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Mr G Finlayson
Barker & Associates
PO Box 1986
Shortland Street
Auckland 1140

3 July 2025

Copy via email: GusF@barker.co.nz

Dear Gus,

ON SITE WASTEWATER – 88,130,133 UPPER OREWA ROAD AND 53A,53B,55 RUSSELL ROAD, OREWA

Further to your recent instructions, we have undertaken an assessment of the potential traffic impacts when treated water cannot be discharged on-site but rather held on-site and then removed by truck and taken to a wastewater treatment facility for disposal or to a location for reuse.

1 PROPOSAL

1.1 GENERAL

Apex Water has prepared this technical note related to the development of private, on-site wastewater treatment and discharge infrastructure for the Delmore land development project.

This document supports the Wastewater Treatment Plant (WWTP) Design Report included in the consent documentation and provides details of truck movements that the site could experience in response to a range of different scenarios. The three scenarios are detailed in the Apex report are as follows:

> *"**Scenario 1** – This scenario models the construction and subsequent occupancy of 483 residential lots over a 24-month period. It assumes an average completion and occupancy rate of 20 lots per month. The associated truck movements required by the wastewater treatment plant resulting from this activity have been assessed over the same time frame.*
>
> ***Scenario 2** – This scenario examines the operation of the treatment plant at full capacity. A 10-year historical rainfall dataset has been used to model the frequency and impact of peak flow events on truck movements.*
>
> ***Scenario 3** – Raw wastewater to be tankered off-site as a contingency.*

1.2 TRUCK TYPE

The Apex report is based on a truck capacity of 28.8 m³ for transportation of treated wastewater and reverse osmosis reject. The vehicle is based on a Fonterra Truck and Trailer which is approximately 19.5m long. Should raw wastewater need to be removed from site (scenario 3), the same size of truck will be used.

The dewatered sludge is anticipated to be collected in a skip bin on site. A standard skip truck/small flatbed truck will be used for sludge collection. Chemical delivery is also anticipated to be conducted with a smaller truck. As a conservative assessment we have used a 10.3m rubbish truck to represent this truck.

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1.3 TRUCK NUMBERS

The following table outlines the results of the Apex analysis for each scenario.

Table 1: Truck numbers

Scenario	Average daily truck visits	90% ile daily truck visits
1	1.73	3.72
2	3.39	7.56
3	5.27	8.71

It is noted that in Scenario 2 the 99%ile truck number is 14.9 and out of the 3,259 days modelled, only 81 days requires 10 or more truck visits. Of these, 80 days coincided with peaking events during the dry-weather period, underscoring the influence of rainfall patterns on peak trucking events during the dry-weather period.

The above values are total Fonterra type 18.9m trucks visiting the site with each truck producing two movements (one entry and one exit). Further these movements will be evenly split throughout the day with the same truck(s) making return journey throughout the day. Table 2 outlines the daily and hourly truck movements for each scenario (assuming the truck operates 10 hours per day).

Table 2: Truck movements

Scenario	Average daily truck movements	90% ile daily truck movements	90% ile hourly truck movements
1	3.46	7.44	Less than one
2	6.78	15.12	One - two
3	10.54	17.42	One – two

In all cases above the hourly volume of trucks will be two movements or less (one truck visit). Even using the 99%ile Scenario 2 truck number (15 trucks per day) translates to 30 movements per day or three movements per hour.

As such the majority of the time (99%) there will be up to one truck (two movements) per hour. Even outside this time, there will in practice only ever be three truck movements per hour.

In both scenario 1 and 2, smaller truck movements visiting the wastewater treatment plant is anticipated to be on average 0.21 trucks per day or about 1 every 5 days. As such the majority of the truck movements in Table 2 are the large wastewater truck.

It is noted that scenario 3 represents a contingency scenario where the wastewater treatment plant is not yet available to treat the wastewater for disposal on-site. Scenario 3 95%ile truck movements for scenario 3 are not expected to exceed 18 movements per day (nine truck visits) and likely average truck movements is approximately 10 movements per day (five truck visits).

