

RUAKAKA SERVICE CENTRE

2581 STATE HIGHWAY 1
RUAKAKA

TRAFFIC IMPACT ASSESSMENT

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	EXISTING TRANSPORT ENVIRONMENT	2
2.1	Road Network	2
2.1.1	State Highway 1	2
2.1.2	State Highway 15A	3
2.2	Traffic Safety	5
3.0	CONSENTED DEVELOPMENT ON SH15A.....	7
4.0	THE PROPOSAL.....	8
4.1	Traffic Generation	8
4.2	Vehicle Access Locations.....	9
4.3	Vehicle Sight Lines.....	11
4.4	Vehicle Access Designs.....	12
4.4.1	State Highway 1	13
4.4.2	State Highway 15A Site	13
4.4.3	Acceleration and Merge from Consented Service Centre onto SH15A.....	14
4.4.4	Access Option 1 – Right Turn Bay on SH15A	15
4.4.5	Access Option 2 – No Right Turn Entry from SH15A	16
4.4.6	Access Option 3 – Left-In and Left-Out Arrangement on SH15A	16
5.0	SAFETY ASSESSMENT OF THE PROPOSED ACCESS POINTS	17
6.0	INTERNAL SITE LAYOUT AND ASSESSMENT	19
6.1	Proposed Site Layout	19
6.2	Vehicle Access Assessment	20
6.3	Parking Assessment	21
6.4	Bus Drop Off and Truck Stop.....	21
6.5	Deliveries and Servicing	21
6.6	Construction Effects.....	22
7.0	RESPONSE TO WK - NZTA COMMENTS.....	23
7.1	WK - NZTA Comments of November 2018.....	23
7.1	WK - NZTA Comments of October 2020	24
8.0	OPERATIVE WHANGAREI DISTRICT PLAN REQUIREMENTS.....	28
9.0	OPERATIVE WHANGAREI DISTRICT PLAN ASSESSMENT CRITERIA	31
10.0	DECISION VERSION WHANGAREI DISTRICT PLAN REQUIREMENTS.....	32

11.0	DECISION VERSION WHANGAREI DISTRICT PLAN ASSESSMENT CRITERIA	37
12.0	CONCLUSIONS.....	39

ATTACHMENT 1: CONCEPT INTERSECTION DESIGNS

ATTACHMENT 2: ON-SITE VEHICLE TRACKING DIAGRAMS

ATTACHMENT 3: INDEPENDENT ROAD SAFETY AUDIT REPORT WITH DESIGNER RESPONSES

1.0 INTRODUCTION

This report examines and describes an assessment for a proposed Ruakaka Service Centre. The report specifically describes the proposed activity, the existing road environment, the traffic generation of the proposed activity and assesses the concept design for the site layout and access.

The site is located on the northern side of the intersection of State Highway 1 (SH1) and State Highway 15A (SH15A) as shown in **Figure 1**. The site has been chosen because of its location on the eastern side of SH1 near Ruakaka. The site is currently zoned Rural Production in the Whangarei District Plan (WDP).

By way of a summary, it is considered that the traffic planning effects of the proposed Service Centre can be accommodated on the road network without compromise to its function, capacity, or safety.



Figure 1: Site Location

Image Source: Land Information New Zealand

2.0 EXISTING TRANSPORT ENVIRONMENT

2.1 Road Network

The site has road frontage onto both SH1 and SH15A. The typical traffic management arrangements on SH1 and SH15A in the vicinity of the site are shown in **Figure 2**. A large roundabout accommodates turning movements where the roads intersect, with single lane entry and exit points on all legs. The roundabout also provides access to a small Service Centre on the west side of SH1 to the south of SH15A.



Figure 2: Study Area Traffic Management
Image Source: Land Information New Zealand

2.1.1 State Highway 1

Near the site, SH1 provides one traffic lane in each direction along with a partially sealed shoulder. For the purposes of this assessment, SH1 is considered to have a north-south road alignment.

Near the site on the eastern side of State Highway 1, there is one driveway providing access to a rural dwelling some 200 metres north of SH15A. This driveway will be removed and reinstated as road shoulder and berm as part of the proposal. There are no vehicle access points on the western side of SH1 near the site.

Traffic counts collected by Waka Kotahi - New Zealand Transport Agency (WK - NZTA), 300 metres north of Flyger Road (approximately 3.5 km north of the subject site), reported on WK - NZTA Map Hub indicate an annual average daily traffic (AADT) of 15,360 vehicles with 11% heavy vehicles. Based on the AADT volumes, peak hour flows of 1,500 vehicles are estimated.

The posted speed limit on this section of SH1 is 100 km/h. Speed observations of unrestricted vehicles near Prescott Road and at the driveway for No. 2581 SH1 were collected between 15:00 and 16:30 on Saturday 20th April 2019. The data indicated that the 85th percentile southbound speed is 101 km/h for traffic at Prescott Road and 80 km/h at No. 2581 SH1. It is clear that vehicles are slowing down as they approach the roundabout. The vehicle speed distribution is summarised in **Figure 3**.

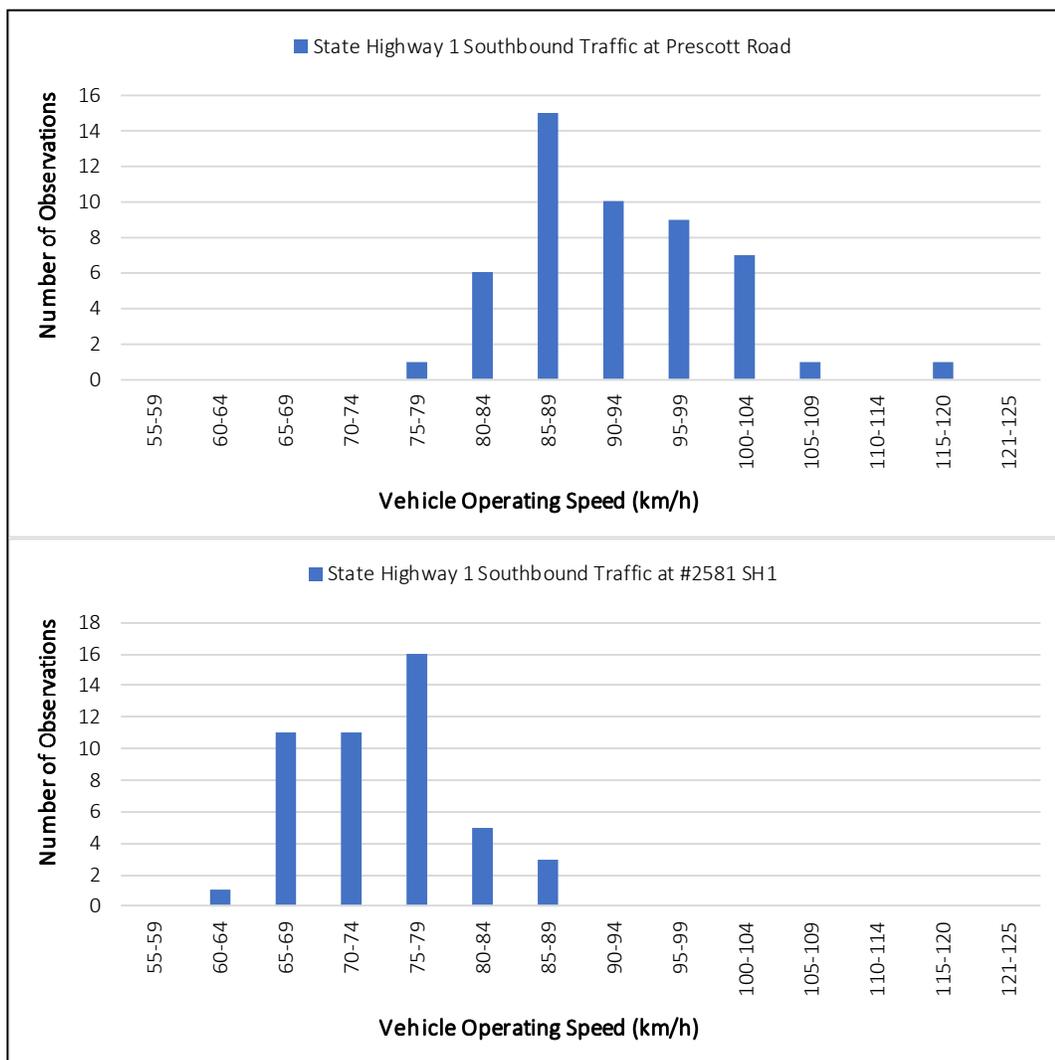


Figure 3: State Highway 1 Southbound Operating Speed Distribution

Source: Traffic Planning Consultants Ltd.

2.1.2 State Highway 15A

Near the site, SH15A also provides one traffic lane in each direction along with a partially sealed shoulder. For the purposes of this assessment, SH15A is considered to have an east-west road alignment.

On the northern side of State Highway 15A, near the site, there is one driveway providing access to a rural dwelling some 175 metres east of SH1. This driveway will be removed and reinstated as road shoulder and berm as part of the proposal. On the southern side, there is one access serving a paddock, along with the old SH15A road connection to SH1 which is now defunct.

Traffic counts collected by WK - NZTA in 2018, between Bens View Road and Rama Road (approximately 6.0 km east of the subject site), reported an AADT of 4,500 vehicles with 19.2% heavy vehicles. Based on the AADT volumes, peak hour flows of 450 vehicles are estimated.

The posted speed limit on this section of SH15A is 100 km/h. Speed observations of unrestricted vehicles along SH15A were collected between 11:00 and 12:30 on Sunday 9th June 2019 indicated that the 85th percentile eastbound speed is 75 km/h and westbound speed is 80 km/h. The vehicle speed distribution is summarised in **Figure 4**.

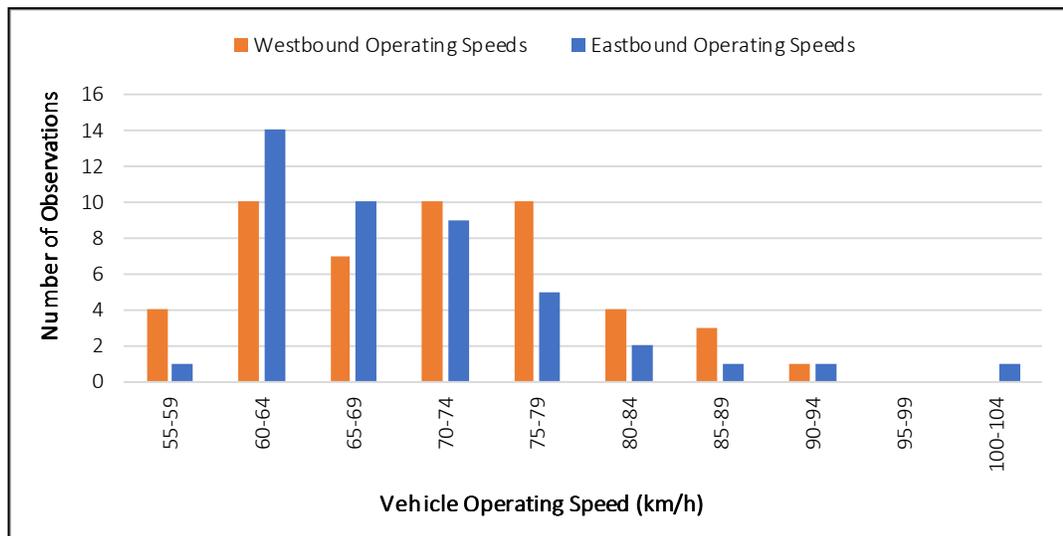


Figure 4: State Highway 15A Operating Speed Distribution

Source: Traffic Planning Consultants Ltd.

2.2 Traffic Safety

Information from WK - NZTA's "Crash Analysis System" indicates that 31 crashes were reported on SH1/SH15A within approximately 500 metres of the site for the five-year period from January 2014 to December 2018 (plus any available data from 2019), with two crashes involving a fatality, one involving serious injury and two crashes involving minor injury. These crashes are summarised in **Table 1** and shown in **Figure 5**.

