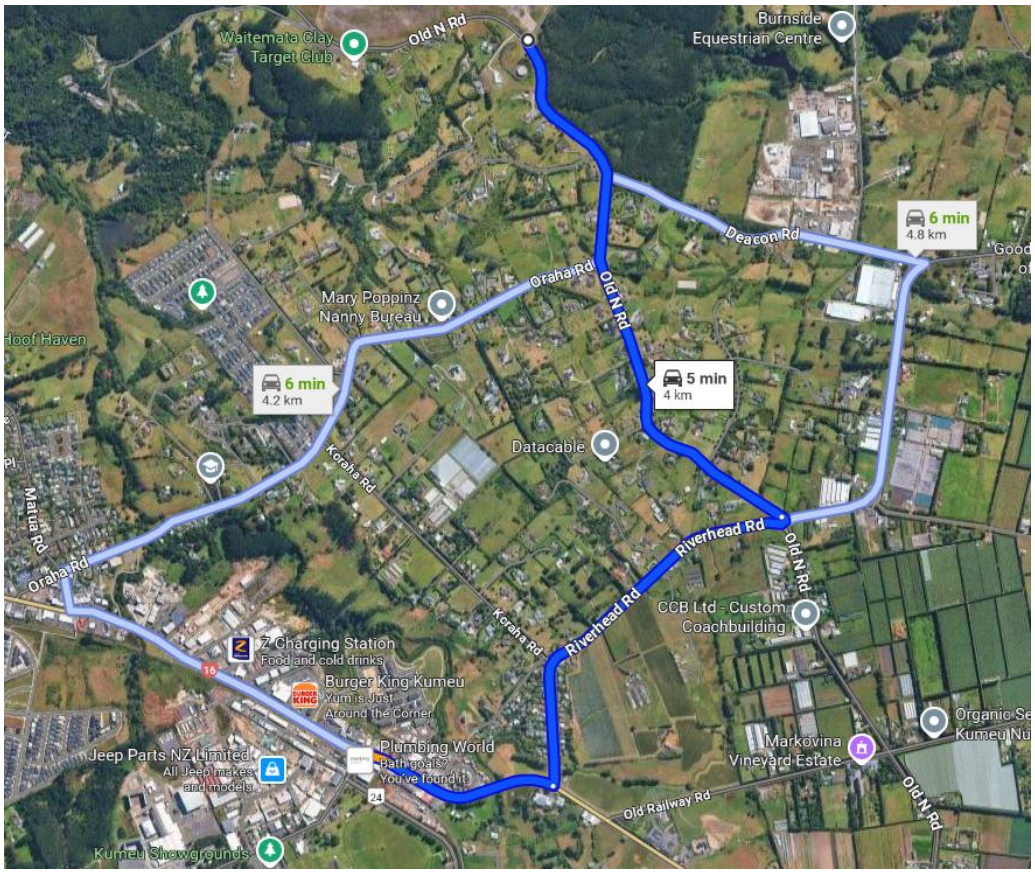
Figure 1: Travel Time Comparison between Old North Road and Coatesville-Riverhead Highway



Additionally travel routes from the proposed site to Kumeu has been assessed, Figure 2 highlights that Riverhead Road provided the most efficient travel routes from the site to Kumeu.

Figure 2: Travel Time Comparison Between Riverhead Road and Oraha Road.



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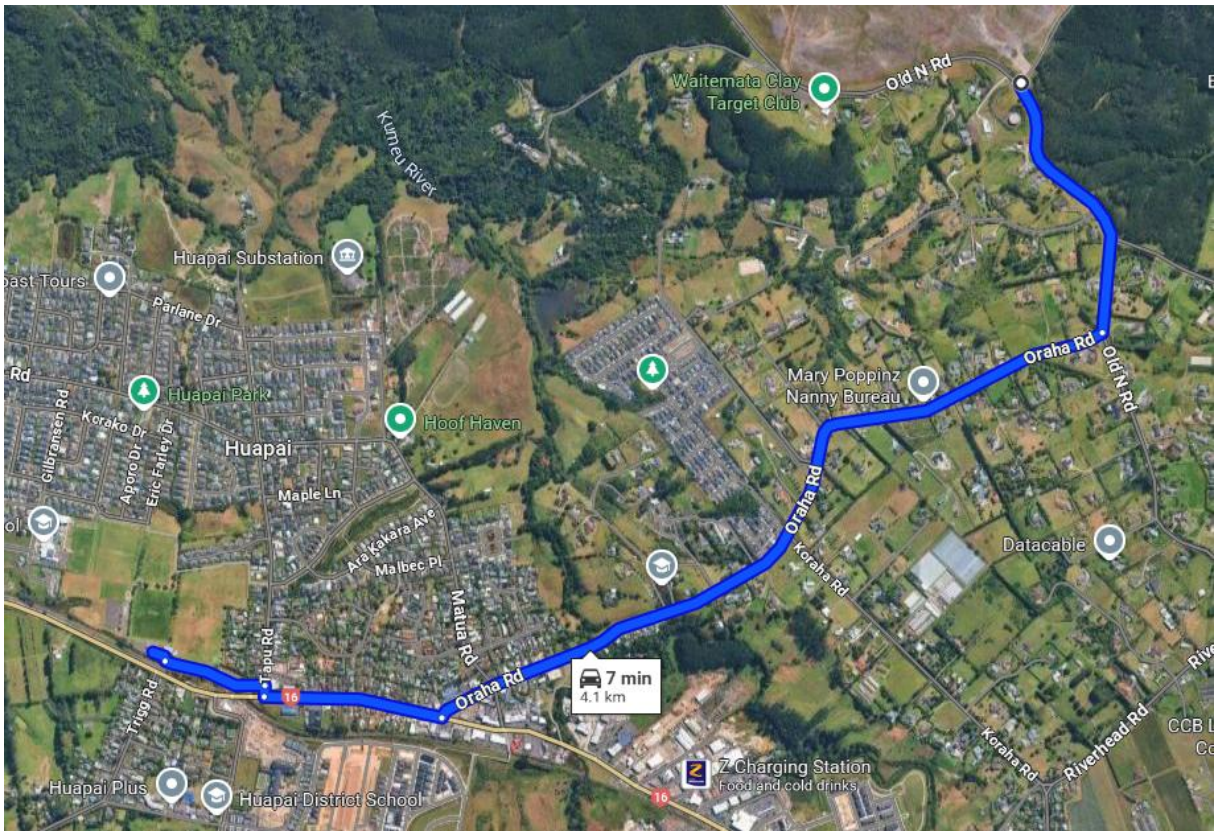
Travel routes to Huapai have also been assessed, it has been found that Oraha Road provides the most efficient and direct route from the proposed site as seen in Figure 3.

Figure 3: Travel Time Comparison Between To Huapai.



In terms of the generated traffic generation diagrams, we agree with the grammatical errors. **Appendix D** shows the revised distributions with the revised trip rates used.

1.1.3 ITEM E & F – SIDRA MODELLING

Comment:

e) *The following matters need to be addressed in the traffic modelling:*

- I. *All traffic models need to be calibrated for existing conditions (i.e. queues and delays, and in the case of the SH16 intersections, interaction between intersections has not been taken into account) and evidence of calibration should be provided;*
- II. *At the SH16 / Coatesville-Riverhead Highway intersection, the modelling does not reflect the queues and congestion that occur on the western leg (eastbound flows) of the intersection, particularly in the AM peak. The operation of the SH16 / Coatesville- Riverhead Highway intersection, which effectively reverses priorities between eastbound SH16 traffic and movements turning to and from SH16 should be addressed in the model (particularly the AM peak);*
- III. *The interaction between the SH16 / Coatesville-Riverhead Highway and SH16 / Old North Road intersections should be taken into account in the traffic modelling;*
- IV. *Potential supressed traffic demand on eastbound SH16 needs to be taken into account in the modelling of the SH16 intersections with Coatesville-Riverhead Highway and Old North Road; and*

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V. SIDRA Model Layout drawings should be provided.

f) An assessment of the effects of the development on the operation of SH16 east of Coatesville-Riverhead Highway is required to understand the impacts on the capacity of SH16

Commute response:

e)

I) The existing traffic models have already been calibrated for existing conditions based on previous traffic surveys. Calibration on priority intersections which are not under capacity pressure can be difficult to accurately undertake. In all cases the default gap acceptance parameters have been used.

Table 2: Intersection Observation Summary

Intersection	Observation
Coatesville-Riverhead Highway / SH 16	Excessive queueing on Coatesville-Riverhead Highway for turning vehicles occurs in the morning peak in particular. Intersection considered difficult to accurate calibrate in SIDRA.
Old North Road / Taupaki Road / SH 16	Coupled with Coatesville-Riverhead / SH16 intersection, this intersection experiences queuing in the morning peak in particular due to reverse let-in behavior. Roundabout calibrated on size / approach angles.
Riverhead Road / SH 16	Default gap acceptance parameters have been used
Oraha Road / SH 16	Default gap acceptance parameters have been used
Coatesville-Riverhead Highway / Kaipara Portage Road / Riverhead Road	Operates with minimal queues and delays observed. Default gap acceptance parameters have been used
Deacon Road / Riverhead Road	Operates with minimal queues and delays observed. Default gap acceptance parameters have been used
Old North Road / Deacon Road	Operates with minimal queues and delays observed. Default gap acceptance parameters have been used
Riverhead Road / Old North Road	Operates with minimal queues and delays observed. Default gap acceptance parameters have been used

II) Interaction between SH 16 intersections is difficult to capture due to let-in behaviour which we agree (and noted in the ITA) is not reflected in the SIDRA models. It is noted that the SIDRA modelling is assuming that the Coatesville-Riverhead upgrade has occurred which is anticipated to reduce vehicle queuing from the Coatesville-Riverhead Road / SH 22 intersection towards the Old North Road / SH 22 intersection. Stage 2 of the SH 16 safety improvements project which includes the upgrade of the Coatesville-Riverhead Highway / SH 22 roundabout has been confirmed by NZTA[1] We understand this is being discussed by experts relating to PC100.

III) See response to I above and II above.

IV) The level of supressed traffic demand on SH16 some 5km from the subject site is considered well beyond the scope of an assessment of already zoned land.

[1] Stage 2 of SH16 safety improvements project to move forward to construction | NZ Transport Agency Waka Kotahi

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V) SIDRA Model Layout drawings have been provided along with revised SIDRA with revised volumes and sensitivity tests of Access 2 in **Appendix B.** The results show similar results as previously documented in the ITA and show that Access 2 can operate at acceptable levels with the additional Community traffic sensitivity test.

f) The operation of SH16 east of Coatesville-Riverhead Highway is considered well beyond the scope of the assessment due to:

- Stage 2 of the SH 16 safety improvements project includes the upgrade of the Coatesville-Riverhead Highway / SH 22 intersection and four lanes on SH16 (to Brigham Creek roundabout) and has recently been confirmed to now have funding by NZTA.
- The subject site is already zoned as 'Rural – Countryside Living' and is considered to be a live zone; therefore, it is expected that the site could already be generating traffic which has already been considered by the Unitary Plan; and
- This section of Stage Highway is some 5km from the subject site.

It is noted that in addition to the above the site is already zoned 'Rural – Countryside Living' and is considered to be a live zone, therefore, it is expected that the site could already be generating traffic which is already been considered by the Unitary Plan. The proposal to develop countryside living residential dwellings aligns with the objectives of the Unitary Plan and the operation of the State Highway network east of the Coatesville-Riverhead Highway / SH 16 intersection is not (just like the rest of the State Highway / motorway system in Auckland) the applicant's responsibility.

Table 3 below summarises the results of the revised SIDRA with the updated traffic generation.

Table 3: SIDRA results

Intersection	Existing			Proposed			Proposed with PPC 100		
AM top and PM bottom	Average LOS	Average Delay	Average Queue Length	Average LOS	Average Delay	Average Queue Length	Average LOS	Average Delay	Average Queue length
Old North Road / Deacon Road	LOS A	3.7 seconds	7.4m	LOS A	3.5 seconds	8.7m	LOS A	3.5 seconds	8.7m
	LOS A	3.6 seconds	5m	LOS A	3.2 seconds	6.0m	LOS A	3.3 seconds	6.4m
Riverhead Road / Deacon Road	LOS A	5.1 seconds	12.4m	LOS A	5.8 seconds	23.1m	LOS A	4.6 seconds	11.5m
	LOS A	4.5 seconds	11.1m	LOS A/B	5.0 seconds	11.9m	LOS B	4.6 seconds	13.1m
Riverhead Road / Coatesville-Riverhead Highway/Kaipara Portage Road*	LOS A	6.7 seconds	38.7m	LOS A	7.4 seconds	51.5m	LOS E (Western Approach)	30.9 seconds	317m
	LOS A	6.4 seconds	43.9m	LOS A	6.0 seconds	25.8m	LOS B	10.5 seconds	54m
Riverhead Road / Old North Road	LOS A	5.9 seconds	14.1m	LOS A	6.1 seconds	20.0m	LOS A	6.5 seconds	24m
	LOS A	4.4 seconds	22.1m	LOS A	5.0 seconds	34.9m	LOS A	5.7 seconds	48.4m
Forestry Road / Deacon Road	LOS A	2.2 seconds	3.6m	LOS A	2.9 seconds	5.5m	LOS A	2.9 seconds	5.5m
	LOS A	1.5 seconds	2.m	LOS A	2.3 seconds	6.4m	LOS A	2.3 seconds	6.4m

*Intersection upgraded as part of PC100

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1.1.4 ITEM G-K – ACCESS & FORESTRY ROAD

Comment:

g) *The Access 1 (Opposite Pinetone Road) design needs to address the following matters*
   a. *The design needs to take into account Pinetone Road;*
   b. *The access is within 10m Pinetone Road and therefore Vehicle Access Restrictions apply under E27.6.4.1(2) and (3). An assessment as a Restricted Discretionary activity is required.*
   c. *It should be demonstrated that where the access splits into two JOALS, that the design would not result in vehicles accessing the site blocking back onto Old North Road*

h) *At Access 2 (Browns Road)*
   a. *Visibility to the west is restricted. An assessment of the effects of the shortfall of the visibility is required and any measures needed to mitigate the shortfall of visibility.*
   b. *A gate is proposed on the access way north of Access 2. It should be demonstrated that vehicles would not queue back onto Old North Road from the gate.*

i) *Access 3, 4 and 5 should be clearly identified on the plans and an assessment of the visibility as these accesses provided.*

j) *An assessment should be provided as to whether an upgrade to the Forestry Road / Deacon Road intersection is required with the increased development flows*

k) *For the upgrade of Forestry Road, the following information is required*
   a. *Tracking of a 6.3m van and a 10.3m truck is required to demonstrate that these vehicles can pass without conflict.*
   b. *Where vehicle crossings need to be amended for the revised vertical (and horizontal) alignment of Forestry Road, confirmation of approval for such works within private property should be provided by the property owners.*

Commute response:

Site speed surveys at each of the access location (and the Old North Road / Deacon Road intersection) have been summarised below:

Table 4: Speed Survey Summary

Access West	85th % Speed	Access East	85th % Speed
Access 1	76	Access 1	74
Access 2	76	Access 2	68
Access 3	76	Access 3	68
Access 4	76	Access 4	63
Access 5	72	Access 5	71
Deacon Road / Old North Road South	68	Deacon Road / Old North Road South	Not recorded (not critical)

g) Access 1 has been further assessed as per below:
   a. We agree with this comment regarding Pinetone Road. See (b) below.

   b. Access 1 is located approximately 27m from the lot boundary at Pinetone Road as seen in Figure 4 as per Unitary Plan measurement. Therefore, Access 1 is **not** located within 10m of the existing Pinetone Road, and vehicle access restrictions do not apply. No adverse safety effects are anticipated due to the low volume nature of Pinetone Road, the additional of the new turning lane, and the "right-left" stager which means right tuning vehicles do not conflict. We do however consider the design can

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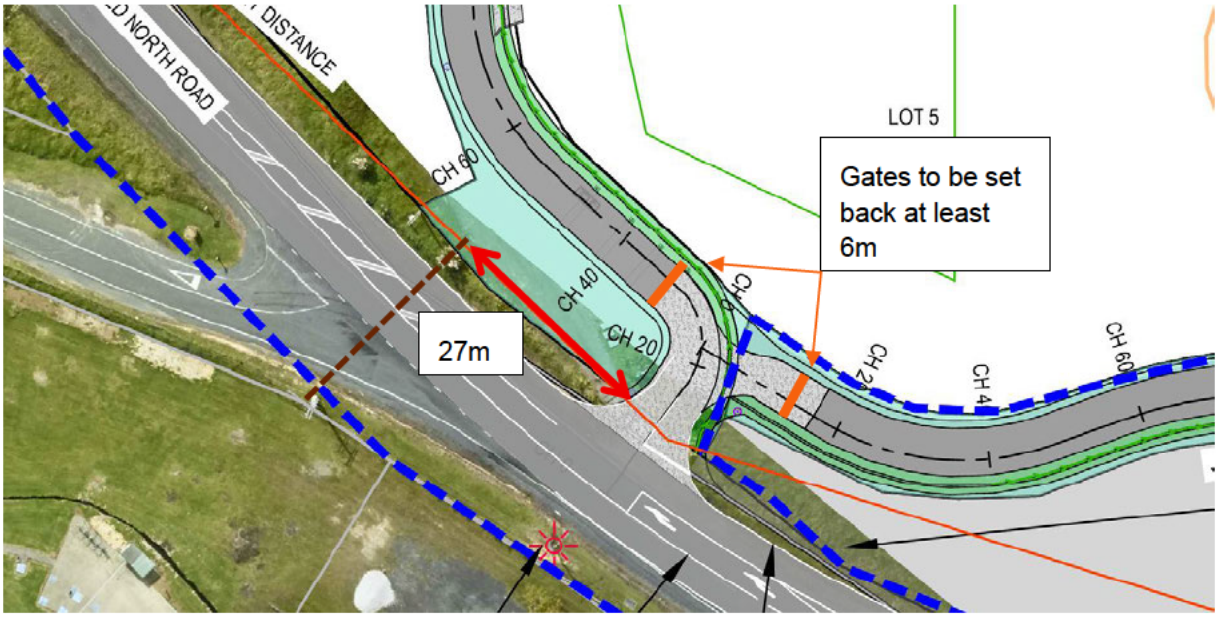
be slightly refined at EPA Stage 1 including a slightly wider median for right turning vehicles into Pinetone Road.

c. The split JOALs is not anticipated to lead to any queuing concerns. This access serves 21 Country Living Lots creating 14 outbound trips and 4 inbound trips in the AM peak period and vice versa for the evening peak hour. There is also space available to accommodate two cars before queuing onto Old North Road. We do note that there is the potential for gates to be provided on both JOAL's. These should be set back at least 6m from the JOAL intersection as per below.

