BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the Proposed Waikato District Plan

STATEMENT OF EVIDENCE OF RHULANI MATSHEPO BALOYI (TRANSPORT)

Dated 17 FEBRUARY 2021

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INTRODUCTION

1. My full name is Rhulani Matshepo Baloyi. I am a senior traffic and transportation engineer at Bloxam Burnett & Olliver Ltd (**BBO**), a firm of consulting engineers, planners and surveyors based in Hamilton. I have held this position since July 2019.

2. I hold a Bachelor of Engineering degree in Civil Engineering (2012) and a Bachelor of Engineering (Honours) degree in Transportation Engineering (2014) from the University of Pretoria in South Africa. I am registered as a Professional Engineer (PrEng) with the Engineering Council of South Africa (ECSA) and I am a Member of Engineering New Zealand (MEngNZ).

3. I have nine years' experience in the field of traffic and transportation engineering gained through over seven years of employment in South Africa and almost two years of employment in New Zealand. I have experience in traffic and transportation engineering matters associated with resource management, including effects assessments for resource consents, plan changes and structure plans. I also have experience in traffic modelling and have provided input in the design of traffic infrastructure and facilities.

4. I have been engaged by Shand Properties Limited (**Shand**) to provide expert advice on traffic and transportation matters in relation to its submission to the Proposed Waikato District Plan (**PDP**) for the rezoning of approximately 30.5 ha of land located in Huntly North. I have prepared an Integrated Transport Assessment (**ITA**) report dated 9 December 2020 which supports the rezoning submission and is **Attachment 1** to my evidence.

5. I have visited the two sites that are subject to the rezoning submission and inspected the surrounding road network on several occasions, most recently on 8 September 2020.

CODE OF CONDUCT

6. I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014 and agree to comply with it. I confirm that the opinions expressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

PURPOSE AND SCOPE OF EVIDENCE

7. The purpose of my evidence is to provide an overview of:

   a) The transport characteristics of the rezoning proposal;

   b) The potential effects of the proposal on the transport environment;

   c) The mitigation measures that I recommend to address the potential adverse effects; and

   d) Any other measures proposed to ensure a safe and efficient transport network for pedestrians, cyclists, motorists and public transport commuters.

8. My evidence provides a summary of the ITA report and the conclusions reached.

SUMMARY OF EVIDENCE

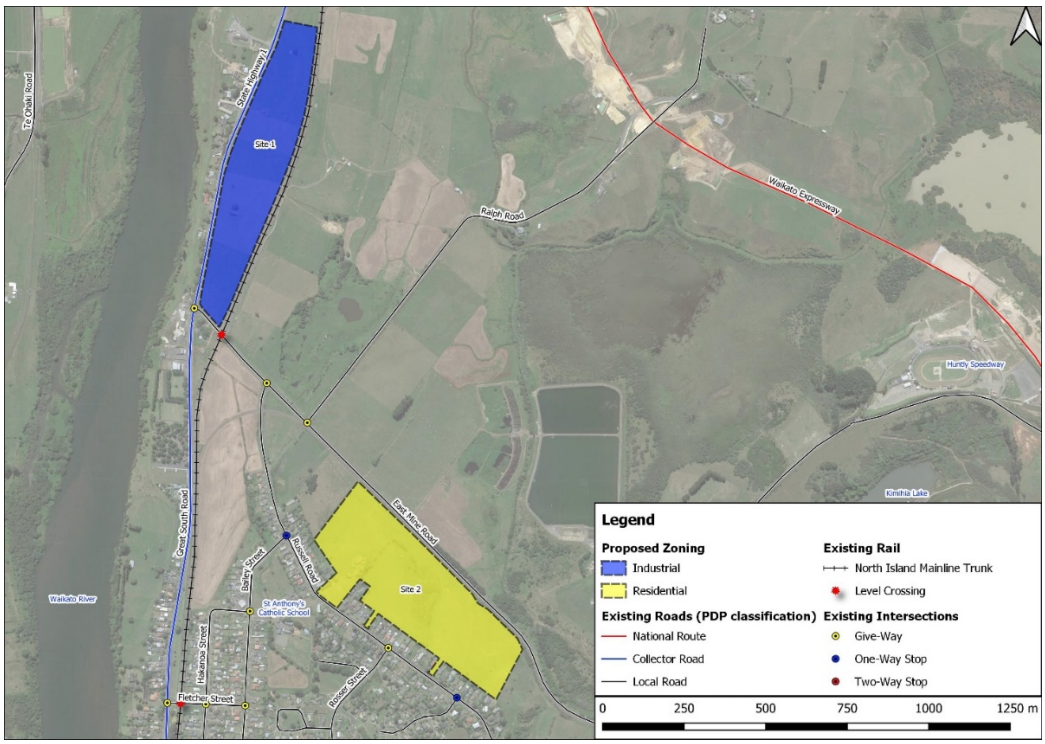
Proposal overview

9. Shand seeks to change the zoning of two parcels of land located in Huntly North from the current rural zoning to industrial and residential zoning to

enable the development of 13.07 ha of industrial land and approximately 17.46 ha of residential development. The two sites are located to the north of the current urban boundary of Huntly township. Figure 1 below illustrates the locality and extent of the two rezoning sites.

10. Given the close proximity of Site 1 to the North Island Main Trunk Line (**NIMT**), there is potential for a rail siding access to the NIMT to be provided within the proposed industrial precinct. However, as a conservative approach, the effects assessment was undertaken on the basis that no rail siding would be provided and therefore all freight trips are by road.

Figure 1: Proposed Rezoning



Predicted trip generation

11. On the basis of conservative trip generation rates provided in industry recognised trip generation databases and publications, the proposed rezoning sites are anticipated to generate up to 3,830 trips per day and 675 trips during the peak hour.

12. Based on the existing mode share for public transport, walking and cycling trips in Huntly East, approximately 45 commuter and 60 walking and cycling trips per day are anticipated to be generated by the land use activities allowed for within the proposed rezoning sites.

Transportation effects assessment and proposed mitigation measures

13. The overall transportation effects of the rezoning proposals on the adjoining network are expected to be no more than minor, particularly given the significantly reduced traffic volume on Great South Road since the opening of the Huntly section of the Waikato Expressway (**WEX**) in early 2020 moved State Highway 1 (**SH1**) traffic out of Huntly. Additionally, the close proximity of the rezoning sites to existing public transport services and walking and cycling facilities provide some choice of travel mode rather than reliance on private car travel for every trip.

14. Capacity assessments for existing road corridors and intersections within the vicinity of the rezoning sites show that the future traffic associated with this proposal is unlikely to adversely affect the performance and safety of the local road network. Sensitivity testing using varying trip distribution figures confirms that safety and capacity improvement works on the existing network are unlikely to be triggered by the additional traffic from the rezoned sites.

15. The anticipated public transport demand will be serviced by the existing public transport services within Huntly. Both sites are ideally located in close proximity to the regional bus services operated by the Waikato Regional Council, as well as the future Huntly passenger rail station for connection to and from Auckland.

16. A network of footpaths (with cyclists sharing the traffic lane) have been recommended as part of future road cross-sections within the rezoning sites to service the anticipated walking and cycling trips. The proposed

footpaths will connect the sites to the existing on-road walking and cycling facilities along the surrounding road network.

17. While it is anticipated that the rezoning traffic will not adversely affect the safe operation of the NIMT level crossings on East Mine Road and Fletcher Street, KiwiRail have requested that a Level Crossing Safety Impact Assessment (**LCSIA**) be conducted as part of the future subdivision consents to assess any potential safety effects of the additional traffic and walking and cycling trips on the existing level crossings.

18. Separate resource consents will be required for each earthworks/ construction phase to determine and mitigate the associated construction traffic effects, if any. The construction traffic effects are likely to be manageable for the duration of works through conditions of consent as is standard practice, including the requirement for a specific Construction Traffic Management Plan. There are no unique construction transport related issues anticipated.

SITE DESCRIPTION AND LOCATION

19. Site 1 is bordered by SH1/ Great South Road to the west, the NIMT railway to the east and East Mine Road to the south. Site 2 is located to the south of East Mine Road and adjoins the existing northern urban boundary of Huntly.

20. Both sites presently contain one dwelling and are used for agricultural activities with the majority of the land comprising pasture. Access to the dwellings and the existing paddocks are provided via several accesses along Great South Road, East Mine Road and Russell Road.

EXISTING TRANSPORT ENVIRONMENT

SH1/Great South Road

21. SH1/Great South Road previously formed part of the nationally strategic state highway network maintained by Waka Kotahi New Zealand Transport Agency (**Waka Kotahi**). Now that the Huntly section of the WEX is open to traffic and identified as SH1, the road will be put through a revocation process on 1 July 2021. It will then become a district road managed by Waikato District Council (**WDC**). Accordingly, the section of Great South Road between the SH1 Expressway and Rayner Road is classified in the PDP as a collector road.

22. Automatic tube counters were used in October 2020 to collect classified vehicle count data over a seven-day period that was then compared against the last recorded Average Daily Traffic (**ADT**) volume on the road[1]. At the time of our data collection, Great South Road had an ADT of 4,760 vpd (five-day average) with 6% heavy commercial vehicles (**HCV**). This confirms that the ADT on the road has reduced significantly (by over 18,500 vpd) since to the opening of the Huntly Bypass, but remains more than double the current estimates by WDC.

23. The section of the road fronting Site 1 has a posted speed limit of 70 km/h. Gated 70/100 km/h speed threshold treatment signs are provided approximately 240 m and 900 m north of the East Mine intersection. An 85th percentile vehicle operating speed of 83.9 km/h was recorded along the section of the road fronting Site 1, showing that the environment is still largely rural.

[1] Based on traffic data sourced from Mobile Road, Great South Road previously had an Average Daily Traffic (ADT) volume of approximately 23,300 vehicles per day (vpd) with approximately 15.6% being heavy commercial vehicles (HCV). This ADT was estimated based on data that was collected in late 2019 when the road carried SH1 traffic, prior to the completion and opening of the Huntly section of the WEX. Traffic volume estimates on the WDC website show Great South Road is now considered to carry an ADT volume of approximately 2,000 vpd.

WDC roads

24. East Mine Road, Russell Road, Bailey Street, and Fletcher Street provide access to the existing residential area in Huntly East via the intersections of Great South Road/East Mine Road and Great South Road/Fletcher Street.

25. These roads are all classified as local roads in the Operative District Plan (**ODP**) and PDP and have an ADT of less than 1,500 vpd. The urban sections of these roads have posted speed limits of 50 km/h to 70 km/h.

26. The NIMT railway line crosses East Mine Road and Fletcher Street at-grade. The level crossings are currently active control with flashing lights, bells, and barrier arms.

Proposed rezoning and anticipated development yield

27. Preliminary concept subdivision plans were developed to show a feasible subdivision layout that could be achieved within the two sites. (Refer to Drawings 144370-02-001 and 144370-02-002 in Appendix A of the **Attachment 1**).

28. Based on the preliminary subdivision plans, a net developable area of 11.47 ha is achievable within Site 1. This assumes that the existing overhead powerlines on the south-western corner of the site would be rerouted underground, and thus opening this land up for development. Adopting a conservative figure of 50% site coverage as Gross Floor Area (**GFA**), Site 1 could realistically yield approximately 57,350 m^2 GFA of industrial activity.

29. For Site 2, while Shand proposes rezoning the entire 17.46 ha site to residential, a significant portion of the site is low lying and resultantly lies within a floodplain. Due to these constraints, the low-lying areas within Site 2 are not feasible to develop and have been identified instead as wetland. The resulting net developable area is 9.79 ha. On the basis that

lot sizes[2] would range between 500 m^2 and 1,500 m^2, approximately 85 dwelling units could potentially be provided within the rezoned site.

Internal transport network

30. A network of internal local roads has been designed at a concept level to demonstrate how the two sites could be serviced. The street hierarchy, which is illustrated in **Figure 2** on the following page, has been guided by the minimum access and road performance standards set out in Table 14.12.5.14 of the PDP, as well as Table 3.2 of the New Zealand Standard (**NZS**) 4404:2010.

31. Road Type 1 and 2 (both industrial local roads) and Road Type 4 (residential local road) have adopted and comply with the PDP standard for local roads.

32. **Figure 3** on the following page illustrates the locality and configuration of Road Type 3, while **Figure 4** shows the proposed cross-section through the road typology. As shown in both figures, a road reserve width of 15 m is proposed because the area within which the road typology is located is constrained as there are residential lots located on both sides of the road reserve boundary. In order to provide the minimum required 20 m road reserve width, additional land would need to be purchased from the adjacent private residential lots. In my opinion, the narrower width is acceptable and workable for this specific area due to the relatively short (60 m) road sections.

[2] The average lot sizes have been generally guided by the PDP Residential Zone Subdivision rules (Rule 16.4.1 of the PDP specified that proposed lots should have a minimum net site area of 450 m^2) as well as the lot sizes of the surrounding residential dwellings (which are in the range of 650 m^2 to 1,800 m^2).

Figure 2: Proposed Internal Transport Network and Site Accesses

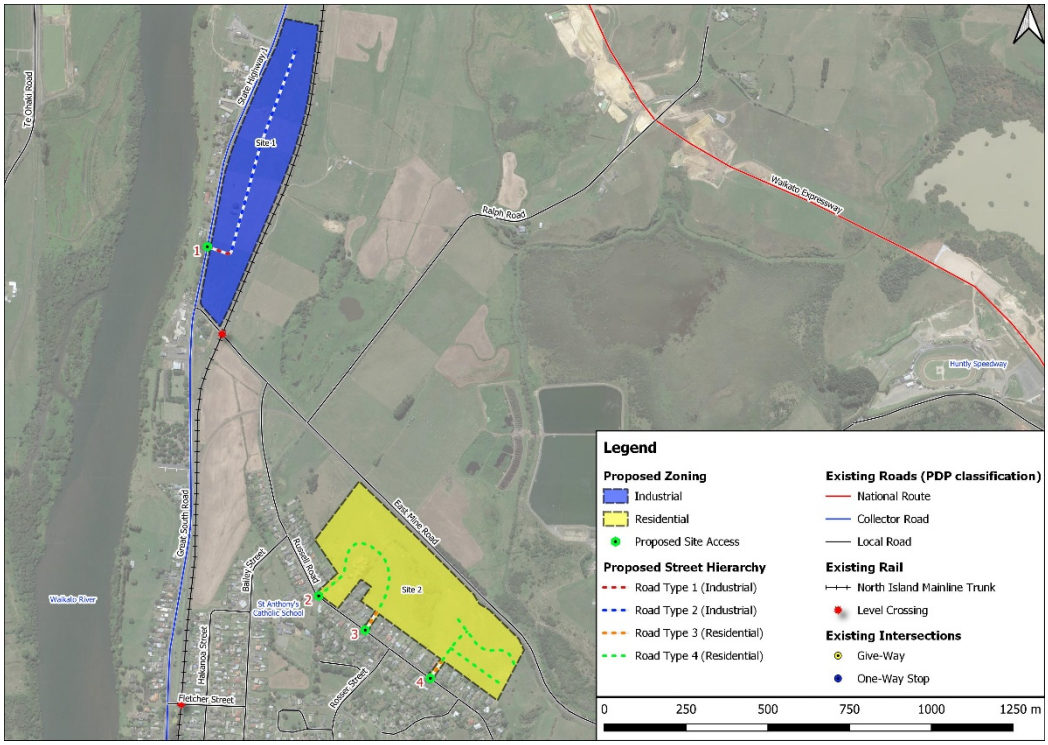
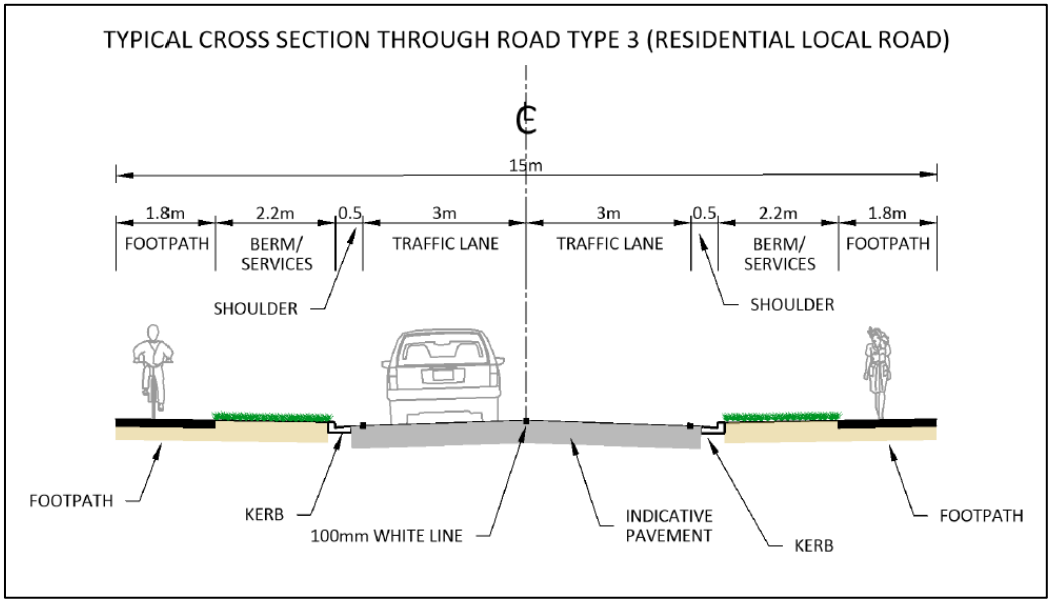


Figure 3: Location and Configuration of Road Type 3

Figure 4: Proposed Cross-section Through Road Type 3



33. As shown in **Figure 4**, parking facilities have not been proposed on either side of the road for Road Type 3; while this is not in accordance with the provisions in the PDP, I consider this to be appropriate as sufficient alternative parking has been provided along Russell Road and internally within the development.

Site access proposals

34. As shown in **Figure 2**, four new road intersections are likely to be required to service the future developments, including one new T-intersection on Great South Road (i.e. Intersection 1 in **Figure 2**) located approximately 200 m north of the East Mine Road T-intersection to service the Industrial site and three new T-intersections (Intersection 2 to 4 in **Figure 2**) on Russell Road to service the Residential site. Drawings 144370-02-0200, 144370-02-0201, 144370-02-0202 and 144370-02-0203 in Appendix A of **Attachment 1** illustrate the conceptual intersection configurations. The appropriate control (either a Stop or Give-Way) for each intersection will be determined at detail design stage.

35. Proposed Intersection 1 on Great South Road:

(a) While the proposed intersection does not comply with Rule 14.12.1.1(e) of the PDP[3], in my opinion the proposed location is appropriate given that the southern boundary of the site (bordering East Mine Road) is very short (approximately 90 m long) and is constrained at either end by the NIMT level crossing and the intersection of East Mine Road and Great South Road. Positioning a new access along this short 90 m section will not meet the PDP's minimum separation or safe intersection sight distances (**SISD**) requirements. In my opinion, it would also create a more complex traffic environment in close proximity to the rail level crossing.

(b) A right-turn bay treatment is recommended at the intersection on Great South Road, in line with the turning volume warrants provided in the Austroads Guide to Road Design manual Part 4A. The desirable treatment for use in an urban situation[4] is 50 m long including a 20 m long diverge taper, and 30 m right turn bay.

(c) If the new road intersection is approved at the proposed location, the gated 70/100 km/h speed threshold treatment that is currently located approximately 40 m north of the proposed intersection location would have to be removed. In my opinion, no adverse safety effects are likely by its removal because a newer 70/100 km/h threshold treatment exists approximately 700 m north of the proposed access intersection.

(d) To improve night-time visibility and thus the safety of the intersection, it is recommended that street lighting be incorporated into the intersection design and integrated with the existing lighting already provided on Great South Road.

[3] Rule 14.12.1.1(e) of PDP specifies that sites with frontage to two roads should access only from the road with the lower classification.
[4] Refer to Manual of Traffic Signs and Markings Part 2.

36. In my opinion, a right-turn bay treatment is unlikely to be required at the three T-intersections on Russell Road (i.e. Intersection 2 to 4) given the low volume and low speed environment on Russell Road.

37. The proposed road access locations for each site are considered appropriate for the following reasons:

    (a) All four proposed intersections are expected to have good sight lines in all directions, complying with the minimum required SISD for the surrounding speed environment.

    (b) The proposed intersection locations comply with the PDP's minimum intersection separation requirements.

    (c) While the proposed intersections do not fully comply with the minimum access separation requirements to the nearest vehicle crossing on the basis of the observed/estimated operating speed, the available access separation distance is considered suitable and acceptable because:

        (i) The nearby vehicle crossings are all private property accesses and will likely only generate approximately one vehicle movement per peak hour based on typical generation rates of a residential dwelling. The small amount of traffic is unlikely to cause regular conflict with the traffic from the subject site.

        (ii) There are numerous existing private accesses on Russell Road which are separated by less than 30 m from an existing intersection which have no significant safety issues. Based on assessment of the crash data, there has only been one crash (which did not result in any injuries) in the previous 10 years which was related to a vehicle access (i.e. a vehicle either turning into or out of a private access). The low speed

environment would ensure that the likelihood and severity of crashes are minimised.

38. Based on observations made related to the constraints on site, the following in relation to Intersection 4 will require specific design consideration as part of the future subdivision consents:

(a) As shown in **Figure 5** below, there is a retaining wall structure on the northern side of Russell Road to the immediate west of Intersection 4 due to the significant height difference between Russell Road and the existing properties located to the north of Russell Road. A retailing wall structure or embankment stabilisation works would likely be required on the western side of the proposed intersection and access road to compensate for these level differences.

Figure 5: Existing roading layout in the vicinity of Intersection 4

(b) In my opinion, the available separation distance to the nearest private access to Intersection 4 (i.e. 110 Russell Road) is not sufficient. The driveway for the property is spaced approximately 10 m from the proposed intersection. While there are several driveways off Russell Road that are located less than 15 m from an intersection, I consider that the existing driveway should be relocated and access provided within the new access road (and not off Great South Road).

This would require consultation with and agreement from the affected property owner.

39. Notwithstanding the above, the location and access design of the proposed intersections will be subject to planning and engineering approvals from WDC which will be finalised at the time of development.

PREDICTED TRIP GENERATION

Predicted trip generation

40. Based on trip rates derived for similar proposed land use activities[5] using the Waikato Regional Transportation Model (**WRTM**), the proposed industrial and residential rezoning sites at Huntly could be expected to generate approximately 3,110 trips per day combined, and 300 trips during the peak hour.

41. However, to ensure a conservative effects assessment, I based the trip generation calculations on trip rate data provided in industry standard trip generation publications which are generally higher than the WRTM based trip rates. On this basis, the proposed rezoning sites are predicted to generate approximately 3,830 trips per day and 675 trips during the peak hour. It is the peak hour flow rates that intersection capacity and safety effects are assessed with.

Predicted trip distribution

42. The distribution pattern of new trips on the external network was based on the existing observed travel patterns in Huntly (where a higher number of trips travels to and from the south than north) as well as future growth projections within the Waikato district[6]. On this basis, I assumed that 35%

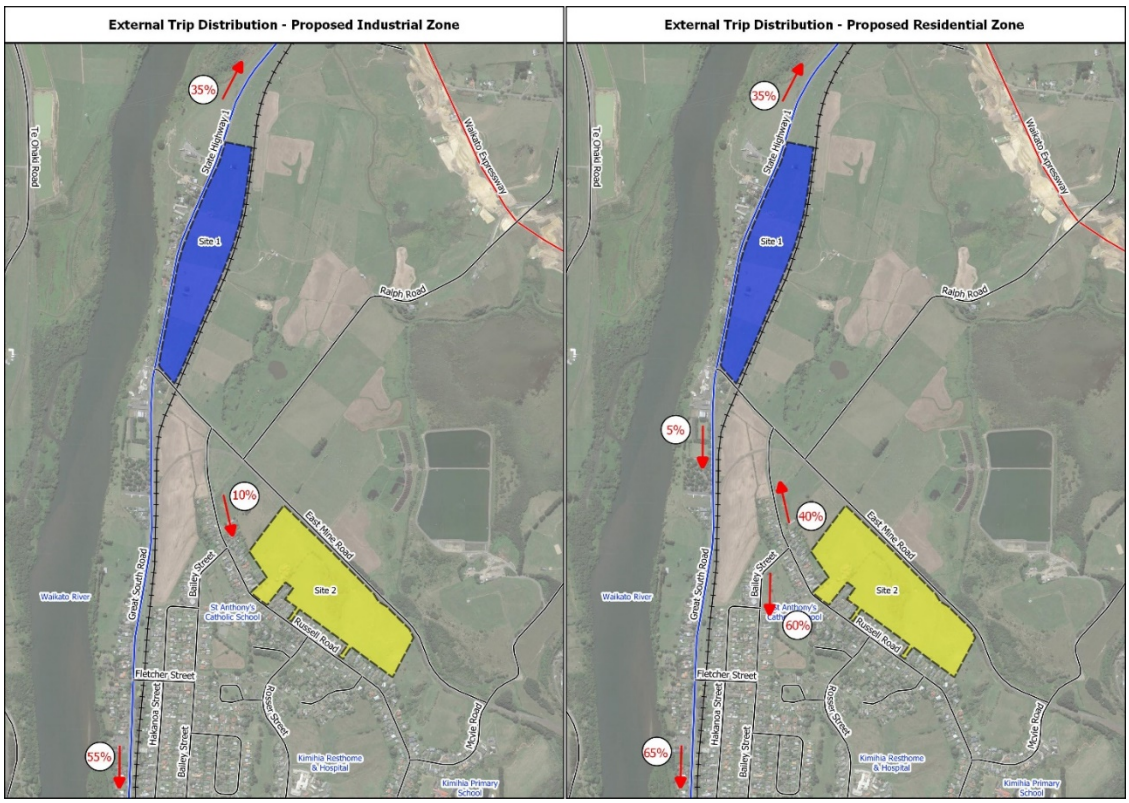
[5] Including the proposed Ohinewai Rezoning and Structure Plan project in Ohinewai, the consented Ruakura Plan Change in Hamilton, and the consented Te Awa Lakes Rezoning in Hamilton.

[6] Significant growth in the district is expected along the southern population centres such as Hamilton.

of the traffic associated with the rezoning proposals would travel north, and the remaining 65% will travel south (to Huntly CBD or further south) and/or east to the existing Huntly East residential area. The predicted trip distribution is illustrated in **Figure 6** below.

43. Sensitivity testing of what I considered the worst-case trip distribution scenario was conducted to analyse the effect of alternative external traffic distributions on the performance and safety of the surrounding road network. The sensitivity scenario tested the assumption that 10-20% of the traffic associated with the rezoning proposals would travel north, and the remaining 90-80% will travel south and/or east.

Figure 6: Predicted Trip Distribution



Transportation effects assessment and proposed mitigation measures

44. The effects assessment was conducted on the basis of a 10-year assessment period (i.e. 2030/2031), in line with the anticipated medium to long term development period. The 2030/31 traffic demand projections

were estimated based on the medium to long term population, household, and labour force projections by WRC[7] for Huntly Township.

45. On the basis of the population growth projections, an annual traffic growth rate figure of 1.5% was applied to road links and intersections within the surrounding road network. The historic growth in traffic along the surrounding road corridors was not factored into the horizon year traffic demand given the recent opening of the Huntly WEX and the resulting "watershed" change in travel patterns through Huntly. In my opinion, the historic traffic growth on Great South Road would not appropriately reflect future traffic growth and travel purpose.

46. While this assessment has not included the likely resulting growth in traffic on Great South Road as a result of the proposed Ohinewai Structure Plan (**OSP**) and rezoning[8], sensitivity testing was conducted to assess the impact of including the OSP rezoning traffic onto Great South Road.

Effects assessment – road corridors

47. Traffic volumes on the existing roads are expected to increase by the following if development of these two sites occurs:

    (a) Great South Road from approximately 5,300 vpd to between 6,500 and 7,500 vpd;

    (b) East Mine Road from approximately 1,000 vpd to 1,650 vpd;

    (c) Russell Road from approximately 1,000 vpd to 2,500 vpd;

[7] According to the Waikato Regional Council Technical Report 2016/03 titled "*Land use, demographic and economic projections for the Waikato region, 2013 to 2063*", the population of Huntly East and Huntly West is estimated to grow by approximately 1% per annum over the next 30 years. The report projected a similar growth rate (i.e. 1% per annum) for households and the labour force.

[8] At the time of writing this statement of evidence, a decision from the independent hearings panel related to a rezoning proposal and Structure Plan for land located in Ohinewai was pending. Based on the WRTM based assessment for the OSP area, the proposed rezoning is projected to add approximately 4,500 vpd and 700 trips during the peak hour on Great South Road.

(d) Bailey Street from approximately 1,200 vpd to 1,800 vpd; and

(e) Fletcher Street from approximately 1,700 vpd to 2,200 vpd.

48. The effects of the rezoning proposal on the capacity, efficiency and safety of the surrounding road corridors is likely to be negligible based on the following:

(a) There is ample spare capacity[9] available to accommodate the increased daily traffic volumes associated with the proposed rezoning, especially given the low volumes that presently exist since the opening of the Huntly WEX.

(b) Even with the inclusion of the proposed OSP traffic to the road network, Great South Road will continue to operate at better levels of service than when it was carrying over 23,000 vpd.

(c) An assessment of crash data for the previous five-year period showed that while a number of crashes were recorded along Great South Road and Russell Road:

(i) The road safety risks along Great South Road will have been significantly reduced with the reduced volume of traffic on this road.

(ii) The road safety risks along Russell Road are considered low given the low speed environment and that the observed crashes did not result in any deaths or serious injuries.

[9] According to Table 4.3 of the RTA's Guide to Traffic Generating Developments, the typical mid-block capacity of a two-way urban road with adjacent parking bays is 1,800 vehicles per hour.

Effects assessment – existing intersections

49. I consider that the effects of the rezoning proposal on the capacity and safety of the surrounding intersections[10] is likely to be negligible to no more than minor in scale based on the following:

    (a) Performance assessments indicate that the surrounding intersections will continue operating at acceptable levels of service with the rezoning traffic added to the network.

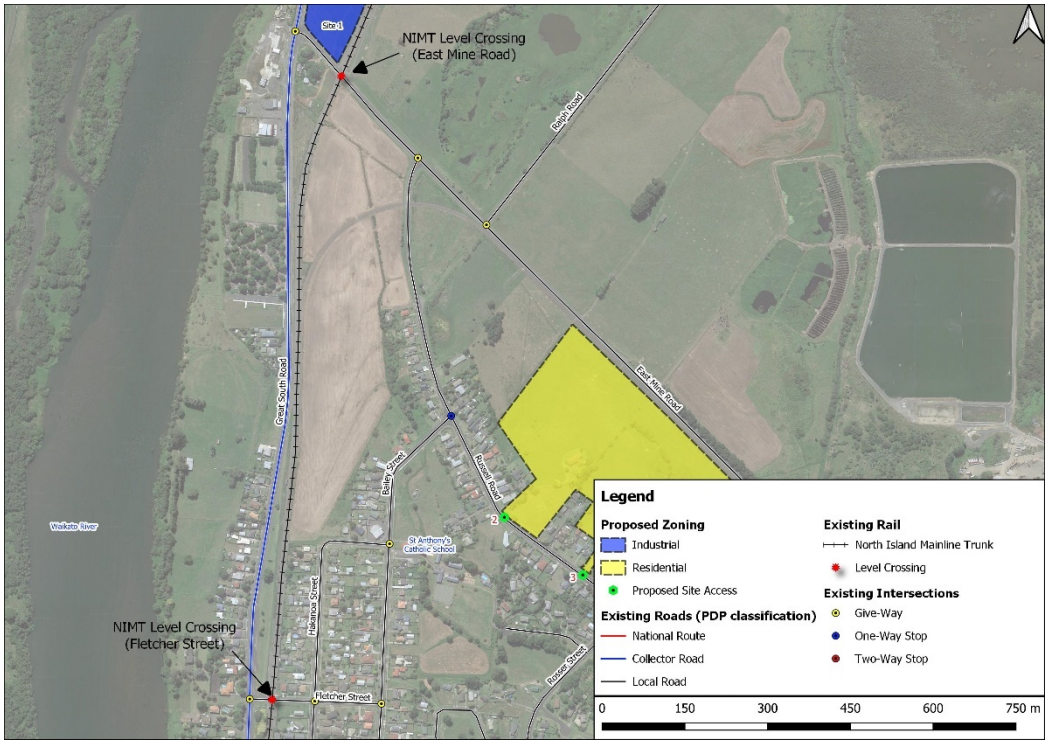
    (b) An assessment of the crash history shows that a total of seven crashes were recorded at three[11] of the surrounding intersections in the previous five-year period, all of which were caused by driver negligence[12]. I considered that the road safety risk at these three intersections is low given that the risk ratings for the intersections are "Low" personal risk, and "Low" collective risk on the basis of Waka Kotahi's High-Risk Intersection Guide (**HRIG**) assessment, and that the crashes did not result in any in any deaths or serious injuries.

NIMT level crossing assessment

50. **Figure 7** below illustrates the locality of the existing NIMT level crossings on East Mine Road and Fletcher Street. Based on the trip distribution assumptions, the rezoning traffic is anticipated to result in a 68% (i.e. an additional 660 vpd) and 33% (i.e. an additional 555 vpd) increase in the ADT on East Mine Road and Fletcher Street, respectively.

[10] Intersections assessed included the intersections of Great South Road and East Mine Road, East Mine Road and Russell Road, Russell Road and Bailey Street, Russell and Rosser Street and Great South Road and Fletcher Street.
[11] Including the intersections of Russell Road and Bailey Street (two crashes), Russell and Rosser Street (one crash) and Great South Road and Fletcher Street (four crashes).
[12] A driver either falling asleep behind the wheel or failing to stop and colliding with a vehicle.

Figure 7: Locality of the existing NIMT level crossings on East Mine Road and Fletcher Street



51. While I anticipate that the rezoning traffic will not adversely affect the safe operation of the level crossing on East Mine Road or Fletcher Street, KiwiRail has been consulted (refer to the meeting notes attached in Appendix E of **Attachment 1**) and they require that a LCSIA be conducted as part of the future subdivision consents to assess the safety effects of the rezoning traffic on the existing level crossings, and determine whether any safety improvements for traffic or active modes area required to bring the crossings down to "Low" or "Low/Medium" risk scores.

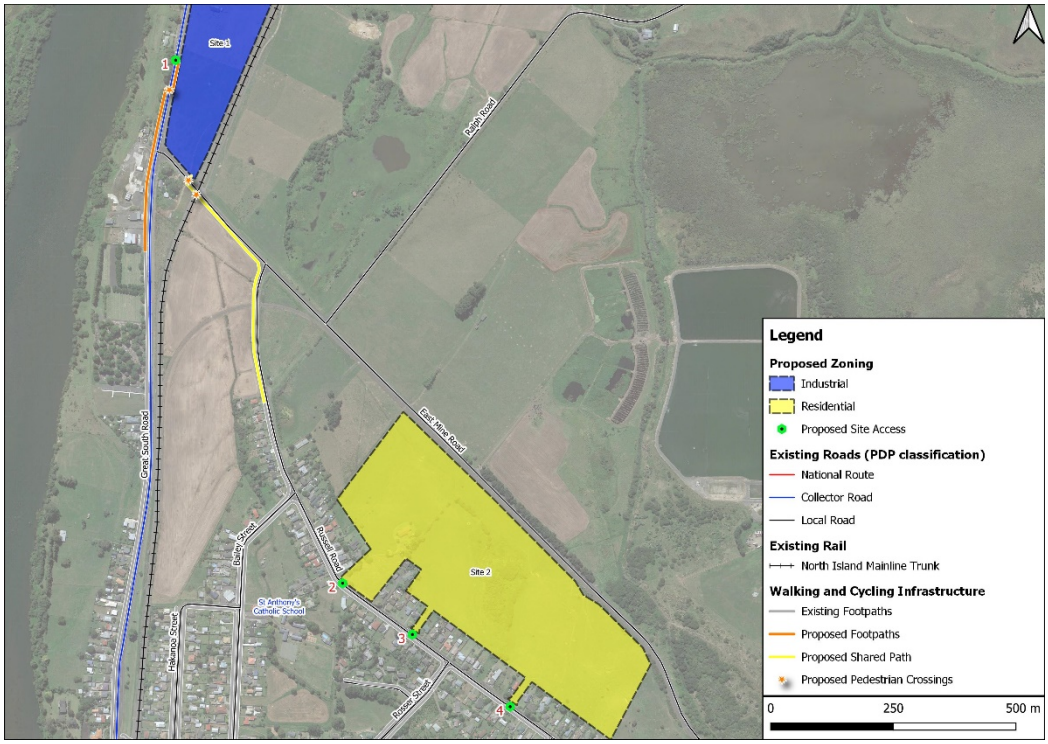
52. On this basis, I recommend that the undertaking of an LCSIA be required through a rule in the PDP that is triggered at the time of the first subdivision consent in either the Residential or Industrial site.

Walking and cycling

53. 1.8 m wide footpaths are proposed on both sides of the proposed local road network within both rezoning sites consistent with the PDP standards.

Similar to the surrounding local road network, cyclists are proposed to share the carriageway space with vehicles. **Figure 8** illustrates the proposed connection of the proposed walking infrastructure within the rezoning sites to the existing walking and cycling facilities.

Figure 8: Proposed Walking and Cycling Infrastructure



54. As shown in **Figure 8**, while no formal pedestrian and cyclist facilities are presently available along the section of Great South Road that fronts Site 1, there is an existing footpath located approximately 400 m south of the proposed new intersection on Great South Road (i.e. Intersection 1) on the western side of Great South Road. The proposed walking infrastructure within the site are proposed to be extended to Great South Road and connect to the existing footpath as follows:

    (a) A new 1.8 m wide pedestrian footpath is proposed on the eastern side of Great South Road which extends from Intersection 1 to approximately 140 m north of the East Mine Road T-intersection, with a new pedestrian crossing facility (a new pedestrian refuge

island within the central flush median – refer to Figure 9 below) at this location.

Figure 9: Proposed new pedestrian crossing facility on Great South Road

(b) It is proposed that the existing pedestrian footpath on the western side of Great South Road be extended to the proposed pedestrian crossing facility.

(c) It is also proposed that, as part of any future urbanisation upgrade works along Great South Road[13], painted cycle lanes to and from Huntly CBD be provided within the existing sealed shoulder.

55. The internal walking network within Site 2 is proposed to connect to the existing footpath on the southern side of Russell Road via kerb crossings on either side of the proposed intersections.

[13] Once SH1/ Great South Road is revocated to WDC as a district road, it is probable that Council will in future revise the existing road cross-section to better reflect the collector road function (a mix of property access and mobility) including provision for active transport modes (walking and cycling) in line with the provisions in Table 14.12.5.14 of the PDP.

56. For walking and cycling connections between the two sites, a 2.5 wide shared path is proposed to be provided on the southern side of East Mine Road and western side of Russell Road extending from the southern boundary of Site 1 to the existing footpath on Russell Road. The new shared path is approximately 485 m in length. Two new pedestrian and cyclists crossing facilities would be required: one crossing over the NIMT and another over East Mine Road (approximately 30 m east of the existing level crossing).

Public transport

57. While Site 1 is located adjacent to the Northern Connector bus route, the nearest bus stop is located approximately 1.5 km walking distance from the site. Given the close proximity of the regional bus service to Site 1, a bus stop facility could potentially be provided on both sides of Great South Road near Intersection 1, with a suitable pedestrian crossing and refuge facility in the centre of the road for added safety should the Huntly North area be urbanised in future. The provision of these facilities would ensure that public transport becomes an integral part of the travel options for workers within the site.

58. Site 2 is considered to be well served by the existing public transport services within Huntly. The closest bus stop to the site (at 115 Russell Road) is located within the generally accepted maximum comfortable walking distance of 600 m.

Construction traffic management

59. Development of the rezoning sites is likely to occur in stages over a 10-year period, subject to market conditions. Separate resource consents will be required for each earthworks/construction phase to determine and mitigate the associated transport related effects (including safety effects), if any.

60. The construction traffic effects should be managed for the duration of works through conditions of consent, including the requirement for a specific Construction Traffic Management Plan.

CONCLUSION

61. On the basis of the assessments carried out, I consider that the overall transportation effects of the Huntly North rezoning proposal on the adjoining road network are likely to be negligible to no more than minor in scale given the low volumes of traffic that presently exists in the area and the close proximity of the rezoning sites to existing public transport services, and walking and cycling facilities.

62. In my opinion, the transport infrastructure and further assessments recommended in this statement of evidence relating to safety, connectivity and accessibility for all anticipated vehicle and active travel modes ensure a safe and efficient transport network for pedestrians, cyclists, motorists and public transport commuters.

Rhulani Matshepo Baloyi

17 February 2021

Attachment 1

Integrated Transport Assessment

Shand Properties Limited

Huntly North Rezoning

Contract number/s: 144370

Integrated Transport Assessment

9 December 2020

BLOXAM BURNETT & OLLIVER

Document control

Project identification		
Client	Shand Properties Limited	
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Job number/s	144370	
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Contract numbers	N/A	
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Version	**Changes**	**Signature**	**Issue date**
V1	Internal Review		13/11/2020
V2			
V3			

Table of contents

1. Executive Summary

Huntly North Rezoning and Structure Plan

Shand Properties Limited ("Shand") seeks to change the zoning of approximately 30.52 ha of land located in Huntly North from the current rural zoning to industrial and residential zoning which will enable development of approximately 57,350 m^2 gross floor area (GFA) of industrial development and 85 residential lots.

