

Harrison Transportation

Gull Service Station
Kapiti Road Paraparaumu

Transportation Assessment Report
October 2018

PO Box 11557
Palm Beach
Papamoa 3151

Reference: 276 TA v2

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1. Introduction

Gull NZ propose to develop a new service station at 3 Kapiti Road, Paraparaumu. This report has been prepared, at the request of Wasley Knell Consultants, to assess the expected transportation effects of that proposal. The key transportation issues associated with the proposed service station are:

- The level of traffic expected to be generated by the service station and the effect that this will have on the adjacent road network.
- The provision of suitable access to the site.
- The manoeuvring of vehicles, including fuel tankers, within the site.

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

2. The Site

The site is located on the western side of Amohia Street, approximately 65m south of Kapiti Road. The site has access to both Amohia Street and Kapiti Road. The location of the site is shown on Figure 1.

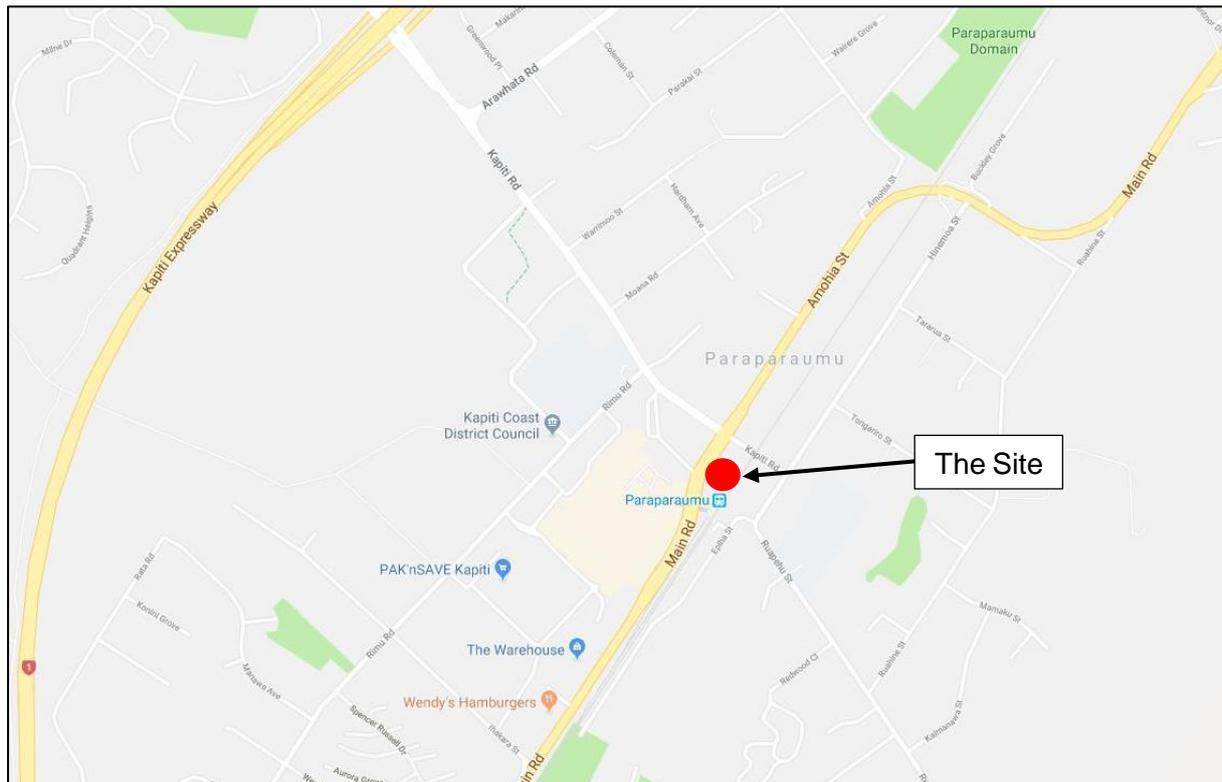


Figure 1: Site Location.

The site is zoned Industrial / Service in the Kapiti Coast District Plan, with the proposed service station understood to be a Permitted Activity in both the Operative and Proposed District Plans.

The site is presently vacant. Photograph 1 shows the site, viewed from Amohia Street while Photograph 2 shows the site viewed from Kapiti Road.



Photograph 1: The Site, Viewed From Amohia Street.



Photograph 2: The Site, Viewed From Kapiti Road.

Adjacent activities include the Paraparaumu railway station immediately to the east of the site, with a number of park and ride car parks located on the eastern side of the railway.

Commercial activities are located immediately to the north of the site with the Coastlands shopping centre located on the western side of Amohia Street.

3. Transportation Environment

Amohia Street is classified in the Operative District Plan as a National / Major District Arterial Road while in the Proposed District Plan it is classified as a Strategic Arterial Route. As part of SH1, Amohia Street has until recently formed part of the main north-south route through the Kapiti Coast District. With the opening of the Kapiti Expressway on 24 February 2017, Amohia Street no longer provides the main north-south route, however the SH1 designation has not yet been lifted.

Adjacent to the site Amohia Street has a 21.5m wide dual carriageway marked with two traffic lanes in each direction separated by a solid median. Photograph 3 shows Amohia Street looking to the north while Photograph 4 shows Amohia Street looking to the south.



Photograph 3: Amohia Street Looking North.



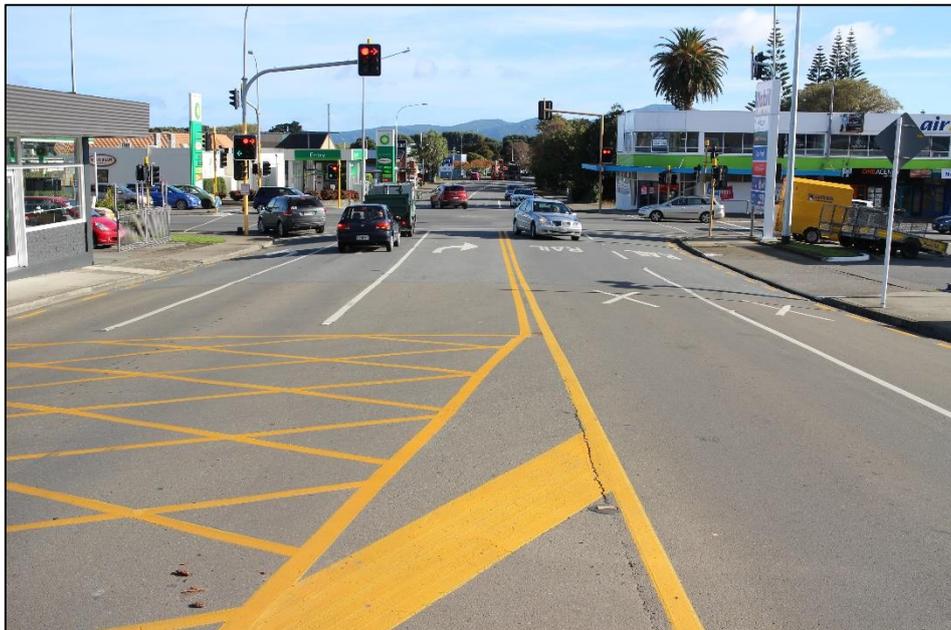
Photograph 4: Amohia Street Looking South.

Kapiti Road is classified in the Operative District Plan as a Secondary Arterial Road, while in the Proposed District Plan it is classified as a Neighbourhood Assess Route. Adjacent to the site it has a 14.7m wide carriageway marked with two traffic lanes in each direction separated by a yellow painted median. Yellow hatching is painted across the westbound traffic lanes adjacent to the intersection.

Photograph 5 shows Kapiti Road looking to the east while Photograph 6 shows Kapiti Road looking to the west.



Photograph 5: Kapiti Road Looking East.



Photograph 6: Kapiti Road Looking West.

The intersection of Amohia Street and Kapiti Road has traffic signal control. Each approach has two through traffic lanes in each direction, with an additional right turn lane on each approach.

Kapiti Road crosses the Northern Main Trunk Line railway immediately to the east of the site. The rail crossing has warning lights and barrier arms.

A pedestrian underpass is provided under both Amohia Street and the railway. A fence within the garden along the eastern side of Amohia Street, adjacent to the railway station, discourages pedestrians from taking a short-cut across Amohia Street.

The area is subject to a 50km/h speed restriction.

4. Future Road Proposals

Following the opening of the Kapiti Expressway, NZTA propose to make a number of changes to the Amohia Street carriageway to reflect its new traffic function as road serving the local community. The proposed changes are shown on the following figure.



Figure 2: Proposed Changes to Amohia Street.

Figure 2 shows that the proposed changes include:

- A reduction from two to one traffic lane in each direction.
- Provision of a cycle lane in each direction.
- Provision of improved bus stops, the bus stop in the southbound direction being located immediately to the south of the site.

The timing of the construction of these changes is not yet known.

5. Traffic Data

5.1. Traffic Volumes

The latest available traffic count data for Amohia Street has been obtained from NZTA. The count was recorded north of Ihakara Street so is assessed as representative of the volumes adjacent to the site.

The latest traffic count data for Kapiti Road has been obtained from Council. Two counts are available, one approximately 100m west of Amohia Street and the other approximately 40m east of Amohia Street, adjacent to the site.

The average daily traffic (ADT) volumes from these counts are given in the following table.

Road	Time Period	5-Day ADT	7-Day ADT
Amohia Street (SH1)	February 2017	28,124	27,740
	March 2017	10,751	9,876
Kapiti Road (West)	November 2017	10,721	10,077
Kapiti Road (East)	August 2018	8,953	8,098

Table 1: Daily Traffic Count Data (veh/day).

Table 1 shows that the daily traffic volumes on Amohia Street have reduced significantly with the opening of the Kapiti Expressway, with a current 7-day ADT of 9,876 veh/day. The volumes on Kapiti Road adjacent to the site are less, with a 7-day ADT of 8,098 veh/day.

The peak hour traffic volumes from the above counts are given in the following table.

Road	Time Period	AM Peak	PM Peak
Amohia Street (SH1)	February 2017	1,999	2,316
	March 2017	980	996
Kapiti Road (West)	November 2017	732	839
Kapiti Road (East)	August 2018	648	831

Table 2: Peak Hour Traffic Count Data (veh/h).