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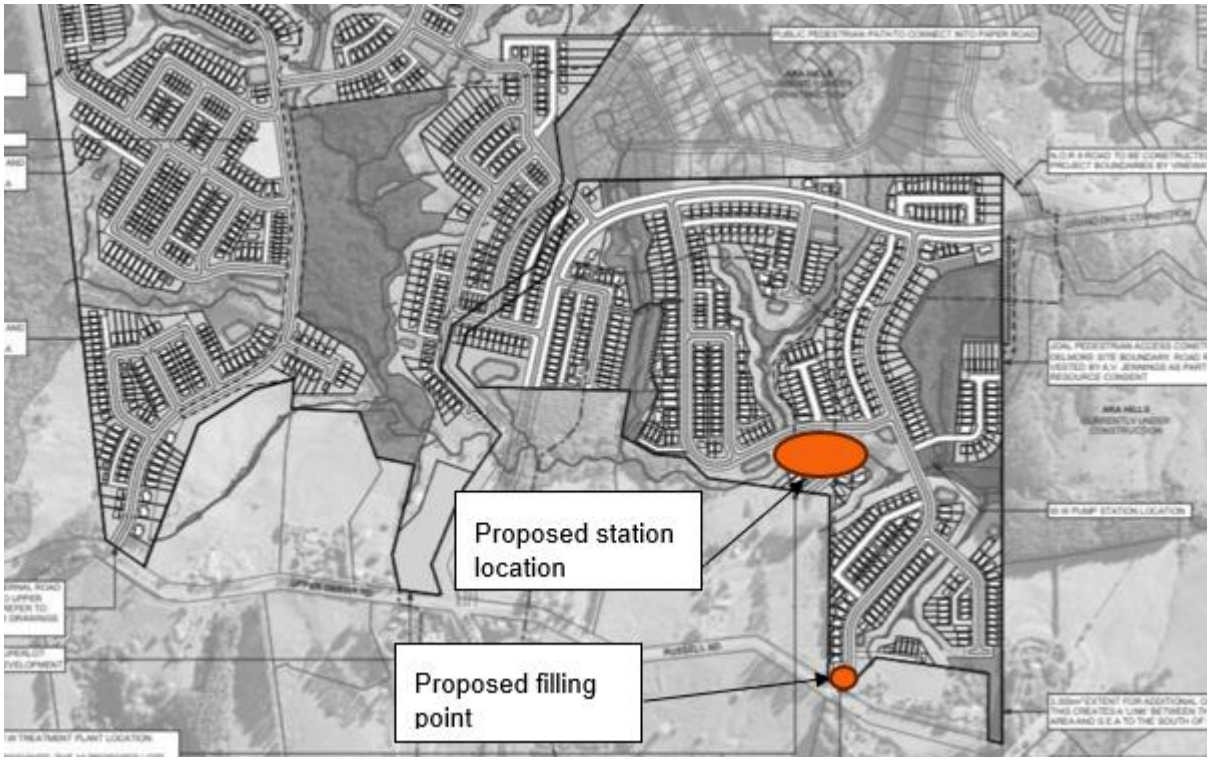
1.4 WASTEWATER TREATMENT PLANT LOCATION

The location of the proposed Wastewater Treatment Plant (WWTP) is shown in Figure 1 below. The WWTP will be within Stage 1 of the subdivision, however due to limitations within the roading network (cannot accommodate a large truck and trailer), there will be a remote filling point located on Russell Road.

Figure 1: Station location



1.5 TRUCK ROUTES

The exact location for the disposal of the wastewater is unknown and could be a variety of locations. In all cases however access for large Fonterra type 18.9m truck and trailers will be to / from the northern motorway.

Figure 2 below shows the route to / from the northern motorway (to south and north).