Amendments to the Proposed District Plan (PDP) are sought to enable the development to occur in Huntly. This Integrated Transport Assessment (ITA) supports submissions to the PDP that seek to incorporate the proposed rezoning and embed a new Structure Plan for the Huntly North rezoning sites into the PDP. The ITA assesses the transportation effects of the proposal and outlines the recommended network upgrades to support the rezoning. This ITA report forms part of the overall Assessment of Environmental effects reporting for the rezoning in Huntly North.

Development Staging

If the rezoning request is successful, the development of the proposed rezoning sites is anticipated to occur over the medium to long term (i.e. a development period of approximately 10 years), subject to market conditions and resource consent processes.

Predicted Trip Generation

Based on trip rates derived from previous Waikato Regional Transportation Model (WRTM) based effects assessments for similar proposed land use activities, the proposed industrial and residential rezoning sites are anticipated to generate approximately 3,110 trips per day and 300 trips during the peak hour. However, as a conservative approach, the effects assessment was based on trip rate data provided in generally accepted trip generation manuals and publications[1]. On the basis of these higher trip generation rates, the proposed rezoning sites are anticipated to generate approximately 3,830 trips per day and 675 trips during the peak hour.

Site Access Proposals – New Intersections

New accesses are proposed on Great South Road and Russell Road as follows:

- Access to the proposed industrial rezoning site – one new T-intersection with a channelised right-turn treatment on Great South Road. The proposed intersection is located on Great South Road, approximately 200 m north of the East Mine Road intersection. It is recommended that street lighting be incorporated into the intersection design and integrated with the existing lighting already provided on Great South Road to improve visibility (especially during night-time) and to maximise the safety of the intersection.
- Access to the proposed residential rezoning site - three new T-intersections are recommended to service the future development of this site.

The four accesses/ intersections to the rezoning sites should be in general accordance with the form and location described in this ITA, however, the final access location and form should be confirmed during the subsequent subdivision design stages. The accesses/ intersections shall be designed in accordance with the provisions in the Waikato District Plan and the Regional Infrastructure Technical Specifications (RITS). The location and access design will be subject to planning and engineering approvals from Waikato District Council which will be finalised at the time of development.

Internal Road Network

[1] The published trip rates were found to be generally higher than the WRTM based trip rates.

A network of internal local roads (Road Type 1 to 4) has been designed at a concept level to demonstrate how the two sites could be serviced. The proposed internal road cross-sections generally comply with the standards set out in the PDP, as well as standards provided in Table 3.2 of the New Zealand Standard (NZS) 4404:2010 (Land Development and Subdivision Infrastructure). While the Structure Plan reflects the high-level network configuration, the finer details of the road network will be refined at future subdivision stages.

Car Parking

Parking within the proposed rezoning sites should be provided at the ratio listed in the relevant sections in the PDP, unless a separate resource consent is obtained to reduce the required number of parking spaces for a particular activity on the site. The exact number of parks will need to be determined during the detailed design phase once the exact land use and GFAs for each subdivision are confirmed.

East Mine Road and Fletcher Street Level Crossings

While it is anticipated that the rezoning traffic will not adversely affect the safe operation of the North Island Mainline Trunk (NIMT) level crossings on East Mine Road and Fletcher Street, KiwiRail have requested that a Level Crossing Safety Impact Assessment (LCSIA) be conducted as part of the future subdivision consents to assess any potential safety effects of the additional traffic and walking and cycling trips on the existing level crossings.

On this basis, it is recommended that the undertaking of an LCSIA be required through a rule in the PDP that is triggered at the time of the first subdivision consent in either the Residential or Industrial site.

Public Transport Infrastructure

On the basis of the existing mode share for public transport trips in Huntly East, approximately 45 commuter trips per day are expected to be generated by the land use activities within the proposed rezoning sites. The public transport demand is anticipated to be serviced by the existing public transport services in Huntly. Both rezoning sites are ideally located in close proximity to the regional public transport service as well as the future Huntly passenger rail station.

Given the close proximity of the existing regional bus service to Site 1, there is opportunity to provide a bus stop in Huntly North along the existing bus route should the area be urbanised in future. A bus stop facility could potentially be provided on both sides of Great South Road near Intersection 1, with a suitable pedestrian crossing and refuge facility in the centre of the road for added safety. The provision of these facilities would ensure that public transport becomes an integral part of the travel options for workers within the site. It is recommended that consultation with WRC be undertaken to investigate the potential of providing a bus stop on Great South Road near Site 1 and the proposed pedestrian crossing point.

Walking and Cycling Infrastructure

Walking and cycling linkages are critical for promoting public health and reducing vehicle dependency for short trips. On the basis of the existing mode share for walking and cycling trips in Huntly East, approximately 60 walking and cycling trips per day are expected to be generated by the land use activities within the proposed rezoning sites once fully developed. A network of footpaths (with cyclists sharing the movement lane) have been recommended as part of the future road cross-sections within the rezoning sites. These footpaths will connect the rezoning sites to the existing on- and off-road walking and cycling facilities along the surrounding road network as follows:

Industrial site:

- A new 1.8 m wide pedestrian footpath is proposed on the eastern side of Great South Road which extends from Access Intersection 1 to approximately 140 m north of the East Mine Road intersection, with a new pedestrian crossing facility (a new pedestrian refuge island within the central flush median) provided at this location.

- It is proposed that the existing pedestrian footpath on the western side of Great South Road (which currently terminates approximately 400 m south of Access Intersection 1) be extended to the proposed pedestrian crossing facility. The new footpath on the western side of Great South Road will be approximately 340 m in length.
- It is also proposed that, as part of any future urbanisation upgrade works along Great South Road, painted cycle lanes to and from Huntly CBD be provided within the existing sealed shoulder.

Residential site:

- The internal walking network within the rezoning site is proposed to connect to the existing footpath on the southern side of Russell Road via kerb crossings on either side of the proposed intersections.

Walking and cycling connections between the two sites:

- A new 2.5 wide shared path is proposed on the southern side of East Mine Road and western side of Russell Road, which extends from the southern boundary of Site 1 to the existing footpath on the western side of Russell Road. The new shared path would be approximately 485 m in length.
- Two new pedestrian and cyclists crossing facilities would be required: one crossing over the NIMT and another over East Mine Road (approximately 30 m east of the existing level crossing).

Construction Traffic Effects

Separate resource consents will be required for each earthworks/ construction phase to determine and mitigate the associated transport related effects (including safety effects), if any. The construction traffic effects should be managed for the duration of works through conditions requiring specific Construction Traffic Management Plans (CTMPs).

2. Introduction

2.1 Background

Shand Properties Limited ("Shand") is seeking, via submissions to the Proposed District Plan (PDP), to re-zone land located in Huntly East from the current rural zoning to residential zoning, and land located to the north of Huntly from rural to industrial zoning.

In their original submission to Waikato District Council (WDC), dated 9 October 2018, Shand identified three parcels of land (identified as Site 1, 2 and 3 in their original submission with a total area of approximately 97 ha) for rezoning. Subsequent to the lodgement of the submission, technical experts were engaged to better understand the feasibility of the rezoning request, and as a result of these findings, the area of land requesting to be rezoned has been reduced in size to approximately 30.5 ha.

Shand intends developing the 30.5 ha of land over the medium to long term (i.e. a development period of approximately 10 years), subject to market conditions and resource consent processes.

2.2 Report Purpose

This report is an Integrated Transportation Assessment (ITA) completed in accordance with the provisions of Waka Kotahi NZ Transport Agency's (Waka Kotahi) guideline document, published 1 June 2012, which outlines Waka Kotahi's preferred methodology for undertaking integrated transport assessments. It provides an assessment of the expected trip generation and associated land transport related effects of the proposed development and identifies the necessary mitigation measures to satisfactorily address those effects.

This ITA report has been prepared on behalf of Shand as a technical input to the overall Assessment of Environmental Effects reporting for the rezoning at Huntly North. The scope of the ITA included the following:

- An assessment of the existing transportation environment in the vicinity of the site, including investigating whether any crash history exists that could highlight safety issues in that vicinity of the road network, using Waka Kotahi's CAS database.
- Estimation of the expected trip generation and traffic distribution of the proposed development and address any potential impacts that those trips could cause on the immediate adjoining road network.
- Investigation into the preferred access locations and layout details of the preferred access locations, with an assessment against the District Plan access formation standards.
- Description of the effects of the proposed development traffic on the performance and safety of the existing key roads supporting the site. These roads include State Highway 1/ Great South Road, East Mine Road, and Russel Road.
- Identification of the existing and likely future public transport and active mode (walking and cycling) demands, network provisions and infrastructure needed to support and promote mode neutral travel choices for the future workers and residents of the proposed rezoning sites.
- Description and assessment of the likely construction transportation effects on the network.
- Description of the relevant transportation policies and how the proposed development aligns with these, including the Waikato Regional Land Transport and Public Transport Plans, and the Government Policy Statement on Land Transport (2018).

2.3 Site Description and Location

The locality of the rezoning sites is shown in Figure No. 1, while the land holding plan is illustrated in Figure No. 2 (and in Appendix A).

Figure No. 1: Locality Map

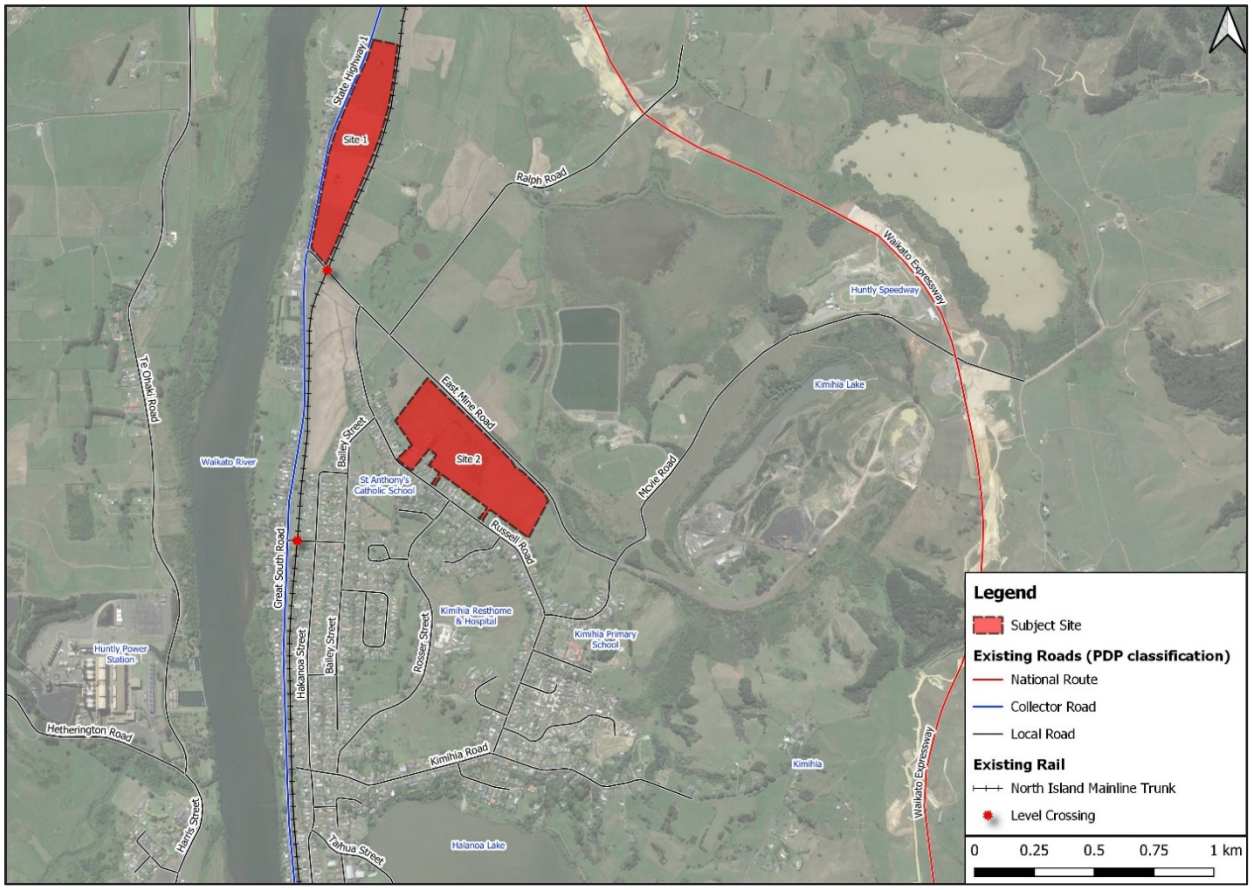
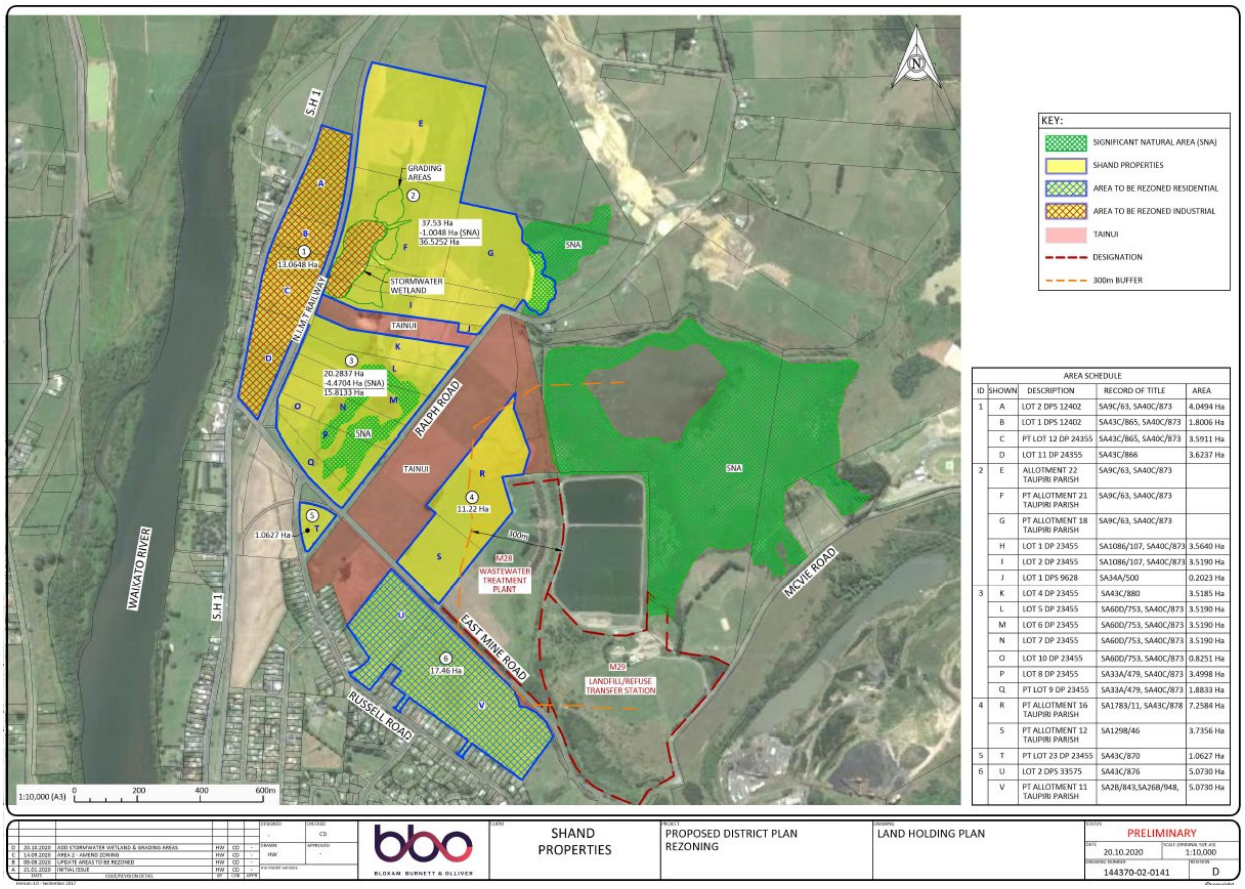


Figure No. 2: Land Holding Plan



AREA SCHEDULE				
ID	SHOWN	DESCRIPTION	RECORD OF TITLE	AREA
1	A	LOT 2 DPS 12402	SA9C/63, SA40C/873	4.0494 Ha
	B	LOT 1 DPS 12402	SA43C/865, SA40C/873	1.8006 Ha
	C	PT LOT 12 DP 24355	SA43C/865, SA40C/873	3.5911 Ha
	D	LOT 11 DP 24355	SA43C/866	3.6237 Ha
2	E	ALLOTMENT 22 TAUPIRI PARISH	SA9C/63, SA40C/873	
	F	PT ALLOTMENT 21 TAUPIRI PARISH	SA9C/63, SA40C/873	
	G	PT ALLOTMENT 18 TAUPIRI PARISH	SA9C/63, SA40C/873	
	H	LOT 1 DP 23455	SA1086/107, SA40C/873	3.5640 Ha
	I	LOT 2 DP 23455	SA1086/107, SA40C/873	3.5190 Ha
	J	LOT 1 DPS 9628	SA34A/500	0.2023 Ha
3	K	LOT 4 DP 23455	SA43C/880	3.5185 Ha
	L	LOT 5 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
	M	LOT 6 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
	N	LOT 7 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
	O	LOT 10 DP 23455	SA60D/753, SA40C/873	0.8251 Ha
	P	LOT 8 DP 23455	SA33A/479, SA40C/873	3.4998 Ha
	Q	PT LOT 9 DP 23455	SA33A/479, SA40C/873	1.8833 Ha
4	R	PT ALLOTMENT 16 TAUPIRI PARISH	SA1783/11, SA43C/878	7.2584 Ha
	S	PT ALLOTMENT 12 TAUPIRI PARISH	SA1298/46	3.7356 Ha
5	T	PT LOT 23 DP 23455	SA43C/870	1.0627 Ha
6	U	LOT 2 DPS 33575	SA43C/876	5.0730 Ha
	V	PT ALLOTMENT 11 TAUPIRI PARISH	SA2B/843,SA268/948,	5.0730 Ha

As shown in Figure No. 1 and Figure No. 2, the proposed rezoning comprises of two sites. The first subject site (identified as **Site 1** in Figure No. 1 and **Area 1** in Figure No. 2) is located approximately 3.5 km north of the Huntly Central Business District (CBD) in Huntly North, while the second site (identified as **Site 2** in Figure No. 1 and **Area 6** in Figure No. 2) is located along the boundary of the existing Huntly East residential area. The two subject sites are located approximately 1.8 km apart and are defined as follows:

- **Site 1/ Area 1**: The land parcel, which is approximately 13.06 ha is size, is bordered by Great South Road to the west, the North Island Mainline Trunk (NIMT) railway line to the east and East Mine Road to the south. The parcel of land is made up of several allotments as follows:
  - Lot 2 Deposited Plan South Auckland 12402, Record of Title SA9C/63, SA40C/873.
  - Lot 1 Deposited Plan South Auckland 12402, Record of Title SA43C/865, SA40C/873.
  - Part Lot 12 Deposited Plan 24355, Record of Title SA43C/865, SA40C/873.
  - Lot 11 Deposited Plan 23455, Record of Title SA43C/866.
- **Site 2/ Area 6**: The land parcel, which is approximately 17.46 ha is size, is located south of East Mine Road. The land is made up of several allotments as follows:
  - Lot 2 Deposited Plan South Auckland 33575, Record of Title SA43C/876.
  - Part Allotment 11 Parish of Taupiri, Record of Title SA2B/843, SA26B/948.

The land adjacent to **Site 1** is zoned Rural (under both the Operative District Plan (OPD) and PDP) with the land to the west, along Great South Road, comprising a mixture of residential and commercial activities (dairy farming), and the land to the east of the NIMT currently being used for agricultural activities.

The land to the north of **Site 2** along East Mine Road is all zoned Rural (under both the ODP and PDP) with the land currently being used for agricultural activities, while the southern boundary of Site 2 adjoins the existing northern urban boundary of Huntly; the land to the south is currently zoned Residential and comprises of single family residential dwelling units.

3. Baseline Transport Environment

3.1 Existing Land Use

The land areas subject to this submission are currently zoned Rural under the ODP and comprises of several land holdings. Both sites are currently used for agricultural activities with the majority of the land comprising pasture.

Site 1 contains one dwelling which is situated near the north-western boundary of the site, with access to the existing property currently provided via a private vehicle access at 3761 Great South Road, Huntly. Access to the existing agricultural activities are provided via several farm accesses along Great South Road and East Mine Road.

Site 2 contains one dwelling which is situated near the western boundary, with access to the existing property currently provided via a private vehicle access at 162 Russell Road, Huntly. Access to the existing agricultural activities is provided via farm gates along Russell Road and East Mine Road.

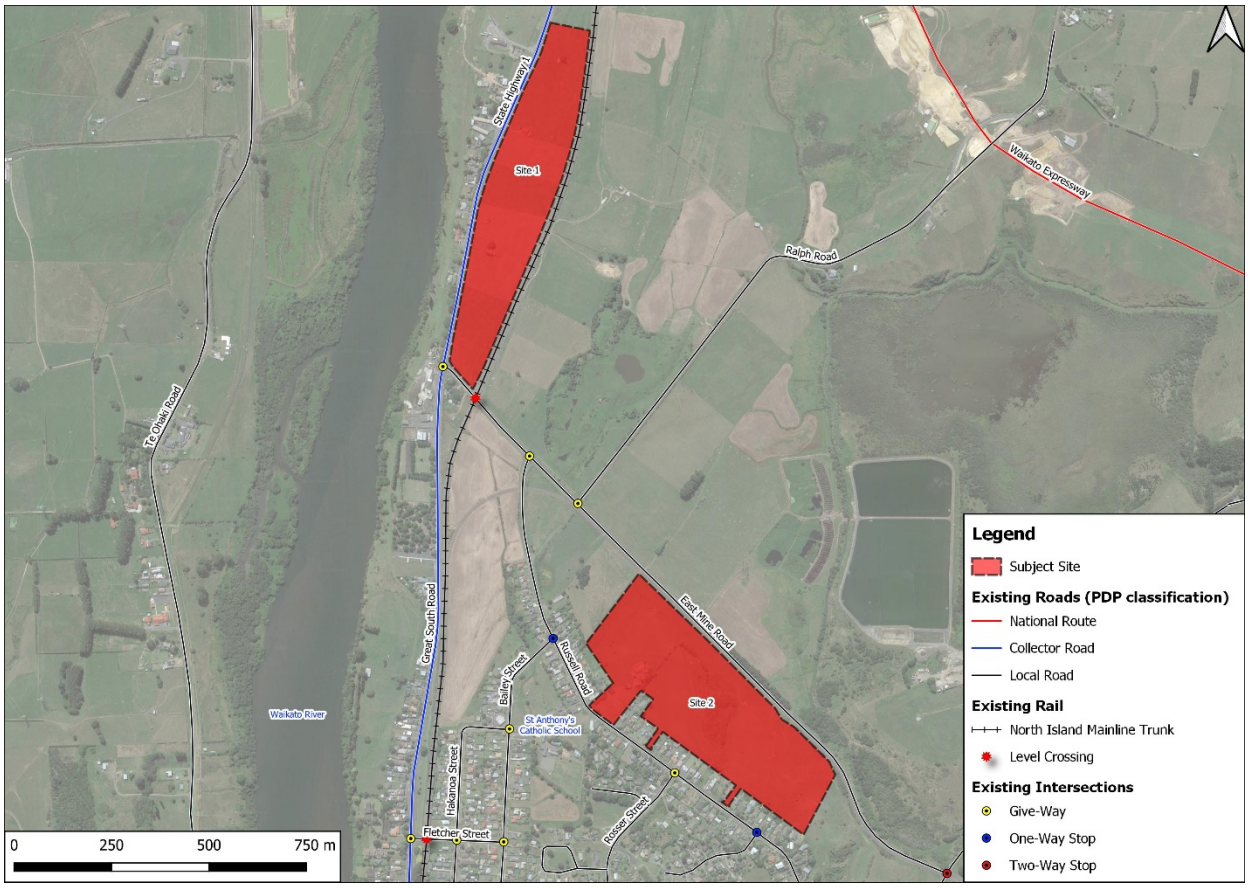
No public roads exist through the subject sites.

3.2 Baseline Transport Network Characteristics

The existing network of roads surrounding the subject sites comprises of the following: (refer to Figure No. 3 for indicative locations of the roads noted below):

- State Highway 1/ Great South Road: administered by Waka Kotahi (NZTA).
- East Mine Road, Russell Road, Bailey Street, and Fletcher Street. These roads provide access to the existing residential area in Huntly East.

Figure No. 3: External road network surrounding the subject sites



A summary of the main characteristics of each road is provided in Table No. 1 and discussed in the subsections to follow.

Table No. 1

Local road network characteristics						
Characteristics	**Great South Road**	**East Mine Road**	**Russell Road**	**Bailey Street**	**Fletcher Street**	**Gordon Road/ Hakanoa Street**
Road Classification[2]	Collector road	Local road	Local road	Local road	Local road	Local road
Carriageway width (m)[3]	13 m	11.8 m	11.6 - 12.8 m	9.5 - 10.2 m	9.1 m	10 – 12 m
Posted Speed Limit (km/h)	70 km/h	70 – 100 km/h	50 – 100 km/h	50 km/h	50 km/h	50 km/h
Average Daily Traffic – 5-Day Average (vpd)	4,750 vpd[4]	850 vpd[4]	No data	No data	No data	No data
Average Daily Traffic – 7-Day Average (vpd)	4,560 vpd[4]	840 vpd[4]	600 – 1,050 vpd[3]	800 – 1,060 vpd[3]	1,455 vpd[3]	700 vpd[3]
Heavy Commercial Vehicles (%)	6%[4]	2.5%[4]	4% - 10%[3]	4%[3]	5%[3]	6%[3]
Peak Hour Volumes (vph)[5]	390 vph[4]	74 vph[4]	60 – 100 vph	80 – 100 vph	150 vph	70 vph

3.2.1 Great South Road

Great South Road previously formed part of the nationally strategic State Highway 1 network maintained by Waka Kotahi. The section of road, until early 2020, provided inter-regional north-south connectivity between Auckland and Hamilton, with a secondary access function to the townships of Huntly, Taupiri and Ngaruawahia. While it is currently classified as a national route in the ODP (Table 8 in Appendix A), it is anticipated that Great South Road will be revocated on 1 July 2021 to a district road managed by WDC, now that the Huntly section of the Waikato Expressway (WEX) is open to traffic and identified as State Highway 1. Accordingly, the section of Great South Road between SH 1 and Rayner Road is classified in the PDP (Table 14.12.5.6) as a collector road. In the interim period until revocation it is referred to as SH1H and is still managed by Waka Kotahi.

Great South Road (SH1H) borders the western boundary of Site 1 and currently is a two-lane sealed carriageway of approximately 13 m width, with the following features:

- Two 3.5 m wide traffic lanes with a 1 m wide flush central median;
- A 2.8 m wide sealed shoulder on the western side of the road, and 2.2 m wide sealed shoulder on the eastern side of the road;
- Kerb and channel treatment along the northbound carriageway (up to 3796 State Highway 1, Huntly).

[2] Source: Table 14.12.5.6 of the PDP.
[3] Source: Mobile Road (accessed 13 October 2020)
[4] Based on automatic tube count data collected over a continuous 7-day period from the 12th to 21st October 2020
[5] Part 4 of the Austroads *Guide to Road Design* manual states that peak hour volumes or peak hour percentages are not available, it can be assumed that the design peak hour volume equals 8% to 10% of the Annual Average Daily Traffic (AADT) for urban situations and 11% to 16% for rural situations.

Figure No. 4 below shows the current formation of Great South Road, looking north.

Figure No. 4: State Highway 1/ Great South Road looking north (Source: Google Street View)

Once SH1/ Great South Road is revocated to WDC as a district road, it is probable that Council will in future revise the existing road cross-section to better reflect the collector road function (a mix of property access and mobility) including provision for active transport modes (walking and cycling) in line with the provisions in Table 14.12.5.14 of the PDP[6].

Based on traffic data sourced from Mobile Road, Great South Road previously had an Average Daily Traffic (ADT) volume of approximately 23,300 vehicles per day (vpd) with approximately 15.6% being heavy commercial vehicles (HCV). This ADT was estimated based on data that was collected in late 2019, prior to the completion and opening of the Huntly section of the WEX. It no longer accurately depicts the traffic volume on the road since the opening of the Huntly Bypass.

According to more recent traffic volume estimates from the WDC website[7], Great South Road is now considered to carry an ADT volume of approximately 2,000 vpd.

To confirm this ADT figure, classified vehicle count data was collected using automatic tube counters over a seven-day period between the 12th and 21st October 2020. According to the collected traffic count data, Great South Road has an ADT of 4,760 vpd (five-day average) with heavy vehicles making up approximately 6% of the daily traffic. Approximately 8% of the average daily traffic occurred during the AM peak hour (390 vph between 8am to 9am). The traffic data confirms that ADT on the road has reduced significantly (by over 18,500 vpd) since to the opening of the Huntly Bypass, but is more than double current estimates by WDC.

The section of the road fronting Site 1 has a posted speed limit of 70 km/h. Gated speed threshold treatment signs are provided approximately 240 m and 900 m north of the East Mine intersection. An 85th percentile vehicle operating speed of 83.9 km/h was recorded[8] along the section of the road fronting Site 1 (84.6 km/h for northbound vehicles, and 83.5 km/h for southbound vehicles); this exceeds the current 70 km/h speed limit of the road, indicating that the road environment does not appropriately reflect the legal limit.

3.2.2 East Mine Road

East Mine Road is classified as a Local Road in the ODP and PDP, and a secondary collector in accordance with Waka Kotahi's One Network Road Classification (ONRC). The road currently provides access to a residential

[6] WDC has been consulted in this regard and have stated that there is currently no plans (in the short term period) to upgrade the road or amend the cross-section of the road once SH1 has been revocated to a district council road.

[7] https://www.waikatodistrict.govt.nz/services-facilities/roads-travel-and-parking/roads-and-transport/our-road-strategy-and-partners/traffic-counts, accessed on 30 September 2020

[8] Vehicle operating speeds were measured over a seven-day period (12th to 20th October 2020) approximately 450 m north of the intersection of Great South Road and East Mine Road using automatic tube counts.

dwelling (8 East Mine Road), agricultural activities to the north and south of the road, and the decommissioned Huntly East Coal Mine.

The NIMT railway line is located approximately 110 m east of the Great South Road / East Mine Road intersection and crosses East Mine Road at-grade at a 115-degree angle (approximate). The level crossing, which is illustrated in Figure No. 5 below, is currently an active control crossing with flashing lights, bells and barrier arms.

Figure No. 5: NIMT Level Crossing on East Mine Road

The two-lane road has a seal width of 11.8 m with 4 m wide traffic lanes and 2 m wide sealed shoulders on both sides of the road. The section of the road from Great South Road to the existing NIMT level crossing has kerb and shoulder treatment on both sides of the road. The current formation of the road is shown in Figure No. 6 and Figure No. 7 below.

Based on traffic data sourced from Mobile Road, the section of East Mine Road between Great South Road and the level crossing has an ADT of approximately 1,600 vpd with 11% HCV (estimated during construction of the Huntly Bypass), while the section between the level crossing and Russell Road has an ADT of 630 vpd with 4% HCV.

To confirm this ADT figure, classified vehicle count data was collected using automatic tube counters over a seven-day period between the 12th and 21st October 2020. According to the collected traffic count data, the section of the road between the level crossing and Russell Road has an ADT of 850 vpd (five-day average) with 2.5% HCVs. Approximately 8% of the average daily traffic occurred during the peak hour (i.e. 70 vph).

East Mine Road currently has a posted speed limit of 70 km/h from the intersection with Great South Road to approximately 50 m east of the level crossing. The remaining section of the road has a posted speed limit of 100 km/h. An 85th percentile vehicle operating speed of 68.8 km/h (67 km/h for eastbound vehicles, and 70.9 km/h for westbound vehicles) was recorded approximately 100 m east of the intersection with Great South Road using automatic tube counts. These speeds where well below the 100 km/h speed limit on that section of the road.

Figure No. 6: East Mine Road - west of the NIMT level crossing (Source: Google Street View)

Figure No. 7: East Mine Road – east of the NIMT level crossing (Source: Google Street View)

3.2.3 Russell Road

Russell Road is classified as a Local Road in the ODP and PDP, and a secondary collector in accordance with the ONRC. The two-lane road runs parallel to the southern boundary of Site 2 and provides access to the existing Huntly East residential area.

The section of the road to the south of Site 2 has a seal width of 11.4 m with two 5.7 m wide traffic lanes (comprising of the movement lane plus provision for on-street parking) and kerb and channel shoulder treatment on both sides of the road. The current formation of the road is shown in Figure No. 8 below.

According to traffic data sourced from Mobile Road, the section of Russell Road between East Mine Road and Bailey Street has an ADT of approximately 600-800 vpd with 8-10% HCV, while the section between Bailey Street and Gavin Place has an ADT of 1,050 vpd with 4% HCV.

Russell Road currently has a posted speed limit of 100 km/h from the intersection with East Mine Road to approximately 250 m south of the East Mine Road intersection, and a 50 km/h posted speed limit along the remaining urban section of the road. Given the urbanised road environment and roadside friction in the form

of on-street parking, it is considered unlikely that vehicle operating speeds would exceed the posted speed limit.

Figure No. 8: Russell Road looking east (Source: Google Street View)

3.2.4 Bailey Street

Bailey Street is classified as a Local Road in the ODP and PDP; the section between Russell Road and Gordon Road is classified as a secondary collector in accordance with the ONRC, while the section to the south of Gordon Road is classified as an access road. The road is considered to be one of the primary access routes from Huntly CBD (via the Great South Road/ Fletcher Street intersection) to the northern residential dwellings within Huntly East.

The two-lane road has a seal width of 10.2 m (this reduces to 9.7 m for the section to the south of Gordon Road) with kerb and channel shoulder treatment on both sides of the road. The current formation of the road is shown in Figure No. 9 below.

According to traffic data sourced from Mobile Road, the section of Bailey Street between Russell Road and Gordon Road has an ADT of approximately 1,060 vpd with 4% HCV, while the section to the south of Gordon Road has an ADT of 800 vpd with 4% HCV.

The road currently has a posted speed limit of 50 km/h. Given the urbanised road environment and roadside friction in the form of on-street parking, it is considered unlikely that vehicle operating speeds would be significantly higher than the posted speed limit.

Figure No. 9: Bailey Street looking south (Source: Google Street View)

3.2.5 Fletcher Street

Fletcher Street is classified as a Local Road in the ODP and PDP, and a secondary collector road in accordance with the ONRC. The two-lane road has a seal width of 9.1 m with kerb and channel shoulder treatment on both sides of the road. The current formation of the road is shown in Figure No. 10 below.

The NIMT railway line crosses Fletcher Street at-grade at a 90-degree angle (approximate). The level crossing, which is illustrated in Figure No. 11 below, is located approximately 40 m east of the Great South Road intersection and is currently an active control crossing with flashing lights, bells and barrier arms.

According to traffic data sourced from Mobile Road, the road has an ADT of approximately 1,455 vpd with 5% HCV. The road currently was a posted speed limit of 50 km/h. Given the urbanised road environment, it is considered unlikely that vehicle operating speeds are significantly higher than the posted speed limit.

Figure No. 10: Fletcher Street looking north (Source: Google Street View)

Figure No. 11: NIMT Level Crossing on Fletcher Street

3.2.6 Local Area Intersections

This section identifies existing intersections within the vicinity of the rezoning sites which could potentially be affected by traffic associated with the rezoning. The intersections listed below, which are considered to be located along the likely travel route for traffic associated with any future development that would be

consistent with the rezoning request (if successful). Refer to Section 6.2.2 for discussions regarding the predicted assignment of traffic associated with the proposed rezoning on the surrounding road network.

- Great South Road and East Mine Road intersection;
- East Mine Road and Russell Road intersection;
- Russell Road and Bailey Street intersection;
- Great South Road and Fletcher Street intersection.

Figure No. 3 (on page 7 of this report) demonstrates the location of the intersections listed above. A summary of the main characteristics of the affected intersections are provided in the subsections to follow.

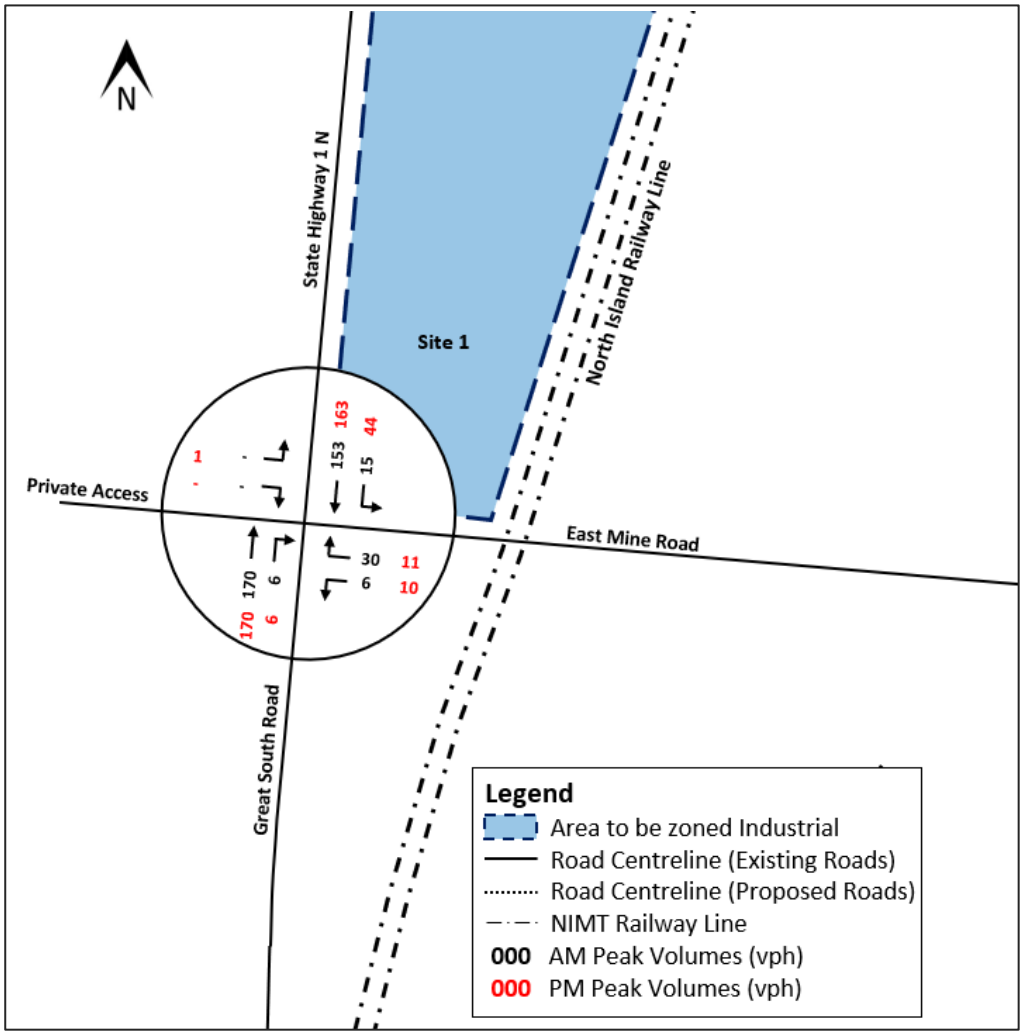
Great South Road / East Mine Road Intersection

The intersection of Great South Road and East Mine Road is Give-Way controlled on the westbound approach (i.e. East Mine Road) and free-flow on the Great South Road approaches with a vehicle crossing/ private vehicle access on the western approach. The intersection is built to an urban intersection standard with an approximately 30 m long auxiliary right-turn bay (excluding taper length) on the northbound approach and a central/ splitter raised island on the westbound approach. Street lighting is provided on all approaches. The intersection configuration is illustrated in Figure No. 12 below.

Figure No. 12: Great South Road/ East Mine Road Intersection Configuration

Turning movement surveys were conducted at the intersection on Wednesday, 14th October 2020 during the morning (7am to 9am) and afternoon (4pm to 6pm) peak periods. The existing (2020) AM and PM peak hour turning volumes at the Great South Road/ East Mine Road intersection are illustrated in Figure No. 13 below.

Figure No. 13: 2020 Peak Hour Turning Volumes - Great South Road/ East Mine Road Intersection



East Mine Road/ Russell Road Intersection

The intersection of East Mine Road and Russell Road is Give-way controlled on the northbound approach (i.e. Russell Road) and free-flow on the East Mine Road approaches (refer to Figure No. 14). The T-intersection is located approximately 105 m east of the level crossing on East Mine Road and is built to a rural intersection standard with street lighting provided on the northern side of the intersection. The level crossing located approximately 85 m south of the intersection on Russell Road was removed/decommissioned subsequent to the decommissioning of the Huntly East Coal Mine.