Table 2 shows that the peak hour volumes on Amohia Street have also dropped significantly, with a current evening peak of 996 veh/h. The peak hour volumes on Kapiti Road to the west and east of Amohia Street are similar.

5.2. Vehicle Speeds

The recorded 85th percentile vehicle speeds on Kapiti Road east of Amohia Street are given in the following table. No data is available for Kapiti Road west of Amohia Street, or Amohia Street.

Location	Eastbound	Westbound	Combined
Kapiti Road (East)	40	33	37

Table 3: Vehicle Speeds (km/h).

A vehicle operating speed of 40 km/h has therefore been adopted for this assessment.

5.3. Queue Lengths

A queue length survey was carried out on Kapiti Road on the evening of Monday 13 August and the morning of Tuesday 14 August 2018. The survey recorded the maximum length of the queue during each cycle of the traffic lights and railway barrier. The results are summarised in the following table:

Queue	Average		95 th Percentile	
	AM Peak	PM Peak	AM Peak	PM Peak
Westbound from Traffic Signals	3	5	5	8
Eastbound from Railway Barrier	4	5	7	7

Table 4: Maximum Queue Lengths (vehicles)

Table 4 shows maximum queue lengths in the westbound direction of three to eight vehicles, with maximum queues in the eastbound direction of four to seven vehicles.

No significant congestion was observed on either Amohia Street of Kapiti Road adjacent to the site.

5.4. Pedestrian Movements

A count of the number of pedestrians walking along and across both Amohia Street and Kapiti Road was carried out at the same time as the queue length surveys above, with the results given in the following table.

Road	Movement	AM Peak	PM Peak
Amohia Street	Along Eastern side	1	1
	Across	1	6
Kapiti Road	Along Southern Side	25	28
	Across	-	-

Table 5: Pedestrian Movements (ped/h).

Table 5 shows very few pedestrians walking either along or crossing Amohia Street. Up to 28 pedestrians were however recorded walking along Kapiti Road during the evening peak.

5.5. Driveway Movements

The number of vehicles using the driveways to the adjacent Jaycar site was also recorded. This is summarised in the following table.

Driveway Location	AM Peak	PM Peak
Amohia Street	0	0
Kapiti Road	6	8

Table 6: Driveway Movements (veh/h).

Table 6 shows that few vehicles use the adjacent driveways.

6. Crash History

A search of the NZTA Crash Analysis System (CAS) has been carried out to identify all reported crashes in the vicinity of the site during the five-year period 2013 to 2017. Available data for 2018 has also been included. The search area consisted of Amohia Street between Kapiti Road and the shopping centre southern access, as well as Kapiti Road between Amohia Street and Hinemoa Street.

The search identified a total of 55 crashes, as follows:

- 32 crashes were recorded at the intersection of Amohia Street and Kapiti Road. 14 of these involved right turning vehicles failing to give way, while eight crashes involved vehicles hitting the rear of a vehicle stopped at the traffic lights. One crash resulted in a serious injury and four crashes resulted in minor injuries.
- Four crashes were recorded at the shopping centre access from Amohia Street. One involved a lane change manoeuvre, one a vehicle losing control, one a vehicle turning right out of the access failing to give way and one a vehicle hitting the rear of a vehicle in a queue. None of these resulted in an injury.
- Two crashes were recorded at the intersection of Kapiti Road and Hinemoa Street. Both involved right turning vehicles failing to give way. Neither resulted in an injury.
- 13 mid-block crashes were recorded on Amohia Street. Four of these involved vehicles hitting the rear of vehicles in a queue or stopped at the traffic lights, three involved vehicles losing control, two involved lane change manoeuvres and two involved manoeuvring vehicles. One crash resulted in a serious injury and three crashes resulted in minor injuries.
- Four mid-block crashes were recorded on Kapiti Road. One of these involved a vehicle hitting the rear of a vehicle in a queue, one involved a vehicle turning left out of the Mobil service station hitting a cyclist on the footpath, one involved a bus turning right into the railway station hitting a pedestrian and one involved a bus turning right into the railway station hitting a car stopped at the traffic lights. One crash resulted in a minor injury.

The reported crashes are shown on Figure 3.

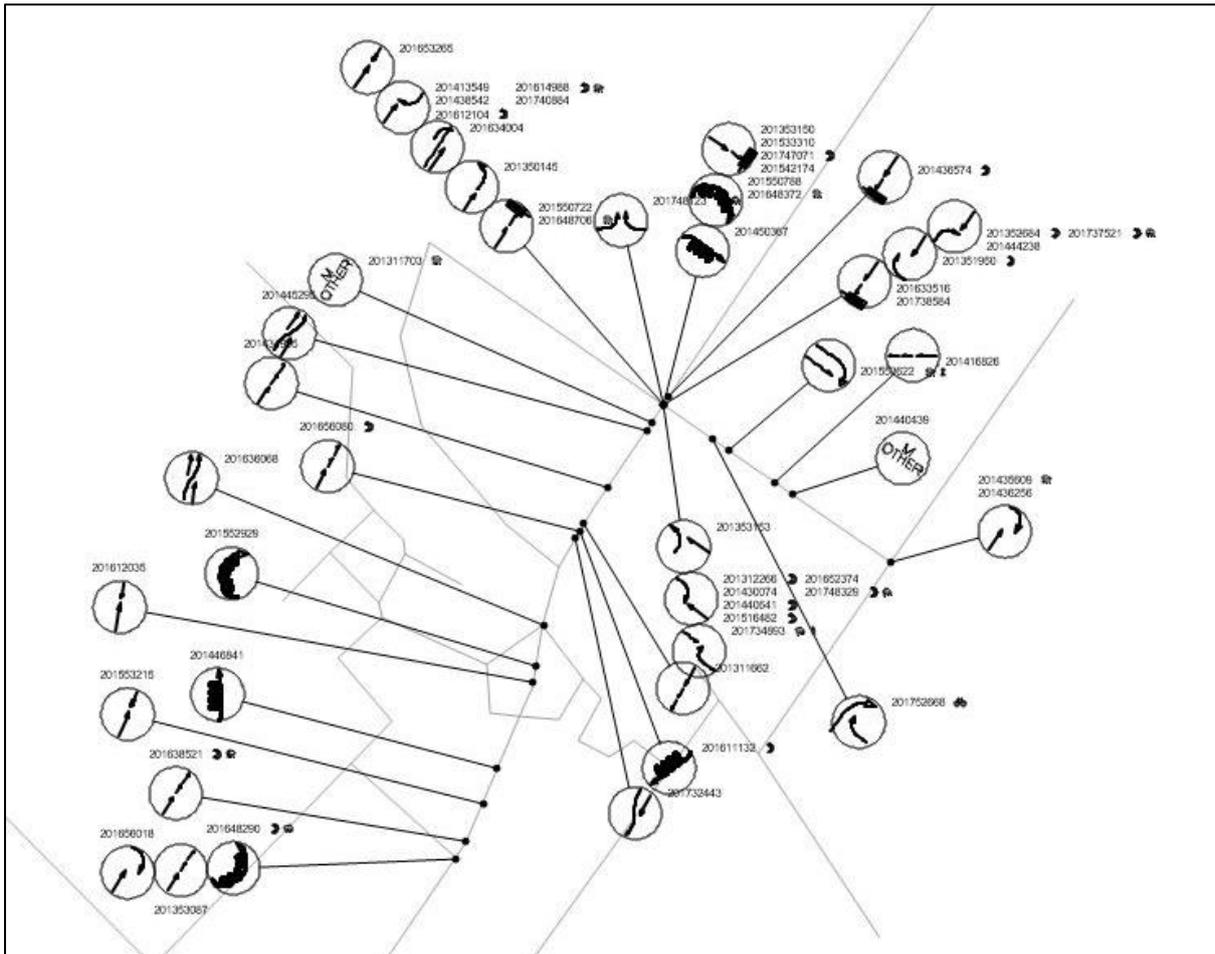


Figure 3: Crash History.

Figure 3 shows a high number of crashes both on Amohia Street and at the intersection of Amohia Street with Kapiti Road, which is consistent with the high traffic volumes on this road prior to the opening of the Kapiti Expressway. There were no crashes associated with the site access to Amohia Street, but two crashes associated with the site access to Kapiti Road, both of which involved buses which will no longer use the site. Overall, the crash history has not identified any specific road safety issues relevant to the proposed service station.

7. The Proposed Development

Gull NZ propose to develop a new fully automated service station on the site. The service station will have a site area of approximately 1,235m², with leased car parking provided on the balance of the site not required for the service station.

The service station will provide three multi-hose fuel dispensers with six pumps. The forecourt will service light vehicles only, there will be no facilities provided for the refuelling of heavy vehicles. There will be no convenience store, customers will pay at the pump. Similarly, there will be no car wash or any other associated facilities. The service station is proposed to operate 24 hours a day, seven days a week.

The existing two-way vehicle crossings onto both Amohia Street and Kapiti Road are proposed to be retained, with the Amohia Street crossing modified as necessary to tie in to NZTA's

proposed changes on Amohia Street. The attached drawings show the proposed site layout both with the existing road layout and with the proposed changes to Amohia Street.

8. Traffic Generation and Effects

8.1. Traffic Generation

Traffic generation data for service stations is available in the following references:

- NZ Transport Agency Research Report 453 “Trips and Parking Related to Land Use” (RR453).
- Roads and Traffic Authority of New South Wales “Guide to Traffic Generating Developments” (RTA).
- Institute of Transportation Engineers “Trip Generation Web Based App” (ITE).

The expected traffic generation rates given in these references are summarised in the following table.

Data Source	Independent Variable	Daily Rate	Peak Hour Rate
RR453	GFA of convenience store	718 veh/day/100m ²	40.7 veh/h/100m ²
	Number of fuelling bays	122 veh/day/bay	20.4 veh/h/bay
RTA	Site Area plus Convenience store GFA	Up to 17 times the peak hour generation	4.0 veh/h/100 ² , plus 30 veh/h/100m ²
ITE	GFA of convenience store	1,295 veh/day/100m ²	118 veh/h/100m ²
	Number of fuelling bays	172 veh/day/bay	14.0 veh/h/bay
	Percentage of Passing Traffic	4%	4%

Table 7: Expected Traffic Generation Rates.

