Before Kaipara District Council

IN THE MATTER	the Resource Management Act 1991 ("**RMA**")
And	
IN THE MATTER	of an application for Private Plan Change 83 ("**PC83**") by THE RISE LIMITED to rezone 56.9 ha of land at Cove Road and Mangawhai Heads Road, Mangawhai from Rural Zone to Residential Zone.

STATEMENT OF EVIDENCE OF PETER JUSTIN KELLY

ON BEHALF OF THE RISE LIMITED

TRANSPORTATION ENGINEERING

23 February 2024

Michael Savage

Barrister

Park Chambers

1. INTRODUCTION

1.1 My full name is Peter Justin Kelly. I am a Senior Transportation Engineer at Traffic Planning Consultants Limited ("TPC").

1.2 I have 13 years' experience as a Transportation Engineer. I have been with TPC since 2017. Prior to that, I gained seven years of experience as a Transportation Engineer with Paradigm Transportation Solutions Limited, an engineering firm based in Waterloo, Ontario, Canada. I hold a Bachelor of Applied Science (Civil Engineering) from the University of Waterloo, in Waterloo, Ontario, Canada

1.3 During my time with TPC, I have been engaged by local authorities and the private sector for advice on many matters covering traffic engineering road safety, design and network management. I have extensive experience in assessing transport and access requirements of residential, commercial, and industrial activities.

1.4 Although this is not a hearing before the Environment Court, I record that I have read and agree to and abide by the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2023. This evidence is within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses as presented to this hearing. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

2. SCOPE OF EVIDENCE

2.1 My evidence will address the following topics:

(a) Existing Transport Environment;

(b) Description of Proposal;

(c) Impact of Development;

(d) Council Officer's Section 42A Report; and

(e) Concerns Raised in Submissions.

3. INVOLVEMENT WITH THE PROPOSAL

3.1 I was instructed by The Rise Limited in September 2023 to review the surrounding transportation network and identify potential effects resulting from the proposal, as well as to provide design guidance onto the design guidelines/precinct provisions for the area, where pertaining to transport matters. I am familiar with the area to which the application relates. I have visited the site and the surrounding area on Wednesday, October 11th, 2023.

3.2 I prepared the Transport Assessment ("TA") for the proposed plan change in January 2024, which is appended to this evidence.

3.3 Following the completion of my TA, I subsequently met with representatives from the Northland Transport Alliance ("NTA") and Flow Transportation to discuss the TA and any outstanding matters. During these discussions' clarification was given to the associated reporting and these discussions are suitably captured within the evidence prepared by Mr. van der Westhuizen in support of the Section 42A Hearing Report ("S42A").

4. EXISTING TRANSPORT ENVIRONMENT

4.1 Cove Road is a two-lane road, which operates as a collector road from Tara Road to Mangawhai Heads Road and continues as an arterial road past its intersection with Mangawhai Heads Road towards the north.

4.2 Cove Road has a posted speed limit of 80 km/h and there are no footpaths provided along its length near the Plan Change area.

4.3 Cove Road is estimated to carry some 1,900-2,000 vehicles per day. Peak hour volumes determined to be 143 vehicle during the AM peak hour and 179 vehicles during the PM peak hour, from a traffic count carried out on Wednesday, October 11th, 2023.

4.4 Mangawhai Heads Road is a two-lane road, which operates as an arterial road from Cove Road to Molesworth Drive and continues as a local road past its intersection with Molesworth Drive towards the east.

4.5 Mangawhai Heads Road has a posted speed limit of 50 km/h between Cullen Road and approximately 80 metres west of Jack Boyd Drive. From 80 metres west of Jack Boyd Drive to Cove Road, a speed limit of 60 km/h applies.

4.6 There are no footpaths provided along its Mangawhai Heads Road, west of Jack Boyd Drive. East of Jack Boyd Drive a footpath is provided on the south side of the road towards Molesworth Drive.

4.7 Mangawhai Heads Road is estimated to carry some 2,100-4,400 vehicles per day along its length; with greater volumes closer to Molesworth Drive. Peak hour volumes were determined to be 345 vehicle during the AM peak hour and 386 vehicles during the PM peak hour, from a traffic count carried out on Wednesday, October 11th, 2023.

4.8 Other area roads are described in detail within my TA; however, their form and function are not considered to be vitally relevant to the balance of my evidence.

4.9 Within the TA, it was identified from New Zealand Transport Agency's Crash Analysis System ("CAS") that nine crashes had been reported along Cove Road and Mangawhai Head Road between 2014 and January 2024 (2024 data subject to reporting delays). Three of these crashes resulted in serious injuries, and one resulted in a minor injury.

4.10 In preparing this evidence, I have revisited CAS, to identify if any additional crashed have been reported to the database. No crashes have since been reported.

4.11 From the reviewed crash history, it is my opinion that there are no pre-existing safety concerns with Cove Road, Mangawhai Head Road, or other study area roads, which require remedial measures.

5. DESCRIPTION OF PROPOSAL

5.1 The proposal looks to rezone 56.9 hectares of land from Rural to Residential. This change is estimated to enable the creation of up to 380 residential lots. It is noted that within my TA I state that the rezoning applies to 54 hectares of land erroneously. This error did not impact my conclusions or recommendations as the residential lot yield of 380, is what predominantly guided my assessment, as opposed to land area.

5.2 The creation of 380 residential lots is estimated to generate up to 3,116 daily vehicle trips and 342 peak hour vehicle trips. This is based off the 85th percentile trip generation rates published within the NZ Transport Agency's "Trips and Parking Related to Land-Use"; which are 8.2 daily trips per dwelling and 0.9 peak hour trips per dwelling.

5.3 The proposal is supported by a concept plan which provides an indicative road layout, allowing the area to be suitably serviced via new public road connections and pedestrian path onto Cove Road and Mangawhai Heads Road.

5.4 I note that the concept plan and the roads are a guideline and that the ultimate location and path of roads may be different when ultimately constructed. Notwithstanding, it is my opinion that the construction of these various roads; whether done as a whole or independently allow for the Plan Change Area to be developed in stages, provided that their design accounts for the future internal connections. As such, development of the Plan Change Area is not contingent on one sole landowner, but rather allows for a degree of flexibility and natural progression over time.

6. IMPACT OF DEVELOPMENT AND REMEDIAL MEASURES

6.1 Greater detail on the Assessment of Effects from PPC83 is available within my TA, attached to this evidence. I have summarised what I consider to be the key points of this assessment.

6.2 Assigning the trip generation from the development to the wider road network, it was determined that following nearby intersections, will continue to operate at acceptable levels, under the 2034 Total Traffic Horizon:

(a) Cove Road and Pigeonwood Place,

(b) Cove Road and Robert Hastie Drive,

(c) Cove Road and Mangawhai Heads Road,

(d) Mangawhai Heads Road and Jack Boyd Drive, and

(e) Mangawhai Heads Road and Molesworth Drive.

6.3 Under a sensitivity analysis, which increased existing traffic volumes by a factor of 1.5x, it was determined that intersections within the study area continued to operate at generally acceptable levels.

6.4 The intersection of Mangawhai Heads Road and Jack Boyd Drive did experience an increase in delays for vehicles turning right from Jack Boyd Drive to approximately 41 seconds (Level of Service E). However, this intersection was modelled at its most basic level and the implementation of auxiliary turn lanes would be likely to improve operations. Similarly, the implementation of a roundabout at this location would also

improve safety and operations, however the feasibility of this implementation with respect to available property and existing topography has not been investigated at this stage, and I consider it to be more appropriately done at a subdivision consent stage of development.

6.5 New public road intersections onto Cove Road and Mangawhai Heads Road are able to be constructed to a high standard, allowing for safe and efficient movement of vehicles from the site onto the existing public road network. In my experience, design and construction of any of these intersections are subject to extensive review as part of Engineering Plan Approval, as will a third-party safety assessment completed by a suitably qualified Transportation Engineer to ensure the continued safety and operations of the surrounding network. I considered this to be standard practice within Transportation Engineering and while there may not be an explicit District Plan / Precinct Plan requirement to this effect, my experience is that Council's will not accept the vesting of new roads unless this practice has been followed to ensure the integrity of the road network.

6.6 In October 2023, I visited this site along with my colleague Mr. Udit Bhati, where we completed a preliminary Safe System Assessment ("SSA") of the existing intersections in the area. We looked to identify areas of concern within the road's design which may contribute to serious or fatal injuries during a road crash event of various types.

(a) In general, it was considered that the intersections had good formation, and generally good sightlines in both directions for vehicles completing turning movements.

(b) The largest contributing factor for intersections receiving higher scoring was related to vehicle operating speeds. Under the SSA framework it is recognised that higher vehicle operating speeds negatively contribute to worse injury outcomes due to the physical forces involved. Specifically, if pedestrians and cyclists are struck at higher speeds (50 km/h+); they are significantly more at risk of suffering serious or fatal injuries. As such the absence of facilities to accommodate pedestrians/cyclists, where there is demand for said facilities results in generally poor road safety outcomes.

(c) From the completion of the SSA as well as further review following meeting with Council and in the preparation of this evidence, I am of the opinion that the

following changes are to be made to the existing network to realise the maximum development potential of the Plan Change Area.

(i) Reduction of speed limit on Cove Road from 80 km/h to a speed 50 km/h (and reduction of speed limit on Mangawhai Heads Road from 60 km/h to 50 km/h. Following a granted Plan Change, I would expect that Council reviews the speed limits on these roads, in anticipation of subsequent development.

(ii) It is my opinion that under existing conditions with the residential development along Robert Hastie Drive and Pigeonwood Place, as well as three intersections within a span of approximately 270 metres, there is already sufficient precursors to warrant investigation of a speed limit reduction in this location.

(iii) Provision of footpath connections from newly developed areas within the Plan Change Area to the existing network along Mangawhai Heads Road, on a demand basis subject to more detailed design/demand analysis. I consider that the Restricted Discretionary activity status, with the Matters of Discretion specified under Rule 13.13C.2 and Rule 13.14.2 for the Cove Road North Precinct ensures that suitable supporting infrastructure with be considered and implemented as appropriate. I discuss this further within my response to Council's S42A report.

7. RESPONSE TO S42A REPORT

7.1 I have reviewed Council's S42A report in detail, where discussion has been focused on Transport related matters.

7.2 Within Section 4.5 (a)(v) of Mr. van der Westhuizen's evidence, it is noted that "Access Connection 5" is still intended as part of the wider area but has not been included in Figure 7 "Conceptual Road Network" of my TA. This was done as it is likely that any development in this area, specifically served by a cul-de-sac is unlikely to generate any significant effect onto the wider network. However, these traffic volumes generated by this potential cul-de-sac have still been reflected within the wider network modelling and assessment. I consider this approach to be appropriate and acceptable, so as not to 'over-analyse' fine details of the proposal which at the Plan Change stage are intended to be high level and indicative.

7.3 Within Section 4.5 (b) of Mr. van der Westhuizen's evidence, it is noted that "All of the indicative internal roads connect to all of the access connections, with no cul-de-sacs". This statement is correct; however, I note that other roads which may be constructed within the Plan Change Area may be formed as a cul-de-sac. As finer details are unknown with respect to ground conditions, topography, and watercourses within the land outside that owned by the Applicant, it is possible that roading cul-de-sacs may need to be constructed.

(a) I consider that the recommended matters of discretion regarding Restricted Discretionary subdivisions are appropriate, such that any future public road development will involve expert Transportation Engineering input (from independent sources, Council, and NTA), so as to ensure that future roading network is appropriate to serve the needs of the site.

(b) I further note that while roading cul-de-sacs may be created, the expectation as outlined within the Precinct's Objectives and Policies would still require for active mode connections to be provided between any subsequent cul-de-sacs.

(c) Lastly, I agree that cul-de-sacs should be avoided wherever possible, however I understand that, and have the opinion that in some circumstances they cannot be avoided and are still able to suitably service abutting parcels of land, through high-quality design.

7.4 Within Section 5.13 of Mr. van der Westhuizen's evidence, it is stated that "the New Transport Assessment failed to outline the policy (PRECX-P3)". It is correct that my TA does not comment directly on PRECX-P3 and as such I make the following comments:

(a) PRECX-P3.1 provides clear guidance that the street network within the Plan Change Area is to be connected and designed with neighbouring properties in mind. It is my opinion that this Policy will help guide the overall development of the Plan Change Area, while also allowing for a degree of flexibility within the ultimate design.

(b) PRECX-P3.2 and PRECX-P3.3 outlines clearly that internal connections to engage with the natural environment and promoting active modes of transportation is a priority for the Plan Change Area.

(c) I consider that this Policy provides sufficient guidance to promote these ideals, while also allowing flexibility within the finalised design, so as to not be overly prescriptive to the detriment of natural development over time of the Plan Change Area.

7.5 Within Section 5.13, 6.53, 7.11 of Mr. van der Westhuizen's evidence, it is recommended that a shared path should be constructed along Mangawhai Heads Road and Cove Road along the PPC83 Area frontage. I do not agree with this recommendation.

(a) I agree that a shared path facility should be provided for the Plan Change Area, however my opinion is that Cove Road and Mangawhai Heads Road along the Area's frontage is not the appropriate location, as these roads will carry higher volumes of traffic, currently have restricted berms due to open swale drainage and may potentially be higher speed roads.

(b) I consider that the internal shared path to the Plan Change Area is a more appropriate location as it would see higher engagement with abutting properties as well as be able to be designed to a higher standard, noting the greenfield development.

(i) I expect that the internal shared paths within the Plan Change Area will be resolved as the area develops, subject to individual subdivision applications. I anticipate that the shared paths will be constructed over time and ultimately will create a robust network. I consider this to be an appropriate response and I do not consider that the entirety of the network needs to be in place at the initial outset of development within the Plan Change Area.

(c) Mr. van der Westhuizen expresses concerns that if this shared path is not constructed along Cove Road and Mangawhai Heads Road, there will be no available cyclist connection for the north portion of the PPC83 Area served by Pigeonwood Place, should the overall Area not be developed.

(i) While this concern at its core has merit, I question whether there would be sufficient demand resulting from the development of the northern part of the site to warrant significant upfront investment along with ongoing maintenance of a shared path.

(ii) Reviewing Census data for the Mangawhai Heads area, approximately 1% of all work/education-based trips completed were carried out by bicycle.

(iii) With the Pigeonwood Place northern area serving approximately 100 lots, it is estimated that 820 daily trips will be completed from this area. As such, approximately eight daily cyclist trips can be expected.

(iv) Beyond the Plan Change Area, there are no additional cycling facilities known to be constructed to date and the only plans known as identified within the Kaipara Walking and Cycling Strategy involves the establishment of Molesworth Drive as a “slow street”.

(v) I consider that the provision of the Mr. van der Westhuizen’s recommended shared path would serve a relatively low number of users (both pedestrian and cyclists) and would not be connected to the cycling network; thereby still requiring cyclists to utilise the road carriageway at least in part.

(vi) If a shared path were to be constructed in this area, I am of the opinion that some of the road’s existing formation would create significant barriers to the full development of a shared path in this location.

(vii) On the northeast corner of Cove Road and Mangawhai Heads Road the legal road reserve is restricted due to the property at #148 Mangawhai Heads Road. As such, between the existing edge of seal and the boundary there is approximately 2.4-2.5 metres of width available, where a shared path typically requires a minimum width of 3.0 metres and is also not best practice to be installed directly adjacent to the carriageway when the abutting road is an arterial road.

(viii) Mr. van der Westhuizen states in Section 6.7 of his evidence that the intersection of Cove Road and Mangawhai Heads Road could be redesigned to urban form to accommodate the required width.

(ix) I agree that this could likely be achieved, however in doing so, transitioning the intersection to an urban form would also likely coincide with a speed limit reduction along Cove Road. With the lower speeds along Cove Road and an urban form, combined with the relatively low

peak hour volumes in this location *(estimated 1,000 peak hour vehicles under the 2034 Sensitivity Horizon),* I would consider it to be appropriate for the forecast number of daily cyclist trips (eight) to be completed on street.

(d) I am of the opinion that while a shared path along Cove Road and Mangawhai Heads Road would an ideal outcome, it is not considered to be explicitly required to mitigate effects arising from PPC83, as it is intended that an alternate shared path through the Plan Change Area on quieter, lower speeds road is planned be provided.

(e) I consider that it would be appropriate for a footpath to be provided on the Plan Change Area frontage along both Cove Road and Mangawhai Heads Road in order to ensure that the Plan Change Area is connected to the existing footpath network, which begins on Mangawhai Heads Road, east of Jack Boyd Drive.

(f) I consider that providing a footpath in this location would be contingent upon the speed limit along Cove Road and Mangawhai Heads Road to be reduced to 50 km/h (to be done by Council), as encouraging pedestrian movements in close proximity to an 80 km/h road can be expected to have adverse safety outcomes.

(g) I also consider that should alternate active mode connections be available through the wider Plan Change Area, it may not be necessary for the entire frontage of the site to be provided with a footpath. I consider that this would be appropriate to assess during subsequent subdivision stages.

7.6 In Section 6.13, 6.14, 6.45, and 7.6 of Mr. van der Westhuizen's evidence it is recommended that the future intersection of Mangawhai Heads Road and Road 6/Jack Boyd Drive be formed as an urban roundabout.

(a) While I agree that a roundabout would likely be the safest intersection treatment, as is typical of roundabouts, I do not agree that this should be explicitly prescribed as part of the Precinct Plan. As detailed data collection of this area with respect to civil infrastructure, gradients, water courses, has not been completed to date, prescribing a roundabout, which has considerable land area requirements, may overly restrict future development.

(b) I consider that the proposed rules which treat subdivision activities as Restricted Discretionary, provides suitable pathways for Council and subsequent applicants to review the existing area, the proposed development, and identifying appropriate design responses when greater detail is known.

7.7 In Section 6.21 of Mr. van der Westhuizen's evidence, the date of the data collection was queried during our meeting on 24 January 2024. I confirm that traffic counts were collected on Wednesday 11 October 2023, while schools were in session.

7.8 In Section 6.22 of Mr. van der Westhuizen's evidence, the use of a 1.25 factor to estimate Saturday peak hour conditions was queried as compared to a factor of 1.5 as identified in the Superseded Traffic Assessment. As I have applied the 1.25 factor to the peak weekday hour, I consider that this fairly represents a typical weekend period where there can be increased holiday traffic.

(a) This is further supported by tube traffic counts collected by Commute Transportation Limited as reported in the expert evidence of Mr. Leo Hills, as part of an Environment Court Hearing for Mangawhai Central.

(b) In this, two-way traffic volumes along Molesworth Drive were found to be approximately 575 vehicles during the weekday PM peak hour, and two-way traffic volumes for Saturday peak hour were found to be approximately 700 vehicles. As such, this difference represents a 1.22 increased between weekday PM peak hour and Saturday peak hour.

(c) As the Plan Change Area is located within the northern area of Mangawhai, I consider that the increase in holiday traffic would begin reducing in advance of this area, based on the majority of holiday home properties and general residential areas being located south of the area.

(d) Further a sensitivity analysis is completed which factors existing volumes by a factor of 1.5 for the AM and PM peak hours, with an additional factor of 1.25 for the Saturday peak hour (based off the PM peak hour volumes). Considering this I believe that the assessment suitably represents a Saturday peak holiday period.

7.9 In Section 6.23 of Mr. van der Westhuizen's evidence he identifies that the sensitivity factor should be applied to the SSA matrices to identify any potential changes in

conclusions from this assessment. I have applied this factor to the SSA and in short, I do not find that the results produce any significant change which would alter my original conclusions. Tables 8-12 from my TA have been updated below:

(a) Cove Road and Pigeonwood Place

Scenario	**Score**
Existing Typical	62 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	86.5 out of 448
Sensitivity Scenario Existing	86.5 out of 448
Sensitivity Scenario Existing with Proposed Development	90.75 out of 448
With Identified Improvements	
Existing Typical	46 out of 448
Existing Peak Period	49.25 out of 448
With Proposed Development	65.5 out of 448
Sensitivity Scenario Existing	64.5 out of 448
Sensitivity Scenario Existing with Proposed Development	67.75 out of 448

(b) Cove Road and Robert Hastie Drive

Scenario	**Score**
Existing Typical	66.25 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	86.5 out of 448
Sensitivity Scenario Existing	86.5 out of 448
Sensitivity Scenario Existing with Proposed Development	90.75 out of 448
With Identified Improvements	
Existing Typical	49.25 out of 448
Existing Peak Period	49.25 out of 448
With Proposed Development	64.5 out of 448
Sensitivity Scenario Existing	64.5 out of 448
Sensitivity Scenario Existing with Proposed Development	67.75 out of 448

(c) Cove Road and Mangawhai Heads Road

Scenario	**Score**
Existing Typical	70.5 out of 448
Existing Peak Period	74.75 out of 448
With Proposed Development	95 out of 448
Sensitivity Scenario Existing	99.25 out of 448
Sensitivity Scenario Existing with Proposed Development	103.5 out of 448
With Identified Improvements	
Existing Typical	52.5 out of 448
Existing Peak Period	55.75 out of 448
With Proposed Development	71 out of 448
Sensitivity Scenario Existing	74.25 out of 448
Sensitivity Scenario Existing with Proposed Development	77.5 out of 448

(d) Mangawhai Heads Road and Jack Boyd Drive/Road 4

Scenario	**Score**
Existing Typical	68.5 out of 448
Existing Peak Period	71.75 out of 448
With Proposed Development	78.25 out of 448
Sensitivity Scenario Existing	78.25 out of 448
Sensitivity Scenario Existing with Proposed Development	88 out of 448
With Identified Improvements	
Existing Typical	41.5 out of 448
Existing Peak Period	43.25 out of 448
With Proposed Development	46.75 out of 448
Sensitivity Scenario Existing	46.75 out of 448
Sensitivity Scenario Existing with Proposed Development	52 out of 448

(e) Mangawhai Heads Road and Molesworth Drive

Scenario	**Score**
Existing Typical	66.25 out of 448
Existing Peak Period	68 out of 448
With Proposed Development	68 out of 448
Sensitivity Scenario Existing	68 out of 448
Sensitivity Scenario Existing with Proposed Development	68 out of 448
With Identified Improvements	
Existing Typical	60.75 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	66.5 out of 448
Sensitivity Scenario Existing	68 out of 448
Sensitivity Scenario Existing with Proposed Development	68 out of 448

7.10 In Section 6.39 of Mr. van der Westhuizen's evidence commentary on the potential challenges of lowering the speed limit on Cove Road, as indicated by Ms. Elizabeth Stacey from NTA. It is stated that it may not be possible to lower the speed limit until further urbanisation of the area occurs.

(a) It is my opinion that should this Plan Change application be granted; it will be known that this area will be urbanised. As such I consider it appropriate for a speed limit change to be progressed as part of subsequent subdivision consents for the area.

(b) Further I note that the existing subdivisions on both Robert Hastie Drive and Pigeonwood Place see increased activity and an intersection frequency (200 metres between Mangawhai Heads Road and Robert Hastie Drive, and 75 metres between Robert Hastie Drive and Pigeonwood Place) which is more closely associated with an urban environment, as compared to a rural environment where I would expect greater separation.

(c) The recommended speed limit reduction would see approximately 800 metres of Cove Road reduced from 80 km/h to either 50 km/h or 60 km/h. Ideally, speeds would be reduced to 50 km/h to decrease the potential for serious/fatal injury crashes within the intersection.

(d) For reference, a vehicle travelling at 80 km/h would take 36 seconds to travel the 800-metre section of Cove Road, where at 50 km/h a vehicle would take 58 seconds. This increase in travel time of 22 seconds, is not considered to be overly significant as many journeys along this section of road are likely to be at least 15-minute journeys, thereby increasing travel time by only 2.5%.

(e) It is my opinion that the speed limit change would be a proactive change for overall road safety and would ultimately be required following development of the Plan Change Area.

(f) Mr. van der Westhuizen also states that it would be appropriate to reduce the speed limits along Mangawhai Heads Road from 60 km/h to 50 km/h, as part of PPC83. I agree with this statement.

7.11 In Section 6.40 and 6.41 of Mr. van der Westhuizen's evidence it is stated that additional assessment should be carried out to determine the required mitigation measures, should Cove Road remain at a speed limit of 80 km/h.

(a) In general, I do not consider that these mitigation measures should investigated in any detail as I think they are fairly irrelevant. If PPC83 is granted, I would not consider it appropriate for Cove Road to remain at a speed of 80 km/h and I note that in Section 123 of Mr. Clease's Report, he carries a similar opinion.

(b) As such, mitigation measures implemented under an 80 km/h speed environment may, in the future, become inappropriate/redundant in the expected lower speed environment.

(c) In the event Cove Road were to remain as an 80 km/h road in perpetuity;

(i) I would consider that the additional intersection onto Cove Road from the Plan Change Area would likely be inappropriate due to the proximity of the other intersections. If this connection were to not be created, I anticipate that the road connection would instead connect south towards Mangawhai Heads Road and what my TA refers to as "Road 2"

(ii) The provision of a footpath or shared path along the side of Cove Road would need careful consideration, as I do not consider it appropriate for these facilities to be provided in such close proximity to a high-speed

road and I would rather see walking/cycling actively discouraged through not providing any dedicated facilities.

(iii) One improvement to road safety would be the introduction of rumble strips both on the edge line and on the edge of the flush median. This measure would provide audio feedback to drivers that they have drifted from their lane and provide them with an opportunity to correct themselves prior to a collision.

(iv) Another improvement would be for the road corridor to be provided with wider formed shoulders to allow space for vehicles to pull to the side or leave the lane and recover safely. Similarly, the removal of any physical obstructions (trees, utility poles, signage), should be located away from the carriageway so that it is not hit by an errant driver.

(v) Overall, I consider improvements for road safety to be relatively limited based on the placement of existing intersections and speed typically being the highest contributing factor to serious and fatal injuries.

7.12 In Section 6.42 of Mr. van der Westhuizen's evidence he states that intersection spacing has not been assessed within the SSA and that there are concerns with overlapping right-turn movements between Robert Hastie Drive and Pigeonwood Place.

(a) From my Sensitivity 2034 network modelling, I forecast that between Robert Hastie Drive and Pigeonwood Place there will be approximately 8 right turns into Robert Hastie Drive and 66 right turns into Pigeonwood Place. As such, I consider there to be a low likelihood of opposing right turns to meet with regular frequency.

(b) Reviewing the SIDRA modelling for both intersections, vehicles turning right into Robert Hastie Drive will have an average delay of 8 seconds with a 95th percentile queue of one vehicle. Pigeonwood Place was also modelled to have an 8 second average delay and a 95th percentile queue of one vehicle. Considering this, there is not anticipated to be a high proportion of overlapping right-turn movements through these intersections.

(c) With good forward visibility for both northbound and southbound traffic along Cove Road, it is anticipated that drivers will be able to identify any approaching

vehicles looking to turn right and react accordingly. As opposing drivers would both be approaching the respective intersections looking to turn, I consider it appropriate to presume these drivers will be attentive and aware of their surroundings. Further, their operating speeds will be reducing, as the look to turn through the intersection.

(d) I anticipate that the final formation of these intersections will see a flush median with marked right-turn bays, in accordance with MOTSAM: Part 2, Figure 3.30. This formation would further reinforce the urbanised environment in this area and help support the speed limit reduction.

7.13 In Section 6.43 of Mr. van der Westhuizen's evidence he recommends retrofitting the Pigeonwood Place intersection from 'Give-way' control to 'Stop' control. While I believe the intersection would be able to function safely as 'Give-way', I would also support its change to 'Stop' control for better overall outcomes. I also note that this change would be more appropriately dealt with during a subsequent subdivision consent if PPC83 is granted, rather than including this change within the Precinct rules.

7.14 In Section 6.44, 7.15, and 7.16 of Mr. van der Westhuizen's evidence he states his opinion that the implementation of a southbound left turn lane from Cove Road onto Mangawhai Heads Road may cause adverse safety impacts as left turning vehicles may obscure oncoming southbound through traffic. Further he states that this intersection should alternatively be upgraded to a safe urban form.

(a) At the time of the writing this recommendation, I considered that Cove Road would see a speed limit reduction to 60 km/h or 50 km/h.

(b) I agree that if the speed limit along Cove Road were to remain at 80 km/h, this has the potential to result in adverse effects as described by Mr. van der Westhuizen.

(c) Upon further review of this recommendation following discussions with Mr. van der Westhuizen, I am of the opinion that while the implementation of the auxiliary southbound left-turn would have some operational benefits to the intersection, these do not outweigh the potential for the crash type as identified. Further, with the implementation of this auxiliary lane it may jeopardise a pedestrian path being formed to a suitable standard within the road reserve, a point of which I acknowledge was not previously considered.

(d) As I consider the need for a pedestrian path to be a priority in this location, I agree with Mr. van der Westhuizen that there is not a requirement for this lane to be provided.

(e) As part of subsequent installation of a footpath along Cove Road and Mangawhai Heads Road, I recommend that this intersection be further reviewed as part of the associated subdivision consent application, to ensure that an appropriate design response is identified.

(i) I note that some submitters indicated that this intersection should be upgraded to a roundabout. Based on my assessment, I do not consider that a roundabout treatment is necessary in this location, based on the forecast volumes, modelled operations, and practicality of implementing a roundabout in this location based upon available space within the road reserve along with adjacent topography and infrastructure. Notwithstanding, I would consider it appropriate for further investigation to be completed with respect to this as part of a subsequent subdivision, as opposed to as part of the Plan Change Process.

(ii) Rather the implementation of footpath facilities, kerb and gutter, along with a speed limit reduction along Cove Road and Mangawhai Heads Road would be a more appropriate design response to improve the overall safety of this intersection. I anticipate that detailed design work in this regard will be completed as part of subsequent subdivision applications, should PPC83 be granted.

7.15 In Section 6.46, 6.55, 6.64, 6.65, 6.66, and 7.7 of Mr. van der Westhuizen's evidence he states the need for shared paths to be constructed along the Plan Change Area frontages along Cove Road and Mangawhai Heads Road, the intersection of Mangawhai Heads Road and Jack Boyd Drive to be upgraded to an urban roundabout, and for the intersection of Cove Road and Mangawhai Heads Road to be upgraded to an urban formed. While I agree in part with some of these measures, I disagree with the requirement that these upgrades be implemented prior to the occupation of any dwelling within the Plan Change Area.

(a) I consider it to be a much more appropriate response that as the Plan Change Area develops, further assessments are done to determine resultant effects,

while also balancing against the Precinct's Objectives and Policies, and the recommendations made within the TA completed as part of PPC83.

(b) I also note that Council has the authority to levy development contributions to fund infrastructure projects required to facilitate the necessary network improvements. As such, this creates an opportunity for smaller subdivision schemes to occur, while still contributing to the wider improvements.

7.16 In Section 119 of Mr. Clease's Report, it is stated that Mr. van der Westhuizen requested that further analysis be undertaken within the SIDRA modelling to account for sensitivity testing with a factor of 1.5. I do not believe this statement to be entirely correct, as it is my understanding that the request related to the SSA, with road volumes being increased, which would ultimately impact on the overall intersection scoring matrices, as outlined within Figures 25-34 of my TA. This further sensitivity analysis within the SSA has been undertaken and is discussed in greater detail later within my evidence.

7.17 In Section 125 of Mr. Clease's Report he discusses that the requirement to provide all transport infrastructure upgrades prior to the occupation of any dwelling within the PPC83 Area would effectively sterilise the site. I agree with this comment.

7.18 In Section 126 of Mr. Clease's Report he discusses that the changing of speed limits as an area transitions from a rural lifestyle area to a suburban area is commonplace, and while not guaranteed, there are clear processes in place to assess the need for changes to posted speed limits. I agree with this statement.

8. RESPONSE TO SUBMITTERS

8.1 I have reviewed the submissions where the comments received pertain to my area of expertise. I consider that submitters raised concerns predominantly with respect to increases to congestion, infrastructure upgrades, and general road safety.

8.2 I note that the submissions received would have reviewed the previous Transport Assessment prepared by Engineering Outcomes Limited. I do not anticipate that the submitters would have reviewed the Transport Assessment prepared by myself based on the timing of the revised reporting and assessment.

8.3 Many of the submitters commented the that prepared Transport Assessment did not suitably assess the potential effects of PPC83 and did not account for peak summer periods within Mangawhai. As described in my evidence above (Section 8.8), I have

assessed future scenarios based on recent traffic counts, with factors applied to represent busier peak periods, and I have concluded that the intersections are forecast to operate within acceptable levels following the development of the Plan Change Area.

8.4 Further I note that in Transport Engineering, it is not common practice to design for the busiest periods to operate with free-flowing traffic as this would require roads to be oversized for the majority of time, resulting in inefficient use of limited resources.

8.5 Many of the submitters commented on the requirement of upgrades to be borne by the developers so that ratepayers were not left to fund the required improvements. I agree with these comments brought forward by submitters and I consider that the Precinct Provisions allow Council sufficient recourse in the future to require upgrades to be provided as part of subsequent subdivision applications. As such, more considered design responses will be able to be created as greater details of the proposal and site constraints will be known.

8.6 There were also several submissions which commented on the general road safety, specifically at the intersection of Cove Road and Mangawhai Heads Road. Given the 80 km/h speed limit along Cove Road, I share the sentiment that if a crash were to occur, due to the higher operating speeds, it is likely that a serious injury or even death may occur, however given the relatively low volume of vehicles turning through the intersection and the available sightlines, the likelihood of these crashes is considered to be unlikely.

8.7 The 10-year safety history of the intersection indicates that relatively few collisions (three) have occurred at this intersection, with two of the three resulting in serious injury. This evidence supports the commentary provided in preceding Section.

8.8 My expectation as part of PPC83 being granted is that a speed limit review process should be started by Council along Cove Road and Mangawhai Heads Road due to the expectation of future development and urbanisation within this area. As such, future design considerations as part of subsequent subdivisions can be aligned with the likely future 50 km/h speed limit, as opposed to being designed for an 80 km/h speed limit which may result in the design outcomes being inappropriate in the future when the speed limit is changed.

8.9 Further I consider that the Precinct Objectives and Policies, along with subdivision activities being a Restricted Discretionary Activity provide Council with sufficient

recourse to ensure that future development is considered both internal to the site and external, with adverse effects being appropriately mitigated.

9. CONCLUSION

9.1 The creation of 380 residential lots is estimated to generate up to 3,116 daily vehicle trips and 342 peak hour vehicle trips. This is based off the 85th percentile trip generation rates published within the NZ Transport Agency's "Trips and Parking Related to Land-Use"; which are 8.2 daily trips per dwelling and 0.9 peak hour trips per dwelling.

9.2 From the completion of the SSA as well as further review following meeting with Council and in the preparation of this evidence, I am of the opinion that the following changes are to be made to the existing network to facilitate the development of the Plan Change Area.