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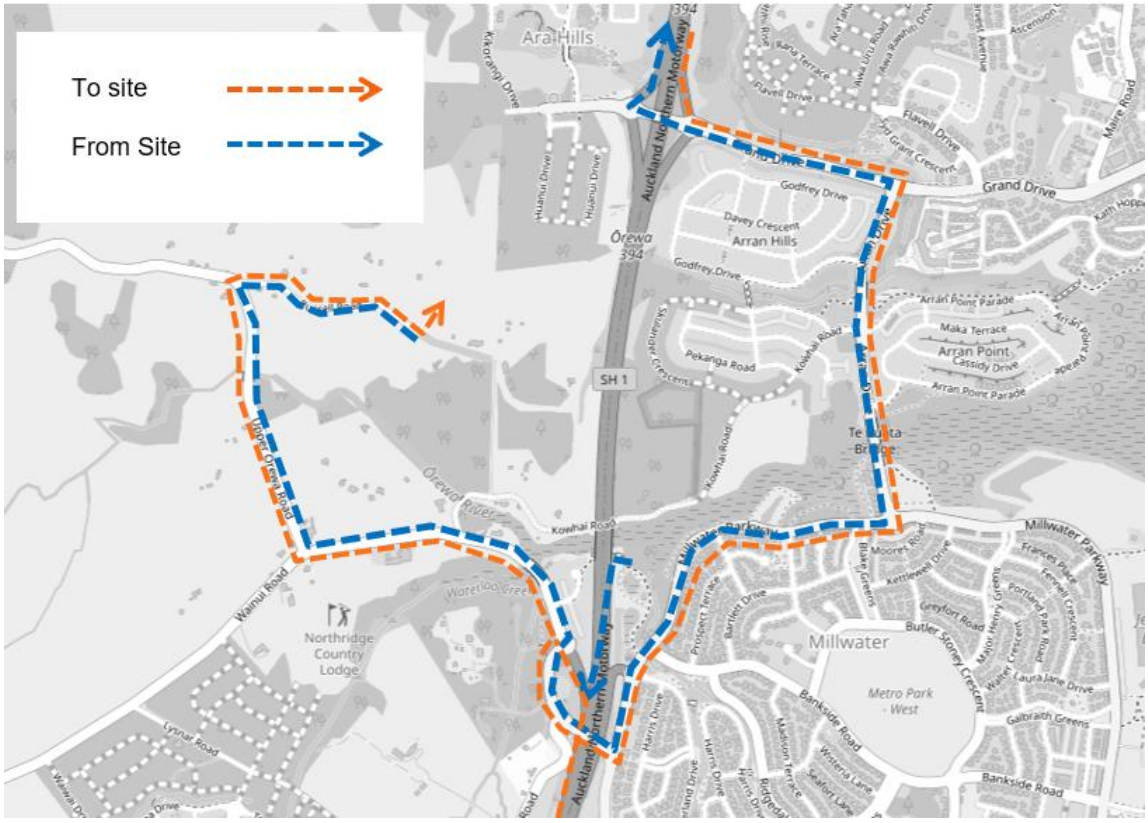