Table 7 shows a wide variation in both the independent variable used to estimate the traffic generation (the GFA of the convenience store, the site area, the number of refuelling bays, the percentage of passing traffic) and also the expected traffic generation rates.

The expected traffic generation of the proposed service station, assessed on the basis of the above rates, is as given in the following table.

Data Source	Measure	Number	Daily Traffic (veh/day)	Peak Hour (veh/h)
RR453	Convenience store	-	-	-
	Fuelling bays	6 bays	732	122
RTA	Site Area plus Convenience store	1,235m ² -	833	49
ITE	Convenience store	-	-	-
	Fuelling bays	6 bays	1,032	84
	Passing Traffic	15,922veh/day 1,514veh/h	637	61

Table 8: Expected Traffic Generation Based on Published Data.

Table 8 shows a wide variation in the expected traffic generation depending on the source of the data and the independent variable used for the assessment.

The expected traffic generation of the proposed service station has also been assessed on the basis of information and data provided by Gull for comparable service stations. These service stations are comparable to the proposed service station in that they are self-service, without a convenience store or other associated services. The available data is summarised in the following table.

Location	ADT of Frontage Road (veh/day)	Average Daily Transactions	Percentage (%)
Ti Rakau Drive, Auckland (eastbound)	20,959	409	2.0
SH16 Kumeu	18,781	297	1.6
Fraser Street, Tauranga	15,090	-	2.0
Norton Road Hamilton	14,400	199	1.4
Ohaupo Road Hamilton (southbound)	13,300	173	1.3
SH2 Bethlehem (eastbound)	13,243	349	2.6
Rifle Range Road, Taupo	8,360	356	4.3
Parton Road, Tauranga	6,750	529	7.8

Table 9: Traffic Generation Rates of Other Gull Sites.

The data in Table 9 shows average daily transactions of between 1.3% and 7.8% of the frontage road’s daily traffic volumes. The data also shows that service stations located adjacent to roads with high traffic volumes typically have a lower percentage of transactions than those on roads with low traffic volumes.

The data given in the above table is shown on the following figure.

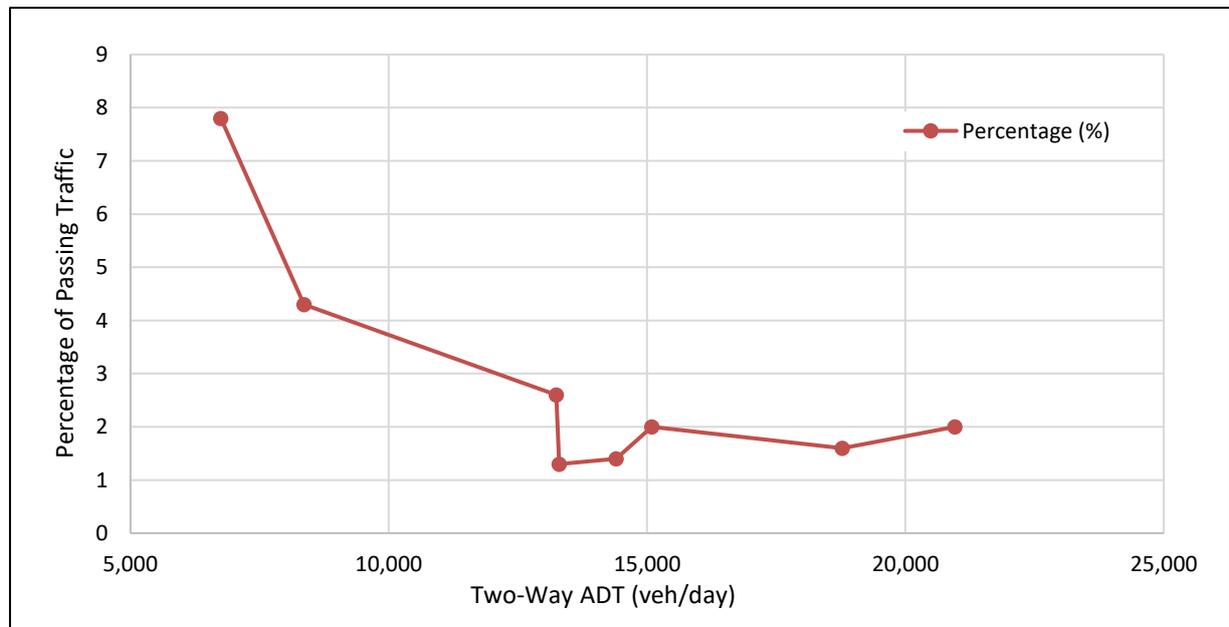


Figure 4: Gull Transaction Data

Figure 4 shows that sites on roads with an ADT of around 10,000 veh/day typically have transactions that are around 4% of the passing traffic, while sites on roads with an ADT of approximately 20,000 veh/day typically have transactions of around 2% of the passing traffic.

The reason for this is expected to be that, on roads with high traffic volumes, the delays associated with turning right into and out of the site discourage motorists travelling on the opposite side of the road from using the site.

Table 1 of this report has identified a 7-day ADT on Amohia Street of 9,876 veh/day with an ADT on Kapiti Road of 8,098 veh/day. This gives a combined ADT of approximately 18,000 veh/day. On the basis of the data provided in Table 9 and Figure 4, a traffic generation rate of 2% of the passing traffic volume on both Amohia Street and Kapiti Road has been adopted for this assessment. It is noted that the adoption of this rate allows for the presence of the solid median restricting the right turns in and out of the site on Amohia Street and the remote location of the service station relative to Kapiti Road.

On the basis of the above transaction rates, two vehicle movements per transaction (an inward and an outward movement), and the traffic volumes given in Section 5 of this report, the expected traffic generation of the proposed service station is as given in the following table.

Road	Passing Traffic		Traffic Generation	
	ADT (veh/day)	Peak Hour (veh/h)	Daily (veh/day)	Peak Hour (veh/h)
Amohia Street	9,876	996	395	40
Kapiti Road	8,098	831	324	33
Total	-	-	719	73

Table 10: Expected Traffic Generation Based on Other Gull Sites.

Table 10 shows that the daily traffic generation of the proposed service station is expected to be approximately 719 veh/day, with a peak hour traffic generation of approximately 73 veh/h.

A comparison of the expected traffic generation given in Table 8 and Table 10 above shows that the expected traffic generation based on the Gull data is at the lower end of the range expected from the published data. Given that there is no convenience store and therefore no ability for customers to pay by cash, it is assessed that the traffic generation of the proposed Gull service station, assessed on the basis of the data for similar Gull service stations, is an appropriate assessment of the expected traffic generation of the proposed service station.

8.2. Price Promotions

It is noted that Gull does, on occasion, offer fuel at discounted prices. There is limited data available on the effect of these price promotions. The limited data that is available suggests very little effect at some locations, with increases in the range of 50% to 100% in other locations. The data suggests that service stations located adjacent roads with high traffic volumes typically have a lower increase in the number of transactions than those service stations located on roads with low traffic volumes.

It is also noted that not only do other service stations also offer similar price promotions as Gull, often at the same time as the Gull promotion, but that price promotions are common in many other retail sectors.

Due to the lack of appropriate data, there has been no assessment of the expected increase in traffic associated with price promotions. It is however expected that any increase in traffic during a price promotion is expected to be primarily existing traffic on the road network rather than additional traffic.

8.3. Traffic Distribution

The turning movements at a service station are typically approximately 70% left in and left out, with 30% right in and right out. Due to the solid median, turning movements on Amohia Street will however be limited to left in and left out. The expected turning movements to and from the site based on this distribution are shown on the following figure.

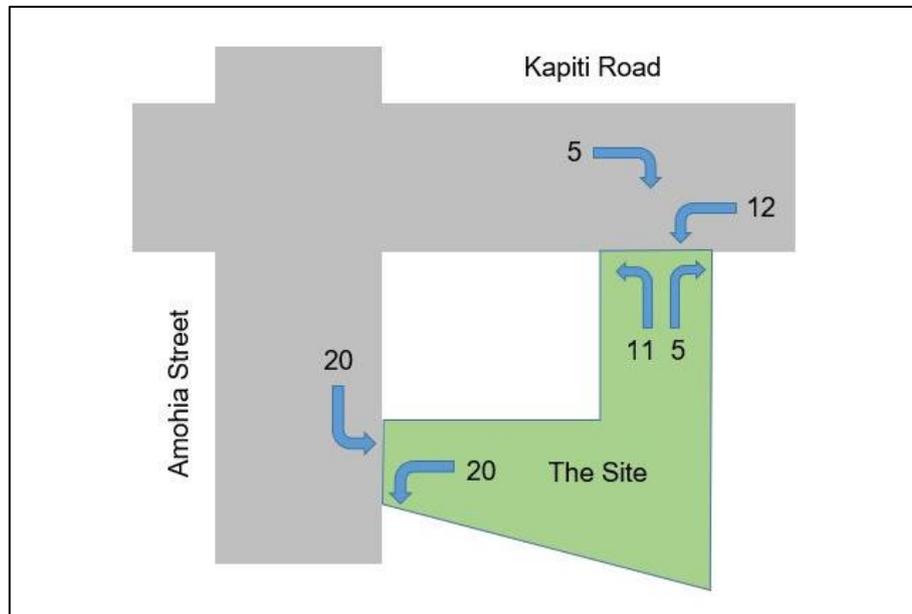


Figure 5: Peak Hour Turning Movements (veh/h).

Figure 5 shows turning movements of up to 20 veh/h turning left into and left out of the site from Amohia Street with up to 12 veh/h turning left in and left out onto Kapiti Road.

8.4. Traffic Effects

As the proposed service station does not include a convenience store, the traffic generation associated with the service station is expected to be predominantly by-pass trips with little, if any, additional traffic on the road network. As the volume of any additional traffic on the adjacent road network is expected to be negligible, the effects of this traffic on the wider road network are also assessed as being negligible.