(a) Reduction of speed limit on Cove Road from 80 km/h to a speed 50 km/h (and reduction of speed limit on Mangawhai Heads Road from 60 km/h to 50 km/h. Following a granted Plan Change, I would expect that Council reviews the speed limits on these roads, in anticipation of subsequent development.

(b) It is my opinion that under existing conditions with the residential development along Robert Hastie Drive and Pigeonwood Place, as well as three intersections within a span of approximately 270 metres, there is already sufficient precursors to warrant investigation of a speed limit reduction in this location.

(c) Provision of footpath connections from newly developed areas within the Plan Change Area to the existing network along Mangawhai Heads Road, on a demand basis subject to more detailed design/demand analysis. I consider that the Restricted Discretionary activity status, with the Matters of Discretion specified under Rule 13.13X.2iv and Rule 13.14.2 for the Cove Road North Precinct ensures that suitable supporting infrastructure with be considered and implemented as appropriate.

9.3 Under a 2034 horizon sensitivity analysis, which increased existing traffic volumes by a factor of 1.5x, it was determined that intersections within the study area continued to operate at generally acceptable levels.

9.4 The Precinct Plan Provisions, as proposed, are appropriate to enable the safe and efficient movement of vehicles, pedestrians, and cyclists to and from the subject lands of PPC83.

This evidence has been prepared in full by:

Peter Justin Kelly

Dated 23 February 2024

LIST OF ABBREVIATIONS USED IN THIS STATEMENT OF EVIDENCE:

Council	Kaipara District Council
NRPS	Northland Regional Policy Statement
RMA	Resource Management Act 1991
s32	Section 32 of the RMA / Council's Section 32 Evaluation Report
s42A	Section 42A of the RMA / Council's Section 42A Report
ODP	Kaipara District Plan
PPC	Private Plan Change
TA	Transport Assessment
SSA	Safe System Assessment
NTA	Northland Transport Alliance

TRAFFIC PLANNING CONSULTANTS LTD

PRIVATE PLAN CHANGE 83
TRANSPORT ASSESSMENT

THE RISE
MANGAWHAI

Project Information:

Client	The Rise Ltd.
Job Number	230431
Title	Proposed Private Plan Change, The Rise, Mangawhai
Prepared By	Peter Kelly and Udit Bhatti
Date	January 2024
Report Status	Final

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1.0 INTRODUCTION

The following is a transport assessment for the proposed Private Plan Change (PPC) of the area bound by Cove Road, Tangaroa Road, and Mangawhai Heads Road, hereby referred to as "The Rise", in Mangawhai. The subject site is currently zoned Rural and is proposed to be changed to Residential to enable density in general accordance with Residential zoning. Approximately 54 hectares of land is seeking a plan change to facilitate the development of approximately 380 residential lots. **Figure 1** displays area subject to the PPC83.

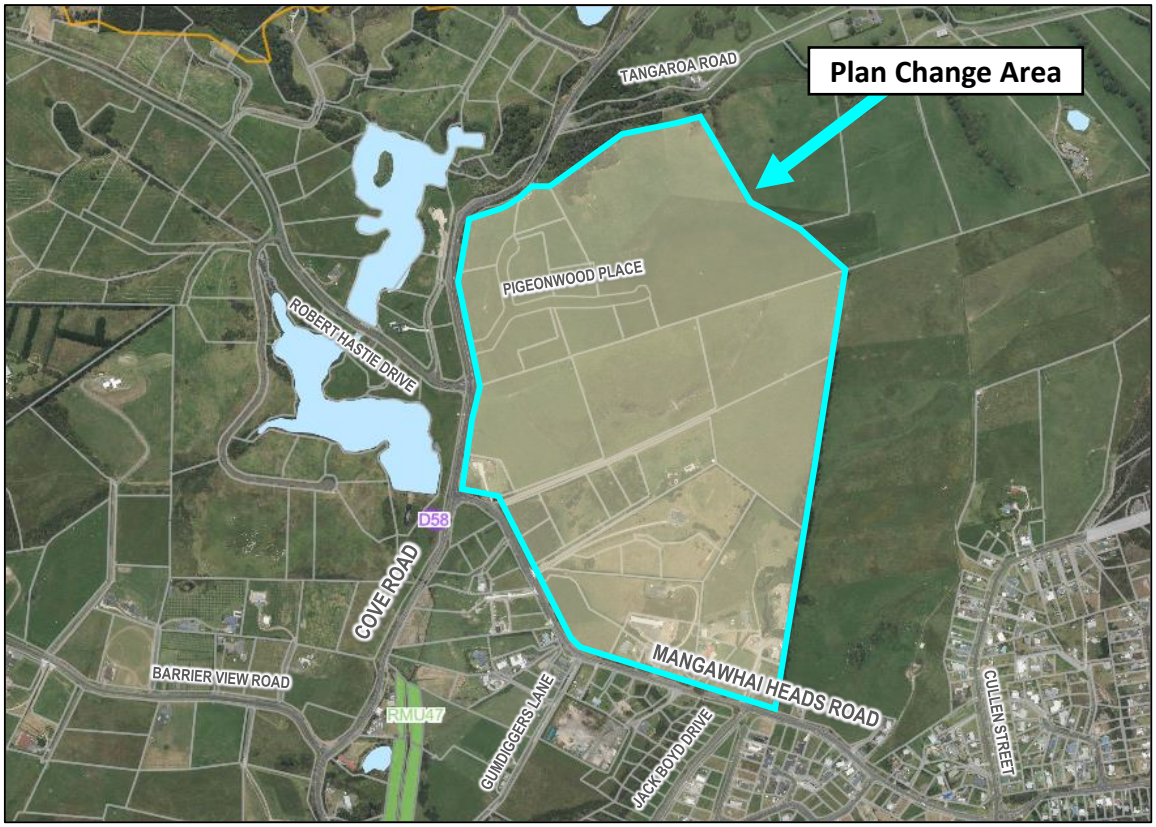

Figure 1: Site Location
Image Source: Kaipara District GIS

2.0 EXISTING TRANSPORT ENVIRONMENT

2.1 Road Network

2.1.1 Cove Road

Cove Road runs in a general north-south direction and forms an intersection with Tara Road at its southern end and continues as The Centre in the north. Under the Kaipara District Council, Cove Road is classified as collector road from Tara Road to Mangawhai Heads Road and continues as an arterial road past its intersection with Mangawhai Heads Road towards the north. It has a carriageway width of approximately 7.0 metres providing one traffic lane in each direction. Footpaths are not provided near the subject site. It has a posted speed limit of 80 km/h.

Information from Mobile Road suggests that in November 2022, Cove Road had an ADT between 1,900 and 2,000 vehicles per day along its sections between the Mangawhai Heads Road and Cove Road intersection and the Cove Road and Pigeonwood Place intersection. A traffic survey conducted by Traffic Planning Consultants Ltd (TPC) in October 2023 indicates that Cove Road has a peak hour flow (vph) of 143 vehicles during AM peak and 179 vehicles during PM peak. These peak hour volumes are generally consistent with the estimated ADT.

2.1.2 Mangawhai Heads Road

Mangawhai Heads Road is classified as an arterial road and runs in a general east-west direction. It forms an intersection with Cove Road at its western end and terminates at its eastern end providing access to a public reserve. Mangawhai Heads Road has a carriageway width of some 7.0 metres from its western end to Gumdiggers Lane. East of Gumdiggers Lane it widens to 8.5 metres. Mangawhai Heads Road generally provides for one traffic lane in each direction, and on-street parking is permitted; however based on the surrounding environment regular utilisation of on-street parking is not anticipated.

Mangawhai Heads Road has a posted speed limit of 50 km/h between Cullen Road and approximately 80 metres west of Jack Boyd Drive. From 80 metres west of Jack Boyd Drive to Cove Road, a speed limit of 60 km/h applies. A 1.2-metre-wide footpath is provided along the southern side of Mangawhai Heads Road between Jack Boyd Driver and Molesworth Drive, and on the northern side of the road from Molesworth Drive to Wintle Street. Information from Mobile Road shows that in November 2022, Mangawhai Heads Road had an ADT between 2,100 and 4,400 vehicles per day at its different sections. A traffic survey conducted by TPC in October 2023 indicates that Mangawhai Heads Road has 345 vph during the AM peak and 386 vph during the PM peak. These peak hour volumes are generally consistent with the estimated ADT.

2.1.3 Jack Boyd Drive

Jack Boyd Drive is classified as local road and runs in a general north-south direction. It forms an intersection with Mangawhai Heads Road at its northern end and has a cul-de-sac arrangement at its southern end. It generally has a carriageway width of 7.0 metres providing one traffic lane in each direction and on-street parking on both sides of the carriageway. It has a posted speed limit of 50 km/h. A 1.2-metre-wide footpath is provided along the eastern side of the road.

Information from Mobile Road shows that in November 2022, Mangawhai Heads Road had an ADT of 785 vehicles per day. A traffic survey conducted TPC in October 2023 indicates that Jack Boyd Drive has 89 vph during the AM peak and 92 vph during the PM peak. These peak hour volumes are generally consistent with the estimated ADT.

2.1.4 Robert Hastie Drive

Robert Hastie Drive is currently a private road, which has been generally formed to public standards. It runs in a general east-west direction. It forms an intersection with Cove Road at its eastern end and has a cul-de-sac arrangement at its western end. It generally has a carriageway width of 7.0 metres providing one traffic lane in each direction and on-street parking on both sides of the carriageway. It has a posted speed limit of 30 km/h. Footpaths are not present on either side of the carriageway.

A traffic survey TPC in October 2023 indicates that Robert Hastie Drive has 82 vph during the AM peak and 67 vph during the PM peak.

2.1.5 Pigeonwood Place

Pigeonwood Place is currently a private road but is intended to be vested to Council as a local road. It runs in a general east-west direction and forms an intersection with Cove Road at its western end and has a cul-de-sac arrangement at its eastern end. It has a carriageway width of 6.0 metres providing one traffic lane in each direction and on-street parking on both sides of the carriageway. It widens to some 8.0 metres for a short section where solid median is provided. It has a posted speed limit of 50 km/h. Footpaths are not present on either side of the carriageway.

A traffic survey conducted by TPC in October 2023 indicates that Pigeonwood Place has two vph during the AM peak and four vph during the PM peak. It is noted that currently minimal development has taken place on Pigeonwood Place.

2.1.6 Cullen Street

Cullen Street is classified as local road which runs in a general northeast-south direction. It forms a roundabout junction with Mangawhai Heads Road and Molesworth Drive at its southern end and has a cul-de-sac arrangement at its north-eastern end. It has a carriageway width of some 6.5 metres providing one traffic lane in each direction and on-street parking on both sides of the carriageway. It has a posted speed limit of 50 km/h. Footpaths are not present on either side of the road.

Information from Mobile Road shows that in November 2022, Cullen Street has a maximum ADT of 769 vehicles per day. A traffic survey conducted TPC in October 2023 indicates that Cullen Street has 21 vph during the AM peak and 21 vph during the PM peak. These volumes are significantly less than those reported from Mobile Road. Reviewing the amount of development along Cullen Road, the peak hour volumes are likely to translate to a daily volume of approximately 250-300 vehicles.

2.2 Traffic Volumes

Turning movement count data was collected in October 2023 for the intersections of:

- Mangawhai Heads Road and Molesworth Drive (peak hour control intersection);
- Mangawhai Heads Road and Jack Boyd Drive;
- Mangawhai Heads Road and Cove Road;
- Cove Road and Robert Hastie Drive; and
- Cove Road and Pigeonwood Place.

Intersection turning movement counts were collected from 08:00 – 18:00 at the intersection of Mangawhai Heads Road and Molesworth Drive in order to determine the peak hours for the morning and afternoon periods. Intersection turning movement counts were then collected at other intersections for at least 90 minutes during peak hours to determine the peak hour volumes via an adjustment factor along with the turning movement distributions. From the control intersection it was determined that the peak hours were captured within the 90-minute count period.

For Saturday peak hour traffic volumes, the busier of the two identified peaks, was factored by 1.25 to account for increased traffic as a result of Mangawhai having many holiday homes and increased weekend activity on the roads. Turning movement splits were compared against the AM and PM peaks, with the higher of the two taken and applied in both directions. As such, the Saturday peak represents the busiest scenario of the three peaks.

Figure 2 displays the AM peak hour traffic volumes within the study area, Figure 3 the PM peak hour traffic volumes and Figure 4 the Saturday peak hour traffic volumes. Volumes in these figures are best viewed digitally, allowing for increased legibility utilising zoom functions; or if printed at A3.

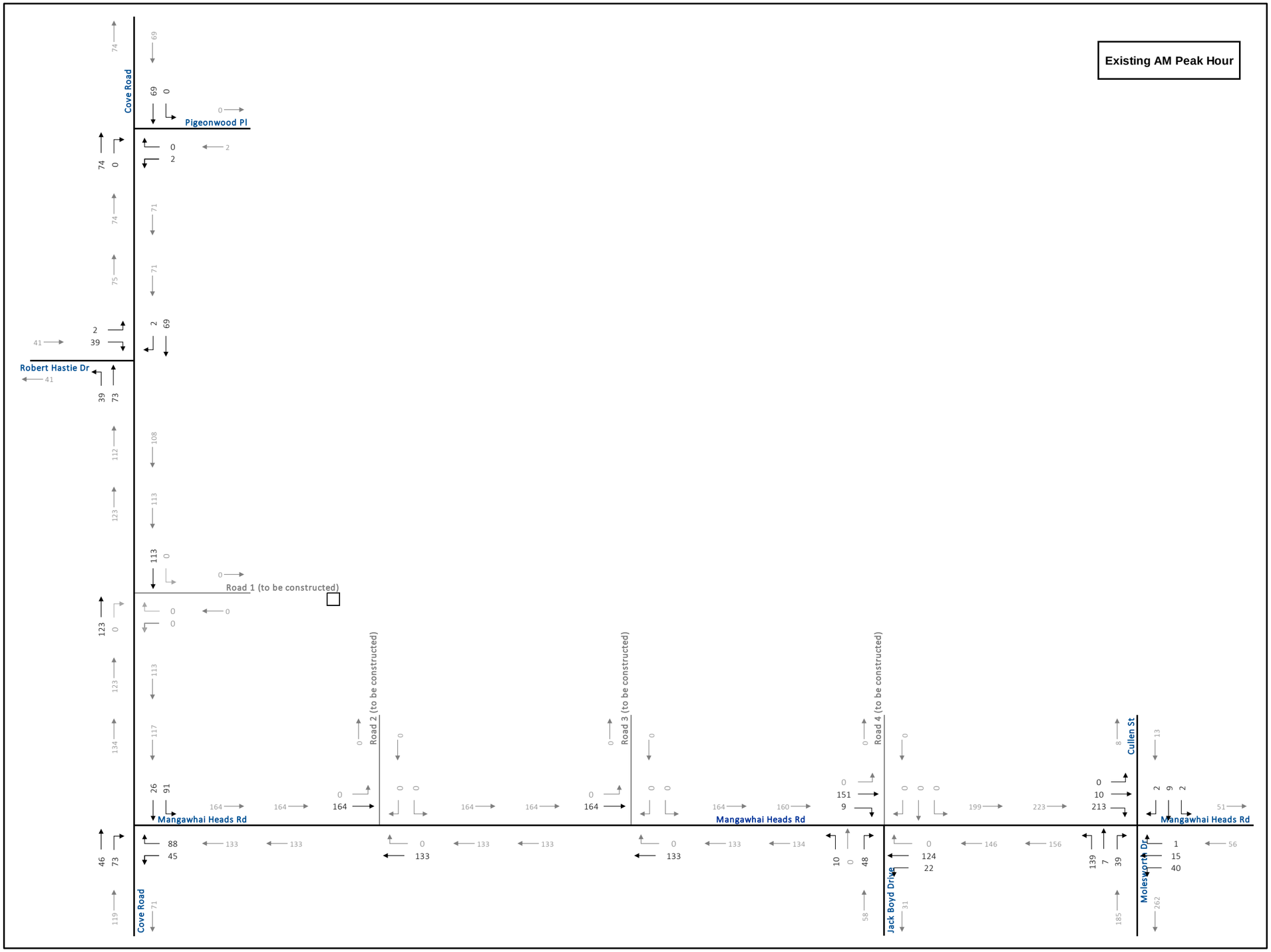

Figure 2: Study Area AM Peak Hour Existing Traffic Volumes

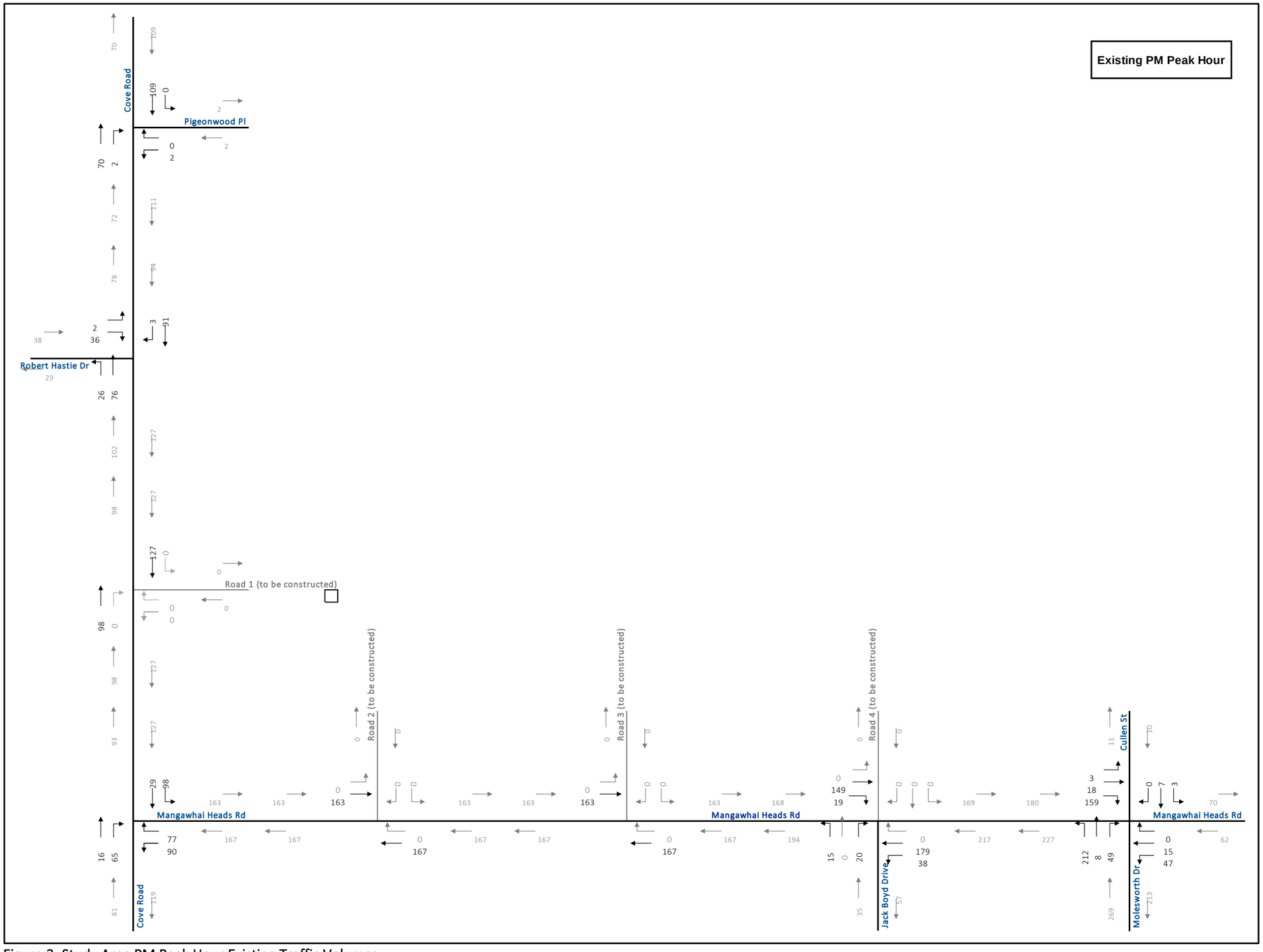

Figure 3: Study Area PM Peak Hour Existing Traffic Volumes

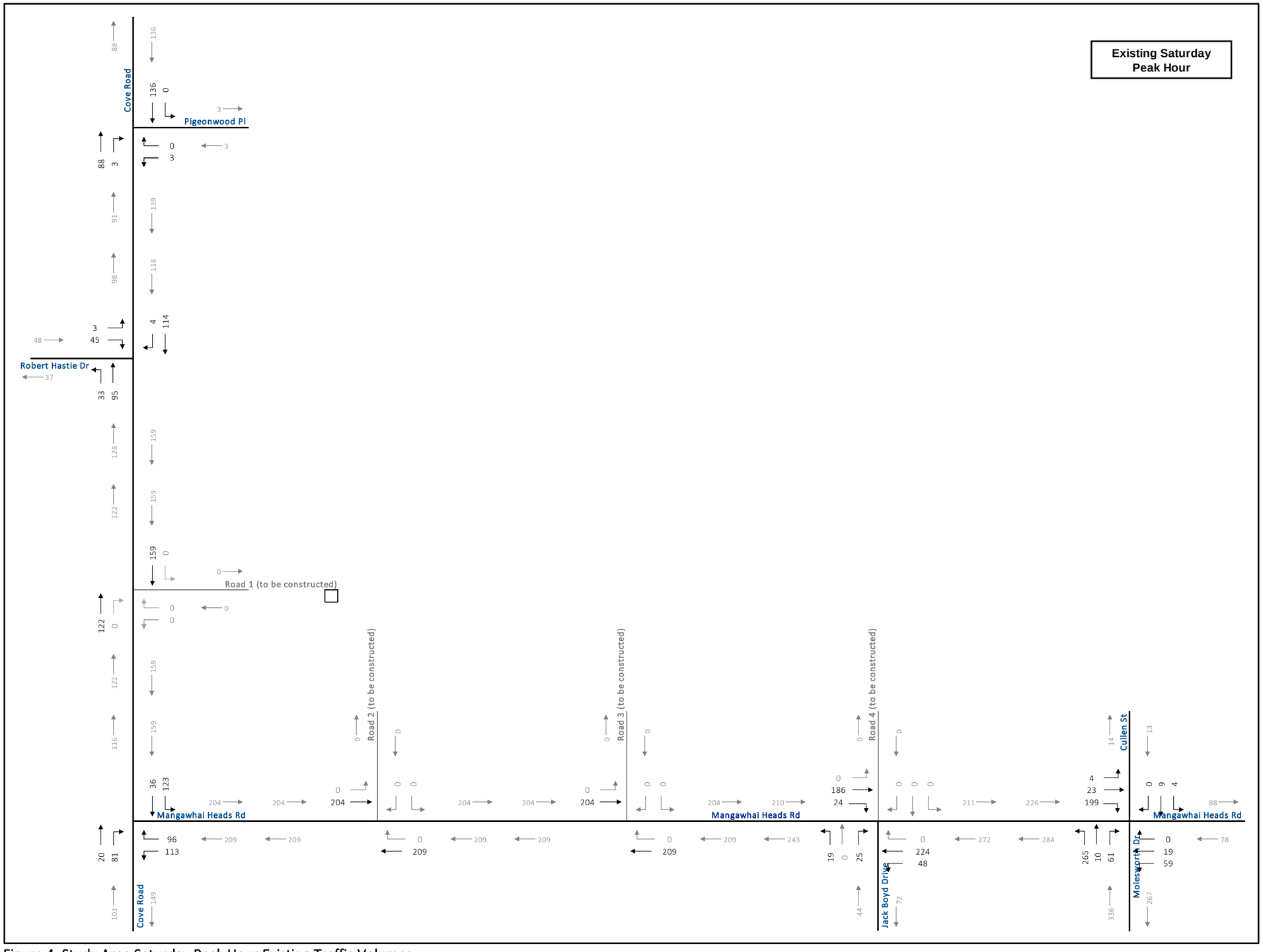

Figure 4: Study Area Saturday Peak Hour Existing Traffic Volumes

2.3 Crash History

Information from the New Zealand Transport Agency's "Crash Analysis System" for the ten+ year period, from January 2014 to present (2024 data subject to reporting delays), indicates that nine crashes have been reported within the study area (**Figure 5**). The reported crashes are summarised in **Table 1** below.

Table 1: Study Area Crash History

Location	Reported Crashes			Key Factors
	Total	Injury	Non-Injury	
Intersection: Cove Road/ Mangawhai Heads Road	3	2 serious	1	1 – failed to give-way to an oncoming vehicle (serious) 1 – failed to give way to a right turning motorcyclist (serious) 1 – vehicle collided with a cyclist while turning right into Mangawhai Heads Road
Midblock: Cove Road	1	-	1	1 – aggressive driver overtaking hit side of vehicle
Midblock: Mangawhai Heads Road	5	1 serious 1 minor	3	1 – a speeding vehicle lost control, went off roadway and collided with a parked bus (serious) 1 – vehicle lost control, went off-roadway and collided with a power pole (minor) 1 – vehicle lost control while turning in a property and ended up in a ditch 1 – speeding driver lost control, left road and hit fence. 1 – vehicle lost control at the horizontal bend, went off roadway and collided with a tree/fence
TOTAL	**9**	**3 serious 1 minor**	**5**	

The following injury crashes were reported at the Cove Road and Mangawhai Heads Road intersection:

- One serious injury crash occurred when a vehicle while turning onto Cove Road failed to notice a left turning vehicle into Mangawhai Heads Road (obscured by vehicle in front) and collided with it.
- One serious injury crash occurred when a vehicle failed to notice a motorcyclist turning right into Mangawhai Heads Road and initiated right turn onto Cove Road resulting in the collision.

The following injury crash was reported midblock at Mangawhai Heads Road:

- One serious injury crash occurred when a speeding vehicle lost control on a horizontal bend in the road, went off-roadway and collided with a parked bus. It is noted that this was considered to be a suicide attempt.
- One minor injury crash occurred when a vehicle lost control at a horizontal bend in the road, went off-roadway and collided with a power pole.

Overall, the crash history would not suggest the occurrence of any recurring crash problems, in terms of common crash types recurring at any one specific location.

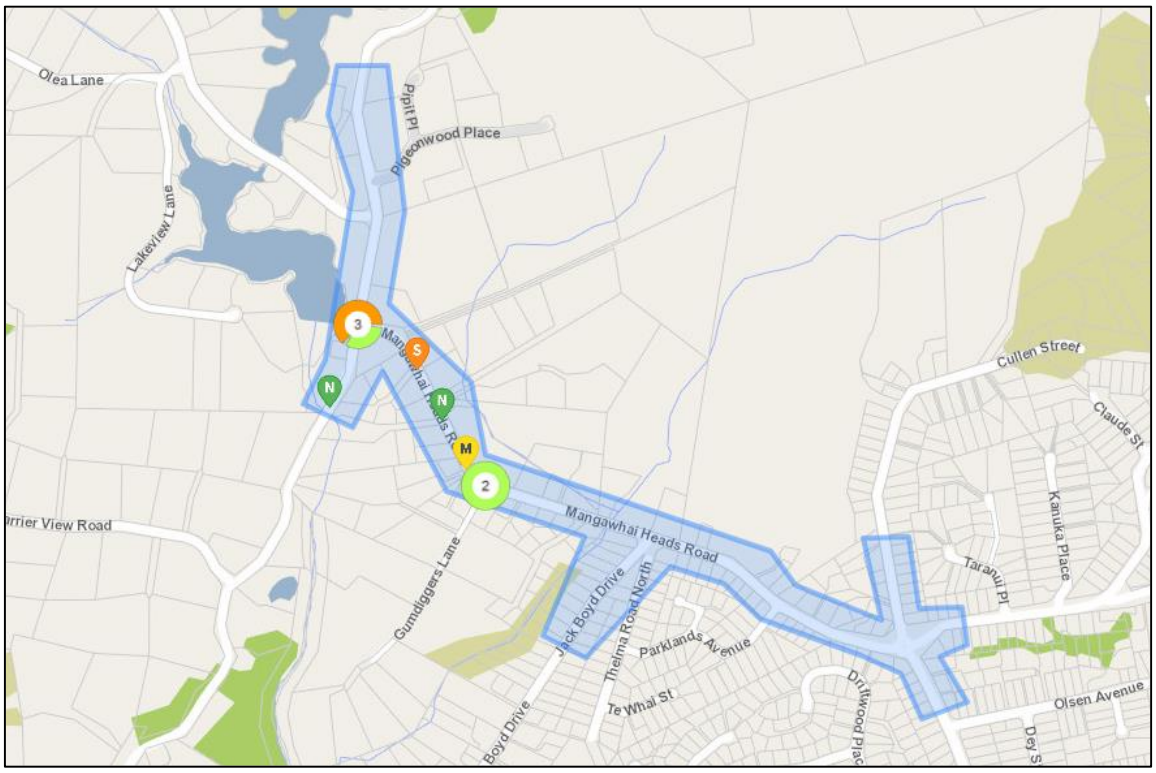

Figure 5: Study Area Ten Year Crash History
Image Source: NZTA Crash Analysis System

3.0 THE PROPOSAL

The proposal consists of rezoning approximately 54 hectares of Rural zoning to Residential zoning. Based on the site area and consideration of existing environmental constraints, it is estimated that approximately 380 residential lots will be able to be created between 600-1,000 m^2 in size. An indicative number of lots throughout the site is indicated within **Figure 6**. It is noted that the number of lots is strictly indicative and is subject to further engineering design as part of any subsequent subdivision application.

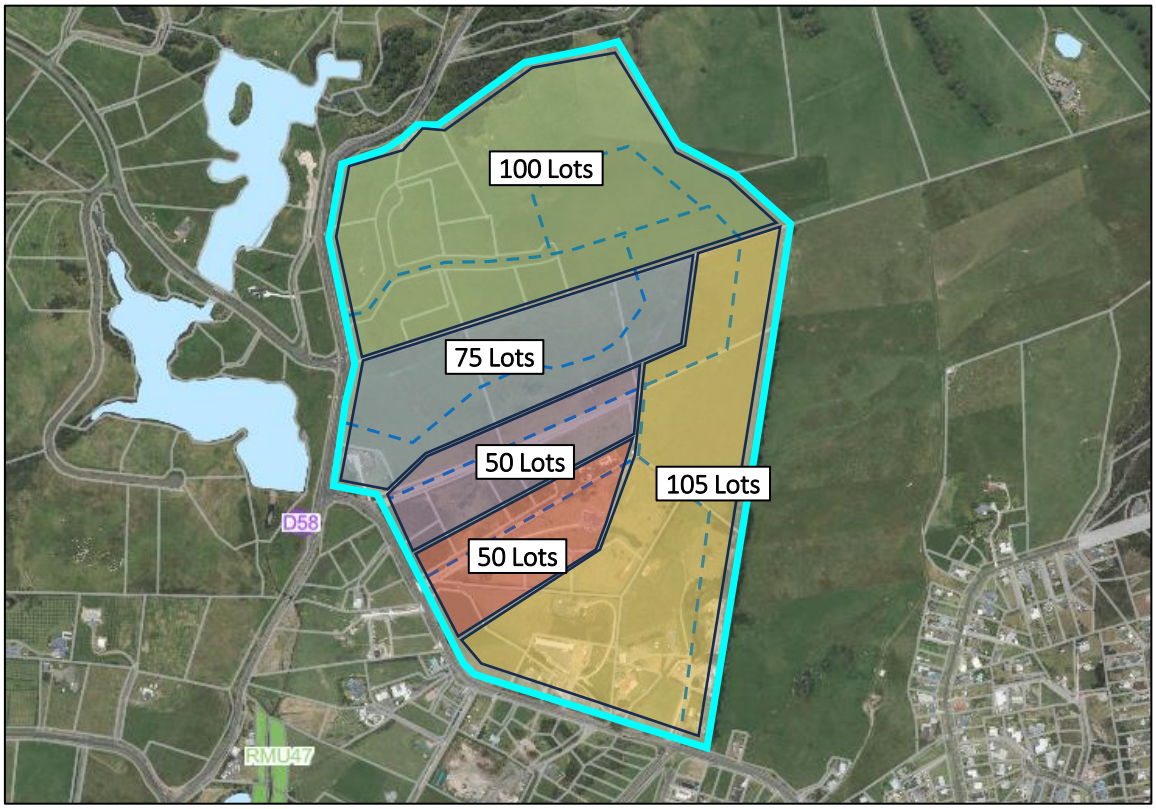

Figure 6: Indicative Lot Yield
Image Source: Traffic Planning Consultants Ltd.

As part of any subsequent subdivision and development, new public roads will be formed and vested to council. While these roads are strictly indicative at this point, no detailed assessment has been carried out; as their locations are not confirmed and doing so would result in likely inaccurate findings. As such, this assessment focusses solely on the existing road network and looks to identify any potential remedial measures to facilitate the plan change. As part of the PPC provisions, any subsequent subdivision involving the formation of a new public road will require an Integrated Transport Assessment to be completed as part of the application, thereby ensuring that suitable assessment is carried out at each stage of development, as greater detail is known.

3.1 Trip Generation

Residential trip generation data taken from the NZ Transport Agency publication "Trips and Parking Related to Land-Use", provides trip generation estimates for outer suburban dwellings. The publication indicates an 85th percentile rate of 0.9 peak hour trips and 8.2 daily trips. The 85th percentile rates have been utilised due to no local public transportation infrastructure and higher reliance on personal vehicles for travel within this area. Further, utilising the higher rate, represents a more conservative approach within the following assessment, as it is not likely that each future dwelling in this area will have the 85th percentile trip generation rate in practice. As such the trip generation rates utilised can be determined to represent a peak summer period.

Overall, the site is estimated to generate 3,116 daily trips and 342 peak hour trips. As residential trips are typically tidal, with vehicles leaving in the AM and returning in the PM, an 80-20 and 20-80 inbound-outbound split has been estimated for the AM and PM peak hours, respectively; for the Saturday peak hour a 50-50 inbound-outbound split has been utilised.

3.2 Trip Distribution

Trips to and from the subject lands have been distributed to the wider road network based on trip attractors within the area, census data, and engineering judgement and experience based on likely travel routes factoring in road quality and travel time. From this, Table 2 summarises the trip distribution which was applied to the site generated traffic volumes. It is noted that this distribution is based on the full build out of the subject lands and internal road network. As the development of the land is likely to be staged and road connections through the site will be completed in due course, it is important that further Transport Assessments are completed at subsequent subdivision stages when the internal roading network is known to best determine traffic volumes and potential impacts. The need for further Transport Assessments is set out within the Precinct Plan Provisions, through the Assessment Criteria outlined in 13.14.2, where Subdivision is a Restricted Discretionary activity. As such, future subdivision applications will require a more focussed assessment which will suitably account for the existing and proposed road network, allowing for more accurate findings.