Table 1: SH1/SH15A Reported Crash History

Location	Reported Crashes			Key Factors
	Total	Injury	Non-Injury	
Midblock: SH1 between 500 metres north of Prescott Road and Prescott Road	3	0	3	1 – rear-ended vehicle slowing for queue (within construction area) 1 – lost control due to speed through construction area with loose metal on road 1 – overtaking truck and trailer struck vehicle being overtaken
Intersection: SH1 and Prescott Road	4	2 fatal	2	1 – head-on collision due to loss of control (alcohol/drug related) [fatal] 1 – vehicle turning right onto SH1 crashed with northbound vehicle after failing to give-way [fatal] 1 – rear-ended vehicle slowing to turn onto Prescott Road, following too closely 1 – vehicle turning right onto SH1 crashed with northbound vehicle signaling to turn
Midblock: SH1 between Prescott Road and SH15A	11	1 minor	10	9 – rear-ended southbound vehicle stopped/slowing for queue [1 x minor] 1 – truck exiting roundabout, load not secured and tipped vehicle 1 – intoxicated driver hit traffic cones within a work site
Intersection: SH1 and SH15A	6	0	6	4 – rear-ended southbound vehicle stopped/slowing for queue 1 – rear-ended northbound vehicle stopped/slowing for queue 1 – truck tipped while turning through roundabout
Midblock: SH1 between SH15A and 500 metres south of SH15A	1	0	1	1 – loss of control due to vehicle tyre malfunction
Midblock: SH15A between SH1 and Salle Road	3	2 minor	1	1 – loss of control, went off road to left due to fatigue [minor] 1 – loss of control, went off road to left due to speed 1 – driver crossed centerline due to intoxication, resulting in oncoming vehicle swerving to avoid crash and entering ditch [minor]
Intersection: SH15A and Salle Road	3	1 severe	2	2 – rear-ended vehicle slowing to turn onto Salle Road, following too closely [1 x severe] 1 – rear-ended vehicle stopped to turn onto SH15A, failed to notice vehicle
TOTAL	31	2 fatal 1 severe 3 minor	25	

It is noted that the mapped location of some of the crashes are incorrect within **Figure 5**, as they have been mapped relative to the old location of SH15A, prior to the SH1/SH15A roundabout construction.

Overall, the crash data suggests an existing road safety issue with rear-end collisions as vehicles approach the SH1/SH15A roundabout, with 14 of 16 crashes associated with the roundabout being 'rear-ends' on SH1. With relatively straight and flat road alignment along SH1, and drivers on SH1 having had priority for 20km on the approach from Whangarei and 50 km on the approach from Wellsford, some drivers do not expect or are slow to react to vehicles stopping ahead of them for the roundabout. WK - NZTA should investigate measures to increase driver attention approaching the roundabout on SH1.

Two fatal crashes were reported at the intersection of SH1 and Prescott Road. One of the crashes was the result of an intoxicated driver crossing the centreline and hitting an on-coming vehicle head on. This crash is unrelated to the intersections configuration and could have occurred at any location along SH1. The other fatal crash resulted when a vehicle turning right onto SH1 failed to notice an oncoming northbound truck, resulting in a "side-on" collision.

No reported crashes appear to be related to the existing Service Centre on the western side of SH1.

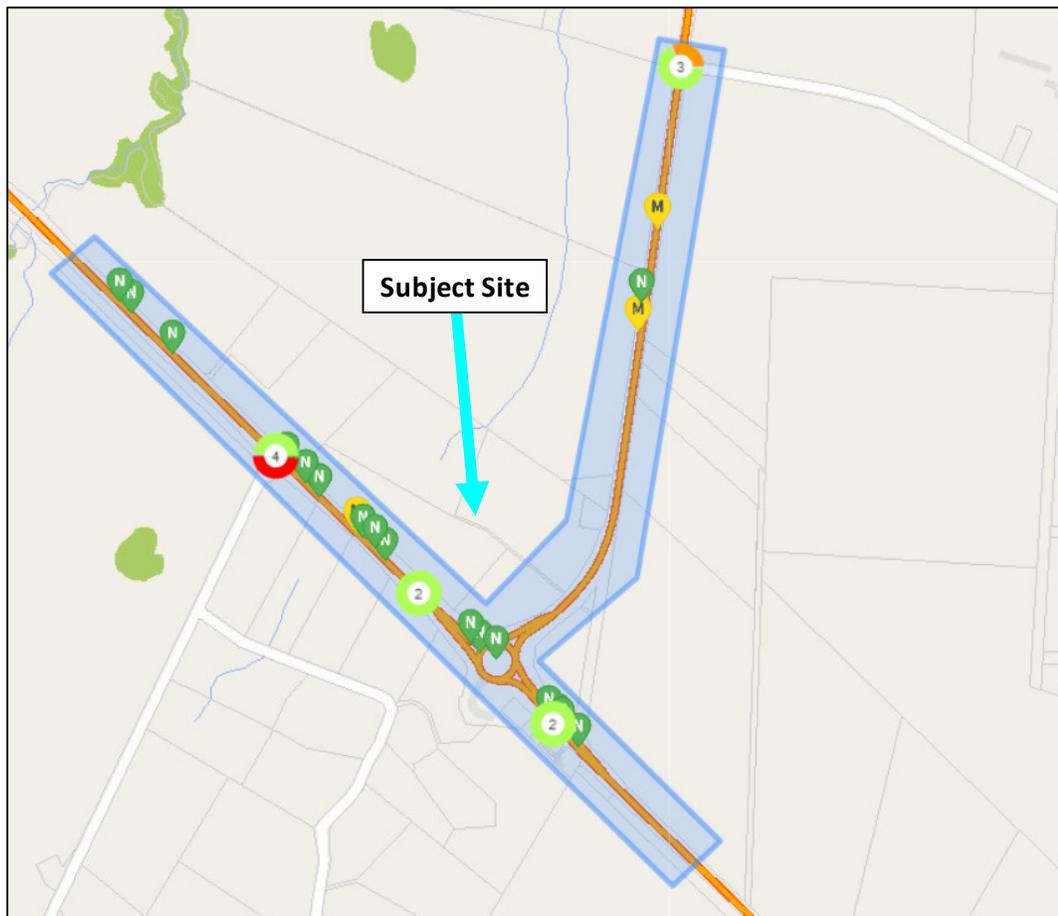


Figure 5: Area Crash History

Image Source: Waka Kotahi - New Zealand Transport Agency, Crash Analysis System

3.0 CONSENTED DEVELOPMENT ON SH15A

In 2011 consent was granted for the development of a Service Centre on SH15A with an access located some 720 metres east of the SH15A/SH1 roundabout.

The consented development comprises of a café (capacity for 80 patrons), retail (1100 m² GFA), storage sheds, boat parking, campervan parks, 30 truck parks and 13 cabins.

The Traffic Effects Assessment report prepared by Engineering Outcomes Ltd dated 8 November 2010 indicated that the traffic generation of the development would be some 541 vehicle movements per hour in the morning peak hour, 746 vehicle movements per hour in the evening peak hour and 5,305 vehicle movements per day on average.

The development was to be built in stages, and at each stage a condition of consent required a traffic impact assessment to either provide evidence that each turning movement at the site access would have a level of Service C or better, or else provide an upgraded site entrance to achieve that level of service. The consent indicated that providing a site access in the form of a seagull intersection as depicted in **Figure 6** would be an acceptable solution.

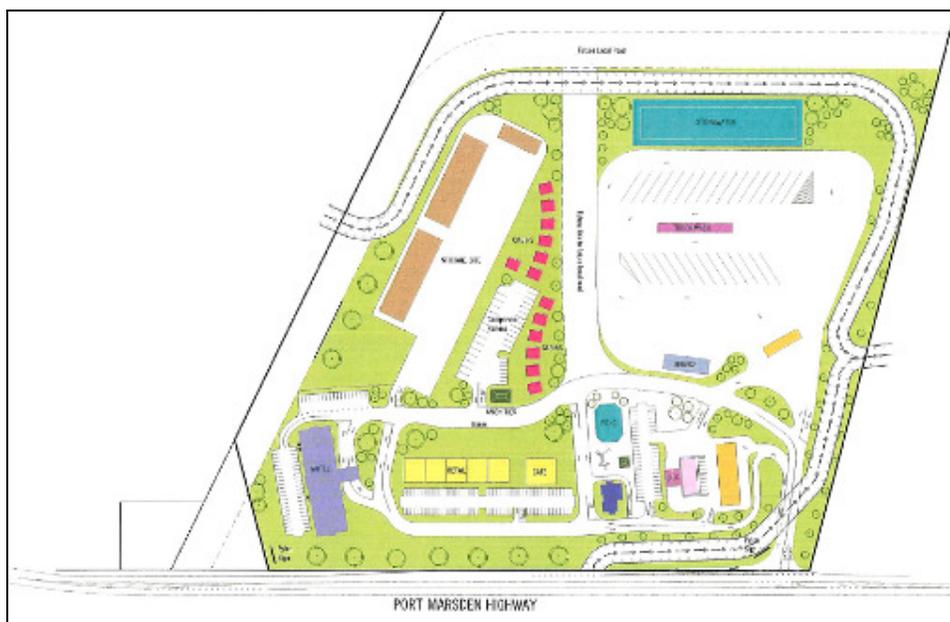


Figure 6: Master Plan of Consented Service Centre

Image Source: Reyburn & Bryant

4.0 THE PROPOSAL

The proposed Service Centre is anticipated to accommodate the following activities:

- Fast-food retailer (280 m² Gross Floor Area [GFA]);
- Café (723 m² GFA);
- Convenience shop (787 m² GFA);
- Retail (385 m²);
- Fuelling station with 16 pumps and associated kiosk (300 m²);
- Picnic area; and
- Public restroom facilities.

The intended access arrangements for the site include a southbound slip lane on SH1 to the north of SH15A. Three options have been developed for site access on SH15A. The third option would also provide a left-turn only priority site egress onto SH1 to the north of SH15A.

A further description of each access option and their operation is included later in this report.

4.1 Traffic Generation

Information on the expected peak hour traffic generation rates for the various Service Centre activities were sourced from WK - NZTA Research Report 453 “*Trips and Parking related to Land Use*” (WK - NZTA-453).

For fast-food restaurants, WK - NZTA-453 indicates that the average peak hour traffic generation rate is 36 vehicle movements per 100 m² of GFA and the daily rate is 266 vehicle movements per 100 m² of GFA. On this basis the 280 m² of fast-food restaurant within the Service Centre is estimated to generate 101 peak hour trips and 745 daily trips.

For restaurants (café), WK - NZTA-453 indicates the average peak hour traffic generation rate is 0.6 vehicle movements per seat and the daily rate is 3.7 vehicle movements per seat. On this basis the 723 m² of café (estimated 50 seats) within the Service Centre is estimated to generate 30 peak hour trips and 185 daily trips.

For retail establishments, WK - NZTA-453 indicates the average peak hour traffic generation rate is 14.6 vehicle movements per 100 m² GFA and the daily rate is 92 vehicle movements per 100 m² GFA. On this basis the 787 m² of convenience shop and 385 m² of general retail within the Service Centre is estimated to generate 175 peak hour trips and 1,104 daily trips.

For service stations (fuelling), WK - NZTA-453 indicates the average peak hour traffic generation rate is 65.1 vehicle movements per 100 m² GFA and the daily rate is 449 vehicle movements per 100 m² GFA. On this basis the 300 m² of fuel station (with 16 pumps) within the Service Centre is estimated to generate 195 peak hour trips and 1,347 daily trips.

No trip generation was included for the picnic area or public restrooms, as these areas are considered ancillary to the other uses, with visitors to those spaces, likely to also visit one of the other activities on site. Any trips which uniquely visit one of these locations will be negligible when compared to the overall trip generation of the wider Service Centre.