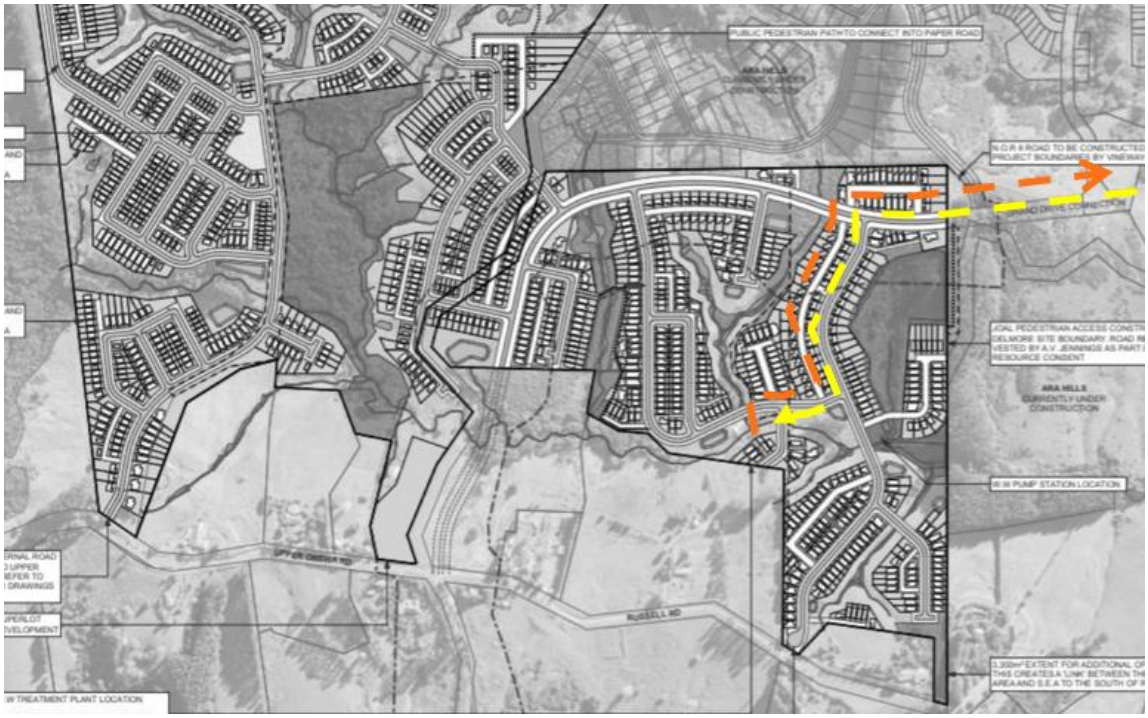
Figure 2: Large Truck routes