Table 2: The Rise Trip Distribution Estimates

Route	Trip Distribution
North via Cove Road	10%
South via Cove Road	25%
South via Mangawhai Heads Road	65%

The following provides additional information regarding the estimated trip distribution:

- North via Cove Road: Provides connection to northern Mangawhai, Lang's Beach, Waipu, and is approximately 20 kilometres and 15 minutes shorter of a drive to reach Waipu/Whangarei.
- South via Cove Road: Provides connection to Kaiwaka and State Highway 1, allowing for connections to Whangarei and Wellsford.
- South via Mangawhai Heads Rad: Provides connection to the Mangawhai Village, Mangawhai Central commercial area as well as other developed areas of Mangawhai.

It is noted that these distributions are strictly estimates and are based upon the full development of the subject site. During the staging of the development are, interim trip distributions are likely to be used and will be reported on accordingly within the respective Transportation Assessment as part of the subdivision stage. It is also noted that the trip generation is based on these

dwellings being utilised for normal residential use. Dwellings utilised as holiday homes would likely have different trip distribution characteristics, however the proportion of these and the overall difference in trip distribution is not anticipated to result in significantly different conclusions in the following modelling/assessment.

3.3 Site Access to Public Road Network

The plan change area is provided with road frontage onto Cove Road and Mangawhai Heads Road. Considering this and master planning for the Plan Change Area, the site is likely to have road connections to the wider existing public road network as shown in **Figure 7**. It is noted that the road layouts identified below are strictly indicative and in no way would require the removal of existing dwellings/appropriation of property. Construction of these indicative road would remain under the ultimate control of the landowner. Road links are indicated, such that should land within the wider Plan Change area be developed, it would be done in general accordance of **Figure 7**, to allow for a well-connected road network.

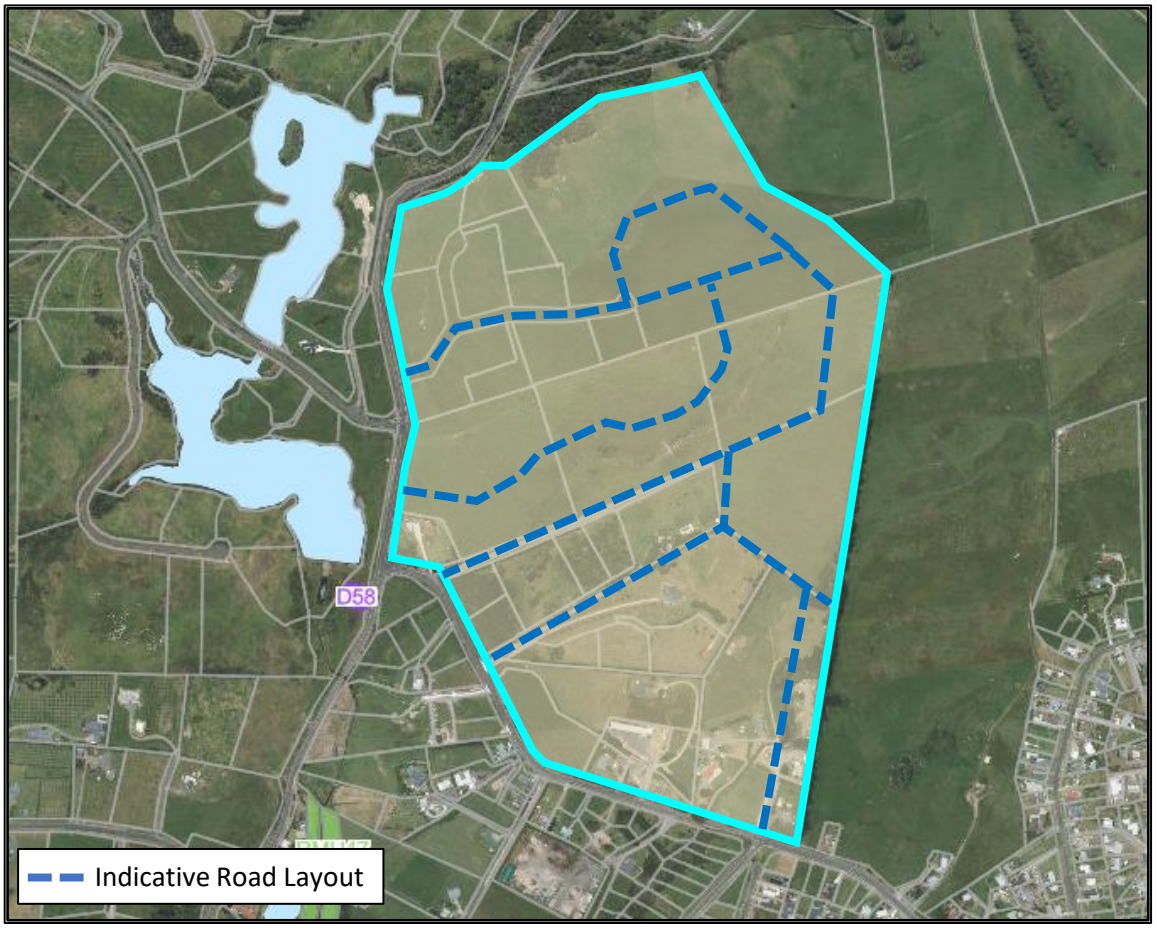

Figure 7: Conceptual Road Network

**Internal road network and road connection locations subject to change following detailed design*

3.4 Site Generated Traffic Volumes

Applying the estimated trip generation for the site, the estimated trip generation to the surrounding road network, and the indicative internal site road layout, traffic volumes at area intersections can be estimated following the full build-out of the subject site. These site generated traffic volumes are included in **Figure 8** for the AM peak hour, **Figure 9** for the PM peak hour, and **Figure 10** for the Saturday peak hour.

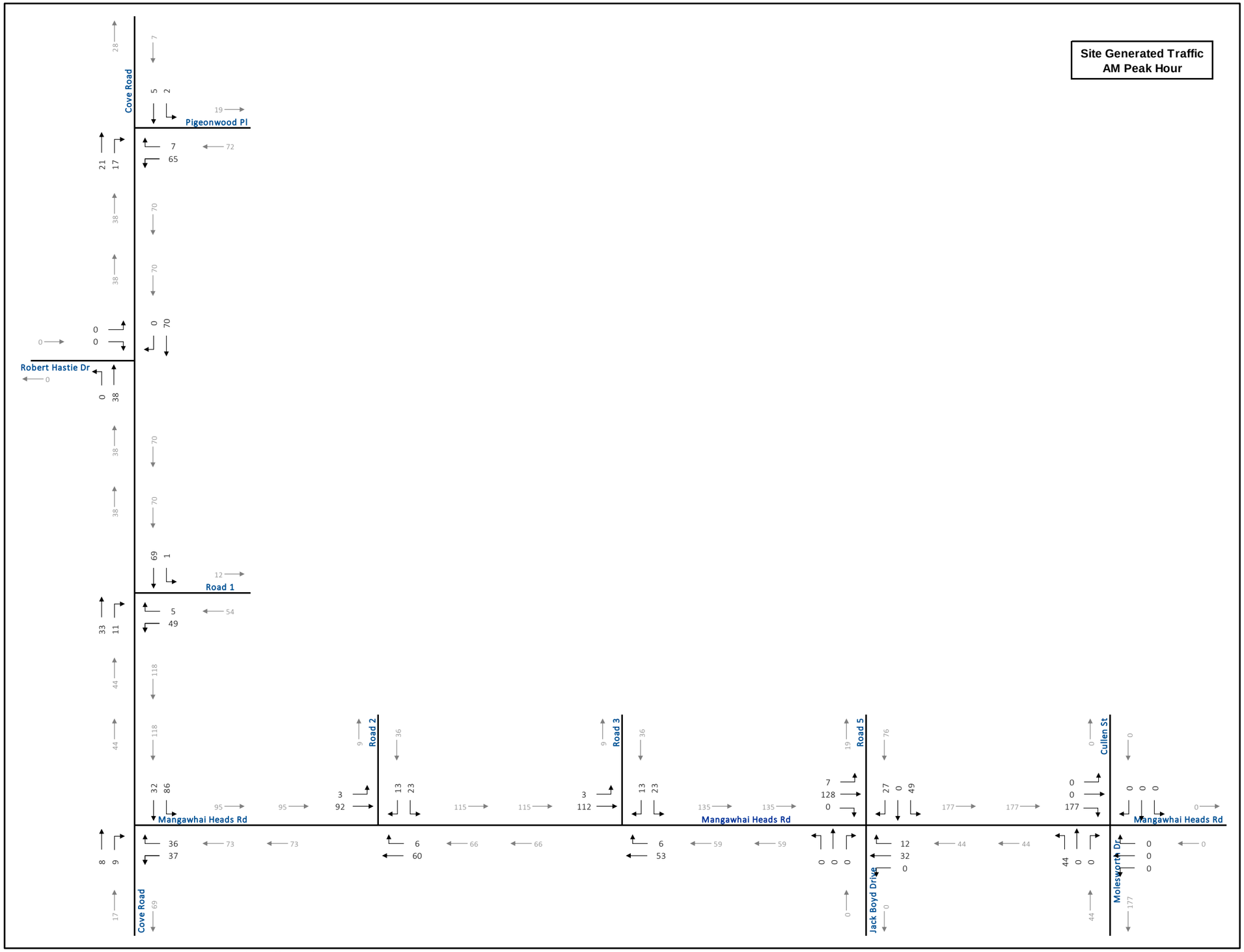

Figure 8: AM Peak Hour Site Generated Traffic Volume Estimates

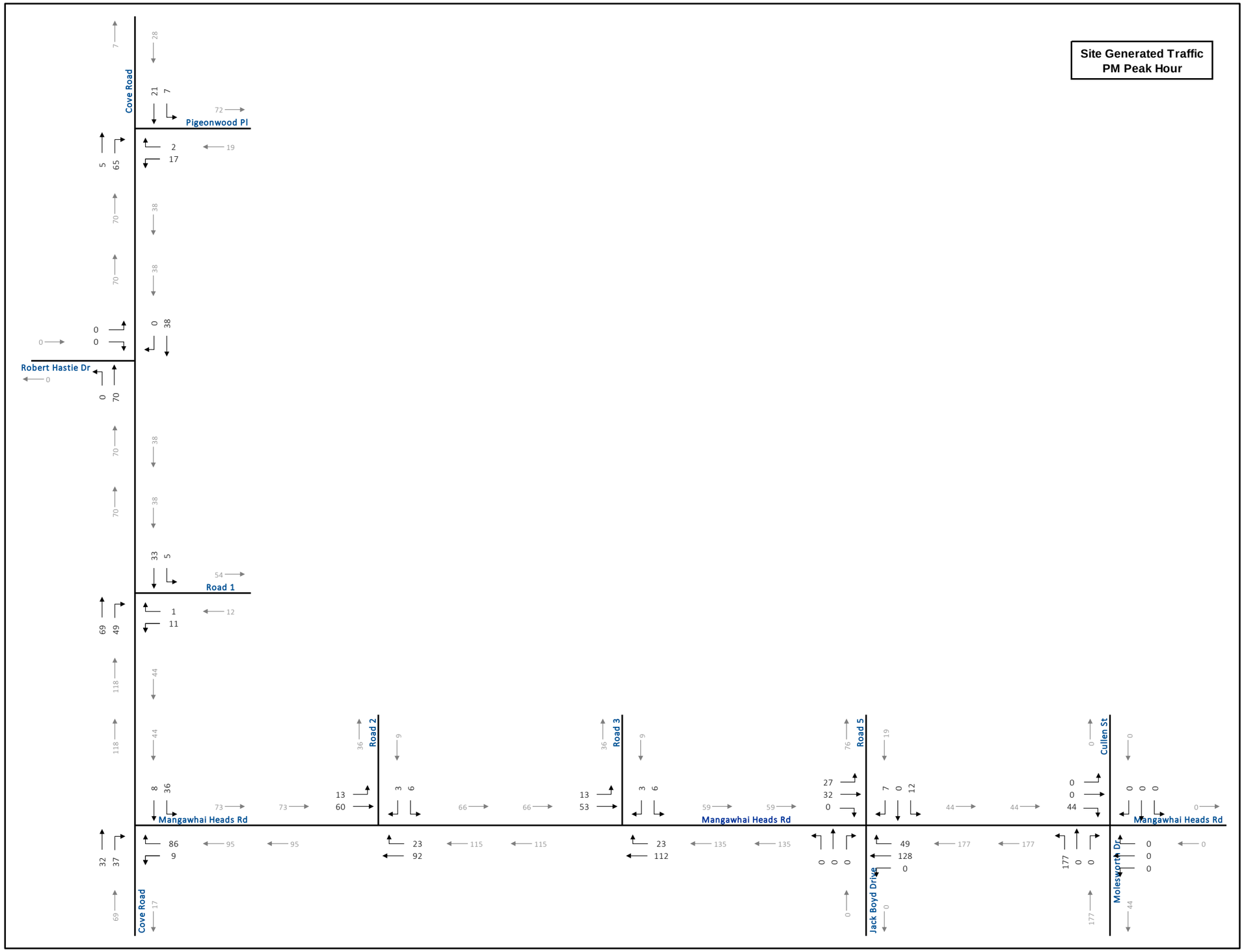

Figure 9: PM Peak Hour Site Generated Traffic Volume Estimates

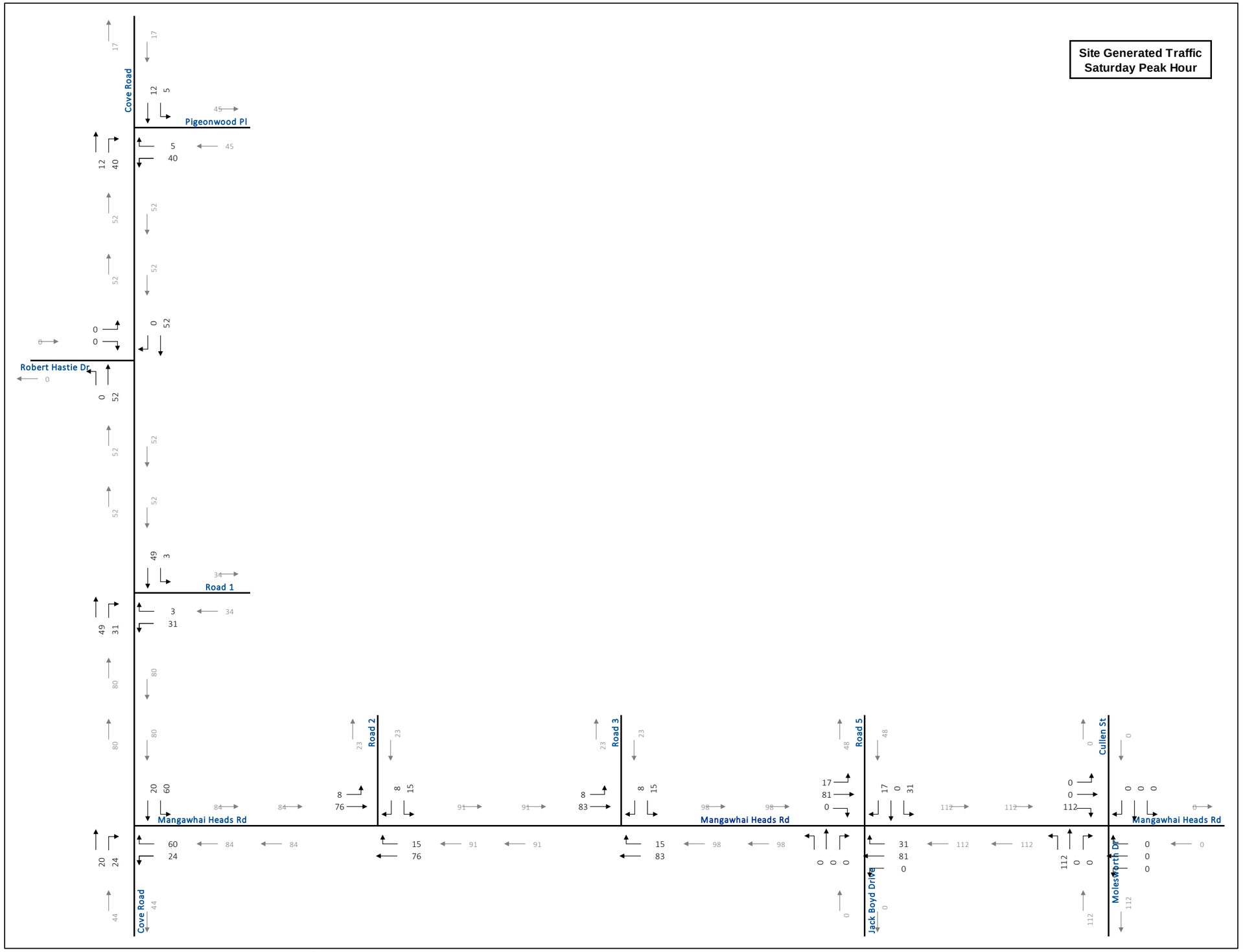

Figure 10: Saturday Peak Hour Site Generated Traffic Volume Estimates

4.0 TRAFFIC OPERATIONS

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are considered to be implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left and right-turn movements at peak times, depending on delays and expected queue lengths. It is noted that improvements should be driven based on safety considerations and not solely on operational considerations, however the two in some instances can be mutual.

The operations of intersections in the study area were evaluated with the existing turning movement volumes using Sidra.

The intersection analysis considered three measures of performance:

- The degree of saturation (volume to capacity ratio) for each intersection.
- The LOS for each turning movement (LOS is based on the average delay per vehicle).
- The 85th percentile queue length.

4.1 Studied Intersections

The following intersections (**Figure 11**) were modelled with existing, background, and total traffic volumes (described later within this report):

- Cove Road and Pigeonwood Place
- Cove Road and Robert Hastie Drive
- Cove Road and “Road 1”
- Cove Road and Mangawhai Heads Road
- Mangawhai Heads Road and “Road 2”
- Mangawhai Heads Road and “Road 3”
- Mangawhai Heads Road and Jack Boyd Drive / “Road 4”
- Mangawhai Heads Road and Molesworth Drive / Cullen Street

Lastly it is reiterated that, as part of the precinct plan provisions, a Transport Assessment is required to be completed as part of any subsequent subdivision activity which creates a new public road. With this in place, more accurate analysis can be completed to identify potential localised impacts, along with remedial measures to mitigate said impacts (if any).

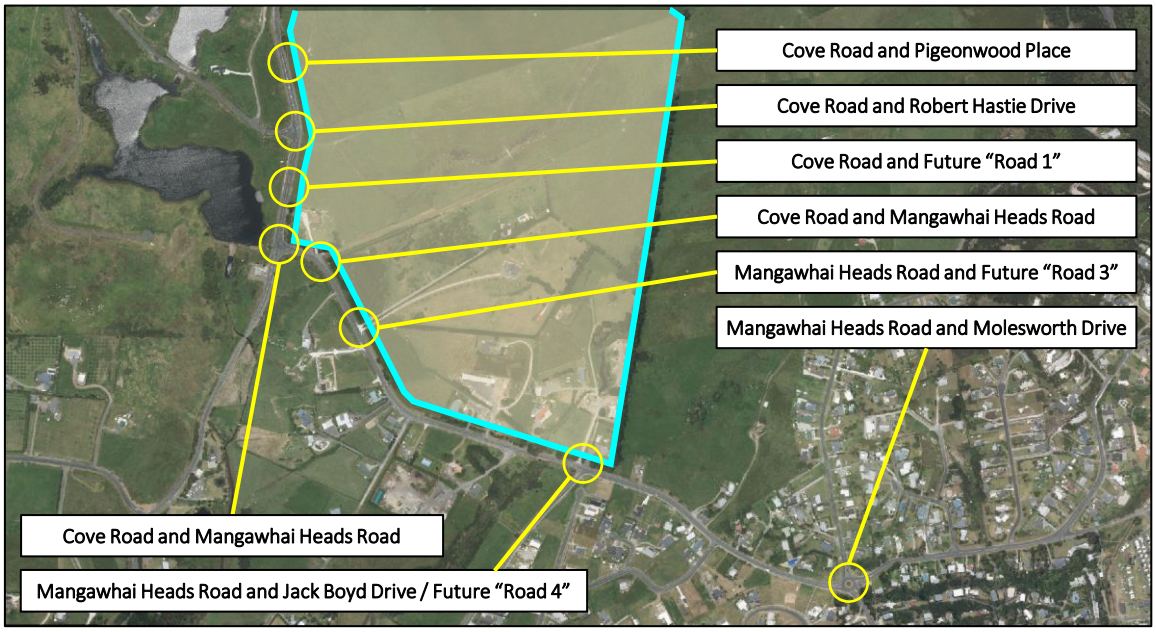

Figure 11: Studied Intersection Locations

Image Source: Traffic Planning Consultants Ltd.

4.2 Existing Operations

Using the above methodology, the existing intersection operations were assessed within Sidra and are summarized in **Table 3**, indicating the existing levels of service (LOS), volume to capacity ratios (V/C) experienced within the study area, for the peak hours. **Attachment 1** contains the detailed Sidra reports.

Table 3: Existing Intersection Operations

Peak Period	Intersection	Approach Leg Level of Service				Overall Degree of Saturation	Highest 95th Queue Length
		North	South	East	West		
AM PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.05	1m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.07	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.13	5m
	Mangawhai Heads Rd and Jack Boyd Dr	n/a	A	A	A	0.10	2m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.17	7m
PM PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.06	1m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.06	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.15	5m
	Mangawhai Heads Rd and Jack Boyd Dr	n/a	A	A	A	0.12	2m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.18	8m
SATURDAY PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.08	1m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.07	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.19	7m
	Mangawhai Heads Rd and Jack Boyd Dr	n/a	A	A	A	0.16	2m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.23	11m

From the analysis of the existing peak hour volume estimates, it was determined that the existing intersections all operate at suitable levels.

4.3 2034 Background Traffic Operations

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic and analysis for the 2034 horizon (10 years from present). The future traffic volumes in the vicinity of the development will likely consist of increased non-site traffic volumes (background traffic), traffic generated by other developments, and the traffic forecast to be generated by the proposed development.

The non-site traffic increase is the generalized traffic growth in Mangawhai. The generalized traffic growth will follow the average increase in population within the area. Background growth was taken as 2% per annum compounded. This percentage was utilised as the development consists of a moderate quantum of housing and therefore represents a notable portion of the growth that may occur within the Mangawhai Area, with 380 households, equalling approximately 950 – 1,330 people (2.5-3.5 people per household). Combining the background 2% growth with the site generated traffic volumes, over the approximate 10-year development horizon, yields a net average growth rate of 2.4%. Background traffic volumes within the study area are illustrated in ***Figures Figure*** 12-***Figure*** 14.

Population in Mangawhai area (census districts Mangawhai Rural, Mangawhai Heads and Mangawhai) is estimated to currently be ~7,000 people. Information made available in the latest Infometrics Kaipara District population projections report (Feb 2023), estimates between 2022-2034, the population will grow by approximately 2.4% per annum. As such, the utilised growth rates utilised within this assessment aligns with the forecast growth identified within the Infometrics report.

Based on the forecast 2034 background traffic volumes, LOS analyses have been conducted using Sidra to determine the peak hour conditions for the intersections within the study area and are summarised in Table 4. Attachment 2 contains the detailed Sidra reports.

Table 4: Background 2034 Intersection Operations

Peak Period	Intersection	Approach Leg Level of Service				Overall Degree of Saturation	Highest 95th Queue Length
		North	South	East	West		
AM PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.06	1m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.09	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.18	6m
	Mangawhai Heads Rd and Jack Boyd Dr	n/a	A	A	A	0.12	3m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.21	9m
PM PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.08	1m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.07	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.19	7m
	Mangawhai Heads Rd and Jack Boyd Dr	n/a	A	A	A	0.15	2m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.23	11m
SATURDAY PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.10	1m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.09	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.25	9m
	Mangawhai Heads Rd and Jack Boyd Dr	n/a	A	A	A	0.20	3m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.23	11m

From the analysis of the 2024 background peak hour volume estimates, it was determined that the existing intersections all operate at suitable levels.

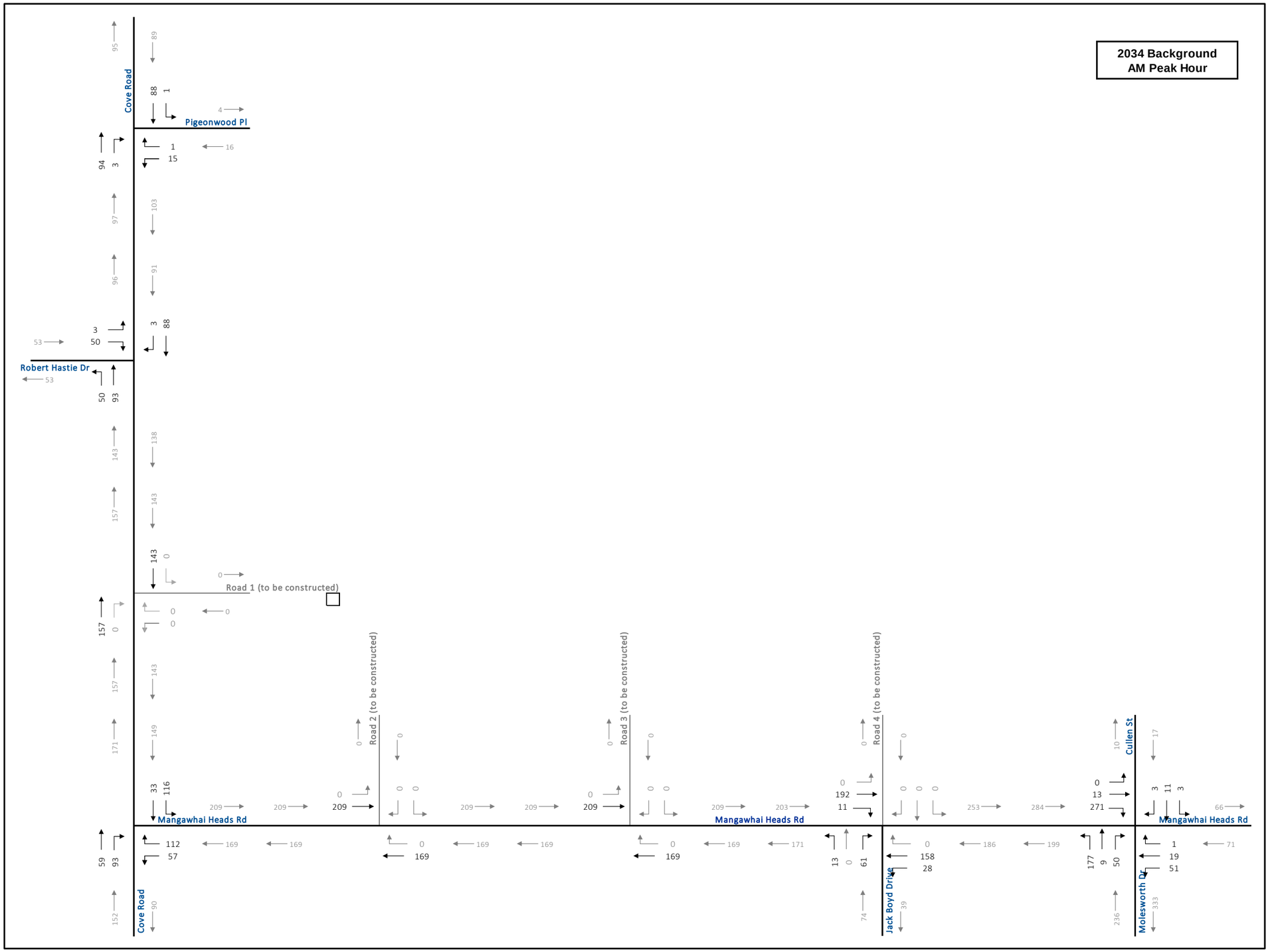

Figure 12: Estimated 2034 Background AM Peak Hour Traffic Volumes

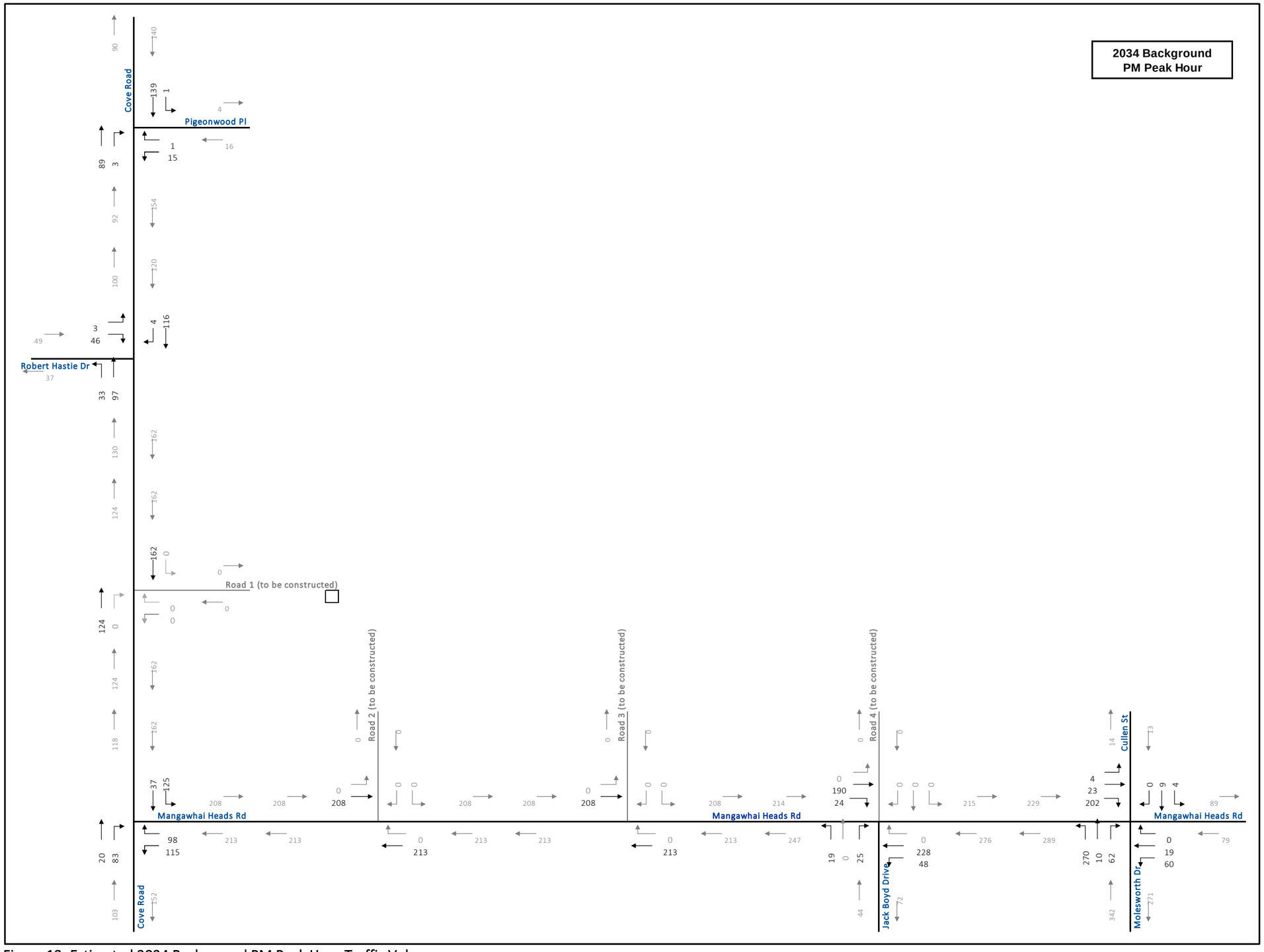

Figure 13: Estimated 2034 Background PM Peak Hour Traffic Volumes

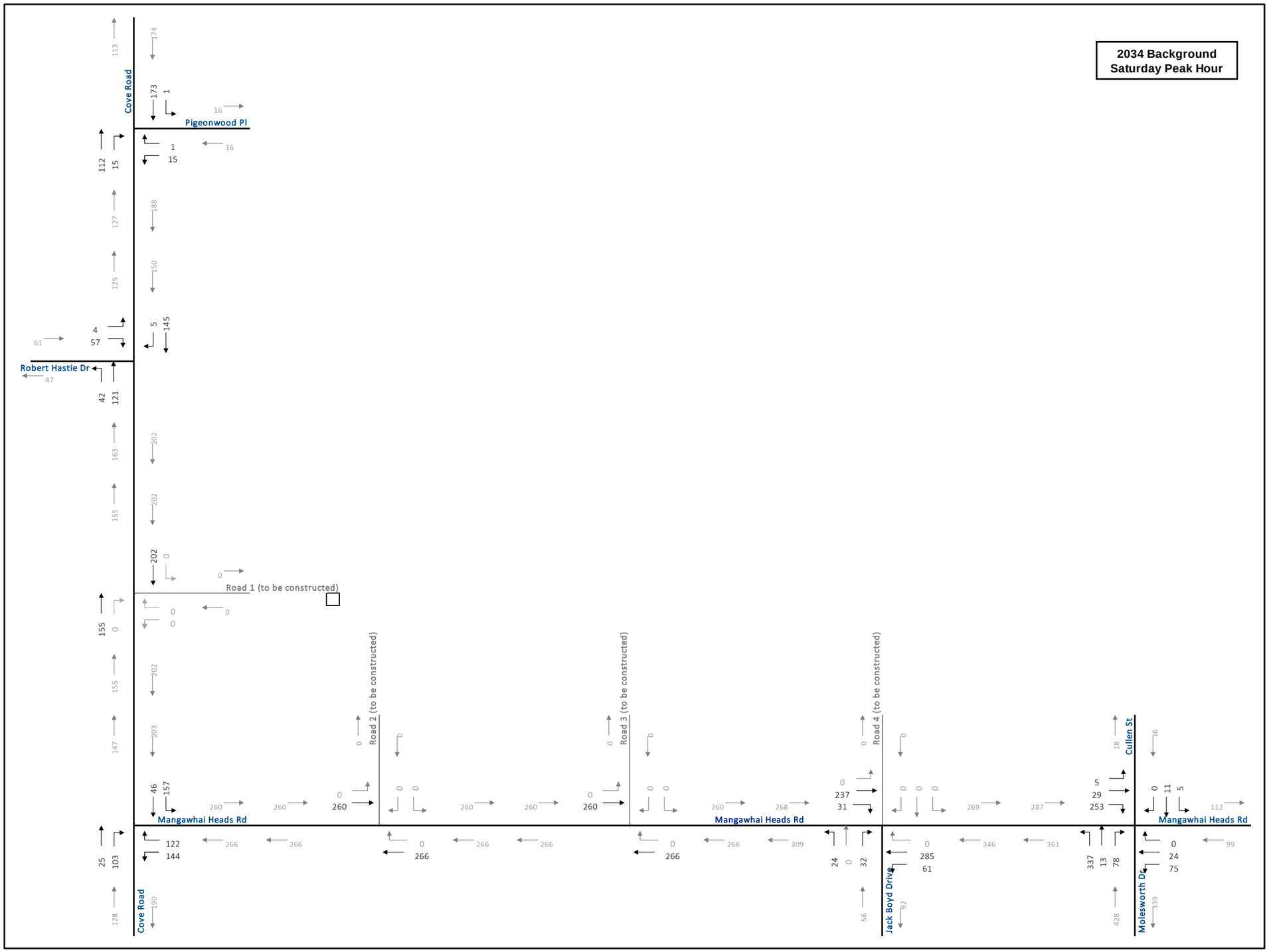

Figure 14: Estimated 2034 Background Saturday Peak Hour Traffic Volumes

4.4 2034 Total Traffic Operations

Figures Figure 15Figure 17 display the total trips expected in 2034 for the AM, PM, and Saturday peak hours, which is the addition of the development traffic *(Figures Figure* 8-*Figure* 10*)* to the background traffic (*Figures Figure* 12-*Figure* 14). Based on the forecast 2034 total traffic volumes, LOS analyses have been conducted using Sidra to determine the peak hour conditions for the intersections within the study area and are summarised in Table 5. It is noted that the modelled new intersections had no improvements and were basic give-way intersections, with no auxiliary turn lanes. This was done to determine a 'worst-case' scenario and to identify if upgrades would be required. Attachment 3 contains the detailed Sidra reports.