Overall, based on the prospective tenancies, the Service Centre would be expected to generate 501 peak hour trips and 3,381 daily trips before considering any overlap in trip generation, such as those that visit both the café and the fuel station. The peak hour trip generation also assumes that each independent activity has the same peak hour, which is not likely to be the case. However, this represents a conservative approach for the matter of assessment. **Table 2** summarises the estimated trip generation for the site.

It is expected that most of the trips to and from the site would be passing traffic already using the adjacent roads, with very few added vehicle trips on the wider State Highway network.

Table 2: Estimated Trip Generation of Ruakaka Service Centre

Activity	Peak Hour Trip Rate	Daily Trip Rate	Unit	Quantity	Peak Hour Trip Generation	Daily Trip Generation
Fast-Food Restaurant	36.0	266.0	100 m ² GFA	280 m ²	101	745
Café	0.6	3.7	seat	~50 seats (800 m ²)	30	185
Convenience Shop	14.6	92.0	100 m ² GFA	800 m ²	117	736
Retail	14.6	92.0	100 m ² GFA	400 m ²	58	368
Fueling Station	65.1	449.0	100 m ² GFA	300 m ²	195	1,347
TOTAL					501	3,381

As 11.2% of SH1 traffic is heavy vehicle traffic, it is anticipated that a similar proportion of Service Centre traffic would be heavy vehicles. The majority of heavy vehicles on SH1 in this vicinity are logging trucks, that will typically only run in the day.

It is anticipated that lunchtimes would be the busiest time of the day. As indicated in **Table 2**, 14.8% of daily Service Centre traffic would occur in the peak hour. Some 11.2% of peak hour traffic is expected to be heavy vehicles. It is anticipated that 80% of Service Centre traffic would be daytime traffic.

4.2 Vehicle Access Locations

The site is located on the northeast corner of the intersection of SH1 and SH15A. Key parameters for the optimal location of a site access are sight distance and spacing from intersections and other accessways. **Figure 7** displays the indicative location of accesses for the Service Centre.

The WK - NZTA Planning Policy Manual indicates that accessways having peak hour flows of 20 or more equivalent car movements per peak hour will be expected to comply with the intersection spacing policy.

Within the WK - NZTA Planning Policy Manual, Table App5B/3 sets out the minimum recommended accessway spacings for a range of 85th percentile operating speeds. For the access onto SH1 (proposed to only be a southbound slip lane entrance into the site), with a southbound 85th percentile speed of 101 km/h the recommended minimum spacing between accessways, and intersections is 200 metres. However, given that SH1 carries more than 10,000 vehicles per day, the Manual indicates that spacings of 500 metres are desirable.

For the access onto SH15A, with eastbound and westbound 85th percentile speeds of 75 km/h and 80 km/h respectively, the recommended minimum spacing between accessways and intersections is 100 metres.

For SH1, there is a section of frontage approximately 700 metres in length which would allow for a site exit onto SH1 to be located more than 200 metres from pre-existing intersections. However, as this location does not provide suitable deceleration length within the site for vehicles exiting SH1, the location of the site entry off SH1 has been selected immediately north of the Prescott Road intersection such that an appropriate deceleration distance can be provided within the site and so that no unsafe weaving conditions are created between the access and Prescott Road.

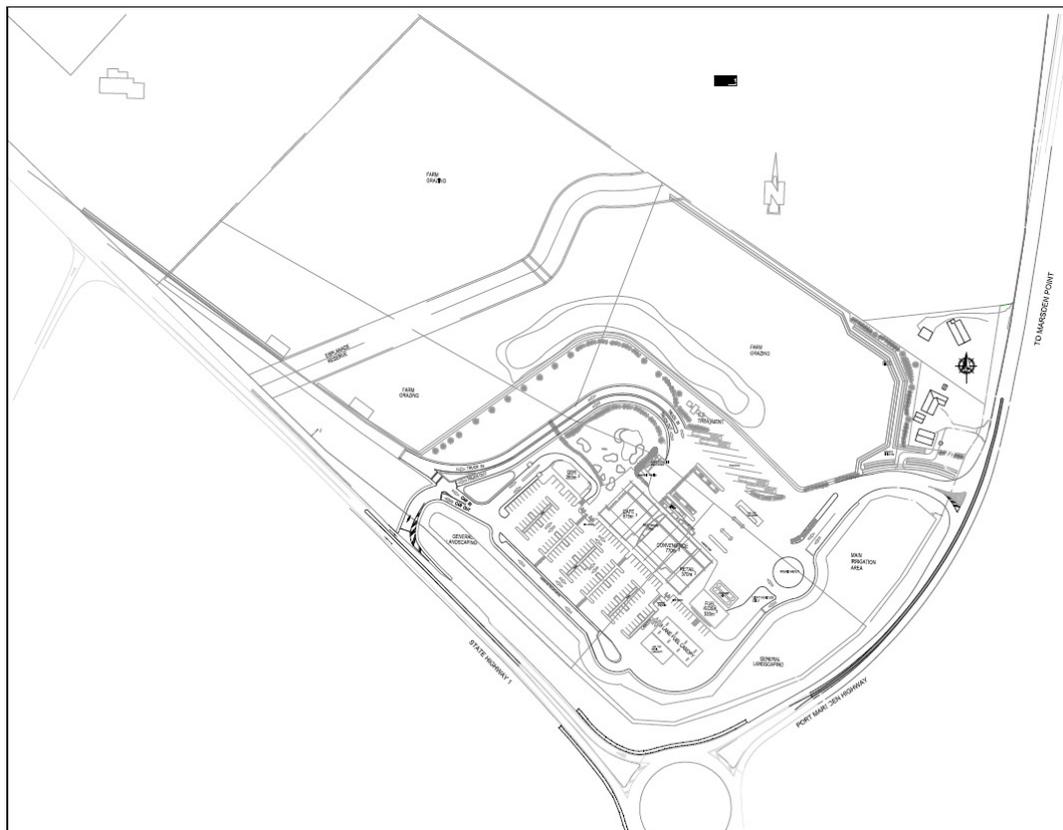


Figure 7: Indicative Access Locations

Image Source: Buchan

An existing driveway serving two rural properties is located on SH1 some 190 metres north of Prescott Road. Otherwise, for access Options 1 and 2 there will be no driveways or intersections within 500 metres of the serviced centre southbound entry ramp and the Prescott Road intersection.

For access Option 3 a left turn exit from the site will be provided some 200 metres north of the roundabout intersection with SH15A and 200 metres south of Prescott Road. While this is less than the minimum spacing requirements for intersections recommended in WK - NZTA's guidelines, this option was recommended for consideration in Section 2.3.3 of the attached independent road safety audit of proposed access arrangements. The road safety auditors advised that "while the reasoning for spacing requirements between normal T-intersections is reasonable, the same reasoning may not necessarily apply to roundabouts where everyone has to slow down to negotiate the intersection (i.e. there is no high speed through traffic passing through both intersections").

For SH15A, the proposed access will be located more than 200 metres from the intersection of SH1 and SH15A. The proposed access will however be within 30 metres of an existing single dwelling vehicle access to No. 39 SH15A. It is proposed to integrate the vehicle access for the residential dwelling (No. 39 SH15A) within the site such that their existing access onto SH15A will be removed. As a result, the access for the development will be more than 100 metres from any other access. Therefore, the proposed access onto SH15A (permitting all vehicle movements) will comply with the separation standards of the WK - NZTA Planning Policy Manual.

4.3 Vehicle Sight Lines

The sight lines of the proposed accesses have been considered against Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections. Table 3.2 of this standard sets out the safe intersection sight distances required for various reaction times and design speeds. Using a 2.5s reaction time and an 80 km/h operating speed, the safe intersection sight distance required for the SH15A access is 192 metres. For a 100 km/h operating speed, the safe intersection sight distance required for the left turn exit onto SH1 is 262 metres.

From the proposed SH15A access, toward the west (SH1), approximately 230 metres of sight distance is available through the bend along the road. Landscaping within the site will be kept low where necessary to maintain that sight distance. Towards the east (Salle Road), 200 metres of sight distance will be provided.

For the access from SH1, as only southbound vehicle movements into and out from the site will be permitted, sight line standards are only relevant for approaching vehicles southbound on SH1. In this instance, SH1 has a straight alignment to the north of the access for more than 300 metres, allowing for good visibility toward the access points.



Figure 8: Indicative SH15A Access Sight Distance
 Image Source: Traffic Planning Consultants Ltd.

4.4 Vehicle Access Designs

The WK - NZTA Planning Policy Manual indicates that accessways having peak hour flows of 20 or more equivalent car movements per peak hour will normally be treated as intersections for the purposes of access safety. As indicated above, the traffic generation of the proposed Service Centre exceeds this threshold and thus the site accesses need to be designed as intersections.

The concept layout of the proposed site accesses on SH1 and of the consented and proposed Service Centre accesses on SH15A are included in **Attachment 1**. The plans show the critical dimensions of the intersection designs and the relevant tracking paths for the design vehicles expected to utilise the accesses.

4.4.1 State Highway 1

The proposed site entry from SH1 is illustrated in drawings 17101-G-(7), (8), (9) and (10) in **Attachment 1**. As only southbound vehicle movements into the site will be permitted via a slip lane, the access is not proposed to be designed to the same standards as the SH15A access. The key requirement for a slip lane type access is set out in Table 5.2 of Austroads Guide to Road Design Part 4A: 2017. The key dimensions for a diverging slip lane are the diverge length and length of the slip lane to enable vehicles to slow.

For an operating speed of 100 km/h, a diverge taper length of 67 metres and total lane length including taper of 217 metres is required. The proposal provides a 67m diverge taper and a total lane length including taper of 285 metres and thus exceeds this requirement.

The proposed slip lane entry point is expected to connect with SH1 immediately north of the intersection with Prescott Road. To prohibit right turn movements into the slip lane from northbound traffic movements and those from Prescott Road, a central median island is proposed on SH1 integrated into the Prescott Road intersection. Full turning movements at the Prescott Road intersection are maintained.

Site access Option 3 would also provide a left turn site exit onto SH1 which would be located some 200 metres from both the Prescott Road intersection and the SH15A roundabout. As illustrated in drawing 17101-G_2-7, and drawings 17101-G_2-7-(1), (2), (3) and (4) in **Attachment 1**, this will be a priority-controlled intersection designed to accommodate a 19.45-metre-long semi-trailer. To prohibit right turn movements from the site exit a central median island is proposed on SH1 integrated into the traffic island on the approach to the roundabout intersection with SH15A.

4.4.2 State Highway 15A Site

It was originally proposed to provide a seagull intersection for site access on SH15A with a downstream merge for westbound traffic turning right out from the site. Because of WK – NZTA concerns raised with these provisions (as set out in Section **Error! Reference source not found.**) this was modified to a seagull intersection with two lanes maintained downstream to the SH1 roundabout.

On the recommendation of WK- NZTA, an independent road safety audit of the proposed access arrangements was undertaken by Stantec. The road safety audit report, together with designer responses, is included as **Attachment 3** to this report. Because of concerns raised in Section 2.3 of that independent road safety audit, a seagull intersection is no longer proposed.

Instead, three revised access options are proposed. Access Option 1 provides a standard right turn bay and allows for all movements at the SH15A site access. Access Option 2 prohibits the right turn into the site from SH15A but maintains all other movements. Access Option 3 only allows left turns into and out from the site access on SH15A, but adds a left turn exit from the site onto SH1. (Option 3 is suggested in Section 2.3.3 of the road safety audit report.)

Figure A10 of Austroads Guide to Road Design Part 4: Intersections and Crossings – General provides warrants for turn treatments on major roads at unsignalised intersections as a function of the peak hour traffic volume on the major road and the side road turning volume.