Figure 4: Pinetone Road / Access 1 Separation



h) A visibility assessment for Access 2 has been conducted (**Appendix A**) based on a design speed of 80km/hr. Visibility in the western direction is limited to 166m and visibility to in the eastern direction is limited to 147m which does not meet the 181m recommended by AUSTROADS for a design speed of 80km/hr. In this regard:

a. Visibility in both directions is limited as a result of horizontal curves. A 45km/h advisory speed curve to the east and 65km/h advisory speed curve to the west limit's visibility, at slower speeds than the 80km/h posted speed limit.
b. Based on speed surveys and on-site observations a conservative 85th percentile operating speed of a 68km/h speed in the eastern direction and a 85th percentile operating speed of 76km/h speed in the western direction has been used. AUSTROADS recommends a safe intersection sight distance of 165m to the west and 145m to the east. The provided sight distance meets the AUSTROADS recommendation and is considered to be acceptable.

i) Other access locations have been labelled on plans as per the ITA (eg Figure 16). A visibility assessment for the other access locations has been conducted (**Appendix A**).

- Access 3: Adequate sight distance for 80km/hr (181+m) is provided to the west and sight distance is limited to the east (158m) due to an 65km/h advisory speed curve. Based on a 85th percentile operating speed of 68km/h to the east (from surveys) AUSTROADS recommends a sight distance of approximately 145m for a 68km/h

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operating speed (based on observations). The provided sight distance meets the AUSTROADS recommendation and is considered to be acceptable.

- Access 4: Sight distance is limited to the northwest due to current vegetation, 110m is provided and a sight distance of 164m is provided to the east which is limited due to a 45km/h advisory speed curve. Based on an 85th percentile operating speed of 63km/h (from surveys), AUSTROADS recommends a sight distance of 131m which is easily provided to the east and therefore considered to be acceptable. Regarding sight distance to the west, Access 4 is proposed to serve a single residential dwelling and therefore it is considered more appropriate to assess sight distance on the RTS 6 Guide which recommends a sight distance of 105m for an operating speed of 80km/h. The provided sight distance meets the RTS 6 Guide and is therefore considered to be acceptable.

- Access 5: Sight distance is limited to ~155m to the northwest due to 45km/h advisory speed curve in the road and 145m to the southeast. Based on a 85th percentile operating speed of 72km/h in both directions (from surveys), AUSTROADS recommends a sight distance of 157m for a conservative case of 72km/h based on observations which is provided in the western direction and is considered to be acceptable. Regarding sight distance to the East, Access 5 is proposed to serve 9 residential dwellings and will be low volume; therefore, the RTS 6 Guide is deemed to provide a more appropriate assessment. The RTS 6 Guide recommends a sight distance of 110m for an operating speed of 80km/h, the provided sight distance easily complies with the above recommendation and is considered to be acceptable.

j) As per Section 7.1 of the ITA a additional safety assessment of the Riverhead Road / Deacon Road intersection has already been conducted and no upgrade to the Forestry Road / Deacon Road intersection is deemed to be required.

k) Tracking provided in **Appendix C**.

1.1.5 ITEM L – STORMWATER MANAGEMENT

Comment:

l) Following information is required to review the stormwater management

c. Can detailed design information be provided for the proposed raingardens, including their construction methodology, functional performance, and maintenance requirements

d. Are any of the raingardens intended to provide stormwater retention or detention for hydrology mitigation, and if so, what are the implications for their size and design?

e. If any of the proposed culverts or bridges are classified as Large Dams and are to vest to AT, what are the anticipated compliance obligations and long-term risks

f. *Given the site's contribution of significant runoff to downstream floodplains, what onsite flood mitigation measures are proposed to protect AT's existing infrastructure*.

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Not a traffic engineering matter.

1.1.6 OTHER COMMENTS

Comment:

1. Trip Generation and Traffic Modelling

   There are significant concerns regarding the trip generation rates used in the Integrated Transport Assessment (ITA). The residential trip rate of 0.85 trips per dwelling is considered too low for a rural context like Riverhead. AT recommends using NZTA Research Report 453, which suggests a more realistic range of 1.1 to 1.4 trips per dwelling. Additionally, the modelling does not account for recreational traffic or potential public use of Access 1. The SIDRA traffic models used are not calibrated to reflect actual traffic conditions, such as queue lengths and delays. Key intersections, including SH16 and Coatesville-Riverhead Highway, are not accurately represented, and the effects of suppressed demand and reverse priority are not considered. These issues must be addressed to ensure the development's traffic impacts are fully understood.

2. SH16 Intersection and Network Capacity

   The assessment does not adequately demonstrate that the development can proceed without prior upgrades to the SH16 / Coatesville-Riverhead Highway intersection and SH16 east of this junction.

   These intersections are already under pressure, and the additional traffic from the proposed development would likely exacerbate congestion and safety issues. AT requires confirmation that these upgrades will be implemented before the development progresses.

3. Access Design and Safety
   Further detail is required to confirm that the proposed vehicle accesses can be provided safely.
   a. Access 1 (Pinetone Road) and Access 2 (Browns Road) present visibility and design challenges.
   b. Access 1 needs to accommodate turning movements and meet visibility standards, while Access 2 has issues related to road curvature and gate placement that could cause queuing.
   c. Accesses 3 to 5 are not shown on the plans and require visibility assessments. The design must comply with AT's standards and Vehicle Access Restrictions.

4. Forestry Road Upgrade

   The proposed upgrade to Forestry Road includes a 6.0m carriageway, which meets the minimum requirement but not the preferred width. The road must be capable of accommodating a 6.3m van and a 10.3m truck. Retaining walls over 4m in height require AT approval. Additionally, some vehicle crossing modifications extend into third-party properties, necessitating property owner consent. These upgrades must ensure that vehicles can pass safely without conflict.

5. Construction Access Requirements

   AT recommends that Access 1 and Access 2 be upgraded to their final form before any construction begins on the site. This is essential to ensure the safe and efficient movement of

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construction traffic and to minimize disruption to the surrounding road network. Early upgrades will also help mitigate safety risks associated with increased vehicle movements during the construction phase.

6. Stormwater management

Raingardens are proposed along the extension of Forestry Road. However, they are not required under the Auckland Unitary Plan as the road is not classified as a High-Use Road. The benefit of these raingardens is unclear when weighed against their whole-of-lifecycle cost, particularly given AT's limited maintenance budget and the higher priority of other contaminant-generating roads.

The stormwater overview plans lack detail on the design, construction, function, and maintenance of these raingardens, which are shown as online devices and therefore pose a higher operational risk. It is also uncertain whether these devices are intended to provide hydrology mitigation, which could significantly increase their size. Additionally, the proposal includes numerous new or upgraded culverts and bridges, some with emergency spillways, raising questions about their classification as Large Dams and the associated compliance risks if vested to AT. Finally, the site contributes substantial runoff to downstream floodplains that affect AT's road network, and the development may require significant on-site flood mitigation to address these impacts.

Commute response:

1. As highlighted in Section 1.1.1 both the RTA and updated tfNSW Guide (2024) suggest a trip generation rate of 0.83-0.85 during the AM/PM peak periods. Overall, based on the more recent TfNSW Guide, the trip generation rates used in the ITA are considered to be appropriate. Despite this, a revised trip generation assessment was undertaken using the above recommended rate of 1.1 vehicle trips per countryside living dwellings during peak travel periods. See Section 1.1.1.

2. We generally agree with this comment. It is noted that funding for Stage 2 of the SH 16 safety improvements project has been confirmed which includes the Coatesville-Riverhead Highway / SH 22 roundabout upgrade[2].

   Further, given the site is live zoned, any network capacity deficiency in the wider network (especially a State Highway some 5km from the site) is not considered relevant to the assessment.

3. As per Section 1.1.4 a further assessment of the proposed vehicle accesses has been conducted, in this regard:
   a. See previous comments.
   b. Vehicle tracking for access 1 was conducted as per Drawing C5 included in the ITA (shown below) and ss considered to be acceptable. Sight visibility at Access 1 has been assessed above in a) and is considered to be acceptable.

[2] Stage 2 of SH16 safety improvements project to move forward to construction | NZ Transport Agency Waka Kotahi

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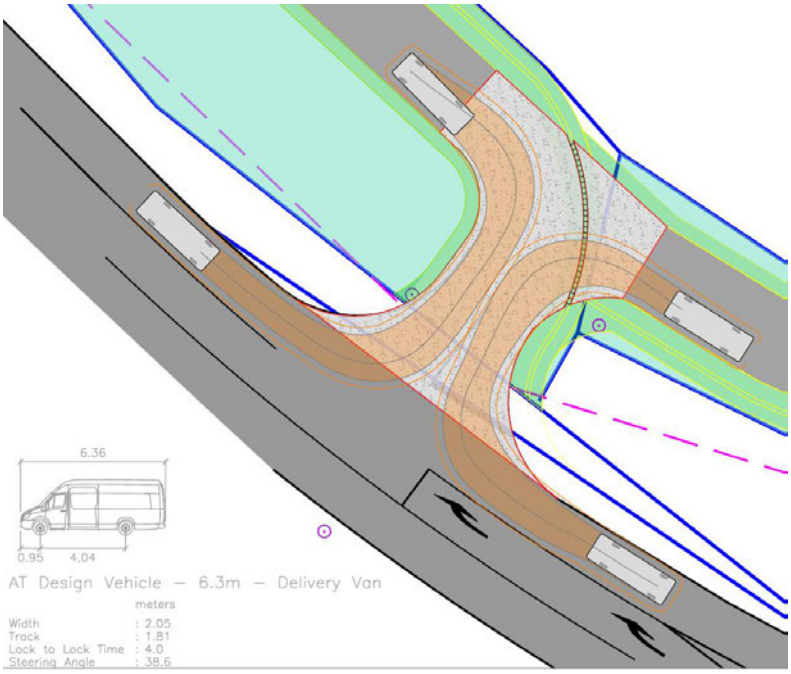
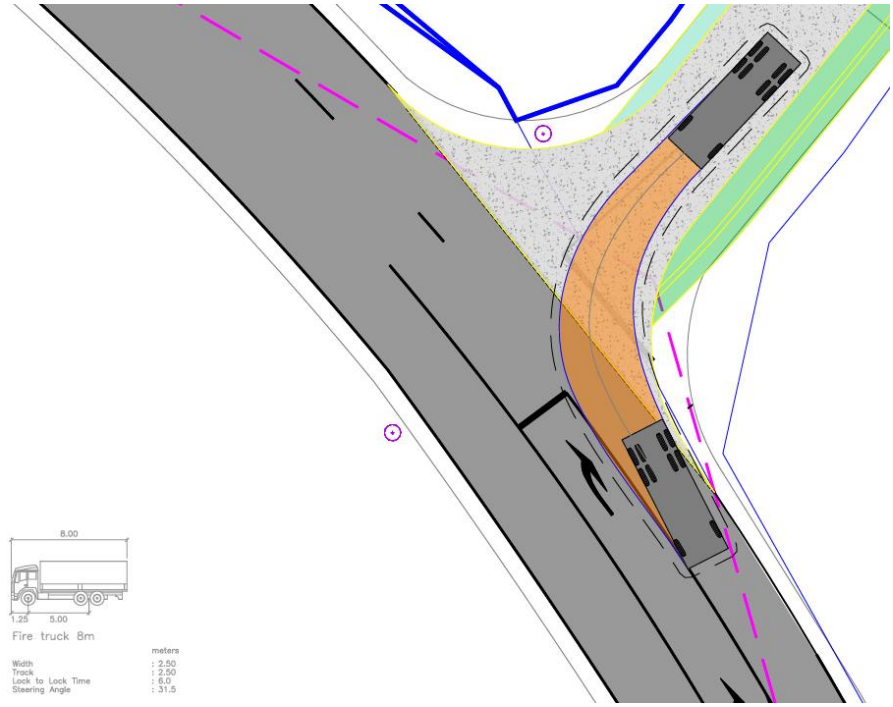


Regarding Access 2, vehicle tracking has already been conducted in drawing C2 of the ITA and it is considered that there are no road curvature concerns.



Additionally, based on drawing C300-4-3 prepared by Maven. The gate is located some 35m from Old North Road and based on SIDRA modelling for Access 2 as per **Appendix B**, no more than one vehicle queuing is anticipated.

c. The location of these Accesses is shown in the civil engineering drawings and Figure 40 of the ITA. A sight visibility assessment has been conducted for Accesses 3-5. All access locations experience sight distance limited by nearby advisory 45-65km/hr curves; however, based on observations lower operating

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speeds have been adopted and the proposed access locations are able to provide sufficient sight visibility which is considered to be acceptable.

4. Vehicle tracking for Forestry Road using a 10.3m truck and 6.3m van has been conducted and can be seen in **Appendix C**. The proposed Forestry Road can accommodate vehicle tracking and is deemed to be acceptable. Retaining walls and vehicle crossing modifications extending into third-party properties is not a traffic engineering matter and has not been addressed.

5. Agreed, we recommend that Access 1 and 2 is upgraded before construction begins on site.

6. Not a traffic engineering matter.

2 AUCKLAND COUNCIL – MAT COLLINS & ASHRITA LILORI (ABLEY)

The comments within the Auckland Transport covering letter prepared by Mat Collins & Ashrita Lilori are in general a summary of the traffic / transport reviews undertaken by Auckland Council. As such, the Commute commentary in response to the covering letter generally refers to detailed review of the other two more substantive reviews, provided further below.

2.1.1 ITEM 1 – ROAD SAFETY ASSESSMENT

Comment:

1. *Road Safety Assessment*
   a. *The ITA provides a cursory review of historic crash records and does not provide sufficient assessment to determine whether the development could exacerbate existing road safety issues. For example, Section 7.1.3 of the ITA identifies a crash trend (failure to give way) at the Deacon Road / Riverhead Road intersection but concludes the intersection is operating acceptably without assessing how the development might increase crash risk.*
   b. *Deacons Road, Old North Road, and Riverhead Road are rural roads that will serve as key access routes to the development. NZTA's CAS data shows 36 injury and fatal crashes along these roads since 2020 (excluding SH16 intersections), which may indicate a higher road safety risk along these corridors.*
   c. *To quantify the potential effect on road safety, please provide an Infrastructure Risk Rating (IRR) assessment for the following corridors (refer to https://www.nzta.govt.nz/assets/resources/infrastructure-risk-rating-manual-road-to-zero-edition/infrastructure-risk-rating-manual-road-to-zero-edition-2022.pdf)*

      i. *Deacons Road, between and including the intersections with Old North Road and Riverhead Road*

      ii. *Old North Road, between and including the intersections with Deacons Road and SH16*

      iii. *Riverhead Road, between and including the intersections with SH16 and Coatesville-Riverhead Highway*

Commute response:

a) *A revised road safety record assessment has been conducted using the NZTA CAS database. The revised search includes all crashes occurring on Old North Road between Pinetone Road*

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and SH 16, Deacon Road between Old North Road and Riverhead Road, Riverhead Road between Deacon Road and SH 16, Oraha Road between Old North Road and SH 16, the Deacon Road / Old North Road intersection, the Deacon Road / Riverhead Road intersection, the Old North Road / Oraha Road intersection, the Old North Road / Riverhead Road intersection, and the Old North Road / Old Railway Road intersection.
A total of 85 crashes were reported between 2020 and 2024, including any crashes in 2025.