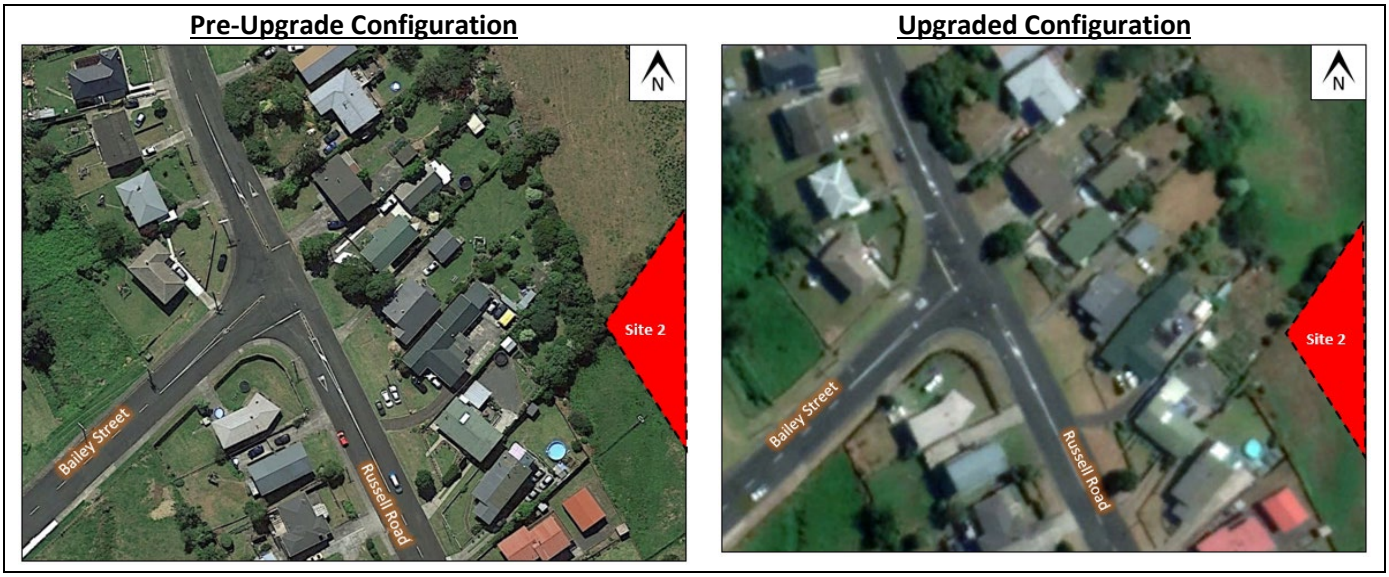
Given the rural nature of the area and considering that alternative routes are available for vehicles to access the Huntly East residential area, low volumes of turning traffic are anticipated at this intersection.

Figure No. 14: East Mine Road/ Russell Road Intersection Configuration

Russell Road/ Bailey Street Intersection

The intersection of Russell Road and Bailey Street, which was previously Give-way controlled on the Russell Road approaches and free-flow on Bailey Street, was recently upgraded in 2018/19 to a one-way stop-controlled intersection with a compulsory Stop on the southwestern approach (i.e. Bailey Street) and free-flow on the Russell Road approaches. The pre- and post-upgrade configurations are illustrated in Figure No. 15 to follow.

Figure No. 15: Russell Road/ Bailey Street Intersection Configuration



Great South Road/ Fletcher Street Intersection

The intersection of Great South Road and Fletcher Street is Give-way controlled on the westbound approach (i.e. Fletcher Street) and free-flow on the Great South Road approaches (refer to Figure No. 16) with a vehicle crossing/private vehicle access on the eastbound approach. The T-intersection is built to an urban intersection standard with an approximately 20 m long short auxiliary right turn bay (excluding taper length) on the northbound approach, a central raised island on the westbound approach, and an approximately 75 m long slip lane (for left-turning vehicles) on the southbound approach. Street lighting is provided on all approaches. The intersection configuration is illustrated in Figure No. 12.

Figure No. 16: Great South Road/ Fletcher Street Intersection Configuration

3.3 Expected Traffic Growth

While future baseline traffic volumes are typically estimated based on the historic traffic growth rates along a road corridor, for this case given the recent opening of the Huntly WEX and the resulting "watershed" change in travel patterns, historic traffic growth rates would not appropriately reflect future traffic growth and travel patterns on the surrounding road network. Therefore, the traffic demand projections in this assessment considered the medium to long term population, household and labour force projections for Huntly Township.

On this basis, the future traffic demand along the external road network was estimated based on the following:

- The historic population growth figures for Huntly township – based on 2006, 2013, and 2018 census data published on the Stats NZ website for Huntly East and Huntly West, the population grew by approximately 17% between 2006 and 2018 (i.e. 1.3% per annum over the 12 year period) and by 15% between 2013 to 2018 (i.e. 2.9% per annum over this 5-year period).
- The projected population growth figures for Huntly township – the population of Huntly East and Huntly West is estimated to grow from 7,320 in 2013 to 9,110 in 2031 and 9,785 in 2041, according to a technical

report by Waikato Regional Council[9]. This equates to a population growth of approximately 1% per annum over the next 30 years. The report projected a similar growth rate (i.e. 1% per annum) for households and the labour force.

Based on the above, an annual traffic growth rate figure of 1.5% was applied to road links and intersections within the surrounding road network. The estimated future traffic demands based on the estimated annual traffic growth figure of 1.5% and a 10-year assessment period (in line with the anticipated 10-year development period) are shown in Table No. 2 below. These low traffic growth figures are considered representative of Huntly given the relatively low population and household growth figures projected for the township.

Table No. 2

Estimated Future Traffic Demands			
Road Section	**2030 Baseline ADT 5-Day Average (vpd)**	**2030 Baseline ADT 7-Day Average (vpd)**	**2030 Baseline Peak Hour Volumes (vph)**
State Highway 1/ Great South Road	5,515 vpd	5,290 vpd	455 vph
East Mine Road	985 vpd	975vpd	85 vph
Russell Road	No data	695 – 1,220 vpd	70 – 120 vph
Bailey Street	No data	930 – 1,230 vpd	90 – 120 vph
Fletcher Street	No data	1,690 vpd	170 vph
Hakanoa Street	No data	810 vpd	80 vph

At the time of writing this report, a decision from the independent hearings panel related to a rezoning proposal and Structure Plan for land located in Ohinewai[10] was pending. If approved, the proposed rezoning and Ohinewai Structure Plan (OSP) is anticipated to result in significant industrial and residential development in Ohinewai and as a result, a significant number of trips on the surrounding road network. Given the proximity of the proposed OSP area to the proposed rezoning sites in Huntly (the proposed OSP site is located approximately 5 km north of the Site 1 on the eastern side of State Highway 1), it is considered that the proposed Ohinewai rezoning will likely result in an increase in the daily and peak hour traffic on the Waikato Expressway and the section of SH 1/ Great South Road fronting Site 1[11].

While this assessment has not included the likely growth in traffic on Great South Road as a result of the proposed OSP and rezoning, sensitivity testing was conducted to assess the impact of the OSP rezoning traffic on the surrounding road network. The findings from the sensitivity assessment are provided in Section 7.

3.4 Other Transport Modes

3.4.1 Existing Public Transport Services

The following bus services currently operate within the Huntly North and East areas (refer to Figure No. 17):

[9] Waikato Regional Council Technical Report 2016/03 titled *Land use, demographic and economic projections for the Waikato region, 2013 to 2063*

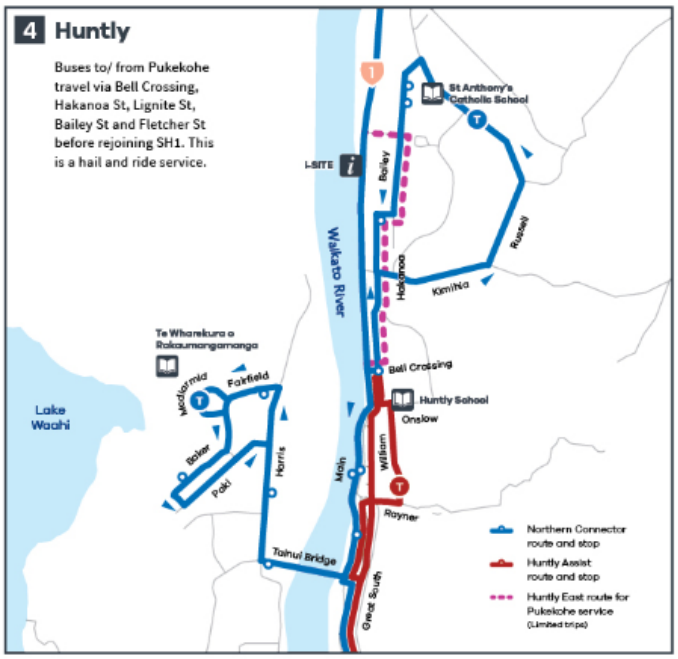
[10] Hearing 19: Ohinewai Rezoning

[1111] Based on the WRTM based assessment for the OSP area, the proposed rezoning is projected to add approximately 4,500 vpd and 700 trips during the peak hour on Great South Road.

- The 21 Northern Connector, a regional bus service operated by BUSIT, currently operates between Hamilton and Huntly/Te Kauwhata and Pukekohe. The service stops in Huntly East at several locations, including along Russell Road, Bailey Street and Hakanoa Street. Several of these are hail and ride bus stops, where the bus will stop to pick up or drop off passengers where it is safe to do so.
- The 41 Huntly Internal bus route which has now become part of the Northern Connector service. The additional route, which incorporates an additional route along Rosser Street and with a bus stop at the Kimihia Home and Hospital, operates on Tuesdays and Thursdays.

Figure No. 17: Existing Bus Services in Huntly (Source: busit.co.nz)

21 Northern Connector routes in Huntly



Bus Route 41 Huntly Internal (Tuesday and Thursday)

The closest bus stop to **Site 1** is located at 104 Bailey Streety, Huntly; the bus stop is located approximately 1.5 km walking distance from the site. The closest bus stop to **Site 2** is located at 115 Russell Road, Huntly; the bus stop is located within a 300 m walking distance from the site.

The bus schedule for the Northern Connector bus service is summarised as follows (source: BusIT website[12]):

- Hamilton (Transport Centre) to Huntly/ Te Kauwhata:
  - Monday to Friday: the bus service currently stops twice in Huntly East during the AM peak period (7am to 9am), twice during the PM peak period (4pm to 6pm), and three times during the off-peak periods (mid-afternoon and night-time).
  - Weekends and Public Holidays: during the morning period (9am to 11am) the bus service stops only once in Huntly East, while during the afternoon period (12pm to 5pm) the bus stops in Huntly East every two hours.
  - In addition to the above, a bus service is provided from Hamilton Boys' High School to Te Kauwhata that stops in Huntly East in the afternoons (during the school term only).
- Huntly/ Te Kauwhata to Hamilton:
  - Monday to Friday: the bus service currently stops twice in Huntly East during the AM peak period (7am to 9am), twice during the PM peak period (4pm to 6pm), and five times during the off-peak periods (early morning, mid-afternoon and night-time).

[12] https://www.busit.co.nz/regional-services/northern-connector/#mf, accessed 13 October 2020

- Weekends and Public Holidays: the bus service stops every two hours in Huntly East during the morning period (9am to 11am), while during the afternoon period (12pm to 5pm) the bus stops in Huntly East every three hours.
- A bus service is provided from Huntly East to Hamilton Boys' High School that departs in the mornings (during the school term only).

As shown above, the Huntly East area is considered to be well served by the existing public transport services. While the regional bus service travels into Huntly, bus stop stops are currently not provided in Huntly North given the current rural nature of the area.

3.4.2 Future Planned Public Transport Services

According to the Waikato Regional Council (WRC), the Te Huia passenger rail service is planned to start operating in 2021. The rail service, which will operate between Hamilton, Huntly and Auckland, will be capable of carrying over 500 passengers a day. The passenger rail service is planned to operate from the Frankton, Rotokauri (The Base) and Huntly stations in the Waikato.

The Huntly rail station, which is located off Glasgow Street in Huntly East, is currently undergoing refurbishment. The upgrade will include a park and ride facility, as well as approximately 40 off-street car parks and additional roadside parking available in close proximity to the station. The nearest bus stops are within a five-minute walk to the station and are serviced by the 21 Northern Connector bus. The subject sites are both located within a 4 km driving distance of the station.

3.4.3 Existing Walking and Cycling Infrastructure

A 1.5 m - 1.8 m wide footpath is provided on the southern side of Russell Road (along the urban section of the road), and on both sides of Bailey Street and Rosser Street to provide for the existing pedestrian traffic through the residential area.

There are currently no existing pedestrian facilities in the area around Great South Road and East Mine Road. This is likely to be due to the currently rural zoning in the area, and the low volumes of pedestrians observed in the area. A footpath is however, provided approximately 200 m south of Great South Road/ East Mine Road intersection along the western side of Great South Road which extends towards Huntly CBD.

While no formal on- or off-road cycle facilities are provided along the surrounding road network, wide sealed shoulders are available for cyclists on both sides of Great South Road and East Mine Road.

4. Road Safety Environment

Crash data for the previous full five-year period (January 2014 to December 2019, and including up to October 2020) was sourced from Waka Kotahi's Crash Analysis System (CAS) and analysed to identify any road safety related issues within the vicinity of the subject sites. Full crash records for each of the locations which were studied are provided in Appendix B.

The sections to follow provide the key observations made during the analysis of the crash data.

4.1 Intersections

A summary of the crash data recorded at external intersections located within the vicinity of the subject sites is provided in Table No. 3.

Table No. 3

Crash summary for the previous ten years (2014 to 2020) - Intersections					
Intersection	Crash Severity				Total
	Fatal	Serious	Minor	Non-Injury	
Great South Road / East Mine Road	-	-	-	-	0
East Mine Road / Russell Road	-	-	-	-	0
Russell Road / Bailey Street	-	-	-	2	2
Russell Road / Rosser Street	-	-	-	1	1
Great South Road/ Fletcher Street	-	-	1	3	4
Total	**-**	**1**	**1**	**6**	**7**

The following observations were made during the analysis of the crash data:

- No crashes were recorded at the intersections of Great South Road/ East Mine Road and East Mine Road/ Russell Road in the previous five-year period. This indicates that there are no apparent road safety issues at these two intersections, even with the previously significantly higher volumes on SH 1/ Great South (given that the assessment period included the period prior to the opening of the Huntly section of the WEX).
- Two non-injury crashes were recorded at (and within a 50 m radius of) the Russell Road/ Bailey Street intersection. Both crashes were caused by driver error.
  - One was a single vehicle crash which occurred when a northbound driver on Bailey Street failed to stop at the stop-controlled approach and as a result collided with the gate/fence of the property located on the opposite side of the intersection. The crash report notes the cause of the crash as brake failure. The crash occurred subsequent to the upgrading of the intersection to a one-way stop-controlled intersection (refer to section 3.2.6).
  - The other non-injury crash was caused by a northbound vehicle on Russell Road failing to give-way and colliding into a vehicle turning right onto Russell Road from Bailey Street who had right of way. The crash occurred prior to the upgrading of the intersection to a one-way stop-controlled intersection (refer to section 3.2.6).
  - On the basis of Waka Kotahi's High-Risk Intersection Guide (HRIG) assessment, the risk ratings for this intersection are "Low" personal risk, and "Low" collective risk.

- Only one non-injury crash was recorded at (and within a 50 m radius of) the Russell Road/ Rosser Street intersection. The single vehicle[13] crash occurred as a result of a northbound driver on Rosser Street losing control of the vehicle while turning right onto Russell Street. The crash report notes that the crash was related to construction activity on Russell Road (i.e. lost control due to loose gravel on the road). On the basis of the HRIG assessment, the risk ratings for this intersection are "Low" personal risk, and "Low" collective risk.
- Four crashes were recorded at (and within a 50 m radius of) the Great South Road/ Fletcher Street intersection:
  - One crash, which resulted in minor injuries, occurred as a result of a northbound vehicle on Great South Road, veering off the road and rear-ending a stationary vehicle waiting to turn right onto Fletcher Street.
  - Two crashes, which were non-injury crashes, occurred as a result of a southbound vehicle failing to stop and rear-ending a slower moving southbound vehicle.
  - The remaining crash, which did not result in any injuries, occurred as a result of a fatigued driver falling asleep behind the wheel, veering off the road and hitting a street light pole. This crash occurred at night.
  - On the basis of the HRIG assessment, the risk ratings for this intersection are "Low" personal risk, and "Low" collective risk.

The crash data assessment indicates that all seven crashes recorded at (and within a 50 m radius) of the local area intersections occurred as a result of driver error. While crashes were recorded at three of the five intersections, it is considered that the road safety risk at these intersections is low given that the risk ratings for the intersections are "Low" personal risk, and "Low" collective risk. Furthermore, of the seven crashes recorded, only one resulted in minor injuries, while the remaining six were non-injury crashes.

4.2 Road Corridors

A summary of the crash data recorded on the adjacent road corridors located within the vicinity of the subject sites is provided in Table No. 4.

Table No. 4

Crash summary for the previous ten years (2014 to 2020) – Road Corridors					
Intersection	Crash Severity				Total
	Fatal	Serious	Minor	Non-Injury	
SH 1/ Great South Road	2	1	5	11	19
East Mine Road	-	-	-	-	-
Russell Road	-	-	2	1	3
Total	**2**	**1**	**7**	**12**	**22**

The following observations were made during the analysis of the crash data:

- 19 crashes were recorded along the section of SH 1/ Great South Road fronting **Site 1** (i.e. the section between East Mine Road and the property located at 3744 State Highway 1).
  - Eight crashes occurred as a result of a fatigued driver falling asleep behind the wheel, veering off the road and landing in the verge or hitting a road side object (fence, street light). Six of the eight crashes did not result in any injuries, while two crashes only resulted in minor injuries. Only one crash occurred during night-time.

[13] The crash report notes that the vehicle involved in the crash was a stolen vehicle.

- Four crashes occurred as a result of a vehicle approaching the back of a queue failing to stop and rear-ending the last vehicle in the queue. Two of the four crashes did not result in any injuries, while the remaining two crashes only resulted in minor injuries. Only one crash occurred during inclement weather conditions (extreme rain).
- Three crashes were head-on collisions. All three crashes occurred as a result of a vehicle crossing the road centreline and colliding into a vehicle on the oncoming lane. Two of the three crashes were fatal, while the remaining resulted in serious injuries.
- Two crashes involved vehicle crossings. Both crashes occurred as a result of a vehicle either turning into or out of a private access failing to give way to traffic on SH 1/ Great South Road. Both crashes did not result in any injuries.
- One crash involved a pedestrian. A northbound vehicle on SH 1 nicked a pedestrian while they were crossing the road. The pedestrian sustained minor injuries.
- The remaining crash occurred during night-time. An emergency services vehicle, while passing/ overtaking a vehicle that was turning into an access, slightly crossed over the road centreline and hit an object that was laying in the middle of the road. The crash did not result in any injuries.

- No crashes were recorded along the section of East Mine Road between Great South Road and Russell Road in the previous five-year period. This indicates that there are no apparent road safety issues along this section of the road.
- Three crashes (in addition to crashes at the intersections with Bailey Street and Rosser Street – see section 4.1) were recorded along the section Russel Road between East Mine Road and Gavin Place.
  - One crash occurred as a result of a distracted driver losing control of the vehicle, veering off the road and hitting a tree. The driver sustained minor injuries.
  - One crash occurred as a result of a driver losing control of their vehicle while navigating a horizontal curve. The crash report notes that the vehicle was traveling at 100 km/h and that the driver was intoxicated. The crash did not result in any injuries.
  - The remaining crash was also a non-injury crash. A southbound vehicle on Russell Road was rear-ended while slowing down to turn left into a private access.

The crash data assessment shows that while a notable number of crashes were recorded along the section of SH 1/ Great South Road fronting the subject site (Site 1), all of the crashes occurred prior to the opening of the Huntly Bypass (the latest crash occurred in late 2019) when traffic volumes on SH 1/ Great South Road were significantly higher than they currently are. It is considered that the road safety risks along this section of the road have been significantly reduced with the reduced volume of traffic on this road.

The crash data assessment indicates that all three crashes along Russell Road occurred as a result of driver error. On this basis, it is considered that the road safety risk along that section of the road is low given the low speed environment and that the observed crashes only resulted in minor or no injuries.

5. Proposed Rezoning

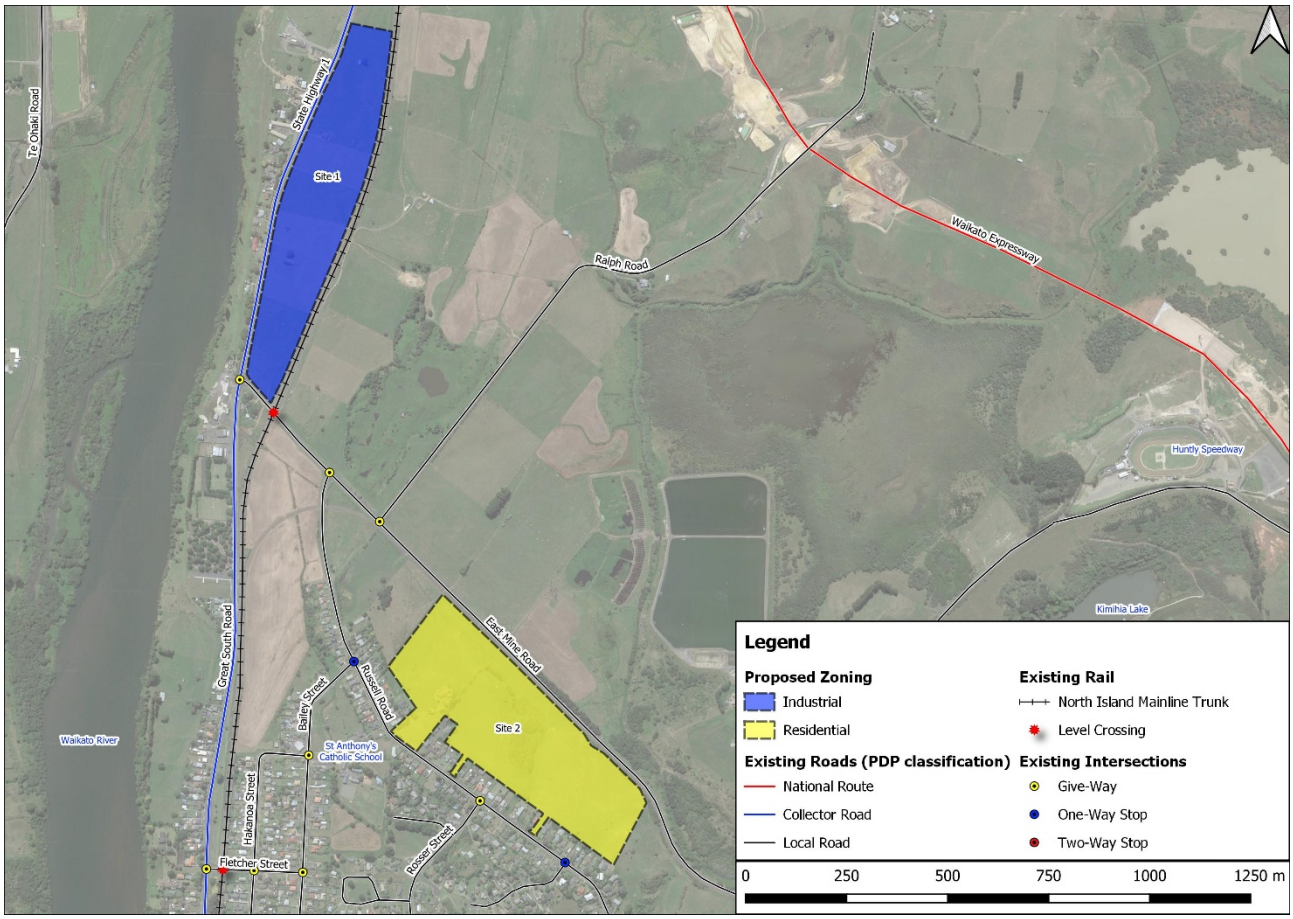
5.1 Proposal Overview

5.1.1 Proposed Land Use Zoning

The sites subject to the proposed re-zoning are illustrated in Figure No. 2 on page 4 and Figure No. 18 below. As shown in Figure No. 18, Shand proposes rezoning **Site 1/ Area 1** (13.07 ha) to Industrial zoning and **Site 2/ Area 6** (17.46 ha) to Residential zoning.

To inform trip generation, the anticipated development yield is described in the subsections to follow.

Figure No. 18: Proposed Re-zoning



5.1.2 Anticipated Development Yield

Industrial Zone

Shand proposes developing the land within **Site 1** for light industrial purposes consistent with the land use activities specified in Rule 20.1 of the PDP. Given the close proximity of the NIMT railway to **Site 1**, there is potential for a rail siding access to the NIMT to be provided within the proposed industrial precinct.

At this rezoning stage, the exact anticipated activities are not known. A concept subdivision plan is illustrated in Figure No. 19 (and attached in Appendix A), to show the possible lot sizes and configuration that could be achieved within the site if the rezoning proposal is was accepted.

Figure 19 shows that a net developable area of 11.47 ha is achievable, excluding approximately 1.6 ha of road reserve areas (approximately 12% of the gross developable area[14]). As shown in Figure No. 19, there is an easement for the conveyance of electricity in the south-western corner of the site through lot 23. The net developable area would reduce as a result of the existing overhead powerlines unless they can be rerouted and placed underground. For assessment purposes, it is assumed that the easement area could be developed (i.e. contributes to the total net developable area).

While there is potential for a rail siding within the site, for purposes of this assessment, as a conservative approach it is assumed that no rail siding would be provided within the rezoning site.

To estimate the gross floor area (GFA), a conservative figure of 50% of site area was applied across the industrial zone. This equates to approximately 57,350 m^2 GFA.

Figure No. 19: Preliminary Draft Concept Plan - Proposed Industrial Zoning

Residential Zone

Shand proposes developing the land within **Site 2** for residential purposes (general density residential dwellings) consistent with the land use activities specified in Rule 16.1 of the PDP. While Shand proposes rezoning the entire 17.47 ha site to Residential, a significant portion of the site is low lying and resultantly lies within a floodplain and a large portion of this area has been identified as an inland wetland. Due to these constraints, the low-lying areas within **Site 2** are not considered to be developable.

A preliminary concept plan, which is illustrated in Figure No. 20 (and attached as Appendix A), was prepared to show the level of development, including the potential lot configuration and size that could be achieved within the site. Also shown in the figure is the floodplain overlay.

[14] Road reserve areas typically comprise between 10%-20% of the total site area. The site falls within this range.

As shown in Figure No. 20, a developable area of 9.79 ha is achievable, with the remaining 7.68 ha as open space/ storm water management areas. Of the gross developable area, approximately 2.41 ha would be road reserve areas (i.e. approximately 25% of the gross developable area).

The average lot sizes have been generally guided by the PDP Residential Zone Subdivision rules (Rule 16.4.1 of the PDP specified that proposed lots should have a minimum net site area of 450 m^2) as well as the lot sizes of the surrounding residential dwellings (which are in the range of 650 m^2 to 1,800 m^2). On this basis, it was assumed that lot sizes would range between 500 m^2 and 1,500 m^2. This equates to approximately 85 dwelling units, and an average net residential density of 11.5 dwellings per hectare.

Figure No. 20: Preliminary Draft Concept Plan - Proposed Residential Zoning

Total Yield

The anticipated development yield (in terms of GFA and dwelling units) is provided in Table No. 5.

Table No. 5

Estimated Development Yield				
Zone	**Total Area (ha)**	**Gross Developable Area (ha)[15]**	**Net Developable Area (ha)[16]**	**Estimated GFA/ dwelling units Total**
Industrial	13.07 ha	13.07 ha	11.47 ha	57,350 m^2 GFA
Residential	17.47 ha	9.79	7.38 ha	85 dwelling units

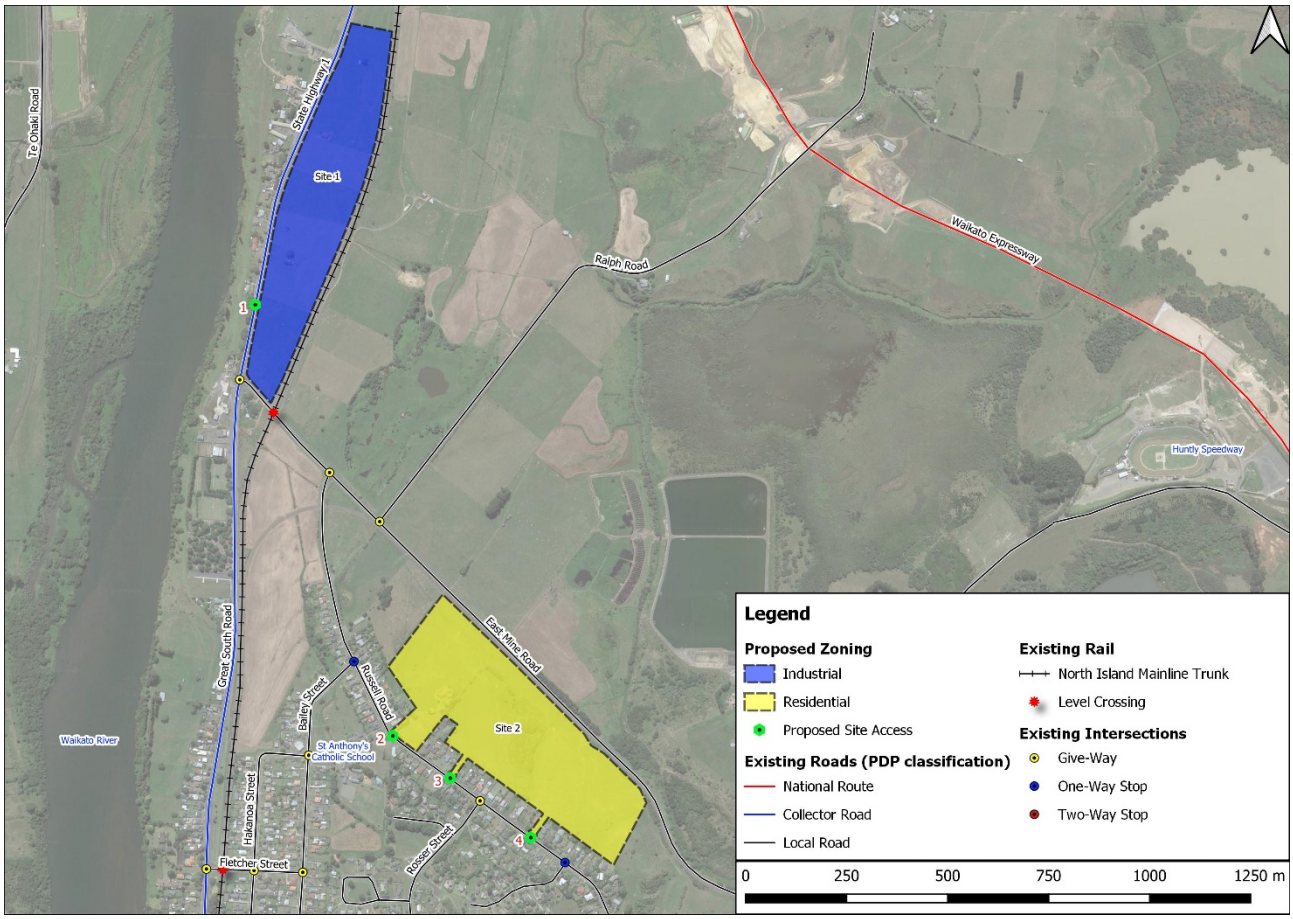
[15] Excluding open space, stormwater management areas, and areas prone to flood
[16] Excluding road reserve areas

5.2 Proposed Road Accesses

As shown in Figure No. 19, Figure No. 20 and Figure No. 21 below, vehicle access to the subject sites is proposed via new road connections as follows:

- Access to the proposed industrial precinct will be via Great South Road (i.e. Access Intersection 1 as shown in Figure No. 21).
- Access to the proposed residential dwellings will be via Russell Road (i.e. Access Intersection 2 to 4 as shown in Figure No. 21).

Figure No. 21: Proposed Vehicle Access



5.2.1 Preliminary Access Configurations

The following preliminary configurations are proposed for each access (refer to the preliminary concept drawings in Appendix A):

- **Access Intersection 1**: T-intersection with free-flow on Great South Road. A right turn bay treatment is recommended on the northbound approach.
- **Access Intersection 2** and **4**: T-intersection with free-flow on Russell Road.

The appropriate control (either a Stop or Gove-Way) for each intersection will be determined at detail design stage.

It was observed during a site investigation that some (potentially significant) ground improvement works may be required to enable the implementation of Intersection 4. A retaining wall structure is provided on the northern side of Russell Road immediately west of Intersection 4 (the existing road layout in the vicinity of the intersection is shown in Figure No. 22) as there is a significant height difference between Russell Road and the existing properties located to the north of Russell Road (i.e. 114, 116, 118A-C and 120 Russell Road).

A 90 m long Right of Way (ROW) is located on the northern side of Russell Road between 112 and 122 Russell Road and provides access to these properties. A retailing wall structure or similar stabilisation works would likely be required on the western side of the proposed intersection and access road to compensate for the level differences. The eastern end of the ROW (i.e. the side where it joins Russell Road at 112 Russell Road) would also need to be closed/ stopped.

Figure No. 22: Existing roading layout in the vicinity of Proposed Intersection 4 (Source: Google Street View)

Section 7.3 of this report provides detailed assessments relating to the efficiency and safety of the proposed intersection forms and locations for access to the rezoning sites.

The final intersection location and configuration will need to be confirmed in future as part of the subdivision consents. The new intersections should be designed in accordance with the provisions of the District Plan and the Waikato Regional Infrastructure Technical Specifications (RITS). The intersection configurations should be designed so that the spatial needs of the appropriate design vehicle are met. The appropriate vehicles include:

- **Intersection 1**: A 19.45 m semi-trailer truck with rear tag steer (High Productivity Motor Vehicle (HPMV)).
- **Intersection 2** to **Intersection 4**: An 8 m medium rigid truck (RTS 18).

5.2.2 Intersection Site Distance

The District Plan refers to the Austroads' Guide to Road Design document (Table 3.2 in Part 4A: Unsignalised and Signalised Intersections) for the minimum required safe intersection sight distances (SISD) at intersections. Table No. 6 provides a summary of the observed and required sight distances at the proposed intersections (on the basis of the preliminary intersection locations – the final intersection locations will be confirmed as part of the subsequent subdivision consents).

Table No. 6

Observed vs Required Safe Intersection Sight Distances					
Proposed Intersection	**Posted Speed Limit**	**Direction**	**Operating Speed**	**Austroads' SISD Requirements[17]**	**Observed Sight Distance**
Intersection 1	70 km/h	Looking North	83.5 km/h	193 m	> 250 m
		Looking South	84.6 km/h	196 m	> 300 m

[17] Based on a 2 second reaction time.

Observed vs Required Safe Intersection Sight Distances					
Proposed Intersection	**Posted Speed Limit**	**Direction**	**Operating Speed**	**Austroads' SISD Requirements[17]**	**Observed Sight Distance**
Intersection 2	50 km/h	Looking East	55 km/h[18]	110 m	> 150 m
		Looking West			> 150 m
Intersection 3		Looking East			> 200 m
		Looking West			> 200 m
Intersection 4		Looking East			> 150 m
		Looking West			> 200 m

As shown in Table No. 6 above, an assessment of the sight distance against the requirements based on the observed operating speed and two second reaction time shows that all four intersections will comply with the minimum SISD in all directions.

5.2.3 Access Separation

Table 14.12.5.1 (and Figure 14.12.5.2) of the PDP provides the minimum required access separation distances at intersections. Table No. 7 below provides a summary of the observed and required separation distances at the proposed intersections (on the basis of the preliminary intersection locations – the final intersection locations will be confirmed as part of the subsequent subdivision consents).

Table No. 7

Achievable vs Required Separation Distances						
Proposed Intersection	**Posted Speed Limit**	**Operating Speed**	**To Nearest Vehicle Crossing**		**To Nearest Intersection/ Side Road**	
			PDP's Separation Distance	**Achievable Separation Distance**	**PDP's Separation Distance**	**Achievable Separation Distance**
Intersection 1	70 km/h	83.9 km/h	80 m	40 m**	200 m	205 m
Intersection 2	50 km/h	55 km/h	30 m	35 m* 25 m**	100 m	190 m
Intersection 3				25 m* 20 m**		95 m
Intersection 4				10 m* 25 m**		105 m
*Same side of the road **Opposite side of the road (excluding accesses directly across the proposed intersection)						

As shown above, an assessment of the access separation against WDC's access spacing requirements showed that:

Available separation distance to the nearest intersection/ side road:

- Intersections 1, 2 and 4 are expected to comply with the PDP's minimum separation distance requirement to the nearest intersection/ side road (a minimum spacing of 200 m is specified for speed

[18] According to Austroads, a reasonable approximation of the 85th percentile speed where it is unknown is the posted speed limit plus 10%.

environments ≥ 70 km/h, while a 100 m minimum spacing is specified for a 50 km/h (or lower) speed environment).

- Intersection 3 is separated by approximately 95 m to the nearest side/ intersection road. While the separation distance does not meet the minimum requirements, the approximately 5 m shortfall is not considered to be significant as the proposed intersection is anticipated to generate low volumes of traffic (serving approximately 20-25 dwelling units). There are several low volume side roads within the vicinity of the site which also do not meet the 100 m separation distance requirement, and as shown by the crash history assessment, there are no known safety issues identified at these side road intersections. On this basis, and due to the anticipated low traffic volumes that are expected to be generated by the side road (less than 250 vpd based on typical generation rates of a residential dwelling), the reduced intersection separation distance is considered to be suitable for the proposal.

Available separation distance to the nearest vehicle crossing/ private access:

- As shown in Table No. 7, Intersection 1 does not fully comply with the minimum separation distance requirement to the nearest private access/ vehicle crossing (a minimum spacing of 80 m is specified for a 80 km/h speed environment - Intersection 1 is separated by approximately 40 m to the nearest vehicle crossing).
- All three proposed intersections on Russell Road also do not comply with the PDP's minimum separation distance requirement to the nearest private access/ vehicle crossing (a minimum spacing of 30 m is specified for a 50km/h (or lower) speed environment); there is also an existing access directly across from all three proposed intersections.
- The available access separation distance at Intersection 1, 2 and 3 is, however, considered to be suitable for the proposal for the following reasons:
  - The nearby vehicle crossings are all private property accesses and will likely only generate approximately one vehicle movement per peak hour based on typical generation rates of a residential dwelling. The small amount of traffic is unlikely to cause regular conflict with the traffic from the subject site.
  - Sight distance well in excess of the minimum requirements is available to the proposed intersections and existing private accesses.
  - On balance there is no better location for the access to Site 1 than the location proposed. Other locations were considered but deemed to be inferior due to less sight distance and/or closer to other existing accesses than the preferred location.
  - There are numerous existing private accesses on Russell Road which are separated by less than 30 m from an existing intersection which have no significant safety issues; based on assessment of the crash data, there has only been one crash (which did not result in any injuries) in the previous 10 years which was related to a vehicle access (i.e. a vehicle either turning into or out of a private access). The low speed environment would ensure that the likelihood and severity of crashes are minimised.
- The available separation distance to the nearest private access to Intersection 4 is considered to not be sufficient. The driveway for the property located at 110 Russell Road is spaced approximately 10 m from the proposed intersection. While there are several driveways off Russell Road that are located less than 15 m from an intersection (e.g. 62, 93 and 173 Russel Road), it is proposed that the existing driveway at 110 Russell Road be relocated to an appropriate distance from the proposed intersection (e.g. access to the existing property could potentially be provided off the proposed internal road network and not on Russell Road). The appropriate driveway configuration and placement should be further investigated as part of the detail design of the intersection.

5.3 Internal Road Network

An indicative network of internal roads to service the proposed rezoning sites has been developed as illustrated in Figure No. 23 below, and Figure No. 19 and Figure No. 20 above.

As shown in Figure No. 23, the internal road network consists of four local road typologies. The indicative cross-section elements for the proposed road typologies are summarised in Table No. 8 below. The indicative cross-sections of the proposed road typologies are provided in Appendix A.

The street hierarchy has been guided by the minimum access and road performance standards set out in Table 14.12.5.14 of the PDP, as well as Table 3.2 of the New Zealand Standard (NZS) 4404:2010 (Land Development and Subdivision Infrastructure).