9. Parking

9.1. District Plan Parking Requirements

Both the Operative and Proposed District Plans require on-site parking for service stations and motor garages to be provided at the following rates:

- Two car parks per three employees.
- Two car parks for any ancillary retail.
- Four car parks per workshop bay.
- Three car parks for a carwash (Proposed District Plan; two car parks for queuing).
- One car park for air hose/vacuum.

As the proposed service station will be entirely self-service with no staff, retail store or other associated services, no on-site parking is required.

9.2. Expected Parking Demand

Published parking demand data for service stations is available from the same sources of data as given in Section 8.1 of this report. The parking demand rates given in these references are as follows:

- RR453: 9.1 spaces/100m² GFA.
- RTA: 6 spaces/work bay plus 5 spaces/100m² GFA.

As the service station is proposed to be self-service with no convenience store or work bays, there is expected to be no demand for car parking other than at the fuel pumps. No on-site parking is therefore proposed, other than that at the fuel pumps.

9.3. Leased Parking

Leased car parking spaces are proposed to be provided on the balance of the site not used for the service station. These will consist of 26 car parking spaces and four motorbike parking spaces. A review of the proposed car park layout has been carried out. Both the Operative and Proposed District Plans refer to AS/NZS 2890.1:2004 for the required car parking dimensions. It is confirmed that the dimensions of the proposed car parking spaces are in accordance with the dimensions specified in this standard. The proposed parking layout will allow vehicles to turn on the site and exit in a forward's direction.

The access to the car parks will be via the service station access driveway. It is noted that the traffic volumes using the access driveway, as shown on Figure 5, will be low and not dissimilar to that in a public car park. It is also noted that the car parking spaces are expected to be typically used for all-day parking rather than high turnover parking. The potential for conflict between vehicles using the car parks and vehicles using the service station is therefore assessed as negligible.

9.4. Accessible Parking

The Operative District Plan requires all public and private car parking areas with between 11 and 100 car parking spaces to provide two accessible spaces for people with a disability. It is recommended that two accessible car parking spaces be provided in accordance with this requirement.

The Proposed District Plan requires accessible parking spaces to be provided for any activity requiring more than two car parking spaces. As the proposed service station does not require any car parking, no accessible spaces are required. As noted above, two accessible spaces are however recommended.

10. Access

Both the Operative and Proposed District Plans have general standards for property access, as well as specific standards for service stations. The general standards therefore apply for the access to the leased car parking spaces while the specific standards apply to the access to the service station.

10.1. Pedestrian Movements

Both the Operative and Proposed District Plans require that there be no access to a service station across a footpath where the number of pedestrians exceeds 1,000 per hour for two or more hours per day. The pedestrian count data given in Table 5 has identified pedestrian volumes along Amohia Street of approximately 1ped/h and along Kapiti Road of up to 28 ped/h. The pedestrian movements on both Amohia Street and Kapiti Road adjacent to the site are therefore less than this threshold.

10.2. Visibility

Sight distances are required to be provided in accordance with the classification of the road and the operating speed of vehicles along the road. The operating speed of vehicles on Amohia Street has been assessed at 50 km/h while, due to the presence of the railway crossing, the speed of vehicles on Kapiti Road has been measured at up to 40 km/h.

It is noted that the Operative District Plan and Proposed District Plan have different sight distance requirements, with the Proposed Plan having the higher sight distance requirement for Secondary Arterial Roads. The sight distance requirements of the Proposed Plan have therefore been adopted for this assessment. The required sight lines are shown on the following figure.

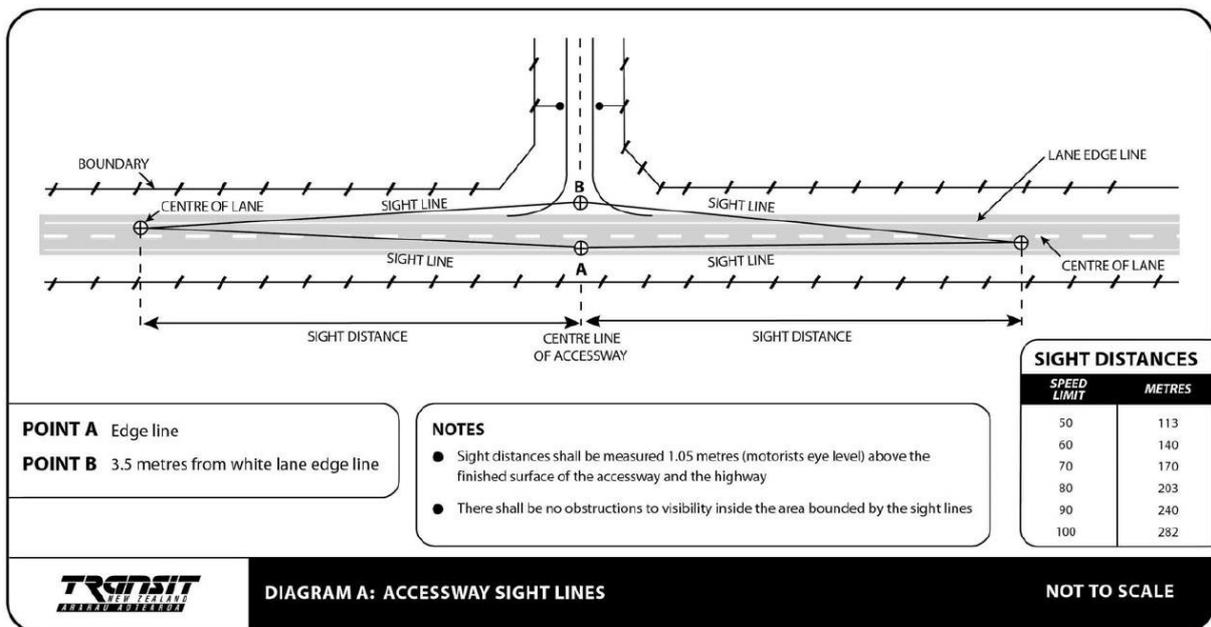


Figure 6: Required Sight Lines.

It is noted that the required sight distances given on Figure 6 are for a service station located on a Strategic Arterial Route. The sight distance requirements for Local roads are provided in a separate table. Due to the solid median on Amohia Street that prevents right turn movements into and out of the site, only the sight distance from point B to the north is relevant at this access.

The compliance of the available sight distances with the requirements of the Proposed Plan is given in the following table.

Road	Location	Sight Line	Operating Speed (km/h)	Sight Distance (m)		Complies?
				Required	Available	
Amohia Street	B	To the North	50	113	75	No
Kapiti Road	A	To the East	40	30	75	Yes
	A	To the West	40	30	>100	Yes
	B	To the East	40	30	56	Yes
	B	To the West	40	30	>100	Yes

Table 11: Sight Distances at the Site Access.

Table 11 shows that the available sight distances comply, with the exception of the sight distance at the Amohia Street access towards the north which is less than that specified in the Proposed District Plan.

The available sight distances with the existing road layout are shown on Drawing 05 attached to this report, while the sight distances with the proposed road layout are shown on Drawing 06.

The available sight lines are shown on the following photographs.



Photograph 7: Amohia Street Sight Line to the North.



Photograph 8: Kapiti Road Sight Line to the East.



Photograph 9: Kapiti Road Sight Line to the West.

Photograph 7 shows that the Amohia Street sight line to the north is presently restricted by low branches on the street tree located to the north of the site. It is expected that, with the proposed road layout, the available sight distance will be improved. It is however recommended that the low branches on the tree be trimmed so that the required sight distance is available until such time as the road improvements are implemented.

Photograph 8 shows that the Kapiti Road sight line to the east is through the pedestrian fences for the railway crossing. While the gaps in the fence do provide the required visibility, it is noted that additional visibility is available as the vehicle moves forward from the stopped position.

10.3. Arterial Route Stations

The Proposed District Plan requires that, on Strategic Arterial Routes:

- Pumps be located at least 9.0m from the road boundary.
- Deceleration and acceleration lanes be provided in accordance with Diagram A4 (Schedule 11.1) of the Plan.

The site plan shows that the pumps are proposed to be located approximately 23m from the road boundary, which exceeds the specified minimum.

The site plan shows that NZTA's proposed changes to Amohia Street include the provision of a dedicated deceleration lane for the entry movement into the site. The provision of an exit taper is not practical due to the close proximity of the access to the adjacent bus stop.

10.4. Median Divided Roads

Both the Operative and Proposed District Plans require that service stations on roads that have central medians operate only as left turn in, left turn out, with no opening in the central median. It is confirmed that the access to Amohia Street will operate as left turn in and left turn out.

10.5. Locations Near Intersections

The Operative District Plan's requirements for service stations specify that, for locations near intersections, the general requirements apply. Similarly, in the Proposed District Plan, the requirements for locations near intersections are given in the general requirements. These requirements specify that, at intersections where traffic signals are operating, no vehicle crossing be located within 30m of the intersection or within 60m on the departure side of an urban state highway intersection.

The proposed location of the vehicle crossings are as follows:

- Amohia Street: 68m south of the Kapiti Road intersection.
- Kapiti Road: 37m east of the Amohia Street intersection.

The available separation distances therefore comply with this requirement.

Both the Operative and Proposed District Plan's general requirements then go on to specify additional requirements for major traffic activities. These require:

- An access to a Major Arterial / Strategic Arterial Route to be a minimum of 60m from an intersecting Arterial / Strategic Arterial Route.
- An access to a Major Arterial / Strategic Arterial Route to be a minimum of 30m from an intersecting Local Road / Neighbourhood Access Route.
- An access to a Local Road / Neighbourhood Access Route to be a minimum of 30m from an intersecting Arterial / Strategic Arterial Road.

The proposed Amohia Street access complies with these requirements.

The Kapiti Road access is located within the 60m specified by the Operative District Plan and so does not comply with the Operative Plan. The required spacing of 60m is due to Kapiti Road being classified as a Secondary Arterial Road. The Proposed District Plan re-classifies Kapiti Road as a Neighbourhood Access Route, which results in a lesser distance of 30m

being required. The Kapiti Road access therefore does comply with the Proposed District Plan.

Given that the Kapiti Road access is existing and that the location does comply with the requirements of the Proposed District Plan, it is assessed that the location will have sufficient separation from the intersection to avoid any detrimental effect on the intersection.