In total there are 85 collisions including 2 fatal collisions, 11 serious collisions, 33 minor-injury collisions and 39 non-injury collisions. The crashes are summarised below. The crashes are made up of the following:

Table 5: Crash summary

Road Section / Intersection	Crash Summary
Old North Road	• A single minor collision due to driver losing control in wet conditions on a bend; • A serious collision involving a cyclist due to driver failing to see cyclist due to sunstrike; • A non-injury collision due to driver losing control in wet conditions on a bend; • A serious collision due to driver losing control, crossing the centre line and colliding with oncoming vehicle; • A non-injury collision due being distracted, crossing centre line and crashing with an oncoming vehicle; • A non-injury collision involving driver colliding with a fence; • Two minor injury collisions involving a driver losing control in wet conditions; • A serious collision involving vehicle trailer crossing centerline and colliding with an oncoming vehicle; • A minor collision due to driver losing control and colliding with a street light; • A minor injury collision due to distracted driver driving off road; • Two minor injury collisions due to driver losing control of the vehicle; • A non-injury collision due to driver rear ending a vehicle waiting to turn into private property; and • A minor injury collision due to vehicle overtaken a right turning vehicle on the right hand side.
Riverhead Road	• A non-injury collision due to vehicle swerving to avoid animals on the road and losing control; • A minor injury collision due to vehicle colliding with power pole on straight section; • A minor injury collision due to driver losing control of vehicle and coming off the road; • A non-injury collision due to driver losing control while speeding in wet conditions; • A non-injury collision due to driver under the influence fleeing police lost control of their vehicle; • Two minor injury collisions and a single non-injury collision due to driver failing to give way at the Koraha Road / Riverhead Road intersection; • A minor injury collision due to driver under the influence losing control of their vehicle; • A non-injury collision due to driver over correction on a corner and hitting a bank.
Deacon Road	• A single minor injury collision due to driver losing control of the vehicle or a corner.
Oraha Road	• A non-injury collision due to learner driver losing control of the vehicle on a corner; • A serious injury collision due to driver veering into ditch and flipping; • A serious injury collision due to motorbike failing to slow for a 35km/h corner and losing control; • A non-injury collision due to restricted driver losing control of the vehicle on a corner, alcohol consumption is suspected; • A minor injury collision due to driver losing control on a corner in wet conditions; • Two non-injury collisions and two minor injury collision due to driver losing control on a 35km/h advisory speed corner;

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	• Four non-injury collisions due to a head on collision on a 35km/h advisory speed corner; • A non-injury collision due to driver failing to give way at the Oraha Road / Accolage Blvd intersection; • A serious injury and non-injury collision due to driver failing to give way at the Oraha Road / Koraha Road intersection; • A minor injury collision due to speeding drive losing control of the vehicle, alcohol was a suspected factor; • A serious collision due to driver pulling out of driveway onto Oraha Road failing to see a motorcyclist; • A non-injury and minor collision due to driver rear ending another vehicle waiting to turn into residence; • A minor injury collision due to driver crossing the centre line and colliding into another vehicle; • A non-injury collision due to vehicle colliding with a parked vehicle; • A non-injury collision due to driver failing to stop at a stop sign and colliding with another vehicle at the Matua Road / Oraha Road intersection.
Old North Road / Old Railway Road	• A single non-injury collision due to driver on Old Railway Road failing to give way; • Three minor injury collisions, a single serious collision, and three non-injury collision due to driver failing to stop at the stop sign and colliding with another vehicle; • A single non-injury collision due to driver failing to stop at the stop sign due to sunstrike and colliding with another vehicle; • A single minor injury collision due to driver failing to give way to another vehicle; and • A single fatal collision due to a driver on Old Railway Road failing to stop at the stop sign and colliding with another vehicle travelling on Old North Road.
Oraha / Old North Road	• A single serious collision due to driver failing to stop for a turning vehicle and colliding with a fence on the other side of the road; • A single minor collision due to driver losing control of the vehicle on a corner; • Three non-injury collision due to driver rear ending a vehicle waiting to turn; • A single non-injury collision due to intoxicated driver colliding with a pole while turning into Oraha Road;
Deacon Road / Riverhead Road	• A single minor injury collision due to driver failing to stop for an oncoming vehicle; • A single minor injury collision due to driver stopping unexpectantly for a turning vehicle into Deacon Road leading to a rear ending collision; • Three minor injury collision due to driver making an unsafe turn into Deacon Road colliding with an oncoming vehicle; • A single minor injury collision due to drive making an unsafe turn onto Riverhead Road; • A single non-injury collision due to driver losing control on a corner; and • A single fatal collision due to driver losing control of the vehicle on a corner, driver tested positive for illicit drug consumption.
Old North Road / Deacon Road	• A single non-injury collision due to restricted driver colliding with a concrete pole after losing control in wet conditions; • A single serious collision due to turning vehicle onto Old North Road accelerating too quick and losing control of the vehicle; • A single minor collision due to driver being distracted and losing control of the vehicle; • A single minor collision due to driver driving too fast for conditions and losing control of the vehicle.
Riverhead Road / Old North Road	• A single non-injury collision due to driver turning from Riverhead Road into Riverhead Road, losing control and colliding with a power pole; • Three non-injury collisions and a single serious collision due to driver failing to give way at the roundabout causing a collision;

The majority of crashes are minor/non-injury and involve drivers driving too fast in wet conditions, ignoring speed advisory signs or failing to give way/stop at intersections. In this regard, as the proposed site and surrounding area develops the area will become a more urban environment including with two significant upgrades on Old North Road (full right turn bays) leading to lower speeds and safer outcomes for the transport network. It is not anticipated for the proposal to lead to any adverse safety impacts on the surrounding network.

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It is noted that the site is already zoned 'Rural – Countryside Living' and is considered to be a live zone, therefore, it is expected that the site could already be generating traffic which is already been considered by the Unitary Plan.

b) *Noted. See response above.*

c) *An IRR assessment was conducted and can be seen in Table 6 below. All corridors assessed result in a medium-high risk rating.*

It is anticipated for the surrounding area to become more urbanised as development occurs leading to lower risk ratings. Additionally, all assessed roads were in towards the lower end of the medium-high rating band

It is noted that the site is already zoned 'Rural – Countryside Living' and is considered to be a live zone, therefore, it is expected that the site could already be generating traffic which is already been considered by the Unitary Plan. The proposal to develop countryside living residential dwellings aligns with the objectives of the Unitary Plan.

Table 6: IRR Analysis

	Deacon Road	Old North Road	Riverhead Road
Road Attribute	Risk Score		
Land use	Rural Residential (1.5)	Rural Residential (1.5)	Rural Residential (1.5)
Road stereotype	Two-lane undivided (4)	Two-lane undivided (4)	Two-lane undivided (4)
Horizontal alignment	Curved (1.8)	Curved (1.8)	Curved (1.8)
Roadside hazard	Severe (2.8)	Severe (2.8)	Severe (2.8)
At-grade intersection density	2-3 intersections per km (1.25)	1-2 intersections per km (1.15)	1-2 intersections per km (1.15)
Access density	10-20 accesses per km (1.1)	10-20 accesses per km (1.1)	10-20 accesses per km (1.1)
Traffic volume	1000-5999 vpd (1.4)	6000-12,000 vpd (1.9)	1000-5999 vpd (1.4)
IRR Score	**58.212**	**72.68**	**53.55**
Risk Band	**Medium-High**	**Medium-High**	**Medium-High**

2.1.2 ITEM 2 – OLD NORTH ROAD / DEACONS ROAD

Comment:

2. *Sight Distance at Old North Road / Deacons Road*
   a. *Section 7.3.2 of the ITA states that 181m of sight distance is available at the Old North Road / Deacon Road intersection.*
   b. *However, it appears that sightlines to the south may be obstructed by a vertical crest near 336 Old North Road, along with an embankment and roadside vegetation.*

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c. *Please confirm the available sight distance with further assessment, including geometric constraints and any vegetation encroaching into the sight triangle*

This information is required to understand whether existing rural roads can safely accommodate the increase in traffic generated by the development.

Commute response:

Sight distance to the north (left turns) exceeds the 181m sight distance requirements.

We agree the sight distance to the south is limited to approximately 130m (based on on-site measurements) as a result of a vertical crest and roadside vegetation. On site observations a 85th percentile operating speed over the crest is 68km/h as seen in Table 4 which AUSTROADs recommends a sight distance of 145m.

The provided sight distance does not meet AUSTROAD recommendations; however, this is considered to be an existing issue and does not result in any safety concerns regarding the proposed development as it adds minimal traffic to the right turn movement which would rely on the southern sight distance.

It is noted that the Deacon Road / Old North Road intersection is already existing and has been observed to operate safely and acceptably and the site is already zoned 'Rural – Countryside Living' and is considered to be a live zone, therefore, it is expected that the site could already be generating traffic which is already been considered by the Unitary Plan.

2.2 COUNTRYSIDE LIVING SUBDIVISION RFIS

2.2.1 ITEM 3 – WASTE VEHICLE TRIPS

Comment:

3. *Waste Vehicle Trips*
    a. *The Waste Management Plan (Appendix DD) does not confirm the number of waste vehicle trips expected each week. We note that a 7.2m compactor truck (with lower capacity than Council's 10.3m trucks) is proposed.*
    b. *Please confirm the number of weekly truck movements required for the proposed 7.2m truck compared to a standard 10.3m truck.*

This information is required to assess efficiency effects from increased heavy vehicle movements at site accesses and within the site.

Commute response:

Waste vehicle trips are anticipated to be low and once per week even with the 7.2m compactor truck.

2.2.2 ITEM 4 – VEHICLE CROSSING SIGHTLINES

Comment:

4. *Sightlines at Vehicle Crossings*
    a. *Please provide further assessment of sightlines at the following vehicle crossings:*

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i. *Maven Drawing C110-6-1 suggests the Browns Road (private) crossing may require a sightline over third-party land (Lots 67 and 403 Old North Road), and the road geometry and embankment may obstruct visibility.*

ii. *Maven Drawing C300-1-2 indicates the sightline for drivers exiting JOAL 1 crosses private land (Lot 50).*

iii. *JOAL 4, Lot 55, and Lot 67 vehicle crossings to Old North Road require a sightline assessment to confirm unobstructed visibility and that no sightlines rely on third-party land.*

This information is required to assess safety and efficiency effects of the proposed vehicle crossings.

Commute response:

In regard to the above comments:

- The Browns Road crossing is able to provide adequate sight distances in both directions without conflicting with neighbouring lots as noted previously based on recorded operating speeds.
- JOAL 1 sight lines in the eastern direction does conflict with the Lot 50 which the applicant owns. Condition of consent can be provided for this area to ensure planting is low maintaining sight lines.
- Sight distance assessments for JOAL 4, Lot 55 and Lot 67 have been conducted and can be seen in **Appendix A** and Section 1.1.4 previously**.**

2.2.3 ITEM 5 – VEHICLE CROSSING CONFLICTS AND CONTROLS

Comment:

5. *Vehicle Crossing Conflicts and Controls*

Please assess the safety and efficiency effects of the following:

a. *JOAL 1's proximity to the Pinetone Road intersection – it appears to be within 10m, contrary to the ITA assessment.*

b. *Limited separation between JOAL 1 and JOAL 2 may cause queuing conflicts. Drawing C1 also shows an 8m truck fully occupying the JOAL 1 carriageway when exiting JOAL 2, potentially conflicting with inbound movements.*

c. *Any gates at vehicle crossings (e.g. JOAL gates in the Landscape Concept Plan) may result in queuing within the legal road.*

This information is required to understand potential effects on road safety and network efficiency.

Commute response:

As highlighted previously, measured from the lot boundary JOAL 1 is approximately 27m from the Pinetone Road intersection.

The limited separation between JOAL 1 and JOAL 2 is not anticipated to cause queueing conflicts as highlighted in **Appendix B**, vehicle queues are not expected to exceed a single vehicle.

It is understood that a gate Is proposed on Access 2 (Browns Road), **Appendix B** again highlights that queuing is not anticipated to exceed a single vehicle; therefore, queuing on the local road is not

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expected to occur. There will also be gates provided in JOAL 1 / JOAL 2 which as noted previously we recommend they are at least 6m separated from the termination point of both JOALs.

2.2.4 ITEM 6 – TURNING HEAD PROVISION

Comment:

6. *Turning Head Provision for JOALs*
    a. *Multiple JOALS do not provide turning heads. "TRUCK TURNING FACILITIES" are shown on some drawings, for example Maven Drawing C300-2-2, however these are not located at the end of the JOAL and therefore drivers may be required to undertake extensive reversing manoeuvres, which can affect the safety of other JOAL users. Please provide further discussion of how drivers will safely turn around within JOALs, including waste collection vehicles.*

This information is required to understand whether vehicles can safely turn around within JOALs.

Commute response:

It is understood that truck turning facilities have been provided where trucks are required to enter JOALs and turn around. Adequate space is provided within JOALs for resident vehicles to turn around where needed via driveways or passing bays. This is considered to be acceptable, and vehicles will be able to safely turn around within JOALs.

2.2.5 ITEM 7 – JOAL DESIGN

Comment:

7. *JOAL design and check vehicles*
    a. *Some JOALs will function as roads due to the number of lots served. Please provide an assessment of these JOALs (those serving >10 lots) against Auckland Transport's TDM Section 4.2 – Urban and Rural Roadway Design, including intersection assessments where JOALs meet public roads.*
    b. *Please also provide detailed vehicle tracking for all locations where conflict is identified, ensuring:*
        i. *JOAL and Lot numbers are clearly labelled, to allow easier identification of the portion of the site being assessed.*
        ii. *Conflicts with non-trafficable areas (e.g. berms, footpaths) are addressed*

Commute response:

In regard to the above:

- The JOALS all intersect with roads in rural locations and not urban
- The two JOALs serving >10 lots on Old North Road have both been designed essentially as private roads where they meet the public road (including full right turn bay)
- The lots are all large (1ha or greater) and any minor conflicts in tracking can be addressed at EPA stage.

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2.2.6 ITEM 8 – PASSING BAY SIGHTLINES

Comment:

8. *Sightlines Between Passing Bays*
    a. *For any JOAL with a carriageway narrower than 5.5m, please provide drawings demonstrating sightlines between passing bays, taking vertical alignment into account.*

This information is required to determine whether one-lane sections of JOALS can operate safely and efficiently.

Commute response:

Sightlines between passing bays has been assessed and can be seen in section 10.4.2 of the ITA. in this regard:

Generally, sight lines between passing bays are provided; however, some cases sight lines conflict with Lot boundaries. In this regard:

- These JOALs are low volume and are not anticipated to serve more than 10 dwellings meaning it is unlikely for vehicle conflict to occur.
- Restrictions in planting on lots can be included if required to ensure visibility is maintained.

2.2.7 ITEM 9 – NETWORK CONNECTIVITY

Comment:

9. *Network connectivity*

    a. *The Landscape Concept Plan shows multiple pedestrian paths through the site (e.g. to Forestry Road), but these are not shown on the engineering plans or discussed in the ITA. Please confirm whether pedestrian and cycle connections are proposed. If not, provide an assessment of walking/cycling distances between key locations within the subdivision, and to the Community Centre, Retirement Village, and proposed SUP to Duke Street.*

    b. *Please confirm whether vehicular access to Forestry Road from Stages 9, 12 and 14 has been considered, to improve permeability and resilience.*

This information is required to understand the degree to which the development provides an accessible, connected and resilient movement network.

Commute response:

Refer to Section 3.5 of the ITA where pedestrian paths and connections have been discussed. As per drawing C300-8 prepared by Maven, a 3.0m width shared path connection from the retirement village to the eastern edge of the site is proposed. In this regard:

There is a small section that will not be delivered as part of the proposal connecting to Mill Grove. It is understood that the portion of the path extending from the site through to the township will form part of a future application (as it required a heritage authority that was out of scope). From discussion with the Local Board, and our understanding is that the bridge is scheduled to be replaced in the coming year.

2.2.8 ITEM 10 – CROSS SECTIONS

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Comment:

10. *Cross Sections*
    a. *Maven Drawings C330-1 and C330-2 show indicative JOAL and ROW cross-sections, but it is unclear where each cross-section applies. Please provide a roading plan identifying the location of each typology.*

This information is required to understand whether the cross section for the JOALs and RoWs appropriately accommodate the expected users.

Commute response:

Not a traffic engineering matter.