Figure No. 23: Proposed Internal Road Network

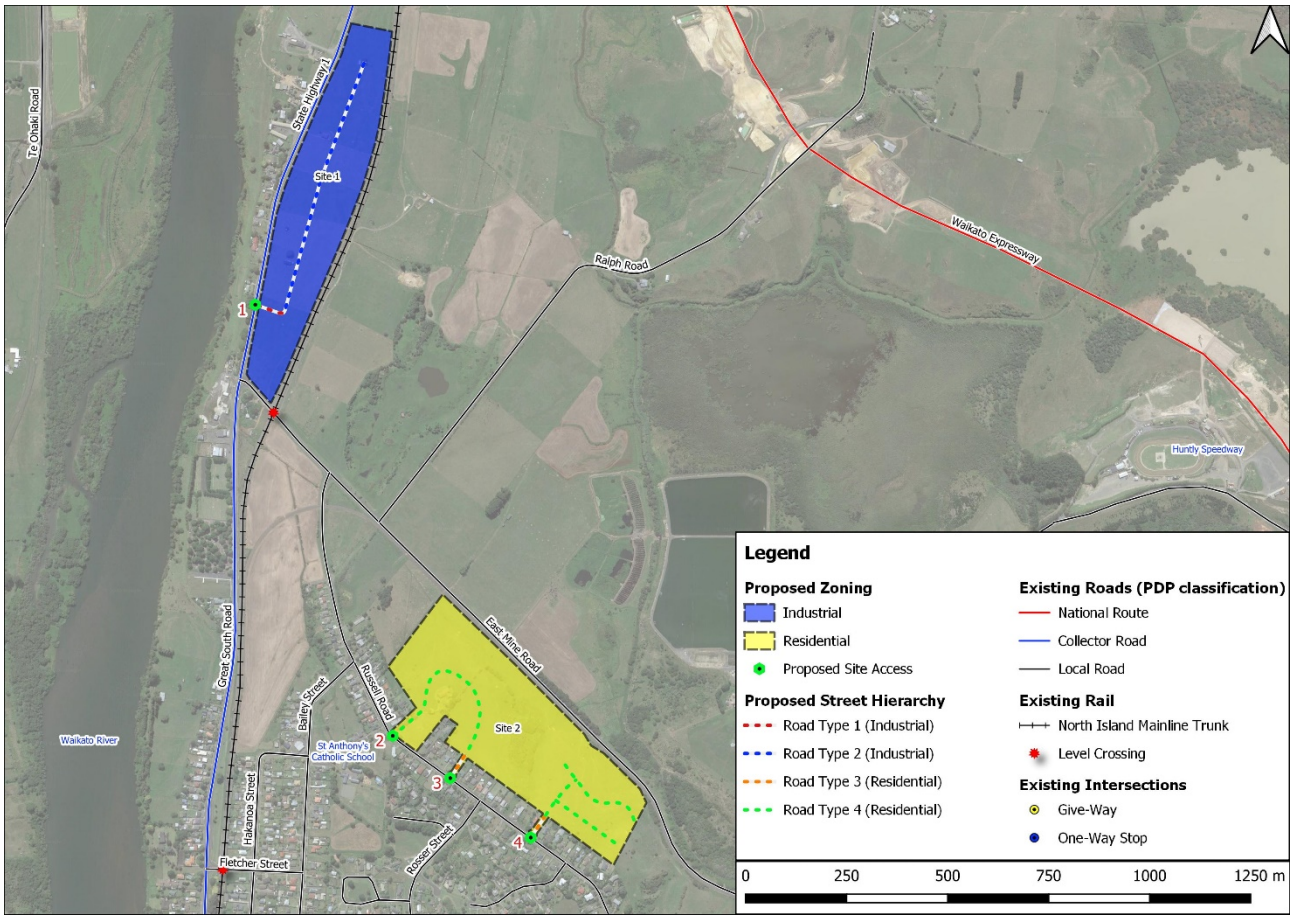


Table No. 8

Proposed Road Typologies				
Typology	**Road Type 1**	**Road Type 2**	**Road Type 3**	**Road Type 4**
Road Classification	Local Road (Industrial)	Local Road (Industrial)	Local Road (Residential)	Local Road (Residential)
Anticipated ADT (vpd)	2,500 – 3,000 vpd	2,000 – 3,000 vpd	< 1,000 vpd	< 1,000 vpd
Proposed Speed (km/h)	50 km/h	50 km/h	50 km/h	50 km/h

Proposed Road Typologies				
Typology	**Road Type 1**	**Road Type 2**	**Road Type 3**	**Road Type 4**
Road Reserve Width (m)	20 m	20 m	15 m	20 m
Carriageway Width (m)	2 x 4 m wide lanes	2 x 4 m wide lanes	2 x 3 m wide lanes	2 x 3 m wide lanes
Services	Provided on both sides – minimum 1.5 m wide berms	Provided on both sides – minimum 1.5 m wide berms	Provided on both sides – minimum 1.5 m wide berms	Provided on both sides – minimum 1.5 m wide berms
Parking Provision	None	On-street parking provided on both sides – 2.5 m wide bays	None	On-street parking provided on both sides – 2.5 m wide bays
Pedestrians & Cyclists	1.8 m side footpaths provided on both sides. Cyclists to share carriageway space.	1.8 m side footpaths provided on both sides. Cyclists to share carriageway space.	1.8 m side footpaths provided on both sides. Cyclists to share carriageway space.	1.8 m side footpaths provided on both sides. Cyclists to share carriageway space.

As shown in Table No. 8, Road Type 1, 2 and 4 comply with the standards set out in the PDP. The road typologies provide a road reserve width of 20 m and pedestrian facilities on both sides of the road. Road Type 1 and 2 (industrial local road) provide a 9 m wide carriageway comprising of 2 x 4 m traffic lanes to accommodate heavy vehicle turning movements into and out of individual lots. Road Type 4 provides a 6 m wide carriageway with 2.5 m wide parking bays on both sides of the road.

Figure No. 24 to follow illustrates the locality and configuration of Road Type 3. As shown in the figure, a road reserve width of 15 m is achievable. While the 15 m road reserve width for Road Type 3 is narrower than the standard minimum road reserve of 20 m, the narrower width is considered appropriate for this specific development because the area within which the road typology is located is constrained. There are residential lots located on both sides of the Road Type 3 road reserve boundary, and in order to provide the minimum required 20 m road reserve width, additional land would need to be purchased from the adjacent private residential lots. Additionally, the narrower width is acceptable and workable for this specific area due to the relatively short (60 m) road sections.

As shown in Table No. 8, parking facilities have not been proposed on either side of the road for Road Type 3. While this is not in accordance with the provisions in the PDP, it is considered appropriate as sufficient alternative parking has been provided along Russell Road, Road Type 4 and internally within the development.

While the preliminary concept plans (and Figure No. 23) reflect the proposed network configuration, the finer details of the road network will be refined at future subdivision stages.

Figure No. 24: Locality and Configuration of Road Type 3

5.4 Other Transport Modes

5.4.1 Walking and Cycling

As shown in Table No. 8, walking and cycling infrastructure has been proposed within both rezoning sites. Footpaths (1.8 m wide) are proposed on both sides of the proposed local road network within both rezoning sites consistent with the PDP standards. Similar to the surrounding local road network, cyclists are proposed to share the carriageway space with vehicles. An appropriate speed limit for safe sharing of the road space should be provided.

The proposed walking infrastructure within the rezoning sites are proposed to connect to the existing walking and cycling facilities as follows (Figure No. 25 illustrates):

Site 1

While no formal pedestrian and cyclist facilities are presently available along the section of Great South Road that fronts the site, there is an existing footpath approximately 400 m south of the proposed Intersection 1 on the western side of Great South Road (refer to section 3.4.3). The proposed walking infrastructure within the site could readily be extended to Great South Road (via kerb crossings) and connect to the existing footpath as follows:

- A new 1.8 m wide pedestrian footpath is proposed on the eastern side of Great South Road which extends from Intersection 1 to approximately 140 m north of the East Mine Road T-intersection, with a new pedestrian crossing facility at this location. Figure No. 26 provides a concept layout of the proposed pedestrian crossing facility (a new pedestrian refuge island provided within the central flush median).
- It is proposed that the existing pedestrian footpath on the western side of Great South Road (which currently terminates approximately 400 m south of Access Intersection 1) be extended to the proposed pedestrian crossing facility. The new footpath on the western side of Great South Road will be approximately 340 m in length.

Figure No. 25: Proposed Walking and Cycling Infrastructure

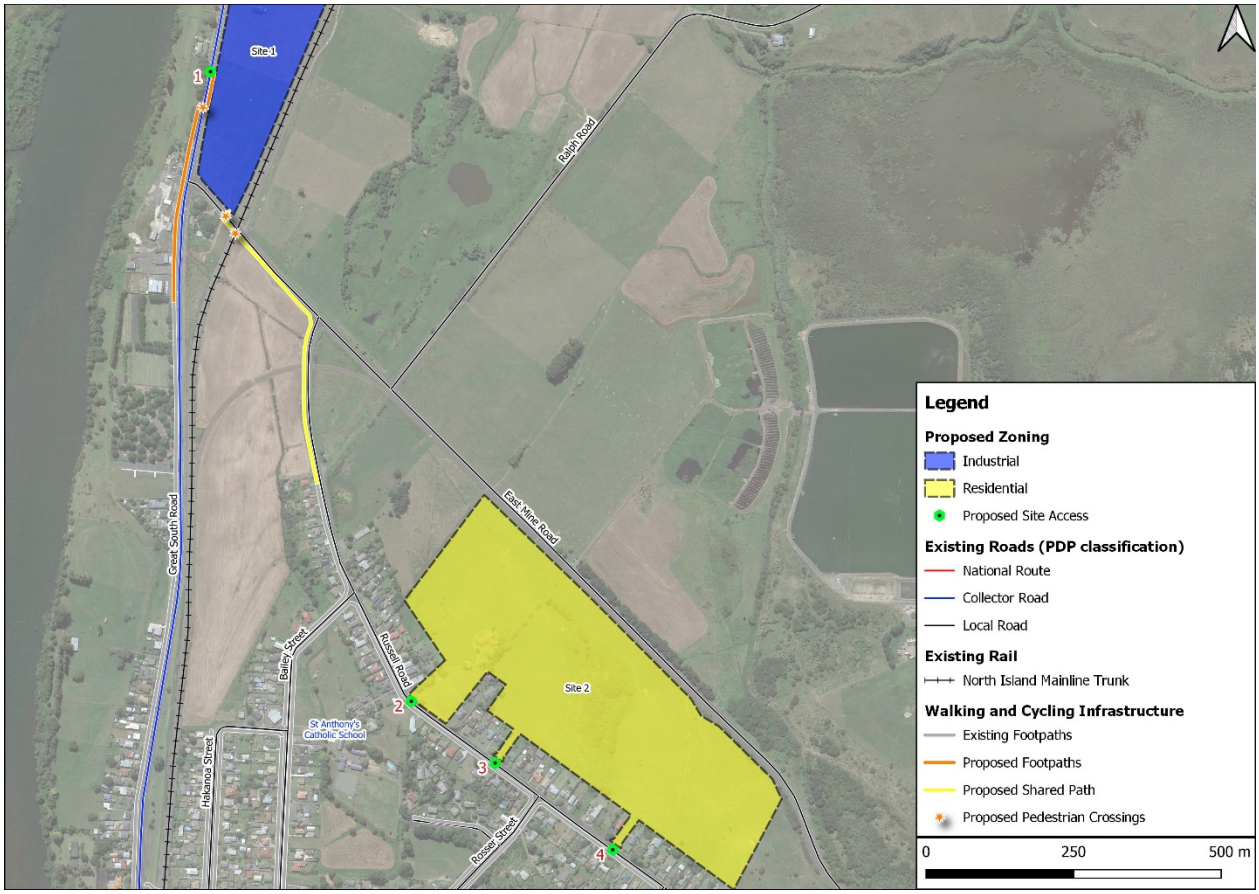


Figure No. 26: Proposed new pedestrian crossing facility on Great South Road

It is also proposed that, as part of any future urbanisation upgrade works along Great South Road, painted cycle lanes to and from Huntly CBD be provided within the existing sealed shoulder.

Site 2

The internal walking network within the rezoning site is proposed to connect to the existing footpath on the southern side of Russell Road via kerb crossings on either side of the proposed intersections.

Walking and cycling connections between Site 1 and 2:

A new 2.5 wide shared path is proposed on the southern side of East Mine Road and western side of Russell Road, which extends from the southern boundary of Site 1 to the existing footpath on the western side of Russell Road. The new shared path would be approximately 485 m in length. Two new pedestrian and cyclists crossing facilities would be required: one crossing over the NIMT and another over East Mine Road (approximately 30 m east of the existing level crossing).

5.4.2 Public Transport

Site 1

While **Site 1** (i.e. the area to be rezoned Industrial) is located adjacent to the Northern Connector bus route (the bus travels north and south on SH 1/ Great South Road), the nearest bus stop is located approximately 1.5 km walking distance from the site (at 104 Bailey Street). The site is also located within approximately 3.5 km to the future Huntly passenger rail station.

The nearest public transport stopping facility falls outside the accepted maximum comfortable walking distance. Although the distances above have traditionally been a barrier to people using public transport, the rapid rise in popularity of electric bikes and e-scooters particularly for "first and last mile journeys means that such distances are now less of a barrier than when walking or cycling were the only alternatives.

Notwithstanding the above, given the close proximity of the existing regional bus service to the site, there is opportunity to provide a bus stop in Huntly North along the existing bus route should the area be urbanised in future. A bus stop facility could potentially be provided on both sides of Great South Road near Intersection 1, with a suitable pedestrian crossing and refuge facility in the centre of the road for added safety. The provision of these facilities would ensure that public transport becomes an integral part of the travel options for workers within the site.

It is therefore recommended that consultation with WRC be undertaken to investigate the potential of providing a bus stop on Great South Road near Site 1 and the proposed pedestrian crossing point[19].

Site 2

As illustrated in Section 3.4.1, **Site 2** (i.e. the area to be rezoned Residential) is considered to be well served by the existing public transport services within Huntly. The closest bus stop to the site (at 115 Russell Road) is located within the generally accepted maximum comfortable walking distance of 600 m from public transport services as outlined in Policy P4 of the Waikato Regional Public Transport Plan 2018 – 2028.

[19] At the time of writing this report, WRC had not yet provided feedback related to potentially providing an additional stop on Great South Road.

6. Predicted Trip Generation

The trip generation predictions for the proposed rezoning have been determined using trip rates that were derived from the Waikato Transportation Model (WRTM) based transportation effects assessments for similar rezoning projects, including:

- The proposed Ohinewai Rezoning and Structure Plan project in Ohinewai;
- The consented Ruakura Plan Change in Hamilton; and
- The consented Te Awa Lakes Rezoning in Hamilton.

The trip rates adopted in the abovementioned WRTM based assessments were compared to trip rate data provided in the following trip generation manuals and related publications:

- NZ Transport Agency research report 453: Trips and parking related to land use (November 2011);
- RTA Guide to Traffic Generating Developments (Version 2.2, October 2002), and
- Institute of Transportation Engineers (ITE) Trip Generation Manual (8th Edition).

6.1 Trip Generation

6.1.1 Industrial Activity

Table No. 9 provides a summary of the predicted trip generation for the proposed industrial zoning on the basis of the trip rate data for typical industrial activities.

Table No. 9

Predicted Trip Generation – Industrial Zone						
Reference Document	Land Use Zone/ Activity	Trip Rate Data		Land Use Extent	Predicted Trip Generation	
		Daily Trip Rate	Peak Hour Trip Rate[20]		Daily Trips (vpd)	Peak Hour Trips (vph)[20]
WRTM trip rates - Ohinewai Rezoning[21]	Industrial	208.5 trips per ha[22]	20.9 trips per ha[22]	11.47 ha net developable area	2,390 vpd	240 vph
WRTM trip rates – Ruakura Plan Change[23]	Industrial	-	20 trips per ha[22]		-	230 vph
NZ Transport Agency research report 453 (Table 7.4)	4.1 Manufacture	30 trips per 100m^2 GFA	2.7 trips per 100m^2 GFA	57,350 m^2 GFA	17,205 vpd	1,550 vph
RTA Guide (section 3.10.1/ Table 3.7)	Factories	5 trips per 100m^2 GFA	1 trip per 100m^2 GFA		2,870 vpd	575 vph
ITE Trip Generation Manual[24]	Manufacturing (Code 140)	4.11 trips per 100m^2 GFA	0.8 trip per 100m^2 GFA		2,360 vpd	460 vph
	Industrial Park (Code 130)	7.45 trips per 100m^2 GFA	0.93 trip per 100m^2 GFA		4,275 vpd	530 vph

[20] The peak hour is expected to be during the PM peak as is expected to generate a higher number of trips compared to the AM peak, Interpeak and off-peak periods.
[21] Ohinewai Rezoning Integrated Transportation Report by Bloxam Burnett & Olliver, dated 20 May 2020
[22] Net developable area
[23] Project REWA Integrated Transportation Assessment Report by Stantec, dated 12 June 2020
[24] Trip rates are converted from trips per 1,000 square feet to trips per 100 square metres

As shown in Table No. 9, based on the respective WRTM traffic demand projections for the proposed Ohinewai Structure Plan (OSP) and consented Ruakura Structure Plan (RSP) areas, the industrial activities within the structure plan areas are anticipated to generate approximately 20 - 21 peak hour trips per hectare (developable area) and approximately 208.5 daily trips per hectare (OSP area).

When comparing these trip rates to trip rate data provided in the above-mentioned manuals and related publications, it was found that:

- The daily trip rates provided in the RTA Guide (factories) and ITE Manual (manufacturing) for manufacturing facilities fell within a similar range to the daily trip rates in the WRTM for the OSP area. Based on these daily rates, the industrial zoning is anticipated to generate between 2,400 and 2,900 trips per day (i.e. between 4 - 5 daily trips per 100 m^2 GFA).
- The peak hour trip rates in the WRTM for the OSP and RSP areas were found to be significantly lower than (almost half) the peak hour trip rates provided in the RTA Guide and ITE Manual for manufacturing facilities. This may likely be due to the fact that the trip rates in the two publications only relate to manufacturing activities and generally exclude other industrial activities such as warehousing, logistics, repair and servicing facilities (which typically generate a lower number of peak hour trips). The ITE Manual also provides trip rates for an 'Industrial Park'[25] land use which includes a number of industrial and related facilities in one location. While the peak hour trip rate for this land use is comparable to the peak hour trip rates for manufacturing land use, the land use is estimated to generate a significantly higher number of trips per day (7.5 daily trips per 100 m^2 GFA compared to 4 - 5 daily trips per 100 m^2 GFA).
- The trip rates provided in the NZ Transport Agency research report 453 (for manufacturing activities) are significantly higher than the trips rates for similar activities provided in the above referenced trip generation manuals and publications. The research report clarifies that the high trip rates include some component of warehousing, distribution, and direct sales to the public. The report also notes that these trip rates are based on a very small sample. On this basis, the trips rates are considered to not be appropriate for the proposed rezoning.

On the basis of the above, the trip rates that were derived from the WRTM based assessments for the proposed OSP and consented RSP areas are considered to be appropriate for the proposed rezoning as they have been derived from similar existing, consented and proposed industrial activities within the wider Waikato region.

Based on these trip rates, the industrial zoning is anticipated to generate approximately 2,400 trips per day and 240 trips during the peak hour.

However, for ensuring a robust assessment, the higher trip rates from the RTA Guide and ITE Manual (i.e. manufacturing activities) were adopted. Based on these higher trip rates, the industrial zoning is anticipated to potentially generate between 2,400 – 2,900 trips per day and 240 – 575 trips during the peak hour. Accordingly the effects assessment (Section 7) is based on the higher generation figures (i.e. 2,900 trips per day and 575 trips during the peak hour).

6.1.2 Residential Activity

Table No. 10 provides a summary of the predicted trip generation for the proposed residential zoning on the basis of the trip rate data for the typical residential activities provided in the above-mentioned reference documents.

[25] The ITE Manual defines industrial parks as containing a number of industrial or related facilities, including a mix of manufacturing, service and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diverse

Table No. 10

Predicted Trip Generation – Residential Zone						
Reference Document	Land Use Zone/ Activity	Trip Rate Data		Land Use Extent	Predicted Trip Generation	
		Daily Trip Rate	Peak Hour Trip Rate		Daily Trip Generation (vpd)	Peak Hour Trip Generation (vph)
WRTM trip rates - Ohinewai Rezoning[26]	General density residential	8.33 trips per dwelling unit	0.67 trips per dwelling unit	85 dwelling units	709 vpd	57 vph
WRTM trip rates – Te Awa Lakes Plan Change[27]	Medium density residential	-	0.52 trips per dwelling unit[28]		-	45 vph
NZ Transport Agency research report 453 (Table 7.4)	7.1.2 Dwelling (suburban)	10.9 trips per dwelling unit	1.2 trips per dwelling unit		927 vpd	102 vph
RTA Guide (section 3.3.1)	Dwelling houses	9 trips per dwelling unit	0.85 trips per dwelling unit		765 vpd	73 vph
ITE Trip Generation Manual	Single-family detached housing (Code 210)	9.57 trips per dwelling unit	1.01 trips per dwelling unit		814 vpd	86 vph

As shown in Table No. 10, based on the respective WRTM traffic demand projections for the proposed OSP and consented Te Awa Lakes Structure Plan (TLSP), the residential activities within the structure plan areas are anticipated to generate approximately 0.67 and 0.52 peak hour trips per dwelling, respectively and approximately 8.33 daily trips per dwelling (OSP area). However, the residential dwellings within the TLSP area are medium density residential units. Based on the OSP residential trip rates, the residential zoning is anticipated to generate approximately 710 trips per day and 60 trips during the peak hour.

By comparison, the daily and peak hour trip rates provided in the above-mentioned manuals and publications were considerably higher (0.85 – 1.2 peak hour and 9 – 10.9 daily trips per dwelling unit) than the WRTM based trip rates. On the basis of these trip rates, the residential zoning is anticipated to potentially generate approximately 815 - 930 trips per day and 75 – 100 trips during the peak hour.

Similar to the Industrial trip component, the effects assessment has been based on the higher residential trip generation figures (i.e. 930 trips per day and 100 trips during the peak hour).

6.1.3 Total Trip Generation

Table No. 11 to follow provides a summary of the predicted trip generation for the rezoning proposal.

As shown in Table No. 11, the proposed rezoning is anticipated to generate approximately 3,135 trips per day and 300 trips during the peak hour. However, as a conservative approach, the adopted trip generation for this assessment was 3,830 trips per day and 675 trips during the peak hour.

[26] Ohinewai Rezoning Integrated Transport Assessment Report by Bloxam Burnett & Olliver, dated 20 May 2020
[27] Te Awa Lakes Integrated Transport Assessment Report by Stantec, dated 21 August 2019
[28] The following conversion factors were used to convert the two-hour trip rate figures in the Te Awa Lakes ITA report into one-hour (peak hour) volumes: AM Peak = 0.571 and PM Peak = 0.556

Table No. 11

Predicted Trip Generation for the Rezoning Proposal					
Zone Area	Development Yield	Predicted Trip Generation: Based on trip rate data from similar land uses in previous WRTM assessments		Adopted Trip Generation: Conservative estimation based on trip rate data from trip generation publications	
		Daily Trip Generation (vpd)	Peak Hour Trip Generation (vph)	Daily Trip Generation (vpd)	Peak Hour Trip Generation (vph)
Industrial Zone	57,350 m^2 GFA	2,400 vpd	240 vph	2,900 vpd	575 vph
Residential	88 dwelling units	710 vpd	60 vph	930 vpd	100 vph
Total		**3,110 vpd**	**300 vph**	**3,830 vpd**	**675 vph**

According to 2018 census data provided by Stats NZ website[29], approximately 1.6% of Huntly East residents use public transport (bus) to travel to work, 3.3% either walk or jog and 0.4% cycle to work. Approximately 87.4% of workers drive to work (using private vehicle and/or company vehicle), while the remaining 6.8% of the labour force work from home.

Given the nature of the activities associated with the proposed rezoning, the mode share for walking, cycling and public transport trips is assumed to be as follows:

Site 1 (Industrial Zoning)

Given the location of the site (rural environment with limited walking, cycling and public transport infrastructure within the vicinity of the site), it is anticipated that the mode share for walking, cycling and public transport trips would be low (i.e. likely to be less than 5% of the total trip generation).

Site 2 (Residential Zoning)

Given that the site is located in an established residential area which is well served by existing public transport services and walking/ cycling facilities, it is anticipated that the mode share for walking, cycling and public transport trips would likely be 5% of the total trip generation. However, this is likely to increase once the planned Te Huia passenger rail service starts running.

Table No. 12 provides an indication of the typical demand that could be expected for these other transport modes during the weekday period. This assumes that the adopted trip generation in Table No. 11 represents 100% of trips, so any walking, cycling and bus trips would assist in reducing the total number of vehicle trips.

Table No. 12

Predicted Daily Trip Generation for the Rezoning Proposal				
Zone Area	Transport Mode	Indicative Mode Share	Indicative Peak Trip Generation (trips per day)	
			Likely Trip Generation	Adopted (Conservative) Trip Generation
Industrial Zone	Car (Driver/ Passenger)	97%	2,352	2,842
	Public Transport	1%	24	29
	Walking & Cycling	1%	24	29
Total		**100%**	**2,400 trips per day**	**2,900 trips per day**
Residential	Car (Driver/ Passenger)	95%	675	884

[29] https://www.stats.govt.nz/tools/2018-census-place-summaries/huntly-east, accessed 13 October 2020

	Public Transport	1.5%	11	14
	Walking & Cycling	3.5%	25	33
Total		**100%**	**710 trips per day**	**930 trips per day**

6.2 Trip Distribution Assumptions

6.2.1 Directional Distribution

Directional distribution data provided in the ITE Trip Generation Manual was used to estimate the number of daily and peak in- and outbound trips (based on the adopted trip generation figures in Table No. 11). Table No. 13 provides the anticipated number of in- and outbound trips for the respective analysis periods.

Table No. 13

Directional Distribution for the Rezoning Proposal						
Zone Area	**Reference**	**Period**	**Directional Distribution**		**Adopted Trip Generation[30]**	
			IN	**OUT**	**IN**	**OUT**
Industrial Zone	ITE Manual (Code 140)	Daily	50%	50%	1,450	1,450
		AM Peak[31]	77%	23%	443	132
		PM Peak	31%	69%	178	397
Residential Zone	ITE Manual (Code 210)	Daily	50%	50%	464	464
		AM Peak[31]	25%	75%	26	77
		PM Peak	63%	37%	66	37

6.2.2 External Trip Distribution

The external trip distribution assumptions were made based on the observed travel patterns in Huntly (higher number of trips going south vs north) as well as future growth projections within the Waikato district (according to population growth data provided in the Waikato District Blueprint's District Growth Strategy and NZ Census data, approximately 80% of the overall growth in the district is expected along the southern population centres such as Hamilton).

Table No. 14 provides a summary of the assumptions that were made regarding the external distribution and assignment of trips on the surrounding road network (Figure No. 27 illustrates). As shown in the table, the following assumptions are made regarding the external trip distribution:

Site 1:

- 35% to the north (towards Auckland) via SH 1;
- 55% to the south (towards Huntly CBD/ Hamilton) via Great South Road; and
- 10% to the east (to Huntly East) via East Mine Road and Russell Road.

Site 2:

- 35% to the north (towards Auckland) via East Mine Road and SH 1;
- 65% to the south (towards Huntly CBD/ Hamilton):
  - 60% via Bailey Street and Fletcher Street; and

[30] Based on conservative trip generation assumptions.
[31] A lower number of trips would typically be generated during the AM peak period compared to the PM peak period for the anticipated land use activities. However, as a conservative approach, the PM peak trip generation was applied to the AM peak period.

- 5% via East Mine Road and Great South Road.

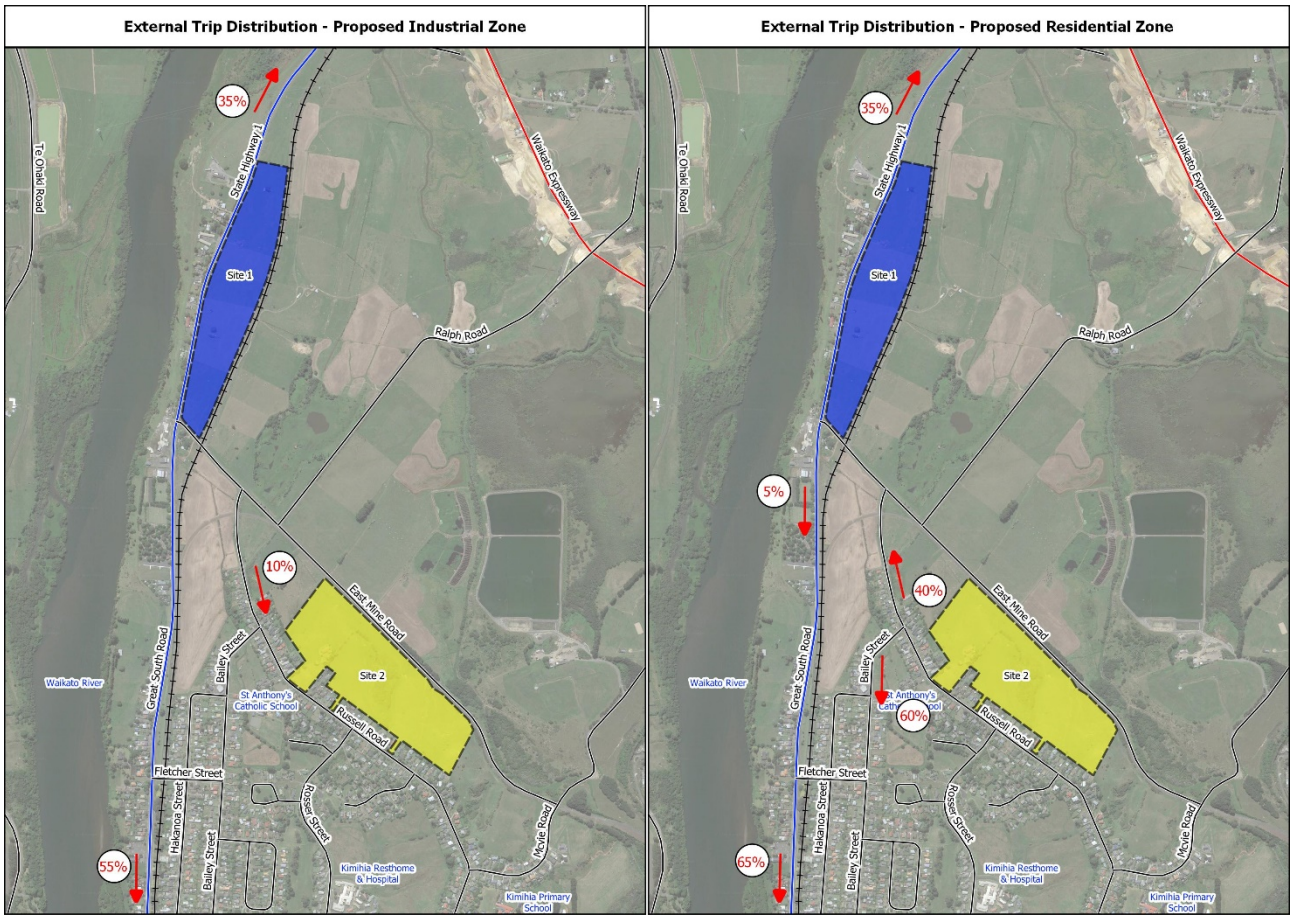
Sensitivity testing (of the considered the worst-case trip distribution scenario) was conducted to analyse the effect of alternative external traffic distributions on the performance and safety of the surrounding road network. The sensitivity scenarios are also provided in Table No. 14.

The estimated traffic volumes that are expected to be generated by the proposed industrial and residential rezoning during the AM and PM peak periods are illustrated in the figures provided in Appendix C.

Table No. 14

Predicted External Trip Distribution for the Rezoning Proposal				
Zone Area	**Direction**		**Assumed Distribution**	**Sensitivity**
Industrial Zone	**North** (To Auckland) via SH 1		35%	10%
	South (To Huntly CBD/ Hamilton) via Great South Road		55%	75%
	East (To Huntly East) via East Mine Road		10%	15%
Residential Zone	**North** (To Auckland) via East Mine Road & SH 1		35%	20%
	South (To Huntly CBD/ Hamilton)	via East Mine Road & Great South Road	5%	10%
		via Bailey Str & Fletcher Str	60%	70%

Figure No. 27: External Trip Distribution and Assignment



7. Assessment of Transportation Effects

The following sections outline the assessment of transportation effects of the proposed rezoning.

7.1 Capacity Assessment – Road Corridors

Table No. 15 provides a summary of the estimated ADT figures on the surrounding road network with the additional rezoning traffic. These ADT figures are based on the adopted trip generation and distribution assumptions provided in Table No. 13 and Table No. 14 respectively.

Table No. 15

Estimated 2030 ADT figures with the additional rezoning traffic					
Road Corridor	**Road Section**	**Estimated 2030 Baseline ADT (vpd)**	**Additional Rezoning Traffic ADT (vpd)**	**2030 Baseline + Rezoning Traffic ADT (vpd)**	**% change**
Great South Road	North of Access Intersection 1	5,290 vpd	1,340 vpd	6,630 vpd	+25%
	Access Intersection 1 to East Mine Road	5,290 vpd	2,210 vpd	7,500 vpd	+42%
	East Mine Road to Fletcher Street	5,290 vpd	1,640 vpd	6,930 vpd	+31%
	South of Fletcher Street	5,290 vpd	2,200 vpd	7,490 vpd	+42%
East Mine Road	Great South Road to Russell Road	975 vpd	660 vpd	1,635 vpd	+68%
Russell Road	East Mine Road to Bailey Street	695 vpd	660 vpd	1,355 vpd	+95%
	Bailey Street to Access Intersection 3	1,220 vpd	1,220 vpd	2,440 vpd	+100%
Bailey Street	Russell Road to Gordon Road	1,230 vpd	555 vpd	1,785 vpd	+45%
Hakanoa Street	Gordon Road to Fletcher Street	810 vpd	555 vpd	1,385 vpd	+69%
Fletcher Street	Great South Road to Hakanoa Street	1,690 vpd	555 vpd	2,245 vpd	+33%

The following discussion relates to the ADT figures in Table No. 15:

- The ADT on Great South Road is estimated to increase by approximately 25% to 45% with the addition of the proposed rezoning traffic on the 2030 baseline traffic. The road section is anticipated to have an ADT of 6,660 – 7,500 vpd with the additional rezoning traffic. The additional traffic (including any additional traffic associated with the proposed OSP area) is not expected to adversely impact the capacity of the collector road[32] given that prior to the opening of the Huntly section of the WEX, the road carried an ADT of over 23,000 vpd (with over 15% HCV).
- The ADT on the local road network within the vicinity of the site (i.e. the above mentioned sections of East Mine Road, Russell Road, Bailey Street, Gordon Road/ Hakanoa Street and Fletcher Street) is anticipated to increase by 30% to 100% with the rezoning traffic on the 2030 baseline traffic. Even with the additional rezoning traffic, the total ADT on the local road network is not expected to exceed 2,500 vpd (two-way traffic). No adverse capacity effects are likely on these roads given that the road links have

[32] Table 14.12.5.6 of the PDP

ample spare capacity[33] to accommodate the increased daily traffic volumes associated with the proposed rezoning.

On this basis, the effect of the rezoning proposal on the capacity and efficiency of the surrounding road corridors is expected to be negligible.

7.2 Capacity Assessment – Local Area Intersections

This section discusses the performance analysis of intersections in Huntly East that could potentially be affected by traffic associated with the rezoning proposal. Intersections included:

- Great South Road and East Mine Road intersection;
- East Mine Road and Russell Road intersection;
- Russell Road and Bailey Street intersection, and
- Great South Road and Fletcher Street intersection.

The effects assessment was conducted on the basis of a 10-year assessment period. Where applicable, the 2020/21 and 2030/31 baseline intersection performance (or level of service (LOS)) with and without the proposed rezoning was assessed using Sidra Intersection 9.0.

7.2.1 SH1/ Great South Road & East Mine Road Intersection

Table No. 16 summarises the capacity analysis results for the Great South Road/ East Mine Road intersection, while the Sidra Intersection summaries are provided in Appendix D. The performance assessment is based on the existing (2020/21) intersection configuration as illustrated by Figure No. 12 and the turning volume figures provided in Appendix C.

Table No. 16

Intersection Movement Performance - Great South Road/ East Mine Road Intersection						
Intersection Approach	AM Peak Hour			PM Peak Hour		
	Ave Delay (sec)	95th percentile Queue (m)	LOS	Ave Delay (sec)	95th percentile Queue (m)	LOS
Assessment Scenario - 2020/21 Baseline (without the rezoning traffic)						
South: Great South Road	0.3	0.1	-	0.3	0.1	-
East: East Mine Road	11.3	1.5	B	11.1	0.7	B
North: State Highway 1	0.5	0.0	-	1.3	0.0	-
Intersection	**1.4**	**1.5**	**-**	**1.3**	**0.7**	**-**
Assessment Scenario - 2030/31 Baseline (without the rezoning traffic)						
South: Great South Road	0.3	0.2	-	0.3	0.2	-
East: East Mine Road	11.9	1.8	B	11.5	0.9	B
North: State Highway 1	0.5	0.0	-	1.3	0.0	-
Intersection	**1.5**	**1.8**	**-**	**1.4**	**0.9**	**-**
Assessment Scenario - 2030/31 Baseline + Proposed Rezoning Traffic						
South: Great South Road	0.2	0.2	-	0.3	0.3	-
East: East Mine Road	20.1	13.4	C	17.8	5.0	C
North: State Highway 1	1.0	0.0	-	1.6	0.0	-
Intersection	**3.7**	**13.4**	**-**	**2.4**	**5.0**	**-**

[33] According to Table 4.3 of the RTA's *Guide to Traffic Generating Developments*, the typical mid-block capacity of a two-way urban road with adjacent parking bays is 1,800 pcu/hour (or 900 pcu/hour one-way).

As shown in Table No. 16, the Great South Road/ East Mine Road intersection is expected to operate at acceptable levels of service (the intersection approaches are expected to operate at LOS B or better) during the AM and PM peak periods for the 2020/21 and 2030/31 baseline (i.e. without the traffic associated with the rezoning proposal) assessment scenarios.

With the addition of the rezoning traffic to the 2030/31 baseline, only a minor increase in the average vehicle delay is expected for vehicles on the westbound approach (i.e. East Mine Road) during the peak operating periods. Furthermore, the 95th percentile queues on the East Mine Road are not expected to exceed 15 m during the peak operating periods; the anticipated queues are not expected to extend to the level crossing. No capacity or safety upgrades are likely to be required at the intersection as it will continue to operate at better levels of service and safety than when Great South Road carried 23,000 vpd.

As explained in Section 6.2, sensitivity testing was conducted as part of the effects assessment to determine whether the existing road network will have sufficient capacity for varying trip distribution assumptions (refer to Table No. 14) bearing in mind that the effects assessment was conducted on a conservative estimation of the trip generation. The results from the sensitivity assessment are summarised in Table No. 17.

Table No. 17

Intersection Performance - Great South Road/ East Mine Road Intersection (Sensitivity)						
Intersection Approach	AM Peak Hour			PM Peak Hour		
	Ave Delay (sec)	95th percentile Queue (m)	LOS	Ave Delay (sec)	95th percentile Queue (m)	LOS
Assessment Scenario - 2030/31 Baseline + Proposed Rezoning Traffic (Sensitivity)						
South: Great South Road	0.2	0.3	-	0.4	0.5	-
East: East Mine Road	26.1	16.5	D	21.9	6.1	C
North: State Highway 1	0.8	0.0	-	1.3	0.0	-
Intersection	**3.8**	**16.5**	**-**	**2.2**	**6.1**	**-**

As shown in Table No. 17, the intersection is expected to operate at acceptable levels of service (the intersection approaches are expected to operate at LOS D or better) when analysed based on the worst-case trip distribution scenario. On this basis, it is considered that the existing intersection form is robust and capacity and safety upgrades are unlikely to be triggered by the proposed development.

An additional sensitivity test was undertaken to assessment the impact of including the OSP rezoning traffic onto Great South Road. As expected, the intersection is expected to continue operating at acceptable levels of service given that it operated well when it carried 23,000 vpd.

7.2.2 East Mine Road & Russell Road Intersection

The rezoning proposal is anticipated to result in an increase in movements consistent with the following: (refer to the turning volume figures provided in Appendix C)

- Right turn traffic from East Mine Road to Russell Road – the baseline turning volumes are anticipated to increase by approximately 24 vph and 66 vph during the AM and PM peak hours respectively.
- Left turn traffic from Russell Road to East Mine Road – the baseline turning volumes are anticipated to increase by approximately 75 vph and 33 vph during the AM and PM peak hours respectively.

As shown above, the proposed rezoning is expected to generate an additional 100 turning vehicles during the respective peak period (this equates to a little under two additional turning vehicles per minute). Given the existing and projected low volume environment on East Mine Road (estimated 2030 baseline < 1,000 vpd), it is anticipated that sufficient gaps would be available in the traffic stream for the additional turning traffic associated with the rezoning proposal. On this basis, no capacity upgrades are expected to be required at the intersection as a result of the additional rezoning traffic.

7.2.3 Russell Road & Bailey Street Intersection

The rezoning proposal is anticipated to result in an increase in movements consistent with the following: (refer to the turning volume figures provided in Appendix C)

- Eastbound traffic on Russell Road – the baseline through movement volumes are anticipated to increase by approximately 21 vph and 58 vph during the AM and PM peak hours respectively.
- Westbound traffic on Russell Road – the baseline through movement volumes are anticipated to increase by approximately 66 vph and 29 vph during the AM and PM peak hours respectively.
- Right turn traffic from Bailey Street to Russell Road – the baseline turning volumes are anticipated to increase by approximately 15 vph and 39 vph during the AM and PM peak hours respectively.
- Left turn traffic from Bailey Street to Bailey Street – the baseline turning volumes are anticipated to increase by approximately 46 vph and 22 vph during the AM and PM peak hours respectively.

As shown above, the proposed rezoning is expected to generate an additional 60 turning vehicles during the respective peak period (this equates to one additional turning vehicle per minute during the peak hour), and an additional 95 through vehicle movement during the peak period (this equates to two additional through vehicles per minute).

Given the existing and projected low volume environment on both intersecting roads, and the low turning volumes, it is anticipated that sufficient capacity is available for the additional turning traffic associated with the rezoning proposal. On this basis, no capacity upgrades are expected to be required at the intersection as a result of the additional rezoning traffic.

7.2.4 Great South Road & Fletcher Street intersection

The rezoning proposal is anticipated to result in an increase in movements consistent with the following: (refer to the turning volume figures provided in Appendix C)

- Northbound traffic on Great South Road – the baseline through movement volumes are anticipated to increase by approximately 448 vph and 305 vph during the AM and PM peak hours respectively.
- Southbound traffic on Great South Road – the baseline through movement volumes are anticipated to increase by approximately 260 vph and 420 vph during the AM and PM peak hours respectively.
- Right turn traffic from Great South Road to Fletcher Street – the baseline turning volumes are anticipated to increase by approximately 15 vph and 39 vph during the AM and PM peak hours respectively.
- Left turn traffic from Fletcher Street to Great South Road – the baseline turning volumes are anticipated to increase by approximately 46 vph and 22 vph during the AM and PM peak hours respectively.

As shown above, the proposed rezoning is expected to generate an additional 60 turning vehicles during the respective peak period (this equates to one additional turning vehicle per minute during the peak hour).