The smaller trucks servicing the wastewater treatment plant are anticipated to access the treatment plant through the site via Grand Drive.

Figure 3 below shows the route to/from the Grand Drive.

Figure 3: Smaller truck routes



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2 OVERALL EFFECTS

2.1 PRACTICAL MOVEMENT

In terms of the movement of a “Milk tanker” size vehicle, it is considered:

- The motorway network including the associated interchanges are all designed to accommodate these sized vehicles;
- Wainui Road and Upper Orewa Road are able to accommodate large trucks; and
- Russell Road and the intersection with Upper Orewa Road cannot currently accommodate this size truck and an opposing car. As such it is recommended that Russell Road be widened once trucking starts as required based on an on-site assessment. Appendix A shows the tracking of the truck/trailer vs a car.

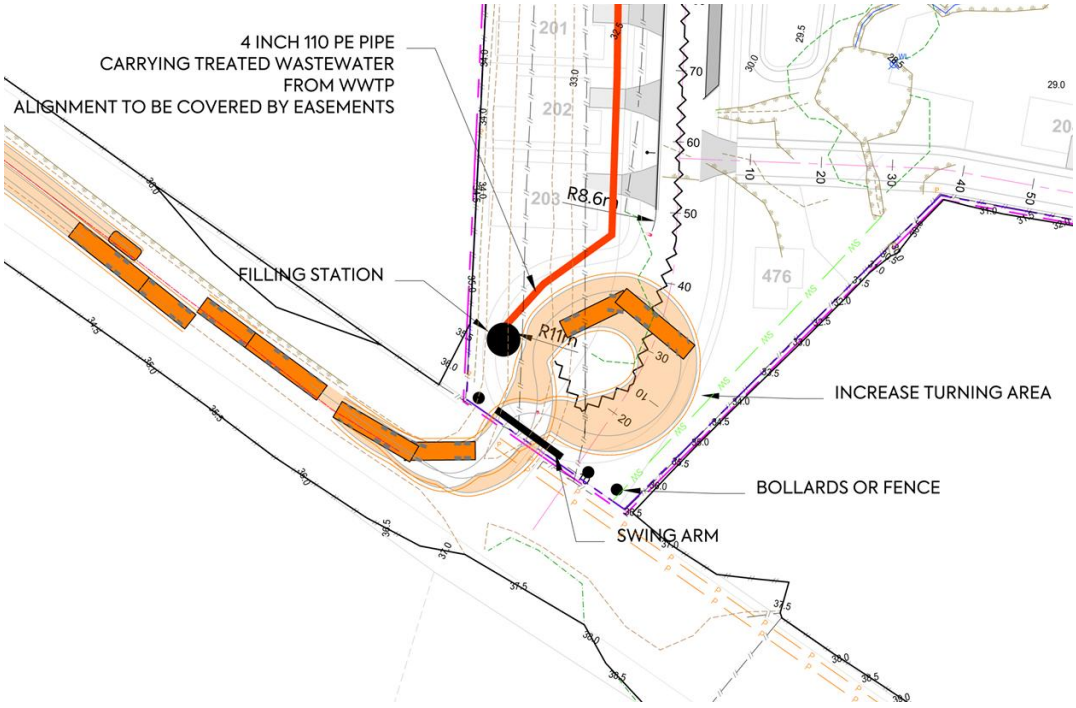
The movement of the smaller trucks within the site to the WWTP location is considered to be acceptable as the site has been designed to accommodate rubbish trucks and the proposed vehicles to the WTTP will be smaller than the rubbish trucks.