Table 5: Total 2034 Intersection Operations

Peak Period	Intersection	Approach Leg Level of Service				Overall Degree of Saturation	Highest 95th Queue Length
		North	South	East	West		
AM PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.08	2m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.11	2m
	Cove Rd and Road 1	A	A	A	n/a	0.12	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.27	10m
	Mangawhai Heads Rd and Road 2	A	n/a	A	A	0.16	1m
	Mangawhai Heads Rd and Road 3	A	n/a	A	A	0.18	1m
	Mangawhai Heads Rd and Jack Boyd Dr / Road 4	B	B	A	A	0.19	4m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.34	16m
PM PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.10	3m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.11	2m
	Cove Rd and Road 1	A	A	A	n/a	0.14	3m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.32	12m
	Mangawhai Heads Rd and Road 2	A	n/a	A	A	0.18	2m
	Mangawhai Heads Rd and Road 3	A	n/a	A	A	0.19	2m
	Mangawhai Heads Rd and Jack Boyd Dr / Road 4	B	B	A	A	0.26	5m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.34	18m
SATURDAY PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.11	3m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.12	3m

Peak Period	Intersection	Approach Leg Level of Service				Overall Degree of Saturation	Highest 95th Queue Length
		North	South	East	West		
SATURDAY PEAK HOUR	Cove Rd and Road 1	A	A	A	n/a	0.14	2m
	Cove Rd and Mangawhai Heads Rd	A	A	A	n/a	0.37	14m
	Mangawhai Heads Rd and Road 2	A	n/a	A	A	0.20	2m
	Mangawhai Heads Rd and Road 3	A	n/a	A	A	0.20	2m
	Mangawhai Heads Rd and Jack Boyd Dr / Road 4	B	B	A	A	0.27	4m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.36	20m

From the analysis of the 2034 Total peak hour volume estimates, it was determined that intersections will operate at good levels with saturation and queue lengths remaining within acceptable levels.

As with any development proposal of this scale further analysis will be carried out at subsequent stages; with a focus on identifying potential improvements to mitigate effects and improve overall safety. While the operational assessment has preliminarily indicated that the operations of the surrounding road will not be significantly impacted (mainly due to low existing traffic volumes and trips being distributed throughout the road network), there may still be some improvements required to help ensure the safety of the wider road network. This is assessed within Section 5.0 of this report.

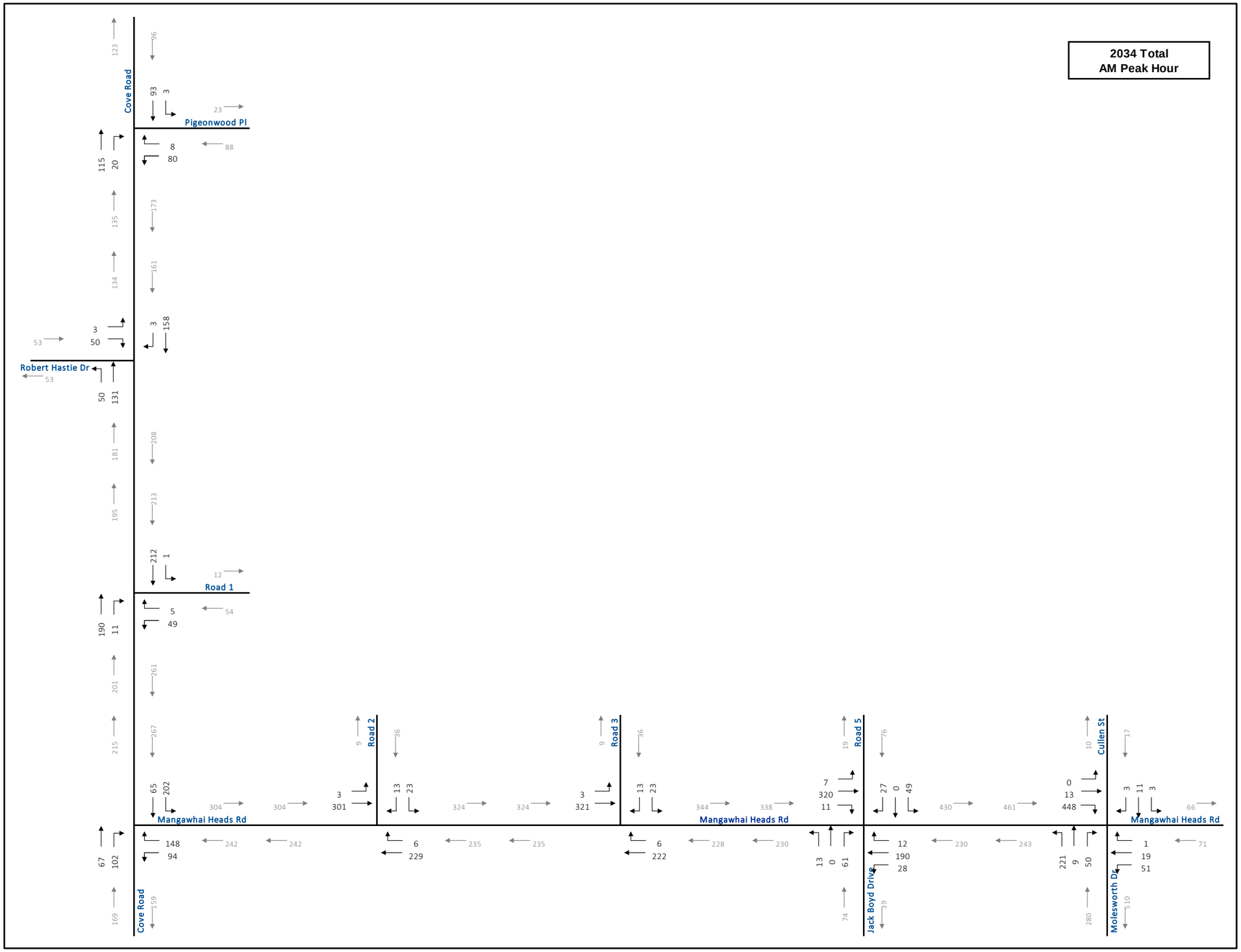

Figure 15: Estimated 2034 Total AM Peak Hour Traffic Volumes

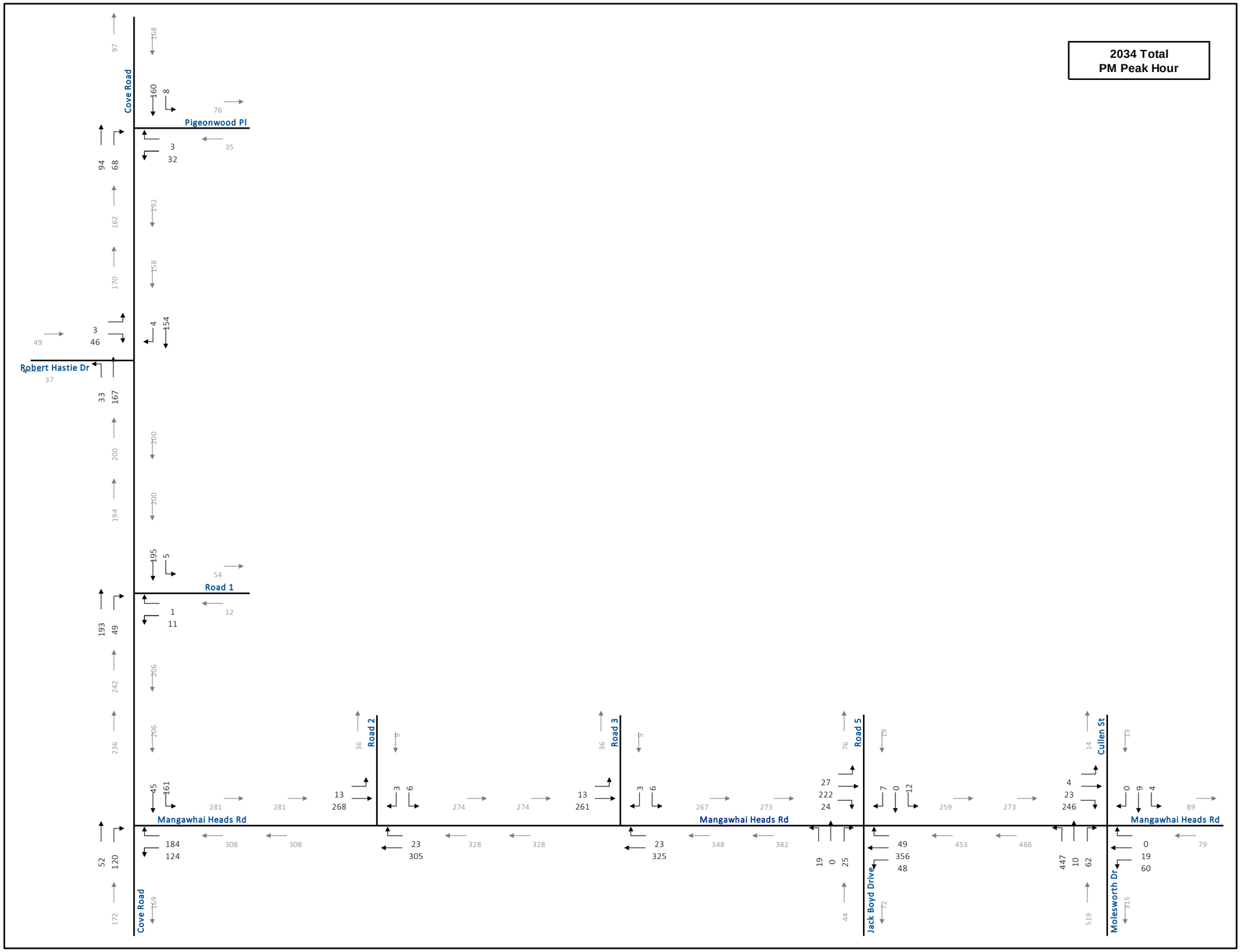

Figure 16: Estimated 2034 Total PM Peak Hour Traffic Volumes

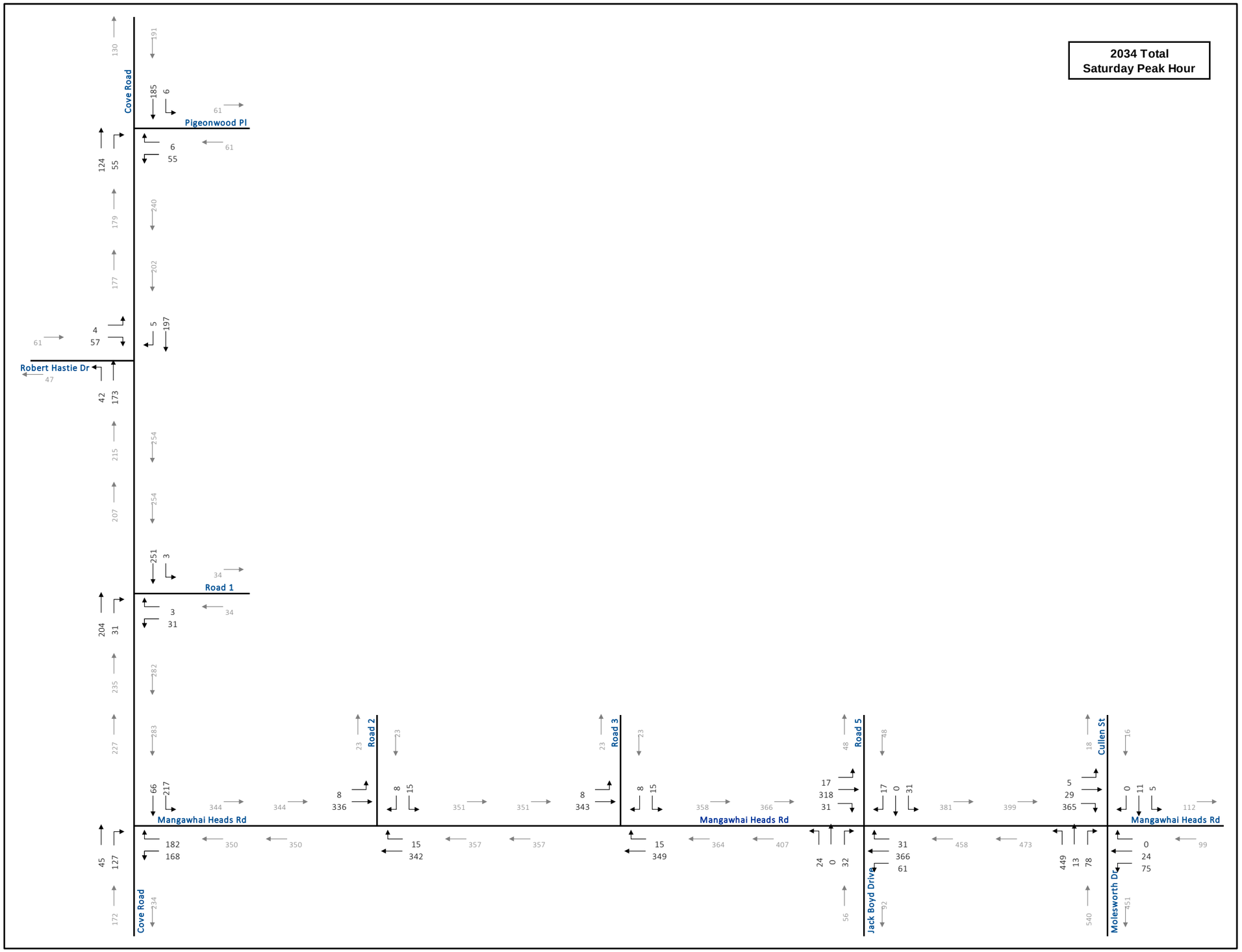

Figure 17: Estimated 2034 Total Saturday Peak Hour Traffic Volumes

4.5 2034 Sensitivity Total Traffic Operations

A final scenario was assessed in order to determine the potential for effects in the future, as a sensitivity analysis. For this, the existing traffic volumes were increased by a factor of 1.5, then had the background growth factor of 1.27 applied. Traffic generated by the development was also increased by a factor of 1.5 (effectively allowing for approximately 570 lots within the plan change area). This scenario results in traffic volumes that are nearly three times greater than current; as summarised below for key intersections:

- Cove Road and Mangawhai Heads Road:
  - Existing Saturday peak hour volume = 469
  - 2034 Total Saturday peak hour volume = 805
    - Difference from existing = 1.72x
  - 2034 Total-Sensitivity Saturday peak hour volume = 1,208
    - Difference from existing = 2.58x
- Mangawhai Heads Road and Jack Boyd Drive:
  - Existing intersection Saturday peak hour volume = 526
  - 2034 Total Saturday peak hour volume = 928
    - Difference from existing = 1.76x
  - 2034 Total-Sensitivity intersection Saturday peak hour volume = 1,414
    - Difference from existing = 2.69x
- Mangawhai Heads Road and Molesworth Drive:
  - Existing intersection Saturday peak hour volume = 653
  - 2034 Total Saturday peak hour volume = 1,054
    - Difference from existing = 1.61x
  - 2034 Total-Sensitivity intersection Saturday peak hour volume = 1,734
    - Difference = 2.66x

From this, it can be seen that the sensitivity analysis represents significantly more traffic within the study area road network. **Figure 18** displays the Saturday peak hour network volumes utilised within the Sidra modelling and **Table 6** summarises the key findings from the Sidra Modelling. **Attachment 4** contains the detailed Sidra reports. It is noted that the AM and PM peak hours were not assessed under this scenario.

Table 6: Total-Sensitivity 2034 Intersection Operations

Peak Period	Intersection	Approach Leg Level of Service				Overall Degree of Saturation	Highest 95th Queue Length
		North	South	East	West		
SATURDAY PEAK HOUR	Cove Rd and Pigeonwood Pl	A	A	A	n/a	0.16	4m
	Cove Rd and Robert Hastie Dr	A	A	n/a	A	0.18	5m
	Cove Rd and Road 1	A	A	A	n/a	0.21	4m
	Cove Rd and Mangawhai Heads Rd	A	A	B	n/a	0.67	56m
	Mangawhai Heads Rd and Road 2	A	n/a	A	A	0.31	3m
	Mangawhai Heads Rd and Road 3	A	n/a	A	A	0.32	3m
	Mangawhai Heads Rd and Jack Boyd Dr / Road 4	C	D	A	A	0.49	14m
	Mangawhai Heads Rd and Molesworth Dr	A	A	A	A	0.62	48m

From the analysis of the 2034 Total-Sensitivity peak hour volume estimates, it was determined that intersections will continue to operate at generally good levels with saturation and queue lengths remaining within acceptable levels. It is noted that the intersection of Mangawhai Heads Road and Jack Boyd Drive sees delays on the north and south approaches reach LOS C and LOS D respectively. This level LOS translates to an average delay of approximately 30-40 seconds. Further, the intersection has not been upgraded to have any auxiliary turn lanes or any other operational/safety improvements; and in practical applications would likely see the intersection upgraded beyond the most basic of intersection configurations, thereby operating at better levels.

From the sensitivity analysis, it is concluded that the existing study area network has sufficient capacity to accommodate the traffic volumes associated with the plan change, as well as the further development in the area, without the need for significant intersection upgrades to improve operations.

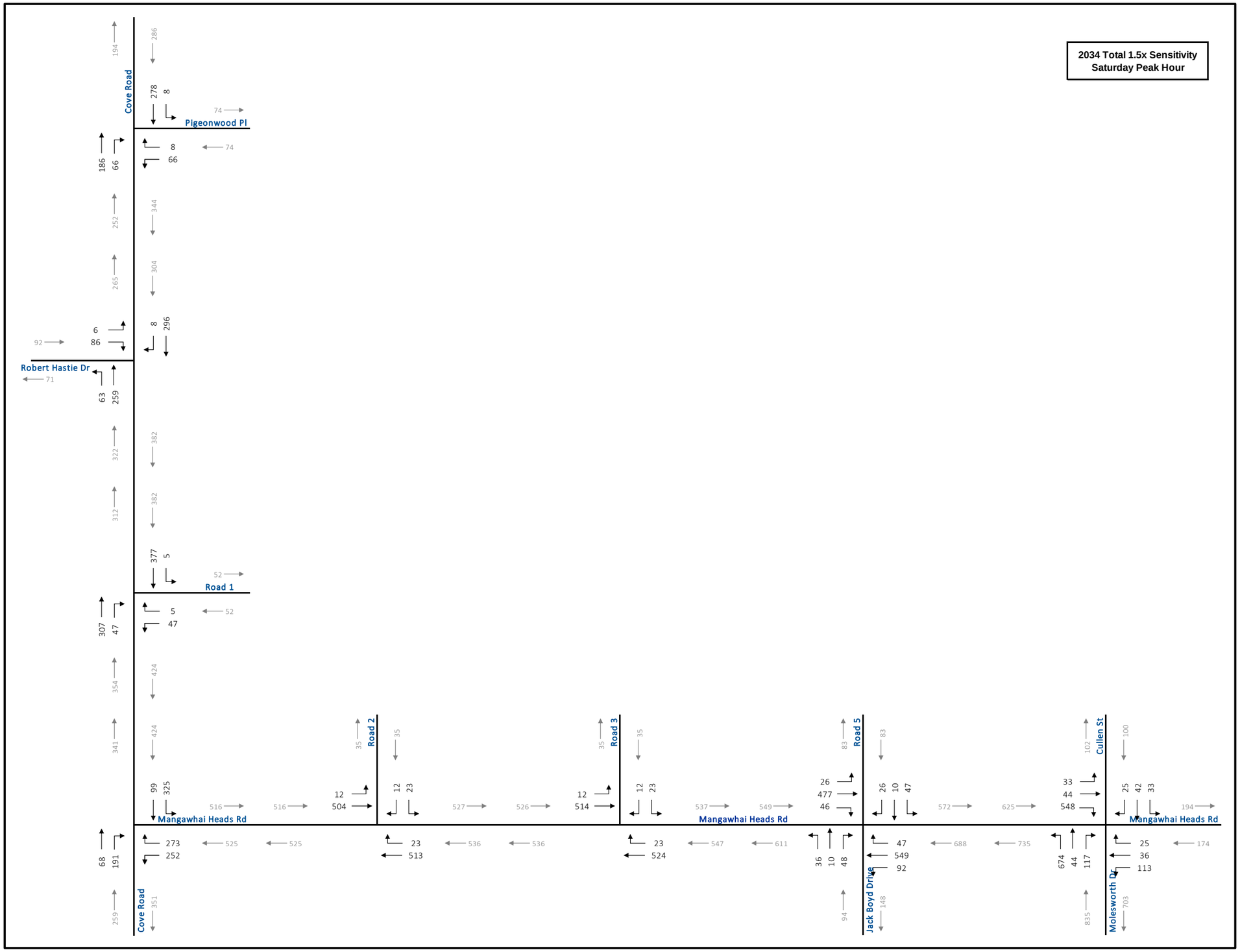

Figure 18: Sensitivity 2034 Total Saturday Peak Hour Traffic Volumes

5.0 PRELIMINARY SAFE SYSTEM ASSESSMENT

A preliminary Safe System Assessment (SSA) has been completed as part of the investigation work for the Plan Change. This following is an assessment of five existing intersection locations, as well as four potential intersection locations, as identified in **Figure 19**.

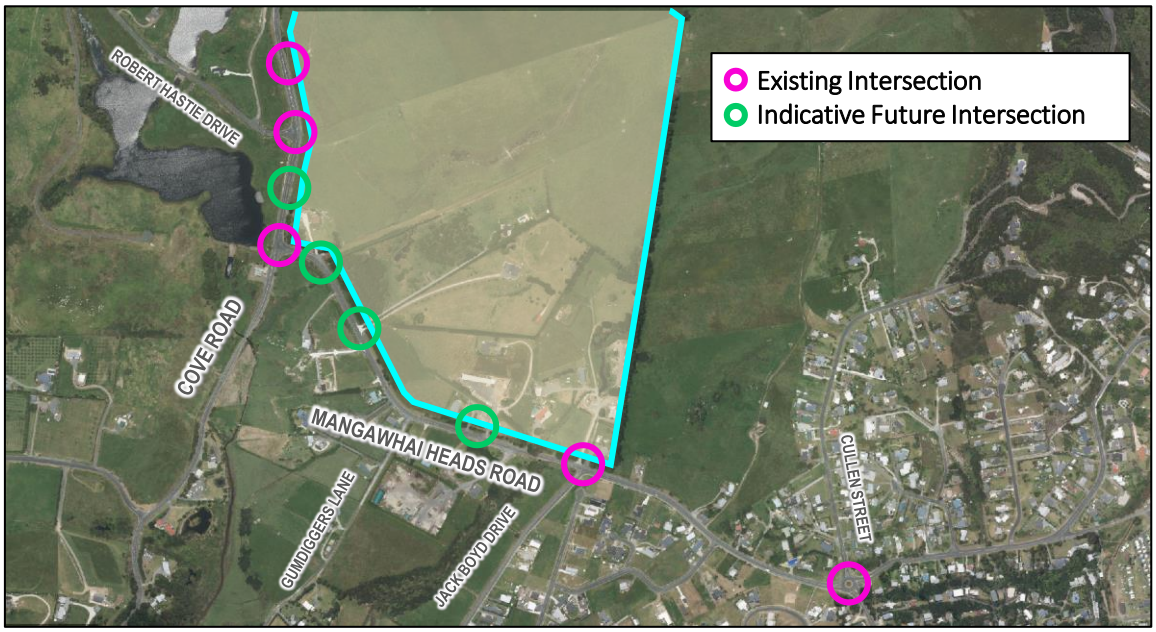

Figure 19: SSA Study Area
Image Source: Kaipara District Council's GIS maps

5.1 Site Visit Observations

The site visit for the SSA was carried out on Wednesday 11th October 2023 between 10:00 – 13:00. The weather was generally dry during the site visit, however intermittent showers occurred. Speed observations were collected when the carriageway was dry, and it was not raining. During this time, a two-person team (Peter Kelly and Udit Bhatti) reviewed the existing intersections in order to identify any areas of concern. Additionally, the indicative future intersection locations were reviewed to identify any significant concerns with future road connections within these areas.

5.1.1 Cove Road Intersection with Pigeonwood Place

This is a give-way priority-controlled intersection with a left turn taper into the side road and a widened should on the west side of the intersection. The taper of the median from the right turn pocket for Robert Hastie Drive runs past this intersection which is currently suitable to accommodate a vehicle turning right into Pigeonwood Place without obstructing northbound through traffic. The existing treatment is suitable for the current volumes within the road network, as well as moderate growth, however will likely be insufficient with PC83 fully realised.

The intersection has good visibility to observe oncoming traffic from the south however, the visibility is limited towards the north due to the horizontal geometry of Cove Road. Based on the observed southbound 85th percentile operating speed of 72 km/h, a Safe Intersection Sight Distance of 147 metres is required (when utilising a 2.5 second observation time, which is considered appropriate under the Extended Design Domain framework). Additionally a Minimum Gap Sight Distance of 111 metres is required based on a 5 second gap and 80 km/h speed. While on site it determined that the intersection has approximately 150 metres of Safe Intersection Sight Distance and 135 metres of Minimum Gap Sight Distance. As such, sightlines at this intersection are considered acceptable.

There is shoulder and berm present along the eastern and western side of the intersection. There are no cyclist or pedestrians facilities provided along any leg of the intersection. Give-way marking is provided on the side road however, a give-way sign post is not present. Edge lines are only present along both sides of Cove Road. Street lights are not present along Pigeonwood Place.

Northbound and southbound traffic on Cove Road are the dominant movements within this intersection. Pigeonwood Place currently has a cul-de-sac arrangement and low traffic volumes were observed during the time of the site visit. The posted speed limit on Cove Road is 80 km/h and there is no posted speed limit on Pigeonwood Place. There are no reported crashes at this intersection for the latest available 10-year period from NZTA' CAS database (it is noted the intersection was constructed in 2018-2019).

Figure 20: Cove Road and Pigeonwood Place Intersection
Image Source: Google Earth

5.1.2 Cove Road Intersection with Robert Hastie Drive

This intersection is a priority intersection with give-way control having a dedicated right turn lane available to turn into Robert Hastie Drive. The intersection has good visibility to observe oncoming northbound and southbound traffic.

A berm with open swale drainage is present along either side of the intersection. Kerb and channel is provided where the intersection is formed with Robert Hastie Drive.

Give-way road marking and signage is provided and edge lines are present on either side of Cove Road. There are no cyclist or pedestrian facilities available at the intersection. Street lights are present at the intersection.

Northbound and southbound traffic on Cove Road are the dominant movements within this intersection and most turning movements at the intersection are to/from the south. Robert Hastie Drive has a cul-de-sac arrangement, and the intersection was observed to operate well during the site visit. The posted speed limit on Cove Road is 80 km/h whilst on Robert Hastie Drive is 30 km/h. There are no reported crashes at this intersection for the latest available 10+ year period from NZTA' CAS database.

Figure 21: Cove Road and Robert Hastie Drive Intersection

Image Source: Kaipara District Council's GIS maps

5.1.3 Cove Road Intersection with Mangawhai Heads Road

This intersection is a priority intersection with stop control along Mangawhai Heads Road. A dedicated right turn lane is available to turn into Mangawhai Heads Road. A 100-metre-long deceleration lane is provided for the southbound traffic to turn left into the side road, however it is formed with a width of approximately 1.5-2.0 metres, which is not considered sufficient to fully contain a vehicle. As such the provision increases the functionality for turning vehicles, but is not considered a dedicated deceleration lane, as a slightly mispositioned vehicle may still be struck in the rear by an oncoming vehicle.

The intersection has good visibility to observe oncoming northbound and southbound traffic. A berm is present along either side of the intersection. In the northeast corner of the intersection, the land falls away, where there is open swale drainage. On the west side of the intersection, and earthen bund if formed which is approximately 0.5-1.0 metre high, should a driver lose control here, their vehicle may be projected into the air. Unsealed shoulders, of varying width are present along the southeastern and western side of the intersection.

Stop control road marking and signage is provided on Mangawhai Heads Road and edge lines are present throughout the intersection.

There are no cyclist or pedestrian facilities available at the intersection. Street lights are present at the intersection.

Turning movements were relatively equal through the intersection, with significantly less volume of through traffic along Cove Road. The posted speed limit on Cove Road is 80 km/h whilst Mangawhai Heads Road has a posted speed limit of 60 km/h. There are three reported crashes at this intersection for the latest available 10-year period from NZTA' CAS database. All three involved turning movements at the intersection.

Figure 22: Cove Road and Mangawhai Heads Road Intersection

Image Source: Kaipara District Council's GIS maps

5.1.4 Mangawhai Heads Road with Jack Boyd Drive Intersection

This intersection is a stop-controlled priority intersection. No auxiliary turn lanes are provided at this intersection. The intersection has good visibility to observe oncoming eastbound and westbound traffic.

Open swale drainage is present along the north and southwest sides of the intersection. In the southwest corner, the swale drops from the carriageway by more than 1 metre and it is understood that during periods of heavy rainfall, this area has difficulty accommodating storm water.

Two vehicle crossings are present within the intersection opposite to Jack Boyd Drive. Stop control road marking and sign post is available at the side road and edge lines are present on either side of the major leg of the intersection.

There are no cyclist facilities available however a footpath is present along the south-eastern leg of the intersection. Street lights are present at the intersection.

Eastbound and westbound traffic on Mangawhai Heads Road are the dominant traffic movements at this intersection. The posted speed limit along Mangawhai Heads Road is 50 km/h whilst on Jack Boyd Drive is 40 km/h. There have been no reported crashes at this intersection for the latest available 10-year period (from NZTA' CAS database).

Figure 23: Mangawhai Heads Road and Jack Boyd Drive Intersection
Image Source: Kaipara District Council's GIS maps

5.1.5 Mangawhai Heads Road – Cullen Street – Molesworth Drive Roundabout Junction

This intersection is give-way priority-controlled roundabout located, with the west and south legs being the major directions of travel. The northern and southern leg of the intersection have good sightlines available. However, sightlines are limited along the eastern and western leg of the roundabout due to the vertical geometry of the carriageway. As the roundabout controls oncoming traffic to one direction at low speeds, the reduced visibility is not considered to be a safety concern.

Splitter islands are provided on each leg of the roundabout, with flush de-facto pedestrian refuge areas. Pram crossings are provided on the eastern and southern legs. On the south leg, the pram crossing and splitter island are not aligned, resulting in pedestrians standing within the flush painted median. Footpaths are not provided on the northeast corner but are present on all others. Cycling facilities are not provided at the roundabout.

Give-way road markings and signage is provided on all legs, along with diverging signage. Street lights are present at the roundabout.

The speed limit on the south and western legs is 50 km/h, and 40 km/h on the north and eastern legs. There are no reported crashes at this intersection for the latest available 10-year period from NZTA' CAS database.

Figure 24: Mangawhai Heads Road – Cullen Street – Molesworth Drive Roundabout
Image Source: Kaipara District Council's GIS maps

5.2 Baseline

The objective of this assessment is to identify how well the current intersections within the study area align with Safe System objectives and to allow comparison with the proposal / development. This is the assessment of five locations, looking at a specific road design and operational issues.

5.3 Site Safe System Assessment Matrixes

Table 7: SSA Additional Considerations

Additional Safe System Components	Prompts	Comments
Road User	Are road users likely to be alert and compliant, or are there factors that might influence this? What are the expected compliance and enforcement levels (alcohol/drugs, speed, road rules, and driving hours) and what is the likelihood of driver fatigue? Are there special road users (e.g. entertainment precincts, elderly, children, on-road activities), distraction by environmental factors (e.g. commerce, tourism), or risk-taking behaviours?	• Local drivers – good reaction times, good level of control • Tourist drivers – unfamiliar with the area and may make mistakes with complex intersections/road layouts (none present) • Good sight distances • Moderate speed environment (50 km/hr) • High speed environment (80 km/hr)
Vehicles	What level of alignment is there with the ideal of safer vehicles? Are there factors which might attract large numbers of unsafe vehicles? Is the percentage of heavy vehicles too high for the proposed/existing road design? Are there enforcement resources in the area to detect non-roadworthy, overloaded or unregistered vehicles and thus remove them from the network?	• Typically, no vehicle enforcement • Low to High volumes • Heavy vehicles – 5-10%
Post-Crash Care	Are there issues that might influence safe and efficient post-crash care in the event of a severe injury? Do emergency and medical services operate as efficiently and rapidly as possible? Are other road users and emergency response teams protected during a crash event? Are drivers provided the correct information to address travelling speeds on the approach and adjacent to the incident? Is there provision for e-safety (i.e. safety systems based on modern information and communication technologies, C-ITS)?	• Road shoulders may be used for emergency stops • The roadside space and land beside the road can be used by emergency services • Generally good visibility allowing approaching drivers to see emergency services in the carriageway • Closeness to emergency facilities (Whangarei Hospital - 60 km)

5.4 Safe System Assessment Process and Findings

With the low-moderate traffic (road user) volumes on the study area roads minor changes in volumes do not, typically, translate into significant changes in scoring. While typically, exposure scoring within the SSA Matrix is given a value of 0, 1, 2, 3, or 4. The assessment utilised quarters of a point in order to recognise the increase in traffic volumes from the proposal, where a typical assessment may not identify any change. For reference the exposure score-band thresholds for a SSA are identified below:

- 0 = no volume
- 1 = < 1,000 vehicles per day
- 2 = 1,000-4,999 vehicles per day
- 3 = 5,000-9,999 vehicles per day
- 4 = 10,000+ vehicles per day

For likelihood scoring, the SSA follows a similar approach to the previous Road Safety Audit system, albeit with scoring assigned based on the thresholds below:

- 1 = very unlikely
- 2 = unlikely
- 3 = likely
- 4 = very likely

For severity scoring, it is based on if a crash were to occur, what would the resultant injury be. The scoring assigned is based on the injury thresholds below:

- 1 = non-injury
- 2 = minor injury
- 3 = serious injury
- 4 = fatal injury

These scores are then multiplied by each other for one of seven crash categories for an intersection/road segment:

- Run-off-road
- Head-on
- Intersection
- Other
- Pedestrian
- Cyclist
- Motorcyclist

The individual scores for each crash type are then summed to give an overall score for the intersection/road segment. As such, there is a maximum score of 448 for the studied location. Within the SSA framework, there is no set score which would trigger the absolute need for an improvement, as the system is intended to provide feedback to design teams in order to

compare and contrast existing scenarios to future scenarios and potential improvements. As with any road environment, there are always improvements which can be implemented which would improve safety, however this is balanced based on the risk profile and available funding. It is considered that an intersection which scores less than 84 (based on a score of 2 x 2 x 3 for each category), typically does not require remedial measures. When higher than this, more investigation should be carried out to identify where there is increased exposure and what potential remedial measures should be.