2.3 RETIREMENT VILLAGE RFIS

2.3.1 ITEM 11 – SHARED PATH COMPLETION AND ACCESS

Comment:

11. *Shared Use Path (SUP) Completion and Access*
    a. *Maven Drawing C300-6 shows the SUP terminating short of Mill Grove, with the final segment excluded from the application. Please confirm when and by whom this remaining section will be completed.*
    b. *Please confirm ownership of the SUP and whether public access is proposed.*

This information is required to understand whether the SUP will provide a degree of active modes accessibility to the site.

Commute response:

Not a traffic engineering matter. See 2.2.7 above.

2.3.2 ITEM 12 – VEHICLE TRACKING

Comment:

12. *Vehicle Tracking Drawings*
    a. *Please also provide detailed vehicle tracking for all locations where conflict is identified, ensuring:*
    b. *Accessway and Unit numbers are clearly labelled, to allow easier identification of the portion of the site being assessed*
    c. *Conflicts with non-trafficable areas (e.g. berms, footpaths) are addressed*

This is required to confirm safe and efficient vehicle movement throughout the site.

Commute response:

Revised vehicle tracking has been conducted and can be seen in **Appendix C**.

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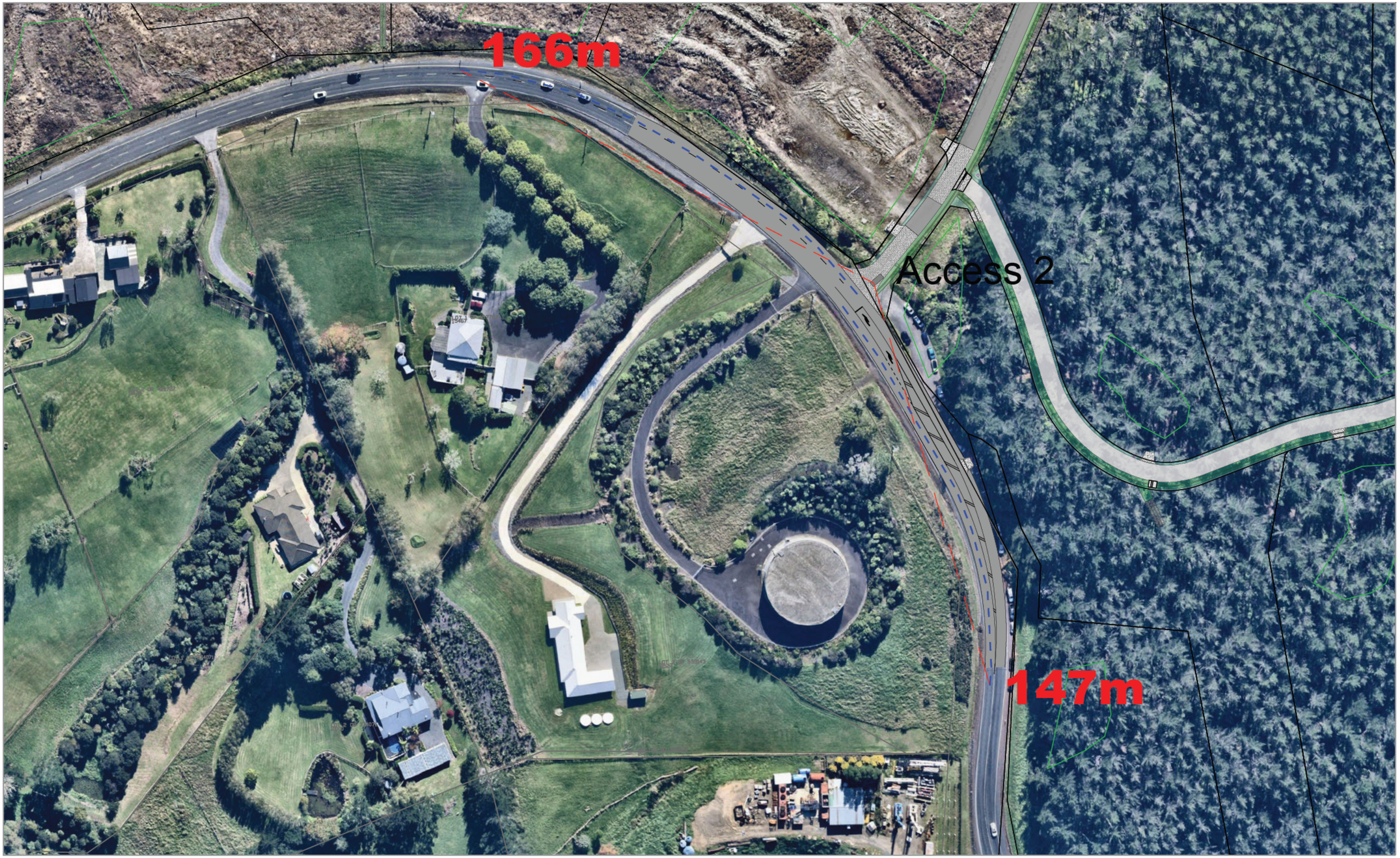
APPENDIX A – SIGHT DISTANCE DRAWINGS



Revision notes:		
Rev:	Date:	Notes:

Drawn by: HA J003122	**Project:** Rangitoopuni Land Trust Project Proposed Residential Development	**Date:** 19/08/25	commute TRANSPORTATION CONSULTANTS	**Figure:** SD A2
Client:	**Drawing Title:** Sight Distance Access 2	**Scale @ A3:** 1:1250		
		Revision: A		

Revision notes:		
Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Sight Distance
Access 3

Date:
19/08/25

Scale @ A3:
1:1000

Revision:
A

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Figure:
SD A3

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Sight Distance
Access 4

Date:
19/08/25

Scale @ A3:
1:1250

Revision:
A

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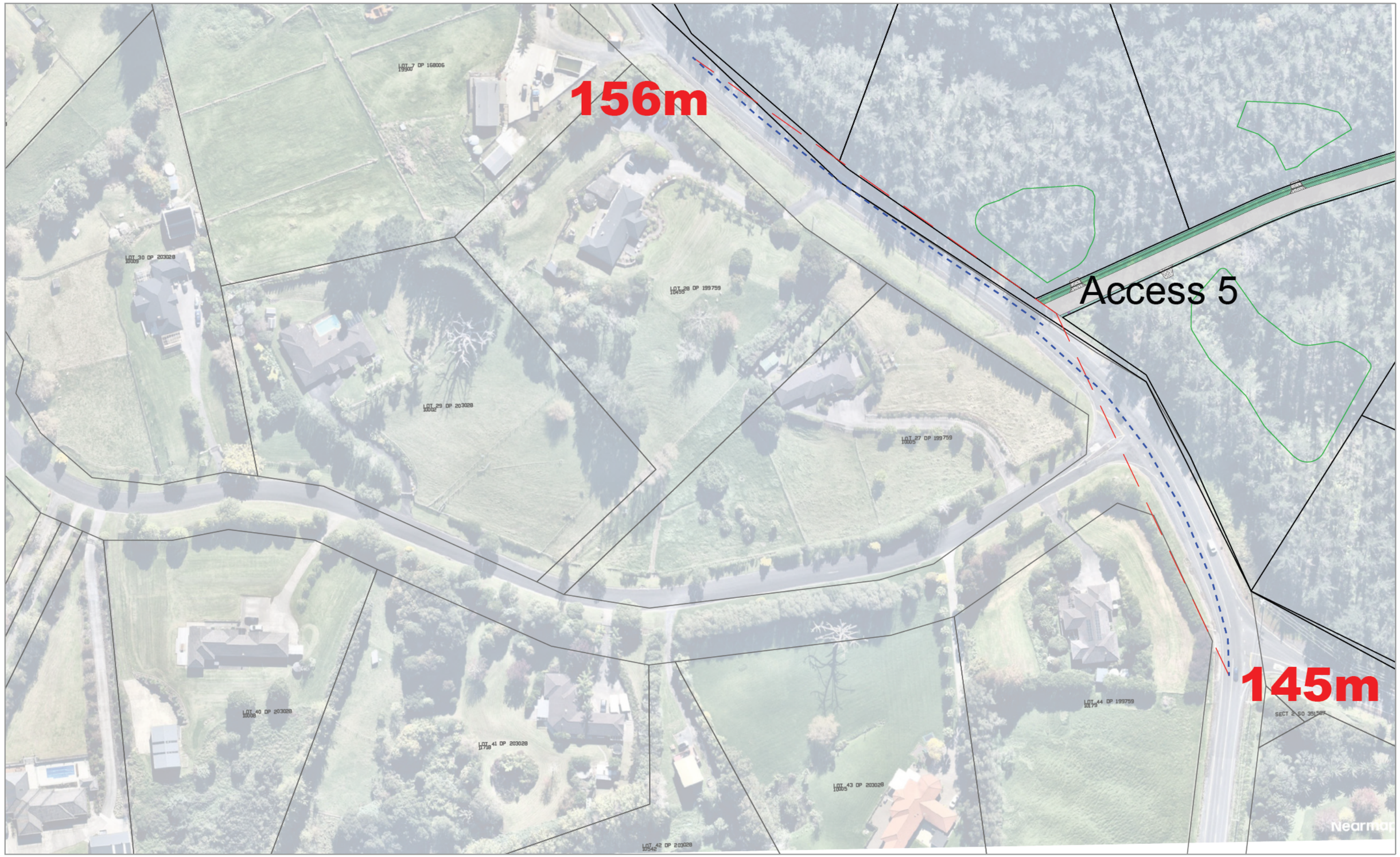
Figure:
SD A4



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Sight Distance
Access 5

Date:
19/08/25

Scale @ A3:
1:1250

Revision:
A

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Figure:
SDA5

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APPENDIX B – SIDRA

LAYOUT DRAWINGS

Figure 5: Access 1 through 5. (Layouts are identical)

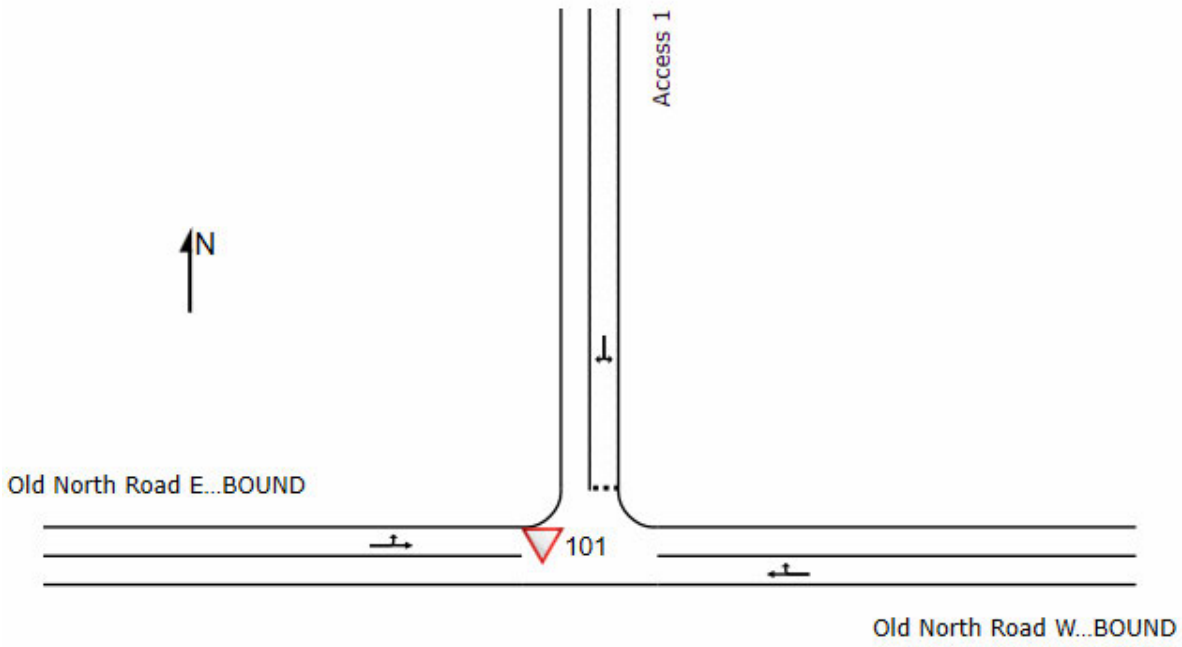

Figure 6: Old North Road / Deacon Road Layout

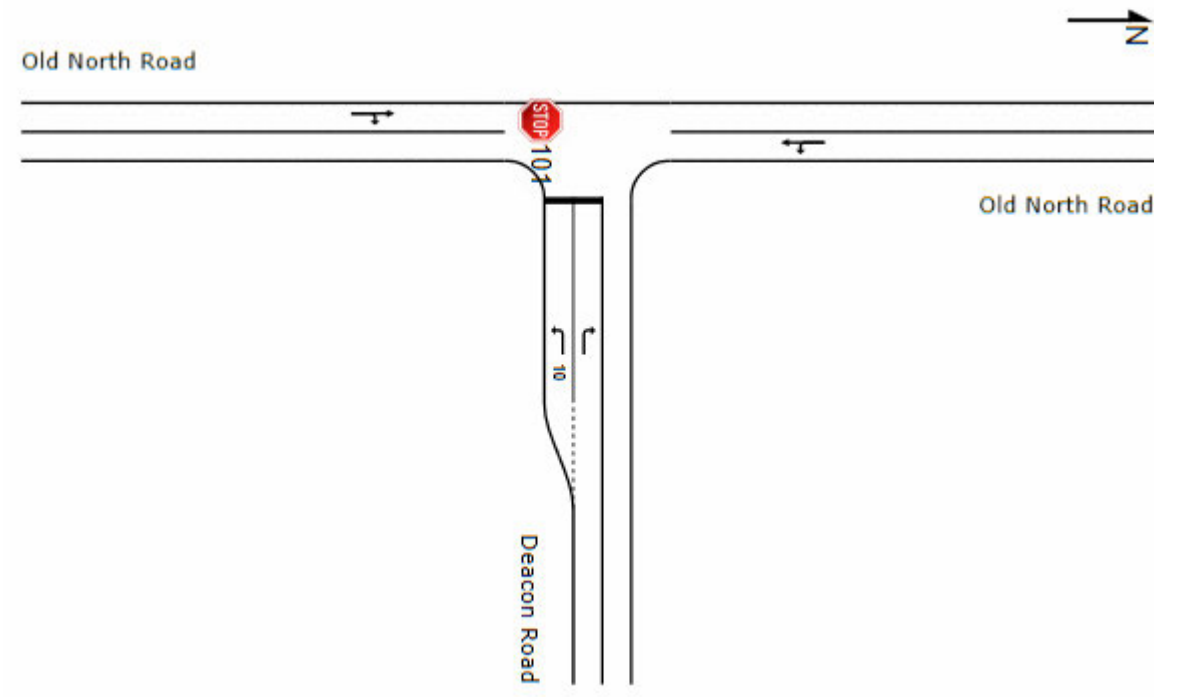

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Figure 7: Riverhead / Coatesville-Riverhead Highway / Kaipara Portage Road Layout

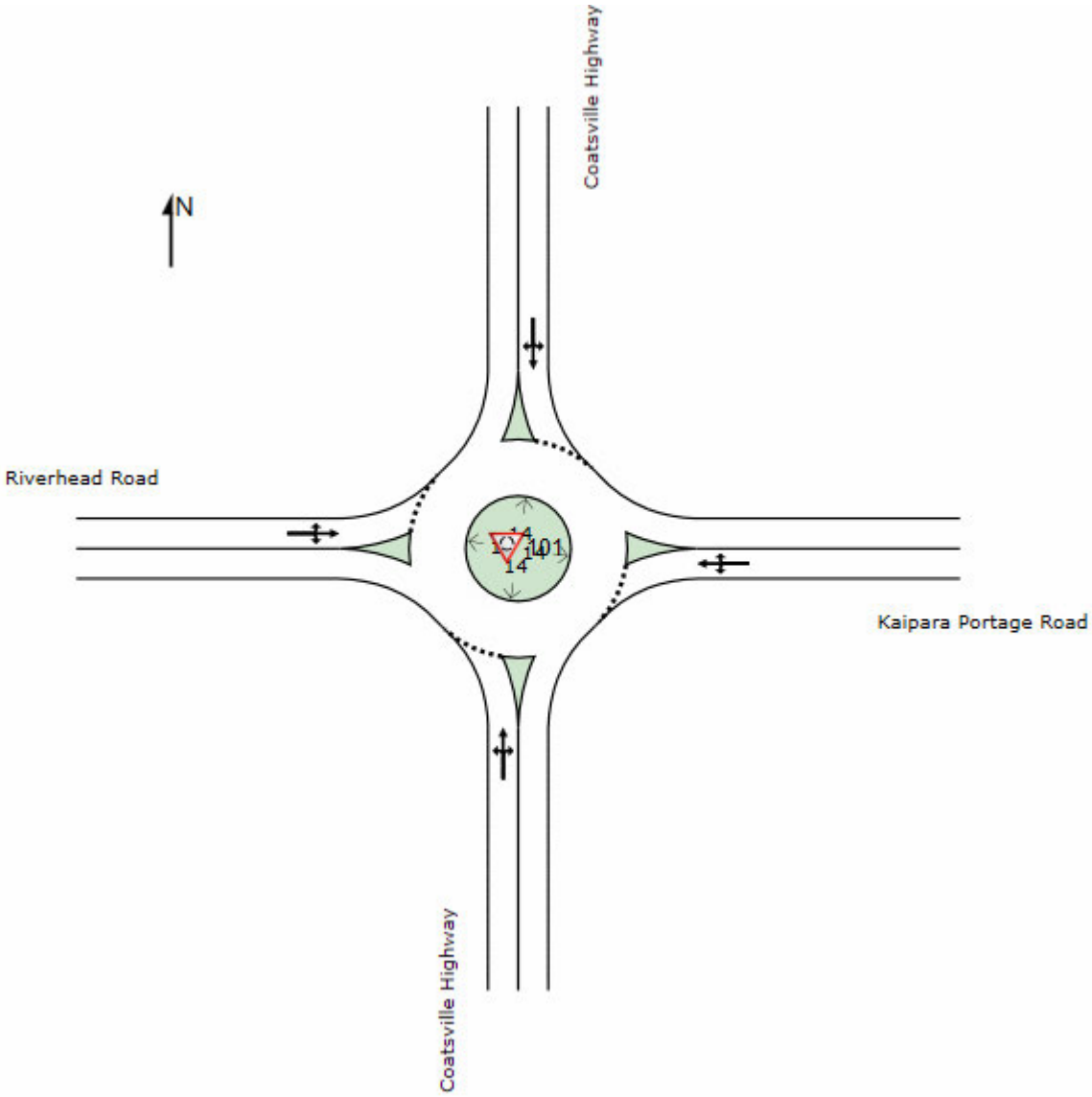

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Figure 8: Old North Road / Riverhead Road Layout