10.6. Distance Between Accesses

Both the Operative and Proposed District Plans specify, for access to a state highway, a minimum distance of 15m between accesses for non-residential activities on the same side of the road. The proposed separation distance between the Amohia Street access and the access to the adjacent Jaycar site is approximately 6m, which does not comply. It is however noted that a specific design for this access is proposed as part of the Amohia Street improvements. This proposed design is shown on the attached drawings. It is assessed that this specific design will provide sufficient separation to ensure the safety of pedestrians and to minimise any potential conflict between turning movements at the access driveways. It is also noted that, following the opening of the Kapiti Expressway, the state highway status of Amohia Street is expected to be revoked.

10.7. Provisions for Road Widening

The District Plan requires that, where road widening is designated, measurements should be taken to the future road boundary or road edge. No road widening is designated and so this requirement is not applicable.

10.8. Manoeuvring Space

It is proposed that fuel will be delivered to the site two or three times per week using semi-trailer vehicles up to 19.45m long. It is proposed that the tanker will travel to the site from SH1, along Kapiti Road, turn right onto Amohia Street and then turn left into the site. The tankers will then depart turning left onto Kapiti Road and continuing straight ahead to SH1. The tracking path of the design fuel tanker is shown on the attached Drawings 1 and 2. The drawings show that the tankers will be able to undertake the required turning manoeuvres and exit the site in a forward's direction.

To achieve easy ingress and egress, the District Plan requires large vehicles such as the fuel tanker, to undertake turns of not less than a 7.5m radius. The turning dimensions used for the vehicle tracking are shown on Drawing 4. This drawing shows an outer turning radius of 8.9m, which exceeds the required 7.5m. It is noted that this tracking template has been specifically developed for the tankers used by Gull.

The District Plan requires light vehicles to undertake turns of not less than a 4.5m radius. The tracking of the design light vehicle is shown on the attached Drawing 3, with the turning dimensions used for the vehicle tracking shown on Drawing 4. This drawing shows, for the design 85th percentile car, an outer turning radius of 6.2m and for the 99th percentile car an outer turning radius of 6.7m. These radii exceed the specified 4.5m radius.

The drawings therefore show that the design vehicles are able to undertake the required manoeuvres without exceeding the specified minimum radii.

10.9. Distance of Pumps From Road

Pumps are required to be located a minimum of 7m from a vehicle crossing and 4.5m from a road boundary. The pumps are proposed to be located a minimum of approximately 23m from the Amohia Street vehicle crossing and a minimum of approximately 6.0m from the Amohia Street side boundary. The location of the pumps therefore complies with these requirements.

It is expected that there will be up to approximately 31 fuel transactions per hour during the peak hour. When divided equally between the six fuel outlets, this results in approximately five fuel transactions per pump, or one transaction every 12 minutes. It is understood that transactions at automated Gull service stations take, on average, approximately three minutes each. The proposed six fuel outlets will therefore have ample capacity to process the expected peak hour traffic generation with minimal queuing.

10.10. Driveways and Crossing Points

The Operative District Plan's general standards specify the minimum vehicle crossing widths. For sites containing more than six car parking spaces, two-way vehicle crossings are required to be a minimum of 6.0m wide. All other vehicle crossings are required to be a minimum of 3.0m wide. The Proposed District Plan contains a similar requirement, but also specifies a maximum width of 9.0m.

Both the Operative and Proposed District Plan's requirements for service stations require vehicle crossings accommodating tanker movements to be a minimum of 6.0m and a maximum of 9.0m wide.

The existing Amohia Street vehicle crossing is proposed to be retained in the short term but then replaced as part of NZTA's proposed changes to Amohia Street. The proposed crossing will be approximately 10.0m wide, which exceeds the specified maximum of 9.0m.

The width of vehicle crossings is generally restricted in order to discourage parallel exit manoeuvres and to minimise a pedestrian's exposure to conflict. To mitigate the effects of the wider crossing it is proposed to paint a central island on the pavement surface at the Amohia Street access. The painted island will be approximately 1.5m wide and 5.0m long. The painted island will guide exiting vehicles to the correct side of the access and minimise any risk of parallel exit manoeuvres. The painted island will also provide a central refuge area for pedestrians, thereby minimising any increased risk.

The existing access to Kapiti Road is proposed to be retained. This vehicle crossing is approximately 8.5m wide so complies with the District Plan.

The District Plan also requires vehicle crossings to be designed so that a tanker can enter and exit the site without crossing the centreline of the road. The attached Drawings 1 and 2 show that this requirement is achieved.

10.11. Bulk Tanker Filling

Bulk filling points are required to be located so that tankers do not need to park on the legal road and so that the tankers do not obstruct the driveways and vehicle crossings. Again, the attached Drawings 1 and 2 show that this is achieved.

10.12. Operational Performance

An assessment of the operational performance of the access has been carried out using the traffic volumes given in Section 5.1 of this report together with the expected turning movement volumes given in Section 8.3 of this report. The expected operational performance of the Amohia Street access is given in the following table.

Peak	Approach	Movement	Degree of Saturation	Average Delay (s)	Queue (veh)	Level of Service
AM	Site Access	Left	0.022	3.9	0.1	A
	Amohia Street Southbound	Left	0.012	4.6	0.0	A
		Through	0.254	0.0	0.0	A
PM	Site Access	Left	0.022	4.0	0.1	A
	Amohia Street Southbound	Left	0.012	4.6	0.0	A
		Through	0.259	0.0	0.0	A

Table 12: Operational Performance of the Amohia Street Access.

Table 12 shows that that the Amohia Street access is expected to operate efficiently with low delays, negligible queues and a high level of service.

The expected operational performance of the Kapiti Road access is given in the following table.

Peak	Approach	Movement	Degree of Saturation	Average Delay (s)	Queue (veh)	Level of Service
AM	Site Access	Left	0.023	2.6	0.1	A
		Right	0.023	8.6	0.1	A
	Kapiti Road Westbound	Left	0.100	4.6	0.0	A
		Through	0.100	0.0	0.0	A
	Kapiti Road Eastbound	Through	0.091	0.1	0.1	A
		Right	0.091	6.3	0.1	A
PM	Site Access	Left	0.028	2.7	0.1	A
		Right	0.028	12.3	0.1	B
	Kapiti Road Westbound	Left	0.115	4.6	0.0	A
		Through	0.115	0.0	0.0	A
	Kapiti Road Eastbound	Through	0.129	0.1	0.1	A
		Right	0.129	6.8	0.1	A

Table 13: Operational Performance of the Kapiti Road Access.

Table 13 shows that all movements at the Kapiti Road access are expected to operate efficiently with low delays, negligible queues and a high level of service. The table shows that the average delay to the right turn movement into the site is expected to be 6.4s in the morning peak and 6.8s in the evening peak. Of this, 4.6s is geometric delay. The stop line delay is therefore 1.7s in the morning peak and 2.2s in the evening peak. These delays are very low.

The 95% back of queue for the right turn movement into the site is expected to be 0.1 vehicles during both the morning and evening peaks. This indicates that any queuing associated with

the right turn in movement is expected to be negligible. Any delay to the through movement on Kapiti Road is therefore also expected to be negligible.

The queue length surveys on Kapiti Road, as given in Section 5.3 of this report, identified a westbound 95th percentile maximum queue length associated with the traffic signals of five vehicles in the morning peak and eight vehicles in the evening peak. The access to the site is located approximately five vehicle lengths from the traffic signals. The maximum queue length therefore extends past the site, particularly during the evening peak. It is however noted that the predominant movements at the Kapiti Road access are expected to be the left turn into and out of the site. Vehicles turning left into the site will be unaffected, as these vehicles will wait in the queue until able to enter the site. Vehicles turning left out of the site may experience some additional delay while waiting for the queue to disperse during the next phase of the traffic signals, however these vehicles will queue within the site and so will not affect the flow of traffic on Kapiti Road. The existing hatching across the site access will allow right turn movements into and out of the site.

The queue length surveys identified an eastbound 95th percentile maximum queue length associated with the railway crossing of seven vehicles during both the morning and evening peaks. The access to the site is located immediately to the west of the railway crossing, so any queuing will extend past the site. Again, it is noted that the predominant movements at the access are expected to be the left turn into and out of the site, which will be unaffected by the queues associated with the railway crossing. Vehicles turning right into the site will also be unaffected, as these vehicles will wait in the queue until able to enter the site. Vehicles turning right out of the site may experience some additional delay while waiting for the queue to disperse, but again these vehicles will queue within the site and so will not affect the flow of traffic on Kapiti Road. The hatching across the site access will assist the right turn movements into and out of the site by discouraging westbound vehicles from queuing across the access.

10.13. Access – Other Issues

Rat-running (vehicles using the site to bypass the traffic signals at the adjacent intersection) has been identified as a potential issue. To quantify the number of rat-running vehicles that could be expected, a survey has been carried out at a service station located adjacent to a busy traffic signal controlled intersection. The surveyed service station is located on the corner of Eleventh Avenue and Cameron Road, Tauranga, which carries a significant left turn volume during the morning peak. A survey carried out during the morning peak identified three out of 170 (1.8%) left turning vehicles using the service station. Given that the rat-running manoeuvre at the proposed Gull service station will be less direct than at the surveyed site, it is expected that the number of vehicles rat-running through the service station will be negligible.

A Mobil service station is located on the north-eastern corner of the intersection of Amohia Street and Kapiti Road. The Kapiti Road access to this service station is located approximately 14m to the west of the access to the proposed Gull service station. A survey at this access recorded 10 veh/h turning right into the Mobil service station during the morning peak, with no vehicles turning right in during the evening peak. Section 8.3 of this report has identified that the predominant turning movements at the Gull service station access are expected to be the left turn in and left turn out of the site, while the right turn in and out movements are expected to be approximately 5 veh/h. Given the expected low volume of the right turn movements at both service stations, any potential conflict between these turning movements is expected to be negligible. It is also noted that the proposed Gull service station may reduce potential conflict on Kapiti Road by avoiding the need for vehicles to turn right in and out of the Mobil service station.

The attached Drawing 02 shows that the Amohia Street southbound traffic lane, proposed as part of the SH1 revocation process, is narrow, resulting in the tanker tracking very close to the solid median. It is noted that the drawings showing the proposed changes to Amohia Street are at a preliminary stage and are therefore indicative only. It is expected that the changes to Amohia Street will be designed in accordance with current design standards and will provide sufficient lane width for the tracking of the fuel tanker.