It is noted that no assessments were carried out for intersections which are anticipated to be constructed as a result of Plan Change, as detailed designs/locations of potential intersections are unknown at this stage. It is likely, and recommended, that as part of the preliminary design process of any subsequent subdivision or road creation that an SSA be carried out, when more details are known; thereby allowing for a more accurate and considered assessment.

5.4.1 Cove Road and Pigeonwood Place

Table 8: Cove Road and Pigeonwood Place SSA Scoring

Scenario	Score
Existing Typical	62 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	86.5 out of 448
With Identified Improvements	
Existing Typical	46 out of 448
Existing Peak Period	49.25 out of 448
With Proposed Development	65.5 out of 448

The score for the intersection under existing scenarios and with the proposed development remains relatively low. With no improvements made, the intersection exceeds the 84-score threshold and as such improvements should be considered. It is noted that the scores for this intersection are largely dictated by the higher speed environment and the lack of pedestrian/cyclist facilities in the area.

The improvements considered for this intersection were:

- Install the northbound right-turn lane into Pigeonwood Place
- Install footpath on the east side of Cove Road, connecting into footpath (*also to be constructed)* on Pigeonwood Place
- Reduction of speed limit from 80 km/h to 50-60 km/h
- Install streetlighting on Pigeonwood Place
- Install pedestrian crossing facility on Pigeonwood Place *(if footpath on both sides of Pigeonwood)*
- Upgrade road drainage to remove open swales
- Installation of Give-way sign on Pigeonwood Place intersection approach

5.4.2 Cove Road and Robert Hastie Drive

Table 9: Cove Road and Robert Hastie Drive SSA Scoring

Scenario	Score
Existing Typical	66.25 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	86.5 out of 448
With Identified Improvements	
Existing Typical	49.25 out of 448
Existing Peak Period	49.25 out of 448
With Proposed Development	64.5 out of 448

The score for the intersection under existing scenarios and with the proposed development remains relatively low. With no improvements made, the intersection exceeds the 84-score threshold and as such improvements should be considered. It is noted that the scores for this intersection are largely dictated by the higher speed environment and the lack of pedestrian/cyclist facilities in the area.

The improvements considered for this intersection were:

- Install footpath on the east side of Cove Road
- Reduction of speed limit from 80 km/h to 50-60 km/h
- Install pedestrian crossing facility across Cove Road
- Upgrade road drainage to remove open swales

5.4.3 Cove Road and Mangawhai Heads Road

Table 10: Cove Road and Mangawhai Heads Road SSA Scoring

Scenario	Score
Existing Typical	70.5 out of 448
Existing Peak Period	74.75 out of 448
With Proposed Development	95 out of 448
With Identified Improvements	
Existing Typical	52.5 out of 448
Existing Peak Period	55.75 out of 448
With Proposed Development	71 out of 448

The score for the intersection under existing scenarios and with the proposed development remains relatively low. With no improvements made, the intersection exceeds the 84-score threshold and as such improvements should be considered. It is noted that the scores for this intersection are largely dictated by the higher speed environment and the lack of pedestrian/cyclist facilities in the area.

The improvements considered for this intersection were:

- Install footpath on the east side of Cove Road and north side of Mangawhai Heads Road
- Reduction of speed limit from 80 km/h to 50-60 km/h
- Install southbound left turn lane into Mangawhai Heads Road
- Upgrade road drainage to remove open swales

5.4.4 Mangawhai Heads Road and Jack Boyd Drive/Road 4

Table 11: Mangawhai Heads Road and Jack Boyd Drive/Road 4 SSA Scoring

Scenario	Score
Existing Typical	68.5 out of 448
Existing Peak Period	71.75 out of 448
With Proposed Development	78.25 out of 448
With Identified Improvements	
Existing Typical	41.5 out of 448
Existing Peak Period	43.25 out of 448
With Proposed Development	46.75 out of 448

The score for the intersection under existing scenarios and with the proposed development remains relatively low. With no improvements made and the additional traffic from the plan change area, the intersection still remains under the 84-score threshold. It is likely that the future intersection would create a crossroad intersection. In the future it is likely that the best design for this intersection would be a roundabout to facilitate the associated turning movements between the Plan Change area, and also Jack Boyd Drive. It is anticipated that intersection would be subject to further design investigation as more details are known about the future road location.

The improvements considered for this intersection were:

- Upgrade to roundabout control intersection, or provide auxiliary turn lanes
- Install footpath on the north side of Mangawhai Heads Road
- Install pedestrian crossing facility across Mangawhai Heads Road
- Upgrade road drainage to remove open swales

5.4.5 Mangawhai Heads Road and Molesworth Drive

Table 12: Mangawhai Heads Road and Molesworth Drive SSA Scoring

Scenario	Score
Existing Typical	60.75 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	66.5 out of 448
With Identified Improvements	
Existing Typical	60.75 out of 448
Existing Peak Period	66.25 out of 448
With Proposed Development	66.5 out of 448

The score for the intersection under existing scenarios and with the proposed development remains relatively low. With no improvements made and the additional traffic from the plan change area, the intersection still remains under the 84-score threshold. Reviewing the existing roundabout it was considered that there was relatively limited opportunity to make any significant improvements which would impact the overall scoring. Notwithstanding, the following improvements could be carried out:

- Removal of existing vehicle crossings connecting into the roundabout's circulation aisle
- Footpath provisions and pedestrian crossing connection on the northwest corner of the roundabout

	Intersection	ADT	Peak Season ADT	Post Development Peak ADT
Road 1:	Cove Road	1700	2125	3165
Road 2:	Pigeonwood Place			

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Low	Volume (Off Peak)	Low	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Low	Volume (Peak Season)	Low	Volume (Peak Season)	Moderate
	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Competent	Horizontal Alignment	Straight
	Vertical Alignment	Relatively flat	Vertical Alignment	Relatively flat	Intersection Control	Give-way	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Relatively flat
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	No give-way sign	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Number and Width of Lanes	2 at 3m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Competent	Volume of Vehicular Traffic	Moderate	Number and Width of Lanes	2 at 3m+
	Speed Limit	Posted 80km/h	Medians	Flush painted	Minor Road Volumes and Movements	Low/Moderate	Buses Stopping	None	Medians	Flush painted	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate	Speed Limit	Posted 80km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 80km/h	Right-Turn Volumes	Low			Speed Limit and Operating Speed	Posted 80km/h	Historical	None	Right Turn Control at Intersection	None
	Medians	Flush painted	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 80km/h			Crossing Distance and Number of Lanes	2.5			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	No	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	None								
Severity	High Speed	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h
	Barriers	No			Reduced Conflict Angles	No	Visible Intersection	Yes	Crossing Facilities	None	Roadside Hazards	Open swale	Roadside Hazards	Open swale
	Steep Gradient	No			Sight Distance	Good	Surfaced	Asphalt						
	Drains	Open swale												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	1	Exposure (Peak Season)	1	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	1	Exposure (Off Peak)	1	Exposure (Off Peak)	2
	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	3	Severity	3	Severity	2	Severity	1	Severity	4	Severity	4	Severity	3
Product	Peak Season	**12**	Peak Season	**12**	Peak Season	**8**	Peak Season	**2**	Peak Season	**8**	Peak Season	**8**	Peak Season	**12**
	Off Peak	**13.5**	Off Peak	**13.5**	Off Peak	**9**	Off Peak	**2.25**	Off Peak	**8**	Off Peak	**8**	Off Peak	**12**
	Post Development	**15**	Post Development	**15**	Post Development	**10**	Post Development	**2.5**	Post Development	**16**	Post Development	**16**	Post Development	**12**
TOTAL	Peak Season	**62**												
	Off Peak	**66.25**												
	Post Development	**86.5**												
	Max Score	**448**												

Figure 25: Cove Road and Pigeonwood Place SSA Matrix

Intersection		ADT	Peak Season ADT	Post Development Peak ADT	Potential Improvements:	
Road 1:	Cove Road	1700	2125	3165	- Right turn lane	- Streetlighting on Pigeonwood
Road 2:	Pigeonwood Place				- Footpath	- Pedestrian crossing facility on side street
					- Speed limit reduction (50-60km/h)	- Fill open swale and drainage improvements
						- Install GW Sign

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Low	Volume (Off Peak)	Low	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Low	Volume (Peak Season)	Low	Volume (Peak Season)	Moderate
	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Competent	Horizontal Alignment	Straight
	Vertical Alignment	Relatively flat	Vertical Alignment	Relatively flat	Intersection Control	Give-way	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Relatively flat
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	No give-way sign	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Number and Width of Lanes	2 at 3m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Competent	Volume of Vehicular Traffic	Moderate	Number and Width of Lanes	2 at 3m+
	Speed Limit	Posted 80km/h	Medians	Flush painted	Minor Road Volumes and Movements	Low/Moderate	Buses Stopping	None	Medians	Flush painted	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate	Speed Limit and Operating Speed	Posted 80km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 80km/h	Right-Turn Volumes	Low			Speed Limit and Operating Speed	Posted 80km/h	Historical	None	Right Turn Control at Intersection	None
	Medians	Flush painted	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 80km/h			Crossing Distance and Number of Lanes	2.5			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	No	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	None								
Severity	High Speed	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h
	Barriers	No			Reduced Conflict Angles	No	Visible Intersection	Yes	Crossing Facilities	None	Roadside Hazards	Open swale	Roadside Hazards	Open swale
	Steep Gradient	No			Sight Distance	Good	Surfaced	Asphalt						
	Drains	Open swale												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	1	Exposure (Peak Season)	1	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	1	Exposure (Off Peak)	1	Exposure (Off Peak)	2
	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	3	Severity	3	Severity	2
Product	Peak Season	**8**	Peak Season	**8**	Peak Season	**8**	Peak Season	**2**	Peak Season	**6**	Peak Season	**6**	Peak Season	**8**
	Off Peak	**9**	Off Peak	**9**	Off Peak	**9**	Off Peak	**2.25**	Off Peak	**6**	Off Peak	**6**	Off Peak	**8**
	Post Development	**10**	Post Development	**10**	Post Development	**10**	Post Development	**2.5**	Post Development	**12**	Post Development	**12**	Post Development	**8**
TOTAL	Peak Season	**46**												
	Off Peak	**49.25**												
	Post Development	**64.5**												
	Max Score	**448**												

Figure 26: Cove Road and Pigeonwood Place with Improvements SSA Matrix

Intersection		ADT	Peak Season ADT	Post Development Peak ADT
Road 1:	Cove Road	2100	2625	3565
Road 2:	Robert Hastie Drive			

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Low	Volume (Off Peak)	Low	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Low	Volume (Peak Season)	Low	Volume (Peak Season)	Moderate
	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Competent	Horizontal Alignment	Straight
	Vertical Alignment	Relatively flat	Vertical Alignment	Relatively flat	Intersection Control	Give-way	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Relatively flat
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	Standard	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Number and Width of Lanes	2 at 3m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Competent	Volume of Vehicular Traffic	Moderate	Number and Width of Lanes	2 at 3m+
	Speed Limit	Posted 80km/h	Medians	Flush painted	Minor Road Volumes and Movements	Low	Buses Stopping	None	Medians	Flush painted	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate	Speed Limit and Operating Speed	Posted 80km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 80km/h	Right-Turn Volumes	Low			Speed Limit and Operating Speed	Posted 80km/h	Historical	None	Right Turn Control at Intersection	None
	Medians	Flush painted	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 80km/h			Crossing Distance and Number of Lanes	None			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	Yes	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	None								
Severity	High Speed	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h
	Barriers	No			Reduced Conflict Angles	No	Visible Intersection	Yes	Crossing Facilities	None	Roadside Hazards	Open swale	Roadside Hazards	Open swale
	Steep Gradient	No			Sight Distance	Good	Surfaced	Asphalt						
	Drains	Open swale												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	2.25	Exposure (Peak Season)	2.25	Exposure (Peak Season)	2.25	Exposure (Peak Season)	2.25	Exposure (Peak Season)	1	Exposure (Peak Season)	1	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	1	Exposure (Off Peak)	1	Exposure (Off Peak)	2
	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	3	Severity	3	Severity	2	Severity	1	Severity	4	Severity	4	Severity	3
Product	Peak Season	**13.5**	Peak Season	**13.5**	Peak Season	**9**	Peak Season	**2.25**	Peak Season	**8**	Peak Season	**8**	Peak Season	**12**
	Off Peak	**13.5**	Off Peak	**13.5**	Off Peak	**9**	Off Peak	**2.25**	Off Peak	**8**	Off Peak	**8**	Off Peak	**12**
	Post Development	**15**	Post Development	**15**	Post Development	**10**	Post Development	**2.5**	Post Development	**16**	Post Development	**16**	Post Development	**12**
TOTAL	Peak Season	**66.25**												
	Off Peak	**66.25**												
	Post Development	**86.5**												
	Max Score	**448**												

Figure 27: Cove Road and Robert Hastie Drive SSA Matrix

Road 1: Cove Road 2100 2625 3565 - Footpath - Pedestrian crossing facility on Cove Road
Road 2: Robert Hastie Drive - Speed limit reduction (50-60km/h) - Fill open swale and drainage improvements

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Low	Volume (Off Peak)	Low	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Low	Volume (Peak Season)	Low	Volume (Peak Season)	Moderate
	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Competent	Horizontal Alignment	Straight
	Vertical Alignment	Relatively flat	Vertical Alignment	Relatively flat	Intersection Control	Give-way	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Relatively flat
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	Standard	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Number and Width of Lanes	2 at 3m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Competent	Volume of Vehicular Traffic	Moderate	Number and Width of Lanes	2 at 3m+
	Speed Limit	Posted 80km/h	Medians	Flush painted	Minor Road Volumes and Movements	Low	Buses Stopping	None	Medians	Flush painted	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate	Speed Limit and Operating Speed	Posted 80km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 80km/h	Right-Turn Volumes	Low			Speed Limit and Operating Speed	Posted 80km/h	Historical	None	Right Turn Control at Intersection	None
	Medians	Flush painted	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 80km/h			Crossing Distance and Number of Lanes	None			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	Yes	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	None								
Severity	High Speed	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h
	Barriers	No			Reduced Conflict Angles	No	Visible Intersection	Yes	Crossing Facilities	None	Roadside Hazards	Open swale	Roadside Hazards	Open swale
	Steep Gradient	No			Sight Distance	Good	Surfaced	Asphalt						
	Drains	Open swale												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	2.25	Exposure (Peak Season)	2.25	Exposure (Peak Season)	2.25	Exposure (Peak Season)	2.25	Exposure (Peak Season)	1	Exposure (Peak Season)	1	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	2.25	Exposure (Off Peak)	1	Exposure (Off Peak)	1	Exposure (Off Peak)	2
	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	3	Severity	3	Severity	2
Product	Peak Season	**9**	Peak Season	**9**	Peak Season	**9**	Peak Season	**2.25**	Peak Season	**6**	Peak Season	**6**	Peak Season	**8**
	Off Peak	**9**	Off Peak	**9**	Off Peak	**9**	Off Peak	**2.25**	Off Peak	**6**	Off Peak	**6**	Off Peak	**8**
	Post Development	**10**	Post Development	**10**	Post Development	**10**	Post Development	**2.5**	Post Development	**12**	Post Development	**12**	Post Development	**8**
TOTAL	Peak Season	**49.25**												
	Off Peak	**49.25**												
	Post Development	**64.5**												
	Max Score	**448**												

Figure 28: Cove Road and Robert Hastie Drive with Improvements SSA Matrix

Intersection		ADT	Peak Season ADT	Post Development Peak ADT
Road 1:	Cove Road	3400	4250	6150
Road 2:	Mangawhai Heads Road			

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Low	Volume (Off Peak)	Low	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Low	Volume (Peak Season)	Low	Volume (Peak Season)	Moderate
	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Competent	Horizontal Alignment	Straight
	Vertical Alignment	Relatively flat	Vertical Alignment	Relatively flat	Intersection Control	Stop	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Relatively flat
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	Standard	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Crossing Distance and Number of Lanes	2 at 4m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Competent	Volume of Vehicular Traffic	Moderate	Crossing Distance and Number of Lanes	2 at 4m+
	Speed Limit	Posted 80km/h	Medians	Flush painted	Minor Road Volumes and Movements	Moderate	Buses Stopping	None	Medians	Flush painted	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate	Speed Limit and Operating Speed	Posted 80km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 80km/h	Right-Turn Volumes	Moderate			Speed Limit and Operating Speed	Posted 80km/h	Historical	1 in 10 years	Right Turn Control at Intersection	None
	Medians	Flush painted	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 80km/h			Crossing Distance and Number of Lanes	2 at 4m+			Historical	1 in 10 years
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	Yes	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	1 in 10 years								
Severity	High Speed	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h
	Barriers	no			Reduced Conflict Angles	no	Visible Intersection	yes	Crossing Facilities	none	Roadside Hazards	open swale	Roadside Hazards	open swale
	Steep Gradient	no			Sight Distance	good	Surfaced	asphalt						
	Drains	open swale												
	Roadside Hazards	utility poles												
Scoring	Exposure (Off Peak)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	1	Exposure (Peak Season)	1	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	1	Exposure (Off Peak)	1	Exposure (Off Peak)	2
	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	3	Severity	3	Severity	2	Severity	1	Severity	4	Severity	4	Severity	3
Product	Peak Season	**15**	Peak Season	**15**	Peak Season	**10**	Peak Season	**2.5**	Peak Season	**8**	Peak Season	**8**	Peak Season	**12**
	Off Peak	**16.5**	Off Peak	**16.5**	Off Peak	**11**	Off Peak	**2.75**	Off Peak	**8**	Off Peak	**8**	Off Peak	**12**
	Post Development	**18**	Post Development	**18**	Post Development	**12**	Post Development	**3**	Post Development	**16**	Post Development	**16**	Post Development	**12**

TOTAL	Peak Season	**70.5**
	Off Peak	**74.75**
	Post Development	**95**
	Max Score	**448**

Figure 29: Cove Road and Mangawhai Heads Road SSA Matrix

Intersection		ADT	Peak Season ADT	Post Development Peak ADT	Potential Improvements:	
Road 1:	Cove Road	3400	4250	6150	- Footpath	- Fill open swale and drainage improvements
Road 2:	Mangawhai Heads Road				- Speed limit reduction (50-60km/h)	- Southbound left turn lane

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Low	Volume (Off Peak)	Low	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Low	Volume (Peak Season)	Low	Volume (Peak Season)	Moderate
	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Competent	Horizontal Alignment	Straight
	Vertical Alignment	Relatively flat	Vertical Alignment	Relatively flat	Intersection Control	Stop	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Relatively flat
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	Standard	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Crossing Distance and Number of Lanes	2 at 4m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Competent	Volume of Vehicular Traffic	Moderate	Crossing Distance and Number of Lanes	2 at 4m+
	Speed Limit	Posted 80km/h	Medians	Flush painted	Minor Road Volumes and Movements	Moderate	Buses Stopping	None	Medians	Flush painted	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate	Speed Limit and Operating Speed	Posted 80km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 80km/h	Right-Turn Volumes	Moderate			Speed Limit and Operating Speed	Posted 80km/h	Historical	1 in 10 years	Right Turn Control at Intersection	None
	Medians	Flush painted	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 80km/h			Crossing Distance and Number of Lanes	2 at 4m+			Historical	1 in 10 years
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	Yes	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	1 in 10 years								
Severity	High Speed	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h	Operating Speeds	~80 km/h
	Barriers	no			Reduced Conflict Angles	no	Visible Intersection	yes	Crossing Facilities	none	Roadside Hazards	open swale	Roadside Hazards	open swale
	Steep Gradient	no			Sight Distance	good	Surfaced	asphalt						
	Drains	open swale												
	Roadside Hazards	utility poles												
Scoring	Exposure (Off Peak)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	1	Exposure (Peak Season)	1	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	1	Exposure (Off Peak)	1	Exposure (Off Peak)	2
	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	3	Severity	3	Severity	2
Product	Peak Season	**10**	Peak Season	**10**	Peak Season	**10**	Peak Season	**2.5**	Peak Season	**6**	Peak Season	**6**	Peak Season	**8**
	Off Peak	**11**	Off Peak	**11**	Off Peak	**11**	Off Peak	**2.75**	Off Peak	**6**	Off Peak	**6**	Off Peak	**8**
	Post Development	**12**	Post Development	**12**	Post Development	**12**	Post Development	**3**	Post Development	**12**	Post Development	**12**	Post Development	**8**
TOTAL	Peak Season	**52.5**												
	Off Peak	**55.75**												
	Post Development	**71**												
	Max Score	**448**												

Figure 30: Cove Road and Mangawhai Heads Road with Improvements SSA Matrix

	Intersection	ADT	Peak Season ADT	Post Development Peak ADT
Road 1:	Mangawhai Heads Road	3800	4750	7050
Road 2:	Jack Boyd Drive			

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate
	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Casual	Horizontal Alignment	Straight
	Vertical Alignment	Moderate	Vertical Alignment	Moderate	Intersection Control	Stop	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Moderate
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	Standard	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Crossing Distance and Number of Lanes	2 at 4m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Children Expected	Volume of Vehicular Traffic	Moderate-high	Number and Width of Lanes	2 at 4m+
	Speed Limit	Posted 50km/h	Medians	None	Minor Road Volumes and Movements	Moderate	Buses Stopping	None	Medians	None	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate-high
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate-high	Speed Limit and Operating Speed	Posted 50km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 50km/h	Right-Turn Volumes	Low			Speed Limit and Operating Speed	Posted 50km/h	Historical	None	Right Turn Control at Intersection	None
	Medians	None	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 50km/h			Crossing Distance and Number of Lanes	2 at 4m+			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	No	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	None								
Severity	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h
	Barriers	No			Reduced Conflict Angles	No	Visible Intersection	Yes	Crossing Facilities	None	Roadside Hazards	Open swale	Roadside Hazards	open swale
	Steep Gradient	No			Sight Distance	Good	Surfaced	Asphalt						
	Drains	Open swale												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2	Exposure (Off Peak)	2	Exposure (Off Peak)	2
	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	2	Likelihood	2	Likelihood	2	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	3	Severity	3	Severity	3
Product	Peak Season	**10**	Peak Season	**10**	Peak Season	**10**	Peak Season	**2.5**	Peak Season	**12**	Peak Season	**12**	Peak Season	**12**
	Off Peak	**11**	Off Peak	**11**	Off Peak	**11**	Off Peak	**2.75**	Off Peak	**12**	Off Peak	**12**	Off Peak	**12**
	Post Development	**13**	Post Development	**13**	Post Development	**13**	Post Development	**3.25**	Post Development	**12**	Post Development	**12**	Post Development	**12**
TOTAL	Peak Season	**68.5**												
	Off Peak	**71.75**												
	Post Development	**78.25**												
	Max Score	**448**												

Figure 31: Mangawhai Heads Road and Jack Boyd Drive SSA Matrix

Intersection		ADT	Peak Season ADT	Post Development Peak ADT	Potential Improvements:	
Road 1:	Mangawhai Heads Road	3800	4750	7050	- Footpath	- Pedestrian crossing facility on MH Road
Road 2:	Jack Boyd Drive				- 4-leg roundabout OR	- Fill open swale and drainage improvements
					- auxillary turn lanes	

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate	Volume (Off Peak)	Moderate
	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate	Volume (Peak Season)	Moderate
	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate	Volume (Post Development)	Moderate
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	3-leg	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Casual	Horizontal Alignment	Straight
	Vertical Alignment	Moderate	Vertical Alignment	Moderate	Intersection Control	Stop	Protected Turn Lanes	No	Crossing Type	None	Separate Facilities	None	Vertical Alignment	Moderate
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	Standard	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	None	Crossing Facilities at Intersection	None	Pavement Condition	Good
	Barriers	None	Crossing Distance and Number of Lanes	2 at 4m+	Conflict Points and Complexity	9 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Children Expected	Volume of Vehicular Traffic	Moderate-high	Number and Width of Lanes	2 at 4m+
	Speed Limit	Posted 50km/h	Medians	None	Minor Road Volumes and Movements	Moderate	Buses Stopping	None	Medians	None	Road Shoulders	Intermittent	Volume of Vehicular Traffic	Moderate-high
	Heavy Vehicles	5-10%	Overtaking Opportunities	Limited	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	Moderate-high	Speed Limit and Operating Speed	Posted 50km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 50km/h	Right-Turn Volumes	Low			Speed Limit and Operating Speed	Posted 50km/h	Historical	None	Right Turn Control at Intersection	None
	Medians	None	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 50km/h			Crossing Distance and Number of Lanes	2 at 4m+			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	No	Intersection Movements	Right-turns	Visibility	Good								
	Historical	None	Historical	None	Historical	None								
Severity	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h	Operating Speeds	~50 km/h
	Barriers	No			Reduced Conflict Angles	No	Visible Intersection	Yes	Crossing Facilities	None	Roadside Hazards	Open swale	Roadside Hazards	open swale
	Steep Gradient	No			Sight Distance	Good	Surfaced	Asphalt						
	Drains	Open swale												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2.5	Exposure (Peak Season)	2	Exposure (Peak Season)	2	Exposure (Peak Season)	2
	Exposure (Peak Season)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2.75	Exposure (Off Peak)	2	Exposure (Off Peak)	2	Exposure (Off Peak)	2
	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	3.25	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2	Exposure (Post Develoment)	2
	Likelihood	1	Likelihood	1	Likelihood	1	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	2	Severity	2	Severity	2
Product	Peak Season	**5**	Peak Season	**5**	Peak Season	**5**	Peak Season	**2.5**	Peak Season	**8**	Peak Season	**8**	Peak Season	**8**
	Off Peak	**5.5**	Off Peak	**5.5**	Off Peak	**5.5**	Off Peak	**2.75**	Off Peak	**8**	Off Peak	**8**	Off Peak	**8**
	Post Development	**6.5**	Post Development	**6.5**	Post Development	**6.5**	Post Development	**3.25**	Post Development	**8**	Post Development	**8**	Post Development	**8**
TOTAL	Peak Season	**41.5**												
	Off Peak	**43.25**												
	Post Development	**46.75**												
	Max Score	**448**												

Figure 32: Mangawhai Heads Road and Jack Boyd Drive with Improvements SSA Matrix

	Intersection	ADT	Peak Season ADT	Post Development Peak ADT
Road 1:	Mangawhai Heads Road	9400	11750	13750
Road 2:	Molesworth Drive / Cullen Street			

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High
	Volume (Peak Season)	Very High	Volume (Peak Season)	Very High	Volume (Peak Season)	Very High	Volume (Peak Season)	Very High	Volume (Peak Season)	High	Volume (Peak Season)	High	Volume (Peak Season)	Very High
	Volume (Post Development)	Very High	Volume (Post Development)	Very High	Volume (Post Development)	Very High	Volume (Post Development)	Very High	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	Very High
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	Roundabout	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Casual	Horizontal Alignment	Straight
	Vertical Alignment	Moderate grade	Vertical Alignment	Moderate grade	Intersection Control	Give-way	Protected Turn Lanes	No	Crossing Type	Refuge island	Separate Facilities	None	Vertical Alignment	Moderate grade
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	central island	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	Partial	Crossing Facilities at Intersection	Refuge island	Pavement Condition	Good
	Barriers	None	Number and Width of Lanes	2 at 3m+	Conflict Points and Complexity	8 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Children expected	Volume of Vehicular Traffic	High	Number and Width of Lanes	2 at 3m+
	Speed Limit	Posted 50km/h	Medians	On appproach	Minor Road Volumes and Movements	Moderate	Buses Stopping	None	Medians	On appproach	Road Shoulders	None	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	n/a	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	High	Speed Limit and Operating Speed	Posted 50km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 50km/h	Right-Turn Volumes	None			Speed Limit and Operating Speed	Posted 50km/h	Historical	None	Right Turn Control at Intersection	Yes
	Medians	On appproach	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 50km/h			Crossing Distance and Number of Lanes	1 at ~4m			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	No	Intersection Movements	roundabout	Visibility	Good								
	Historical	None	Historical	none	Historical	None								
Severity	High Speed	No	Operating Speeds	~50km/h	Operating Speeds	~50km/h	Operating Speeds	~80 km/h	Operating Speeds	~50km/h	Operating Speeds	~50km/h	Operating Speeds	~50km/h
	Barriers	No			Reduced Conflict Angles	Yes	Visible Intersection	Yes	Crossing Facilities	Refuge island	Roadside Hazards	Utility poles	Roadside Hazards	Utility poles
	Steep Gradient	Moderate			Sight Distance	Good	Surfaced	Asphalt						
	Drains	None												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	3.75	Exposure (Peak Season)	3.75	Exposure (Peak Season)	3.75	Exposure (Peak Season)	2.25	Exposure (Peak Season)	3	Exposure (Peak Season)	3	Exposure (Peak Season)	3
	Exposure (Peak Season)	4	Exposure (Off Peak)	4	Exposure (Off Peak)	4	Exposure (Off Peak)	2.25	Exposure (Off Peak)	3	Exposure (Off Peak)	3	Exposure (Off Peak)	4
	Exposure (Post Develoment)	4	Exposure (Post Develoment)	4	Exposure (Post Develoment)	4	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	4
	Likelihood	1	Likelihood	1	Likelihood	1	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	2	Severity	2	Severity	2
Product	Peak Season	**7.5**	Peak Season	**7.5**	Peak Season	**7.5**	Peak Season	**2.25**	Peak Season	**12**	Peak Season	**12**	Peak Season	**12**
	Off Peak	**8**	Off Peak	**8**	Off Peak	**8**	Off Peak	**2.25**	Off Peak	**12**	Off Peak	**12**	Off Peak	**16**
	Post Development	**8**	Post Development	**8**	Post Development	**8**	Post Development	**2.5**	Post Development	**12**	Post Development	**12**	Post Development	**16**

TOTAL	Peak Season	**60.75**
	Off Peak	**66.25**
	Post Development	**66.5**
	Max Score	**448**

Figure 33: Mangawhai Heads Road and Molesworth Drive SSA Matrix

Intersection		ADT	Peak Season ADT	Post Development Peak ADT	Potential Improvements:
Road 1:	Mangawhai Heads Road	9400	11750	13750	- Pedestrian facilities on the northwest corner
Road 2:	Molesworth Drive / Cullen Street				- Removal of vehicle crossings within roundabout

	Run-Off-Road		Head-On		Intersection		Other		Pedestrian		Cyclist		Motorcyclist	
Exposure	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High	Volume (Off Peak)	High
	Volume (Peak Season)	Very High	Volume (Peak Season)	Very High	Volume (Peak Season)	Very High	Volume (Peak Season)	Very High	Volume (Peak Season)	High	Volume (Peak Season)	High	Volume (Peak Season)	Very High
	Volume (Post Development)	Very High	Volume (Post Development)	Very High	Volume (Post Development)	Very High	Volume (Post Development)	Very High	Volume (Post Development)	High	Volume (Post Development)	High	Volume (Post Development)	Very High
Likelihood	Horizontal Alignment	Straight	Horizontal Alignment	Straight	Intersection Type	Roundabout	High Number of Lanes	No	Controlled or Uncontrolled Crossings	Uncontrolled	Cyclist Characteristics	Casual	Horizontal Alignment	Straight
	Vertical Alignment	Moderate grade	Vertical Alignment	Moderate grade	Intersection Control	Give-way	Protected Turn Lanes	No	Crossing Type	Refuge island	Separate Facilities	None	Vertical Alignment	Moderate grade
	Pavement Condition	Good	Pavement Condition	Good	Intersection Features	central island	Extended Deceleration Lanes	No	Crossing Facilities at Intersections	Partial	Crossing Facilities at Intersection	Refuge island	Pavement Condition	Good
	Barriers	None	Number and Width of Lanes	2 at 3m+	Conflict Points and Complexity	8 - simple	Need to Stop at Sign	n/a	Pedestrian Characteristics	Children expected	Volume of Vehicular Traffic	High	Number and Width of Lanes	2 at 3m+
	Speed Limit	Posted 50km/h	Medians	On appproach	Minor Road Volumes and Movements	Moderate	Buses Stopping	None	Medians	On appproach	Road Shoulders	None	Volume of Vehicular Traffic	Moderate
	Heavy Vehicles	5-10%	Overtaking Opportunities	n/a	Heavy Vehicles	5-10%	Historical	None	Traffic Volumes	High	Speed Limit and Operating Speed	Posted 50km/h	Sightlines	Good
	Driver Fatigue	Slight	Speed Limit and Operating Speed	Posted 50km/h	Right-Turn Volumes	None			Speed Limit and Operating Speed	Posted 50km/h	Historical	None	Right Turn Control at Intersection	Yes
	Medians	On appproach	Heavy Vehicles	5-10%	Speed Limit and Operating Speed	Posted 50km/h			Crossing Distance and Number of Lanes	1 at ~4m			Historical	None
	Guideance and Delineation	Good	Potential for Wrong Way Movements	Minor	Protected Turn Lanes	No			Historical	None				
	Auxillary Lanes	No	Intersection Movements	roundabout	Visibility	Good								
	Historical	None	Historical	none	Historical	None								
Severity	High Speed	No	Operating Speeds	~50km/h	Operating Speeds	~50km/h	Operating Speeds	~80 km/h	Operating Speeds	~50km/h	Operating Speeds	~50km/h	Operating Speeds	~50km/h
	Barriers	No			Reduced Conflict Angles	Yes	Visible Intersection	Yes	Crossing Facilities	Refuge island	Roadside Hazards	Utility poles	Roadside Hazards	Utility poles
	Steep Gradient	Moderate			Sight Distance	Good	Surfaced	Asphalt						
	Drains	None												
	Roadside Hazards	Utility poles												
Scoring	Exposure (Off Peak)	3.75	Exposure (Peak Season)	3.75	Exposure (Peak Season)	3.75	Exposure (Peak Season)	2.25	Exposure (Peak Season)	3	Exposure (Peak Season)	3	Exposure (Peak Season)	3
	Exposure (Peak Season)	4	Exposure (Off Peak)	4	Exposure (Off Peak)	4	Exposure (Off Peak)	2.25	Exposure (Off Peak)	3	Exposure (Off Peak)	3	Exposure (Off Peak)	4
	Exposure (Post Develoment)	4	Exposure (Post Develoment)	4	Exposure (Post Develoment)	4	Exposure (Post Develoment)	2.5	Exposure (Post Develoment)	3	Exposure (Post Develoment)	3	Exposure (Post Develoment)	4
	Likelihood	1	Likelihood	1	Likelihood	1	Likelihood	1	Likelihood	2	Likelihood	2	Likelihood	2
	Severity	2	Severity	2	Severity	2	Severity	1	Severity	2	Severity	2	Severity	2
Product	Peak Season	**7.5**	Peak Season	**7.5**	Peak Season	**7.5**	Peak Season	**2.25**	Peak Season	**12**	Peak Season	**12**	Peak Season	**12**
	Off Peak	**8**	Off Peak	**8**	Off Peak	**8**	Off Peak	**2.25**	Off Peak	**12**	Off Peak	**12**	Off Peak	**16**
	Post Development	**8**	Post Development	**8**	Post Development	**8**	Post Development	**2.5**	Post Development	**12**	Post Development	**12**	Post Development	**16**

TOTAL	Peak Season	**60.75**
	Off Peak	**66.25**
	Post Development	**66.5**
	Max Score	**448**

Figure 34: Mangawhai Heads Road and Molesworth Drive with Improvements SSA Matrix

6.0 IDENTIFIED NETWORK IMPROVEMENTS

6.1 Intersections

Following the completion of the operations assessment (**Section 4**) and the Safe System Assessment (**Section 5**), the following network improvements are likely to be required to facilitate the safe and efficient functionality of the Plan Change area. These improvements would be subject to more detailed assessment and engineering design at subsequent subdivision stages, where more detail is known. Additionally, these improvements would be carried out in coordination with the Northland Transport Alliance and Council to ensure that the proposal align with the wider goals/objectives of the area:

- Cove Road and Pigeonwood Place:
  - Install the northbound right-turn lane into Pigeonwood Place
  - Installation of Give-way sign on Pigeonwood Place intersection approach
- Cove Road and Robert Hastie Drive:
  - No specific improvements required
- Cove Road and Mangawhai Heads Road:
  - Upgrade of southbound left turn lane
- Mangawhai Heads Road and Jack Boyd Drive / "Road 4":
  - Upgrading of intersection to have auxiliary turn lanes, or be formed as a roundabout
- Mangawhai Heads Road and Molesworth Drive / Cullen Street:
  - No specific improvements required

Through the implementation of these improvements, the existing transport network can continue to operate at a suitable operational level, as well as have its overall safety improved. It is noted that these identified improvements are preliminary as specific details of the ultimate development of the Plan Change area are unknown. As a subdivision is a Restricted Discretionary activity within the Precinct, Council will be able to consider traffic effects and the proposed road design of an application, and therefore any subdivision application would include a Transport Assessment focussing on the specific effects, if any, of the proposal. This allows for further assessment in the future to ensure that appropriate design responses are provided.