Given that there were no significant capacity issues identified at the intersection prior to the opening of the Huntly Bypass (i.e. when SH 1/ Great South Road carried just over 23,000 vpd), it is anticipated that the intersection would continue to operate at acceptable levels of service. On this basis, no capacity upgrades are expected to be required as a result of the additional rezoning traffic.

7.3 Effects Assessment – Proposed Access Intersections

The following provides an assessment of the proposed locations for access to the rezoning sites, including an assessment of the efficiency (capacity) and safety of the proposed intersection forms.

As identified in Section 5.2, four new accesses are proposed for the rezoning sites. Access to Site 1 is proposed via a new intersection on Great South Road, while access to the proposed residential rezoning site is proposed via three new intersections from Russell Road. The proposed intersection forms include:

- A ‘Tee’ intersection with right turn bay on Great South Road (Intersection 1), and
- Three ‘Tee’ intersections on Russell Road (Intersection 2 to 4).

The expected performance of the proposed intersections was assessed using Sidra Intersection on the basis of a 10-year assessment period (2030/31); the Sidra Intersection output files are provided in Appendix D.

Access Intersection 1 (T-intersection with a compulsory Stop on the westbound approach)

Access to Site 1 is proposed off Great South Road in contrast to Rule 14.12.1.1(e) of PDP specifying that sites with frontage to two roads should access only from the road with the lower classification. This is proposed for the following reasons:

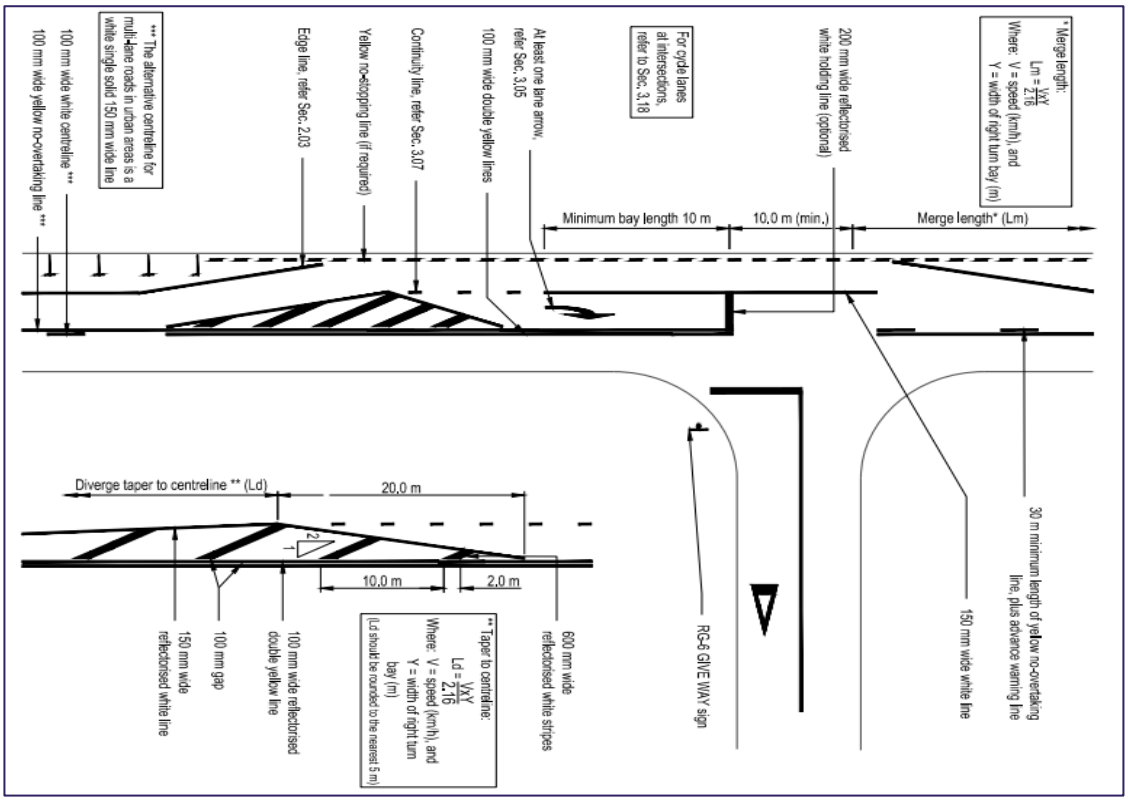
- The southern boundary of Site 1 bordering East Mine Road is approximately 90 m long. This is a short section of road and is constrained by the NIMT level crossing and the intersection of East Mine Road and Great South Road. Positioning a new access along this short 90 m section will not meet the PDP’s minimum separation (200 m) or SISD requirements. It would also create a more complex traffic environment in close proximity to the rail level crossing.
- An access off the short 90 m section of East Mine Road would also likely not comply with Rule 14.12.1.1(e) of PDP which states that no new vehicle access should be created within 30 m of a railway level crossing. It would be particularly inappropriate to form a new road intersection within 200 m of a level crossing if there are safer alternative access options.
- At the proposed location on Great South Road, the new intersection will have good sight lines in both directions (in excess of 250 m in both directions), complying with the minimum required SISD for the speed environment.
- The position of the new intersection is more than 200 m from the nearest existing intersection (East Mine Road) but is only positioned 40 m to the nearest vehicle crossing (i.e. it will not meet the minimum access separation requirement to the nearest vehicle crossing). The result of this is considered to be only a minor effect at worst as explained in Section 5.2. Furthermore, should the operating speed on Great South Road in future become consistent with the existing 70 km/h posted speed limit, the separation distance to the nearest access will then fully comply.
- At the proposed location, the access, is also ideally located away from the existing residential dwellings on the opposite side of Great South Road.

As mentioned in Section 3.2.1, there is an existing 70 km/h speed threshold treatment located approximately 240 m north of the East Mine Road intersection. Assuming the new road intersection is approved at the proposed location (i.e. approximately 200 m north of the intersection of East Mine Road), the speed threshold treatment would have to be removed because it is located only 40 m north of the new intersection. No adverse safety effects are likely by its removal because a newer 70/100 km/h threshold treatment exists approximately 700 m north of the proposed access intersection. The threshold close to the access point is the original 70/100 km/h facility that was superseded when the 70 km/h speed limit zone was extended northwards 700 m.

Given the volume of turning movements that is expected at the proposed intersection (refer to Section 6.1.1 for the predicted trip generation), the volume and speeds of north and southbound vehicles on Great South Road, a right-turn bay treatment[34] is recommended to be included at the intersection. In accordance with Waka Kotahi’s Manual of traffic signs and markings (MOTSAM) Part 2, the desirable treatment for use in an urban situation is 50 m long including a 20 m long diverge taper, and 30 m right turn bay (refer to Figure No. 28). A conceptual layout of the proposed intersection is provided in Appendix A.

[34] Based on the warrants provided in Part 4 (Figure A-10 in Appendix A) of the Austroads Guide to Road Design manual, a channelised right-turn treatment will be applicable.

Figure No. 28: Urban channelised right-turn treatment (Source: Figure 3.26 in MOTSAM Part 2)



To improve visibility (especially during night-time) and in order maximise the safety of the intersection, it is recommended that street lighting be incorporated into the intersection design and integrated with the existing lighting already provided on Great South Road.

An assessment of the performance of the proposed intersection form (refer to Table No. 18) showed that the intersection is expected to perform at acceptable levels of service during both peak periods with little to no queuing expected on the north- and southbound approaches. As shown in Table No. 18, while some queueing is expected on the westbound approach, the 95th percentile queues on the approach is not expected to exceed 40 m (i.e. five vehicles).

Table No. 18

Intersection Performance – Proposed Access Intersection 1						
Intersection Approach	AM Peak Hour			PM Peak Hour		
	Ave Delay (sec)	95th percentile Queue (m)	LOS	Ave Delay (sec)	95th percentile Queue (m)	LOS
Assessment Scenario - 2030/31 Baseline + Proposed Rezoning Traffic						
South: Great South Road	3.4	1.2	-	2.0	3.2	-
East: Proposed Industrial Road	12.4	0.9	B	15.6	39.2	C
North: State Highway 1	2.0	0.0	-	0.9	0.0	-
Intersection	**4.0**	**1.2**	**-**	**6.8**	**39.2**	**-**
Assessment Scenario - 2030/31 Baseline + Proposed Rezoning Traffic (Sensitivity)						
South: Great South Road	3.6	1.6	-	2.4	4.3	-
East: Proposed Industrial Road	9.8	0.6	A	11.0	22.7	B
North: State Highway 1	0.8	0.0	-	0.3	0.0	-
Intersection	**3.7**	**1.6**	**-**	**5.1**	**22.7**	**-**

As shown in Table No. 18, the proposed intersection is expected to operate at acceptable levels of service when analysed based on the worst-case trip distribution scenario (refer to Table No. 14). On this basis, it is considered that the proposed intersection form is robust and will remain appropriate for varying trip distribution assumptions.

Access Intersection 2 to 4 (T-intersections)

Similar to Access Intersection 1, the proposed access locations were considered appropriate for the following reasons:

- The proposed intersections are expected to have good sight lines in both directions and comply with the minimum required SISD in all directions.
- The proposed intersections are expected to comply with the District Plan minimum intersection separation requirements. While the proposed intersections do not fully comply with the minimum access separation requirements to the nearest vehicle crossing, based on an operating speed of 55 km/h, the available access separation distance is considered suitable for the reasons provided in Section 5.2.

A right-turn bay treatment is unlikely to be required at the three T-intersections on Russell Road for the following reasons:

- The low volume environment on Russell Road: as shown in the projected turning volume figures provided in Appendix C, the critical movements at all three intersections will be left-turn in (approximately 20 – 30 vph during the peak hour) and right-turn out (approximately 20 – 35 vph during the peak hour). Based on the relatively low through traffic volumes on Russell Road (approximately 1,200 vpd) and the relatively low turning volumes at these intersections, the likelihood of a crash at these intersections is expected to be low.
- The low speed environment on Russell Road: as mention in Section 3.2.3, the urban section of the road has a posted speed limit of 50 km/h. At this low speed environment, the severity of crashes is lowered.
- Good visibility: all three intersections have relatively good sight lines in both directions (in excess of 150 m in both directions). Drivers approaching the intersection from Russell Road will have sufficient stopping sight distance to safely stop before the intersection, should there be a vehicle turning in/out of the intersection.

An assessment of the performance of the proposed intersections (refer to Table No. 19) showed that all three intersections are expected to perform at acceptable levels of service during both peak periods with little to no queuing expected on the intersection approaches.

Table No. 19

Intersection Performance – Proposed Access Intersection 2 to 4							
Intersection	Intersection Approach	AM Peak Hour			PM Peak Hour		
		Ave Delay (sec)	95th percentile Queue (m)	LOS	Ave Delay (sec)	95th percentile Queue (m)	LOS
Assessment Scenario - 2030/31 Baseline + Proposed Rezoning Traffic							
Access Intersection 2	East: Russell Road	0.2	0.3	-	0.4	0.3	-
	North: Proposed Residential Road	5.3	0.6	A	5.3	0.3	A
	West: Russell Road	0.5	0.0	-	0.5	0.0	-
	Intersection	**0.8**	**0.6**	**-**	**0.8**	**0.3**	**-**
Access Intersection 3	East: Russell Road	0.2	0.3	-	0.4	0.3	-
	North: Proposed Residential Road	5.3	0.6	A	5.3	0.3	A

Intersection Performance – Proposed Access Intersection 2 to 4							
Intersection	Intersection Approach	AM Peak Hour			PM Peak Hour		
		Ave Delay (sec)	95th percentile Queue (m)	LOS	Ave Delay (sec)	95th percentile Queue (m)	LOS
	West: Russell Road	0.5	0.0	-	0.5	0.0	-
	Intersection	**0.8**	**0.6**	**-**	**0.8**	**0.3**	**-**
Access Intersection 4	East: Russell Road	0.2	0.2	-	0.6	0.2	-
	North: Proposed Residential Road	5.1	0.9	A	5.1	0.5	A
	West: Russell Road	1.0	0.0	-	1.1	0.0	-
	Intersection	**1.4**	**0.9**	**-**	**1.4**	**0.5**	**-**

Notwithstanding the above, the final intersection locations and forms will be confirmed during the detailed design stage. The proposed accesses/ intersections must be designed in accordance with the provisions of the District Plan and the Waikato District Infrastructure Technical Specifications. The location and access design will be subject to planning and engineering approvals from the relevant road controlling authority, so they could change from that identified above.

7.4 Level Crossing Assessment

As shown in Table No. 15, the additional rezoning traffic is anticipated to result in a 68% (i.e. an additional 660 vpd) and 33% (i.e. an additional 555 vpd) increase in the ADT on East Mine Road and Fletcher Street respectively. While it is anticipated that the rezoning traffic will not adversely affect the safe operation of the NIMT level crossing on East Mine Road or Fletcher Street (given that the volume across both level crossings is not likely to exceed 2,500 vpd), KiwiRail has been consulted (refer to the meeting notes attached in Appendix E) and they require that a Level Crossing Safety Impact Assessment (LCSIA) be conducted as part of the future subdivision consents to assess the safety effects of the rezoning traffic on the existing level crossings, and determine whether any safety improvements for traffic or active modes area required to bring the crossings down to "Low or Low/Medium" risk scores. On this basis, it is recommended that the LCSIA be included as a condition of subdivision consent.

7.5 Car Parking

Table 14.12.5.7, Table 14.12.5.9 and Table 14.12.5.10 of the PDP specify the following minimum parking requirements that pertain to the two subject sites:

- Industrial activities: One car space per 100 m^2 GFA and loading space for at least one HCV.
- Dwellings: Two car spaces per dwelling with two or more bedrooms and one car space for studio or one-bedroom residential unit.
- Accessible parking spaces for each activity:
  - At least one accessible car park spaces where between one and 20 car spaces are provided;
  - A minimum of two accessible car park spaces where between 21 and 50 car spaces are provided, and
  - Where more than 50 car park spaces are provided, one additional accessible car park space is provided for every additional 50 car parks.
- Bicycle parking spaces: a minimum of one bicycle space for every 10 car park spaces required.

The exact number of parking spaces will need to be determined as part of the future subdivision consents once the exact land use activities and GFA's of any future development is confirmed.

Parking should be provided at the ratios listed above as a minimum, unless a separate resource consent is obtained to reduce the required number of parking spaces for a particular activity within the two subject sites.

8. Construction Traffic Management

Construction of the proposed rezoning sites and the internal road network is expected to occur in stages starting with ground improvements through to completion by approximately 2030 (subject to market conditions). Based on a preliminary geotechnical investigation by CMW Geosciences (draft Geotechnical Investigation report, dated 13 July 2020), it is expected that earthworks and ground remediation works will be required to manage the identified geohazard risks associated with developing the subject site. The importation of clean fill material may likely be required during the development period from offsite to lift the ground levels above the existing site levels as there is unlikely to be enough fill available from the designated "cut" areas.

The clean fill material is expected to be sourced from several quarries within the Waikato Region and transported to site using 50MAX truck-and-trailer units. Given that the proximity of the nearest quarries to the site are in Huntly, it is expected that most, if not all, of the truck-and-trailer units hauling fill material will access the rezoning sites via Great South Road and East Mine Road. The ground improvement earthworks, subdivision and building construction activities will all temporarily increase traffic volumes at various stages throughout development, on Great South Road and East Mine Road. Separate resource consent applications and Construction Traffic Management Plans (CTMP) for each phase of works will be required to determine, quantify and mitigate any transportation related effects of construction traffic.

However, an overarching principle for the bulk import fill phase of earthworks in particular is to minimise amenity effects on residents on Great South Road opposite subject Site 1 and on residents on Russell Road on the southern boundary of subject Site 2. This will be achieved by requiring access to the rezoning sites from purpose-built accesses (either temporary or at future permanent intersection locations) on Great South Road and East Mine Road, connecting to internal haul roads. The proposed temporary access or accesses should be constructed as per the RITS standards for heavy commercial rural entranceways. The location and access design will be subject to planning and engineering approvals from Waikato District Council.

9. Travel Demand Management

Travel Demand Management (TDM) refers to methods to reduce the need to travel as well as reducing short private vehicle trips. TDM is about providing greater choices of sustainable transportation options to the public, thereby spreading all trips over more travel modes and over more times of the day or removing the need to travel at all. TDM therefore also helps to reduce the impact on the environment by reducing the level of carbon produced by travel.

Industrial activities/land-uses predominantly involve the employment of people on site, often in shifts, with little ability for workers to choose to work from home, or on site with flexible working hours. However, automation is becoming more common in large manufacturing and logistics businesses which results in fewer jobs "on the floor" and significantly reduced vehicle trips in the traditional commuter peak periods. Although it is possible that some future industrial activities in Site 1 will experience the trip reducing effects of automation, this is most likely where large areas of land are available for mass manufacturing. Given the shape constraint of Site 1 it is likely that smaller businesses will establish and continue to employ people at traditional rates for industry per square metre of floor area.

On that basis, it is appropriate that this location is close to the existing regional public transport route and the future Huntly passenger rail station and is easily cycled or walkable from the proposed residential

development in Site 2. These transport options reduce reliance on private car use for workers within the proposed industrial area and residents within Huntly for travel to work purposes.

The proposed pedestrian and cycle facilities, which will link to the existing on- and off-road walking and cycling infrastructure in the Huntly East area, will encourage the use of alternative methods of transport (e.g. bicycles (electric and manual), scooters, etc.).

The proximity of the NIMT adjacent to Site 1 also enables the potential for future rail-based freight trips if adding a siding becomes economically viable. This would have the effect of reducing the overall road-based freight trips to/from Site 1.

10. Strategy and Policy Assessment

There are a number of national and regional transportation strategies and policies that influence transportation investment in the Waikato Region. Those most relevant to the proposed re-zoning are discussed below.

10.1 National

10.1.1 Government Policy Statement on Land Transport 2018/19 - 2027/28 (Draft)

The Government Policy Statement (GPS2018) outlines this Government's priorities for expenditure from the National Land Transport Fund over the next 10 years. It also provides guidance to decision-makers about where the Government will focus resources, consistent with the purpose of the Land Transport Management Act, which is:

"*To contribute to an effective, efficient, and safe land transport system in the public interest*."

GPS2018 identifies new strategic priorities and amended objectives to the previous GPS, with themes focussed on safety, mode neutrality, liveable cities, regional economic development, protecting the environment, and delivering the best possible value for money.

Accordingly, the key strategic priorities of the GPS2018 are defined as Safety and Access, with supporting strategic priorities of Value for Money and Environment protection. These are defined further as follows:

- *Safety: A safe system, free of death and serious injury;*
- *Access: Provides increased access to economic and social opportunities, enables transport choice and is resilient;*
- *Value for Money: Delivers the right infrastructure and services to the right level, at the best cost;*
- *Reduces the adverse effects on the climate, local environment and public health.*

Further explanation of the Themes in the GPS2018 to assist with delivering the strategic priorities are:

- *Addresses current and future demand for access to economic and social opportunities;*
- *Provide appropriate transport choices;*
- *Is resilient;*
- *Is a safe system, increasingly free of death and serious injury;*
- *Mitigates the effects of land transport on the environment; and*
- *Delivers the right infrastructure and services to the right level at the best cost.*

10.1.2 Connecting New Zealand (2012)

Connecting New Zealand (2012) was prepared by Waka Kotahi to provide an overview of the government's broad policy direction for the transport sector from 2012 to 2022. The overall objective for transport is as follows:

"*The government is seeking an effective, efficient, safe, secure, accessible and resilient transport system that supports the growth of our country's economy, in order to deliver greater prosperity, security and opportunities for all New Zealanders."*

10.1.3 The Transport Outlook 2017

The Transport Outlook 2017 provides an overview of what we can expect by way of traffic movements in the future. The population is expected to grow consistently over the next 50 years which will create additional demand on New Zealand's transport networks. Of particular relevance to this proposal is the projected increase in freight movements and general traffic movements on Waikato's Transport network.

10.1.4 Waka Kotahi Statement of Intent 2017-2021

This statement of intent presents a new direction for Waka Kotahi. Over the next three to five years the Waka Kotahi aims to deliver three big changes that form the foundation of this new direction:

- *One connected transport system: Transform the performance of the land transport system by integrating digital technology with physical infrastructure to create a safe, connected system that works for everyone.*
- *People-centred services: Simplify our customers' lives and our partners' work with innovative services and experiences that make it easy for them to do what they need to.*
- *Partnerships for prosperity: Unlock social and economic opportunities for customers, businesses and communities through targeted partnerships.*

10.1.5 Waka Kotahi Long Term Strategic View

The Long-Term Strategic View captures the pressure points and key economic, environmental, and population factors that will shape the transport system we need for the future.

10.1.6 National Land Transport Programme 2018-2021

The National Land Transport Programme provides an overview of the investment expected between 2018 and 2021 and what this spending will be focused on achieving. The National Land Transport Fund's investment is aimed squarely at improving road safety, access to opportunities, transport choice and resilience. This reflects the strategic direction set by the Government Policy Statement on land transport as stated above.

10.2 Regional

10.2.1 The Waikato Plan 2017

The Waikato Plan was created as a collaborative effort between the Waikato Councils, the Central Government and other private and public agencies. The Plan provides an overview of the important issues that affect the region now and are likely to affect the region over the next 30 years. The plan provides strategic guidance and advocacy to multiple agencies across the Waikato Region. Of particular relevance in this instance is priority 2 which is:

"*Connecting our communities through targeted investment - To maximise our resources and access what we need, we must be able to connect with others quickly, safely and efficiently. Whether by road, rail, air or via*

new technology, the Waikato Plan will ensure we have the right infrastructure in the right place, at the right time so our people and economy can succeed and prosper."

10.2.2 2018 Update to the Waikato Regional Land Transport Plan (WRLTP) 2015-2045

The 2018 update of the WRLTP, builds on the 2015 Plan. As a mid-term review, it focuses in particular, on the regions key transport problems and priorities over the next three years, leading up to a full review of the plan in 2021. The plan is built around the regions three key transport problems, being:

- *Protecting the function of our strategic corridors in the context of growth pressures in and around Hamilton, the North Waikato and in the upper North Island;*
- *Tackling our complex road safety problem and the disproportionate number of deaths and serious injuries in the region*
- *Providing for the access and mobility needs of our communities in a changing social, demographic, economic and technological landscape.*

10.2.3 Waikato Regional Public Transport Plan 2015 – 2025

The Waikato Regional Public Transport Plan is a strategic document that sets the objectives and policies for public transport in the region and contains details of the public transport network and development plans between 2015 and 2025. The plan builds on the strategic direction for transport established through the Waikato Regional Land Transport Plan 2015-2045 (detailed above), and aims to deliver an effective, efficient and integrated public transport system for the people of Waikato. The overall goal set-out in this plan is as follows:

"*A growing and affordable public transport system that contributes to the economic, social and environmental vitality of the region*."

10.3 District

10.3.1 Waikato District and Local Area Blueprints 2019

The WDC commissioned the development of a Blueprint for the district to provide a high- level spatial picture of how the district could progress over the next 30 years, address the community's social, economic and environmental needs, and respond to its regional context. The Waikato District Blueprint works to achieve the overall vision established by the Council for the district:

"*Liveable, Thriving and Connected Communities*."

Of the nine district-wide themes that were developed, the following are the most relevant in this instance:

- Theme 4: Communities – Strengthen, enable and connect local communities and citizens, and support those in need.
- Theme 6: Economy – Support the rural and urban economy, attract more visitors and employment uses.
- Theme 7: Transport – Leverage value off accessibility, help those disadvantaged by the lack of transport options, prepare for the future passenger rail.

10.4 Commentary

It is considered that the proposal is consistent with the above strategies and policies, for the following reasons:

a) The development will support economic growth in the region by providing access to more industrial land that can be developed, which will lead to more jobs and increased prosperity. This is in line with numerous national, regional and district policies.

b) The rezoning proposal provides for mode neutrality by providing walking and cycling infrastructure within the rezoning sites and also on the surrounding network to enable connections to the existing walking and cycling facilities on Great South Road and East Mine Road.

c) In relation to the NZ Statement of Intent, it is considered that 'partnerships for prosperity' is the only change relevant to the proposal and that consenting of the proposed rezoning will contribute to the social and economic opportunities for the future industrial activities expected to be established in the Huntly area.

d) The proximity of the North Island Main Trunk rail line allows utilisation of rail for future freight trips which will significantly reduce the overall demand by HCV and improve safety on the road network.

e) The proximity of the proposed rezoning sites to the proposed Huntly passenger rail station and the existing regional bus service, as well as the proposed pedestrian and cycle facilities provided between the site and the existing Huntly East residential area, ensures that the rezoning sites are suitably connected to multi modal travel, helping to reduce demand on roads, facilitating improved safety, health and environmental sustainability.

11. Conclusions

The following key conclusions are drawn from this ITA report for the proposed re-zoning and development enabled by the Huntly North Structure Plan:

- If successful, the proposed rezoning will enable the development of 13.07ha of industrial land (or approximately 57,350 m^2 GFA of industrial development) and 17.46 ha of residential development (or approximately 85 residential dwelling units).
- On the basis of conservative trip generation rates provided in industry recognised trip generation databases and publications, the proposed rezoning sites are anticipated to generate up to 3,830 trips per day and 675 trips per hour during the peak hour.
- On the basis of the existing mode share for public transport trips in Huntly East, approximately 45 commuter trips per day are expected to be generated by the land use activities within the proposed rezoning sites. The public transport demand is anticipated to be serviced by the existing public transport services in Huntly. Both rezoning sites are ideally located in close proximity to the regional public transport service as well as the future Huntly passenger rail station.
- Approximately 60 walking and cycling trips per day are expected to be generated by the land use activities within the proposed rezoning sites when fully developed. A network of footpaths (with cyclists sharing the movement lane) have been recommended as part of the Structure Plan and future road cross-sections within the rezoning sites. These footpaths will connect the rezoning sites to the existing on- and off-road walking and cycling facilities along the surrounding road network. The internal network of footpaths shall be provided in general accordance with the road typical cross sections.
- A network of internal local roads (Road Type 1 to 4) has been designed to service the two rezoning sites. The proposed internal road cross-sections generally comply with the standards set out in the PDP, as well as standards provided in Table 3.2 of the New Zealand Standard (NZS) 4404:2010 (Land Development and Subdivision Infrastructure).
- Access to the rezoned sites will be via a new road intersection on Great South Road (located approximately 200 m north of the Great South Road/ East Mine Road T-intersection) for Site 1, and three new road intersections on Russell Road for Site 2. All new accesses/ intersections will be designed in accordance with Council standard as provided in the PDP, RITS and Austroads Geometric Design Guidelines Part 4A and 4B.

- A capacity assessment of existing road corridors within the vicinity of the rezoning sites finds that the traffic associated with the rezoning proposal is unlikely to adversely affect the performance and safety of these roads given the low volumes that presently exist.
- The performance analysis of intersections in Huntly East showed that the existing local area intersections will continue operating at good levels of service with the rezoning traffic added. Sensitivity testing for varying trip distribution figures indicates the current intersection forms are robust and safety and capacity improvement works are not likely to be required.
- Development of the rezoning sites is likely in stages over a 10-year period, subject to market conditions. The vast majority of construction traffic for the subdivision and building works will access Site 1 via the proposed accesses on Great South Road and East Mine Road. Separate resource consents will be required for each earthworks / construction phase to determine and mitigate the associated transport related effects (including safety effects), if any.

On this basis, the overall transportation effects on the adjoining road network of the rezoning proposals are expected to be no more than minor, provided the recommendations below are implemented as part of future development resource consents.

12. Recommendations

On the basis of this assessment, Bloxam Burnett & Olliver Ltd make the following recommendations in relation to mitigation of transportation effects of the proposed Huntly North rezoning:

New Road Intersections to the Rezoning Sites

The four access intersections to the rezoning sites should be in general accordance with the form and location described in this ITA and shown on the Structure Plan.

- Access to the proposed industrial rezoning site – one new right turn bay 'Tee' intersection located on Great South Road, approximately 200 m north of the East Mine Road intersection.
- Access to the proposed residential rezoning site - three new priority controlled 'Tee' intersections. No right turn bays are required.

The final intersection locations and forms will be confirmed in agreement with WDC during subdivision detailed design and shall be in accordance with the provisions of the District Plan and the Regional Infrastructure Technical Specifications (RITS). The location and access design will be subject to planning and engineering approvals from the relevant road controlling authority, so they could change from that identified above.

Walking and Cycling Infrastructure

A network of 1.8 m wide footpaths (with cyclists sharing the movement lane) have been recommended as part of the future road cross-sections within the rezoning sites. These footpaths are proposed to connect to the existing on- and off-road walking and cycling facilities along the surrounding road network as follows:

Site 1 (Industrial rezoning site)

- A new 1.8 m wide pedestrian footpath is proposed on the eastern side of Great South Road which extends from Access Intersection 1 to approximately 140 m north of the East Mine Road intersection, with a new pedestrian crossing facility (a new pedestrian refuge island within the central flush median) at this location.
- It is proposed that the existing pedestrian footpath on the western side of Great South Road (which currently terminates approximately 400 m south of Access Intersection 1) be extended to the proposed pedestrian crossing facility. The new footpath on the western side of Great South Road will be approximately 340 m in length.

- It is proposed that, as part of any future urbanisation upgrade works along Great South Road, painted cycle lanes to and from Huntly CBD be provided within the existing sealed shoulder.

Site 2 (Residential rezoning site)

- The internal walking network within the rezoning site is proposed to connect to the existing footpath on the southern side of Russell Road via kerb crossings on either side of the proposed intersections.

Walking and cycling connections between the two sites:

- A 2.5 wide shared path is proposed to be provided on the southern side of East Mine Road and western side of Russell Road extending from the southern boundary of Site 1 to the existing footpath on Russell Road. The new shared path is approximately 485 m in length.
- Two new pedestrian and cyclists crossing facilities would be required: one crossing over the NIMT and another over East Mine Road (approximately 30 m east of the existing level crossing).

Public Transport Infrastructure

Given the close proximity of the existing regional bus service to Site 1, there is opportunity to provide a bus stop in Huntly North along the existing bus route should the area be urbanised in future. A bus stop facility could potentially be provided on both sides of Great South Road near Intersection 1, with a suitable pedestrian crossing and refuge facility in the centre of the road for added safety. The provision of these facilities would ensure that public transport becomes an integral part of the travel options for workers within the site.

It is therefore recommended that consultation with WRC be undertaken to investigate the potential of providing a bus stop on Great South Road near Site 1 and the proposed pedestrian crossing point.

East Mine Road and Fletcher Street Level Crossings

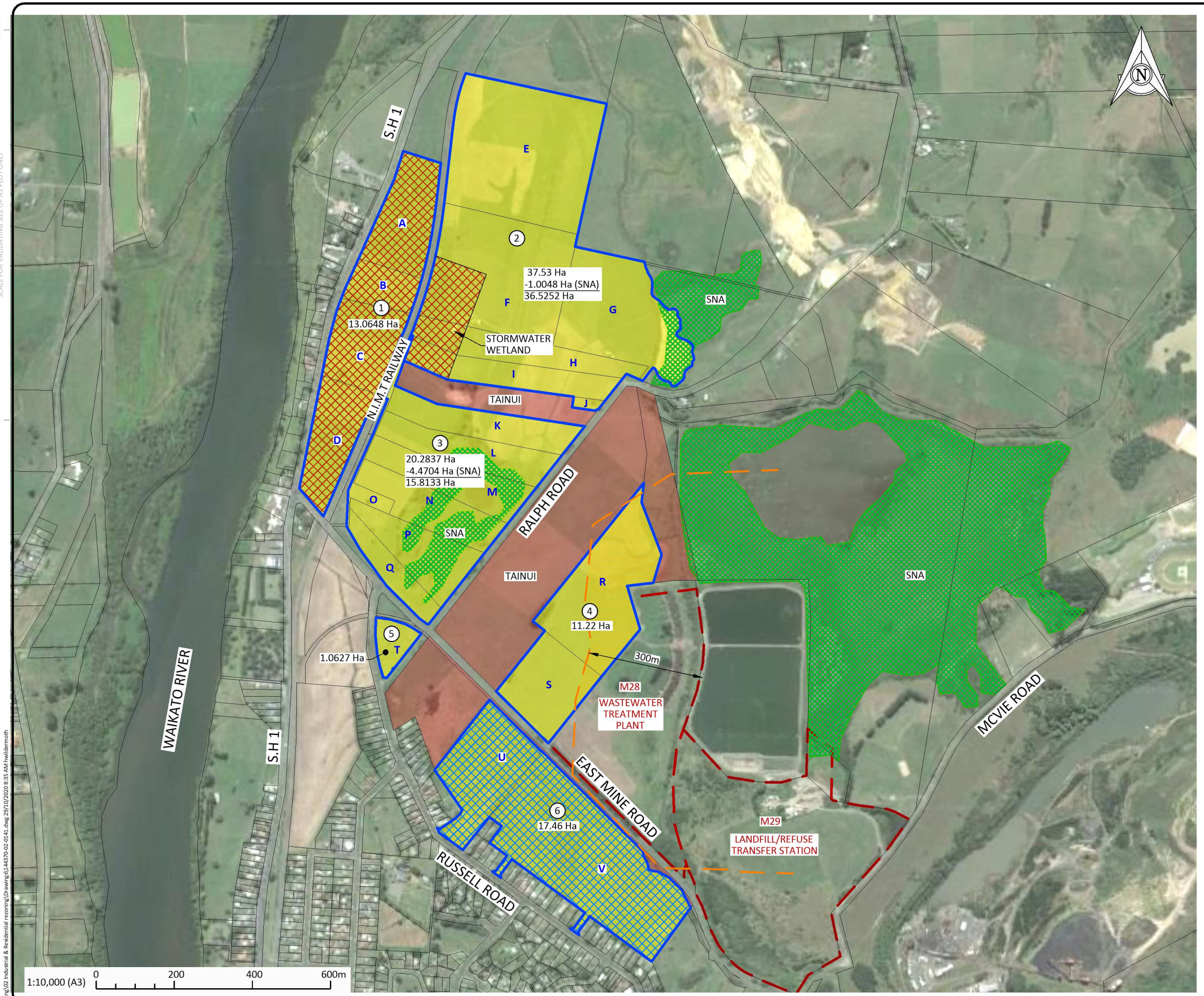
It is recommended that a LCSIA be conducted as part of the future subdivision consents to assess the safety effects of the rezoning traffic on the existing level crossings on East Mine Road and Fletcher Street to determine whether any safety improvements will be required. KiwiRail shall be consulted as an affected party to any future resource consents associated with either rezoned site.

Construction Traffic Effects

The construction traffic effects should be managed for the duration of works through conditions of consent, including the requirement for a specific Construction Traffic Management Plan.

Appendix A – ITA Report Drawings

Land Holdings Plans



KEY:

- SIGNIFICANT NATURAL AREA (SNA)
- SHAND PROPERTIES
- AREA TO BE REZONED RESIDENTIAL
- AREA TO BE REZONED INDUSTRIAL
- TAINUI
- DESIGNATION
- 300m BUFFER

AREA SCHEDULE				
ID	SHOWN	DESCRIPTION	RECORD OF TITLE	AREA
1	A	LOT 2 DPS 12402	SA9C/63, SA40C/873	4.0494 Ha
	B	LOT 1 DPS 12402	SA43C/865, SA40C/873	1.8006 Ha
	C	PT LOT 12 DP 24355	SA43C/865, SA40C/873	3.5911 Ha
	D	LOT 11 DP 24355	SA43C/866	3.6237 Ha
2	E	ALLOTMENT 22 TAUPIRI PARISH	SA9C/63, SA40C/873	
	F	PT ALLOTMENT 21 TAUPIRI PARISH	SA9C/63, SA40C/873	
	G	PT ALLOTMENT 18 TAUPIRI PARISH	SA9C/63, SA40C/873	
	H	LOT 1 DP 23455	SA1086/107, SA40C/873	3.5640 Ha
	I	LOT 2 DP 23455	SA1086/107, SA40C/873	3.5190 Ha
	J	LOT 1 DPS 9628	SA34A/500	0.2023 Ha
3	K	LOT 4 DP 23455	SA43C/880	3.5185 Ha
	L	LOT 5 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
	M	LOT 6 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
	N	LOT 7 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
	O	LOT 10 DP 23455	SA60D/753, SA40C/873	0.8251 Ha
	P	LOT 8 DP 23455	SA33A/479, SA40C/873	3.4998 Ha
	Q	PT LOT 9 DP 23455	SA33A/479, SA40C/873	1.8833 Ha
4	R	PT ALLOTMENT 16 TAUPIRI PARISH	SA1783/11, SA43C/878	7.2584 Ha
	S	PT ALLOTMENT 12 TAUPIRI PARISH	SA1298/46	3.7356 Ha
5	T	PT LOT 23 DP 23455	SA43C/870	1.0627 Ha
6	U	LOT 2 DPS 33575	SA43C/876	5.0730 Ha
	V	PT ALLOTMENT 11 TAUPIRI PARISH	SA2B/843,SA26B/948,	5.0730 Ha

	DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR
D	28.10.2020	ADD STORMWATER WETLAND	HW	CD	-
C	14.09.2020	AREA 2 - AMEND ZONING	HW	CD	-
B	09.09.2020	UPDATE AREAS TO BE REZONED	HW	CD	-
A	21.01.2020	INITIAL ISSUE	HW	CD	-

DESIGNED: - | CHECKED: CD
DRAWN: HW | APPROVED: -
mx model version:

BLOXAM BURNETT & OLLIVER

CLIENT: SHAND PROPERTIES

PROJECT: PROPOSED DISTRICT PLAN REZONING

DRAWING: LAND HOLDING PLAN

STATUS: FOR INFORMATION
DATE: 28.10.2020 | SCALE (ORIGINAL SIZE A3): 1:10,000
DRAWING NUMBER: 144370-02-0141 | REVISION: D

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Version 3.0 - September 2017

Conceptual Subdivision Plans

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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						Designed PP	Checked BJM	
						Drawn BSC	Approved	
A	10/09/2020	INITIAL ISSUE	BSC			mx model version:		
	Date	Issue/revision detail	By	Chk	Appr			

Version 2.04 – October 2013

PBLOXAM BURNETT & OLLIVER2431

Client: SHAND PROPERTIES LIMITED

Project: HUNTLY NORTH REZONING

Drawing: INDUSTRIAL ZONE CONCEPTUAL SUBDIVISION PLAN

Status: PRELIMINARY

Date: 10/09/2020

Scale (Original Size A3): 1:2500

Drawing Number: 144370/02/-/0002

Revision: A

100mm

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SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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	Date	Issue/revision detail	By	Chk	Appr
A	20/10/2020	INITIAL ISSUE	BSC		

Version 2.04 – October 2013

Designed	Checked
PP	BJM
Drawn	Approved
BSC	

mx model version:

BLOXAM BURNETT & OLLIVER

Client: SHAND PROPERTIES LIMITED

Project: HUNLTY NORTH REZONING

Drawing: RESIDENTIAL ZONE CONCEPTUAL SUBDIVISION PLAN

Status: PRELIMINARY

Date	Scale (Original Size A3)
20/10/2020	1:2000

Drawing Number	Revision
144370/02 /- /0001	A

Conceptual Intersection Layout Plans

						DESIGNED	RB	CHECKED CI
						DRAWN	RB	APPROVED CI
-	-	-	-	-	-	mx model version:		
	DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR			