The attached Drawing 01 shows that vehicles turning left into the site at the Amohia Street access will cross over the proposed cycle lane. It is noted that the proposed design of the Amohia Street improvements is consistent with the provisions of the NZTA *“Manual of Traffic Signs and Marking”* (MOTSAM), with green coloured surfacing indicating the presence of the cycle lane and dashed continuity lines on either side of the cycle lane indicating that motorists may cross over the cycle lane into the left turn slip lane. Given that the proposed design is consistent with the requirements of MOTSAM and that clear visibility of the cycle lane will be available, this is not expected to lead to any safety concerns.

The proposed Amohia Street access is located approximately 7m to the south of an existing access to the adjacent Jaycar site. A survey at this access recorded no vehicles turning in or out of this access during the morning and evening peak periods. All vehicles associated with this site, on the day of the survey, used the Kapiti Road access. While the number of vehicles using the Amohia Street Jaycar access is presently negligible, it is noted that the proposed improvements to Amohia Street will provide an improved access to the site which may increase the number of vehicles using the access. Given however the proposed separation between the two access driveways and the proposed separate left turn exit from the Gull site, the potential for conflict between these access driveways is assessed as negligible.

Similarly, as part of the Amohia Street improvements, a new bus stop is proposed to be provided on the eastern side of Amohia Street immediately to the south of the site access. While it is noted that the buses will be slowing down as they pass the proposed Gull access, this is not expected to significantly affect the capacity of the access driveway. It is also noted that buses may exit the bus stop at the same time as a vehicle exits the proposed service station access. Due to the alignment of the Gull access, it is noted that vehicles will exit the site at a slow speed. Given this slow speed, the potential for conflict with a bus exiting the bus stop is assessed as negligible.

The attached Drawing 03 shows a vehicle turning left out of the Amohia Street access and tracking close to the central median. Again it is noted that the drawings showing the proposed changes to Amohia Street are at a preliminary stage and are therefore indicative only. Again it is expected that the changes to Amohia Street will be designed in accordance with current design standards and that the detailed design of the access will provide sufficient width for the tracking of the design vehicles.

Section 10.8 of this report has identified that fuel tankers are proposed to travel to the site from SH1, along Kapiti Road, turn right onto Amohia Street and then turn left into the site. The tankers will then depart turning left onto Kapiti Road and continuing straight ahead to SH1. The tracking of the tankers at the intersection of Amohia Street and Kapiti Road is shown on the attached Drawing 7. The drawing shows that the tracking can be accommodated.

The proposed site layout will allow vehicles to enter from either Amohia Street or Kapiti Road and to exit to either Amohia Street or Kapiti Road. Observations at other similar service stations indicate that customers may choose to use the forecourt in either a clockwise or anti-clockwise direction. It is noted that ample space will be available on the forecourt for the manoeuvring of vehicles in either direction and that any congestion created by vehicles using the forecourt in opposite directions will be minimal.

11. Pedestrians

The pedestrian survey data, as given in Section 5.4 of this report has identified that the number of pedestrians walking along or crossing Amohia Street in the vicinity of the site access is negligible. It is therefore expected that there will be no appreciable conflict with pedestrians at the proposed site access.

It is noted that the proposed changes to Amohia Street, as given in Section 4 of this report, include the construction of an at-grade pedestrian crossing to supplement the existing pedestrian subway. The proposed at-grade crossing will be located approximately 50m south of the proposed site access. It is understood that a new path will be constructed between the southern end of the railway station and the at-grade crossing. This path will be located to the south of the Gull site. Given the low pedestrian volumes on Amohia Street adjacent to the site, the direct pedestrian route from the train station to the crossing and the distance between the a-grade pedestrian crossing and the proposed site access, any conflict between the site access and the at-grade crossing is expected to be negligible.

The pedestrian survey data identified up to 28 pedestrians walking along Kapiti Road during the peak hour. It is expected that, with the construction of the new at-grade pedestrian crossing, some of these pedestrian movements may relocate to the new crossing, thereby reducing the number of pedestrians walking along Kapiti Road. It is noted that the straight alignment of the access driveway leading to Kapiti Road could encourage higher than desirable vehicle speeds along the driveway, which could then potentially lead to conflict with pedestrians. To address this potential conflict, it is recommended that a speed hump be installed on the access driveway.

12. Road Safety

The crash history given in Section 6 of this report has identified a high number of crashes both on Amohia Street and at the intersection of Amohia Street with Kapiti Road. It is noted that,

- Of the 32 crashes recorded at the intersection of Amohia Street and Kapiti Road, 25 occurred prior to the opening of the Kapiti Expressway.
- Of the 13 mid-block crashes recorded on Amohia Street, all occurred prior to the opening of the expressway.
- Four mid-block crashes recorded on Kapiti Road, three occurred prior to the opening of the expressway.

While it is too soon after the opening of the expressway to identify a long-term trend, the crash history suggests that the reduction in traffic volumes has led to a reduction in the number of crashes on both Amohia Street and at the intersection. It is therefore expected that the previous road safety concerns have been addressed through the reduction in traffic volumes on Amohia Street.

13. Conclusion

Gull NZ propose to develop a new service station at 3 Kapiti Road, Paraparaumu. The service station will provide six pumps to service light vehicles only. There will be no convenience store or any other associated facilities.

The traffic generation of the proposed service station has been assessed on the basis of data provided by Gull. This gives an expected daily traffic generation of 719 veh/day, with a peak hour traffic generation of approximately 73 veh/h. While this is at the lower end of the range expected from the published data, given that there is no convenience store and no ability for customers to pay by cash, it is assessed that this is an appropriate assessment of the expected traffic generation.

The main turning movements are expected to be at the Amohia Street access which, due to the solid median, will be limited to left in and left out.

As the proposed service station does not include a convenience store, the traffic generation is expected to be predominantly by-pass trips with little, if any, additional traffic on the road network. As the volume of any additional traffic on the adjacent road network is expected to be negligible, the effects of this traffic on the wider road network are also assessed as being negligible.

As the proposed service station will be entirely self-service with no associated services, the District Plan does not require any on-site parking to be provided. No on-site parking is proposed for the service station.

Leased parking is proposed to be provided on the balance of the site not used for the service station. The dimensions of the proposed car parking spaces are in accordance with the dimensions specified in the District Plan. It is recommended that two accessible car parking spaces be provided.

The proposed site access generally complies with the requirements of both the Operative and Proposed District Plans. It is however noted that the sight line at the Amohia Street access is potentially restricted by low branches on the street tree located to the north of the site. It is expected that, with the proposed road layout, the available sight distance will be improved. It is recommended that the low branches on the tree be trimmed.

The sight line at the Kapiti Road access is through the pedestrian fences for the railway crossing. While gaps in the fence do provide visibility, full visibility is available as the vehicle moves forward from the stopped position.

The distance between the existing Kapiti Road access and the Amohia Street intersection is less than that specified in the Operative District Plan. The Proposed District Plan however re-classifies Kapiti Road as a Neighbourhood Access Route, which results in a lesser separation distance being required. The Kapiti Road access does comply with the Proposed District Plan. It is assessed that the location will have sufficient separation from the intersection to avoid any detrimental effect on the intersection.

The proposed separation distance between the Amohia Street access and the access to the adjacent site is less than that required by the District Plan. It is however noted that NZTA has proposed a specific design for this access as part of their Amohia Street improvements. It is assessed that this specific design will provide sufficient separation to ensure the safety of pedestrians and to minimise any potential conflict between turning movements at the access driveways.

It is proposed that fuel tanker will turn left onto the site from Amohia Street, then exit left onto Kapiti Road. The tankers will be able to undertake the required turning manoeuvres within the site and exit in a forward's direction.

The width of the Amohia Street vehicle crossing, as proposed by NZTA as part of their changes to Amohia Street, exceeds the maximum width specified in the District Plan. To mitigate the effects of the wider crossing it is proposed to paint a central island on the pavement surface within the site. This will guide exiting vehicles to the correct side of the access to minimise any risk of parallel exit manoeuvres and will provide a central refuge area for pedestrians, thereby minimising any increased risk.

The existing Kapiti Road access is proposed to be retained, which complies with the District Plan.

Both the Amohia Street and Kapiti Road accesses are expected to operate efficiently with low delays, negligible queues and a high level of service. The existing queues on Kapiti Road may cause some additional delay to vehicles exiting the site, however these vehicles will queue within the site and so will not affect the flow of traffic on Kapiti Road. The existing hatching across the site access will allow right turn movements into and out of the site.

The proposed site layout will allow vehicles to enter from either Amohia Street or Kapiti Road and to exit to either Amohia Street or Kapiti Road. It is assessed that ample space will be available on the forecourt for the manoeuvring of vehicles and that any congestion created by vehicles using the forecourt in opposite directions will be minimal.

Surveys have identified few pedestrians walking along or across Amohia Street adjacent to the site. An at-grade pedestrian crossing is proposed to supplement the existing pedestrian subway located to the south of the Gull site. Given the low pedestrian volumes, any conflict between the site access and the at-grade crossing is expected to be negligible.

The straight alignment of the access driveway leading to Kapiti Road could encourage higher than desirable vehicle speeds along the driveway, which could then potentially lead to conflict with pedestrians. To address this potential conflict, it is recommended that a speed hump be installed on the access driveway.