2.2 ON-SITE TREATMENT

Figure 4 shows the on-site arrangement. In terms of traffic engineering:

- The truck will enter the site via Russell Road via a barrier activated by push-button;
- It will then use the proposed (enlarged) cul-de-sac head to stop, fill the truck and turn around;
- It will then exit via the same barrier arm activated by push-button.

Figure 4: On-site arrangement



This arrangement is considered appropriate.

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2.3 TRAFFIC GENERATION

The actual increase in traffic to the Russell road route is generally two truck movements per hour (one in and one out), increasing at peak times to a realistic maximum of three truck movements per hour. This level of increase is considered negligible and will not alter the performance of the roading network in any noticeable way.

The movement of the smaller trucks within the site is essentially one per week which is also considered to be negligible.

3 CONCLUSION

Overall, with the mitigation proposed to Russell Road, the proposal to hold wastewater on-site and then remove it by truck and trailer and taken to a wastewater treatment facility for disposal is considered to have minimal adverse traffic engineering effects.

We therefore consider there are no traffic engineering reasons for precluding approval of the proposed wastewater treatment option.

Yours sincerely

Commute Transportation Consultants

Leo Hills

Director

leo@commute.kiwi

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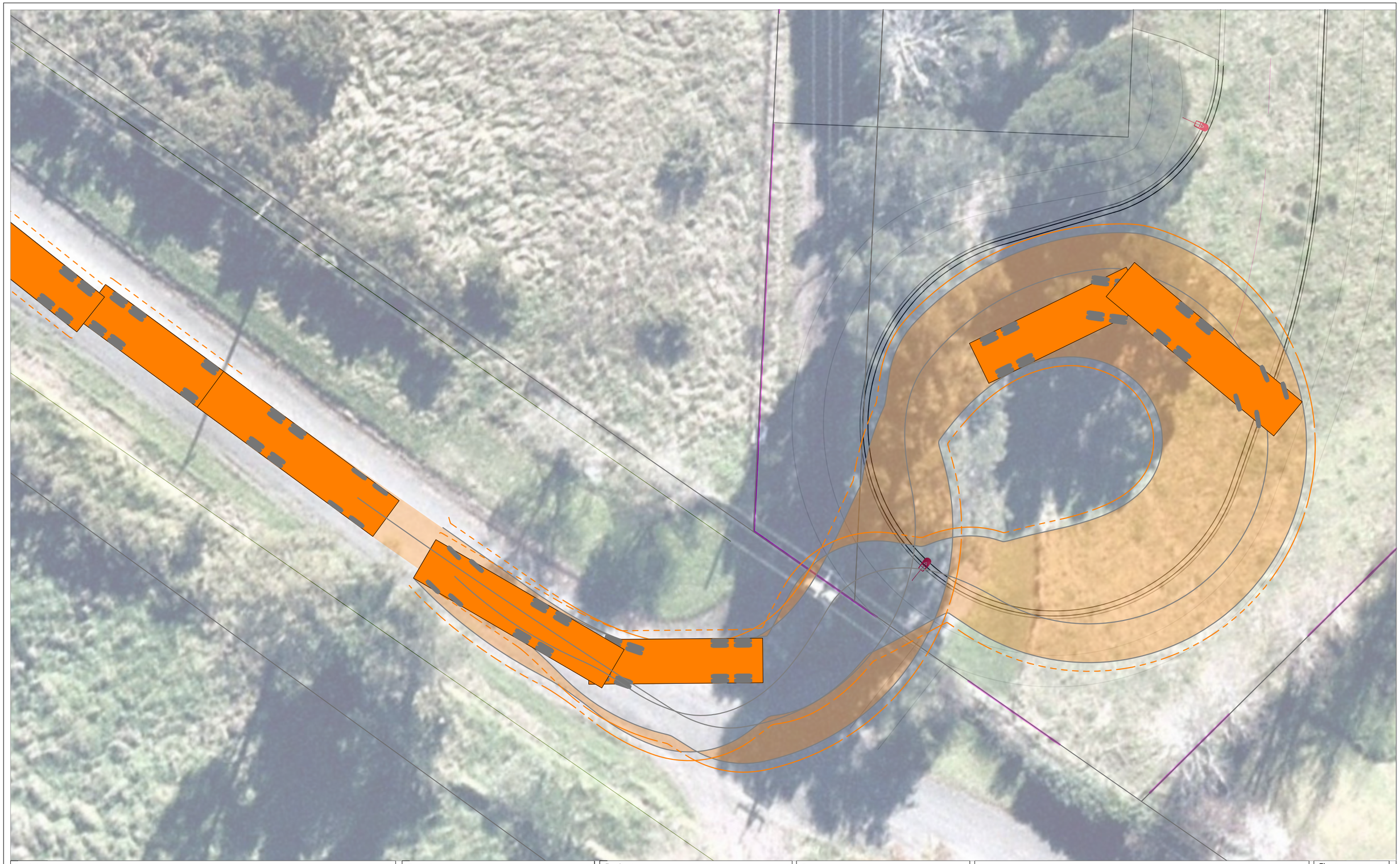
ATTACHMENT A – VEHICLE TRACKING



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003135

Client:

Project:
Delmore, Orewa
Proposed Residential Development

Drawing Title:
20m Tanker Tracking
Russell Road connection Tracking

Date:
09/06/25

Scale @ A3:
1:200

Revision:
A

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Figure:
RR 1

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
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Client:

Project:
Delmore, Orewa
Proposed Residential Development

Drawing Title:
20m Tanker & 10.3m Truck Intersection Tracking
Russell Road / Upper Orewa Road Intersection