Based on the forecast peak hour traffic volumes for the proposed Service Centre, the SH15A access warrants a right turn bay treatment (CHR) and a rural left turn treatment (AUL). However

due to the possibility of vehicles using a left turn auxiliary lane obscuring the visibility of through traffic, WK - NZTA does not favour full left turn auxiliary lanes. It is therefore proposed to provide a basic left turn treatment (BAL) at the Service Centre access on SH15A for all three access options.

Austrroads provides the dimensional requirements for the lane treatments, although the diverge and merge taper lengths of rural right turn bays in New Zealand follow the requirements of Figure 3.25 of the New Zealand Manual of Traffic Signs and Markings (MoTSaM), with no distinction between the short and full right turn bay treatments. The SH15A Option 1 access layout has been designed on this basis and meet these requirements.

The geometric requirements for the Service Centre SH15A accesses (intersections), based on the measured 85th percentile vehicle speeds, are set out in **Table 3**.

Table 3: Geometric Requirements for the Service Centre SH15A Intersection

Component	Direction	Design Speed	Dimensional Requirement	Source
Acceleration Lane from consented Service Centre egress	Westbound	80 km/h	235 metres (including taper)	Table 5.5, AGRD Part 4A: Unsignalised and Signalised Intersections
Merge taper from consented Service Centre egress	Westbound	80 km/h	80 metres	Table 5.5, AGRD Part 4A: Unsignalised and Signalised Intersections
Separation between end of merge from consented Service Centre and start of right turn diverge taper for proposed development access right turn bay	Westbound	80 km/h	55.5 metres (2.5 seconds travel time)	Minimum reaction time to perceive and react to a particular stimulus and take appropriate action at high-speed rural intersections as per Table 5.2 of AGRD Part 3: Geometric Design
Proposed development access right turn bay, diverge taper (Option 1 only)	Westbound	80 km/h	130 metres	Figure 3.25 NZ Manual of Traffic Signs and Markings
Acceleration Lane from proposed development egress (Option 1 only)	Westbound	80 km/h	130 metres	Figure 3.25 NZ Manual of Traffic Signs and Markings
Proposed development access length of widened shoulder for rural BAL left turn treatment (all options)	Eastbound	80 km/h	15 metres	Table 8.1, AGRD Part 4A: Unsignalised and Signalised Intersections
Proposed development access taper length for rural BAL left turn treatment (all options)	Eastbound	80 km/h	22 metres	Figure 8.2, AGRD Part 4A: Unsignalised and Signalised Intersections

4.4.3 Acceleration and Merge from Consented Service Centre onto SH15A

While the consent for the Service Centre located to the east on SH15A indicated that providing a site access in the form of a seagull intersection as depicted in **Figure 6** would be an acceptable solution for that consented development, it is necessary to refine the access arrangements westbound to the west of the consented development to accommodate the current proposal.

The proposed configuration for the acceleration and merge from the consented Service Centre on SH15A is illustrated in drawings 17101-G2-(14) and (15) in **Attachment 1**. (We have not shown any changes to the left turn auxiliary lane into the consented development as shown in **Figure 6**, however we note that due to the possibility of vehicles using a left turn auxiliary lane obscuring the visibility of through traffic, WK - NZTA does not favour full left turn auxiliary lanes and may revisit this provision.)

Austrroads Guide to Road Design Part 4: Intersections and Crossings – General indicates that the length of the acceleration lane for the merge into the main carriageway should allow for an adequate distance for acceleration, plus an observation time of 3 sec to 5 sec at the operating speed of the major road, plus a taper. At a design speed of 80 km/h this would represent an acceleration lane length of 235 metres including an 80-metre taper, plus 90 metres to provide 4 seconds of observation time. However, the distance between the consented and proposed Service Centres (470 metres) would not allow room for this plus a 130 metre diverge taper for the right turn bay into the proposed development and 70 metres for the right turn bay itself, let alone provide any separation between the merge from the consented Service Centre and the start of the diverge taper for the proposed Service Centre.

The proposal therefore provides a shorter acceleration lane and omits the separate observation time of 3 sec to 5 sec after the acceleration and before the merge taper.

The 200-metre length of acceleration lane proposed would provide for a merge speed of 75 km/h entering a traffic stream of vehicles currently travelling at 80 km/h. Section 5.3.2 of Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections advises that “in some situations where the site is constrained and the volume in the through lane is low it may be acceptable to design for a speed decrement of 20 km/h within the merge area (i.e., a merging vehicle travelling at 80 km/h enters a traffic stream of vehicles travelling at 100 km/h)”. In the access design a speed decrement of 5 km/h is proposed. While the volume of merging traffic will not be low, once the consented Service Centre is in place, the roadside development and presence of the seagull intersection are expected to reduce the 85th percentile speed westbound so that any speed decrement at the merge would be negligible.

Drivers in the acceleration lane will be able to observe potentially conflicting vehicles and prepare to merge while accelerating, as they normally do in acceleration lanes for cars (refer Section 5.3 of Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections). Thus, it is considered that the omission of the separate observation time of 3 sec to 5 sec after the acceleration lane and before the merge taper from the consented Service Centre is acceptable.

4.4.4 Access Option 1 – Right Turn Bay on SH15A

Access Option 1 is illustrated in drawings 17101-G2-2-(0), (1), (2) and (3) in **Attachment 1**. This access option comprises a standard right turn bay providing for all movements at the site access on SH15A. Using a reaction time of 2.5 seconds and a coefficient of friction of 0.36, as per Table 3.2 of Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2021) the required Safe Intersection Sight Distance to the east from the site egress on SH15A for a design speed of 80 km/h is 192 metres. 200 metres of sight distance has been provided by moving forward the stop line on the Service Centre egress by adjusting the alignment of SH15A.

As shown in drawings 17101-G2-2-(1) and (2), providing a merge taper as per MoTSaM for a design speed of 80 km/h will mean the 130m merge taper ending some 85 metres from the SH1 roundabout limit line.

It should be noted that westbound vehicles on SH15A need to slow down as they approach the roundabout and thus 80km/h speeds will not be retained throughout the approach to the SH1/SH15 intersection. Thus a 130-metre merge taper is longer than it needs to be. Nevertheless, with a 130-metre merge taper and assuming vehicle speeds at the end of the merge are 50km/h and the entry speed to the roundabout is 30 km/h, the travel time from the end of the merge to the limit line would be over 7.5 seconds. This is an ample time for motorists, having completed the merge, to decide what action to take at the roundabout.

4.4.5 Access Option 2 – No Right Turn Entry from SH15A

Access Option 2 is illustrated in drawings 17101-G2-4-(0), (1) and (2) in **Attachment 1**. This access option retains a right turn out from the site onto SH15A but uses traffic islands to prevent the right turn into the site from SH15A. Westbound traffic on SH15A can continue to access the Service Centre by going completely around the roundabout and then turning left into the site.

4.4.6 Access Option 3 – Left-In and Left-Out Arrangement on SH15A

Access Option 3 would provide for only left turns into and out from the site on both SH1 and SH15A. Right turns at the site accesses are prevented by solid median islands. The access layout on SH15A for this access option is illustrated in drawings 17101-G2-3-(0), (1), (2) and (3) in **Attachment 1**.

This access option would require modifications to the internal vehicle circulation layout of the site, which is illustrated in Section 6.1.

5.0 SAFETY ASSESSMENT OF THE PROPOSED ACCESS POINTS

Appendix 5B of the WK - NZTA Planning Policy Manual sets out the Authority's safety standards for accessways onto State Highways as follows:

- General Accessway Safety Considerations;
- Sight Distances;
- Accessway Spacing Standards;
- Accessway Geometric Design Diagrams;
- Trip Generation Rates;
- Accident Effects of Accessways; and
- Checklist of Techniques to Reduce Adverse Safety Impacts.

In considering each of these standards, the following points are noted:

- a) In terms of access to the Service Centre site, it is not possible for access to the site to be provided from a local road rather than directly from the state highway.
- b) The proposed access arrangements will comply with the appropriate standards for sight distance;
- c) All vehicle movements to and from the site will be in a forward direction;
- d) The safety record of the highway in the vicinity of the site suggests a traffic safety problem with respect to rear-end collisions. As such, the site entries have been designed to reduce the potential for rear-end collisions;
- e) The safety record does not indicate any safety issue associated with the existing Service Centre on the western side of SH1;
- f) The safety needs of cyclists will continue to be provided for by the provision of road shoulders on both sides of the highway separated from the through traffic lanes.
- g) No significant levels of pedestrian movement are anticipated, due to the rural location of the site;
- h) It is considered that the location of the accessways onto the state highways have been optimised for the site;
- i) The site access into the site from SH1 is proposed to be a one-way southbound slip lane entrance. It will not generate any right turn movements, nor will it require any vehicles to slow down on the highway. While the proposed site accessway on SH1 technically does not comply with WK - NZTA accessway spacing standards, an independent road safety audit did not raise any issues with this proposed southbound slip lane in relation to the safe operation of SH1, and thus it is not anticipated to have any adverse effect on the safety or operation of the highway;

- j) The site egress onto SH1 for access Option 3 would be located some 200 metres from both the Prescott Road intersection and the SH15A roundabout. While this is less than the minimum spacing requirements for intersections recommended in WK - NZTA's guidelines, this option was recommended for consideration by the independent road safety audit of proposed access arrangements. The road safety auditors advised that "while the reasoning for spacing requirements between normal T-intersections is reasonable, the same reasoning may not necessarily apply to roundabouts where everyone has to slow down to negotiate the intersection, i.e., there is no high speed through traffic passing through both intersections";
- k) The proposed access onto SH15A is located more than 200 metres to the east of the SH1 and SH15A intersection. The access will be more than 100 metres from the nearest adjacent property accessway onto SH15A meeting the minimum spacing requirements for access and complying with WK - NZTA's guidelines;
- l) An independent road safety audit did not raise any issues with the proposed configuration of the acceleration and merge from the consented Service Centre onto State Highway 15A; and
- m) The three options for site access on SH15A have been designed in accordance with the relevant provisions of the NZ Manual of Traffic Signs and Markings and Austroads standards for geometric design.

Overall, it is considered that the traffic planning effects of the proposed road access for the Service Centre can be accommodated on the road network (with the proposed improvements) without compromise to its function, capacity, or safety.

6.0 INTERNAL SITE LAYOUT AND ASSESSMENT

6.1 Proposed Site Layout

Figure 9 below illustrates the proposed site layout for the Service Centre under access Options 1 and 2.