Version 4.0 - March 2020

BLOXAM BURNETT & OLLIVER

CLIENT: SHAND PROPERTIES LIMITED

PROJECT: HUNTLY NORTH REZONING

DRAWING: PRELIMINARY CONCEPT LAYOUT PEDESTRIAN CROSSING FACILITY

STATUS: PRELIMINARY

DRAFT COPY NOT APPROVED

DATE: 16/11/2020

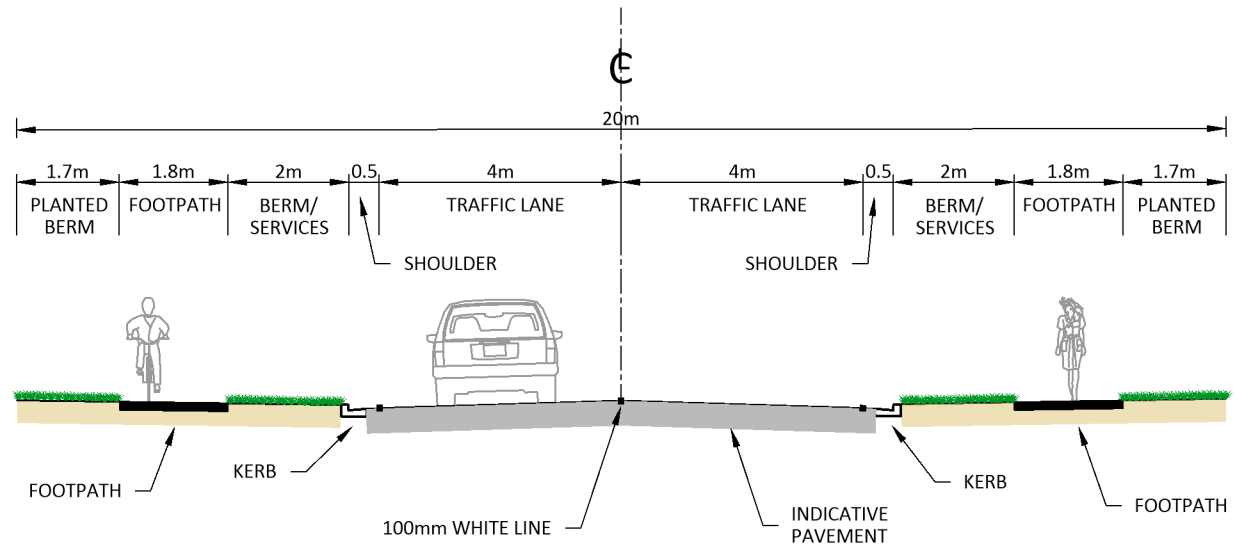
SCALE (ORIGINAL SIZE A3): 1 : 500

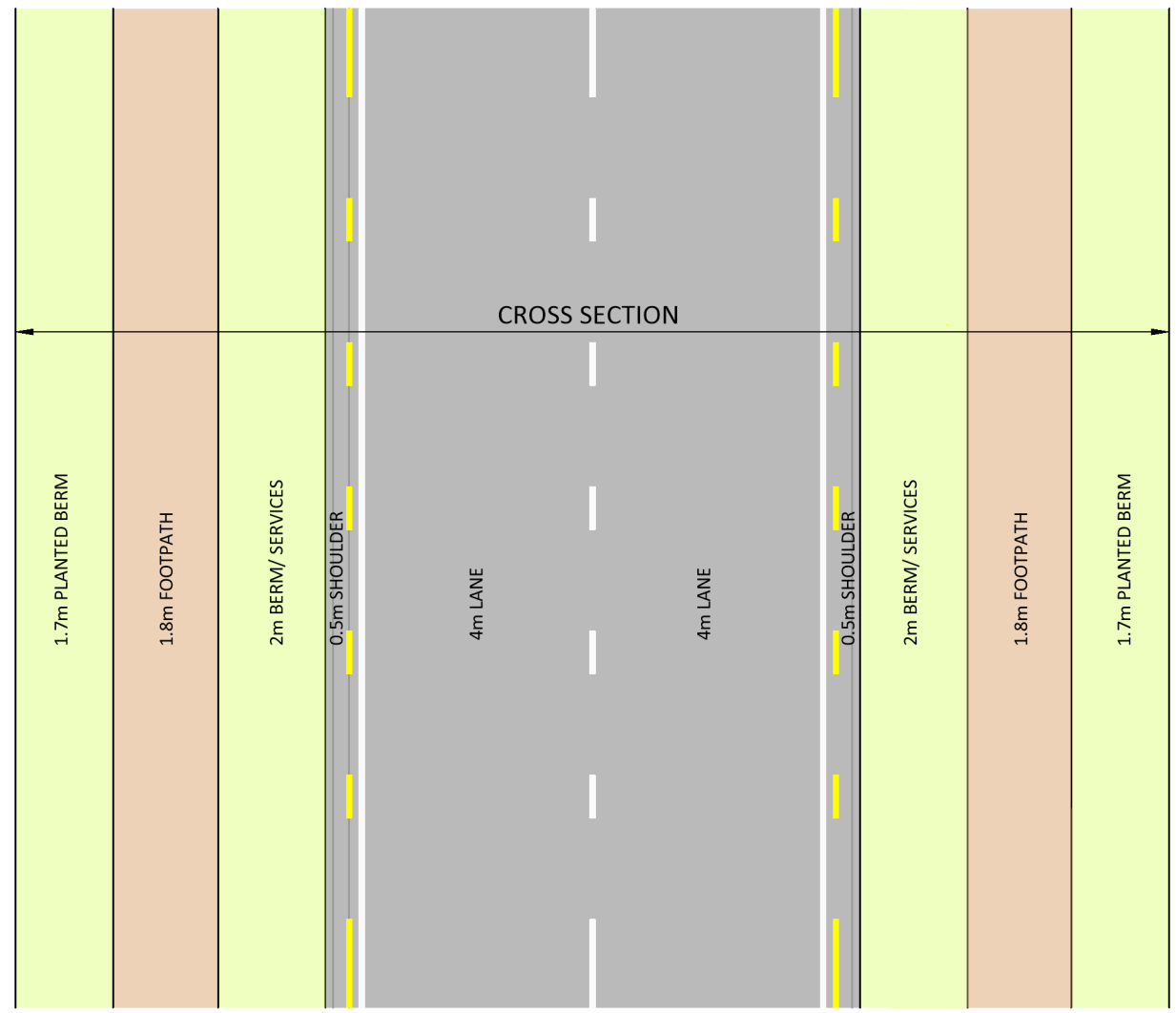
DRAWING NUMBER: 144370-02-0204

REVISION: -

Typical Road Cross-sections

TYPICAL CROSS SECTION THROUGH ROAD TYPE 1 (INDUSTRIAL LOCAL ROAD)





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SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

Version 4.0 - March 2020

DESIGNED	CHECKED
RB	RB
DRAWN	APPROVED
RB	CI

mx model version:

BLOXAM BURNETT & OLLIVER

CLIENT: SHAND PROPERTIES LIMITED

PROJECT: HUNTLY NORTH REZONING

DRAWING: TYPICAL ROAD CROSS SECTION ROAD TYPE 1

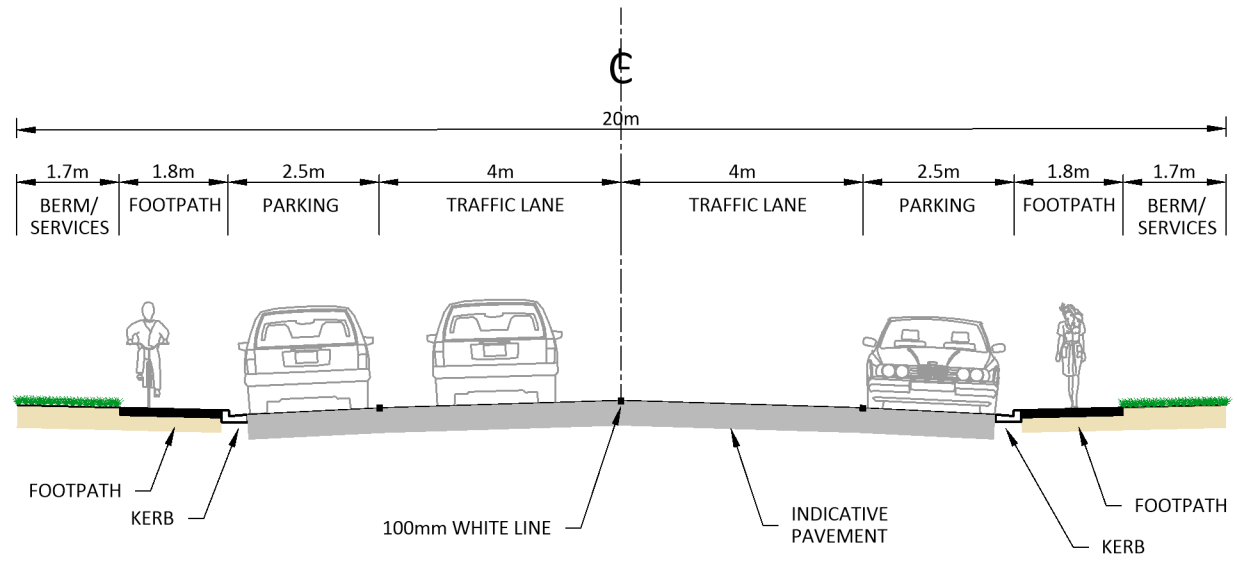
STATUS: PRELIMINARY

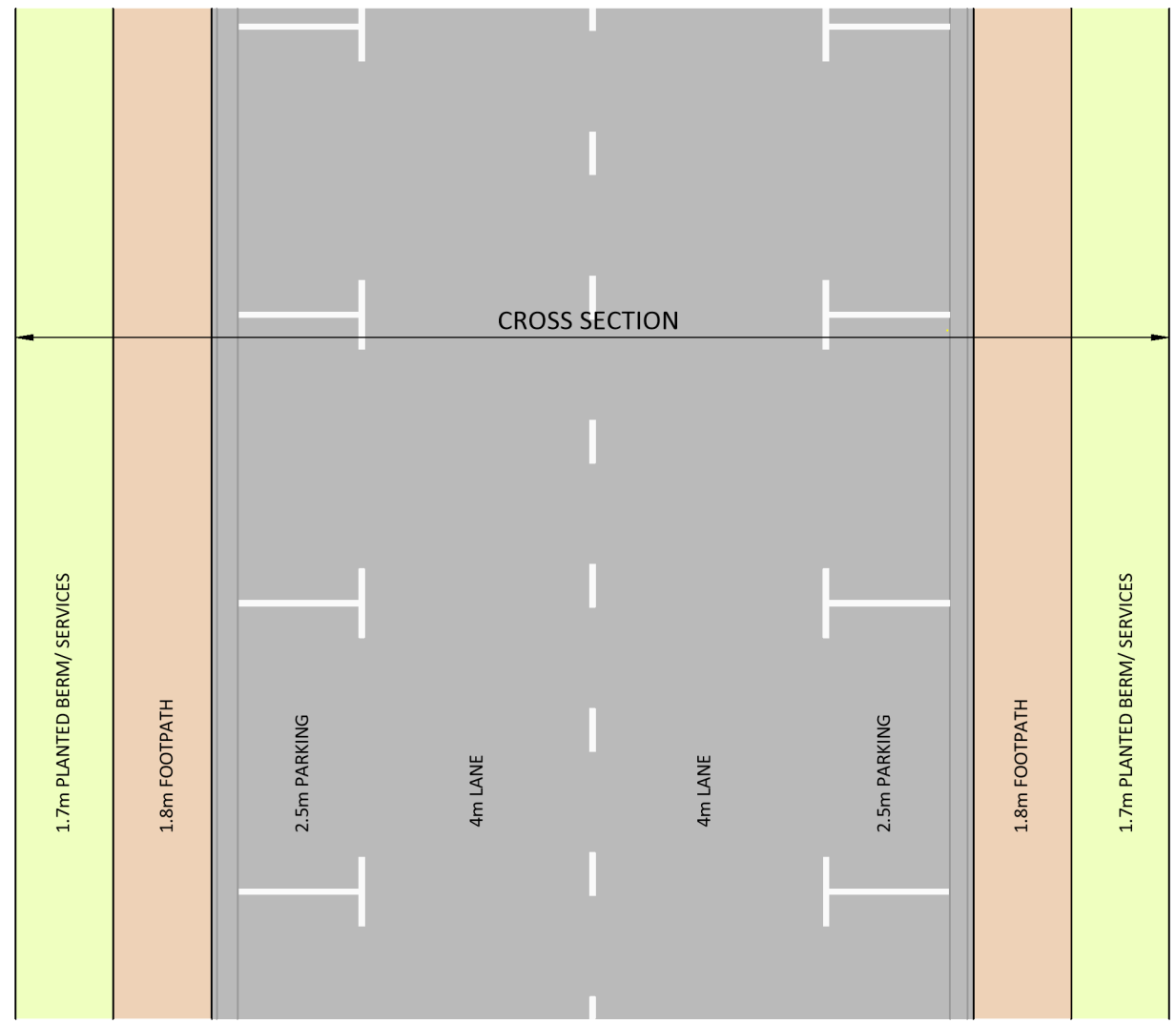
DRAFT COPY NOT APPROVED

DATE	SCALE (ORIGINAL SIZE A3)
02/11/2020	1 : 125

DRAWING NUMBER	REVISION
144370-02-1400	-

TYPICAL CROSS SECTION THROUGH ROAD TYPE 2 (INDUSTRIAL LOCAL ROAD)





DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

DESIGNED: RB | CHECKED: RB
DRAWN: RB | APPROVED: CI
mx model version:

BLOXAM BURNETT & OLLIVER

CLIENT: SHAND PROPERTIES LIMITED

PROJECT: HUNTLY NORTH REZONING

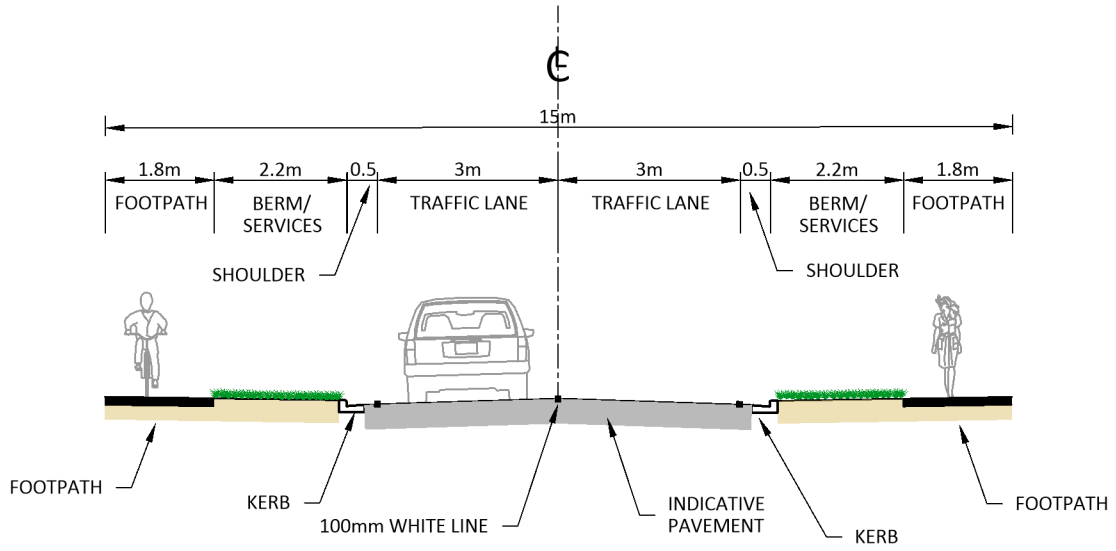
DRAWING: TYPICAL ROAD CROSS SECTION ROAD TYPE 2

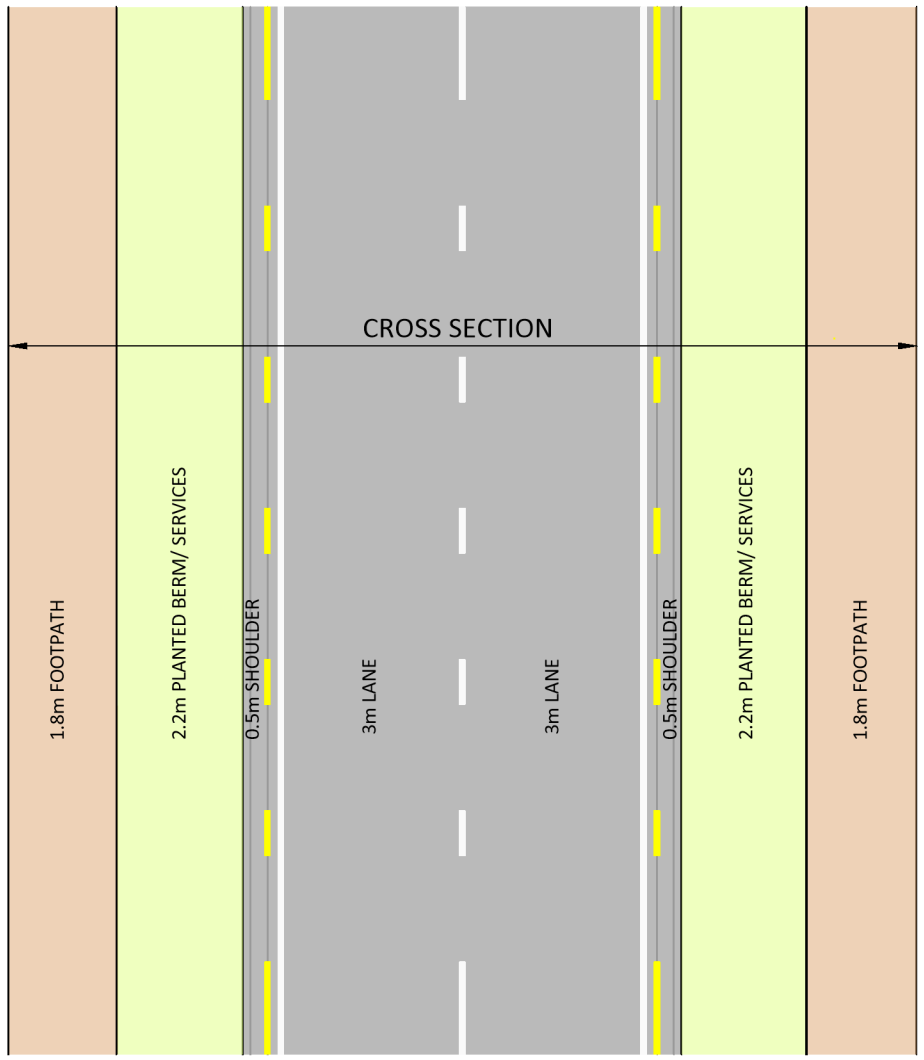
STATUS: PRELIMINARY — DRAFT COPY NOT APPROVED

DATE: 02/11/2020 | SCALE (ORIGINAL SIZE A3): 1 : 125

DRAWING NUMBER: 144370-02-1401 | REVISION: -

TYPICAL CROSS SECTION THROUGH ROAD TYPE 3 (RESIDENTIAL LOCAL ROAD)





DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

DESIGNED: RB | CHECKED: RB
DRAWN: RB | APPROVED: CI
mx model version:

BLOXAM BURNETT & OLLIVER

CLIENT: SHAND PROPERTIES LIMITED

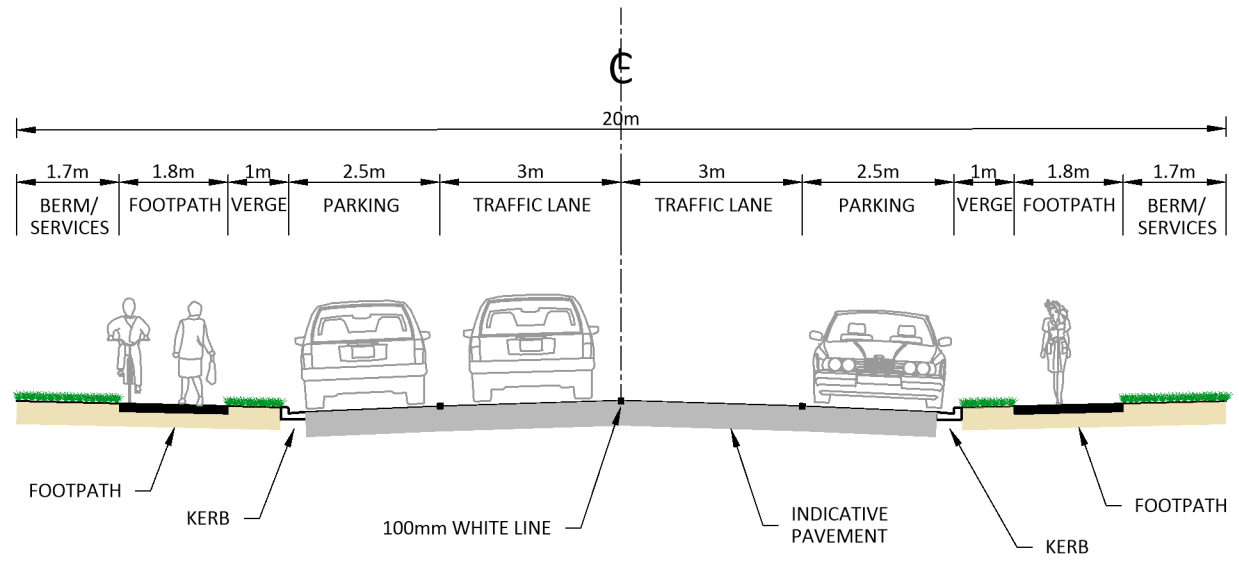
PROJECT: HUNTLY NORTH REZONING

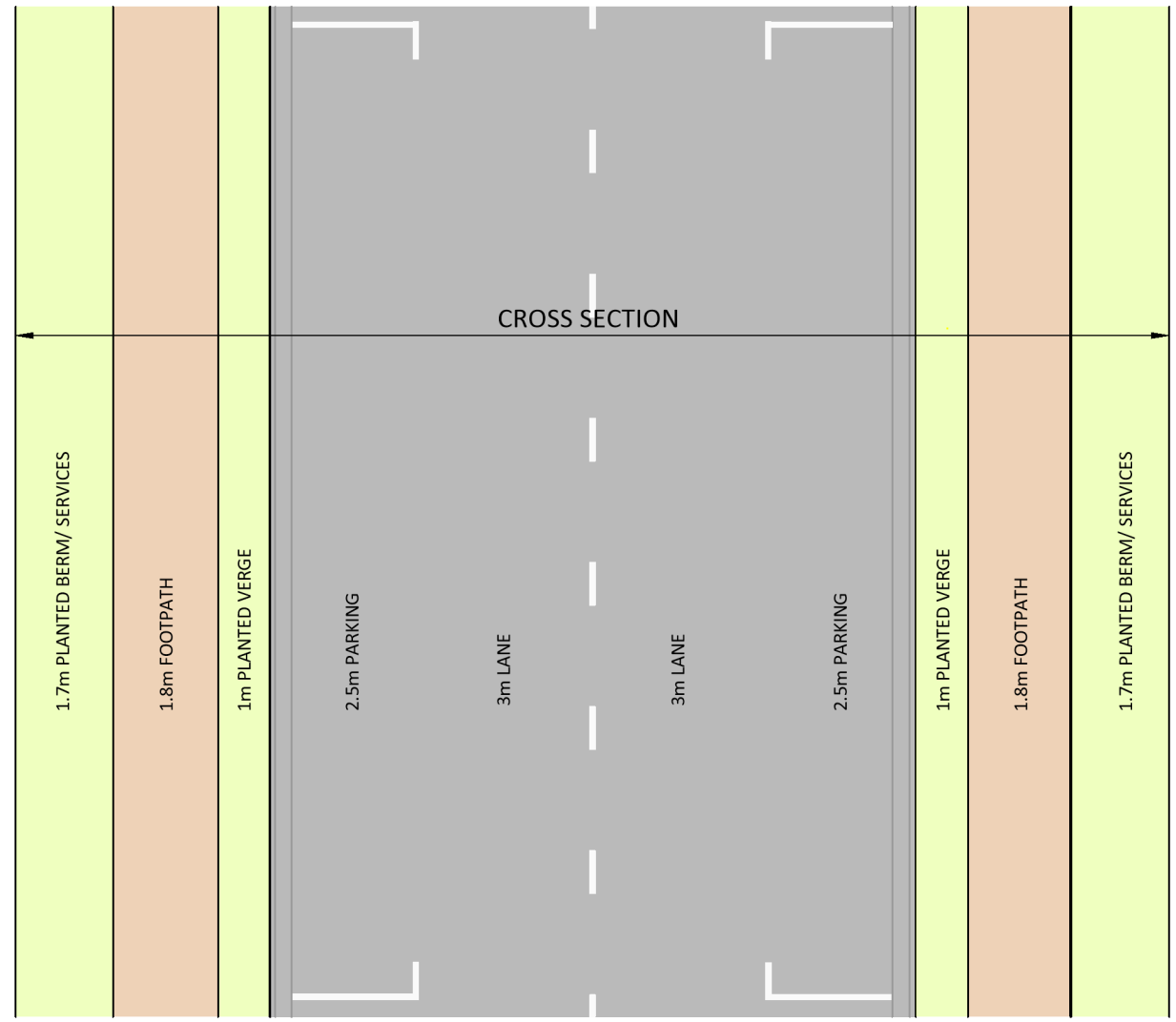
DRAWING: TYPICAL ROAD CROSS SECTION ROAD TYPE 3

STATUS: PRELIMINARY
DRAFT COPY NOT APPROVED

DATE: 02/11/2020
SCALE (ORIGINAL SIZE A3): 1 : 125
DRAWING NUMBER: 144370-02-1402
REVISION: -

TYPICAL CROSS SECTION THROUGH ROAD TYPE 4 (RESIDENTIAL LOCAL ROAD)





DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

Version 4.0 - March 2020

DESIGNED	CHECKED
RB	RB
DRAWN	APPROVED
RB	CI

mx model version:

BLOXAM BURNETT & OLLIVER

CLIENT: SHAND PROPERTIES LIMITED

PROJECT: HUNTLY NORTH REZONING

DRAWING: TYPICAL ROAD CROSS SECTION ROAD TYPE 4

STATUS: PRELIMINARY

DRAFT COPY NOT APPROVED

DATE	SCALE (ORIGINAL SIZE A3)
02/11/2020	1 : 125
DRAWING NUMBER	REVISION
144370-02-1403	-

Appendix B – NZTA CAS Data

Untitled query

Saved sites

Great South Rd & Fletcher Street

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Crash year

2014 — 2020

Plain English report

4 results from your query.

1-4 of 4

Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1790696-5843131	**FLETCHER ST**		I			SH 1N	1790696	5843130	175.158432	-37.539116	201745564	16/07/2017	Sun	00:30	Car/Wagon1 SDB on FLETCHER ST lost control; went off road to left, Car/Wagon1 hit non specific pole	CAR/WAGON1, fa of sleep
1790696-5843131	**GREAT SOUTH ROAD**		I			FLETCHER STREET	1790697	5843123	175.158454	-37.539171	201988541	29/12/2019	Sun	12:25	Car/Wagon1 SDB on GREAT SOUTH ROAD, HUNTLY, WAIKATO hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, al limit, failed to no stopping/station attention diverte alcohol test belo
1790696-5843131	**SH 1N**	15m	N			FLETCHER ST	1790697	5843145	175.158432	-37.538979	201745481	15/07/2017	Sat	18:20	Car/Wagon1 SDB on Sh1 south bounf huntly hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, fo closely
1790696-5843131	**SH 1N**		I			FLETCHER ST	1790696	5843130	175.158432	-37.539116	201611355	17/01/2016	Sun	15:10	Car/Wagon1 NDB on SH 1N hit rear of Car/Wagon2 NDB on SH 1N turning right from centre line	CAR/WAGON1, sp travelled straight turning lane or fl

1-4 of 4

Untitled query

Saved sites

Russell Road & Bailey Street

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Crash year

2014 — 2020

Plain English report

2 results from your query.

1-2 of 2

Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1791072-5843631	**RUSSELL ROAD**		I			BAILEY ST	1791074	5843625	175.162582	-37.534576	201898721	16/10/2018	Tue	08:30	Car/Wagon1 NDB on Russell Road hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON1, alcol limit CAR/WAGON2, below limit, failed t priority traffic contr intentions of anothe
1791072-5843631	**RUSSELL ROAD**		I			BAILEY STREET	1791071	5843635	175.162545	-37.534483	201967042	10/05/2019	Fri	17:30	Ute1 EDB on Bailey Avenue missed intersection or end of road	UTE1, parking brake failed/defective

1-2 of 2

Untitled query

Saved sites

Russell Road & Rosser Street

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Crash year

2014 — 2020

Plain English report

1 results from your query.

1-1 of 1

Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1791378-5843282	**RUSSELL ROAD**		I			ROSSER STREET	1791383	5843278	175.166168	-37.537635	2020141740	10/01/2020	Fri	13:55	Car/Wagon1 NDB on ROSSER STREET lost control turning right; went off road to left, Car/Wagon1 hit fence, power pole	CAR/WAGON1, lost conditions, speed corner/curve, ENV construction or m

1-1 of 1

Untitled query

Saved sites

Great South Road

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Crash year

2014 — 2020

Plain English report

19 results from your query.

1-19 of 19

Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1790809-5844333	**01N-0502/09.68**	470m	N			EAST MINE ROAD	1790912	5844793	175.160446	-37.524090	201700244	13/09/2017	Wed	13:12	Car/Wagon1 SDB on SH1 swinging wide hit Truck2 head on	CAR/WAGON1, alcoh limit, fatigue due to swung wide on benc
1790809-5844333	**SH 1N**	450m	N			EAST MINE ROAD	1790906	5844774	175.160385	-37.524261	201838407	21/04/2018	Sat	14:10	Bus1 NDB on SH1 hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON2, alcoh limit BUS1, alcohol t limit, following too c
1790809-5844333	**SH 1N**	850m	S			FISHER ROAD	1790986	5844963	175.161240	-37.522545	201515990	11/07/2015	Sat	11:30	Car/Wagon1 SDB on SH 1N hit rear end of SUV2 stop/slow for queue	CAR/WAGON1, follov closely
1790809-5844333	**SH 1N**	100m	N			EAST MINE ROAD	1790830	5844432	175.159607	-37.527359	201752610	21/10/2017	Sat	17:25	Car/Wagon1 SDB on Great South Road lost control; went off road to left, Car/Wagon1 hit non specific ditch	CAR/WAGON1, alcoh limit or test refused,
1790809-5844333	**SH 1N**	700m	N			EAST MINE ROAD	1791005	5845003	175.161438	-37.522179	201538010	01/05/2015	Fri	17:15	Truck2 turning right hit by oncoming Car/Wagon1 SDB on SH 1N	TRUCK2, did not che another party from c failed to give way tu turning traffic, ENV: leaving private hous
1790809-5844333	**SH 1N**	590m	N			EAST MINE ROAD	1790958	5844903	175.160934	-37.523090	201712919	15/04/2017	Sat	10:50	Van1 SDB on Greatsouth road nearby Huntly hit rear end of Van2 stop/slow for queue	VAN1, following too speed on straight

Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1790809-5844333	**SH 1N**	600m	N			EAST MINE ROAD	1790963	5844912	175.160980	-37.523010	201415430	24/07/2014	Thu	21:50	SUV1 NDB on SH 1N hit Pedestrian2 (Age 47)	SUV1, swerved to av pedestrian, PEDESTI alcohol impaired no (pedestrian/cyclist/p diverted eg cigarette player, ped playing c unnecessarily on roa
1790809-5844333	**SH 1N**	600m	N			EAST MINE ROAD	1790963	5844912	175.160980	-37.523010	201535227	25/03/2015	Wed	14:15	Van1 NDB on SH 1N lost control; went off road to right, Van1 hit non specific fence	VAN1, other fatigue, control
1790809-5844333	**SH 1N**	300m	N			EAST MINE ROAD	1790873	5844627	175.160049	-37.525593	201532421	27/02/2015	Fri	14:30	Car/Wagon1 SDB on SH 1N hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, failec slowing, stopping/st ENV: heavy rain
1790809-5844333	**SH 1N**	650m	N			EAST MINE ROAD	1790984	5844958	175.161209	-37.522591	201718890	25/04/2017	Tue	14:55	Car/Wagon1 NDB on Great south rd hit Car/Wagon2 headon on straight	CAR/WAGON1, fatigu of sleep, too far right
1790809-5844333	**01N-0502/09.68**	450m	N			EAST MINE ROAD	1790906	5844774	175.160385	-37.524261	201500141	19/06/2015	Fri	18:18	Car/Wagon1 NDB on SH 1 hit Truck2 headon on straight	CAR/WAGON1, alcoh suspected, tested ar use onl, new driver/r instruction, other fat right
1790809-5844333	**SH 1N**	140m	N			EAST MINE ROAD	1790839	5844471	175.159698	-37.527008	201614977	17/08/2016	Wed	15:23	SUV1 SDB on State Highway One lost control; went off road to right, SUV1 hit non specific fence, non specific tree	SUV1, other fatigue,
1790809-5844333	**SH 1N**	600m	N			EAST MINE ROAD	1790963	5844912	175.160980	-37.523010	201531583	24/03/2015	Tue	07:50	Truck1 NDB on SH 1N hit Van2 turning right onto AXROAD from the left	VAN2, did not check, another party from c failed to give way en roadway from drivev entering or leaving c commercial
1790809-5844333	**SH 1N**	100m	N			EAST MINE ROAD	1790830	5844432	175.159607	-37.527359	201754368	19/11/2017	Sun	15:36	Car/Wagon1 SDB on SH1 lost control; went off road to left, Car/Wagon1 hit non specific pole	CAR/WAGON1, other
1790809-5844333	**SH 1N**	200m	N			EAST MINE ROAD	1790852	5844530	175.159836	-37.526474	201633724	27/01/2016	Wed	01:15	Car/Wagon1 SDB on SH 1N lost control; went off road to left, Car/Wagon1 hit non specific fence, non specific ditch	CAR/WAGON1, other far left
1790809-5844333	**SH 1N**	200m	N			EAST MINE ROAD	1790852	5844530	175.159836	-37.526474	201410133	07/01/2014	Tue	17:05	Car/Wagon1 SDB on SH 1N lost control; went off road to left, Car/Wagon1 hit non specific kerb	CAR/WAGON1, fatigu of sleep, other lost c
1790809-5844333	**SH 1**	360m	N			EAST MINE ROAD	1790882	5844681	175.160141	-37.525101	201981285	21/09/2019	Sat	21:04	Car/Wagon1 NDB on State Highway One, Huntly hit obstruction, Car/Wagon1 hit other	CAR/WAGON1, alcoh limit, emergency veh attending emergenc obstructions or obje

Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1790809-5844333	**SH 1**	160m	N			EAST MINE ROAD	1790843	5844490	175.159743	-37.526828	201988971	09/12/2019	Mon	17:30	Car/Wagon1 NDB on SH 1, HUNTLY, WAIKATO lost control; went off road to right, Car/Wagon1 hit fence	CAR/WAGON1, alcoh limit, fatigue due to too far right
1790809-5844333	**SH 1N**	790m	S			FISHER ROAD	1791012	5845017	175.161514	-37.522053	201842779	24/06/2018	Sun	16:05	Car/Wagon1 NDB on GSR lost control; went off road to left, Car/Wagon1 hit non specific fence, non specific ditch	CAR/WAGON1, alcoh limit, other fatigue

1-19 of 19

Untitled query

Saved sites

Russell Road

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Crash year

2014 — 2020

Plain English report

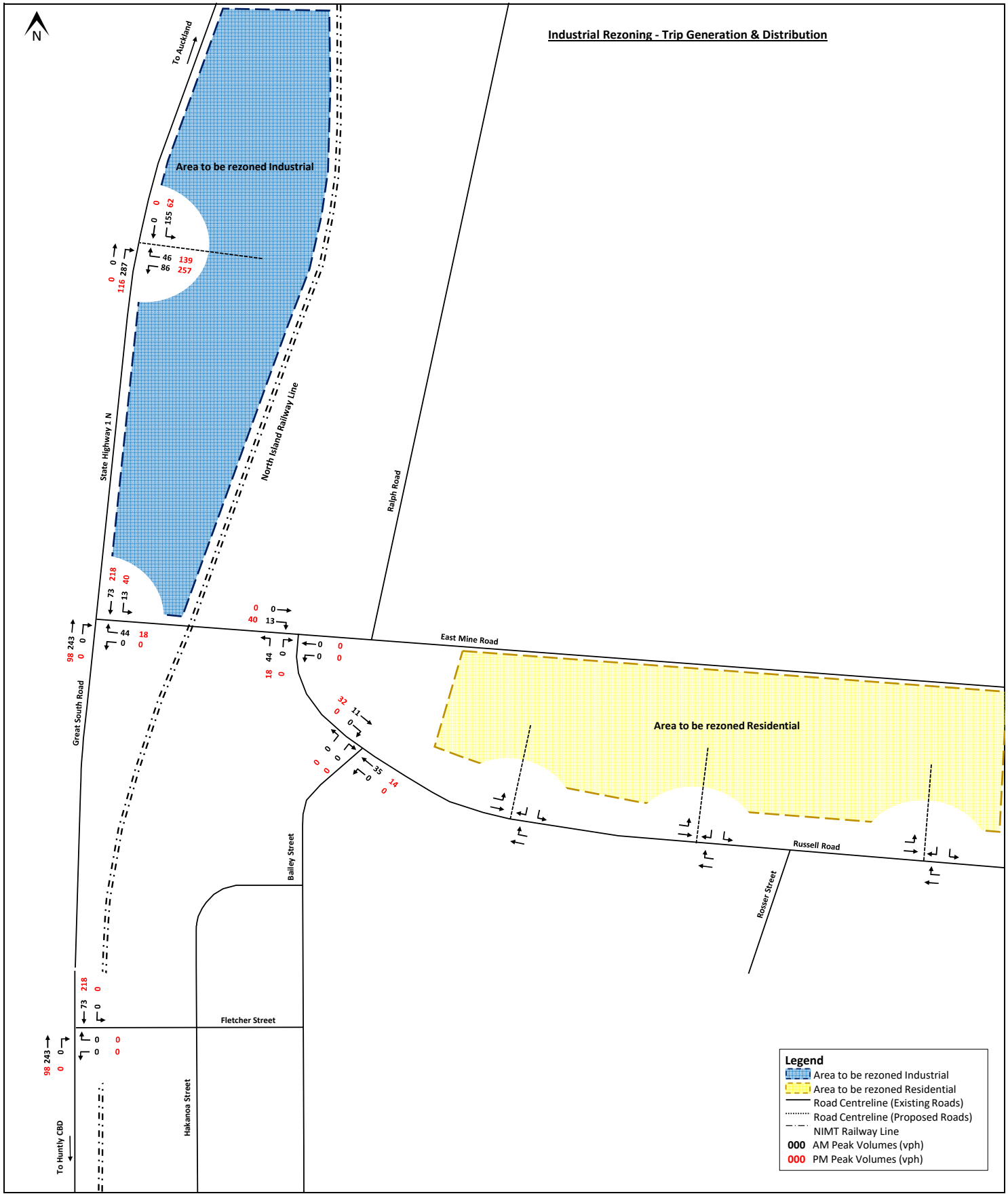
6 results from your query.