Date:
09/06/25

Scale @ A3:
1:500

Revision:
A

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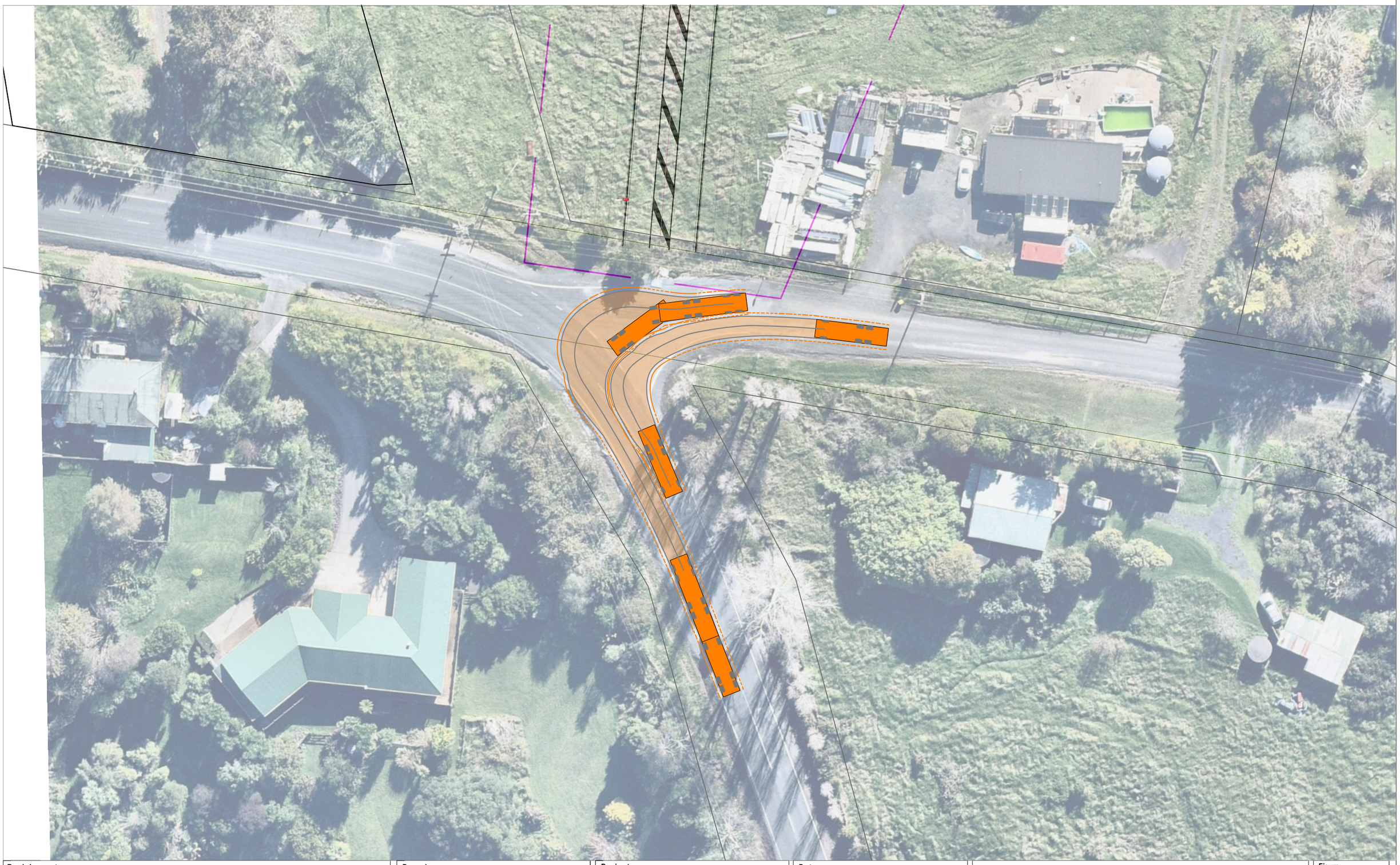
Figure:
RR2



Revision notes:

Rev:	Date:	Notes:

Drawn by:
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J003135

Client:

Project:
Delmore, Orewa
Proposed Residential Development

Drawing Title:
20m Tanker & 10.3m Truck Tracking
Russell Road / Upper Orewa Road Intersection