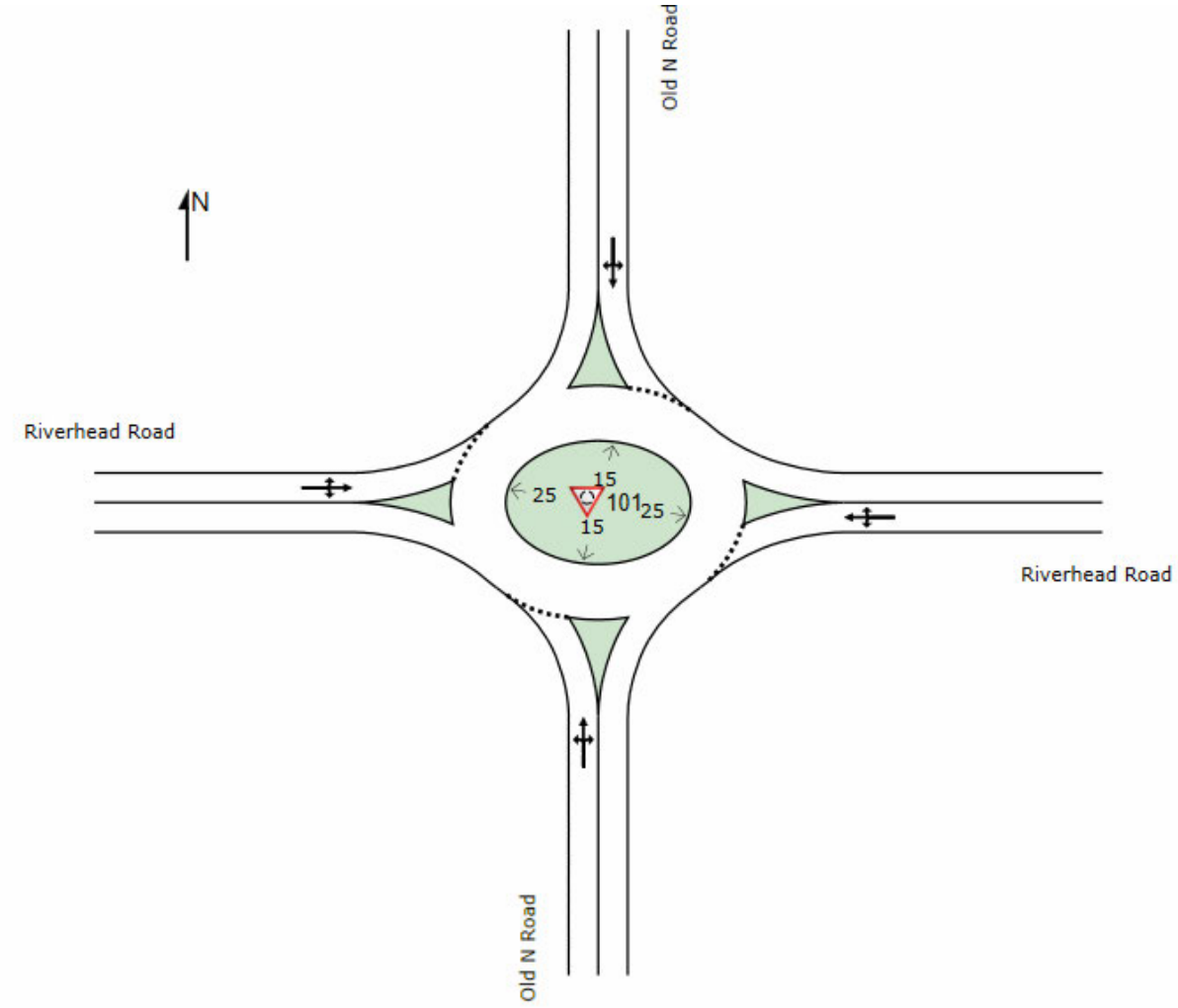

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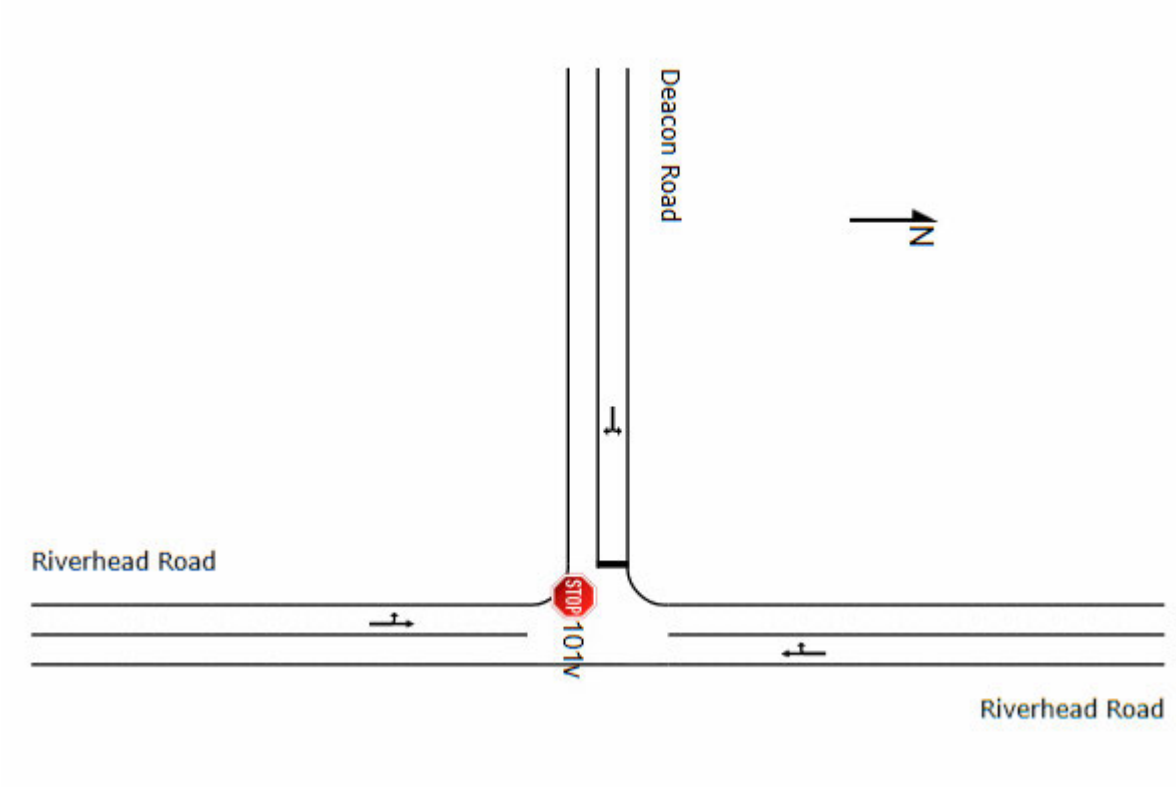
Figure 9: Deacon Road / Riverhead Road Layout



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SIDRA OUTPUT ACCESSES

Figure 10: Access 1 AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	177	0.0	177	0.0	0.092	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
6	R2	All MCs	2	0.0	2	0.0	0.092	5.2	LOS A	0.0	0.1	0.01	0.01	0.01	48.5
Approach			179	0.0	179	0.0	0.092	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Access 1															
7	L2	All MCs	19	0.0	19	0.0	0.018	5.8	LOS A	0.1	0.5	0.41	0.57	0.41	45.0
9	R2	All MCs	1	0.0	1	0.0	0.018	7.0	LOS A	0.1	0.5	0.41	0.57	0.41	44.8
Approach			20	0.0	20	0.0	0.018	5.9	LOS A	0.1	0.5	0.41	0.57	0.41	45.0
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.198	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	384	0.0	384	0.0	0.198	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			385	0.0	385	0.0	0.198	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			584	0.0	584	0.0	0.198	0.3	NA	0.1	0.5	0.02	0.02	0.02	49.7

Figure 11: Access 2 AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	177	0.0	177	0.0	0.113	0.3	LOS A	0.2	1.6	0.15	0.17	0.15	49.2
6	R2	All MCs	26	0.0	26	0.0	0.113	6.1	LOS A	0.2	1.6	0.15	0.17	0.15	47.8
Approach			203	0.0	203	0.0	0.113	1.1	NA	0.2	1.6	0.15	0.17	0.15	49.0
North: Access 2															
7	L2	All MCs	107	0.0	107	0.0	0.104	6.1	LOS A	0.4	2.8	0.44	0.64	0.44	45.0
9	R2	All MCs	5	0.0	5	0.0	0.104	7.6	LOS A	0.4	2.8	0.44	0.64	0.44	44.8
Approach			113	0.0	113	0.0	0.104	6.2	LOS A	0.4	2.8	0.44	0.64	0.44	44.9
West: Old North Road EASTBOUND															
10	L2	All MCs	4	0.0	4	0.0	0.209	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.7
11	T1	All MCs	403	0.0	403	0.0	0.209	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach			407	0.0	407	0.0	0.209	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles			723	0.0	723	0.0	0.209	1.3	NA	0.4	2.8	0.11	0.15	0.11	48.8

Figure 12: Access 3 AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	172	0.0	172	0.0	0.089	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	50.0
6	R2	All MCs	1	0.0	1	0.0	0.089	5.3	LOS A	0.0	0.1	0.01	0.01	0.01	48.5
Approach			173	0.0	173	0.0	0.089	0.0	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Access 3															
7	L2	All MCs	1	0.0	1	0.0	0.003	6.4	LOS A	0.0	0.1	0.49	0.59	0.49	44.6
9	R2	All MCs	1	0.0	1	0.0	0.003	7.8	LOS A	0.0	0.1	0.49	0.59	0.49	44.4
Approach			2	0.0	2	0.0	0.003	7.1	LOS A	0.0	0.1	0.49	0.59	0.49	44.5
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.263	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.6
11	T1	All MCs	512	0.0	512	0.0	0.263	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			513	0.0	513	0.0	0.263	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			687	0.0	687	0.0	0.263	0.1	NA	0.0	0.1	0.00	0.00	0.00	49.9

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Figure 13: Access 4 AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Deacon Road WESTBOUND															
5	T1	All MCs	172	0.0	172	0.0	0.089	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	50.0
6	R2	All MCs	1	0.0	1	0.0	0.089	5.3	LOS A	0.0	0.1	0.01	0.01	0.01	48.5
Approach			173	0.0	173	0.0	0.089	0.0	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Access 4															
7	L2	All MCs	1	0.0	1	0.0	0.003	6.4	LOS A	0.0	0.1	0.49	0.59	0.49	44.6
9	R2	All MCs	1	0.0	1	0.0	0.003	7.8	LOS A	0.0	0.1	0.49	0.59	0.49	44.4
Approach			2	0.0	2	0.0	0.003	7.1	LOS A	0.0	0.1	0.49	0.59	0.49	44.5
West: Deacon Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.263	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.6
11	T1	All MCs	512	0.0	512	0.0	0.263	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			513	0.0	513	0.0	0.263	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			687	0.0	687	0.0	0.263	0.1	NA	0.0	0.1	0.00	0.00	0.00	49.9

Figure 14: Access 5 AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Deacon Road WESTBOUND															
5	T1	All MCs	171	0.0	171	0.0	0.088	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	50.0
6	R2	All MCs	1	0.0	1	0.0	0.088	5.3	LOS A	0.0	0.1	0.01	0.01	0.01	48.5
Approach			172	0.0	172	0.0	0.088	0.0	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Access 5															
7	L2	All MCs	7	0.0	7	0.0	0.009	6.4	LOS A	0.0	0.2	0.48	0.60	0.48	44.8
9	R2	All MCs	1	0.0	1	0.0	0.009	7.8	LOS A	0.0	0.2	0.48	0.60	0.48	44.6
Approach			8	0.0	8	0.0	0.009	6.6	LOS A	0.0	0.2	0.48	0.60	0.48	44.8
West: Deacon Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.263	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.6
11	T1	All MCs	513	0.0	513	0.0	0.263	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			514	0.0	514	0.0	0.263	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			694	0.0	694	0.0	0.263	0.2	NA	0.0	0.2	0.01	0.01	0.01	49.8

Figure 15: Sensitivity Testing Access 2 (Community Centre)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	172	0.0	172	0.0	0.155	0.9	LOS A	0.6	4.4	0.33	0.37	0.33	48.2
6	R2	All MCs	79	0.0	79	0.0	0.155	6.2	LOS A	0.6	4.4	0.33	0.37	0.33	46.8
Approach			251	0.0	251	0.0	0.155	2.6	NA	0.6	4.4	0.33	0.37	0.33	47.7
North: Access 2															
7	L2	All MCs	121	0.0	121	0.0	0.118	6.1	LOS A	0.5	3.2	0.45	0.64	0.45	44.9
9	R2	All MCs	6	0.0	6	0.0	0.118	8.0	LOS A	0.5	3.2	0.45	0.64	0.45	44.8
Approach			127	0.0	127	0.0	0.118	6.2	LOS A	0.5	3.2	0.45	0.64	0.45	44.9
West: Old North Road EASTBOUND															
10	L2	All MCs	11	0.0	11	0.0	0.213	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.6
11	T1	All MCs	404	0.0	404	0.0	0.213	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			415	0.0	415	0.0	0.213	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
All Vehicles			793	0.0	793	0.0	0.213	1.9	NA	0.6	4.4	0.18	0.23	0.18	48.3

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Figure 16: Access 1 PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	414	0.0	414	0.0	0.225	0.0	LOS A	0.2	1.1	0.04	0.04	0.04	49.8
6	R2	All MCs	19	0.0	19	0.0	0.225	5.1	LOS A	0.2	1.1	0.04	0.04	0.04	48.3
Approach			433	0.0	433	0.0	0.225	0.3	NA	0.2	1.1	0.04	0.04	0.04	49.7
North: Access 1															
7	L2	All MCs	2	0.0	2	0.0	0.003	5.1	LOS A	0.0	0.1	0.33	0.51	0.33	45.2
9	R2	All MCs	1	0.0	1	0.0	0.003	7.3	LOS A	0.0	0.1	0.33	0.51	0.33	45.0
Approach			3	0.0	3	0.0	0.003	5.8	LOS A	0.0	0.1	0.33	0.51	0.33	45.1
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.096	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	185	0.0	185	0.0	0.096	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			186	0.0	186	0.0	0.096	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			622	0.0	622	0.0	0.225	0.2	NA	0.2	1.1	0.03	0.03	0.03	49.7

Figure 17: Access 2 PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	412	0.0	412	0.0	0.284	0.2	LOS A	0.8	5.9	0.17	0.19	0.17	48.9
6	R2	All MCs	107	0.0	107	0.0	0.284	5.4	LOS A	0.8	5.9	0.17	0.19	0.17	47.5
Approach			519	0.0	519	0.0	0.284	1.3	NA	0.8	5.9	0.17	0.19	0.17	48.6
North: Access 2															
7	L2	All MCs	26	0.0	26	0.0	0.022	5.1	LOS A	0.1	0.6	0.29	0.52	0.29	45.3
9	R2	All MCs	2	0.0	2	0.0	0.022	8.2	LOS A	0.1	0.6	0.29	0.52	0.29	45.1
Approach			28	0.0	28	0.0	0.022	5.3	LOS A	0.1	0.6	0.29	0.52	0.29	45.3
West: Old North Road EASTBOUND															
10	L2	All MCs	5	0.0	5	0.0	0.099	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.6
11	T1	All MCs	188	0.0	188	0.0	0.099	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach			194	0.0	194	0.0	0.099	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
All Vehicles			741	0.0	741	0.0	0.284	1.2	NA	0.8	5.9	0.13	0.15	0.13	48.8