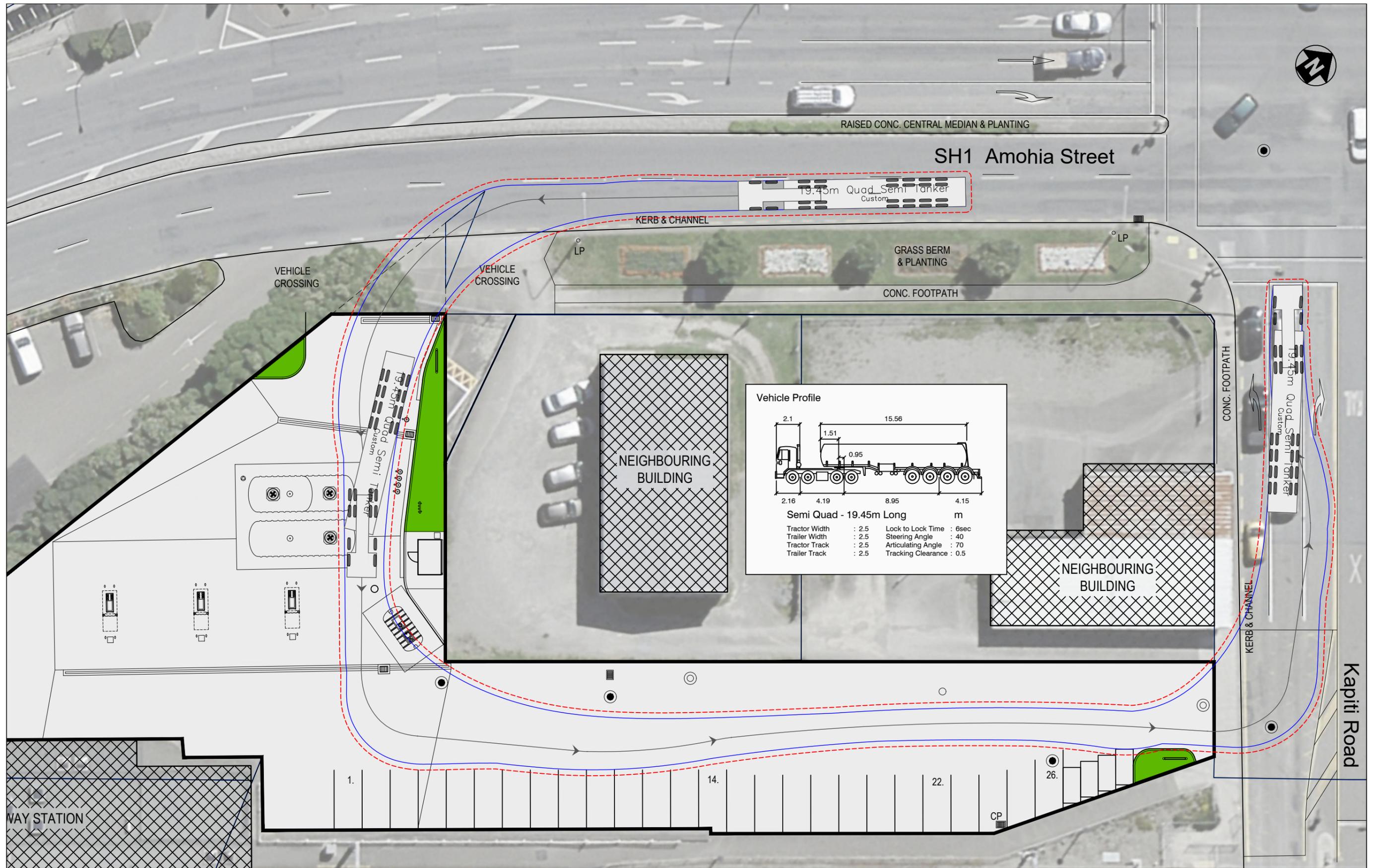
The crash history has identified a high number of crashes both on Amohia Street and at the intersection of Amohia Street with Kapiti Road. The crash history suggests however that there has been a reduction in the number of crashes since the opening of the Kapiti Expressway. It is therefore expected that the previous road safety concerns have been addressed.

It is therefore concluded that, with the recommendations given in this report, the proposed service station can be readily accommodated within the local transportation environment.

Report Prepared by:

Bruce Harrison
Harrison Transportation
25 October 2018

Reference: 276 TA v2



No	DESCRIPTION	DATE	CHK
1	Sight tracking added	23.10.18	BH

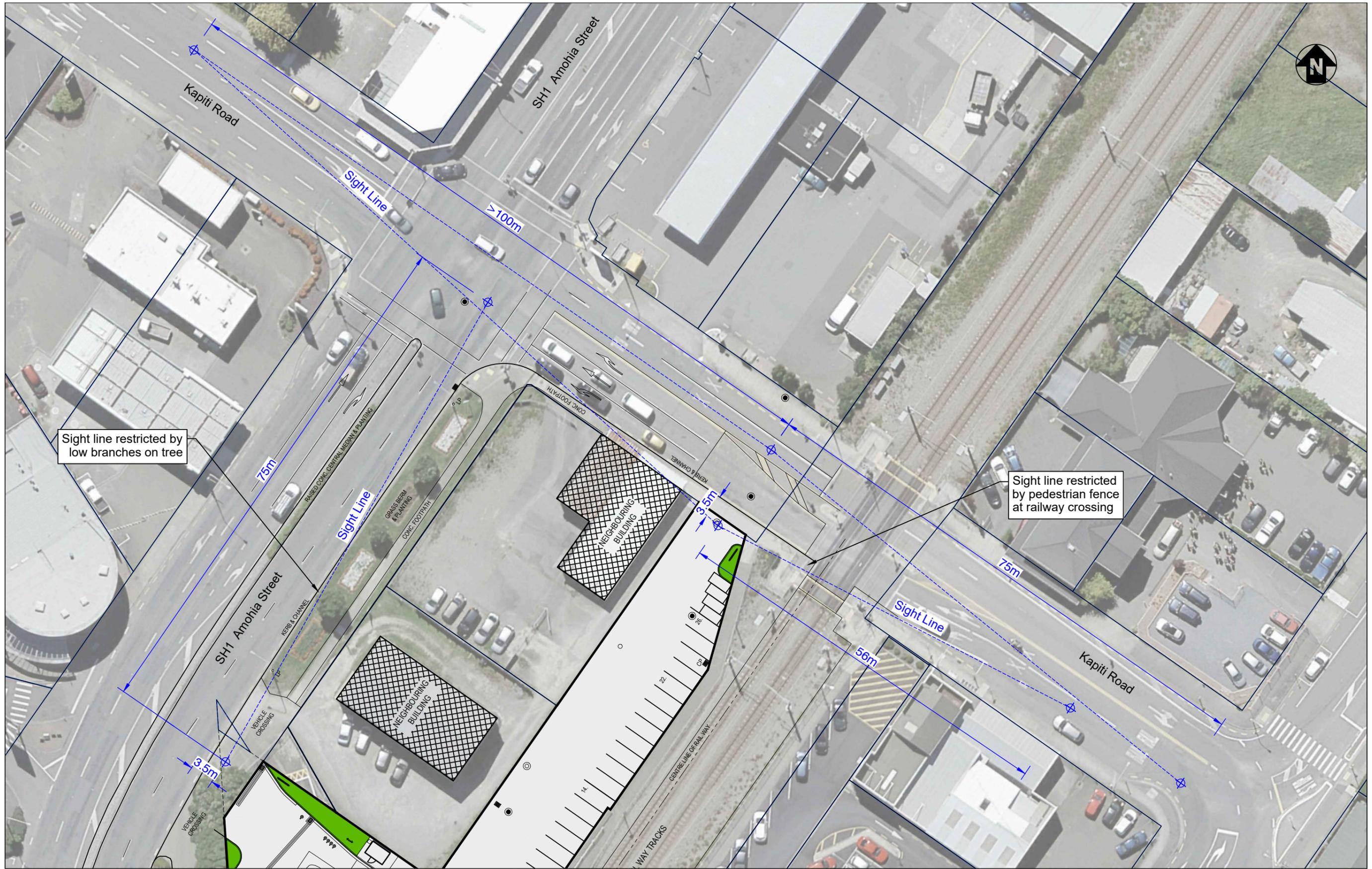
Gull Paraparaumu
 3 Kapiti Road, Paraparaumu
 Vehicle Tracking



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Design	BH	Job No.	276		DRAWING No	01
Drawn	JT	CAD File	Z158	Plot Date	25.10.18	
Checked	BH	Date	16.03.18	Drawing No.	276-01	SCALE
Drawing	1 of 7	Rev.No.	1		1:300 @A3	



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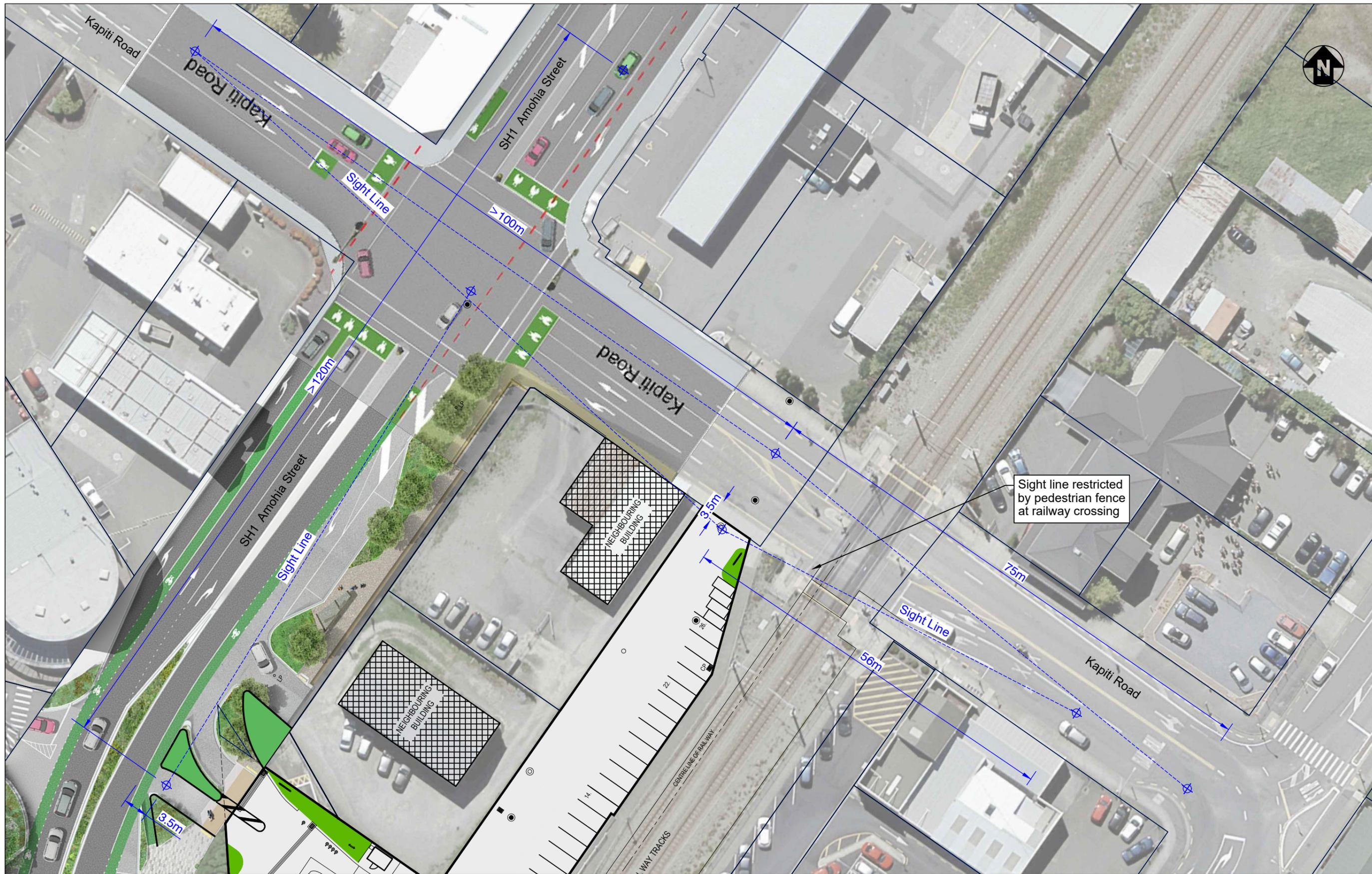
Gull Paraparaumu
 3 Kapiti Road, Paraparaumu
 Sight Distances - Existing Layout