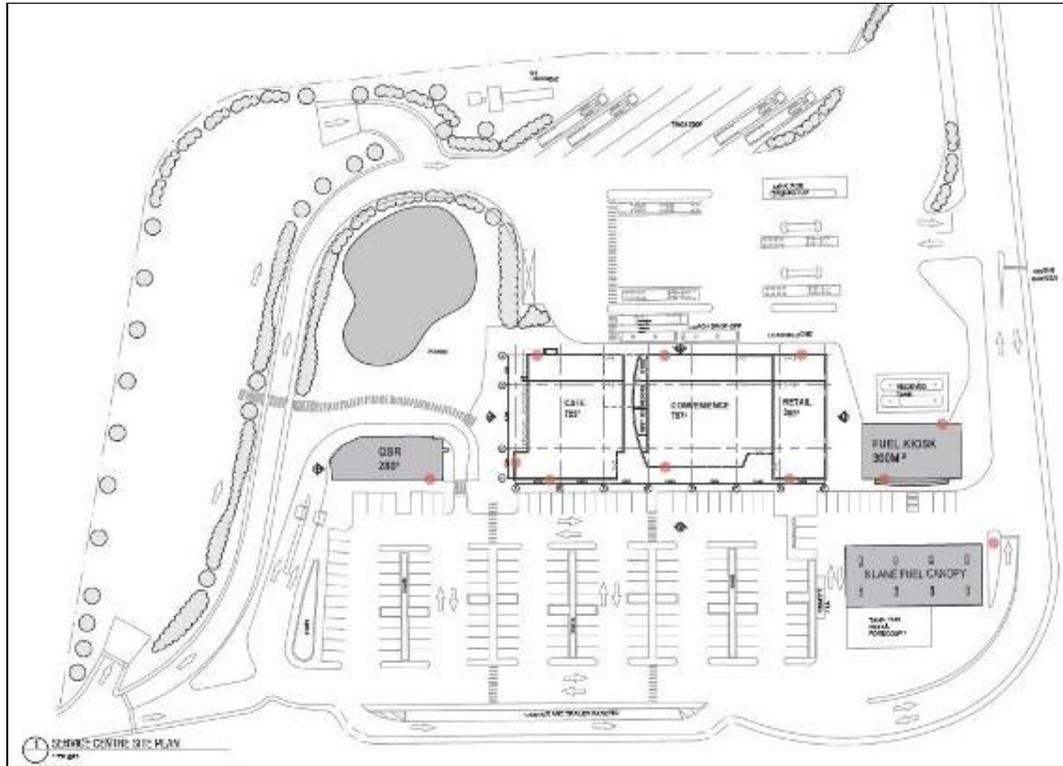


Figure 9: Proposed Option 1 and 2 Site Layout

Image Source: Buchan

All retail activities (including food and beverage) will be located along the 'central axle' of the site. From the north to south, they will be a fast-food restaurant and its associated drive-through facilities, café, convenience shop, general retail area, and fuelling kiosk. The fuel station will be in the southwest corner of the site with the balance of the site being used for parking and circulation.

All light vehicle circulation and parking will be in the western portion of the site, including some along the shop frontages, while all heavy vehicle parking and circulation including bus drop off and truck loading areas will be in the eastern portion of the site. In addition, a picnic area will be provided in the northern portion of the site.

Within the site, a network of internal circulating lanes will be constructed to service all proposed activities. Traffic will be permitted to enter the site from proposed access points on both SH1 and SH15A. For access Options 1 and 2 exit is only permitted via the access point onto SH15A, while for access Option 3 a left turn exit onto SH1 would also be provided.

It is proposed to integrate the vehicle access for the residential dwelling (No. 39 SH15A) within the site such that their existing access onto SH15A will be removed. A network of pedestrian footpaths will also be provided within the site connecting all activities.

In total, 151 car parking spaces and 8 truck parking spaces will be formed within the site. The coach drop-off area will be able to accommodate two coaches at the same time. In addition, a loading zone will be provided at the back of the retail building.

The proposed internal site layout for access Option 3 is illustrated in **Figure 10**.

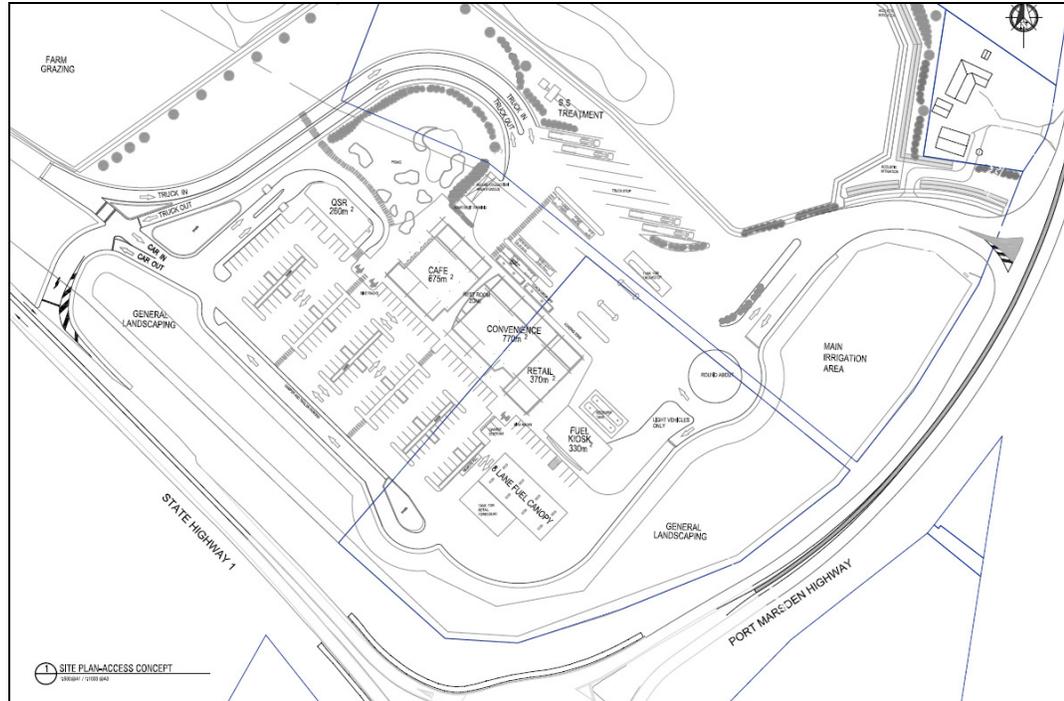


Figure 10: Proposed Option 3 Site Layout

Image Source: Buchan

The layout is like that for access Options 1 and 2, except that all light vehicles will need to exit the site onto SH1. Also, because heavy vehicles would no longer be able to turn right onto SH15A to access the SH1/SH15A roundabout, a roundabout is provided within the southern part of the site to assist trucks to turn around use the left turn exit onto SH1 if they wish to continue travelling north or south on SH1.

6.2 Vehicle Access Assessment

Within the site, a network of internal accessways will be constructed to service all proposed activities. The one-way entry road from SH1 will be formed with a constant width of 7.0 metres. At the access point on SH15A, the accessway will have two exit lanes (a dedicated left-turn and a right-turn lane) and one entry lane. Under access Options 1 and 2, the access point will be 18.3 metres wide at the site boundary.

As mentioned earlier, it is proposed to integrate the vehicle access for the residential dwelling (No. 39 SH15A) within the site such that their existing access onto SH15A will be removed. As a result, the access for the development will be more than 100 metres from any other access. Therefore, the proposed access onto SH15A will comply with the minimum separation standards of the WK - NZTA Planning Policy Manual.

Within the site, the main accessways will be constructed to be at least 8.0 metres wide, providing two-way traffic flow. One-way operation is proposed for the site access from SH1, and the accessways for the drive-through of the restaurant and for the camper and trailer parking area. One-way accessways will be typically 4.0 metres wide, with a minimum width of 3.0 metres.

The accessways will be typically formed on gradients no steeper than 1 in 20 (5%). This gradient is considered suitable for the anticipated use.

Sight lines and speeds are expected to be suitable so as not to create unsafe conditions for the interaction of vehicle and pedestrian activities within the site.

6.3 Parking Assessment

The proposal includes the provision of 151 light vehicle parking spaces within the site, including nine accessible parking spaces (five required). Although the parking allocation to each activity is yet to be confirmed, it is anticipated that the proposed parking is to be shared by all activities within the site.

All these parking spaces will be formed, drained, and set out as angled (90°) parking spaces. They will be typically 2.6 metres wide and 5.0 metres deep with 0.4-metre overhang after the kerb. All parking spaces will be provided with a minimum manoeuvring space of 7.0 metres. The proposed mobility parking spaces will have a functional width of 3.5 metres (including an access aisle) for accessible use.

Parking and manoeuvring will be typically formed on flat gradients with a gradient no steeper than 1 in 20 (5%). The accessible parking spaces will be formed with a gradient no steeper than 1 in 33 (3%). These gradients are considered suitable for the anticipated use.

At each parking space, an 85th percentile vehicle will be able to enter and leave the site in a forward direction.

6.4 Bus Drop Off and Truck Stop

Bus drop off and truck stop areas will be in the eastern portion of the site. The site has been designed to accommodate parking for up to two coaches and 8 semi-trailers or B-train trucks. As illustrated by tracking in **Attachment 2**, tour coaches and articulated trucks can enter the site, circulate, and leave the site in a forward direction.

6.5 Deliveries and Servicing

Typical tracking curves for a large fuel delivery tanker accessing the site are illustrated in **Attachment 2**. Fuel tankers will be typically entering from SH15A and leaving the site from the same access point onto SH15A, however **Attachment 2** also demonstrates that tankers can

access the site from SH1 and leave via SH15A if required. The remote fill points are in the outer fuelling lane on the forecourt, where the delivery vehicle can stop to discharge fuel in a position that is completely clear of the entry crossing and the main areas of the forecourt.

The loading zone will be located at the back of the retail building and the truck activities are expected not to interact with other general traffic within the site. As illustrated by tracking in **Attachment 2**, trucks can enter the site, access the loading zone and leave in a forward direction.

Overall, it is considered that the design is adequate to meet the needs of the truck activity associated with the new Service Centre development.

6.6 Construction Effects

The need to introduce truck and other vehicle movements during the construction phases of any development always has a potential to impact on the surrounding area and road network, but a certain degree of impact for what is normally a relatively short period of time (at least in the context of the life of the proposed development) is inevitable and should not normally be a reason for restricting development.

What is important however is that measures must be put in place to minimise the potential impacts of construction traffic, and this is generally achieved through the requirement for a construction traffic management plan to be prepared and approved prior to work commencing. Where necessary this seeks to control the times of construction traffic (e.g., avoiding peak periods), routes used, and other matters to minimise any potential construction traffic impact on SH1 and SH15A and neighbouring properties. It is recommended that a construction traffic management plan should be required as a condition of resource consent.

7.0 RESPONSE TO WK - NZTA COMMENTS

7.1 WK - NZTA Comments of November 2018

Waka Kotahi - New Zealand Transport Agency was asked to provide input on the Service Centre proposal in November 2018. The Agency's response indicated that they did not support the proposal for a Service Centre at this location. The reasons for not supporting the proposal and our responses to them are set out in **Table 4** below.

Table 4: Responses to WK - NZTA Concerns of November 2018

WK - NZTA Concern	Response
The proposed location for this development is in a 100km/hr section of the State Highway and is not suitable for potentially unsafe pedestrian and vehicle conflict situations generated by an expansion of Service Centre style activities to both sides of the roundabout. (Fuel stops, food coffee etc potential pedestrian / vehicle trips across the highway etc.)	The site access arrangements have been designed to minimise the potential for unsafe vehicle conflict situations. There is no obvious reason why pedestrians would wish to walk between the existing Service Centre and the proposed Service Centre, however it is proposed that a fence be constructed along the site boundary between the two site access points, meaning that a person would need to walk 500 metres or more through the site and along the highway to get from one Service Centre to the other.
The SH1/15 route is identified as a nationally strategic route for freight vehicles and the proposed development at the intersection of these two main state highways has the potential to interfere with the safe and efficient operation of this strategic route.	The site access arrangements have been designed to ensure that there will be negligible effect on the safe and efficient operation of the highways in this location. Priority is still provided to the through vehicle movements on both these routes and therefore we do not anticipate any reduction in the level of service.
Expansion of the facilities and potential for agglomeration of other activities in this location has the potential to accentuate traffic conflict risks associated with increased vehicular, pedestrian and cycling traffic drawn to this location. (e.g. pedestrian / cycle / car movement across the State Highway)	Service Centres are generally used by traffic that is passing the site anyway. There would be minimal increased vehicular, pedestrian and cycling traffic drawn to this location. Also, as described above, the site access arrangements and fencing will minimise the potential for any unsafe vehicle or pedestrian conflict situations.
There also would be potential pressure for the Transport Agency to reduce speed over time due to the demand for expanded and intensified Service Centre facilities in this location. Again, this is not desirable from an efficiency point of view for this National Strategic Route.	The proposal would replace an existing farm access on SH1 with a southbound ramp into the site in a new location. The proposal would replace a farm access on SH15A with an intersection. The site access on SH15A is within an area where speeds are already controlled by the curve in the road and the proximity to the SH1 roundabout. There is no reason that these proposals would create any pressure for the Transport Agency to reduce speed over time.