Figure 18: Access 3 PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	414	0.0	414	0.0	0.213	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	50.0
6	R2	All MCs	1	0.0	1	0.0	0.213	4.6	LOS A	0.0	0.1	0.00	0.00	0.00	48.5
Approach			415	0.0	415	0.0	0.213	0.0	NA	0.0	0.1	0.00	0.00	0.00	50.0
North: Access 3															
7	L2	All MCs	1	0.0	1	0.0	0.002	5.1	LOS A	0.0	0.1	0.36	0.52	0.36	45.1
9	R2	All MCs	1	0.0	1	0.0	0.002	7.1	LOS A	0.0	0.1	0.36	0.52	0.36	44.9
Approach			2	0.0	2	0.0	0.002	6.1	LOS A	0.0	0.1	0.36	0.52	0.36	45.0
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.097	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	187	0.0	187	0.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			188	0.0	188	0.0	0.097	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			605	0.0	605	0.0	0.213	0.0	NA	0.0	0.1	0.00	0.00	0.00	49.9

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Figure 19: Access 4 PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	412	0.0	412	0.0	0.215	0.0	LOS A	0.1	0.4	0.01	0.01	0.01	49.9
6	R2	All MCs	6	0.0	6	0.0	0.215	4.8	LOS A	0.1	0.4	0.01	0.01	0.01	48.5
Approach			418	0.0	418	0.0	0.215	0.1	NA	0.1	0.4	0.01	0.01	0.01	49.9
North: Access 4															
7	L2	All MCs	1	0.0	1	0.0	0.002	5.2	LOS A	0.0	0.1	0.38	0.52	0.38	45.0
9	R2	All MCs	1	0.0	1	0.0	0.002	7.3	LOS A	0.0	0.1	0.38	0.52	0.38	44.8
Approach			2	0.0	2	0.0	0.002	6.2	LOS A	0.0	0.1	0.38	0.52	0.38	44.9
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.111	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	215	0.0	215	0.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			216	0.0	216	0.0	0.111	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			636	0.0	636	0.0	0.215	0.1	NA	0.1	0.4	0.01	0.01	0.01	49.9

Figure 20: Access 5 PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road WESTBOUND															
5	T1	All MCs	412	0.0	412	0.0	0.216	0.0	LOS A	0.1	0.4	0.02	0.01	0.02	49.9
6	R2	All MCs	7	0.0	7	0.0	0.216	4.9	LOS A	0.1	0.4	0.02	0.01	0.02	48.4
Approach			419	0.0	419	0.0	0.216	0.1	NA	0.1	0.4	0.02	0.01	0.02	49.9
North: Access 5															
7	L2	All MCs	2	0.0	2	0.0	0.003	5.2	LOS A	0.0	0.1	0.35	0.51	0.35	45.2
9	R2	All MCs	1	0.0	1	0.0	0.003	7.4	LOS A	0.0	0.1	0.35	0.51	0.35	45.0
Approach			3	0.0	3	0.0	0.003	5.9	LOS A	0.0	0.1	0.35	0.51	0.35	45.1
West: Deacon Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.111	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	216	0.0	216	0.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			217	0.0	217	0.0	0.111	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			639	0.0	639	0.0	0.216	0.1	NA	0.1	0.4	0.01	0.01	0.01	49.9

Figure 21: Access 2 Sensitivity Testing Community Centre

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	412	0.0	412	0.0	0.294	0.3	LOS A	0.9	6.6	0.18	0.20	0.18	48.8
6	R2	All MCs	121	0.0	121	0.0	0.294	5.4	LOS A	0.9	6.6	0.18	0.20	0.18	47.4
Approach			533	0.0	533	0.0	0.294	1.4	NA	0.9	6.6	0.18	0.20	0.18	48.5
North: Access 2															
7	L2	All MCs	79	0.0	79	0.0	0.071	5.2	LOS A	0.3	1.9	0.30	0.54	0.30	45.3
9	R2	All MCs	8	0.0	8	0.0	0.071	8.6	LOS A	0.3	1.9	0.30	0.54	0.30	45.1
Approach			87	0.0	87	0.0	0.071	5.5	LOS A	0.3	1.9	0.30	0.54	0.30	45.2
West: Old North Road EASTBOUND															
10	L2	All MCs	6	0.0	6	0.0	0.100	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	48.6
11	T1	All MCs	188	0.0	188	0.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.9
Approach			195	0.0	195	0.0	0.100	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.8
All Vehicles			815	0.0	815	0.0	0.294	1.6	NA	0.9	6.6	0.15	0.19	0.15	48.4

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Figure 22: Old North Road / Deacon Road AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	166	0.0	166	0.0	0.238	1.9	LOS A	1.2	8.7	0.50	0.56	0.50	47.1
3	R2	All MCs	159	0.0	159	0.0	0.238	7.0	LOS A	1.2	8.7	0.50	0.56	0.50	46.0
Approach			325	0.0	325	0.0	0.238	4.4	NA	1.2	8.7	0.50	0.56	0.50	46.6
East: Deacon Road															
4	L2	All MCs	107	0.0	107	0.0	0.115	9.5	LOS A	0.4	3.1	0.46	0.91	0.46	43.8
6	R2	All MCs	37	0.0	37	0.0	0.079	12.6	LOS B	0.2	1.7	0.62	1.00	0.62	42.1
Approach			144	0.0	144	0.0	0.115	10.2	LOS B	0.4	3.1	0.50	0.93	0.50	43.4
North: Old North Road															
7	L2	All MCs	115	0.0	115	0.0	0.270	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.0
8	T1	All MCs	405	0.0	405	0.0	0.270	0.1	LOS A	0.0	0.0	0.00	0.12	0.00	49.2
Approach			520	0.0	520	0.0	0.270	1.1	NA	0.0	0.0	0.00	0.12	0.00	48.9
All Vehicles			989	0.0	989	0.0	0.270	3.5	NA	1.2	8.7	0.24	0.38	0.24	47.3

Figure 23: Old North Road / Deacon Road PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	469	0.0	469	0.0	0.314	0.3	LOS A	0.9	6.0	0.16	0.17	0.16	49.0
3	R2	All MCs	104	0.0	104	0.0	0.314	5.5	LOS A	0.9	6.0	0.16	0.17	0.16	47.7
Approach			574	0.0	574	0.0	0.314	1.2	NA	0.9	6.0	0.16	0.17	0.16	48.7
East: Deacon Road															
4	L2	All MCs	186	0.0	186	0.0	0.155	8.3	LOS A	0.7	4.6	0.31	0.87	0.31	44.3
6	R2	All MCs	77	0.0	77	0.0	0.167	13.0	LOS B	0.5	3.8	0.65	1.00	0.65	41.9
Approach			263	0.0	263	0.0	0.167	9.6	LOS A	0.7	4.6	0.41	0.91	0.41	43.6
North: Old North Road															
7	L2	All MCs	35	0.0	35	0.0	0.113	4.6	LOS A	0.0	0.0	0.00	0.09	0.00	48.3
8	T1	All MCs	184	0.0	184	0.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	49.5
Approach			219	0.0	219	0.0	0.113	0.8	NA	0.0	0.0	0.00	0.09	0.00	49.3
All Vehicles			1056	0.0	1056	0.0	0.314	3.2	NA	0.9	6.0	0.19	0.34	0.19	47.4

Figure 24: Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Coatsville Highway															
1	L2	All MCs	38	5.6	38	5.6	0.368	5.8	LOS A	2.3	17.3	0.61	0.57	0.61	45.1
2	T1	All MCs	300	6.3	300	6.3	0.368	5.8	LOS A	2.3	17.3	0.61	0.57	0.61	45.4
3	R2	All MCs	7	0.0	7	0.0	0.368	9.4	LOS A	2.3	17.3	0.61	0.57	0.61	44.9
Approach			345	6.1	345	6.1	0.368	5.9	LOS A	2.3	17.3	0.61	0.57	0.61	45.3
East: Kaipara Portage Road															
4	L2	All MCs	24	0.0	24	0.0	0.152	7.4	LOS A	0.9	6.3	0.71	0.70	0.71	43.7
5	T1	All MCs	31	0.0	31	0.0	0.152	7.4	LOS A	0.9	6.3	0.71	0.70	0.71	43.9
6	R2	All MCs	57	0.0	57	0.0	0.152	11.2	LOS B	0.9	6.3	0.71	0.70	0.71	43.4
Approach			112	0.0	112	0.0	0.152	9.4	LOS A	0.9	6.3	0.71	0.70	0.71	43.6
North: Coatsville Highway															
7	L2	All MCs	11	0.0	11	0.0	0.460	4.1	LOS A	3.8	28.4	0.46	0.51	0.46	45.0
8	T1	All MCs	295	6.1	295	6.1	0.460	4.2	LOS A	3.8	28.4	0.46	0.51	0.46	45.2
9	R2	All MCs	255	8.3	255	8.3	0.460	8.1	LOS A	3.8	28.4	0.46	0.51	0.46	44.6
Approach			560	7.0	560	7.0	0.460	6.0	LOS A	3.8	28.4	0.46	0.51	0.46	44.9
West: Riverhead Road															
10	L2	All MCs	486	8.2	486	8.2	0.654	8.7	LOS A	6.9	51.5	0.82	0.76	0.97	43.6
11	T1	All MCs	13	0.0	13	0.0	0.654	8.3	LOS A	6.9	51.5	0.82	0.76	0.97	43.9
12	R2	All MCs	97	9.8	97	9.8	0.654	12.6	LOS B	6.9	51.5	0.82	0.76	0.97	43.3
Approach			596	8.3	596	8.3	0.654	9.3	LOS A	6.9	51.5	0.82	0.76	0.97	43.6
All Vehicles			1613	6.8	1613	6.8	0.654	7.4	LOS A	6.9	51.5	0.64	0.63	0.70	44.4

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Figure 25Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Coatsville Highway															
1	L2	All MCs	34	0.0	34	0.0	0.340	5.4	LOS A	2.1	15.2	0.57	0.56	0.57	45.2
2	T1	All MCs	274	1.9	274	1.9	0.340	5.4	LOS A	2.1	15.2	0.57	0.56	0.57	45.4
3	R2	All MCs	29	0.0	29	0.0	0.340	9.2	LOS A	2.1	15.2	0.57	0.56	0.57	44.9
Approach			337	1.6	337	1.6	0.340	5.8	LOS A	2.1	15.2	0.57	0.56	0.57	45.3
East: Kaipara Portage Road															
4	L2	All MCs	19	0.0	19	0.0	0.093	6.7	LOS A	0.5	3.7	0.66	0.67	0.66	44.3
5	T1	All MCs	28	3.7	28	3.7	0.093	6.9	LOS A	0.5	3.7	0.66	0.67	0.66	44.5
6	R2	All MCs	24	0.0	24	0.0	0.093	10.5	LOS B	0.5	3.7	0.66	0.67	0.66	44.1
Approach			72	1.5	72	1.5	0.093	8.1	LOS A	0.5	3.7	0.66	0.67	0.66	44.3
North: Coatsville Highway															
7	L2	All MCs	12	9.1	12	9.1	0.453	4.2	LOS A	3.5	25.8	0.41	0.50	0.41	45.0
8	T1	All MCs	295	6.1	295	6.1	0.453	4.1	LOS A	3.5	25.8	0.41	0.50	0.41	45.3
9	R2	All MCs	265	4.4	265	4.4	0.453	7.9	LOS A	3.5	25.8	0.41	0.50	0.41	44.7
Approach			572	5.3	572	5.3	0.453	5.9	LOS A	3.5	25.8	0.41	0.50	0.41	45.0
West: Riverhead Road															
10	L2	All MCs	265	2.4	265	2.4	0.358	5.5	LOS A	2.4	16.9	0.61	0.59	0.61	45.4
11	T1	All MCs	46	0.0	46	0.0	0.358	5.5	LOS A	2.4	16.9	0.61	0.59	0.61	45.7
12	R2	All MCs	35	3.0	35	3.0	0.358	9.4	LOS A	2.4	16.9	0.61	0.59	0.61	45.1
Approach			346	2.1	346	2.1	0.358	5.9	LOS A	2.4	16.9	0.61	0.59	0.61	45.4
All Vehicles			1326	3.3	1326	3.3	0.453	6.0	LOS A	3.5	25.8	0.51	0.55	0.51	45.1

Figure 26: Old North Road / Riverhead Road AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old N Road															
1	L2	All MCs	15	7.1	15	7.1	0.255	4.0	LOS A	1.6	12.1	0.38	0.49	0.38	45.2
2	T1	All MCs	151	7.0	151	7.0	0.255	3.6	LOS A	1.6	12.1	0.38	0.49	0.38	45.6
3	R2	All MCs	134	8.7	134	8.7	0.255	8.1	LOS A	1.6	12.1	0.38	0.49	0.38	45.0
Approach			299	7.7	299	7.7	0.255	5.6	LOS A	1.6	12.1	0.38	0.49	0.38	45.3
East: Riverhead Road															
4	L2	All MCs	142	9.6	142	9.6	0.288	5.9	LOS A	1.8	13.7	0.68	0.61	0.68	45.6
5	T1	All MCs	106	4.0	106	4.0	0.288	5.9	LOS A	1.8	13.7	0.68	0.61	0.68	45.7
6	R2	All MCs	3	0.0	3	0.0	0.288	10.3	LOS B	1.8	13.7	0.68	0.61	0.68	45.2
Approach			252	7.1	252	7.1	0.288	5.9	LOS A	1.8	13.7	0.68	0.61	0.68	45.6
North: Old N Road															
7	L2	All MCs	12	9.1	12	9.1	0.417	6.6	LOS A	2.8	20.0	0.69	0.61	0.69	44.9
8	T1	All MCs	342	2.2	342	2.2	0.417	5.9	LOS A	2.8	20.0	0.69	0.61	0.69	45.4
9	R2	All MCs	21	10.0	21	10.0	0.417	10.7	LOS B	2.8	20.0	0.69	0.61	0.69	44.7
Approach			375	2.8	375	2.8	0.417	6.2	LOS A	2.8	20.0	0.69	0.61	0.69	45.3
West: Riverhead Road															
10	L2	All MCs	13	8.3	13	8.3	0.288	4.4	LOS A	1.8	13.1	0.53	0.57	0.53	45.0
11	T1	All MCs	148	12.1	148	12.1	0.288	4.7	LOS A	1.8	13.1	0.53	0.57	0.53	45.1
12	R2	All MCs	145	0.0	145	0.0	0.288	9.0	LOS A	1.8	13.1	0.53	0.57	0.53	44.6
Approach			306	6.2	306	6.2	0.288	6.7	LOS A	1.8	13.1	0.53	0.57	0.53	44.9
All Vehicles			1232	5.7	1232	5.7	0.417	6.1	LOS A	2.8	20.0	0.57	0.57	0.57	45.3

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Figure 27: Old North Road / Riverhead Road PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old N Road															
1	L2	All MCs	141	1.5	141	1.5	0.560	4.4	LOS A	4.9	34.9	0.53	0.49	0.53	45.4
2	T1	All MCs	422	2.2	422	2.2	0.560	4.0	LOS A	4.9	34.9	0.53	0.49	0.53	45.8
3	R2	All MCs	129	6.5	129	6.5	0.560	8.6	LOS A	4.9	34.9	0.53	0.49	0.53	45.1
Approach			693	2.9	693	2.9	0.560	5.0	LOS A	4.9	34.9	0.53	0.49	0.53	45.6
East: Riverhead Road															
4	L2	All MCs	185	1.1	185	1.1	0.269	3.6	LOS A	1.7	12.0	0.44	0.45	0.44	46.4
5	T1	All MCs	131	2.4	131	2.4	0.269	3.9	LOS A	1.7	12.0	0.44	0.45	0.44	46.5
6	R2	All MCs	5	0.0	5	0.0	0.269	8.4	LOS A	1.7	12.0	0.44	0.45	0.44	46.0
Approach			321	1.6	321	1.6	0.269	3.8	LOS A	1.7	12.0	0.44	0.45	0.44	46.4
North: Old N Road															
7	L2	All MCs	1	0.0	1	0.0	0.188	5.0	LOS A	1.1	7.8	0.53	0.52	0.53	45.5
8	T1	All MCs	163	5.8	163	5.8	0.188	4.7	LOS A	1.1	7.8	0.53	0.52	0.53	45.8
9	R2	All MCs	17	0.0	17	0.0	0.188	9.1	LOS A	1.1	7.8	0.53	0.52	0.53	45.2
Approach			181	5.2	181	5.2	0.188	5.1	LOS A	1.1	7.8	0.53	0.52	0.53	45.7
West: Riverhead Road															
10	L2	All MCs	32	3.3	32	3.3	0.264	5.9	LOS A	1.7	12.3	0.71	0.63	0.71	45.2
11	T1	All MCs	176	3.6	176	3.6	0.264	6.2	LOS A	1.7	12.3	0.71	0.63	0.71	45.3
12	R2	All MCs	17	0.0	17	0.0	0.264	10.6	LOS B	1.7	12.3	0.71	0.63	0.71	44.8
Approach			224	3.3	224	3.3	0.264	6.5	LOS A	1.7	12.3	0.71	0.63	0.71	45.2
All Vehicles			1419	3.0	1419	3.0	0.560	5.0	LOS A	4.9	34.9	0.54	0.50	0.54	45.7