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Design	BH	Job No.	
Drawn	JT	276	CAD File Z158
Checked	BH		Plot Date 25.10.18
Date	16.03.18	Drawing No.	Rev.No.
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DRAWING No
05
 SCALE
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No	DESCRIPTION	DATE	CHK
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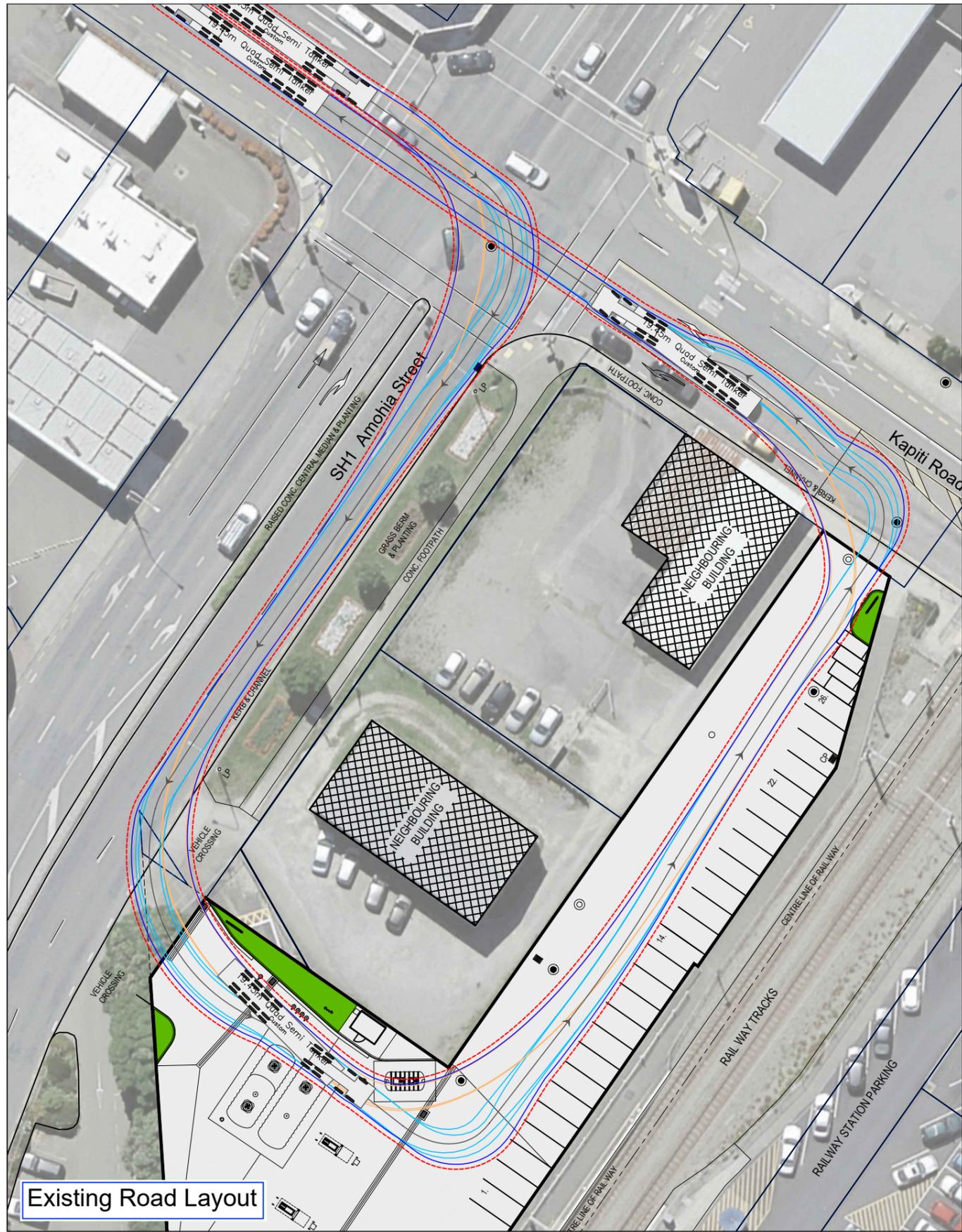
Gull Paraparaumu
 3 Kapiti Road, Paraparaumu
 Sight Distances - NZTA Road layout



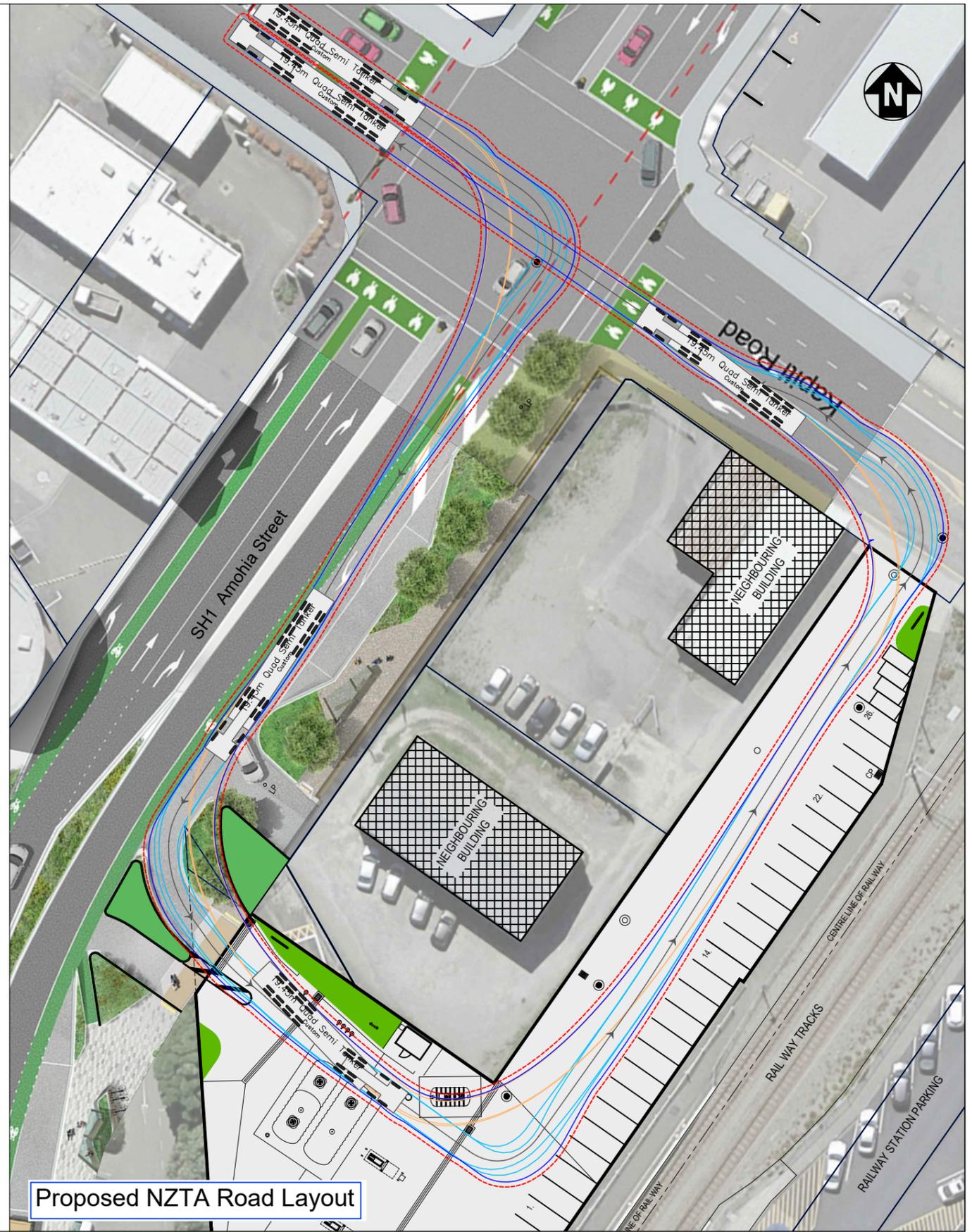
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Checked	BH	Drawing No.	276-06	Rev.No.	1
Date	16.03.18				
Drawing	6 of 7				

DRAWING No
06
 SCALE
 1:500 @A3



Existing Road Layout



Proposed NZTA Road Layout

No	DESCRIPTION	DATE	CHK
1	Sight tracking added	23.10.18	BH

Gull Paraparaumu
 3 Kapiti Road, Paraparaumu
 Tracking, Existing and Proposed Layouts



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Design	BH	Job No.	276		DRAWING No	07
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