WK - NZTA Concern	Response
<p>An on and off ramp to and from the SH1 was considered and rejected for the reasons given above.</p>	<p>The proposal has been modified so that there is only a southbound offramp into the site now proposed on SH1.</p> <p>An onramp from the site onto SH1 is no longer proposed. Site access Option 3 would provide a give-way controlled left-turn only site exit onto SH1.</p> <p>As explained above, the proposed site access arrangements and fencing would mean that the potential for unsafe pedestrian and vehicle conflict, interference with the safe and efficient operation of the State Highways, or pressure for the Transport Agency to reduce speed over time is negligible.</p>
<p>An exit only from SH1 was also considered, however, heavy vehicles right turning onto SH15 is an issue as this is in direct conflict with the National Strategic Route to Port Marsden. This impedes freight efficiencies and introduces traffic effects that compromises the priority freight route.</p>	<p>The site access on SH15A is within an area where speeds are already controlled by the curve in the road and the proximity to the SH1 roundabout, and thus heavy vehicles turning right onto SH15A will not impede freight efficiencies or introduce traffic effects that compromise the priority freight route. Nevertheless, access Option 3 would exclude any vehicles turning right onto SH15A.</p>
<p>A Service Centre that has local road access would be the most preferable option.</p>	<p>The crash history at the Prescott Road intersection includes a fatal crash and two non-injury crashes in a five-year period involving traffic turning to and from a side road with a low traffic volume. A Service Centre on a local road off SH1 would increase the frequency of traffic turning on and off the highway at the local road intersection with the highway.</p> <p>The proposed Service Centre is a far safer option to cater for traffic on SH1.</p>
<p>Re-zoning of the land to a specific "Service Centre" zone was also discussed as a potential option for controlling the types of activities that the Transport Agency would be more satisfied with (as opposed to a resource consent which could then be later varied- and permitted baseline argument used). However, regardless of the planning mechanism pursued, ultimately as far as the NZ Transport agency is concerned; a Service Centre in this location is not considered to be appropriate as it would compromise the safety and efficiency of SH1/15 as a National Strategic Route for freight.</p>	<p>As explained above and elsewhere within this traffic assessment, the proposed Service Centre would not compromise the safety and efficiency of SH1/15A as a National Strategic Route for freight.</p>

7.1 WK - NZTA Comments of October 2020

WK - NZTA was asked to provide input on a revised Service Centre access proposal in October 2020. The Agency's response indicated that they still did not support the proposal for a Service Centre at this location. Their comments on the proposal and our responses to them are set out in **Table 5** below.

Table 5: Responses to WK-NZTA Comments of October 2020

WK - NZTA Comments	Response
<p>SH15 access</p> <p>1. Left turn auxiliary lane may block visibility for right turns out</p>	<p>A left turn auxiliary lane is no longer proposed for the SH15A access to the proposed Service Centre. Instead, a basic rural left turn treatment is proposed. This was incorporated into the plans submitted for Road Safety Audit and no concerns regarding this revised left turn provision were raised.</p>
<p>2. Seagull arrangement may not be safe, applicant should consider and comment on the safety concerns of WK - NZTA research report 644 and Austroads Part 4 and Part 6 within their Transport Assessment Report (TAR), including aspects related to speed environment and location on a horizontal curve.</p>	<p>A seagull intersection on SH15A is no longer proposed.</p>
<p>3. Deceleration and acceleration/merge distance for right turn out may not comply with Austroads requirements.</p> <p>(a) Section 2.1.2 of the ITA identifies the 85th percentile speed as 75 km/hr EB and 80 km/hr WB, however Section 3.4 of the ITA uses 50km/hr as the design speed for the acceleration lane/merge taper? Austroads Part 4A Table 5:2 indicates a deceleration length of around 150m? Merge lane uses 50km/hr, might be too low?</p> <p>(b) Need to consider differential speed between trucks turning right and through traffic on SH15A given the higher proportion of truck movements from the site.</p>	<p>(a) All revised access options that provide a westbound diverge are designed with a 130m taper length which complies with taper lengths specified in MoTSaM for an 80km/h design speed. Revised access Option 1 is the only revised access option that requires a westbound merge taper. It has been provided with a 130m merge taper as per MoTSaM for an 80km/h design speed, however see Section 4.4.4 of this report.</p> <p>(b) As indicated in Section 4.1 of this TIA report, we expect the proportion of heavy vehicle traffic to the Service Centre will be similar to the proportion of SH traffic that is heavy vehicles. The southbound access into the site from SH1 is accommodated by a ramp with no need for trucks to slow within the through traffic lane, and all other site access movements occur in locations on the highways where traffic is already slowing for the SH1/SH15A intersection.</p>
<p>4. Per PPM Appendix 5B.3 the accessway should be considered as an intersection rather than a vehicle crossing, as it has more than 20 veh/hr. The TAR incorrectly uses Table APP 5B/3, which only applies to lower volume vehicle crossings. Spacing for low volume vehicle crossings is 200m, spacing for intersections is at WK - NZTA discretion, per PPM Chapter 3.5.5.2. TAR should respond to key considerations listed in Chapter 3.5.5.2.</p>	<p>Chapter 3.5.5.2 advises that WK - NZTA will determine intersection spacing on state highways on a case-by case basis, following an assessment of criteria including:</p> <ul style="list-style-type: none"> • key transport outcomes from growth strategies and WK - NZTA's strategic studies; • the state highway category; • anticipated safety issues on the state highway and connecting local road(s); and • anticipated project costs, available funding options and affordability. <p>It is considered that the proposed access on SH15A will not compromise the efficiency of SH15A as a National Strategic Route for freight. The Road Safety Audit does not raise any concerns regarding the proposed intersection spacings on SH15A, and the project will be at no cost to WK – NZTA.</p>
<p>5. Concern about the limited spacing from the consented development to the east (master plan for the</p>	<p>The proposal has been modified to include access arrangements for the consented Service Centre on SH15A to the east. An independent Road Safety Audit did not raise</p>

WK - NZTA Comments	Response
neighbouring site is attached for applicants' information).	any concerns with the spacing from the consented development to the east.
6. Concern about the limited distance from the end of the right turn merge to the SH1/SH15 intersection.	The only revised access that still requires a westbound merge taper is Option 1. The proximity of the end of the right turn merge to the SH1/SH15 intersection is discussed further in Section 4.4.4 of this report.
<p>SH1 access</p> <p>1. Per PPM Appendix 5B.3 the accessway should be considered as an intersection rather than a vehicle crossing, as it has more than 20 veh/hr. The TAR incorrectly uses Table APP 5B/3, which only applies to lower volume vehicle crossings. Spacing for low volume vehicle crossings is 500m (SH1 has more than 10,000 vpd), spacing for intersections is at WK - NZTA discretion, per PPM Chapter 3.5.5.2. Spacing from Prescott Road is minimal. WK not supportive of the limited spacing from SH1/SH15 intersection or existing vehicle crossings to the north.</p>	<p>The proposal would provide a southbound offramp only on SH1 in the vicinity of Prescott Road. The Road Safety Audit did not raise any concerns regarding the proposed intersection spacings on SH1 and it is considered that this provision would have no effects on the safety, capacity or strategic function of SH1, or on the Prescott Road intersection.</p> <p>The proposed site egress onto SH1 for access Option 3 would be located some 200 metres from both the Prescott Road intersection and the SH15A roundabout. While this is less than the minimum spacing requirements for intersections recommended in WK - NZTA's guidelines, this option was actually recommended by the independent Road Safety Audit which advised that "while the reasoning for spacing requirements between normal T-intersections is reasonable, the same reasoning may not necessarily apply to roundabouts where everyone has to slow down to negotiate the intersection, i.e., there is no high speed through traffic passing through both intersections".</p>
2. Deceleration lane, parallel to SH1, is required. This may affect the existing driveway to the north.	<p>A deceleration lane parallel to the highway is undesirable as it might create the potential for U-turns on the highway. The proposed exit ramp layout for southbound access off SH1 is based on Figure 2.13 of MoTSaM. which Section 2.4.8 of MoTSaM advises is "the layout and signing for a typical Service Centre exit." This is the same layout used at:</p> <ul style="list-style-type: none"> • The northbound access to the Service Centre on SH1 in Dairy Flat, and • The southbound access to the Papakura Service Centre on SH1. <p>Neither of these has a deceleration lane parallel to the highway, as adequate deceleration distance is provided on the entry ramp itself.</p> <p>The northbound access to the Mill Road Service Centre on SH1, Bombay and the northbound access to the existing Ruakaka Service Centre have deceleration lanes parallel to the highway because they do not have adequate deceleration distance within the entry ramps to the sites.</p> <p>The Road Safety Audit did not raise any concerns regarding the proposed exit ramp layout for southbound access off SH1.</p>

WK - NZTA Comments	Response
<p>Further information requests</p> <p>1. Recommend that an independent Road Safety Audit is commissioned by the applicant, once comments above have been considered. The RSA should be part of the matters assessed during consent as its findings may fundamentally affect the proposed access points for the development, this would be very difficult to address post consent approval.</p>	<p>A Road Safety Audit has been undertaken by the road safety auditors suggested by WK – NZTA. The Road Safety Audit did not raise any concerns with:</p> <ul style="list-style-type: none"> • The basic rural left turn treatment into the site access on SH15A (plan 17101-G2-(12)). • The provisions for the consented development to the east (plans 17101-G2-(14) and (15)). • The proposed exit ramp layout for southbound access off SH1 (plans 17101-G-(7), (8), (9) and (10)). <p>The road safety audit raised concerns with the previously proposed seagull intersection on SH15A which is no longer proposed. The audit also recommended consideration of proving for only left turns into and out from the site from SH1 and SH15A. This has been included as access Option 3.</p> <p>The only road safety audit recommendation that has not been adopted is the provision of footpaths connecting to the proposed Service Centre and pedestrian crossing points. Such provisions may have unintended safety consequences, viz. that such facilities encourage passing motorists, who would otherwise drive into the site, to park on the State Highway shoulder opposite the Service Centre instead and use the footpaths and crossing points to cross the highway to the Service Centre and back again. It is proposed that a fence be constructed along the Service Centre site boundary between the two site access points, meaning that a person would need to walk 500 metres or more through the site and along the highway to walk between the proposed Ruakaka Service Centre and the existing GAS service station. Given the few people that would wish to travel between the two sites, and the potential adverse safety consequences, it would be most appropriate for anyone going from one site to the other to do so in a vehicle rather than walking.</p>
<p>2. Recommend that traffic modelling is undertaken to estimate the potential effects on the efficiency of SH1 and SH15. Suggested scope for TPC is as follows</p> <ol style="list-style-type: none"> (a) AIMSUN model (b) Include SH1/SH15 intersection and all legs (c) Include SH15/seagull plus necessary extent of SH15 to the east (may need to consider proposed development to the east, unless existing consent lapses) (d) Do not need to include SH1/slip lane access to the development (e) Key metrics sought are average delay and total delay to through movements on SH1 and SH15 	<p>Microsimulation modelling requires turning movement surveys during normal traffic conditions or WK – NZTA providing turning movement flow data, but due to current Covid restrictions on international visitors current traffic volumes are not representative. In any event, given the respective flows and current roundabout operation, the omission of the seagull intersection previously proposed, and the fact that all site exit movements occur on points in the highways where vehicles are already slowing for the SH1/SH15A intersection, we do not expect the effects on SH1 or SH15A to be noticeable and we do not believe microsimulation is now necessary.</p>

8.0 OPERATIVE WHANGAREI DISTRICT PLAN REQUIREMENTS

Within the Whangarei District Plan standards relating to parking, vehicle access, road construction and other transport considerations are provided within various sections. **Table 6** lists the relevant standards that apply to this development and comments on compliance. Where there is non-compliance, further assessment has been undertaken in Section 9.0 of this report.