6.2 Proposed Intersections

In reviewing the indicative road connections for the plan change area, it was identified these locations had generally good sight distance and can be suitably separated from adjacent intersections or combined with adjacent intersections. The design of any future intersection would be carried out by a professional design team, and independent SSA auditor, as well as with input from Council and NTA. As such, it is considered that these intersections can be constructed to allow for safe and efficient movement of vehicles, pedestrians and cyclists. Reviewing the right-turn warrant nomographs for the proposed intersections, it was determined that all future intersections would require a dedicated right-turn lane to connect to the side street. Warrant nomographs are included in **Attachment 5**. The following figures display the indicative sightlines available at these locations.

Figure 35: Cove Road and “Road 1” Indicative Sightlines

Figure 36: Mangawhai Heads Road and "Road 2" Indicative Sightlines

Figure 37: Mangawhai Heads Road and “Road 3” Indicative Sightlines

Figure 38: Mangawhai Heads Road and "Road 4" Indicative Sightlines

Figure 39: Mangawhai Heads Road and "Cul-de-sac Road" Indicative Sightlines

6.3 General Road Network

The surrounding road network would benefit from changes/improvements, which would increase the overall safety and functionality of the area. These changes would be subject to further design investigation/feasibility and are:

- Fill in of open swale drainage to enable footpath construction, as required.
- Speed limit reduction to 50 km/h or 60 km/h on Cove Road from approximately 250 metres south of Mangawhai Heads Road and 250 metres north of Pigeonwood Place.
- Install streetlighting along existing sections of Pigeonwood Place.

Through the implementation of these improvements, the existing transport network can continue to operate at a suitable operational level, as well as have its overall safety improved. It is again noted that any subdivision is a Restricted Discretionary activity within the Precinct and effects of any development will need to be assessed and remedied as part of subsequent applications.

6.4 Pedestrian and Cyclist Facilities

The area surrounding the plan change area currently has limited footpath facilities to enable safe and efficient movement of pedestrians and less confident cyclists. As part of the plan change it is considered appropriate to provide suitable footpath connections between new dwellings and the existing pedestrian network.

It is expected that all new roads within the Plan Change area will provide footpaths on both sides of the respective carriageways. Further to enable safe cyclist connections, shared paths are also proposed to connect through the area. It is noted that no shared path is proposed along Cove Road. Rather a footpath connection is proposed, as within the northeast corner of the intersection of Cove Road and Mangawhai Heads Road there is limited shoulder width within the legal boundaries of the road. It is likely that the available width would not be able to contain a shared path and as such alternate routes are provided throughout the area. The indicative active transport network is included in Figure 40.

Based on the fragmented ownership of properties within the Plan Change area, it is very unlikely that the entirety of the area would all be developed at the same time. As a result, it is also unlikely that the entirety of the enabling footpath connections would be constructed all at the same time; as in doing so would require the first development to construct upwards of 1.4 kilometres of new footpath connection. Based on the size of the development proposed there is potential that a footpath connection may not be needed initially when considering the likely generation of pedestrian trips to the wider network. It is considered appropriate that instead of constructing the entirety of the footpath connections along Cove Road and Mangawhai Heads Road, a pedestrian demand assessment should be prepared as part of the supporting Transport Assessment. This demand assessment would be able to look at mode share of trips within the area and further assess the availability of routes and determine the requirement for pedestrian/cyclist facilities.

Further it is noted that the development within Robert Hastie Drive supports approximately 60 residential lots and there have been no pedestrian connections provided to date, albeit it is noted that this area has less density than the proposed Plan Change area.

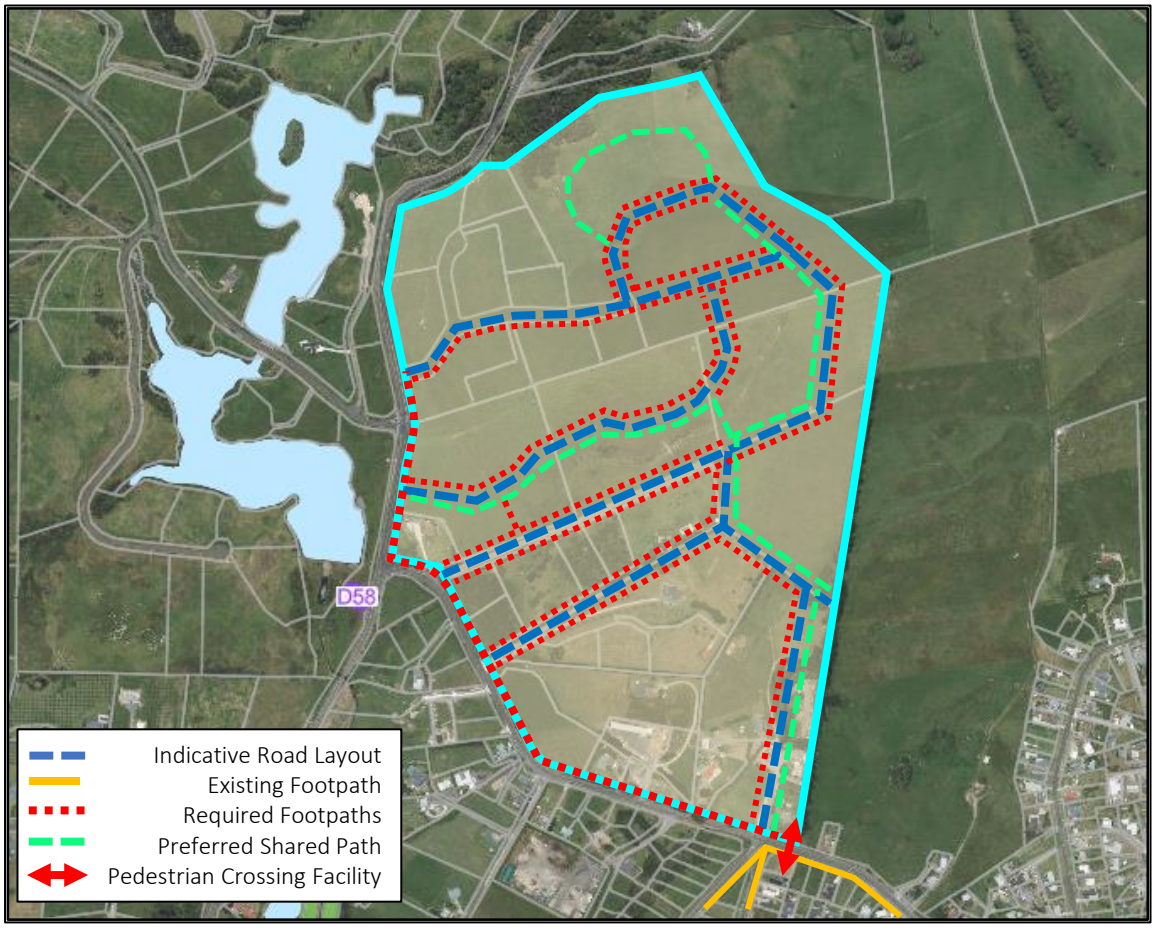

Figure 40: Plan Change Area Indicative Pedestrian/Cycle Network

7.0 CONCLUSION

Based on the investigations carried out as part of this assessment the following is concluded:

- The proposed plan change for approximately 54 hectares of rural land, enabling the creation of approximately 380 residential lots, will generate approximately 3,116 daily trips and 342 peak hour trips.
    - Trip generation has been calculated based on the 85th percentile trip generation rate for each of the 380 dwellings; thereby representing a conservative approach to effect determination.
- A review of the area crash history did not suggest any inherent road safety issues, which would likely result in serious injury or death.
- When these trips are assigned to the wider road network, there were no noticeable effects onto the studied intersections, as they continue to operate at acceptable levels.
- Cove Road from approximately 250 metres south of Mangawhai Heads Road and 250 metres north of Pigeonwood Place should have a speed reduction from 80 km/h to 50 or 60 km/h.
- Area roads (intersections) where accommodating turning movements associated with the Plan Change Area, should be provided with auxiliary right turn bays to increase the general safety of vehicle movements, along with increased lighting and infill of open swale drainage (where appropriate).
- Development within the Plan Change area should provide pedestrian/cyclist connections to the existing network, on a demand basis dependent on the proposed subdivision application supported by a Transport Assessment by a suitably qualified professional.
- Subsequent subdivision applications involving public roads to be vested shall provide an Integrated Transport Assessment and Safe System Assessment to ensure more detailed assessment is carried out with respect to the proposal.

Prepared by,

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ATTACHMENT 1:

EXISTING TRAFFIC INTERSECTION OPERATIONS

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: EX_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	74	12	78	16.2	0.045	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
3	R2	1	0	1	0.0	0.045	4.8	LOS A	0.0	0.1	0.01	0.01	0.01	49.0
Approach		75	12	79	16.0	0.045	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.9
East: Pigeonwood Place														
4	L2	2	0	2	0.0	0.002	4.8	LOS A	0.0	0.1	0.16	0.50	0.16	46.3
6	R2	1	0	1	0.0	0.002	5.1	LOS A	0.0	0.1	0.16	0.50	0.16	45.8
Approach		3	0	3	0.0	0.002	4.9	LOS A	0.0	0.1	0.16	0.50	0.16	46.1
North: Cove Road														
7	L2	1	0	1	0.0	0.040	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
8	T1	69	7	73	10.1	0.040	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		70	7	74	10.0	0.040	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		148	19	156	12.8	0.045	0.2	NA	0.0	0.1	0.01	0.02	0.01	49.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: EX_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	39	2	41	5.1	0.067	4.6	LOS A	0.0	0.0	0.00	0.19	0.00	48.3
2	T1	73	12	77	16.4	0.067	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	48.8
Approach		112	14	118	12.5	0.067	1.6	NA	0.0	0.0	0.00	0.19	0.00	48.6
North: Cove Road														
8	T1	69	7	73	10.1	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	2	0	2	0.0	0.001	4.9	LOS A	0.0	0.0	0.22	0.50	0.22	45.7
Approach		71	7	75	9.9	0.040	0.1	NA	0.0	0.0	0.01	0.01	0.01	49.9
West: Robert Hastie Drive														
10	L2	2	0	2	0.0	0.044	4.8	LOS A	0.2	1.2	0.30	0.56	0.30	46.0
12	R2	39	1	41	2.6	0.044	5.6	LOS A	0.2	1.2	0.30	0.56	0.30	45.5
Approach		41	1	43	2.4	0.044	5.5	LOS A	0.2	1.2	0.30	0.56	0.30	45.5
All Vehicles		224	22	236	9.8	0.067	1.9	NA	0.2	1.2	0.06	0.20	0.06	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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove Road - MH Road (Site Folder: EX_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	46	6	48	13.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	73	3	77	4.1	0.049	5.0	LOS A	0.2	1.6	0.24	0.53	0.24	45.6
Approach		119	9	125	7.6	0.049	3.1	NA	0.2	1.6	0.15	0.32	0.15	47.2
East: Road 1														
4	L2	45	3	47	6.7	0.133	4.7	LOS A	0.6	4.2	0.14	0.54	0.14	46.0
6	R2	88	8	93	9.1	0.133	6.0	LOS A	0.6	4.2	0.14	0.54	0.14	45.5
Approach		133	11	140	8.3	0.133	5.6	LOS A	0.6	4.2	0.14	0.54	0.14	45.7
North: Cove Road														
7	L2	91	6	96	6.6	0.069	4.6	LOS A	0.0	0.0	0.00	0.41	0.00	47.1
8	T1	26	3	27	11.5	0.069	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	47.6
Approach		117	9	123	7.7	0.069	3.6	NA	0.0	0.0	0.00	0.41	0.00	47.2
All Vehicles		369	29	388	7.9	0.133	4.1	NA	0.6	4.2	0.10	0.43	0.10	46.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Road - Jack Boyd Drive (Site Folder: EX_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	10	0	11	0.0	0.070	8.0	LOS A	0.2	1.7	0.34	0.91	0.34	44.7
3	R2	48	2	51	4.2	0.070	8.8	LOS A	0.2	1.7	0.34	0.91	0.34	44.3
Approach		58	2	61	3.4	0.070	8.6	LOS A	0.2	1.7	0.34	0.91	0.34	44.3
East: MH Road														
4	L2	22	3	23	13.6	0.086	4.7	LOS A	0.0	0.0	0.00	0.08	0.00	48.8
5	T1	124	15	131	12.1	0.086	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	49.5
Approach		146	18	154	12.3	0.086	0.7	NA	0.0	0.0	0.00	0.08	0.00	49.4
West: MH Road														
11	T1	151	18	159	11.9	0.095	0.0	LOS A	0.1	0.6	0.04	0.03	0.04	49.7
12	R2	9	1	9	11.1	0.095	5.3	LOS A	0.1	0.6	0.04	0.03	0.04	48.5
Approach		160	19	168	11.9	0.095	0.3	NA	0.1	0.6	0.04	0.03	0.04	49.6
All Vehicles		364	39	383	10.7	0.095	1.8	NA	0.2	1.7	0.07	0.19	0.07	48.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Road - Molesworth Dr - Cullen St (Site Folder: EX_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	139	10	146	7.2	0.130	3.0	LOS A	0.7	5.3	0.10	0.44	0.10	47.2
2	T1	7	1	7	14.3	0.130	2.9	LOS A	0.7	5.3	0.10	0.44	0.10	48.3
3	R2	39	1	41	2.6	0.130	7.4	LOS A	0.7	5.3	0.10	0.44	0.10	48.6
Approach		185	12	195	6.5	0.130	3.9	LOS A	0.7	5.3	0.10	0.44	0.10	47.6
East: MH Road														
4	L2	40	2	42	5.0	0.053	4.0	LOS A	0.3	1.9	0.39	0.46	0.39	47.0
5	T1	15	1	16	6.7	0.053	3.9	LOS A	0.3	1.9	0.39	0.46	0.39	48.1
6	R2	1	0	1	0.0	0.053	8.3	LOS A	0.3	1.9	0.39	0.46	0.39	48.3
Approach		56	3	59	5.4	0.053	4.0	LOS A	0.3	1.9	0.39	0.46	0.39	47.3
North: Cullen Street														
7	L2	2	0	2	0.0	0.013	4.0	LOS A	0.1	0.5	0.41	0.45	0.41	46.5
8	T1	9	1	9	11.1	0.013	4.1	LOS A	0.1	0.5	0.41	0.45	0.41	47.5
9	R2	2	0	2	0.0	0.013	8.5	LOS A	0.1	0.5	0.41	0.45	0.41	47.7
Approach		13	1	14	7.7	0.013	4.8	LOS A	0.1	0.5	0.41	0.45	0.41	47.4
West: MH Road														
10	L2	1	0	1	0.0	0.166	3.1	LOS A	0.9	6.3	0.17	0.57	0.17	45.3
11	T1	10	1	11	10.0	0.166	3.1	LOS A	0.9	6.3	0.17	0.57	0.17	46.3
12	R2	213	6	224	2.8	0.166	7.5	LOS A	0.9	6.3	0.17	0.57	0.17	46.5
Approach		224	7	236	3.1	0.166	7.3	LOS A	0.9	6.3	0.17	0.57	0.17	46.4
All Vehicles		478	23	503	4.8	0.166	5.5	LOS A	0.9	6.3	0.18	0.50	0.18	47.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: EX_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	70	5	74	7.1	0.041	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	49.9
3	R2	2	0	2	0.0	0.041	4.9	LOS A	0.0	0.1	0.01	0.02	0.01	48.9
Approach		72	5	76	6.9	0.041	0.1	NA	0.0	0.1	0.01	0.02	0.01	49.8
East: Pigeonwood Place														
4	L2	2	0	2	0.0	0.002	4.9	LOS A	0.0	0.1	0.21	0.50	0.21	46.1
6	R2	1	0	1	0.0	0.002	5.2	LOS A	0.0	0.1	0.21	0.50	0.21	45.7
Approach		3	0	3	0.0	0.002	5.0	LOS A	0.0	0.1	0.21	0.50	0.21	46.0
North: Cove Road														
7	L2	1	0	1	0.0	0.062	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
8	T1	109	6	115	5.5	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		110	6	116	5.5	0.062	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		185	11	195	5.9	0.062	0.2	NA	0.0	0.1	0.01	0.02	0.01	49.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: EX_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	26	0	27	0.0	0.058	4.6	LOS A	0.0	0.0	0.00	0.14	0.00	48.7
2	T1	76	5	80	6.6	0.058	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	49.2
Approach		102	5	107	4.9	0.058	1.2	NA	0.0	0.0	0.00	0.14	0.00	49.0
North: Cove Road														
8	T1	91	0	96	0.0	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	3	0	3	0.0	0.002	4.8	LOS A	0.0	0.1	0.21	0.50	0.21	45.7
Approach		94	0	99	0.0	0.049	0.2	NA	0.0	0.1	0.01	0.02	0.01	49.8
West: Robert Hastie Drive														
10	L2	2	0	2	0.0	0.041	4.8	LOS A	0.2	1.1	0.30	0.56	0.30	46.0
12	R2	36	0	38	0.0	0.041	5.6	LOS A	0.2	1.1	0.30	0.56	0.30	45.6
Approach		38	0	40	0.0	0.041	5.6	LOS A	0.2	1.1	0.30	0.56	0.30	45.6
All Vehicles		234	5	246	2.1	0.058	1.5	NA	0.2	1.1	0.05	0.16	0.05	48.7

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove Road - MH Road (Site Folder: EX_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	16	2	17	12.5	0.009	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	65	8	68	12.3	0.046	5.1	LOS A	0.2	1.6	0.25	0.53	0.25	45.5
Approach		81	10	85	12.3	0.046	4.1	NA	0.2	1.6	0.20	0.43	0.20	46.3
East: Road 1														
4	L2	90	7	95	7.8	0.145	4.7	LOS A	0.6	4.6	0.12	0.53	0.12	46.2
6	R2	77	3	81	3.9	0.145	5.7	LOS A	0.6	4.6	0.12	0.53	0.12	45.8
Approach		167	10	176	6.0	0.145	5.2	LOS A	0.6	4.6	0.12	0.53	0.12	46.0
North: Cove Road														
7	L2	98	2	103	2.0	0.073	4.6	LOS A	0.0	0.0	0.00	0.41	0.00	47.2
8	T1	29	2	31	6.9	0.073	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	47.7
Approach		127	4	134	3.1	0.073	3.6	NA	0.0	0.0	0.00	0.41	0.00	47.3
All Vehicles		375	24	395	6.4	0.145	4.4	NA	0.6	4.6	0.10	0.47	0.10	46.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Road - Jack Boyd Drive (Site Folder: EX_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	15	1	16	6.7	0.042	8.5	LOS A	0.1	1.1	0.35	0.89	0.35	44.6
3	R2	20	1	21	5.0	0.042	9.2	LOS A	0.1	1.1	0.35	0.89	0.35	44.2
Approach		35	2	37	5.7	0.042	8.9	LOS A	0.1	1.1	0.35	0.89	0.35	44.3
East: MH Road														
4	L2	38	0	40	0.0	0.123	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	48.9
5	T1	179	15	188	8.4	0.123	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.4
Approach		217	15	228	6.9	0.123	0.8	NA	0.0	0.0	0.00	0.10	0.00	49.3
West: MH Road														
11	T1	149	10	157	6.7	0.099	0.2	LOS A	0.2	1.2	0.10	0.06	0.10	49.4
12	R2	19	2	20	10.5	0.099	5.6	LOS A	0.2	1.2	0.10	0.06	0.10	48.2
Approach		168	12	177	7.1	0.099	0.8	NA	0.2	1.2	0.10	0.06	0.10	49.3
All Vehicles		420	29	442	6.9	0.123	1.5	NA	0.2	1.2	0.07	0.15	0.07	48.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Road - Molesworth Dr - Cullen St (Site Folder: EX_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	212	9	223	4.2	0.183	2.9	LOS A	1.1	7.6	0.10	0.43	0.10	47.3
2	T1	8	0	8	0.0	0.183	2.9	LOS A	1.1	7.6	0.10	0.43	0.10	48.5
3	R2	49	0	52	0.0	0.183	7.4	LOS A	1.1	7.6	0.10	0.43	0.10	48.7
Approach		269	9	283	3.3	0.183	3.7	LOS A	1.1	7.6	0.10	0.43	0.10	47.6
East: MH Road														
4	L2	47	3	49	6.4	0.057	3.7	LOS A	0.3	2.1	0.34	0.44	0.34	47.1
5	T1	15	1	16	6.7	0.057	3.7	LOS A	0.3	2.1	0.34	0.44	0.34	48.2
6	R2	1	0	1	0.0	0.057	8.1	LOS A	0.3	2.1	0.34	0.44	0.34	48.5
Approach		63	4	66	6.3	0.057	3.8	LOS A	0.3	2.1	0.34	0.44	0.34	47.4
North: Cullen Street														
7	L2	3	0	3	0.0	0.010	3.8	LOS A	0.0	0.3	0.37	0.42	0.37	46.8
8	T1	7	0	7	0.0	0.010	3.8	LOS A	0.0	0.3	0.37	0.42	0.37	47.9
9	R2	1	0	1	0.0	0.010	8.3	LOS A	0.0	0.3	0.37	0.42	0.37	48.1
Approach		11	0	12	0.0	0.010	4.2	LOS A	0.0	0.3	0.37	0.42	0.37	47.6
West: MH Road														
10	L2	3	0	3	0.0	0.138	3.1	LOS A	0.7	5.2	0.19	0.56	0.19	45.4
11	T1	18	1	19	5.6	0.138	3.1	LOS A	0.7	5.2	0.19	0.56	0.19	46.4
12	R2	159	7	167	4.4	0.138	7.6	LOS A	0.7	5.2	0.19	0.56	0.19	46.6
Approach		180	8	189	4.4	0.138	7.1	LOS A	0.7	5.2	0.19	0.56	0.19	46.5
All Vehicles		523	21	551	4.0	0.183	4.9	LOS A	1.1	7.6	0.17	0.48	0.17	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: EX_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	88	7.0	93	7.0	0.052	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	79.4
3	R2	3	0.0	3	0.0	0.052	7.1	LOS A	0.0	0.2	0.02	0.02	0.02	65.3
Approach		91	6.8	96	6.8	0.052	0.3	NA	0.0	0.2	0.02	0.02	0.02	78.9
East: Pigeonwood Place														
4	L2	3	0.0	3	0.0	0.003	5.9	LOS A	0.0	0.1	0.24	0.54	0.24	57.9
6	R2	1	0.0	1	0.0	0.003	6.3	LOS A	0.0	0.1	0.24	0.54	0.24	57.5
Approach		4	0.0	4	0.0	0.003	6.0	LOS A	0.0	0.1	0.24	0.54	0.24	57.8
North: Cove Road														
7	L2	1	0.0	1	0.0	0.077	7.0	LOS A	0.0	0.0	0.00	0.00	0.00	74.5
8	T1	136	6.0	143	6.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		137	6.0	144	6.0	0.077	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		232	6.2	244	6.2	0.077	0.2	NA	0.0	0.2	0.01	0.02	0.01	78.9

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: EX_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	33	0.0	35	0.0	0.072	7.0	LOS A	0.0	0.0	0.00	0.17	0.00	71.9
2	T1	95	6.0	100	6.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	76.8
Approach		128	4.5	135	4.5	0.072	1.8	NA	0.0	0.0	0.00	0.17	0.00	75.5
North: Cove Road														
8	T1	114	7.0	120	7.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	4	0.0	4	0.0	0.003	7.0	LOS A	0.0	0.1	0.24	0.57	0.24	40.5
Approach		118	6.8	124	6.8	0.064	0.2	NA	0.0	0.1	0.01	0.02	0.01	77.4
West: Robert Hastie Drive														
10	L2	3	0.0	3	0.0	0.054	2.3	LOS A	0.2	1.5	0.34	0.47	0.34	40.1
12	R2	45	0.0	47	0.0	0.054	3.7	LOS A	0.2	1.5	0.34	0.47	0.34	40.0
Approach		48	0.0	51	0.0	0.054	3.6	LOS A	0.2	1.5	0.34	0.47	0.34	40.0
All Vehicles		294	4.7	309	4.7	0.072	1.5	NA	0.2	1.5	0.06	0.16	0.06	66.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: EX_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	20	15.0	21	15.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	81	12.0	85	12.0	0.059	7.4	LOS A	0.3	2.1	0.29	0.61	0.29	57.1
Approach		101	12.6	106	12.6	0.059	6.0	NA	0.3	2.1	0.23	0.49	0.23	60.5
East: MH Rd														
4	L2	113	8.0	119	8.0	0.188	5.8	LOS A	0.8	6.2	0.14	0.57	0.14	56.0
6	R2	96	4.0	101	4.0	0.188	7.0	LOS A	0.8	6.2	0.14	0.57	0.14	56.6
Approach		209	6.2	220	6.2	0.188	6.3	LOS A	0.8	6.2	0.14	0.57	0.14	56.3
North: Cove Road														
7	L2	123	2.0	129	2.0	0.091	7.0	LOS A	0.0	0.0	0.00	0.50	0.00	66.4
8	T1	36	8.0	38	8.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.50	0.00	71.4
Approach		159	3.4	167	3.4	0.091	5.4	NA	0.0	0.0	0.00	0.50	0.00	67.5
All Vehicles		469	6.6	494	6.6	0.188	5.9	NA	0.8	6.2	0.11	0.53	0.11	60.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr (Site Folder: EX_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	19	5.0	20	5.0	0.068	7.9	LOS A	0.2	1.7	0.43	0.92	0.43	39.9
2	T1	1	0.0	1	0.0	0.068	9.6	LOS A	0.2	1.7	0.43	0.92	0.43	39.8
3	R2	25	4.0	26	4.0	0.068	10.4	LOS B	0.2	1.7	0.43	0.92	0.43	39.6
Approach		45	4.3	47	4.3	0.068	9.3	LOS A	0.2	1.7	0.43	0.92	0.43	39.7
East: MH Road														
4	L2	48	0.0	51	0.0	0.155	4.6	LOS A	0.0	0.1	0.00	0.10	0.00	44.2
5	T1	224	8.0	236	8.0	0.155	0.0	LOS A	0.0	0.1	0.00	0.10	0.00	49.4
6	R2	1	0.0	1	0.0	0.155	5.3	LOS A	0.0	0.1	0.00	0.10	0.00	48.4
Approach		273	6.6	287	6.6	0.155	0.8	NA	0.0	0.1	0.00	0.10	0.00	48.4
North: Road 5														
7	L2	1	0.0	1	0.0	0.004	8.2	LOS A	0.0	0.1	0.40	0.86	0.40	44.2
8	T1	1	0.0	1	0.0	0.004	10.1	LOS B	0.0	0.1	0.40	0.86	0.40	40.1
9	R2	1	0.0	1	0.0	0.004	10.6	LOS B	0.0	0.1	0.40	0.86	0.40	44.1
Approach		3	0.0	3	0.0	0.004	9.6	LOS A	0.0	0.1	0.40	0.86	0.40	42.7
West: MH Road														
10	L2	1	0.0	1	0.0	0.127	5.8	LOS A	0.2	1.7	0.12	0.07	0.12	48.8
11	T1	186	7.0	196	7.0	0.127	0.2	LOS A	0.2	1.7	0.12	0.07	0.12	49.3
12	R2	24	13.0	25	13.0	0.127	5.9	LOS A	0.2	1.7	0.12	0.07	0.12	43.7
Approach		211	7.6	222	7.6	0.127	0.9	NA	0.2	1.7	0.12	0.07	0.12	48.6
All Vehicles		532	6.8	560	6.8	0.155	1.6	NA	0.2	1.7	0.09	0.16	0.09	47.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: EX_SAT)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	265	4.0	279	4.0	0.229	3.0	LOS A	1.4	10.3	0.12	0.43	0.12	47.3
2	T1	10	14.3	11	14.3	0.229	3.0	LOS A	1.4	10.3	0.12	0.43	0.12	48.4
3	R2	61	1.6	64	1.6	0.229	7.4	LOS A	1.4	10.3	0.12	0.43	0.12	48.6
Approach		336	3.9	354	3.9	0.229	3.8	LOS A	1.4	10.3	0.12	0.43	0.12	47.6
East: MH Road														
4	L2	59	7.0	62	7.0	0.074	4.0	LOS A	0.4	2.8	0.38	0.46	0.38	47.0
5	T1	19	5.0	20	5.0	0.074	3.9	LOS A	0.4	2.8	0.38	0.46	0.38	48.1
6	R2	1	0.0	1	0.0	0.074	8.3	LOS A	0.4	2.8	0.38	0.46	0.38	48.3
Approach		79	6.4	83	6.4	0.074	4.0	LOS A	0.4	2.8	0.38	0.46	0.38	47.3
North: Cullen Street														
7	L2	4	0.0	4	0.0	0.014	4.1	LOS A	0.1	0.5	0.42	0.44	0.42	46.6
8	T1	9	11.1	9	11.1	0.014	4.2	LOS A	0.1	0.5	0.42	0.44	0.42	47.7
9	R2	1	0.0	1	0.0	0.014	8.6	LOS A	0.1	0.5	0.42	0.44	0.42	47.9
Approach		14	7.1	15	7.1	0.014	4.5	LOS A	0.1	0.5	0.42	0.44	0.42	47.4
West: MH Road														
10	L2	4	0.0	4	0.0	0.177	3.2	LOS A	0.9	6.9	0.23	0.56	0.23	45.4
11	T1	23	4.0	24	4.0	0.177	3.2	LOS A	0.9	6.9	0.23	0.56	0.23	46.4
12	R2	199	5.0	209	5.0	0.177	7.7	LOS A	0.9	6.9	0.23	0.56	0.23	46.5
Approach		226	4.8	238	4.8	0.177	7.2	LOS A	0.9	6.9	0.23	0.56	0.23	46.5
All Vehicles		655	4.6	689	4.6	0.229	5.0	LOS A	1.4	10.3	0.20	0.48	0.20	47.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ATTACHMENT 2:

2034 BACKGROUND TRAFFIC INTERSECTION OPERATIONS

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: BG_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	94	16.0	99	16.0	0.058	0.0	LOS A	0.0	0.2	0.01	0.02	0.01	79.5
3	R2	3	0.0	3	0.0	0.058	6.9	LOS A	0.0	0.2	0.01	0.02	0.01	65.3
Approach		97	15.5	102	15.5	0.058	0.2	NA	0.0	0.2	0.01	0.02	0.01	78.9
East: Pigeonwood Place														
4	L2	15	0.0	16	0.0	0.011	5.8	LOS A	0.0	0.3	0.18	0.54	0.18	58.1
6	R2	1	0.0	1	0.0	0.011	6.1	LOS A	0.0	0.3	0.18	0.54	0.18	57.7
Approach		16	0.0	17	0.0	0.011	5.8	LOS A	0.0	0.3	0.18	0.54	0.18	58.0
North: Cove Road														
7	L2	1	0.0	1	0.0	0.051	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	74.5
8	T1	88	10.0	93	10.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
Approach		89	9.9	94	9.9	0.051	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.8
All Vehicles		202	11.8	213	11.8	0.058	0.6	NA	0.0	0.3	0.02	0.06	0.02	77.1