Figure 28: Riverhead Road / Deacon Road AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Riverhead Road															
1	L2	All MCs	67	0.0	67	0.0	0.140	4.6	LOS A	0.0	0.0	0.00	0.14	0.00	48.0
2	T1	All MCs	203	0.0	203	0.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	49.2
Approach			271	0.0	271	0.0	0.140	1.2	NA	0.0	0.0	0.00	0.14	0.00	48.9
North: Riverhead Road															
8	T1	All MCs	139	0.0	139	0.0	0.186	0.8	LOS A	0.9	6.5	0.36	0.42	0.36	47.5
9	R2	All MCs	158	0.0	158	0.0	0.186	5.6	LOS A	0.9	6.5	0.36	0.42	0.36	46.2
Approach			297	0.0	297	0.0	0.186	3.4	NA	0.9	6.5	0.36	0.42	0.36	46.8
West: Deacon Road															
10	L2	All MCs	329	0.0	329	0.0	0.469	9.4	LOS A	3.3	23.1	0.50	0.90	0.62	43.4
12	R2	All MCs	125	0.0	125	0.0	0.469	12.5	LOS B	3.3	23.1	0.50	0.90	0.62	43.2
Approach			455	0.0	455	0.0	0.469	10.2	LOS B	3.3	23.1	0.50	0.90	0.62	43.4
All Vehicles			1022	0.0	1022	0.0	0.469	5.8	NA	3.3	23.1	0.33	0.56	0.38	45.7

Figure 29: Riverhead Road / Deacon Road PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Riverhead Road															
1	L2	All MCs	115	0.0	115	0.0	0.152	4.6	LOS A	0.0	0.0	0.00	0.21	0.00	47.6
2	T1	All MCs	176	0.0	176	0.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	48.7
Approach			291	0.0	291	0.0	0.152	1.8	NA	0.0	0.0	0.00	0.21	0.00	48.3
North: Riverhead Road															
8	T1	All MCs	192	0.0	192	0.0	0.304	1.1	LOS A	1.7	11.9	0.42	0.48	0.42	47.2
9	R2	All MCs	279	0.0	279	0.0	0.304	5.8	LOS A	1.7	11.9	0.42	0.48	0.42	45.9
Approach			471	0.0	471	0.0	0.304	3.9	NA	1.7	11.9	0.42	0.48	0.42	46.4
West: Deacon Road															
10	L2	All MCs	152	0.0	152	0.0	0.326	8.4	LOS A	1.5	10.3	0.49	0.86	0.51	43.3
12	R2	All MCs	104	0.0	104	0.0	0.326	13.4	LOS B	1.5	10.3	0.49	0.86	0.51	43.1
Approach			256	0.0	256	0.0	0.326	10.5	LOS B	1.5	10.3	0.49	0.86	0.51	43.2
All Vehicles			1017	0.0	1017	0.0	0.326	5.0	NA	1.7	11.9	0.32	0.50	0.32	46.1

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Figure 30: Forestry Road / Deacon Road AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Deacon Road															
5	T1	All MCs	116	0.0	116	0.0	0.139	0.7	LOS A	0.7	4.6	0.34	0.39	0.34	47.7
6	R2	All MCs	109	0.0	109	0.0	0.139	5.5	LOS A	0.7	4.6	0.34	0.39	0.34	46.4
Approach			225	0.0	225	0.0	0.139	3.1	NA	0.7	4.6	0.34	0.39	0.34	47.0
North: Forestry Road															
7	L2	All MCs	199	0.0	199	0.0	0.187	5.5	LOS A	0.8	5.5	0.38	0.59	0.38	45.1
9	R2	All MCs	28	0.0	28	0.0	0.187	7.0	LOS A	0.8	5.5	0.38	0.59	0.38	44.9
Approach			227	0.0	227	0.0	0.187	5.7	LOS A	0.8	5.5	0.38	0.59	0.38	45.1
West: Deacon Road															
10	L2	All MCs	19	0.0	19	0.0	0.141	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	48.5
11	T1	All MCs	255	0.0	255	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.7
Approach			274	0.0	274	0.0	0.141	0.4	NA	0.0	0.0	0.00	0.04	0.00	49.6
All Vehicles			726	0.0	726	0.0	0.187	2.9	NA	0.8	5.5	0.22	0.32	0.22	47.3

Figure 31: Forestry Road / Deacon Road PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Deacon Road															
5	T1	All MCs	252	0.0	252	0.0	0.220	0.3	LOS A	0.9	6.4	0.20	0.25	0.20	48.4
6	R2	All MCs	141	0.0	141	0.0	0.220	5.1	LOS A	0.9	6.4	0.20	0.25	0.20	47.0
Approach			393	0.0	393	0.0	0.220	2.0	NA	0.9	6.4	0.20	0.25	0.20	47.9
North: Forestry Road															
7	L2	All MCs	128	0.0	128	0.0	0.102	5.0	LOS A	0.4	2.9	0.24	0.52	0.24	45.4
9	R2	All MCs	12	0.0	12	0.0	0.102	7.1	LOS A	0.4	2.9	0.24	0.52	0.24	45.2
Approach			140	0.0	140	0.0	0.102	5.1	LOS A	0.4	2.9	0.24	0.52	0.24	45.4
West: Deacon Road															
10	L2	All MCs	13	0.0	13	0.0	0.072	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	48.5
11	T1	All MCs	126	0.0	126	0.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.7
Approach			139	0.0	139	0.0	0.072	0.4	NA	0.0	0.0	0.00	0.05	0.00	49.6
All Vehicles			672	0.0	672	0.0	0.220	2.3	NA	0.9	6.4	0.17	0.27	0.17	47.7

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Figure 32: Old North Road / Deacon Road AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	166	0.0	166	0.0	0.238	1.9	LOS A	1.2	8.7	0.50	0.56	0.50	47.1
3	R2	All MCs	159	0.0	159	0.0	0.238	7.0	LOS A	1.2	8.7	0.50	0.56	0.50	46.0
Approach			325	0.0	325	0.0	0.238	4.4	NA	1.2	8.7	0.50	0.56	0.50	46.6
East: Deacon Road															
4	L2	All MCs	107	0.0	107	0.0	0.115	9.5	LOS A	0.4	3.1	0.46	0.91	0.46	43.8
6	R2	All MCs	37	0.0	37	0.0	0.079	12.6	LOS B	0.2	1.7	0.62	1.00	0.62	42.1
Approach			144	0.0	144	0.0	0.115	10.2	LOS B	0.4	3.1	0.50	0.93	0.50	43.4
North: Old North Road															
7	L2	All MCs	115	0.0	115	0.0	0.270	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.0
8	T1	All MCs	405	0.0	405	0.0	0.270	0.1	LOS A	0.0	0.0	0.00	0.12	0.00	49.2
Approach			520	0.0	520	0.0	0.270	1.1	NA	0.0	0.0	0.00	0.12	0.00	48.9
All Vehicles			989	0.0	989	0.0	0.270	3.5	NA	1.2	8.7	0.24	0.38	0.24	47.3

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Figure 33: Old North Road / Deacon Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old North Road															
2	T1	All MCs	482	2.6	482	2.6	0.326	0.3	LOS A	0.9	6.4	0.17	0.18	0.17	49.0
3	R2	All MCs	105	1.0	105	1.0	0.326	5.6	LOS A	0.9	6.4	0.17	0.18	0.17	47.7
Approach			587	2.3	587	2.3	0.326	1.2	NA	0.9	6.4	0.17	0.18	0.17	48.7
East: Deacon Road															
4	L2	All MCs	196	4.8	196	4.8	0.170	8.6	LOS A	0.7	5.3	0.33	0.88	0.33	44.2
6	R2	All MCs	78	1.4	78	1.4	0.182	13.7	LOS B	0.6	4.1	0.67	1.00	0.67	41.6
Approach			274	3.8	274	3.8	0.182	10.0	LOS B	0.7	5.3	0.43	0.91	0.43	43.4
North: Old North Road															
7	L2	All MCs	36	2.9	36	2.9	0.120	4.6	LOS A	0.0	0.0	0.00	0.09	0.00	48.2
8	T1	All MCs	192	3.8	192	3.8	0.120	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	49.5
Approach			227	3.7	227	3.7	0.120	0.8	NA	0.0	0.0	0.00	0.09	0.00	49.3
All Vehicles			1088	3.0	1088	3.0	0.326	3.3	NA	0.9	6.4	0.20	0.34	0.20	47.4

Figure 34: Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway AM

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Coatsville Highway															
1	L2	All MCs	140	0.0	140	0.0	0.722	11.1	LOS B	9.1	63.5	0.94	0.90	1.25	42.2
2	T1	All MCs	262	0.0	262	0.0	0.722	11.0	LOS B	9.1	63.5	0.94	0.90	1.25	42.4
3	R2	All MCs	221	0.0	221	0.0	0.722	15.3	LOS B	9.1	63.5	0.94	0.90	1.25	42.0
Approach			623	0.0	623	0.0	0.722	12.6	LOS B	9.1	63.5	0.94	0.90	1.25	42.2
East: Kaipara Portage Road															
4	L2	All MCs	256	0.0	256	0.0	0.653	16.3	LOS B	7.1	49.4	1.00	1.01	1.40	40.0
5	T1	All MCs	34	0.0	34	0.0	0.653	16.3	LOS B	7.1	49.4	1.00	1.01	1.40	40.2
6	R2	All MCs	87	0.0	87	0.0	0.653	20.6	LOS C	7.1	49.4	1.00	1.01	1.40	39.7
Approach			377	0.0	377	0.0	0.653	17.3	LOS B	7.1	49.4	1.00	1.01	1.40	39.9
North: Coatsville Highway															
7	L2	All MCs	37	0.0	37	0.0	0.731	10.7	LOS B	9.3	65.4	0.92	0.89	1.21	42.0
8	T1	All MCs	259	0.0	259	0.0	0.731	10.6	LOS B	9.3	65.4	0.92	0.89	1.21	42.2
9	R2	All MCs	374	0.0	374	0.0	0.731	15.0	LOS B	9.3	65.4	0.92	0.89	1.21	41.8
Approach			669	0.0	669	0.0	0.731	13.1	LOS B	9.3	65.4	0.92	0.89	1.21	42.0
West: Riverhead Road															
10	L2	All MCs	566	0.0	566	0.0	1.027	64.9	LOS E	45.3	317.0	1.00	2.50	4.08	26.2
11	T1	All MCs	22	0.0	22	0.0	1.027	64.8	LOS E	45.3	317.0	1.00	2.50	4.08	26.2
12	R2	All MCs	222	0.0	222	0.0	1.027	69.1	LOS E	45.3	317.0	1.00	2.50	4.08	26.0
Approach			811	0.0	811	0.0	1.027	66.0	LOS E	45.3	317.0	1.00	2.50	4.08	26.1
All Vehicles			2480	0.0	2480	0.0	1.027	30.9	LOS C	45.3	317.0	0.96	1.44	2.19	34.9

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Figure 35: Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway PM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Coatsville Highway															
1	L2	All MCs	167	0.0	167	0.0	0.666	9.5	LOS A	7.3	51.3	0.88	0.82	1.08	43.1
2	T1	All MCs	268	0.0	268	0.0	0.666	9.5	LOS A	7.3	51.3	0.88	0.82	1.08	43.3
3	R2	All MCs	149	0.0	149	0.0	0.666	13.3	LOS B	7.3	51.3	0.88	0.82	1.08	42.8
Approach			585	0.0	585	0.0	0.666	10.5	LOS B	7.3	51.3	0.88	0.82	1.08	43.1
East: Kaipara Portage Road															
4	L2	All MCs	155	0.0	155	0.0	0.400	9.6	LOS A	2.9	20.5	0.89	0.78	0.92	43.1
5	T1	All MCs	35	0.0	35	0.0	0.400	9.6	LOS A	2.9	20.5	0.89	0.78	0.92	43.3
6	R2	All MCs	51	0.0	51	0.0	0.400	13.4	LOS B	2.9	20.5	0.89	0.78	0.92	42.8
Approach			240	0.0	240	0.0	0.400	10.4	LOS B	2.9	20.5	0.89	0.78	0.92	43.1
North: Coatsville Highway															
7	L2	All MCs	40	0.0	40	0.0	0.684	8.3	LOS A	7.7	54.0	0.83	0.76	0.97	43.2
8	T1	All MCs	277	0.0	277	0.0	0.684	8.3	LOS A	7.7	54.0	0.83	0.76	0.97	43.4
9	R2	All MCs	359	0.0	359	0.0	0.684	12.1	LOS B	7.7	54.0	0.83	0.76	0.97	43.0
Approach			676	0.0	676	0.0	0.684	10.3	LOS B	7.7	54.0	0.83	0.76	0.97	43.2
West: Riverhead Road															
10	L2	All MCs	347	0.0	347	0.0	0.651	9.6	LOS A	7.0	49.0	0.89	0.83	1.08	43.0
11	T1	All MCs	51	0.0	51	0.0	0.651	9.6	LOS A	7.0	49.0	0.89	0.83	1.08	43.2
12	R2	All MCs	151	0.0	151	0.0	0.651	13.4	LOS B	7.0	49.0	0.89	0.83	1.08	42.7
Approach			548	0.0	548	0.0	0.651	10.6	LOS B	7.0	49.0	0.89	0.83	1.08	42.9
All Vehicles			2049	0.0	2049	0.0	0.684	10.5	LOS B	7.7	54.0	0.87	0.80	1.03	43.1

Figure 36: Old North Road / Riverhead AM

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old N Road															
1	L2	All MCs	14	0.0	14	0.0	0.314	4.3	LOS A	2.1	14.9	0.46	0.54	0.46	44.8
2	T1	All MCs	140	0.0	140	0.0	0.314	3.9	LOS A	2.1	14.9	0.46	0.54	0.46	45.2
3	R2	All MCs	208	0.0	208	0.0	0.314	8.3	LOS A	2.1	14.9	0.46	0.54	0.46	44.6
Approach			362	0.0	362	0.0	0.314	6.4	LOS A	2.1	14.9	0.46	0.54	0.46	44.9
East: Riverhead Road															
4	L2	All MCs	264	0.0	264	0.0	0.461	6.0	LOS A	3.4	24.0	0.75	0.65	0.76	45.5
5	T1	All MCs	160	0.0	160	0.0	0.461	6.2	LOS A	3.4	24.0	0.75	0.65	0.76	45.6
6	R2	All MCs	3	0.0	3	0.0	0.461	10.7	LOS B	3.4	24.0	0.75	0.65	0.76	45.1
Approach			427	0.0	427	0.0	0.461	6.1	LOS A	3.4	24.0	0.75	0.65	0.76	45.5
North: Old N Road															
7	L2	All MCs	11	0.0	11	0.0	0.424	6.9	LOS A	2.9	20.0	0.73	0.64	0.73	44.9
8	T1	All MCs	335	0.0	335	0.0	0.424	6.5	LOS A	2.9	20.0	0.73	0.64	0.73	45.2
9	R2	All MCs	19	0.0	19	0.0	0.424	11.0	LOS B	2.9	20.0	0.73	0.64	0.73	44.6
Approach			364	0.0	364	0.0	0.424	6.7	LOS A	2.9	20.0	0.73	0.64	0.73	45.2
West: Riverhead Road															
10	L2	All MCs	12	0.0	12	0.0	0.309	4.6	LOS A	2.0	13.9	0.58	0.59	0.58	45.0
11	T1	All MCs	168	0.0	168	0.0	0.309	4.8	LOS A	2.0	13.9	0.58	0.59	0.58	45.1
12	R2	All MCs	145	0.0	145	0.0	0.309	9.3	LOS A	2.0	13.9	0.58	0.59	0.58	44.6
Approach			325	0.0	325	0.0	0.309	6.8	LOS A	2.0	13.9	0.58	0.59	0.58	44.9
All Vehicles			1479	0.0	1479	0.0	0.461	6.5	LOS A	3.4	24.0	0.64	0.61	0.64	45.1