Table 6: Transport Development Standards

Development Standard	Requirement/Details	Comment
47.2.1 Parking and Loading	<p>Defines the number of parking spaces required for new developments with reference to Appendix 6A;</p> <ul style="list-style-type: none"> For service stations and retail activities, one parking space per 45m² GFA is required. For restaurant, one parking space per 4 persons designed to be accommodated is required. Service station and restaurant each requires at least one loading bay for heavy vehicles. <p>Vehicles are not required to undertake more than one reverse manoeuvre when manoeuvring in or out of any required vehicle parking space or loading bay;</p> <p>Parking spaces and loading bays are not located on any access manoeuvring area or outdoor living court and they remain unobstructed at all times;</p> <p>Parking spaces and loading bays are located on the same site as the activity for which they are required; and</p> <p>All work is undertaken in accordance with the Engineering Performance Standards in Appendix 9.</p>	<p>The proposal includes 1,172 m² of retail activities, 1,003 m² of restaurant activities (no more than 100 seats) and 300 m² of service station associated kiosk. A minimum of 58 parking spaces are required. The proposal includes 151 parking spaces – complies</p> <p>The remote fill points are in the outer fuelling lane on the forecourt, where the delivery vehicle is able to stop to discharge fuel in a position that is completely clear of the entry crossing and the main areas of the forecourt – complies</p> <p>A loading area will be located at the back of the retail building, which is anticipated to be used for all retail and restaurant activities within the site – complies</p> <p>No additional manoeuvre is required when manoeuvring in or out of any proposed parking or loading spaces – complies</p> <p>All parking and loading spaces will located outside of access and manoeuvring areas – complies</p> <p>Parking and loading bays will be located on the same site as the proposed activities – complies</p> <p>All work will be undertaken in accordance with the Engineering Performance Standards in Appendix 9 – complies</p>

Development Standard	Requirement/Details	Comment
E27.7.2.2 Parking for the Disabled (Refer to Policy 22.4.9 approved Plan Change 96)	<p>Policy 22.4.9 Accessible Parking requires accessible parking to be provided for every activity in accordance with NZS 4121:2001 to increase access to the community for parking permit holders.</p> <p>Five accessible parking spaces are required for providing 151 parking space on-site.</p> <p>Each accessible parking space needs to have a minimum functional width of 3.5 metres.</p>	<p>Nine accessible parking spaces will be provided where five are required – complies</p> <p>Each accessible parking space will have a minimum functional width of 3.5 metres – complies</p>
47.2.4 On-Site Manoeuvring	Defines the conditions for which on-site manoeuvring must be provided.	All vehicles will be able to enter and exit the site in a forward direction – complies
E3.4.10 Vehicle Entrances	Defines the number and locations of vehicle entrances for new developments.	<p>No more than one vehicle entrance is proposed on each frontage – complies</p> <p>The design of the vehicle entrances and their distance from intersections has been assessed in terms of the State Highway criteria and discussed earlier in the report – does not apply</p>
ESS 3.4.11.1 Private Accessways	<p>Defines the geometric design requirements for private accessways.</p> <p>For the proposed activities in a rural zone, a minimum legal width of 10 metres and a minimum carriageway width of 6.0 metres should be provided.</p>	<p>The main corridor will be constructed to be at least 8.0 metres wide provide two-way traffic flow – complies</p> <p>The one-way accessways will be typically 4.0 metres wide, with a minimum width of 3.0 metres – does not comply</p>
ESS 3.4.11.3 Private Accessway Gradients	<p>Defines the minimum and maximum gradients for rural private accessways.</p> <p>The maximum gradient shall be:</p> <ul style="list-style-type: none"> • 12.5% for the first 5 metres from the road reserve boundary; • 22.2% for the remainder. 	The private accessways will be formed on relatively flat gradients no greater than 1 in 20 (5.0%) – complies
ESS 3.4.12 Traffic Control, Signage and Road Marking, Traffic Calming	Defines the requirements for providing road marking and signage.	The proposed road (access points) will be marked and signed according to the Manual of Traffic Signs and Markings and NZS 5414 – complies

Development Standard	Requirement/Details	Comment
<p>EES 3.4.18 Size of Parking Spaces</p>	<p>Defines the size, use, and location of parking spaces.</p> <ul style="list-style-type: none"> 90° parking spaces are required to be at least 5.4 metres deep (including no more than 0.6-metre overhang). The manoeuvring space (for casual users) should be no less than 6.6 metres for 2.6-metre-wide parking spaces. <p>The gradient for off-street parking spaces, loading bays and associated manoeuvring areas for all non-residential activities shall not be steeper than 1 in 16 for surfaces at 90° to the angle of parking.</p>	<p>The proposed 90° parking spaces will be 5.4 metres deep (including 0.4-metre overhang) and 2.6 metres wide with a minimum manoeuvring area of 7.0 metres – complies</p> <p>General parking will be formed on relatively flat gradients no greater than 1 in 20 (5%) – complies</p> <p>Accessible parking will be formed on relatively flat gradients no greater than 1 in 33 (3%) – complies</p>
<p>EES 3.4.19 Queuing Space Lengths</p>	<p>Defines the queue length at each proposed access point for the number of parking spaces proposed.</p> <p>A minimum queuing length of 50 metres should be provided at each entrance.</p>	<p>No barrier facilities will be constructed at or within 50 metres of the site entrance points – complies</p>

9.0 OPERATIVE WHANGAREI DISTRICT PLAN ASSESSMENT CRITERIA

The following provides an assessment of the respective effects due to non-compliance against either the rules outlined within the Operative Whangarei District Plan or the Environmental Engineering Standards. The following standard required additional assessment:

- ESS 3.4.11.1 – Private Accessways.

Comment – ESS 3.4.11.1 (Private Accessways):

The reason for consent under this standard relates to the width of the proposed private accessways serving the development. The proposed accessways has been designed to be conducive to a low-speed, traffic calmed environment. As such, the accessways have been designed in some locations with a 3.0-metre to 4.0-metre-wide carriageway, where the minimum required is 6.0 metres. The non-standard one-way accessways are located on the southbound site entry off SH1, where the drive-through facility for the restaurant is located and beside the camper and trailer parking area.

The proposed 3.0 metre to 4.0 metre accessway widths are considered acceptable for the following reasons:

- The accessways have been designed to accommodate one-way vehicle movements in a low-speed environment;
- The accessways are generally located away from pedestrian activities and parking areas, and therefore the interaction between vehicles and pedestrians is minimised;
- Where footpaths cross these accessways zebra crossings are provided;
- Sight lines and speeds are expected to be suitable so as not to create unsafe conditions for the interaction of vehicle and pedestrian activities within the site; and
- The accessway widths are sufficient to accommodate tracking of either an 85th percentile vehicle (including with a trailer) or a semi-trailer as appropriate, as illustrated in **Attachment 2**.

10.0 DECISION VERSION WHANGAREI DISTRICT PLAN REQUIREMENTS

The transport section of the Decision Version of the Whangarei District Plan also sets out rules for permitted activity status relating to parking, vehicle access, road construction and other transport considerations. **Table 6** lists these rules and comments on compliance. Where there is non-compliance, further assessment has been undertaken in Section 11.0 of this report.

Table 6: Transport Development Rules

Rule	Requirement/Details	Comment
TRA-R2 Required Parking Spaces and Dimensions	<p>Defines the car parking spaces, loading spaces, bicycle parking spaces, end-of-trip facilities and associated manoeuvring areas required for new developments with reference to TRA Appendix 1;</p> <ul style="list-style-type: none"> For service stations one parking space per 30m² GFA is required. For retail activities greater than 600m² GFA, one parking space per 60m² GFA is required. For restaurants, one parking space per 20m² GFA is required. NZS 4121:2001 requires 5 accessible parking spaces for 151 parking spaces on-site. Each accessible parking space needs to have a minimum functional width of 3.5 metres. Service stations, retail activities and restaurants each require one long stay bicycle parking space per 15 employees. Retail activities greater than 600m² GFA require one short stay bicycle parking space per 400 m² GFA. Restaurants require one short stay bicycle parking space per 350 m² GFA. Goods handling activities between 300m² and 5,000m² GFA require at least one loading bay for heavy vehicle. Developments with 5 or more long-stay bicycle parking spaces require at least 2 showers and 2 changing rooms to be provided on site. 90° parking spaces in short term high turnover parking areas are required to be at least 5.4 	<p>The proposal includes 1,172 m² of retail activities, 1,003 m² of restaurant activities and 300 m² of service station associated kiosk. A minimum of 80 parking spaces are required. The proposal includes 151 parking spaces – complies</p> <p>Nine accessible parking spaces will be provided where five are required – complies</p> <p>Each accessible parking space will have a minimum functional width of 3.5 metres – complies</p> <p>The proposal will include one long stay bicycle parking space per 15 employees – will comply</p> <p>The proposal includes 1,172 m² of retail activities and 1,003 m² of restaurant activities. A minimum of 6 short stay bicycle parking spaces are required. The proposal will include at least 6 short stay bicycle parking spaces – will comply</p> <p>A loading area will be located at the back of the retail building, which is anticipated to be used for all retail and restaurant activities within the site – complies</p> <p>The remote fill points are located in the outer fuelling lane on the forecourt – complies</p> <p>The proposal will employ less than 75 FTE employees and thus less than 5 long stay bicycle parking spaces are required. As such, no showers or changing rooms are required – complies</p> <p>The proposed 90° parking spaces will be 5.4 metres deep (including 0.4-metre overhang) and 2.6 metres wide with a minimum manoeuvring area of 7.0 metres – complies</p>

Rule	Requirement/Details	Comment
	metres deep (including no more than 0.6-metre overhang). The manoeuvring space should be no less than 6.6 metres for 2.6-metre-wide parking spaces.	
TRA-R3 Parking Location and Identification	<p>All car parking spaces and loading spaces must be:</p> <p>a. Not located on any footpath, access, manoeuvring or outdoor living court area.</p> <p>b. Not located within any Strategic Road Protection Area.</p> <p>c. Permanently marked or delineated, except where they are:</p> <p>i. Associated with a residential unit which is not part of a multi-unit development.</p> <p>ii. Associated with the loading area for the fuel delivery vehicle or car parking spaces at a pump of a service station.</p> <p>iii. Located in the Rural Production Zone, Natural Open Space Zone or Open Space Zone.</p>	<p>No parking or loading space will be located on any footpath, access, manoeuvring or outdoor living court area – complies</p> <p>No parking or loading space will be located within any Strategic Road Protection Area – complies</p> <p>Except for the loading area for fuel delivery and car parking spaces at the service station pumps, all parking and loading spaces will be permanently marked or delineated – complies</p>
TRA-R4 Parking Gradient	<p>All car parking spaces, loading spaces and associated manoeuvring areas must not have a gradient steeper than:</p> <p>a. 1 in 16 for surfaces at 900 to the angle of the parking.</p> <p>b. 1 in 20 for surfaces parallel to the angle of the parking.</p>	<p>General parking will be formed on relatively flat gradients no greater than 1 in 20 (5%) – complies</p>
TRA-R5 Design and Location of Vehicle Crossings and Access	<p>Defines the requirements for vehicle crossing and access are provision and construction with reference to TRA Appendix 2:</p> <ul style="list-style-type: none"> • Sites with frontage onto an arterial road shall not have more than one vehicle crossing • Where a site has frontage to more than one road, the vehicle entrance must be onto the road that has the lower class in the transport network hierarchy. • Where there is more than one road frontage, the frontage measurement will only apply to the road front approved for gaining entrance. • Service stations are permitted 	<p>The proposal includes a service station and therefore two vehicle crossings to the site are permitted. Two vehicle crossings to the site are proposed – complies</p> <p>The site has frontage to two roads, both of which have a National (High Volume) classification in the transport network hierarchy. As such, the requirement that the vehicle entrance must be onto the road that has the lower class in the transport network hierarchy does not apply</p> <p>The proposal requires vehicle access to State Highways 1 and 15A and approval for this access is being sought from the New Zealand Transport Agency – will comply</p> <p>The vehicle crossing onto SH1 is adjacent to the intersection of SH1 with Prescott Road – does not comply</p>