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: BG_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	50	6.0	53	6.0	0.085	7.1	LOS A	0.0	0.0	0.00	0.23	0.00	68.5
2	T1	93	16.0	98	16.0	0.085	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	75.6
Approach		143	12.5	151	12.5	0.085	2.5	NA	0.0	0.0	0.00	0.23	0.00	73.0
North: Cove Road														
8	T1	88	10.0	93	10.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	3	0.0	3	0.0	0.002	7.0	LOS A	0.0	0.1	0.26	0.57	0.26	40.5
Approach		91	9.7	96	9.7	0.051	0.2	NA	0.0	0.1	0.01	0.02	0.01	77.5
West: Robert Hastie Drive														
10	L2	3	0.0	3	0.0	0.060	2.3	LOS A	0.2	1.7	0.34	0.47	0.34	40.2
12	R2	50	2.0	53	2.0	0.060	3.6	LOS A	0.2	1.7	0.34	0.47	0.34	39.7
Approach		53	1.9	56	1.9	0.060	3.5	LOS A	0.2	1.7	0.34	0.47	0.34	39.7
All Vehicles		287	9.6	302	9.6	0.085	2.0	NA	0.2	1.7	0.07	0.21	0.07	64.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: BG_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	59	14.0	62	14.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	93	4.0	98	4.0	0.064	7.2	LOS A	0.3	2.1	0.28	0.60	0.28	57.6
Approach		152	7.9	160	7.9	0.064	4.4	NA	0.3	2.1	0.17	0.37	0.17	64.6
East: MH Rd														
4	L2	57	7.0	60	7.0	0.179	5.7	LOS A	0.8	5.8	0.18	0.59	0.18	55.8
6	R2	112	9.0	118	9.0	0.179	7.5	LOS A	0.8	5.8	0.18	0.59	0.18	54.8
Approach		169	8.3	178	8.3	0.179	6.9	LOS A	0.8	5.8	0.18	0.59	0.18	55.1
North: Cove Road														
7	L2	116	7.0	122	7.0	0.088	7.1	LOS A	0.0	0.0	0.00	0.50	0.00	64.7
8	T1	33	12.0	35	12.0	0.088	0.0	LOS A	0.0	0.0	0.00	0.50	0.00	71.4
Approach		149	8.1	157	8.1	0.088	5.5	NA	0.0	0.0	0.00	0.50	0.00	66.0
All Vehicles		470	8.1	495	8.1	0.179	5.7	NA	0.8	5.8	0.12	0.49	0.12	61.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr (Site Folder: BG_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	13	5.0	14	5.0	0.100	7.6	LOS A	0.3	2.5	0.39	0.93	0.39	40.2
3	R2	61	5.0	64	5.0	0.100	8.8	LOS A	0.3	2.5	0.39	0.93	0.39	39.9
Approach		74	5.0	78	5.0	0.100	8.6	LOS A	0.3	2.5	0.39	0.93	0.39	39.9
East: MH Road														
4	L2	28	14.0	29	14.0	0.109	4.7	LOS A	0.0	0.0	0.00	0.08	0.00	48.8
5	T1	158	12.0	166	12.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	49.5
Approach		186	12.3	196	12.3	0.109	0.7	NA	0.0	0.0	0.00	0.08	0.00	49.4
West: MH Road														
11	T1	192	12.0	202	12.0	0.120	0.1	LOS A	0.1	0.7	0.04	0.03	0.04	49.7
12	R2	11	9.0	12	9.0	0.120	5.4	LOS A	0.1	0.7	0.04	0.03	0.04	44.0
Approach		203	11.8	214	11.8	0.120	0.4	NA	0.1	0.7	0.04	0.03	0.04	49.4
All Vehicles		463	10.9	487	10.9	0.120	1.8	NA	0.3	2.5	0.08	0.19	0.08	47.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: BG_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	177	4.0	186	4.0	0.165	3.0	LOS A	1.0	7.0	0.12	0.44	0.12	47.2
2	T1	9	14.3	9	14.3	0.165	3.0	LOS A	1.0	7.0	0.12	0.44	0.12	48.3
3	R2	50	1.6	53	1.6	0.165	7.4	LOS A	1.0	7.0	0.12	0.44	0.12	48.5
Approach		236	3.9	248	3.9	0.165	3.9	LOS A	1.0	7.0	0.12	0.44	0.12	47.5
East: MH Road														
4	L2	59	7.0	62	7.0	0.079	4.4	LOS A	0.4	3.0	0.44	0.50	0.44	46.8
5	T1	19	5.0	20	5.0	0.079	4.3	LOS A	0.4	3.0	0.44	0.50	0.44	47.9
6	R2	1	0.0	1	0.0	0.079	8.7	LOS A	0.4	3.0	0.44	0.50	0.44	48.2
Approach		79	6.4	83	6.4	0.079	4.4	LOS A	0.4	3.0	0.44	0.50	0.44	47.1
North: Cullen Street														
7	L2	3	0.0	3	0.0	0.018	4.4	LOS A	0.1	0.6	0.46	0.49	0.46	46.3
8	T1	11	9.0	12	9.0	0.018	4.5	LOS A	0.1	0.6	0.46	0.49	0.46	47.3
9	R2	3	0.0	3	0.0	0.018	8.8	LOS A	0.1	0.6	0.46	0.49	0.46	47.5
Approach		17	5.8	18	5.8	0.018	5.2	LOS A	0.1	0.6	0.46	0.49	0.46	47.1
West: MH Road														
10	L2	1	0.0	1	0.0	0.214	3.1	LOS A	1.2	8.6	0.21	0.57	0.21	45.2
11	T1	13	8.0	14	8.0	0.214	3.1	LOS A	1.2	8.6	0.21	0.57	0.21	46.2
12	R2	271	3.0	285	3.0	0.214	7.6	LOS A	1.2	8.6	0.21	0.57	0.21	46.4
Approach		285	3.2	300	3.2	0.214	7.4	LOS A	1.2	8.6	0.21	0.57	0.21	46.4
All Vehicles		617	4.0	649	4.0	0.214	5.6	LOS A	1.2	8.6	0.21	0.51	0.21	46.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: BG_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	89	7.0	94	7.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	3	0.0	3	0.0	0.002	7.0	LOS A	0.0	0.1	0.25	0.57	0.25	57.9
Approach		92	6.8	97	6.8	0.050	0.2	NA	0.0	0.1	0.01	0.02	0.01	79.0
East: Pigeonwood Place														
4	L2	15	0.0	16	0.0	0.012	6.0	LOS A	0.0	0.3	0.24	0.54	0.24	57.8
6	R2	1	0.0	1	0.0	0.012	6.8	LOS A	0.0	0.3	0.24	0.54	0.24	57.5
Approach		16	0.0	17	0.0	0.012	6.0	LOS A	0.0	0.3	0.24	0.54	0.24	57.8
North: Cove Road														
7	L2	1	0.0	1	0.0	0.079	7.0	LOS A	0.0	0.0	0.00	0.00	0.00	74.5
8	T1	139	6.0	146	6.0	0.079	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		140	6.0	147	6.0	0.079	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		248	5.9	261	5.9	0.079	0.5	NA	0.0	0.3	0.02	0.04	0.02	77.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: BG_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	33	0.0	35	0.0	0.073	7.0	LOS A	0.0	0.0	0.00	0.17	0.00	71.9
2	T1	97	6.0	102	6.0	0.073	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	76.8
Approach		130	4.5	137	4.5	0.073	1.8	NA	0.0	0.0	0.00	0.17	0.00	75.5
North: Cove Road														
8	T1	116	7.0	122	7.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	4	0.0	4	0.0	0.003	7.0	LOS A	0.0	0.1	0.24	0.57	0.24	40.5
Approach		120	6.8	126	6.8	0.065	0.2	NA	0.0	0.1	0.01	0.02	0.01	77.4
West: Robert Hastie Drive														
10	L2	3	0.0	3	0.0	0.056	2.3	LOS A	0.2	1.5	0.35	0.47	0.35	40.1
12	R2	46	0.0	48	0.0	0.056	3.7	LOS A	0.2	1.5	0.35	0.47	0.35	39.9
Approach		49	0.0	52	0.0	0.056	3.6	LOS A	0.2	1.5	0.35	0.47	0.35	40.0
All Vehicles		299	4.7	315	4.7	0.073	1.5	NA	0.2	1.5	0.06	0.16	0.06	66.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: BG_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	20	15.0	21	15.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	83	12.0	87	12.0	0.060	7.4	LOS A	0.3	2.1	0.29	0.61	0.29	57.1
Approach		103	12.6	108	12.6	0.060	6.0	NA	0.3	2.1	0.23	0.49	0.23	60.5
East: MH Rd														
4	L2	115	8.0	121	8.0	0.192	5.8	LOS A	0.9	6.3	0.15	0.57	0.15	56.0
6	R2	98	4.0	103	4.0	0.192	7.0	LOS A	0.9	6.3	0.15	0.57	0.15	56.6
Approach		213	6.2	224	6.2	0.192	6.3	LOS A	0.9	6.3	0.15	0.57	0.15	56.2
North: Cove Road														
7	L2	123	2.0	129	2.0	0.092	7.0	LOS A	0.0	0.0	0.00	0.49	0.00	66.5
8	T1	37	8.0	39	8.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	71.5
Approach		160	3.4	168	3.4	0.092	5.4	NA	0.0	0.0	0.00	0.49	0.00	67.6
All Vehicles		476	6.6	501	6.6	0.192	5.9	NA	0.9	6.3	0.12	0.53	0.12	60.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr (Site Folder: BG_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	19	5.0	20	5.0	0.058	7.9	LOS A	0.2	1.5	0.40	0.91	0.40	40.2
3	R2	25	4.0	26	4.0	0.058	9.3	LOS A	0.2	1.5	0.40	0.91	0.40	39.8
Approach		44	4.4	46	4.4	0.058	8.7	LOS A	0.2	1.5	0.40	0.91	0.40	40.0
East: MH Road														
4	L2	48	0.0	51	0.0	0.154	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	48.9
5	T1	224	8.0	236	8.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.4
Approach		272	6.6	286	6.6	0.154	0.9	NA	0.0	0.0	0.00	0.10	0.00	49.3
West: MH Road														
11	T1	190	7.0	200	7.0	0.128	0.2	LOS A	0.2	1.7	0.11	0.06	0.11	49.4
12	R2	24	13.0	25	13.0	0.128	6.0	LOS A	0.2	1.7	0.11	0.06	0.11	43.7
Approach		214	7.7	225	7.7	0.128	0.9	NA	0.2	1.7	0.11	0.06	0.11	48.6
All Vehicles		530	6.8	558	6.8	0.154	1.5	NA	0.2	1.7	0.08	0.15	0.08	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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: BG_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	270	4.0	284	4.0	0.233	3.0	LOS A	1.5	10.5	0.12	0.43	0.12	47.3
2	T1	10	14.3	11	14.3	0.233	3.0	LOS A	1.5	10.5	0.12	0.43	0.12	48.4
3	R2	62	1.6	65	1.6	0.233	7.4	LOS A	1.5	10.5	0.12	0.43	0.12	48.6
Approach		342	3.9	360	3.9	0.233	3.8	LOS A	1.5	10.5	0.12	0.43	0.12	47.6
East: MH Road														
4	L2	60	7.0	63	7.0	0.075	4.0	LOS A	0.4	2.8	0.39	0.47	0.39	47.0
5	T1	19	5.0	20	5.0	0.075	3.9	LOS A	0.4	2.8	0.39	0.47	0.39	48.1
6	R2	1	0.0	1	0.0	0.075	8.3	LOS A	0.4	2.8	0.39	0.47	0.39	48.3
Approach		80	6.4	84	6.4	0.075	4.0	LOS A	0.4	2.8	0.39	0.47	0.39	47.3
North: Cullen Street														
7	L2	4	0.0	4	0.0	0.014	4.1	LOS A	0.1	0.5	0.43	0.45	0.43	46.6
8	T1	9	11.1	9	11.1	0.014	4.3	LOS A	0.1	0.5	0.43	0.45	0.43	47.7
9	R2	1	0.0	1	0.0	0.014	8.6	LOS A	0.1	0.5	0.43	0.45	0.43	47.9
Approach		14	7.1	15	7.1	0.014	4.5	LOS A	0.1	0.5	0.43	0.45	0.43	47.4
West: MH Road														
10	L2	4	0.0	4	0.0	0.178	3.2	LOS A	1.0	6.9	0.23	0.56	0.23	45.4
11	T1	23	4.0	24	4.0	0.178	3.2	LOS A	1.0	6.9	0.23	0.56	0.23	46.3
12	R2	202	4.0	213	4.0	0.178	7.7	LOS A	1.0	6.9	0.23	0.56	0.23	46.5
Approach		229	3.9	241	3.9	0.178	7.2	LOS A	1.0	6.9	0.23	0.56	0.23	46.5
All Vehicles		665	4.3	700	4.3	0.233	5.0	LOS A	1.5	10.5	0.20	0.48	0.20	47.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: BG_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	112	7.0	118	7.0	0.074	0.1	LOS A	0.1	0.8	0.08	0.08	0.08	77.9
3	R2	15	0.0	16	0.0	0.074	7.2	LOS A	0.1	0.8	0.08	0.08	0.08	64.3
Approach		127	6.2	134	6.2	0.074	0.9	NA	0.1	0.8	0.08	0.08	0.08	76.0
East: Pigeonwood Place														
4	L2	15	0.0	16	0.0	0.012	6.1	LOS A	0.0	0.3	0.27	0.55	0.27	57.7
6	R2	1	0.0	1	0.0	0.012	6.6	LOS A	0.0	0.3	0.27	0.55	0.27	57.4
Approach		16	0.0	17	0.0	0.012	6.1	LOS A	0.0	0.3	0.27	0.55	0.27	57.7
North: Cove Road														
7	L2	1	0.0	1	0.0	0.098	7.0	LOS A	0.0	0.0	0.00	0.00	0.00	74.5
8	T1	173	6.0	182	6.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		174	6.0	183	6.0	0.098	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		317	5.7	334	5.7	0.098	0.7	NA	0.1	0.8	0.05	0.06	0.05	76.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: BG_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	42	0.0	44	0.0	0.092	7.0	LOS A	0.0	0.0	0.00	0.17	0.00	71.8
2	T1	121	7.0	127	7.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	76.8
Approach		163	5.2	172	5.2	0.092	1.8	NA	0.0	0.0	0.00	0.17	0.00	75.4
North: Cove Road														
8	T1	145	7.0	153	7.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	5	0.0	5	0.0	0.003	7.1	LOS A	0.0	0.1	0.27	0.57	0.27	40.4
Approach		150	6.8	158	6.8	0.082	0.2	NA	0.0	0.1	0.01	0.02	0.01	77.4
West: Robert Hastie Drive														
10	L2	4	0.0	4	0.0	0.075	2.4	LOS A	0.3	2.0	0.40	0.51	0.40	39.9
12	R2	57	0.0	60	0.0	0.075	4.2	LOS A	0.3	2.0	0.40	0.51	0.40	39.8
Approach		61	0.0	64	0.0	0.075	4.1	LOS A	0.3	2.0	0.40	0.51	0.40	39.8
All Vehicles		374	5.0	394	5.0	0.092	1.5	NA	0.3	2.0	0.07	0.16	0.07	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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: BG_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	25	16.0	26	16.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	103	13.0	108	13.0	0.079	7.7	LOS A	0.4	2.8	0.34	0.62	0.34	56.9
Approach		128	13.6	135	13.6	0.079	6.2	NA	0.4	2.8	0.27	0.50	0.27	60.3
East: MH Rd														
4	L2	144	8.0	152	8.0	0.251	5.8	LOS A	1.2	8.6	0.18	0.58	0.18	55.7
6	R2	122	4.0	128	4.0	0.251	7.6	LOS A	1.2	8.6	0.18	0.58	0.18	56.3
Approach		266	6.2	280	6.2	0.251	6.6	LOS A	1.2	8.6	0.18	0.58	0.18	56.0
North: Cove Road														
7	L2	157	3.0	165	3.0	0.117	7.0	LOS A	0.0	0.0	0.00	0.50	0.00	66.1
8	T1	46	9.0	48	9.0	0.117	0.0	LOS A	0.0	0.0	0.00	0.50	0.00	71.4
Approach		203	4.4	214	4.4	0.117	5.4	NA	0.0	0.0	0.00	0.50	0.00	67.2
All Vehicles		597	7.1	628	7.1	0.251	6.1	NA	1.2	8.6	0.14	0.54	0.14	60.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr (Site Folder: BG_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	24	4.0	25	4.0	0.085	8.2	LOS A	0.3	2.1	0.46	0.94	0.46	39.8
3	R2	32	3.0	34	3.0	0.085	10.5	LOS B	0.3	2.1	0.46	0.94	0.46	39.5
Approach		56	3.4	59	3.4	0.085	9.5	LOS A	0.3	2.1	0.46	0.94	0.46	39.7
East: MH Road														
4	L2	61	0.0	64	0.0	0.196	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	48.9
5	T1	285	8.0	300	8.0	0.196	0.1	LOS A	0.0	0.0	0.00	0.10	0.00	49.3
Approach		346	6.6	364	6.6	0.196	0.9	NA	0.0	0.0	0.00	0.10	0.00	49.3
West: MH Road														
11	T1	237	7.0	249	7.0	0.164	0.3	LOS A	0.3	2.5	0.14	0.07	0.14	49.3
12	R2	31	13.0	33	13.0	0.164	6.5	LOS A	0.3	2.5	0.14	0.07	0.14	43.6
Approach		268	7.7	282	7.7	0.164	1.1	NA	0.3	2.5	0.14	0.07	0.14	48.5
All Vehicles		670	6.8	705	6.8	0.196	1.7	NA	0.3	2.5	0.10	0.16	0.10	48.0

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: BG_SAT)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	270	4.0	284	4.0	0.233	3.0	LOS A	1.5	10.5	0.12	0.43	0.12	47.3
2	T1	10	14.3	11	14.3	0.233	3.0	LOS A	1.5	10.5	0.12	0.43	0.12	48.4
3	R2	62	1.6	65	1.6	0.233	7.4	LOS A	1.5	10.5	0.12	0.43	0.12	48.6
Approach		342	3.9	360	3.9	0.233	3.8	LOS A	1.5	10.5	0.12	0.43	0.12	47.6
East: MH Road														
4	L2	60	7.0	63	7.0	0.075	4.0	LOS A	0.4	2.8	0.39	0.47	0.39	47.0
5	T1	19	5.0	20	5.0	0.075	3.9	LOS A	0.4	2.8	0.39	0.47	0.39	48.1
6	R2	1	0.0	1	0.0	0.075	8.3	LOS A	0.4	2.8	0.39	0.47	0.39	48.3
Approach		80	6.4	84	6.4	0.075	4.0	LOS A	0.4	2.8	0.39	0.47	0.39	47.3
North: Cullen Street														
7	L2	4	0.0	4	0.0	0.014	4.1	LOS A	0.1	0.5	0.43	0.45	0.43	46.6
8	T1	9	11.1	9	11.1	0.014	4.3	LOS A	0.1	0.5	0.43	0.45	0.43	47.7
9	R2	1	0.0	1	0.0	0.014	8.6	LOS A	0.1	0.5	0.43	0.45	0.43	47.9
Approach		14	7.1	15	7.1	0.014	4.5	LOS A	0.1	0.5	0.43	0.45	0.43	47.4
West: MH Road														
10	L2	4	0.0	4	0.0	0.178	3.2	LOS A	1.0	6.9	0.23	0.56	0.23	45.4
11	T1	23	4.0	24	4.0	0.178	3.2	LOS A	1.0	6.9	0.23	0.56	0.23	46.3
12	R2	202	4.0	213	4.0	0.178	7.7	LOS A	1.0	6.9	0.23	0.56	0.23	46.5
Approach		229	3.9	241	3.9	0.178	7.2	LOS A	1.0	6.9	0.23	0.56	0.23	46.5
All Vehicles		665	4.3	700	4.3	0.233	5.0	LOS A	1.5	10.5	0.20	0.48	0.20	47.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ATTACHMENT 3:

2034 TOTAL TRAFFIC INTERSECTION OPERATIONS

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	115	13.0	121	13.0	0.080	0.1	LOS A	0.1	1.0	0.07	0.10	0.07	77.6
3	R2	20	0.0	21	0.0	0.080	6.9	LOS A	0.1	1.0	0.07	0.10	0.07	64.1
Approach		135	11.1	142	11.1	0.080	1.1	NA	0.1	1.0	0.07	0.10	0.07	75.2
East: Pigeonwood Place														
4	L2	80	0.0	84	0.0	0.064	5.8	LOS A	0.3	1.8	0.20	0.55	0.20	58.0
6	R2	8	0.0	8	0.0	0.064	6.4	LOS A	0.3	1.8	0.20	0.55	0.20	57.6
Approach		88	0.0	93	0.0	0.064	5.9	LOS A	0.3	1.8	0.20	0.55	0.20	58.0
North: Cove Road														
7	L2	3	0.0	3	0.0	0.055	7.0	LOS A	0.0	0.0	0.00	0.02	0.00	74.3
8	T1	93	10.0	98	10.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.5
Approach		96	9.7	101	9.7	0.055	0.2	NA	0.0	0.0	0.00	0.02	0.00	79.4
All Vehicles		319	7.6	336	7.6	0.080	2.2	NA	0.3	1.8	0.08	0.20	0.08	70.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	50	6.0	53	6.0	0.105	7.1	LOS A	0.0	0.0	0.00	0.18	0.00	69.3
2	T1	131	11.0	138	11.0	0.105	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	76.6
Approach		181	9.6	191	9.6	0.105	2.0	NA	0.0	0.0	0.00	0.18	0.00	74.4
North: Cove Road														
8	T1	158	6.0	166	6.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	3	0.0	3	0.0	0.002	7.2	LOS A	0.0	0.1	0.29	0.57	0.29	40.4
Approach		161	5.9	169	5.9	0.089	0.1	NA	0.0	0.1	0.01	0.01	0.01	78.5
West: Robert Hastie Drive														
10	L2	3	0.0	3	0.0	0.068	2.4	LOS A	0.3	1.9	0.42	0.53	0.42	39.8
12	R2	50	2.0	53	2.0	0.068	4.4	LOS A	0.3	1.9	0.42	0.53	0.42	39.4
Approach		53	1.9	56	1.9	0.068	4.3	LOS A	0.3	1.9	0.42	0.53	0.42	39.4
All Vehicles		395	7.1	416	7.1	0.105	1.5	NA	0.3	1.9	0.06	0.16	0.06	67.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Road 1 (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	190	0.0	200	0.0	0.111	0.1	LOS A	0.1	0.6	0.05	0.03	0.05	49.7
3	R2	11	0.0	12	0.0	0.111	5.3	LOS A	0.1	0.6	0.05	0.03	0.05	48.7
Approach		201	0.0	212	0.0	0.111	0.4	NA	0.1	0.6	0.05	0.03	0.05	49.6
East: Road 1														
4	L2	49	0.0	52	0.0	0.044	5.3	LOS A	0.2	1.2	0.31	0.54	0.31	45.9
6	R2	5	0.0	5	0.0	0.044	6.3	LOS A	0.2	1.2	0.31	0.54	0.31	45.5
Approach		54	0.0	57	0.0	0.044	5.4	LOS A	0.2	1.2	0.31	0.54	0.31	45.9
North: Cove Road														
7	L2	1	0.0	1	0.0	0.115	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
8	T1	212	0.0	223	0.0	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		213	0.0	224	0.0	0.115	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		468	0.0	493	0.0	0.115	0.8	NA	0.2	1.2	0.05	0.08	0.05	49.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	67	12.0	71	12.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	102	4.0	107	4.0	0.080	7.7	LOS A	0.4	2.6	0.38	0.64	0.38	57.2
Approach		169	7.2	178	7.2	0.080	4.7	NA	0.4	2.6	0.23	0.39	0.23	64.5
East: MH Rd														
4	L2	94	4.0	99	4.0	0.272	5.8	LOS A	1.2	9.1	0.27	0.62	0.27	56.0
6	R2	148	7.0	156	7.0	0.272	8.5	LOS A	1.2	9.1	0.27	0.62	0.27	54.8
Approach		242	5.8	255	5.8	0.272	7.5	LOS A	1.2	9.1	0.27	0.62	0.27	55.3
North: Cove Road														
7	L2	202	4.0	213	4.0	0.154	7.0	LOS A	0.0	0.0	0.00	0.49	0.00	65.9
8	T1	65	6.0	68	6.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	71.6
Approach		267	4.5	281	4.5	0.154	5.3	NA	0.0	0.0	0.00	0.49	0.00	67.2
All Vehicles		678	5.6	714	5.6	0.272	5.9	NA	1.2	9.1	0.15	0.51	0.15	61.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 2 (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	229	0.0	241	0.0	0.129	0.0	LOS A	0.1	0.4	0.03	0.01	0.03	49.8
6	R2	6	0.0	6	0.0	0.129	5.8	LOS A	0.1	0.4	0.03	0.01	0.03	48.9
Approach		235	0.0	247	0.0	0.129	0.2	NA	0.1	0.4	0.03	0.01	0.03	49.8
North: Road 2														
7	L2	23	0.0	24	0.0	0.038	5.6	LOS A	0.1	0.9	0.39	0.60	0.39	45.7
9	R2	13	0.0	14	0.0	0.038	7.1	LOS A	0.1	0.9	0.39	0.60	0.39	45.3
Approach		36	0.0	38	0.0	0.038	6.1	LOS A	0.1	0.9	0.39	0.60	0.39	45.5
West: MH Road														
10	L2	3	0.0	3	0.0	0.164	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	301	0.0	317	0.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		304	0.0	320	0.0	0.164	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		575	0.0	605	0.0	0.164	0.5	NA	0.1	0.9	0.04	0.05	0.04	49.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 3 (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	222	0.0	234	0.0	0.125	0.1	LOS A	0.1	0.4	0.03	0.02	0.03	49.8
6	R2	6	0.0	6	0.0	0.125	5.9	LOS A	0.1	0.4	0.03	0.02	0.03	48.9
Approach		228	0.0	240	0.0	0.125	0.2	NA	0.1	0.4	0.03	0.02	0.03	49.8
North: Road 3														
7	L2	23	0.0	24	0.0	0.039	5.7	LOS A	0.1	1.0	0.40	0.61	0.40	45.7
9	R2	13	0.0	14	0.0	0.039	7.2	LOS A	0.1	1.0	0.40	0.61	0.40	45.2
Approach		36	0.0	38	0.0	0.039	6.2	LOS A	0.1	1.0	0.40	0.61	0.40	45.5
West: MH Road														
10	L2	3	0.0	3	0.0	0.175	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	321	0.0	338	0.0	0.175	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		324	0.0	341	0.0	0.175	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		588	0.0	619	0.0	0.175	0.5	NA	0.1	1.0	0.04	0.05	0.04	49.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr/Road 4 (Site Folder: TOT_AM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	13	5.0	14	5.0	0.162	7.8	LOS A	0.6	4.0	0.52	0.97	0.52	38.9
2	T1	1	0.0	1	0.0	0.162	10.8	LOS B	0.6	4.0	0.52	0.97	0.52	38.8
3	R2	61	5.0	64	5.0	0.162	12.7	LOS B	0.6	4.0	0.52	0.97	0.52	38.6
Approach		75	4.9	79	4.9	0.162	11.8	LOS B	0.6	4.0	0.52	0.97	0.52	38.7
East: MH Road														
4	L2	28	14.0	29	14.0	0.136	5.2	LOS A	0.1	1.1	0.08	0.09	0.08	44.0
5	T1	190	10.0	200	10.0	0.136	0.1	LOS A	0.1	1.1	0.08	0.09	0.08	49.2
6	R2	12	0.0	13	0.0	0.136	6.0	LOS A	0.1	1.1	0.08	0.09	0.08	48.3
Approach		230	10.0	242	10.0	0.136	1.0	NA	0.1	1.1	0.08	0.09	0.08	48.5
North: Road 5														
7	L2	49	0.0	52	0.0	0.112	9.1	LOS A	0.4	2.8	0.47	0.93	0.47	44.0
8	T1	1	0.0	1	0.0	0.112	11.5	LOS B	0.4	2.8	0.47	0.93	0.47	39.9
9	R2	27	0.0	28	0.0	0.112	12.4	LOS B	0.4	2.8	0.47	0.93	0.47	43.8
Approach		77	0.0	81	0.0	0.112	10.3	LOS B	0.4	2.8	0.47	0.93	0.47	43.9
West: MH Road														
10	L2	7	0.0	7	0.0	0.193	5.3	LOS A	0.1	0.9	0.04	0.03	0.04	49.2
11	T1	320	7.0	337	7.0	0.193	0.1	LOS A	0.1	0.9	0.04	0.03	0.04	49.7
12	R2	11	9.0	12	9.0	0.193	5.7	LOS A	0.1	0.9	0.04	0.03	0.04	44.0
Approach		338	6.9	356	6.9	0.193	0.3	NA	0.1	0.9	0.04	0.03	0.04	49.5
All Vehicles		720	6.9	758	6.9	0.193	2.8	NA	0.6	4.0	0.15	0.24	0.15	47.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: TOT_AM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	221	6.0	233	6.0	0.196	3.0	LOS A	1.2	9.0	0.13	0.43	0.13	47.3
2	T1	9	11.0	9	11.0	0.196	2.9	LOS A	1.2	9.0	0.13	0.43	0.13	48.4
3	R2	50	2.0	53	2.0	0.196	7.4	LOS A	1.2	9.0	0.13	0.43	0.13	48.6
Approach		280	5.4	295	5.4	0.196	3.8	LOS A	1.2	9.0	0.13	0.43	0.13	47.5
East: MH Road														
4	L2	51	6.0	54	6.0	0.082	5.4	LOS A	0.4	3.2	0.56	0.58	0.56	46.4
5	T1	19	5.0	20	5.0	0.082	5.3	LOS A	0.4	3.2	0.56	0.58	0.56	47.5
6	R2	1	0.0	1	0.0	0.082	9.7	LOS A	0.4	3.2	0.56	0.58	0.56	47.7
Approach		71	5.6	75	5.6	0.082	5.5	LOS A	0.4	3.2	0.56	0.58	0.56	46.7
North: Cullen Street														
7	L2	3	0.0	3	0.0	0.020	5.4	LOS A	0.1	0.8	0.57	0.55	0.57	45.8
8	T1	11	9.0	12	9.0	0.020	5.6	LOS A	0.1	0.8	0.57	0.55	0.57	46.8
9	R2	3	0.0	3	0.0	0.020	9.9	LOS A	0.1	0.8	0.57	0.55	0.57	47.1
Approach		17	5.8	18	5.8	0.020	6.3	LOS A	0.1	0.8	0.57	0.55	0.57	46.7
West: MH Road														
10	L2	1	0.0	1	0.0	0.337	3.2	LOS A	2.2	15.4	0.24	0.57	0.24	45.1
11	T1	13	8.0	14	8.0	0.337	3.2	LOS A	2.2	15.4	0.24	0.57	0.24	46.1
12	R2	448	2.0	472	2.0	0.337	7.7	LOS A	2.2	15.4	0.24	0.57	0.24	46.3
Approach		462	2.2	486	2.2	0.337	7.5	LOS A	2.2	15.4	0.24	0.57	0.24	46.3
All Vehicles		830	3.6	874	3.6	0.337	6.1	LOS A	2.2	15.4	0.24	0.52	0.24	46.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	94	6.0	99	6.0	0.100	0.4	LOS A	0.4	3.0	0.24	0.27	0.24	73.7
3	R2	68	0.0	72	0.0	0.100	7.2	LOS A	0.4	3.0	0.24	0.27	0.24	61.4
Approach		162	3.5	171	3.5	0.100	3.2	NA	0.4	3.0	0.24	0.27	0.24	68.0
East: Pigeonwood Place														
4	L2	32	0.0	34	0.0	0.027	6.0	LOS A	0.1	0.7	0.26	0.55	0.26	57.8
6	R2	3	0.0	3	0.0	0.027	6.8	LOS A	0.1	0.7	0.26	0.55	0.26	57.4
Approach		35	0.0	37	0.0	0.027	6.1	LOS A	0.1	0.7	0.26	0.55	0.26	57.7
North: Cove Road														
7	L2	8	0.0	8	0.0	0.094	7.0	LOS A	0.0	0.0	0.00	0.03	0.00	74.1
8	T1	160	5.0	168	5.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	79.3
Approach		168	4.8	177	4.8	0.094	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.1
All Vehicles		365	3.7	384	3.7	0.100	2.2	NA	0.4	3.0	0.13	0.19	0.13	71.4