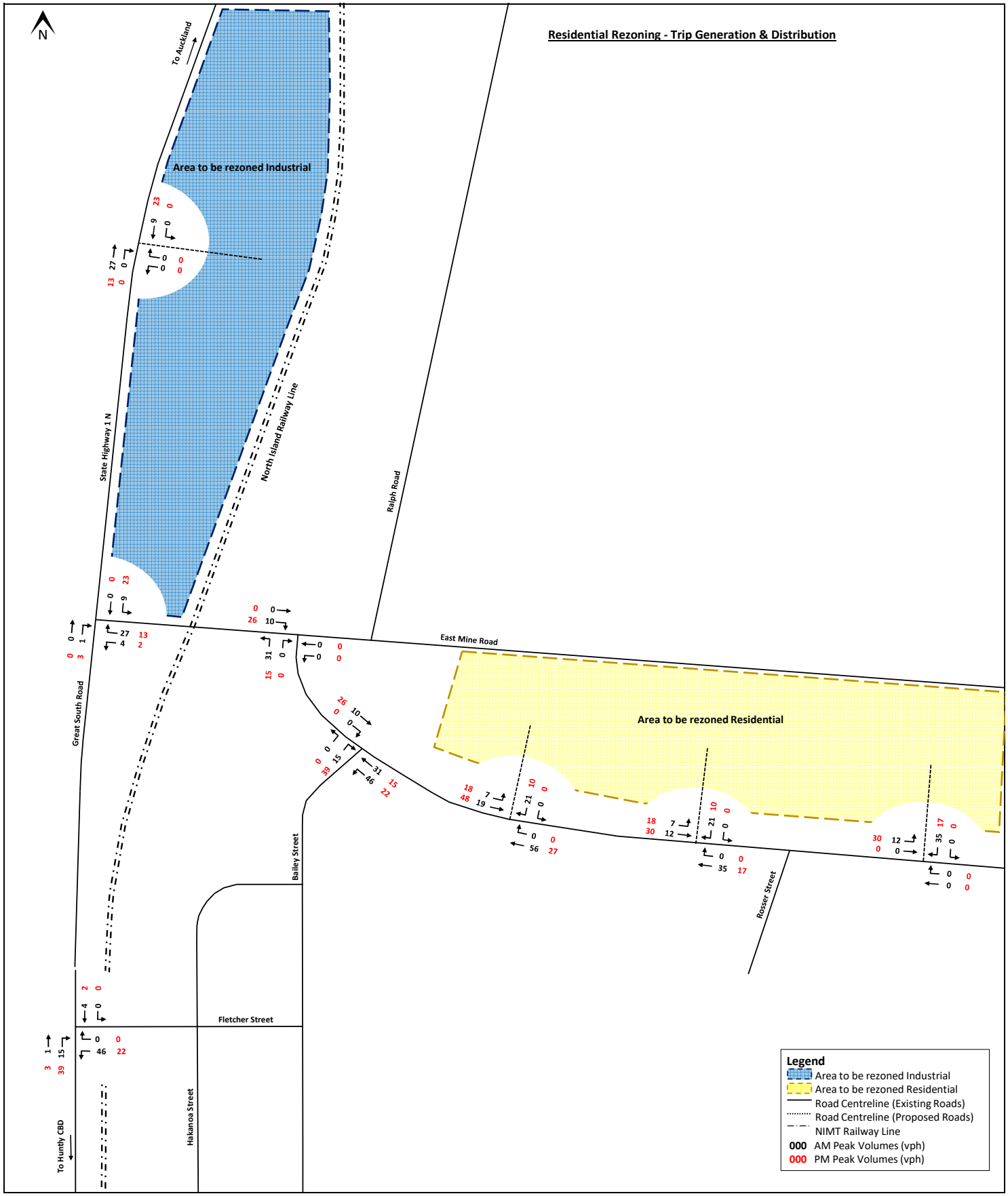
1-6 of 6

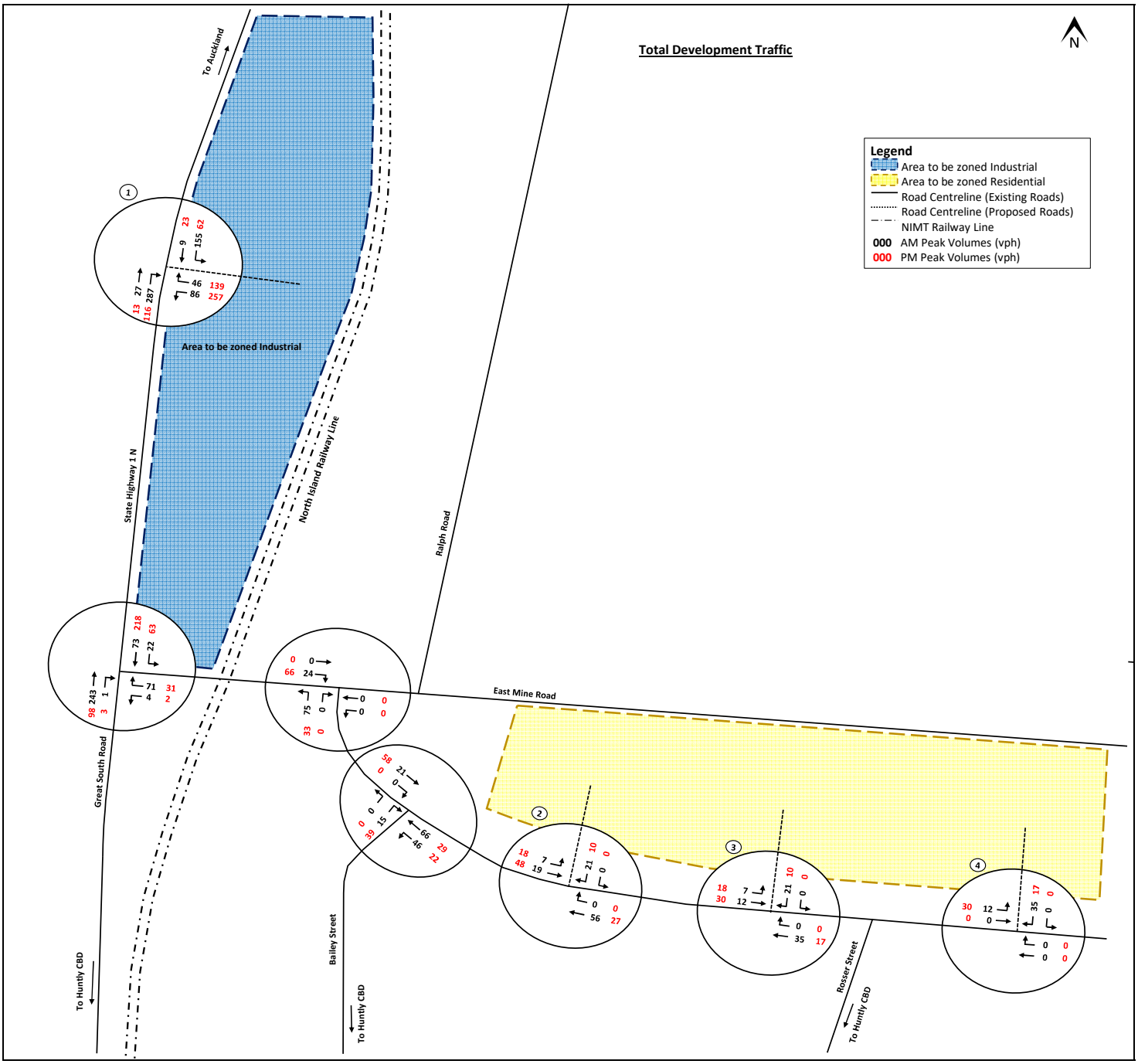
Site Centre: Midpoint	Crash road	Distance	Direction	Reference station	Route position	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors
1791072-5843631	**RUSSELL ROAD**	200m	S			BAILEY ST	1791158	5843453	175.163574	-37.536110	201734107	18/02/2017	Sat	02:09	Car/Wagon1 NDB on Russel Road, Huntly lost control turning right, Car/Wagon1 hit non specific fence, non specific building	CAR/WAGON1, alc limit or test refuse driver/under instru speed limit, speed corner/curve, ENV due to rain
1791072-5843631	**RUSSELL ROAD**	150m	S			BAILEY ST	1791136	5843497	175.163315	-37.535717	201810679	04/02/2018	Sun	01:00	Car/Wagon1 SDB on Russell road lost control; went off road to right, Car/Wagon1 hit non specific tree	CAR/WAGON1, alc suspected, too far
1791072-5843631	**RUSSELL ROAD**		I			BAILEY ST	1791074	5843625	175.162582	-37.534576	201898721	16/10/2018	Tue	08:30	Car/Wagon1 NDB on Russell Road hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON1, alc limit CAR/WAGON below limit, failed priority traffic con intentions of anot
1791072-5843631	**RUSSELL ROAD**		I			BAILEY STREET	1791071	5843635	175.162545	-37.534483	201967042	10/05/2019	Fri	17:30	Ute1 EDB on Bailey Avenue missed intersection or end of road	UTE1, parking bra failed/defective
1791378-5843282	**RUSSELL ROAD**		I			ROSSER STREET	1791383	5843278	175.166168	-37.537635	2020141740	10/01/2020	Fri	13:55	Car/Wagon1 NDB on ROSSER STREET lost control turning right; went off road to left, Car/Wagon1 hit fence, power pole	CAR/WAGON1, lost conditions, speed corner/curve, ENV construction or ma
1791585-5843123	**RUSSELL ROAD**	20m	W			GAVIN PLACE	1791571	5843136	175.168320	-37.538879	201439593	30/06/2014	Mon	16:14	Van1 EDB on RUSSELL ROAD sideswiped by Car/Wagon2 EDB on RUSSELL ROAD turning left	VAN1, misjudged i another party, ove without due care, or leaving private

1-6 of 6

Appendix C – Huntly North Rezoning: Predicted Peak Hour Trip Generation and Distribution


Industrial Rezoning - Trip Generation & Distribution
N
To Auckland
Area to be rezoned Industrial
Area to be rezoned Residential
State Highway 1 N
North Island Railway Line
Ralph Road
East Mine Road
Great South Road
Bailey Street
Fletcher Street
Hakanoa Street
Russell Road
Rosser Street
To Huntly CBD
Legend
Area to be rezoned Industrial
Area to be rezoned Residential
Road Centreline (Existing Roads)
Road Centreline (Proposed Roads)
NIMT Railway Line
000 AM Peak Volumes (vph)
000 PM Peak Volumes (vph)


Residential Rezoning - Trip Generation & Distribution
N
To Auckland
Area to be rezoned Industrial
Area to be rezoned Residential
State Highway 1 N
North Island Railway Line
Ralph Road
East Mine Road
Great South Road
Bailey Street
Fletcher Street
Hakamoa Street
Rosser Street
To Huntly CBD
Legend
Area to be rezoned Industrial
Area to be rezoned Residential
Road Centreline (Existing Roads)
Road Centreline (Proposed Roads)
NIMT Railway Line
000 AM Peak Volumes (vph)
000 PM Peak Volumes (vph)


Total Development Traffic
N
Legend
Area to be zoned Industrial
Area to be zoned Residential
Road Centreline (Existing Roads)
Road Centreline (Proposed Roads)
NIMT Railway Line
000 AM Peak Volumes (vph)
000 PM Peak Volumes (vph)
To Auckland
Area to be zoned Industrial
State Highway 1 N
North Island Railway Line
Ralph Road
East Mine Road
Great South Road
Bailey Street
Rosser Street
To Huntly CBD
To Huntly CBD
To Huntly CBD
1
2
3
4

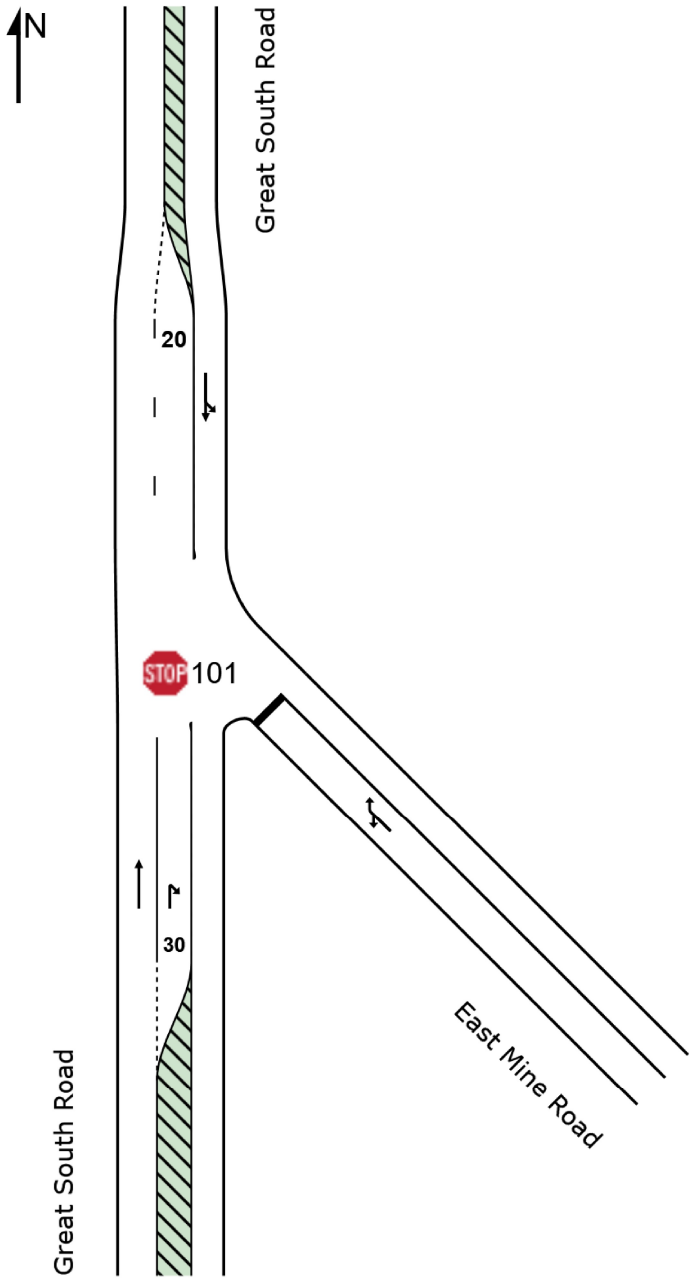
Appendix D – Sidra Intersection Output Files

Great South Road/ East Mine Road Intersection

SITE LAYOUT

Site: 101 [2020 Baseline Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)



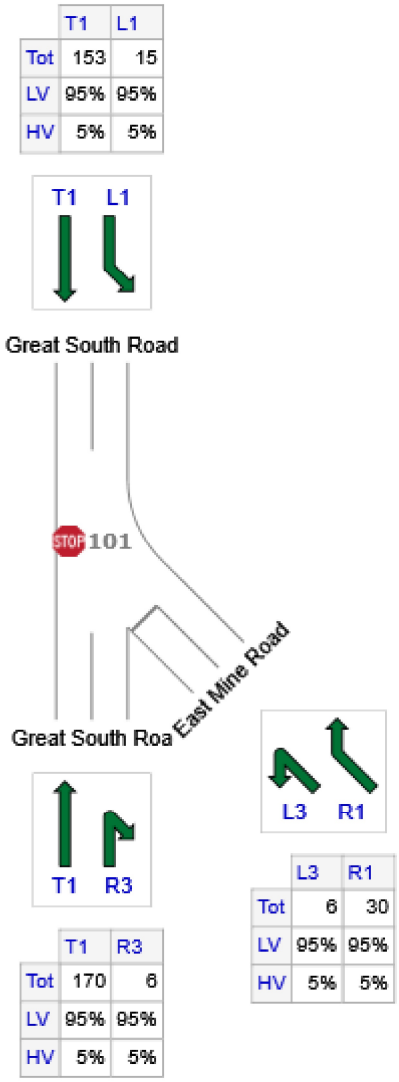
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2020 Baseline Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	176	167	9
SE: East Mine Road	36	34	2
N: Great South Road	168	160	8
Total	380	361	19

MOVEMENT SUMMARY

Site: 101 [2020 Baseline Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	179	5.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
3b	R3	6	5.0	0.004	7.3	LOS A	0.0	0.1	0.28	0.59	0.28	56.6
Approach		185	5.0	0.091	0.3	NA	0.0	0.1	0.01	0.02	0.01	69.4
SouthEast: East Mine Road												
21b	L3	6	5.0	0.053	10.3	LOS B	0.2	1.5	0.42	0.99	0.42	55.4
23a	R1	32	5.0	0.053	11.6	LOS B	0.2	1.5	0.42	0.99	0.42	55.1
Approach		38	5.0	0.053	11.4	LOS B	0.2	1.5	0.42	0.99	0.42	55.2
North: Great South Road												
7a	L1	16	5.0	0.094	6.0	LOS A	0.0	0.0	0.00	0.05	0.00	63.6
8	T1	161	5.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	69.3
Approach		177	5.0	0.094	0.5	NA	0.0	0.0	0.00	0.05	0.00	68.7
All Vehicles		400	5.0	0.094	1.4	NA	0.2	1.5	0.04	0.13	0.04	67.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

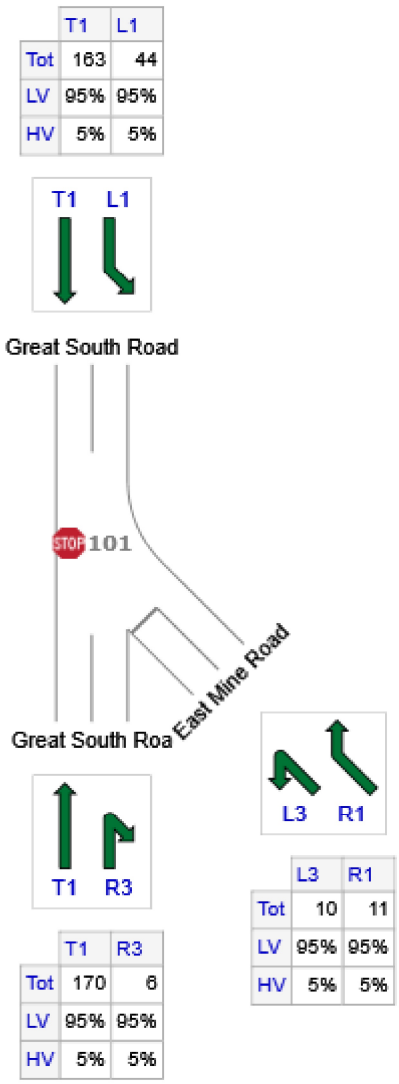
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2020 Baseline Traffic_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	176	167	9
SE: East Mine Road	21	20	1
N: Great South Road	207	197	10
Total	404	384	20

MOVEMENT SUMMARY

Site: 101 [2020 Baseline Traffic_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	179	5.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
3b	R3	6	5.0	0.004	7.5	LOS A	0.0	0.1	0.32	0.59	0.32	56.5
Approach		185	5.0	0.091	0.3	NA	0.0	0.1	0.01	0.02	0.01	69.4
SouthEast: East Mine Road												
21b	L3	11	5.0	0.027	10.4	LOS B	0.1	0.7	0.36	0.93	0.36	55.5
23a	R1	12	5.0	0.027	11.7	LOS B	0.1	0.7	0.36	0.93	0.36	55.1
Approach		22	5.0	0.027	11.1	LOS B	0.1	0.7	0.36	0.93	0.36	55.3
North: Great South Road												
7a	L1	46	5.0	0.116	6.0	LOS A	0.0	0.0	0.00	0.13	0.00	62.8
8	T1	172	5.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	68.3
Approach		218	5.0	0.116	1.3	NA	0.0	0.0	0.00	0.13	0.00	67.1
All Vehicles		425	5.0	0.116	1.3	NA	0.1	0.7	0.02	0.12	0.02	67.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

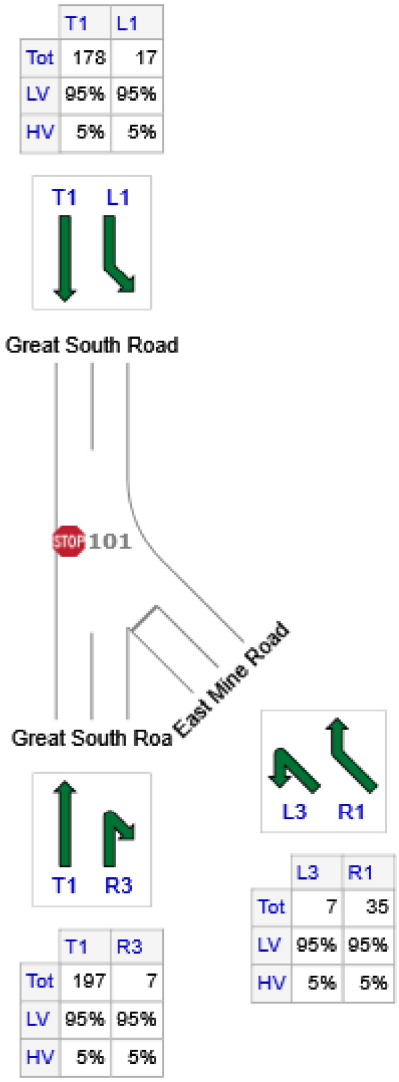
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2030 Baseline Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	204	194	10
SE: East Mine Road	42	40	2
N: Great South Road	195	185	10
Total	441	419	22

MOVEMENT SUMMARY

Site: 101 [2030 Baseline Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	207	5.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
3b	R3	7	5.0	0.005	7.4	LOS A	0.0	0.2	0.31	0.59	0.31	56.5
Approach		215	5.0	0.106	0.3	NA	0.0	0.2	0.01	0.02	0.01	69.4
SouthEast: East Mine Road												
21b	L3	7	5.0	0.067	10.5	LOS B	0.3	1.8	0.46	0.99	0.46	55.1
23a	R1	37	5.0	0.067	12.2	LOS B	0.3	1.8	0.46	0.99	0.46	54.7
Approach		44	5.0	0.067	11.9	LOS B	0.3	1.8	0.46	0.99	0.46	54.7
North: Great South Road												
7a	L1	18	5.0	0.109	6.0	LOS A	0.0	0.0	0.00	0.05	0.00	63.6
8	T1	187	5.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	69.3
Approach		205	5.0	0.109	0.5	NA	0.0	0.0	0.00	0.05	0.00	68.8
All Vehicles		464	5.0	0.109	1.5	NA	0.3	1.8	0.05	0.13	0.05	67.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INPUT VOLUMES

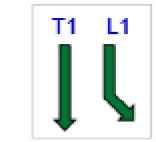
Vehicles and pedestrians per 60 minutes

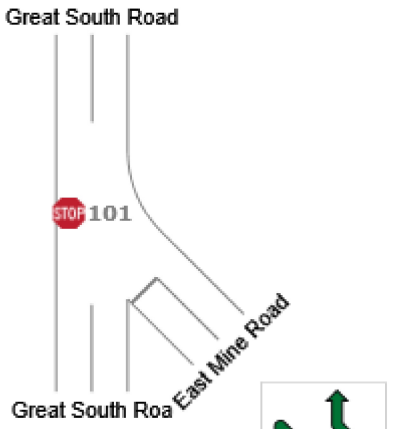
Site: 101 [2030 Baseline Traffic_PM Peak]

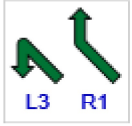
New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

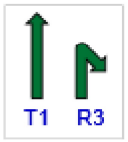
	T1	L1
Tot	189	51
LV	95%	95%
HV	5%	5%







	L3	R1
Tot	12	13
LV	95%	95%
HV	5%	5%



	T1	R3
Tot	197	7
LV	95%	95%
HV	5%	5%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	204	194	10
SE: East Mine Road	25	24	1
N: Great South Road	240	228	12
Total	469	446	23

MOVEMENT SUMMARY

Site: 101 [2030 Baseline Traffic_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	207	5.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
3b	R3	7	5.0	0.005	7.6	LOS A	0.0	0.2	0.35	0.59	0.35	56.4
Approach		215	5.0	0.107	0.3	NA	0.0	0.2	0.01	0.02	0.01	69.4
SouthEast: East Mine Road												
21b	L3	13	5.0	0.034	10.5	LOS B	0.1	0.9	0.40	0.94	0.40	55.2
23a	R1	14	5.0	0.034	12.4	LOS B	0.1	0.9	0.40	0.94	0.40	54.8
Approach		26	5.0	0.034	11.5	LOS B	0.1	0.9	0.40	0.94	0.40	55.0
North: Great South Road												
7a	L1	54	5.0	0.134	6.0	LOS A	0.0	0.0	0.00	0.13	0.00	62.8
8	T1	199	5.0	0.134	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	68.3
Approach		253	5.0	0.134	1.3	NA	0.0	0.0	0.00	0.13	0.00	67.1
All Vehicles		494	5.0	0.134	1.4	NA	0.1	0.9	0.03	0.13	0.03	67.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

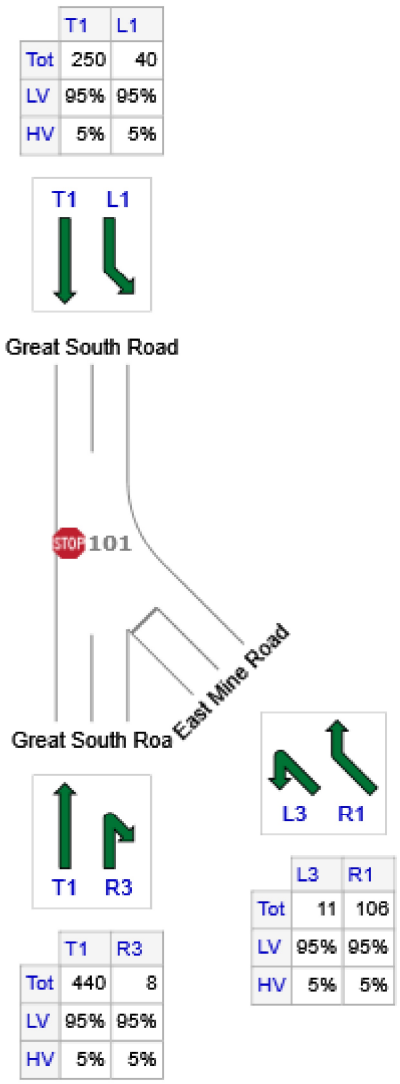
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2030 Baseline + Rezoning Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	448	426	22
SE: East Mine Road	117	111	6
N: Great South Road	290	276	15
Total	855	812	43

MOVEMENT SUMMARY

Site: 101 [2030 Baseline + Rezoning Traffic_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	463	5.0	0.237	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3b	R3	8	5.0	0.006	7.8	LOS A	0.0	0.2	0.39	0.60	0.39	56.3
Approach		472	5.0	0.237	0.2	NA	0.0	0.2	0.01	0.01	0.01	69.6
SouthEast: East Mine Road												
21b	L3	12	5.0	0.340	12.4	LOS B	1.5	10.8	0.72	1.08	0.91	49.6
23a	R1	112	5.0	0.340	20.7	LOS C	1.5	10.8	0.72	1.08	0.91	49.3
Approach		123	5.0	0.340	19.9	LOS C	1.5	10.8	0.72	1.08	0.91	49.3
North: Great South Road												
7a	L1	42	5.0	0.162	6.0	LOS A	0.0	0.0	0.00	0.08	0.00	63.3
8	T1	263	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	68.9
Approach		305	5.0	0.162	0.8	NA	0.0	0.0	0.00	0.08	0.00	68.1
All Vehicles		900	5.0	0.340	3.1	NA	1.5	10.8	0.10	0.18	0.13	65.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

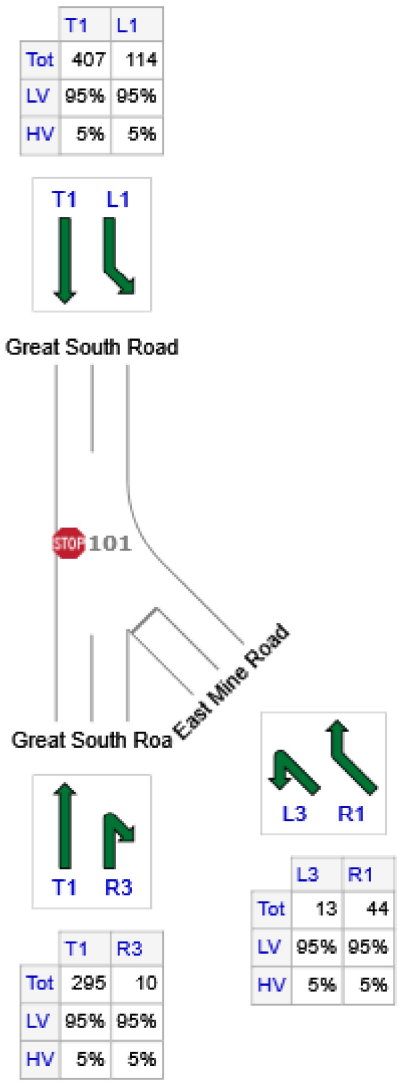
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2030 Baseline + Rezoning Traffic_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	305	290	15
SE: East Mine Road	57	54	3
N: Great South Road	521	495	26
Total	883	839	44

MOVEMENT SUMMARY

Site: 101 [2030 Baseline + Rezoning Traffic_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	311	5.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
3b	R3	11	5.0	0.011	9.1	LOS A	0.0	0.3	0.53	0.67	0.53	55.4
Approach		321	5.0	0.160	0.3	NA	0.0	0.3	0.02	0.02	0.02	69.4
SouthEast: East Mine Road												
21b	L3	14	5.0	0.167	12.0	LOS B	0.6	4.3	0.69	1.03	0.69	50.9
23a	R1	46	5.0	0.167	19.7	LOS C	0.6	4.3	0.69	1.03	0.69	50.6
Approach		60	5.0	0.167	17.9	LOS C	0.6	4.3	0.69	1.03	0.69	50.6
North: Great South Road												
7a	L1	120	5.0	0.292	6.0	LOS A	0.0	0.0	0.00	0.13	0.00	62.7
8	T1	428	5.0	0.292	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	68.2
Approach		548	5.0	0.292	1.3	NA	0.0	0.0	0.00	0.13	0.00	66.9
All Vehicles		929	5.0	0.292	2.1	NA	0.6	4.3	0.05	0.15	0.05	66.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

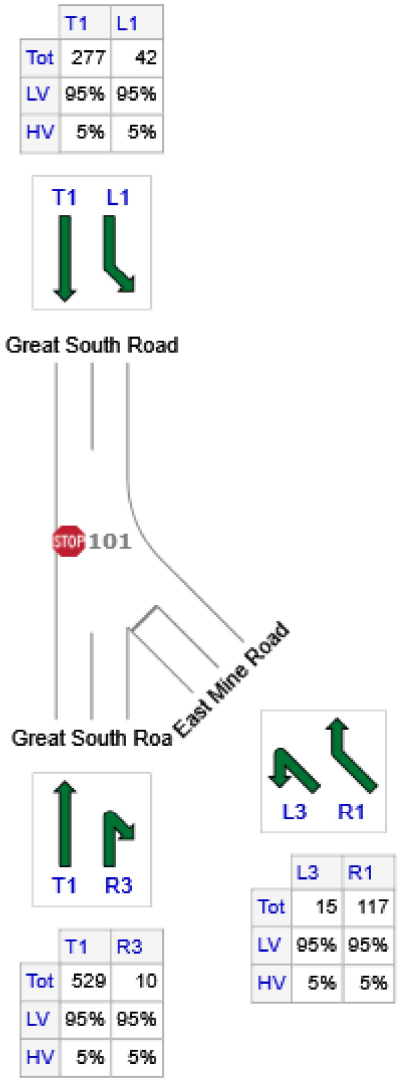
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2030 Baseline + Rezoning Traffic_AM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	539	512	27
SE: East Mine Road	132	125	7
N: Great South Road	319	303	16
Total	990	941	50

MOVEMENT SUMMARY

Site: 101 [2030 Baseline + Rezoning Traffic_AM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	557	5.0	0.286	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
3b	R3	11	5.0	0.008	7.9	LOS A	0.0	0.3	0.41	0.61	0.41	56.2
Approach		567	5.0	0.286	0.2	NA	0.0	0.3	0.01	0.01	0.01	69.6
SouthEast: East Mine Road												
21b	L3	16	5.0	0.482	15.3	LOS C	2.3	16.5	0.81	1.12	1.19	45.9
23a	R1	123	5.0	0.482	27.5	LOS D	2.3	16.5	0.81	1.12	1.19	45.6
Approach		139	5.0	0.482	26.1	LOS D	2.3	16.5	0.81	1.12	1.19	45.6
North: Great South Road												
7a	L1	44	5.0	0.178	6.0	LOS A	0.0	0.0	0.00	0.08	0.00	63.3
8	T1	292	5.0	0.178	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	68.9
Approach		336	5.0	0.178	0.8	NA	0.0	0.0	0.00	0.08	0.00	68.1
All Vehicles		1042	5.0	0.482	3.8	NA	2.3	16.5	0.11	0.18	0.16	64.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

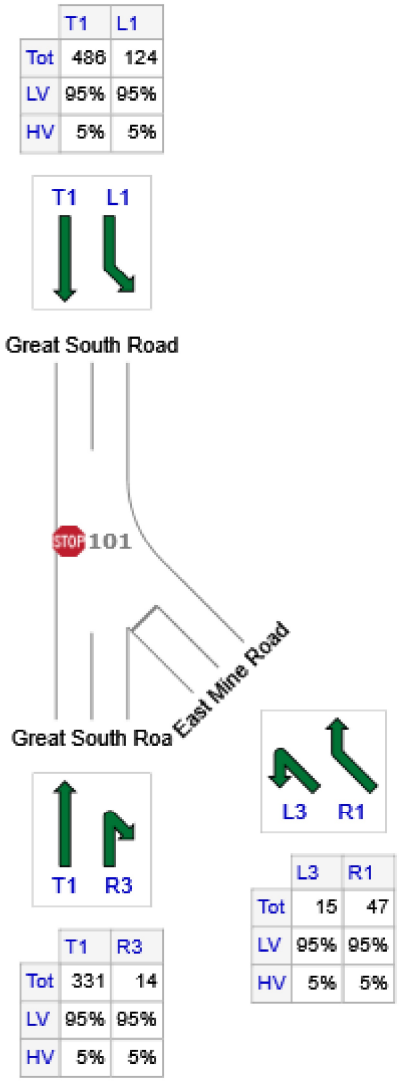
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [2030 Baseline + Rezoning Traffic_PM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	345	328	17
SE: East Mine Road	62	59	3
N: Great South Road	610	580	31
Total	1017	966	51

MOVEMENT SUMMARY

Site: 101 [2030 Baseline + Rezoning Traffic_PM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	348	5.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
3b	R3	15	5.0	0.018	9.8	LOS A	0.1	0.5	0.57	0.72	0.57	54.8
Approach		363	5.0	0.179	0.4	NA	0.1	0.5	0.02	0.03	0.02	69.2
SouthEast: East Mine Road												
21b	L3	16	5.0	0.230	13.4	LOS B	0.8	6.1	0.77	1.05	0.84	48.3
23a	R1	49	5.0	0.230	24.7	LOS C	0.8	6.1	0.77	1.05	0.84	48.0
Approach		65	5.0	0.230	21.9	LOS C	0.8	6.1	0.77	1.05	0.84	48.1
North: Great South Road												
7a	L1	131	5.0	0.342	6.0	LOS A	0.0	0.0	0.00	0.12	0.00	62.8
8	T1	512	5.0	0.342	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	68.3
Approach		642	5.0	0.342	1.3	NA	0.0	0.0	0.00	0.12	0.00	67.1
All Vehicles		1071	5.0	0.342	2.2	NA	0.8	6.1	0.05	0.15	0.06	66.2

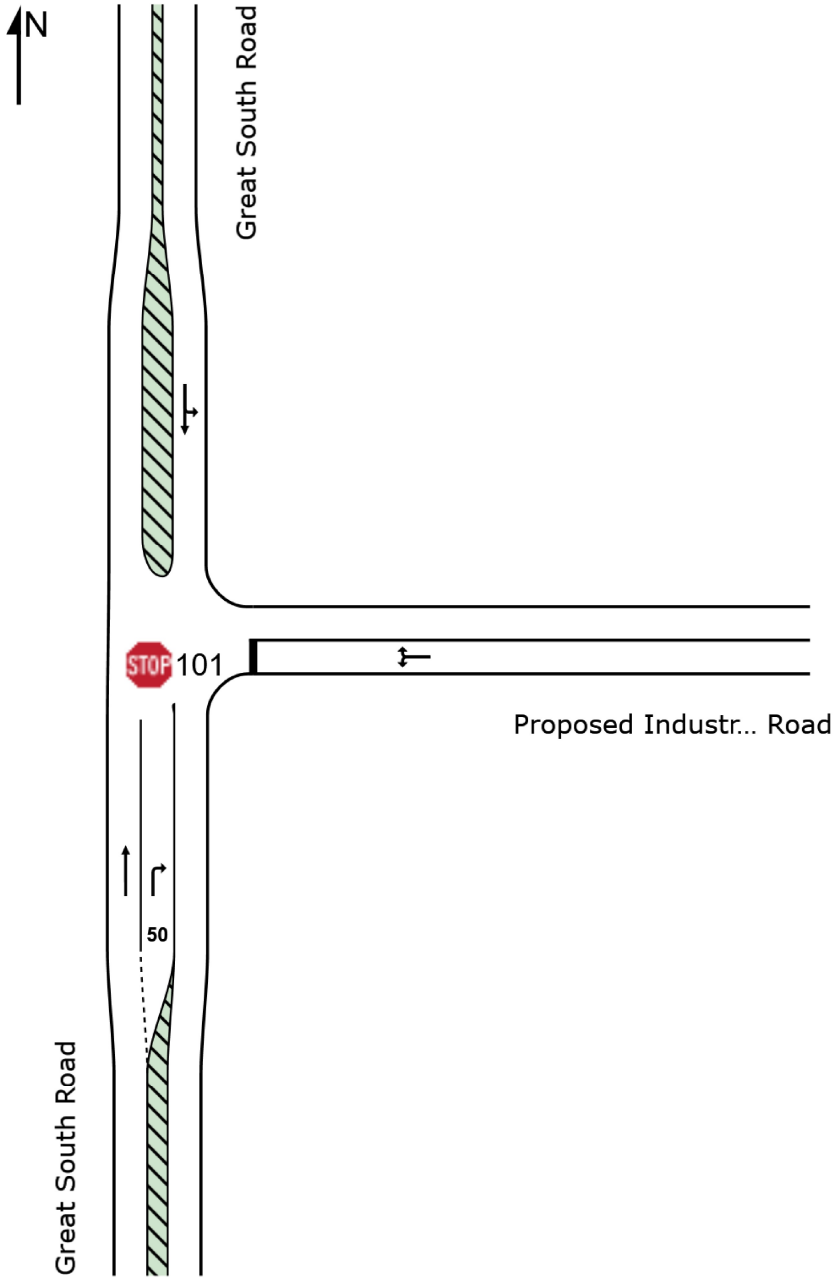
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Access Intersection 1

SITE LAYOUT

Site: 101 [Access Intersection 1_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)



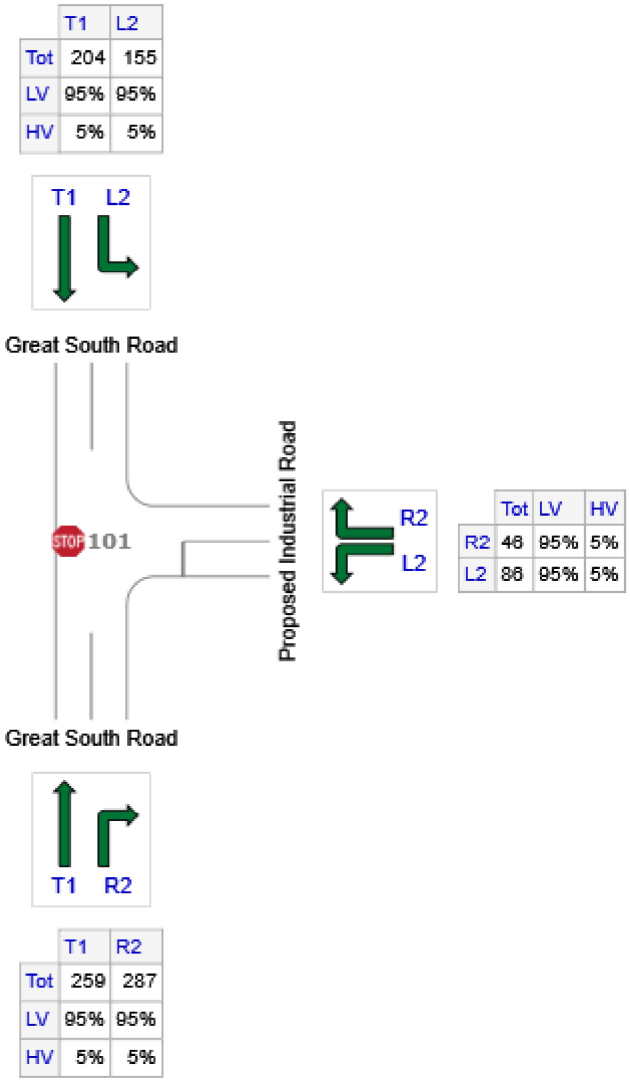
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 1_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	546	519	27
E: Proposed Industrial Road	132	125	7
N: Great South Road	359	341	18
Total	1037	985	52

MOVEMENT SUMMARY

Site: 101 [Access Intersection 1_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	273	5.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	302	5.0	0.253	6.4	LOS A	1.2	9.0	0.50	0.68	0.50	36.7
Approach		575	5.0	0.253	3.4	NA	1.2	9.0	0.26	0.36	0.26	44.7
East: Proposed Industrial Road												
4	L2	91	5.0	0.241	8.7	LOS A	0.9	6.8	0.48	0.91	0.48	32.6
6	R2	48	5.0	0.241	19.4	LOS C	0.9	6.8	0.48	0.91	0.48	38.7
Approach		139	5.0	0.241	12.4	LOS B	0.9	6.8	0.48	0.91	0.48	35.5
North: Great South Road												
7	L2	163	5.0	0.205	4.6	LOS A	0.0	0.0	0.00	0.23	0.00	46.8
8	T1	215	5.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	48.1
Approach		378	5.0	0.205	2.0	NA	0.0	0.0	0.00	0.23	0.00	47.6
All Vehicles		1092	5.0	0.253	4.0	NA	1.2	9.0	0.20	0.38	0.20	44.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

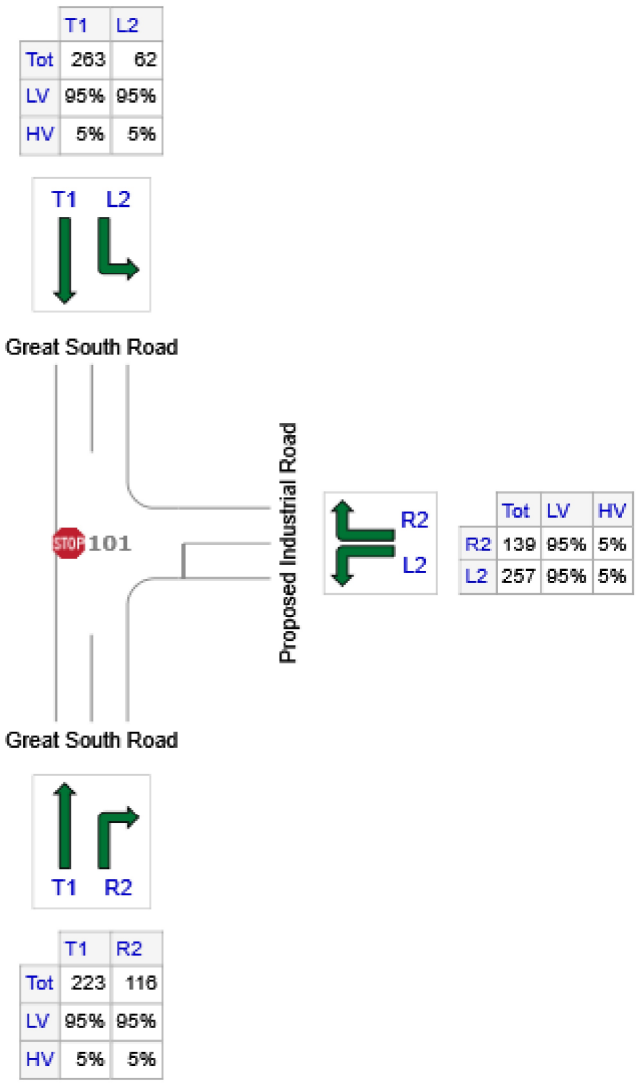
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 1_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	339	322	17
E: Proposed Industrial Road	396	376	20
N: Great South Road	325	309	16
Total	1060	1007	53

Organisation: BLOXAM, BURNETT & OLLIVER LTD | Created: Friday, 30 October 2020 3:49:26 PM
Project: K:\144370 Shand Properties Rezoning\02 Industrial & Residential rezoning\Traffic\Sidra\Site Access Assessments.sip8

MOVEMENT SUMMARY

Site: 101 [Access Intersection 1_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	235	5.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	122	5.0	0.098	5.9	LOS A	0.4	3.2	0.43	0.62	0.43	37.0
Approach		357	5.0	0.125	2.0	NA	0.4	3.2	0.15	0.21	0.15	46.9
East: Proposed Industrial Road												
4	L2	271	5.0	0.614	12.7	LOS B	5.4	39.2	0.64	1.15	1.15	30.0
6	R2	146	5.0	0.614	21.2	LOS C	5.4	39.2	0.64	1.15	1.15	36.8
Approach		417	5.0	0.614	15.6	LOS C	5.4	39.2	0.64	1.15	1.15	33.2
North: Great South Road												
7	L2	65	5.0	0.183	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	48.0
8	T1	277	5.0	0.183	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.1
Approach		342	5.0	0.183	0.9	NA	0.0	0.0	0.00	0.10	0.00	48.9
All Vehicles		1116	5.0	0.614	6.8	NA	5.4	39.2	0.29	0.53	0.48	42.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