Rule	Requirement/Details	Comment
	<p>to provide two crossings per site.</p> <ul style="list-style-type: none"> • Vehicle access to all state highways is managed by the New Zealand Transport Agency under the Government Roadway Powers Act 1989 and access requires the approval of the New Zealand Transport Agency. • Vehicle crossings onto arterial roads with a speed limit over 50km/h must be a minimum distance of 180 metres from intersections • Vehicle crossings onto arterial roads with a speed limit over 50km/h must have a sight distance of at least 305 metres • The maximum change of grade for a breakover angle on any private access is 10% and the maximum change of grade for a departure angle on any private access is 17% • Prohibits structures within the approach sight triangles at level crossings with Give Way signs. <p>Indicates that vehicle crossings fronting a state highway do not have permitted activity status.</p> <p>Requires any unused vehicle crossings to be reinstated to match the existing footpath and kerbing.</p> <p>Requires that vehicle or pedestrian crossings must not be over a railway corridor.</p>	<p>The vehicle crossing onto SH15A is some 240 metres distance from the nearest intersection (the intersection of SH1 and SH15A – complies</p> <p>The vehicle crossing onto SH1 has open visibility – complies</p> <p>The vehicle crossing onto SH15A has 230 metres sight distance to the west and 200 metres visibility to the east - does not comply</p> <p>The change of grade for a breakover angle on all accesses will be less than 10% and the change of grade for a departure angle on all access will be less than 17% – complies</p> <p>No structures are proposed within the approach sight triangles of any crossing with Give Way signs – complies</p> <p>Any unused vehicle crossings to be reinstated to match the existing footpath and kerbing – will comply</p> <p>No vehicle or pedestrian crossing will be over a railway corridor – complies</p>
TRA-R6 Setbacks of Vehicle Crossings	<p>Requires that all new vehicle crossings be located at least:</p> <ol style="list-style-type: none"> a. 30m from a railway level crossing. b. 8m from a dedicated pedestrian crossing facility (including pedestrian crossing, mid-block pedestrian signals, refuge islands and traffic signalled intersections). c. 2m from a separate vehicle crossing. 	<p>Neither vehicle crossing will be within 30m of a railway level crossing– complies</p> <p>Neither vehicle crossing will be within 8m of a dedicated pedestrian crossing facility– complies</p> <p>Both vehicle crossings will be more than 2m from any other separate vehicle crossing– complies</p>

Rule	Requirement/Details	Comment
TRA-R7 Requirements for On-Site Manoeuvring Space	Defines the conditions for which on-site manoeuvring must be provided.	All vehicles will be able to enter and exit the site in a forward direction – complies Vehicles occupying all car parking spaces and loading spaces will have ready access to the road at all times, without needing to move any other vehicles occupying other car parking spaces or loading spaces – complies Adequate room is provided on-site to ensure that vehicles using or waiting to use fuel dispensers, and vehicles waiting at the drive-through food ordering facilities do not queue into the adjoining road or obstruct entry to or exit from the site – complies Every car parking space will accommodate the 90th percentile car tracking curves in Figure TRA 1 so that only one reverse manoeuvre is required to manoeuvre in or out of it – complies Loading spaces will be accessible for the appropriate design vehicle as per NZTA guidelines: RTS 18: NZ on-road tracking curves for heavy vehicles (2007) and no reverse manoeuvre will be required to manoeuvre in or out of any loading space – complies
TRA-R8 Sealing and Formation Standards	Defines the Sealing and Formation Standards for crossings, access and parking areas	Vehicle crossings will be sealed to a standard not less than that of the adjoining road surface. – complies On-site access and parking areas (including loading and manoeuvring areas) will be formed, drained and sealed with a permanent all-weather surface – complies
TRA-R9 Setbacks for Strategic Road Protection Areas and Indicative Roads	Defines the required setbacks of structures from strategic road protection areas and indicative roads	Resource Area Planning Masp46R indicates that the site of the proposed development is not adjacent to any strategic road protection area or indicative road – does not apply
TRA-R10 Landscaping Within Parking Areas	Defines the landscaping requirements of uncovered ground level car parking areas in all zones except for the Heavy Industrial, Rural Production and Strategic Rural Industries zones	The site is within a Rural Production zone – does not apply
TRA-R11 Tree Planting Within Parking Areas	Defines the tree planting requirements of uncovered ground level car parking areas in all zones except for the Heavy Industrial, Rural Production and Strategic Rural Industries zones	The site is within a Rural Production zone – does not apply
TRA-R12	Requires that all non-residential	A minimum of 80 parking spaces are

Rule	Requirement/Details	Comment
Electric Vehicle Charging Station Parking Spaces	parking areas, with 50 or more required car parking spaces set aside space for at least 1 parking space for an electric vehicle charging station per every 50 required car parking spaces	required for the development, and parking space will be provided for 2 electric vehicle charging stations – will comply
TRA-R13 Subdivision	Sets transport requirements for subdivisions	No subdivision is proposed – does not apply
TRA-R14 Restricted Discretionary Integrated Transport Assessments	Requires an Integrated Transport Assessment to be prepared for certain subdivisions and for activities requiring an increase of more than 50 car parking spaces	The proposal requires a minimum of 80 parking spaces and thus an integrated transport assessment is required. This Traffic Impact Assessment report fulfils this requirement - complies
TRA-R15 Discretionary Integrated Transport Assessments	Requires an Integrated Transport Assessment to be prepared for certain subdivisions and for activities requiring an increase of more than 100 car parking spaces	The proposal requires a minimum of 80 parking spaces – does not apply
TRA-R16 Construction of Any New Public Road or Service Lane	Sets transport requirements for the construction of any new public road or service lane	The proposal does not include the construction of any new public road or service lane – does not apply
TRA-R17 Any Major Rooding Alteration to an Existing Public Road	Applies restricted discretionary status to any major alteration to an existing public road and sets out matters of discretion	The transport assessment for this proposal includes a description of the site characteristics, existing development, existing traffic conditions, traffic volumes and vehicle operating speeds, surrounding land uses, the proposed activity and its intensity and traffic generation, parking and roading layout plans, sight distance assessment and an assessment of the effects of the proposal on the safety and efficiency of the transport network - complies

11.0 DECISION VERSION WHANGAREI DISTRICT PLAN ASSESSMENT CRITERIA

The following provides an assessment of the respective effects due to non-compliance against the rules outlined within the Decision Version of the Whangarei District Plan. Two aspects of the proposal (the distance of the SH1 vehicle crossing from the nearest intersection, and the visibility available at the vehicle crossing on SH15A) require additional assessment under the following rule:

- TRA-R5 – Design and Location of Vehicle Crossings and Access

Comment – Distance of Vehicle Crossing from Intersection:

The reason for consent under this standard relates to the proposed vehicle crossing onto SH1 being less than the minimum distance of 180 metres from intersections required for vehicle crossings onto arterial roads with a speed limit over 50km/h. Normally vehicle crossings require a degree of separation from intersections so that there is adequate time for motorists to separately see, perceive and react to the crossing and the intersection and to vehicle movements associated with the crossing and intersection.

The proposed vehicle crossing on SH1 is expected to connect with SH1 immediately north of the intersection with Prescott Road. This vehicle crossing will only provide for left turn entry movements (via a slip lane). Right turn movements into the slip lane from northbound traffic on SH1 and traffic from Prescott Road will be prevented by the installation of a central median island on SH1 integrated into the Prescott Road intersection, as shown in the concept design drawings included in Attachment 1.

The slip lane into the site will provide adequate deceleration distance so that vehicles entering the site will not need to reduce speed on the highway. Traffic using the proposed slip lane to access the site will have no interaction with, and thus no effect on, any vehicle turning movement at the Prescott Road intersection. An independent Road Safety audit did not raise any issues with the proposed slip lane entry into the site. Thus, this non-compliance is not expected to have any effect on the safety and efficiency of the transport network.

Comment – SH15A Vehicle Crossing Sight Distances:

The reason for consent under this standard relates to the proposed vehicle crossing onto SH15A having less than the minimum sight distance of 305 metres required for vehicle crossings onto arterial roads with a speed limit of 100km/h as per Table TRA 8 of the Decision Version of the District Plan. The vehicle crossing onto SH15A has 230 metres sight distance to the west and 200 metres visibility to the east.

Footnote 3 of Table TRA 8 of the Decision Version of the District Plan suggests that “Arterial and regional road sight distances are calculated based upon Safe Intersection Sight Distance (SISD) with RT of 2 seconds” however the speed used for the calculation is not specified.

Section 3.2.2 of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2021) indicates that the speed to use for calculation of Safe Intersection Sight Distances is the operating (85th percentile) speed (km/h). Using vehicle operating speeds takes into account the fact that in some locations there may be a significant proportion of drivers exceeding the speed limit, and at other locations motorists will, because of the road

environment, decide to travel below the speed limit, and that this will affect the stopping distance required.

The proposed vehicle crossing on SH15A will be located 240 metres east of the roundabout at the SH1 / SH15A intersection. Eastbound motorists at the point where the vehicle crossing is proposed will still be accelerating after departing the roundabout, and westbound motorists will be slowing for the roundabout. Speed observations of unrestricted vehicles along SH15A were collected between 11:00 and 12:30 on Sunday 9th June 2019 and indicated that the 85th percentile eastbound speed is 75 km/h and westbound speed is 80 km/h.

On this basis, the Safe Intersection Sight Distances for a 2 second reaction time from the proposed vehicle crossing on SH15A is 166 metres to the west (visibility of eastbound vehicles) and 181 metres to the east (visibility of westbound vehicles). The available sight distance from the proposed vehicle crossing onto SH15A of 230 metres to the west and 200 metres to the east easily meet the Safe Intersection Sight Distance requirement.

Thus, this non-compliance is not expected to have any effect on the safety and efficiency of the transport network.

12.0 CONCLUSIONS

Based on the analyses described in this report, the following conclusions can be made in respect of the proposed Ruakaka Service Centre located on the northern corner of State Highway 1 and State Highway 15A:

- The proposed site tenancies may attract up to 500 vehicle movements during peak hours and 3,400 movements daily;
- The proposed access arrangements will comply with the appropriate standards for location and sight distance and the appropriate MoTSaM or Austroads standards for geometric design;
- The safety record of the State Highway in the vicinity of the site suggests a traffic safety problem with respect to rear-end collisions. Accordingly, the accesses into the site have been designed to reduce the potential for rear-end collisions with vehicles entering the site;
- The safety record does not indicate any safety issue associated with the existing Service Centre on the western side of SH1;
- The site entry from SH1 is proposed to be a one-way southbound slip lane. It will not generate any right turn movements, nor will it require any vehicles to slow down on the highway. No issues with the proposed slip lane were raised in the independent Road Safety Audit, and thus it is not anticipated to have any adverse effect on the safety or operation of the state highway;
- The proposed access onto SH15A will be more than 200 metres from the intersection of SH1 and SH15A to the west and more than 100 metres from the adjacent accessway to the east, complying with the minimum accessway spacing guidelines;
- The proposed internal vehicle and pedestrian circulating areas are configured to an appropriate standard and will operate in a manner that minimises any potential impacts on safety;
- Review of the transport standards has identified one item requiring consent under the standards of the Operative Whangarei District Plan, which has been addressed in this report;
- Review of the transport standards has identified two items requiring consent under the standards of the Decision Version of the Whangarei District Plan, which have been addressed in this report; and
- Each access has been designed to a suitable standard to meet the needs of the design vehicles visiting the site.

Overall, it is considered that the traffic planning effects of the proposed Ruakaka Service Centre can be accommodated on the road network without compromise to its function, capacity, or safety, and without compromise to the safety and efficiency of SH1/15A as a National Strategic Route for freight.

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