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Figure 37: Old North Road / Riverhead PM

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old N Road															
1	L2	All MCs	141	1.5	141	1.5	0.673	5.0	LOS A	6.8	48.4	0.68	0.55	0.68	44.8
2	T1	All MCs	422	2.2	422	2.2	0.673	4.6	LOS A	6.8	48.4	0.68	0.55	0.68	45.2
3	R2	All MCs	239	3.5	239	3.5	0.673	9.2	LOS A	6.8	48.4	0.68	0.55	0.68	44.6
Approach			802	2.5	802	2.5	0.673	6.1	LOS A	6.8	48.4	0.68	0.55	0.68	44.9
East: Riverhead Road															
4	L2	All MCs	266	0.8	266	0.8	0.363	3.7	LOS A	2.6	18.1	0.49	0.46	0.49	46.3
5	T1	All MCs	166	1.9	166	1.9	0.363	4.0	LOS A	2.6	18.1	0.49	0.46	0.49	46.4
6	R2	All MCs	5	0.0	5	0.0	0.363	8.5	LOS A	2.6	18.1	0.49	0.46	0.49	45.9
Approach			438	1.2	438	1.2	0.363	3.9	LOS A	2.6	18.1	0.49	0.46	0.49	46.3
North: Old N Road															
7	L2	All MCs	1	0.0	1	0.0	0.216	6.0	LOS A	1.3	9.3	0.63	0.59	0.63	45.1
8	T1	All MCs	164	5.8	164	5.8	0.216	5.8	LOS A	1.3	9.3	0.63	0.59	0.63	45.4
9	R2	All MCs	17	0.0	17	0.0	0.216	10.1	LOS B	1.3	9.3	0.63	0.59	0.63	44.9
Approach			182	5.2	182	5.2	0.216	6.2	LOS A	1.3	9.3	0.63	0.59	0.63	45.4
West: Riverhead Road															
10	L2	All MCs	32	3.3	32	3.3	0.367	7.1	LOS A	2.6	18.9	0.83	0.70	0.83	44.8
11	T1	All MCs	223	2.8	223	2.8	0.367	7.3	LOS A	2.6	18.9	0.83	0.70	0.83	44.9
12	R2	All MCs	17	0.0	17	0.0	0.367	11.7	LOS B	2.6	18.9	0.83	0.70	0.83	44.4
Approach			272	2.7	272	2.7	0.367	7.5	LOS A	2.6	18.9	0.83	0.70	0.83	44.8
All Vehicles			1694	2.5	1694	2.5	0.673	5.7	LOS A	6.8	48.4	0.65	0.56	0.65	45.3

Figure 38: Riverhead Road / Deacon Road AM

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Riverhead Road															
1	L2	All MCs	67	0.0	67	0.0	0.160	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.1
2	T1	All MCs	242	0.0	242	0.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.3
Approach			309	0.0	309	0.0	0.160	1.0	NA	0.0	0.0	0.00	0.12	0.00	49.0
North: Riverhead Road															
8	T1	All MCs	192	0.0	192	0.0	0.218	0.9	LOS A	1.1	7.4	0.37	0.41	0.37	47.7
9	R2	All MCs	158	0.0	158	0.0	0.218	5.8	LOS A	1.1	7.4	0.37	0.41	0.37	46.4
Approach			349	0.0	349	0.0	0.218	3.1	NA	1.1	7.4	0.37	0.41	0.37	47.1
West: Deacon Road															
10	L2	All MCs	329	0.0	329	0.0	0.505	10.1	LOS B	3.8	26.9	0.57	0.95	0.77	43.0
12	R2	All MCs	125	0.0	125	0.0	0.505	14.2	LOS B	3.8	26.9	0.57	0.95	0.77	42.8
Approach			455	0.0	455	0.0	0.505	11.2	LOS B	3.8	26.9	0.57	0.95	0.77	42.9
All Vehicles			1114	0.0	1114	0.0	0.505	5.8	NA	3.8	26.9	0.35	0.55	0.43	45.8

Figure 39: Riverhead Road / Deacon Road PM

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Riverhead Road															
1	L2	All MCs	115	0.0	115	0.0	0.177	4.6	LOS A	0.0	0.0	0.00	0.18	0.00	47.7
2	T1	All MCs	225	0.0	225	0.0	0.177	0.1	LOS A	0.0	0.0	0.00	0.18	0.00	48.9
Approach			340	0.0	340	0.0	0.177	1.6	NA	0.0	0.0	0.00	0.18	0.00	48.5
North: Riverhead Road															
8	T1	All MCs	235	0.0	235	0.0	0.338	1.3	LOS A	1.9	13.3	0.46	0.50	0.46	47.3
9	R2	All MCs	279	0.0	279	0.0	0.338	6.1	LOS A	1.9	13.3	0.46	0.50	0.46	45.9
Approach			514	0.0	514	0.0	0.338	3.9	NA	1.9	13.3	0.46	0.50	0.46	46.5
West: Deacon Road															
10	L2	All MCs	152	0.0	152	0.0	0.361	9.2	LOS A	1.9	13.0	0.56	0.92	0.67	42.7
12	R2	All MCs	104	0.0	104	0.0	0.361	15.4	LOS C	1.9	13.0	0.56	0.92	0.67	42.5
Approach			256	0.0	256	0.0	0.361	11.7	LOS B	1.9	13.0	0.56	0.92	0.67	42.7
All Vehicles			1109	0.0	1109	0.0	0.361	5.0	NA	1.9	13.3	0.34	0.50	0.37	46.1

4 Leek Street, Newmarket
PO Box 128259, Remuera 1541, Auckland
Ph. 09 869 2825
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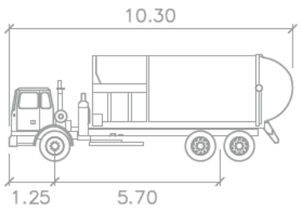
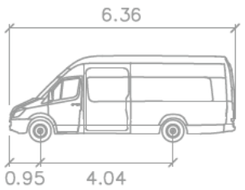
APPENDIX C – VEHICLE TRACKING



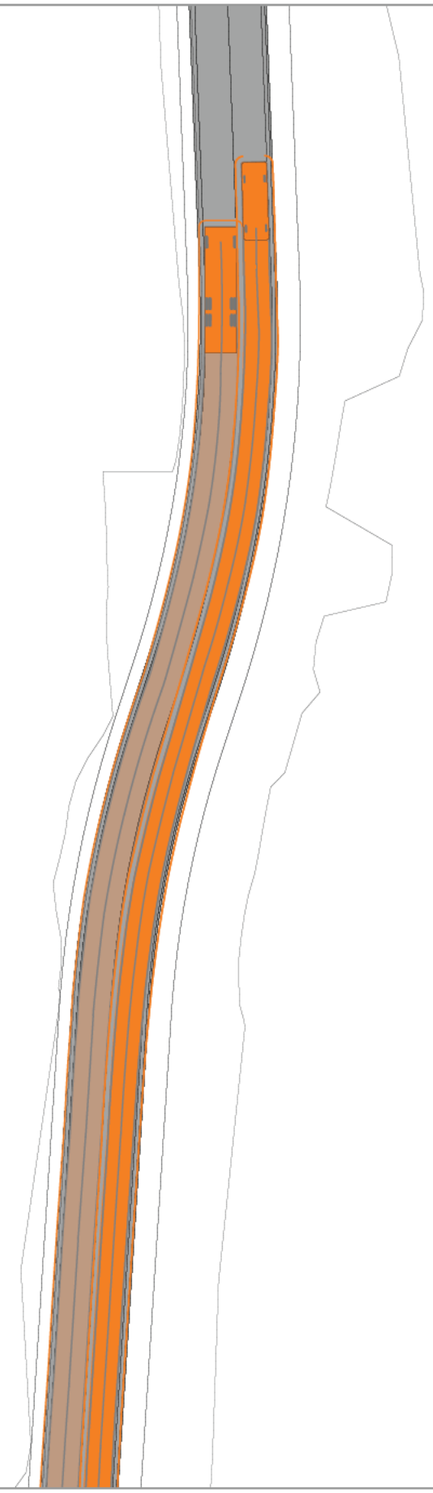
AT – Rubbish – 10.3m – Side load – Rear Steer

	meters
Width	: 2.55
Track	: 2.55
Lock to Lock Time	: 6.0
Steering Angle	: 47.0



AT – Delivery Van

	meters
Width	: 2.05
Track	: 1.81
Lock to Lock Time	: 4.0
Steering Angle	: 38.6



Revision notes:

Rev:	Date:	Notes:

Drawn by: HA
J003122

Client:

Project: Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title: Vehicle Tracking
Forestry Road Midblock Tracking

Date: 27/03/25

Scale @ A3: 1:200

Revision: A

commute TRANSPORTATION CONSULTANTS

Figure: S92

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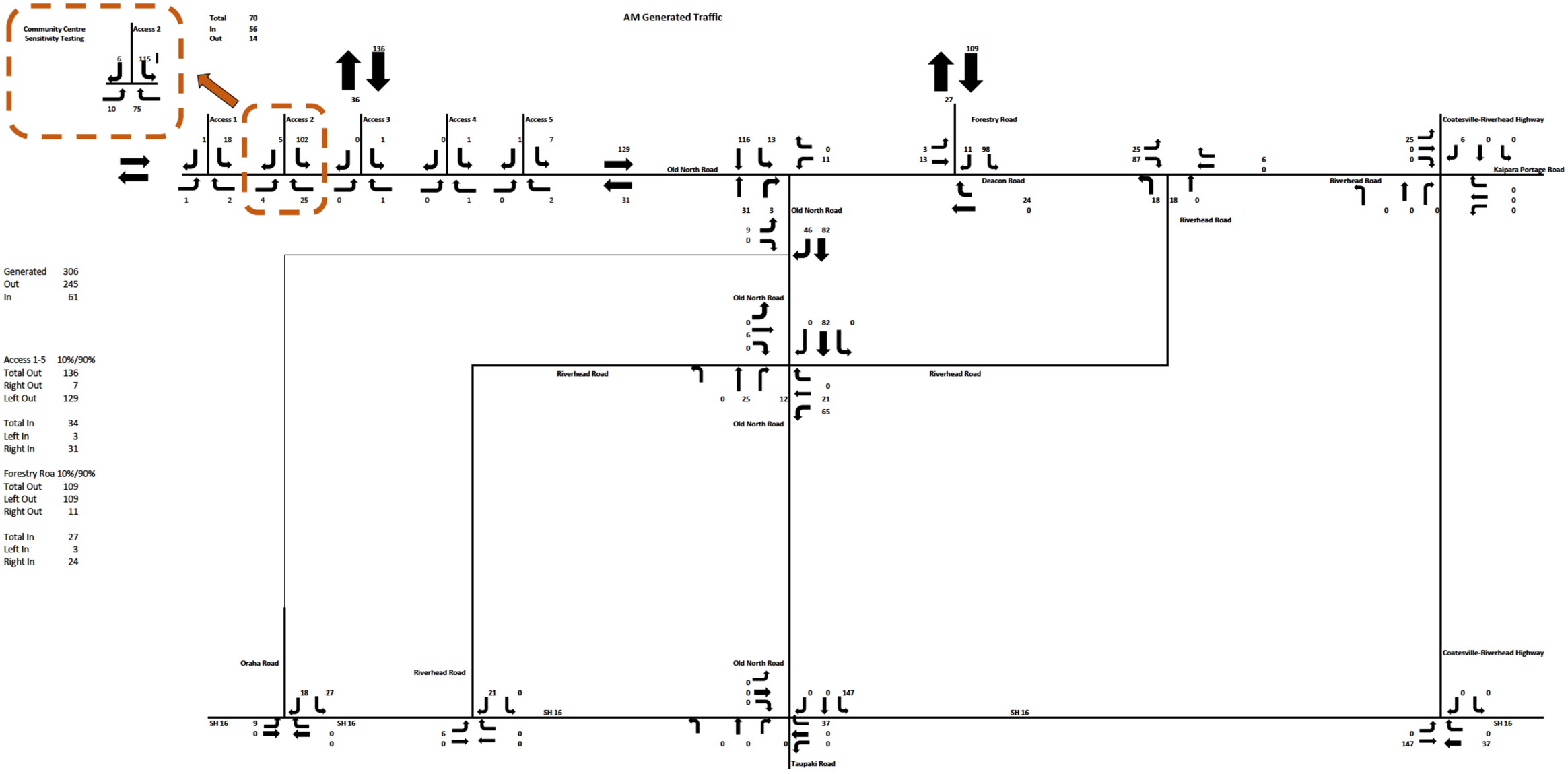
APPENDIX D – TRIP DISTRIBUTION DIAGRAMS

AM Generated Traffic



Generated 306
Out 245
In 61

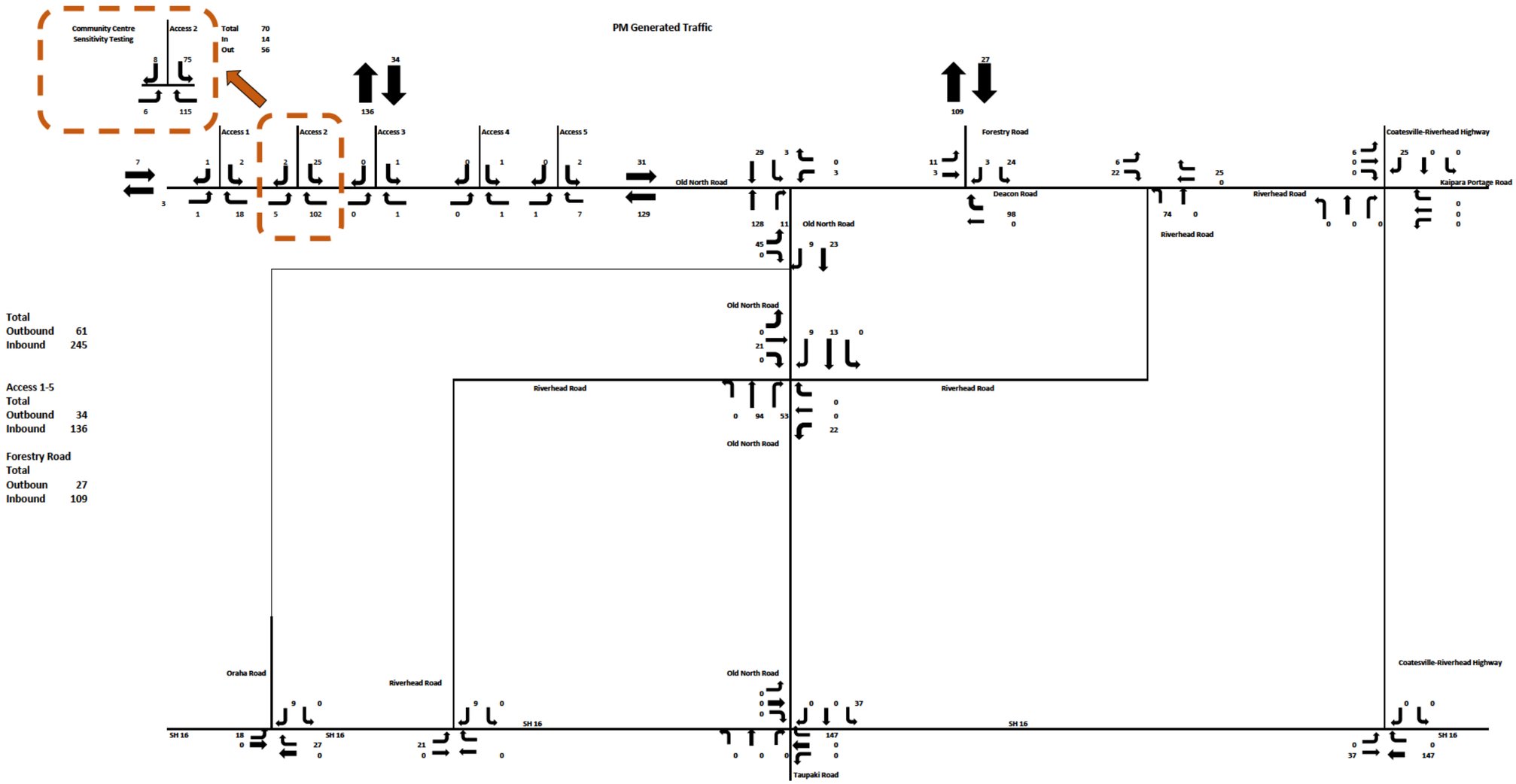
Access 1-5 10%/90%
Total Out 136
Right Out 7
Left Out 129

Total In 34
Left In 3
Right In 31

Forestry Roa 10%/90%
Total Out 109
Left Out 109
Right Out 11

Total In 27
Left In 3
Right In 24

PM Generated Traffic



Total
Outbound 61
Inbound 245

Access 1-5
Total
Outbound 34
Inbound 136

Forestry Road
Total
Outboun 27
Inbound 109