Date:
09/06/25

Scale @ A3:
1:500

Revision:
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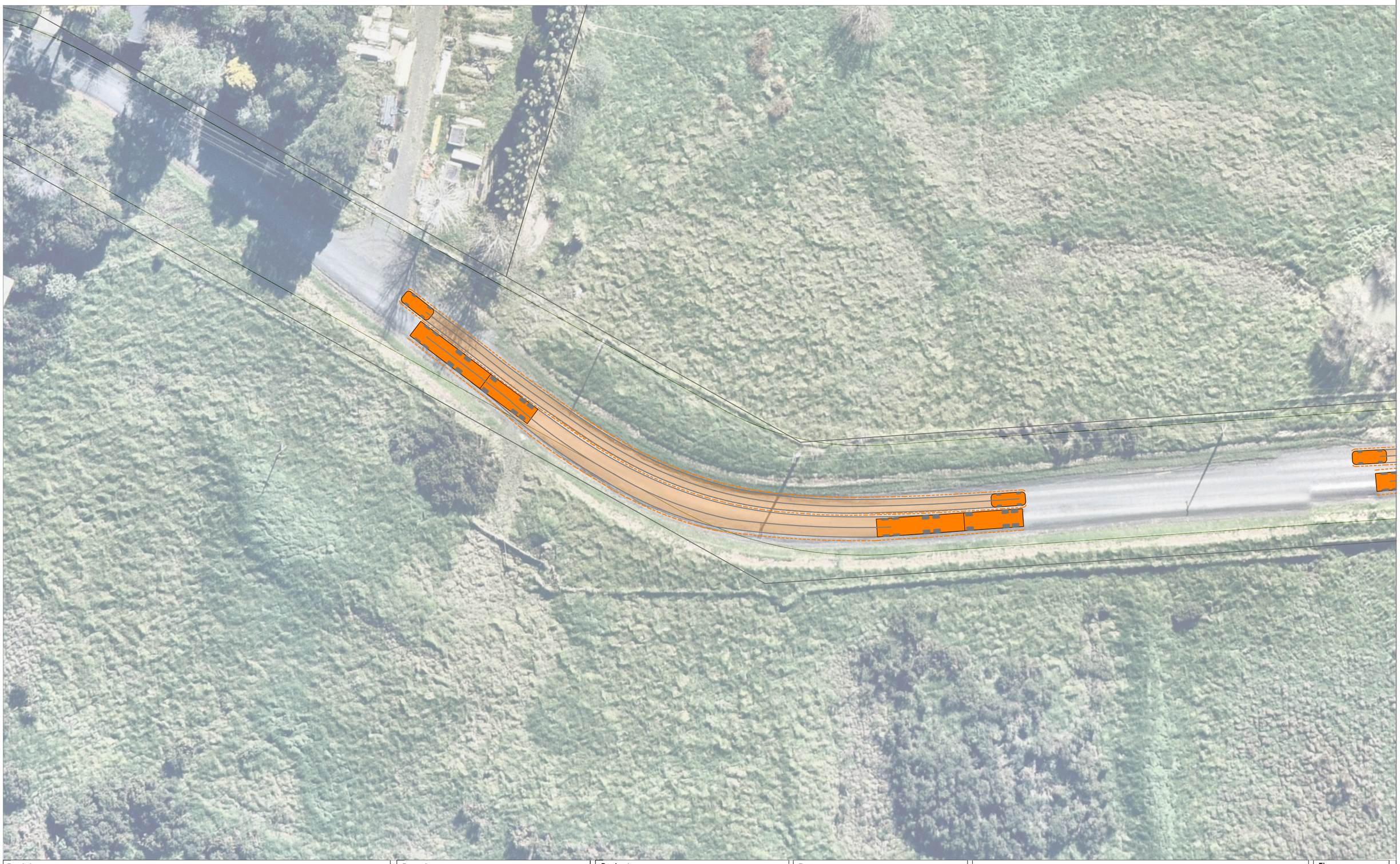
Figure:
RR3



Revision notes:

Rev:	Date:	Notes:

Drawn by:
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Client:

Project:
Delmore, Orewa
Proposed Residential Development

Drawing Title:
20m Tanker & 85th Percentile Vehicle Tracking
Russell Road / Upper Orewa Road Intersection

Date:
09/06/25

Scale @ A3:
1:500

Revision:
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Figure:
RR4

Revision notes:

Rev:	Date:	Notes:

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Client:

Project:
Delmore, Orewa
Proposed Residential Development

Drawing Title:
20m Tanker & 85th Percentile Vehicle Tracking
Russell Road Tracking

Date:
09/06/25

Scale @ A3:
1:500

Revision:
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Figure:
RR5

Revision notes:

Rev:	Date:	Notes:

Drawn by:
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Client:

Project:
Delmore, Orewa
Proposed Residential Development

Drawing Title:
Vehicle Tracking
WWTP 10.3m Truck Tracking

Date:
01/07/25

Scale @ A3:
1:1500

Revision:
A

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Figure:
WWTP