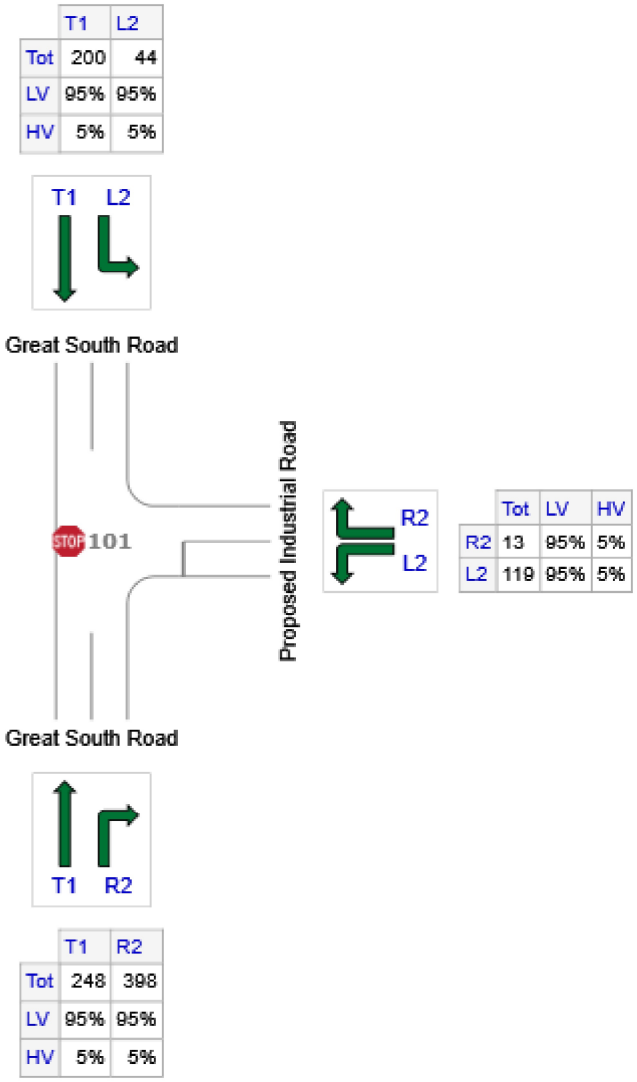
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 1_2030 Baseline + Development_AM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	646	614	32
E: Proposed Industrial Road	132	125	7
N: Great South Road	244	232	12
Total	1022	971	51

MOVEMENT SUMMARY

Site: 101 [Access Intersection 1_2030 Baseline + Development_AM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	261	5.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	419	5.0	0.306	5.8	LOS A	1.6	12.0	0.43	0.62	0.43	37.0
Approach		680	5.0	0.306	3.6	NA	1.6	12.0	0.27	0.38	0.27	43.7
East: Proposed Industrial Road												
4	L2	125	5.0	0.162	8.6	LOS A	0.6	4.7	0.38	0.89	0.38	35.0
6	R2	14	5.0	0.162	21.0	LOS C	0.6	4.7	0.38	0.89	0.38	40.5
Approach		139	5.0	0.162	9.8	LOS A	0.6	4.7	0.38	0.89	0.38	35.9
North: Great South Road												
7	L2	46	5.0	0.137	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	48.0
8	T1	211	5.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.2
Approach		257	5.0	0.137	0.8	NA	0.0	0.0	0.00	0.10	0.00	49.0
All Vehicles		1076	5.0	0.306	3.7	NA	1.6	12.0	0.22	0.38	0.22	44.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

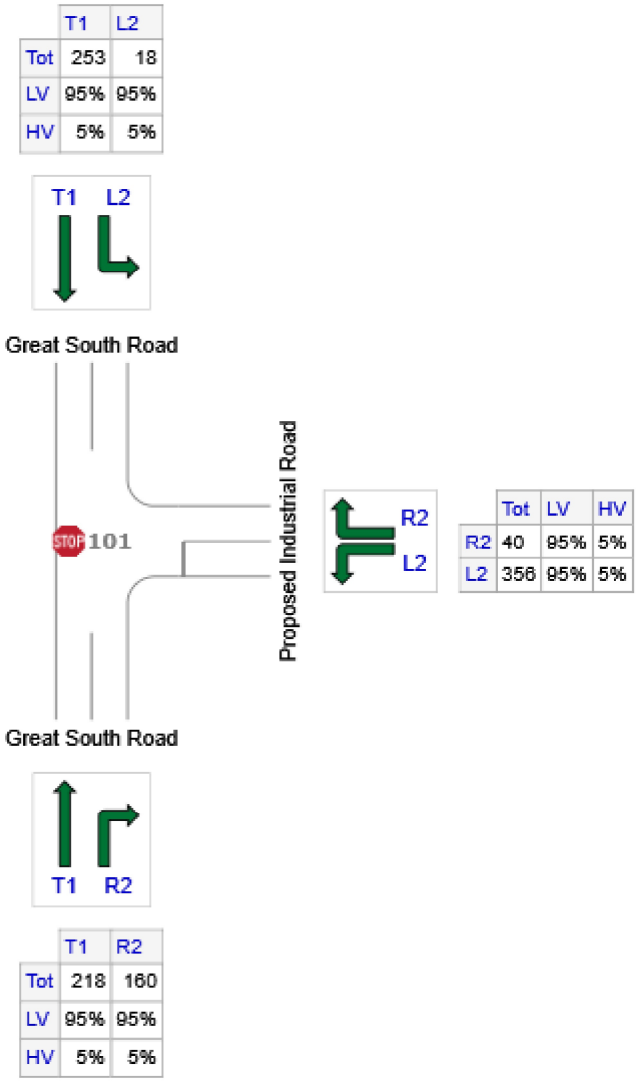
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 1_2030 Baseline + Development_PM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Great South Road	378	359	19
E: Proposed Industrial Road	396	376	20
N: Great South Road	271	257	14
Total	1045	993	52

MOVEMENT SUMMARY

Site: 101 [Access Intersection 1_2030 Baseline + Development_PM Peak (Sensitivity)]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Great South Road												
2	T1	229	5.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	168	5.0	0.127	5.7	LOS A	0.6	4.3	0.40	0.60	0.40	37.2
Approach		398	5.0	0.127	2.4	NA	0.6	4.3	0.17	0.25	0.17	46.1
East: Proposed Industrial Road												
4	L2	375	5.0	0.456	10.2	LOS B	3.1	22.7	0.52	0.97	0.67	34.1
6	R2	42	5.0	0.456	18.5	LOS C	3.1	22.7	0.52	0.97	0.67	39.8
Approach		417	5.0	0.456	11.0	LOS B	3.1	22.7	0.52	0.97	0.67	35.0
North: Great South Road												
7	L2	19	5.0	0.152	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	48.6
8	T1	266	5.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.7
Approach		285	5.0	0.152	0.3	NA	0.0	0.0	0.00	0.04	0.00	49.6
All Vehicles		1100	5.0	0.456	5.1	NA	3.1	22.7	0.26	0.47	0.31	43.6

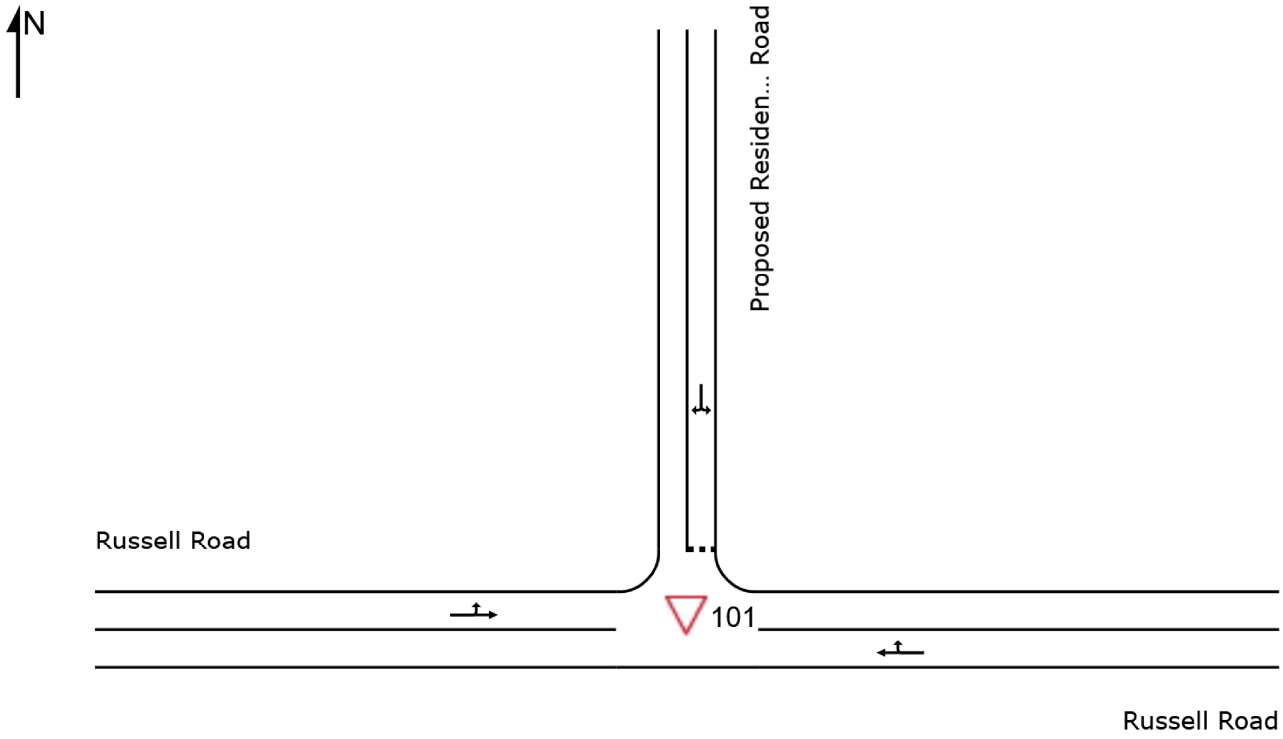
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Access Intersection 2

SITE LAYOUT

Site: 101 [Access Intersection 2_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



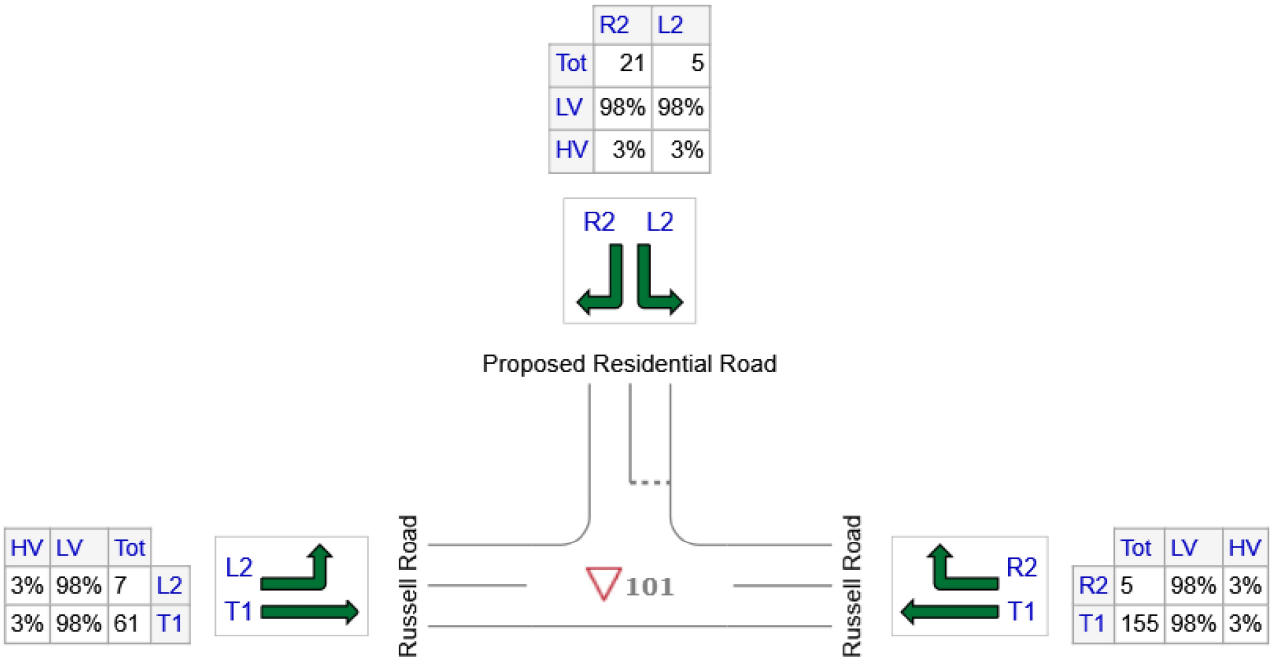
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 2_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Russell Road	160	156	4
N: Proposed Residential Road	26	25	1
W: Russell Road	68	66	2
Total	254	248	6

MOVEMENT SUMMARY

Site: 101 [Access Intersection 2_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Russell Road												
5	T1	163	2.5	0.085	0.0	LOS A	0.0	0.3	0.01	0.02	0.01	49.7
6	R2	5	2.5	0.085	4.8	LOS A	0.0	0.3	0.01	0.02	0.01	46.5
Approach		168	2.5	0.085	0.2	NA	0.0	0.3	0.01	0.02	0.01	49.6
North: Proposed Residential Road												
7	L2	5	2.5	0.025	4.8	LOS A	0.1	0.6	0.21	0.54	0.21	39.3
9	R2	22	2.5	0.025	5.4	LOS A	0.1	0.6	0.21	0.54	0.21	38.4
Approach		27	2.5	0.025	5.3	LOS A	0.1	0.6	0.21	0.54	0.21	38.6
West: Russell Road												
10	L2	7	2.5	0.036	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	47.2
11	T1	64	2.5	0.036	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	49.2
Approach		72	2.5	0.036	0.5	NA	0.0	0.0	0.00	0.06	0.00	49.0
All Vehicles		267	2.5	0.085	0.8	NA	0.1	0.6	0.03	0.08	0.03	48.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

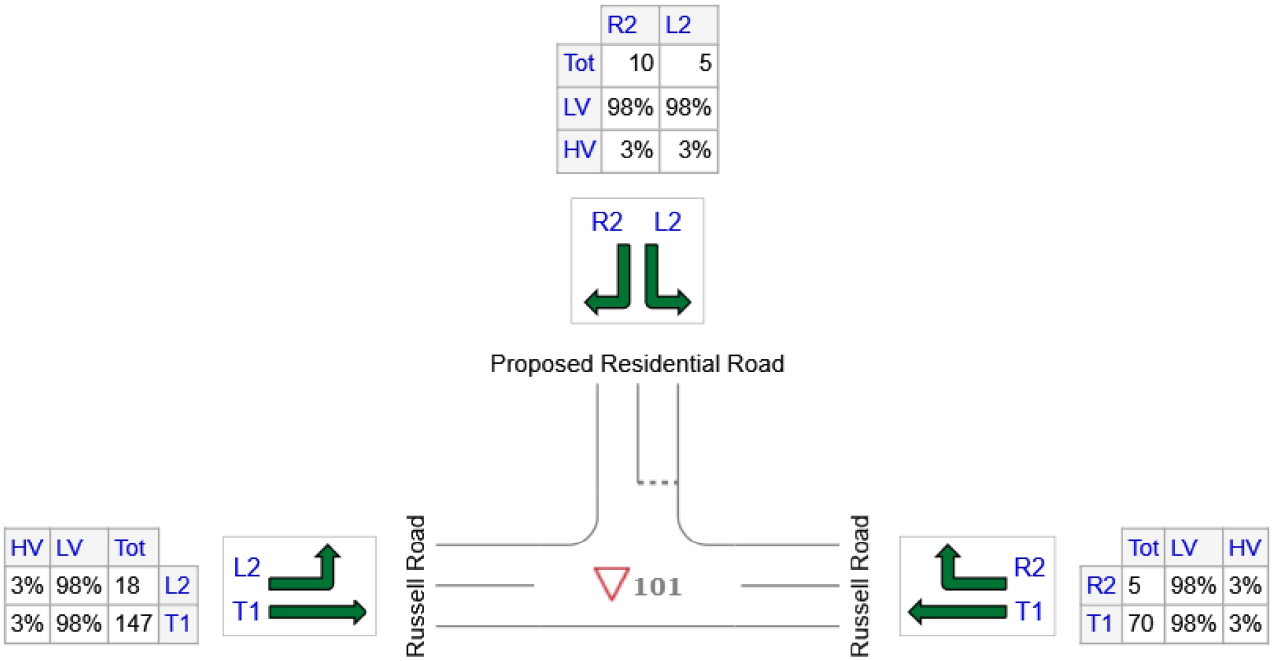
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 2_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Russell Road	75	73	2
N: Proposed Residential Road	15	15	0
W: Russell Road	165	161	4
Total	255	249	6

MOVEMENT SUMMARY

Site: 101 [Access Intersection 2_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Russell Road												
5	T1	74	2.5	0.041	0.1	LOS A	0.0	0.3	0.05	0.04	0.05	49.2
6	R2	5	2.5	0.041	5.1	LOS A	0.0	0.3	0.05	0.04	0.05	46.0
Approach		79	2.5	0.041	0.4	NA	0.0	0.3	0.05	0.04	0.05	49.0
North: Proposed Residential Road												
7	L2	5	2.5	0.014	5.0	LOS A	0.0	0.3	0.27	0.54	0.27	39.0
9	R2	11	2.5	0.014	5.5	LOS A	0.0	0.3	0.27	0.54	0.27	38.2
Approach		16	2.5	0.014	5.3	LOS A	0.0	0.3	0.27	0.54	0.27	38.4
West: Russell Road												
10	L2	19	2.5	0.088	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	47.2
11	T1	155	2.5	0.088	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	49.2
Approach		174	2.5	0.088	0.5	NA	0.0	0.0	0.00	0.06	0.00	49.0
All Vehicles		268	2.5	0.088	0.8	NA	0.0	0.3	0.03	0.08	0.03	48.4

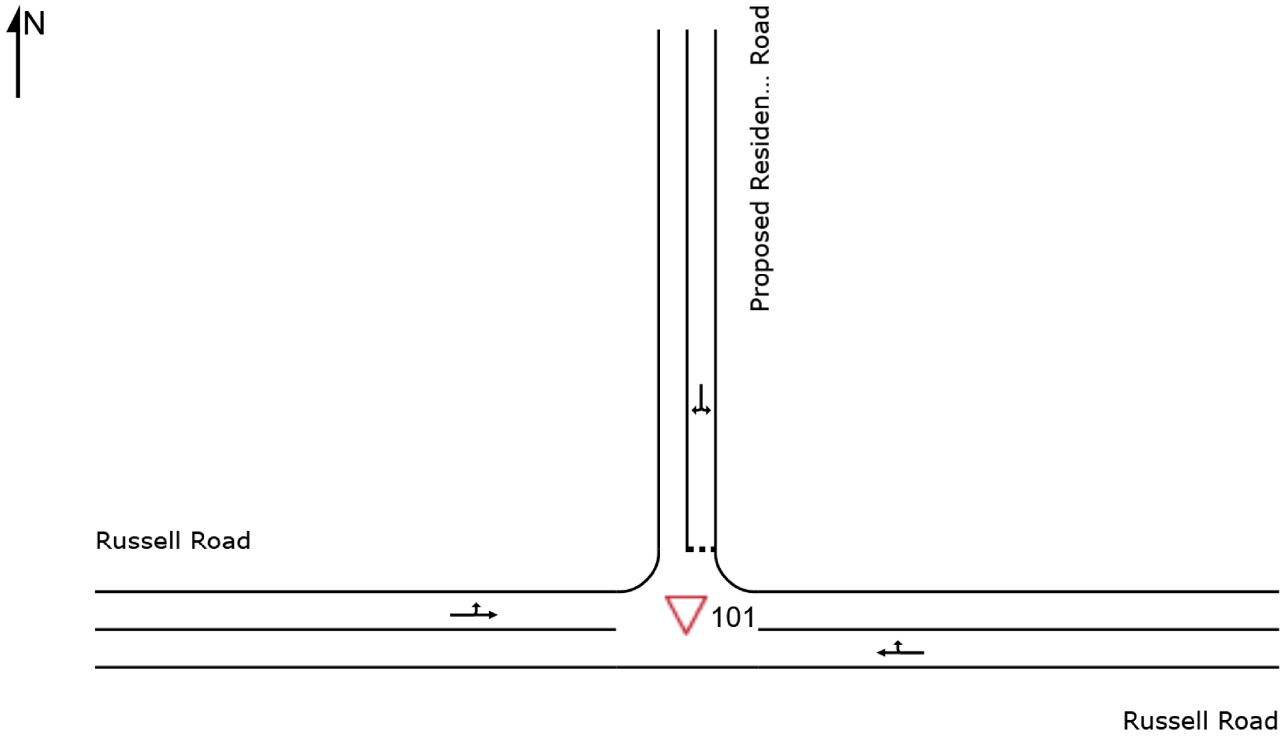
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Access Intersection 3

SITE LAYOUT

Site: 101 [Access Intersection 3_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



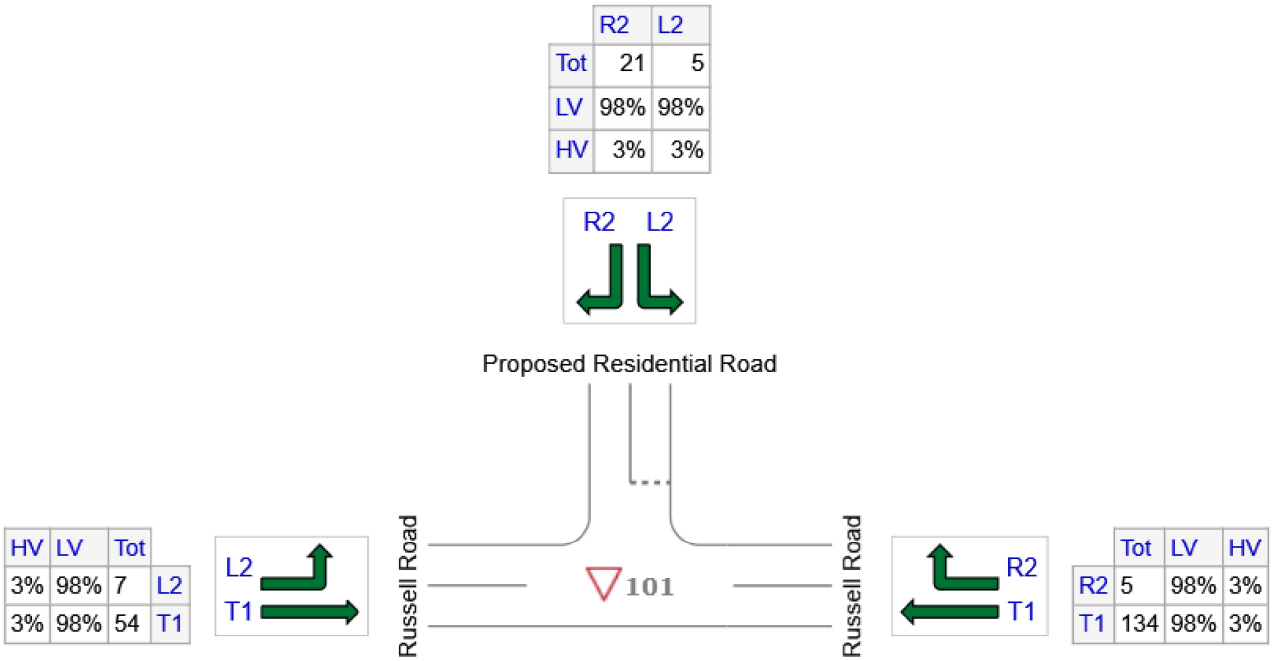
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 3_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Russell Road	139	136	3
N: Proposed Residential Road	26	25	1
W: Russell Road	61	59	2
Total	226	220	6

MOVEMENT SUMMARY

Site: 101 [Access Intersection 3_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Russell Road												
5	T1	141	2.5	0.074	0.0	LOS A	0.0	0.2	0.01	0.02	0.01	49.6
6	R2	5	2.5	0.074	4.8	LOS A	0.0	0.2	0.01	0.02	0.01	46.5
Approach		146	2.5	0.074	0.2	NA	0.0	0.2	0.01	0.02	0.01	49.5
North: Proposed Residential Road												
7	L2	5	2.5	0.024	4.7	LOS A	0.1	0.6	0.20	0.54	0.20	39.3
9	R2	22	2.5	0.024	5.3	LOS A	0.1	0.6	0.20	0.54	0.20	38.5
Approach		27	2.5	0.024	5.2	LOS A	0.1	0.6	0.20	0.54	0.20	38.7
West: Russell Road												
10	L2	7	2.5	0.032	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	47.1
11	T1	57	2.5	0.032	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	49.1
Approach		64	2.5	0.032	0.5	NA	0.0	0.0	0.00	0.06	0.00	48.9
All Vehicles		238	2.5	0.074	0.9	NA	0.1	0.6	0.03	0.09	0.03	48.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

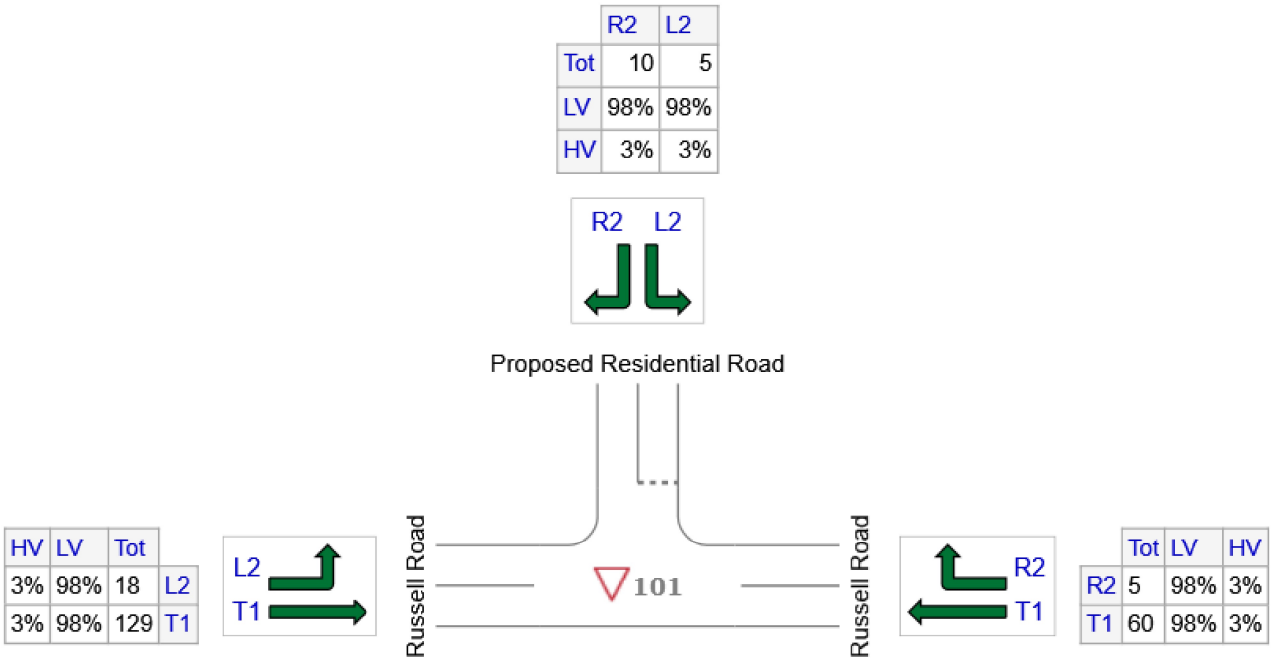
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 3_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Russell Road	65	63	2
N: Proposed Residential Road	15	15	0
W: Russell Road	147	143	4
Total	227	221	6

MOVEMENT SUMMARY

Site: 101 [Access Intersection 3_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Russell Road												
5	T1	63	2.5	0.035	0.1	LOS A	0.0	0.3	0.05	0.04	0.05	49.1
6	R2	5	2.5	0.035	5.1	LOS A	0.0	0.3	0.05	0.04	0.05	45.8
Approach		68	2.5	0.035	0.4	NA	0.0	0.3	0.05	0.04	0.05	48.9
North: Proposed Residential Road												
7	L2	5	2.5	0.014	5.0	LOS A	0.0	0.3	0.25	0.53	0.25	39.1
9	R2	11	2.5	0.014	5.3	LOS A	0.0	0.3	0.25	0.53	0.25	38.3
Approach		16	2.5	0.014	5.2	LOS A	0.0	0.3	0.25	0.53	0.25	38.5
West: Russell Road												
10	L2	19	2.5	0.078	4.6	LOS A	0.0	0.0	0.00	0.07	0.00	47.0
11	T1	136	2.5	0.078	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	49.1
Approach		155	2.5	0.078	0.6	NA	0.0	0.0	0.00	0.07	0.00	48.9
All Vehicles		239	2.5	0.078	0.8	NA	0.0	0.3	0.03	0.09	0.03	48.2

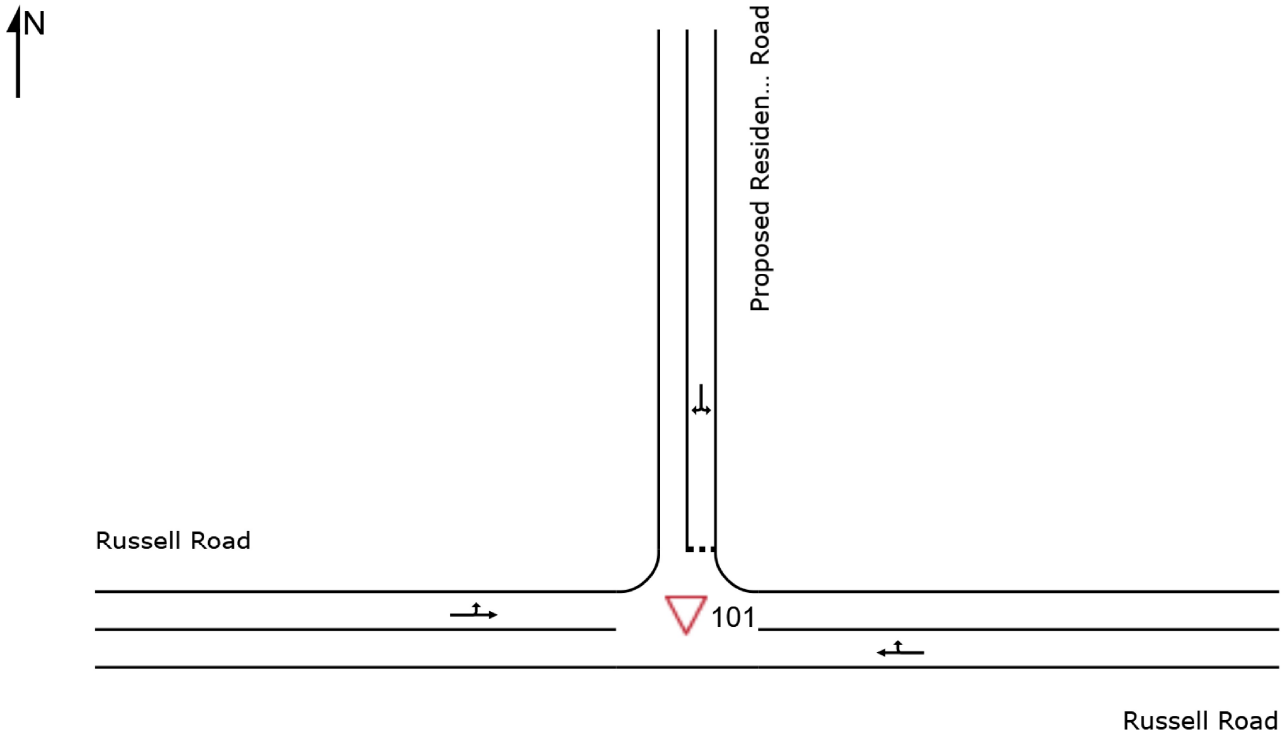
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Access Intersection 4

SITE LAYOUT

Site: 101 [Access Intersection 4_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



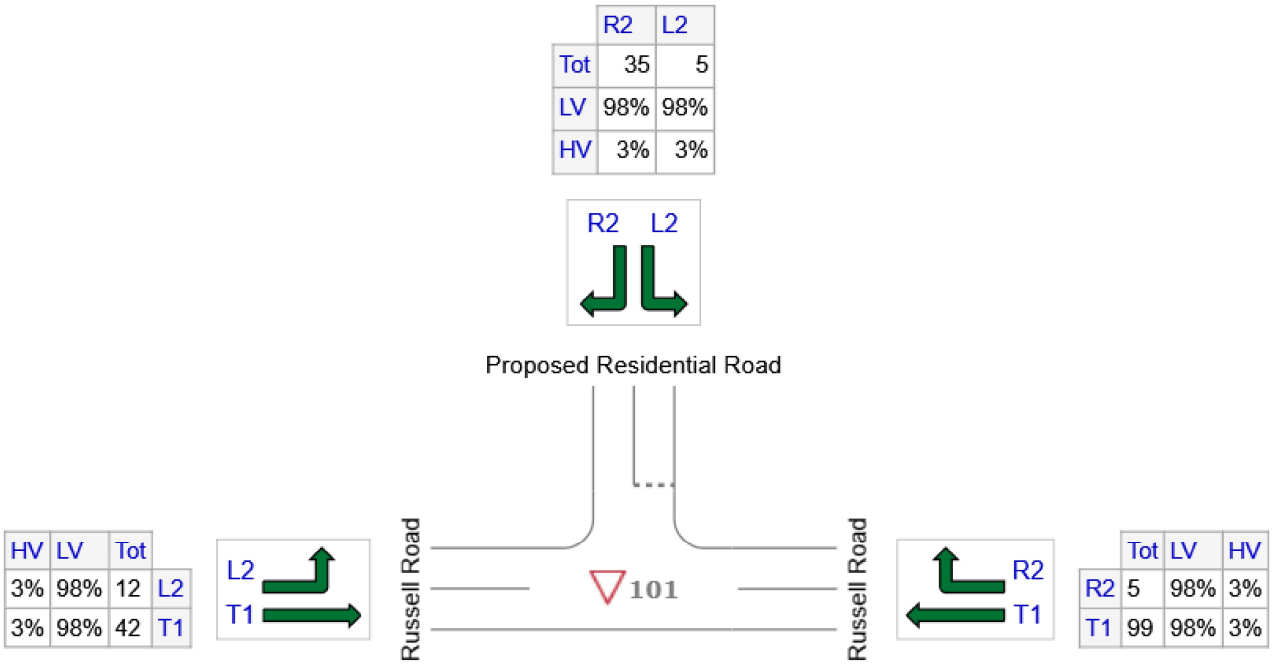
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 4_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Russell Road	104	101	3
N: Proposed Residential Road	40	39	1
W: Russell Road	54	53	1
Total	198	193	5

MOVEMENT SUMMARY

Site: 101 [Access Intersection 4_2030 Baseline + Development_AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Russell Road												
5	T1	104	2.5	0.056	0.0	LOS A	0.0	0.2	0.02	0.03	0.02	49.5
6	R2	5	2.5	0.056	4.8	LOS A	0.0	0.2	0.02	0.03	0.02	46.3
Approach		109	2.5	0.056	0.2	NA	0.0	0.2	0.02	0.03	0.02	49.4
North: Proposed Residential Road												
7	L2	5	2.5	0.037	4.7	LOS A	0.1	0.9	0.19	0.54	0.19	39.4
9	R2	37	2.5	0.037	5.1	LOS A	0.1	0.9	0.19	0.54	0.19	38.5
Approach		42	2.5	0.037	5.1	LOS A	0.1	0.9	0.19	0.54	0.19	38.7
West: Russell Road												
10	L2	13	2.5	0.029	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	46.2
11	T1	44	2.5	0.029	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	48.3
Approach		57	2.5	0.029	1.0	NA	0.0	0.0	0.00	0.12	0.00	47.9
All Vehicles		208	2.5	0.056	1.4	NA	0.1	0.9	0.05	0.16	0.05	46.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

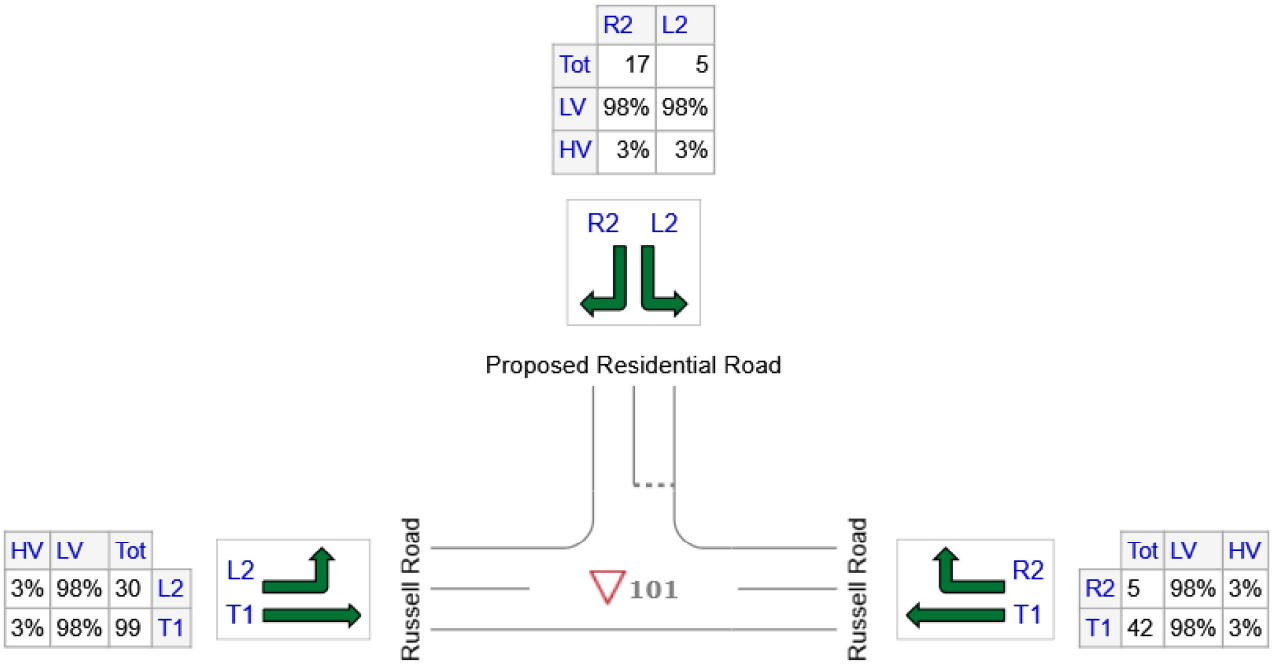
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Access Intersection 4_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Russell Road	47	46	1
N: Proposed Residential Road	22	21	1
W: Russell Road	129	126	3
Total	198	193	5

MOVEMENT SUMMARY

Site: 101 [Access Intersection 4_2030 Baseline + Development_PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Russell Road												
5	T1	44	2.5	0.026	0.1	LOS A	0.0	0.2	0.06	0.06	0.06	48.8
6	R2	5	2.5	0.026	5.0	LOS A	0.0	0.2	0.06	0.06	0.06	45.5
Approach		49	2.5	0.026	0.6	NA	0.0	0.2	0.06	0.06	0.06	48.5
North: Proposed Residential Road												
7	L2	5	2.5	0.020	4.9	LOS A	0.1	0.5	0.22	0.53	0.22	39.2
9	R2	18	2.5	0.020	5.2	LOS A	0.1	0.5	0.22	0.53	0.22	38.4
Approach		23	2.5	0.020	5.1	LOS A	0.1	0.5	0.22	0.53	0.22	38.6
West: Russell Road												
10	L2	32	2.5	0.069	4.6	LOS A	0.0	0.0	0.00	0.13	0.00	46.1
11	T1	104	2.5	0.069	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	48.3
Approach		136	2.5	0.069	1.1	NA	0.0	0.0	0.00	0.13	0.00	47.8
All Vehicles		208	2.5	0.069	1.4	NA	0.1	0.5	0.04	0.16	0.04	47.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E – Consultation

Meeting Notes

Shand Properties
144370
Meeting with Kiwirail
2 October 2020
2.00 pm
MS Teams

		Attendance
Michelle Grinlinton-Hancock	**Kiwirail**	
Chris Dawson	**BBO**	

Item	Discussion	Action	Date
1	**Introduction**		
1.1	Chris introduced the Shand rezoning project at a very high level and introduced the railway related questions for the meeting.		
1.2	Michelle noted that a Level Crossing Risk Assessment (LCRA)would be required for the Residential portion of the plan change to confirm whether the existing East Mine Road rail crossing configuration would be suitable or would need upgrading. Given the time delays between now and the actual development of the land (2-3 years) Michelle suggested that either a condition or a plan provision requiring the LCRA at the time of seeking landuse/subdivision consent would be required.	MGH to send wording for consent condition.	5 October
1.3	Michelle provided a list of qualified consultants who could carry out a LCRA for BBO to use at the right time.		
1.4	Michelle noted that they would be seeking a setback from the rail corridor of between 3 – 5 metres so that any buildings can be maintained without the need to get a grant of access from Kiwirail.		
1.5	Chris discussed the need for a grant to put a Stormwater pipe underneath the railway line between area 1 and Area 2. This would also be done at the time of seeking resource consent so that the technical details such as volume of SW, area of catchment, size of pipe, exact location of the pipe in relation to the railway corridor could all be worked out.		
1.6	Michelle undertook to provide an email to BBO summarising the matters discussed, confirming the wording of a condition/rule relating to the provision of a LCRA and providing the contact details for the grant person at Kiwirail, Daniel Rodriguez.	Michelle	5 October
1.7	**Michelle Grinlinton-Hancock** **Senior RMA Advisor** MOB: +64 027 246 4427 Bunny Street, Wellington 6011 PO Box 593, Wellington 6140, New Zealand		