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	33	0.0	35	0.0	0.111	7.0	LOS A	0.0	0.0	0.00	0.11	0.00	72.8
2	T1	167	4.0	176	4.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	77.9
Approach		200	3.3	211	3.3	0.111	1.2	NA	0.0	0.0	0.00	0.11	0.00	77.0
North: Cove Road														
8	T1	154	5.0	162	5.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	4	0.0	4	0.0	0.003	7.2	LOS A	0.0	0.1	0.31	0.57	0.31	40.4
Approach		158	4.9	166	4.9	0.086	0.2	NA	0.0	0.1	0.01	0.01	0.01	78.0
West: Robert Hastie Drive														
10	L2	3	0.0	3	0.0	0.064	2.5	LOS A	0.2	1.7	0.43	0.54	0.43	39.8
12	R2	46	0.0	48	0.0	0.064	4.5	LOS A	0.2	1.7	0.43	0.54	0.43	39.6
Approach		49	0.0	52	0.0	0.064	4.4	LOS A	0.2	1.7	0.43	0.54	0.43	39.6
All Vehicles		407	3.5	428	3.5	0.111	1.2	NA	0.2	1.7	0.06	0.12	0.06	69.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Road 1 (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	193	0.0	203	0.0	0.140	0.2	LOS A	0.4	2.6	0.15	0.12	0.15	49.0
3	R2	49	0.0	52	0.0	0.140	5.3	LOS A	0.4	2.6	0.15	0.12	0.15	48.0
Approach		242	0.0	255	0.0	0.140	1.3	NA	0.4	2.6	0.15	0.12	0.15	48.8
East: Road 1														
4	L2	11	0.0	12	0.0	0.010	5.2	LOS A	0.0	0.3	0.28	0.51	0.28	46.0
6	R2	1	0.0	1	0.0	0.010	6.4	LOS A	0.0	0.3	0.28	0.51	0.28	45.5
Approach		12	0.0	13	0.0	0.010	5.3	LOS A	0.0	0.3	0.28	0.51	0.28	45.9
North: Cove Road														
7	L2	5	0.0	5	0.0	0.108	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
8	T1	195	0.0	205	0.0	0.108	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		200	0.0	211	0.0	0.108	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		454	0.0	478	0.0	0.140	0.9	NA	0.4	2.6	0.09	0.08	0.09	49.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	52	6.0	55	6.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	120	8.0	126	8.0	0.090	7.6	LOS A	0.4	3.1	0.34	0.63	0.34	57.1
Approach		172	7.4	181	7.4	0.090	5.3	NA	0.4	3.1	0.24	0.44	0.24	62.5
East: MH Rd														
4	L2	124	7.0	131	7.0	0.322	5.8	LOS A	1.6	11.3	0.22	0.61	0.22	55.5
6	R2	184	2.0	194	2.0	0.322	8.1	LOS A	1.6	11.3	0.22	0.61	0.22	56.4
Approach		308	4.0	324	4.0	0.322	7.2	LOS A	1.6	11.3	0.22	0.61	0.22	56.0
North: Cove Road														
7	L2	161	7.0	169	7.0	0.121	7.1	LOS A	0.0	0.0	0.00	0.50	0.00	64.7
8	T1	45	7.0	47	7.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.50	0.00	71.4
Approach		206	7.0	217	7.0	0.121	5.5	NA	0.0	0.0	0.00	0.50	0.00	66.1
All Vehicles		686	5.8	722	5.8	0.322	6.2	NA	1.6	11.3	0.16	0.53	0.16	60.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 2 (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	305	0.0	321	0.0	0.183	0.1	LOS A	0.2	1.5	0.07	0.04	0.07	49.6
6	R2	23	0.0	24	0.0	0.183	5.8	LOS A	0.2	1.5	0.07	0.04	0.07	48.6
Approach		328	0.0	345	0.0	0.183	0.5	NA	0.2	1.5	0.07	0.04	0.07	49.5
North: Road 2														
7	L2	6	0.0	6	0.0	0.010	5.4	LOS A	0.0	0.2	0.37	0.56	0.37	45.7
9	R2	3	0.0	3	0.0	0.010	7.4	LOS A	0.0	0.2	0.37	0.56	0.37	45.3
Approach		9	0.0	9	0.0	0.010	6.1	LOS A	0.0	0.2	0.37	0.56	0.37	45.6
West: MH Road														
10	L2	13	0.0	14	0.0	0.152	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	49.3
11	T1	268	0.0	282	0.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.8
Approach		281	0.0	296	0.0	0.152	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.8
All Vehicles		618	0.0	651	0.0	0.183	0.5	NA	0.2	1.5	0.04	0.04	0.04	49.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 3 (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	325	0.0	342	0.0	0.194	0.1	LOS A	0.2	1.5	0.07	0.04	0.07	49.6
6	R2	23	0.0	24	0.0	0.194	5.7	LOS A	0.2	1.5	0.07	0.04	0.07	48.6
Approach		348	0.0	366	0.0	0.194	0.5	NA	0.2	1.5	0.07	0.04	0.07	49.5
North: Road 3														
7	L2	6	0.0	6	0.0	0.010	5.4	LOS A	0.0	0.2	0.36	0.56	0.36	45.7
9	R2	3	0.0	3	0.0	0.010	7.5	LOS A	0.0	0.2	0.36	0.56	0.36	45.3
Approach		9	0.0	9	0.0	0.010	6.1	LOS A	0.0	0.2	0.36	0.56	0.36	45.6
West: MH Road														
10	L2	13	0.0	14	0.0	0.148	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	49.3
11	T1	261	0.0	275	0.0	0.148	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.8
Approach		274	0.0	288	0.0	0.148	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.8
All Vehicles		631	0.0	664	0.0	0.194	0.5	NA	0.2	1.5	0.04	0.04	0.04	49.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr/Road 4 (Site Folder: TOT_PM)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	19	5.0	20	5.0	0.094	8.7	LOS A	0.3	2.3	0.54	0.95	0.54	39.0
2	T1	1	0.0	1	0.0	0.094	12.5	LOS B	0.3	2.3	0.54	0.95	0.54	38.9
3	R2	25	4.0	26	4.0	0.094	13.9	LOS B	0.3	2.3	0.54	0.95	0.54	38.7
Approach		45	4.3	47	4.3	0.094	11.7	LOS B	0.3	2.3	0.54	0.95	0.54	38.8
East: MH Road														
4	L2	48	0.0	51	0.0	0.263	5.3	LOS A	0.6	4.1	0.14	0.11	0.14	43.8
5	T1	356	5.0	375	5.0	0.263	0.2	LOS A	0.6	4.1	0.14	0.11	0.14	48.9
6	R2	49	0.0	52	0.0	0.263	5.7	LOS A	0.6	4.1	0.14	0.11	0.14	48.0
Approach		453	3.9	477	3.9	0.263	1.3	NA	0.6	4.1	0.14	0.11	0.14	48.2
North: Road 5														
7	L2	12	0.0	13	0.0	0.032	8.4	LOS A	0.1	0.8	0.42	0.89	0.42	43.8
8	T1	1	0.0	1	0.0	0.032	13.0	LOS B	0.1	0.8	0.42	0.89	0.42	39.7
9	R2	7	0.0	7	0.0	0.032	13.9	LOS B	0.1	0.8	0.42	0.89	0.42	43.6
Approach		20	0.0	21	0.0	0.032	10.5	LOS B	0.1	0.8	0.42	0.89	0.42	43.5
West: MH Road														
10	L2	27	0.0	28	0.0	0.165	5.9	LOS A	0.4	2.6	0.15	0.10	0.15	48.5
11	T1	222	6.0	234	6.0	0.165	0.4	LOS A	0.4	2.6	0.15	0.10	0.15	49.0
12	R2	24	13.0	25	13.0	0.165	6.9	LOS A	0.4	2.6	0.15	0.10	0.15	43.4
Approach		273	6.0	287	6.0	0.165	1.5	NA	0.4	2.6	0.15	0.10	0.15	48.4
All Vehicles		791	4.6	833	4.6	0.263	2.2	NA	0.6	4.1	0.17	0.18	0.17	47.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: TOT_PM)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	447	2.0	471	2.0	0.344	3.0	LOS A	2.5	17.6	0.14	0.41	0.14	47.4
2	T1	10	14.3	11	14.3	0.344	3.0	LOS A	2.5	17.6	0.14	0.41	0.14	48.5
3	R2	62	1.6	65	1.6	0.344	7.4	LOS A	2.5	17.6	0.14	0.41	0.14	48.8
Approach		519	2.2	546	2.2	0.344	3.5	LOS A	2.5	17.6	0.14	0.41	0.14	47.6
East: MH Road														
4	L2	60	7.0	63	7.0	0.078	4.2	LOS A	0.4	2.9	0.43	0.49	0.43	46.9
5	T1	19	5.0	20	5.0	0.078	4.1	LOS A	0.4	2.9	0.43	0.49	0.43	48.0
6	R2	1	0.0	1	0.0	0.078	8.5	LOS A	0.4	2.9	0.43	0.49	0.43	48.2
Approach		80	6.4	84	6.4	0.078	4.2	LOS A	0.4	2.9	0.43	0.49	0.43	47.1
North: Cullen Street														
7	L2	4	0.0	4	0.0	0.014	4.3	LOS A	0.1	0.5	0.46	0.46	0.46	46.5
8	T1	9	9.0	9	9.0	0.014	4.5	LOS A	0.1	0.5	0.46	0.46	0.46	47.6
9	R2	1	0.0	1	0.0	0.014	8.8	LOS A	0.1	0.5	0.46	0.46	0.46	47.8
Approach		14	5.8	15	5.8	0.014	4.7	LOS A	0.1	0.5	0.46	0.46	0.46	47.3
West: MH Road														
10	L2	4	0.0	4	0.0	0.211	3.2	LOS A	1.2	8.5	0.24	0.56	0.24	45.3
11	T1	23	4.0	24	4.0	0.211	3.2	LOS A	1.2	8.5	0.24	0.56	0.24	46.3
12	R2	246	4.0	259	4.0	0.211	7.7	LOS A	1.2	8.5	0.24	0.56	0.24	46.4
Approach		273	3.9	287	3.9	0.211	7.3	LOS A	1.2	8.5	0.24	0.56	0.24	46.4
All Vehicles		886	3.2	933	3.2	0.344	4.7	LOS A	2.5	17.6	0.20	0.47	0.20	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	124	6.0	131	6.0	0.108	0.3	LOS A	0.4	2.7	0.21	0.20	0.21	75.0
3	R2	55	0.0	58	0.0	0.108	7.3	LOS A	0.4	2.7	0.21	0.20	0.21	62.3
Approach		179	4.2	188	4.2	0.108	2.5	NA	0.4	2.7	0.21	0.20	0.21	70.6
East: Pigeonwood Place														
4	L2	55	0.0	58	0.0	0.049	6.2	LOS A	0.2	1.3	0.29	0.57	0.29	57.7
6	R2	6	0.0	6	0.0	0.049	7.0	LOS A	0.2	1.3	0.29	0.57	0.29	57.3
Approach		61	0.0	64	0.0	0.049	6.2	LOS A	0.2	1.3	0.29	0.57	0.29	57.6
North: Cove Road														
7	L2	6	0.0	6	0.0	0.107	7.0	LOS A	0.0	0.0	0.00	0.02	0.00	74.3
8	T1	185	5.0	195	5.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.5
Approach		191	4.8	201	4.8	0.107	0.2	NA	0.0	0.0	0.00	0.02	0.00	79.4
All Vehicles		431	3.9	454	3.9	0.108	2.0	NA	0.4	2.7	0.13	0.17	0.13	71.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	42	0.0	44	0.0	0.120	7.0	LOS A	0.0	0.0	0.00	0.13	0.00	72.5
2	T1	173	5.0	182	5.0	0.120	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	77.5
Approach		215	4.0	226	4.0	0.120	1.4	NA	0.0	0.0	0.00	0.13	0.00	76.5
North: Cove Road														
8	T1	197	5.0	207	5.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
9	R2	5	0.0	5	0.0	0.004	7.3	LOS A	0.0	0.1	0.32	0.57	0.32	40.4
Approach		202	4.9	213	4.9	0.110	0.2	NA	0.0	0.1	0.01	0.01	0.01	78.0
West: Robert Hastie Drive														
10	L2	4	0.0	4	0.0	0.085	2.5	LOS A	0.3	2.3	0.47	0.58	0.47	39.6
12	R2	57	0.0	60	0.0	0.085	5.1	LOS A	0.3	2.3	0.47	0.58	0.47	39.4
Approach		61	0.0	64	0.0	0.085	4.9	LOS A	0.3	2.3	0.47	0.58	0.47	39.4
All Vehicles		478	3.9	503	3.9	0.120	1.3	NA	0.3	2.3	0.06	0.14	0.06	68.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Road 1 (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	204	0.0	215	0.0	0.134	0.2	LOS A	0.3	1.8	0.12	0.08	0.12	49.3
3	R2	31	0.0	33	0.0	0.134	5.5	LOS A	0.3	1.8	0.12	0.08	0.12	48.3
Approach		235	0.0	247	0.0	0.134	0.9	NA	0.3	1.8	0.12	0.08	0.12	49.1
East: Road 1														
4	L2	31	0.0	33	0.0	0.029	5.4	LOS A	0.1	0.8	0.33	0.55	0.33	45.8
6	R2	3	0.0	3	0.0	0.029	6.7	LOS A	0.1	0.8	0.33	0.55	0.33	45.4
Approach		34	0.0	36	0.0	0.029	5.5	LOS A	0.1	0.8	0.33	0.55	0.33	45.8
North: Cove Road														
7	L2	3	0.0	3	0.0	0.137	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
8	T1	251	0.0	264	0.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		254	0.0	267	0.0	0.137	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		523	0.0	551	0.0	0.137	0.8	NA	0.3	1.8	0.08	0.07	0.08	49.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	45	9.0	47	9.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	127	10.0	134	10.0	0.105	8.0	LOS A	0.5	3.6	0.41	0.66	0.41	56.8
Approach		172	9.7	181	9.7	0.105	5.9	NA	0.5	3.6	0.30	0.48	0.30	61.5
East: MH Rd														
4	L2	168	7.0	177	7.0	0.371	5.9	LOS A	1.9	13.6	0.27	0.62	0.27	55.2
6	R2	182	3.0	192	3.0	0.371	8.9	LOS A	1.9	13.6	0.27	0.62	0.27	55.9
Approach		350	4.9	368	4.9	0.371	7.5	LOS A	1.9	13.6	0.27	0.62	0.27	55.6
North: Cove Road														
7	L2	217	2.0	228	2.0	0.162	7.0	LOS A	0.0	0.0	0.00	0.49	0.00	66.5
8	T1	66	6.0	69	6.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	71.5
Approach		283	2.9	298	2.9	0.162	5.4	NA	0.0	0.0	0.00	0.49	0.00	67.6
All Vehicles		805	5.3	847	5.3	0.371	6.4	NA	1.9	13.6	0.18	0.54	0.18	60.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 2 (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	342	0.0	360	0.0	0.197	0.1	LOS A	0.2	1.1	0.05	0.02	0.05	49.7
6	R2	15	0.0	16	0.0	0.197	6.1	LOS A	0.2	1.1	0.05	0.02	0.05	48.8
Approach		357	0.0	376	0.0	0.197	0.4	NA	0.2	1.1	0.05	0.02	0.05	49.7
North: Road 2														
7	L2	15	0.0	16	0.0	0.027	5.7	LOS A	0.1	0.7	0.42	0.61	0.42	45.5
9	R2	8	0.0	8	0.0	0.027	8.2	LOS A	0.1	0.7	0.42	0.61	0.42	45.1
Approach		23	0.0	24	0.0	0.027	6.6	LOS A	0.1	0.7	0.42	0.61	0.42	45.3
West: MH Road														
10	L2	8	0.0	8	0.0	0.186	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	336	0.0	354	0.0	0.186	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		344	0.0	362	0.0	0.186	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
All Vehicles		724	0.0	762	0.0	0.197	0.5	NA	0.2	1.1	0.04	0.04	0.04	49.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 3 (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	349	0.0	367	0.0	0.201	0.1	LOS A	0.2	1.1	0.05	0.02	0.05	49.7
6	R2	15	0.0	16	0.0	0.201	6.2	LOS A	0.2	1.1	0.05	0.02	0.05	48.8
Approach		364	0.0	383	0.0	0.201	0.4	NA	0.2	1.1	0.05	0.02	0.05	49.7
North: Road 3														
7	L2	15	0.0	16	0.0	0.027	5.8	LOS A	0.1	0.7	0.43	0.62	0.43	45.4
9	R2	8	0.0	8	0.0	0.027	8.3	LOS A	0.1	0.7	0.43	0.62	0.43	45.0
Approach		23	0.0	24	0.0	0.027	6.6	LOS A	0.1	0.7	0.43	0.62	0.43	45.3
West: MH Road														
10	L2	8	0.0	8	0.0	0.190	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	343	0.0	361	0.0	0.190	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		351	0.0	369	0.0	0.190	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
All Vehicles		738	0.0	777	0.0	0.201	0.5	NA	0.2	1.1	0.04	0.04	0.04	49.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr/Road 4 (Site Folder: TOT_SAT)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	24	4.0	25	4.0	0.139	8.8	LOS A	0.5	3.3	0.60	0.96	0.60	38.5
2	T1	1	0.0	1	0.0	0.139	14.0	LOS B	0.5	3.3	0.60	0.96	0.60	38.3
3	R2	32	3.0	34	3.0	0.139	16.3	LOS C	0.5	3.3	0.60	0.96	0.60	38.2
Approach		57	3.4	60	3.4	0.139	13.1	LOS B	0.5	3.3	0.60	0.96	0.60	38.3
East: MH Road														
4	L2	61	0.0	64	0.0	0.267	5.3	LOS A	0.4	3.2	0.11	0.10	0.11	43.9
5	T1	366	7.0	385	7.0	0.267	0.2	LOS A	0.4	3.2	0.11	0.10	0.11	49.0
6	R2	31	0.0	33	0.0	0.267	6.3	LOS A	0.4	3.2	0.11	0.10	0.11	48.1
Approach		458	5.6	482	5.6	0.267	1.3	NA	0.4	3.2	0.11	0.10	0.11	48.2
North: Road 5														
7	L2	31	0.0	33	0.0	0.088	9.0	LOS A	0.3	2.1	0.50	0.92	0.50	43.4
8	T1	1	0.0	1	0.0	0.088	15.0	LOS B	0.3	2.1	0.50	0.92	0.50	39.4
9	R2	17	0.0	18	0.0	0.088	16.0	LOS C	0.3	2.1	0.50	0.92	0.50	43.2
Approach		49	0.0	52	0.0	0.088	11.5	LOS B	0.3	2.1	0.50	0.92	0.50	43.2
West: MH Road														
10	L2	17	0.0	18	0.0	0.220	6.6	LOS A	0.5	3.5	0.15	0.07	0.15	48.7
11	T1	318	5.0	335	5.0	0.220	0.4	LOS A	0.5	3.5	0.15	0.07	0.15	49.2
12	R2	31	13.0	33	13.0	0.220	7.3	LOS A	0.5	3.5	0.15	0.07	0.15	43.5
Approach		366	5.4	385	5.4	0.220	1.3	NA	0.5	3.5	0.15	0.07	0.15	48.6
All Vehicles		930	5.1	979	5.1	0.267	2.5	NA	0.5	3.5	0.18	0.19	0.18	47.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: TOT_SAT)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	449	3.0	473	3.0	0.364	3.0	LOS A	2.8	19.9	0.17	0.42	0.17	47.3
2	T1	13	0.0	14	0.0	0.364	2.9	LOS A	2.8	19.9	0.17	0.42	0.17	48.4
3	R2	78	0.0	82	0.0	0.364	7.4	LOS A	2.8	19.9	0.17	0.42	0.17	48.6
Approach		540	2.5	568	2.5	0.364	3.6	LOS A	2.8	19.9	0.17	0.42	0.17	47.5
East: MH Road														
4	L2	75	7.0	79	7.0	0.108	5.0	LOS A	0.6	4.3	0.53	0.56	0.53	46.6
5	T1	24	4.0	25	4.0	0.108	4.8	LOS A	0.6	4.3	0.53	0.56	0.53	47.7
6	R2	1	0.0	1	0.0	0.108	9.3	LOS A	0.6	4.3	0.53	0.56	0.53	47.9
Approach		100	6.2	105	6.2	0.108	5.0	LOS A	0.6	4.3	0.53	0.56	0.53	46.9
North: Cullen Street														
7	L2	5	0.0	5	0.0	0.020	5.2	LOS A	0.1	0.8	0.55	0.52	0.55	46.2
8	T1	11	9.0	12	9.0	0.020	5.3	LOS A	0.1	0.8	0.55	0.52	0.55	47.2
9	R2	1	0.0	1	0.0	0.020	9.6	LOS A	0.1	0.8	0.55	0.52	0.55	47.5
Approach		17	5.8	18	5.8	0.020	5.5	LOS A	0.1	0.8	0.55	0.52	0.55	47.0
West: MH Road														
10	L2	5	0.0	5	0.0	0.309	3.3	LOS A	1.9	13.8	0.29	0.57	0.29	45.1
11	T1	29	3.0	31	3.0	0.309	3.3	LOS A	1.9	13.8	0.29	0.57	0.29	46.1
12	R2	365	3.0	384	3.0	0.309	7.8	LOS A	1.9	13.8	0.29	0.57	0.29	46.3
Approach		399	3.0	420	3.0	0.309	7.5	LOS A	1.9	13.8	0.29	0.57	0.29	46.2
All Vehicles		1056	3.1	1112	3.1	0.364	5.2	LOS A	2.8	19.9	0.26	0.49	0.26	46.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ATTACHMENT 4:

2034 TOTAL-SENSITIVITY TRAFFIC INTERSECTION OPERATIONS

MOVEMENT SUMMARY

Site: 101 [Cove - Pigeonwood (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	186	6.0	196	6.0	0.157	0.5	LOS A	0.5	4.0	0.24	0.18	0.24	75.2
3	R2	66	2.0	69	2.0	0.157	7.9	LOS A	0.5	4.0	0.24	0.18	0.24	62.3
Approach		252	5.0	265	5.0	0.157	2.4	NA	0.5	4.0	0.24	0.18	0.24	71.4
East: Pigeonwood Place														
4	L2	66	2.0	69	2.0	0.068	6.6	LOS A	0.3	1.8	0.37	0.61	0.37	56.8
6	R2	8	2.0	8	2.0	0.068	8.2	LOS A	0.3	1.8	0.37	0.61	0.37	56.5
Approach		74	2.0	78	2.0	0.068	6.8	LOS A	0.3	1.8	0.37	0.61	0.37	56.8
North: Cove Road														
7	L2	8	2.0	8	2.0	0.160	7.0	LOS A	0.0	0.0	0.00	0.02	0.00	73.4
8	T1	278	5.0	293	5.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.6
Approach		286	4.9	301	4.9	0.160	0.2	NA	0.0	0.0	0.00	0.02	0.00	79.4
All Vehicles		612	4.6	644	4.6	0.160	1.9	NA	0.5	4.0	0.15	0.16	0.15	72.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Robert Hastie Dr (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
1	L2	63	2.0	66	2.0	0.181	7.0	LOS A	0.0	0.0	0.00	0.13	0.00	71.7
2	T1	259	5.0	273	5.0	0.181	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	77.5
Approach		322	4.4	339	4.4	0.181	1.4	NA	0.0	0.0	0.00	0.13	0.00	76.3
North: Cove Road														
8	T1	296	5.0	312	5.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
9	R2	8	2.0	8	2.0	0.007	7.8	LOS A	0.0	0.2	0.40	0.60	0.40	40.2
Approach		304	4.9	320	4.9	0.165	0.2	NA	0.0	0.2	0.01	0.02	0.01	77.9
West: Robert Hastie Drive														
10	L2	6	2.0	6	2.0	0.175	3.0	LOS A	0.7	4.7	0.59	0.73	0.59	38.3
12	R2	86	2.0	91	2.0	0.175	7.7	LOS A	0.7	4.7	0.59	0.73	0.59	38.1
Approach		92	2.0	97	2.0	0.175	7.3	LOS A	0.7	4.7	0.59	0.73	0.59	38.1
All Vehicles		718	4.3	756	4.3	0.181	1.7	NA	0.7	4.7	0.08	0.16	0.08	68.1

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - Road 1 (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	307	5.0	323	5.0	0.214	0.4	LOS A	0.5	3.7	0.17	0.08	0.17	49.1
3	R2	47	2.0	49	2.0	0.214	6.5	LOS A	0.5	3.7	0.17	0.08	0.17	48.1
Approach		354	4.6	373	4.6	0.214	1.2	NA	0.5	3.7	0.17	0.08	0.17	49.0
East: Road 1														
4	L2	47	2.0	49	2.0	0.055	6.1	LOS A	0.2	1.4	0.44	0.62	0.44	45.6
6	R2	5	2.0	5	2.0	0.055	8.9	LOS A	0.2	1.4	0.44	0.62	0.44	45.1
Approach		52	2.0	55	2.0	0.055	6.4	LOS A	0.2	1.4	0.44	0.62	0.44	45.5
North: Cove Road														
7	L2	5	2.0	5	2.0	0.214	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
8	T1	377	6.0	397	6.0	0.214	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		382	5.9	402	5.9	0.214	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		788	5.1	829	5.1	0.214	1.0	NA	0.5	3.7	0.11	0.08	0.11	49.1

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Cove - MH Rd (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cove Road														
2	T1	68	9.0	72	9.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	191	10.0	201	10.0	0.189	8.9	LOS A	0.9	6.5	0.53	0.75	0.53	56.2
Approach		259	9.7	273	9.7	0.189	6.6	NA	0.9	6.5	0.39	0.55	0.39	61.0
East: MH Rd														
4	L2	252	7.0	265	7.0	0.671	9.6	LOS A	7.7	56.0	0.44	0.81	0.82	50.9
6	R2	273	3.0	287	3.0	0.671	16.2	LOS C	7.7	56.0	0.44	0.81	0.82	51.5
Approach		525	4.9	553	4.9	0.671	13.0	LOS B	7.7	56.0	0.44	0.81	0.82	51.2
North: Cove Road														
7	L2	325	2.0	342	2.0	0.242	7.0	LOS A	0.0	0.0	0.00	0.49	0.00	66.5
8	T1	99	6.0	104	6.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	71.5
Approach		424	2.9	446	2.9	0.242	5.4	NA	0.0	0.0	0.00	0.49	0.00	67.6
All Vehicles		1208	5.3	1272	5.3	0.671	9.0	NA	7.7	56.0	0.27	0.64	0.44	58.1

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 2 (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	513	5.0	540	5.0	0.311	0.3	LOS A	0.4	2.9	0.08	0.03	0.09	49.6
6	R2	23	2.0	24	2.0	0.311	8.1	LOS A	0.4	2.9	0.08	0.03	0.09	48.6
Approach		536	4.9	564	4.9	0.311	0.6	NA	0.4	2.9	0.08	0.03	0.09	49.5
North: Road 2														
7	L2	23	2.0	24	2.0	0.062	6.8	LOS A	0.2	1.4	0.56	0.73	0.56	44.1
9	R2	12	2.0	13	2.0	0.062	13.0	LOS B	0.2	1.4	0.56	0.73	0.56	43.8
Approach		35	2.0	37	2.0	0.062	8.9	LOS A	0.2	1.4	0.56	0.73	0.56	44.0
West: MH Road														
10	L2	12	2.0	13	2.0	0.288	4.7	LOS A	0.0	0.0	0.00	0.01	0.00	49.3
11	T1	504	5.0	531	5.0	0.288	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		516	4.9	543	4.9	0.288	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
All Vehicles		1087	4.8	1144	4.8	0.311	0.7	NA	0.4	2.9	0.06	0.04	0.06	49.4

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Road 3 (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: MH Road														
5	T1	524	5.0	552	5.0	0.317	0.3	LOS A	0.4	3.0	0.08	0.03	0.09	49.6
6	R2	23	2.0	24	2.0	0.317	8.2	LOS A	0.4	3.0	0.08	0.03	0.09	48.6
Approach		547	4.9	576	4.9	0.317	0.6	NA	0.4	3.0	0.08	0.03	0.09	49.5
North: Road 3														
7	L2	23	2.0	24	2.0	0.063	6.9	LOS A	0.2	1.5	0.57	0.74	0.57	44.1
9	R2	12	2.0	13	2.0	0.063	13.4	LOS B	0.2	1.5	0.57	0.74	0.57	43.7
Approach		35	2.0	37	2.0	0.063	9.1	LOS A	0.2	1.5	0.57	0.74	0.57	43.9
West: MH Road														
10	L2	12	2.0	13	2.0	0.293	4.7	LOS A	0.0	0.0	0.00	0.01	0.00	49.3
11	T1	514	5.0	541	5.0	0.293	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		526	4.9	554	4.9	0.293	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
All Vehicles		1108	4.8	1166	4.8	0.317	0.7	NA	0.4	3.0	0.06	0.04	0.06	49.4

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [MH Rd - Jack Boyd Dr/Road 4 (Site Folder: TOT_SAT - Sensitivity)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jack Boyd Drive														
1	L2	36	4.0	38	4.0	0.493	17.0	LOS C	1.9	13.8	0.87	1.14	1.24	32.5
2	T1	10	2.0	11	2.0	0.493	33.9	LOS D	1.9	13.8	0.87	1.14	1.24	32.4
3	R2	48	3.0	51	3.0	0.493	40.9	LOS E	1.9	13.8	0.87	1.14	1.24	32.3
Approach		94	3.3	99	3.3	0.493	31.0	LOS D	1.9	13.8	0.87	1.14	1.24	32.4
East: MH Road														
4	L2	92	2.0	97	2.0	0.412	6.5	LOS A	1.3	9.4	0.18	0.11	0.23	43.6
5	T1	549	7.0	578	7.0	0.412	0.6	LOS A	1.3	9.4	0.18	0.11	0.23	48.7
6	R2	47	2.0	49	2.0	0.412	8.6	LOS A	1.3	9.4	0.18	0.11	0.23	47.7
Approach		688	6.0	724	6.0	0.412	2.0	NA	1.3	9.4	0.18	0.11	0.23	47.9
North: Road 5														
7	L2	47	2.0	49	2.0	0.308	12.1	LOS B	1.1	7.9	0.75	1.05	0.90	39.2
8	T1	10	2.0	11	2.0	0.308	31.8	LOS D	1.1	7.9	0.75	1.05	0.90	35.9
9	R2	26	2.0	27	2.0	0.308	33.1	LOS D	1.1	7.9	0.75	1.05	0.90	39.0
Approach		83	2.0	87	2.0	0.308	21.1	LOS C	1.1	7.9	0.75	1.05	0.90	38.7
West: MH Road														
10	L2	26	2.0	27	2.0	0.349	9.6	LOS A	1.4	10.2	0.23	0.08	0.30	47.9
11	T1	477	5.0	502	5.0	0.349	1.2	LOS A	1.4	10.2	0.23	0.08	0.30	48.4
12	R2	46	13.0	48	13.0	0.349	10.7	LOS B	1.4	10.2	0.23	0.08	0.30	42.9
Approach		549	5.5	578	5.5	0.349	2.4	NA	1.4	10.2	0.23	0.08	0.30	47.9
All Vehicles		1414	5.4	1488	5.4	0.493	5.2	NA	1.9	13.8	0.28	0.22	0.36	45.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [MH Rd - Molesworth (Site Folder: TOT_SAT - Sensitivity)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

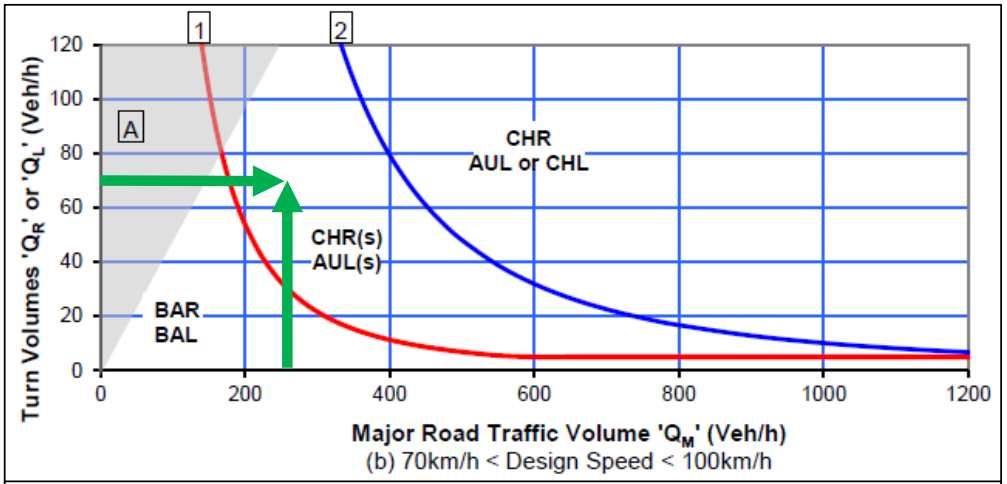
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Molesworth Drive														
1	L2	674	3.0	709	3.0	0.624	3.6	LOS A	6.6	47.6	0.47	0.47	0.47	46.6
2	T1	44	2.0	46	2.0	0.624	3.6	LOS A	6.6	47.6	0.47	0.47	0.47	47.7
3	R2	117	2.0	123	2.0	0.624	8.1	LOS A	6.6	47.6	0.47	0.47	0.47	47.8
Approach		835	2.8	879	2.8	0.624	4.3	LOS A	6.6	47.6	0.47	0.47	0.47	46.8
East: MH Road														
4	L2	113	7.0	119	7.0	0.243	7.1	LOS A	1.6	11.5	0.75	0.76	0.75	45.2
5	T1	36	4.0	38	4.0	0.243	6.9	LOS A	1.6	11.5	0.75	0.76	0.75	46.3
6	R2	25	2.0	26	2.0	0.243	11.4	LOS B	1.6	11.5	0.75	0.76	0.75	46.4
Approach		174	5.7	183	5.7	0.243	7.7	LOS A	1.6	11.5	0.75	0.76	0.75	45.6
North: Cullen Street														
7	L2	33	2.0	35	2.0	0.152	7.6	LOS A	1.0	7.0	0.76	0.76	0.76	44.7
8	T1	42	9.0	44	9.0	0.152	7.8	LOS A	1.0	7.0	0.76	0.76	0.76	45.7
9	R2	25	2.0	26	2.0	0.152	12.0	LOS B	1.0	7.0	0.76	0.76	0.76	45.9
Approach		100	4.9	105	4.9	0.152	8.8	LOS A	1.0	7.0	0.76	0.76	0.76	45.4
West: MH Road														
10	L2	33	2.0	35	2.0	0.540	4.3	LOS A	4.5	32.2	0.57	0.64	0.57	44.6
11	T1	44	3.0	46	3.0	0.540	4.3	LOS A	4.5	32.2	0.57	0.64	0.57	45.6
12	R2	548	3.0	577	3.0	0.540	8.8	LOS A	4.5	32.2	0.57	0.64	0.57	45.7
Approach		625	2.9	658	2.9	0.540	8.3	LOS A	4.5	32.2	0.57	0.64	0.57	45.6
All Vehicles		1734	3.3	1825	3.3	0.624	6.3	LOS A	6.6	47.6	0.55	0.58	0.55	46.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

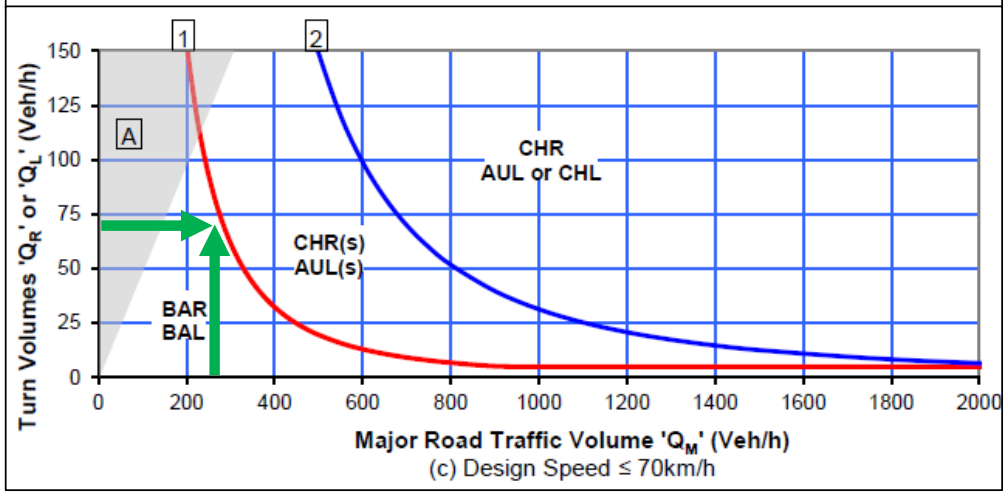
ATTACHMENT 5:

AUXILIARY TURN LANE WARRANT NOMOGRAPHS

Cove Road and Pigeonwood Place Right Turn Lane

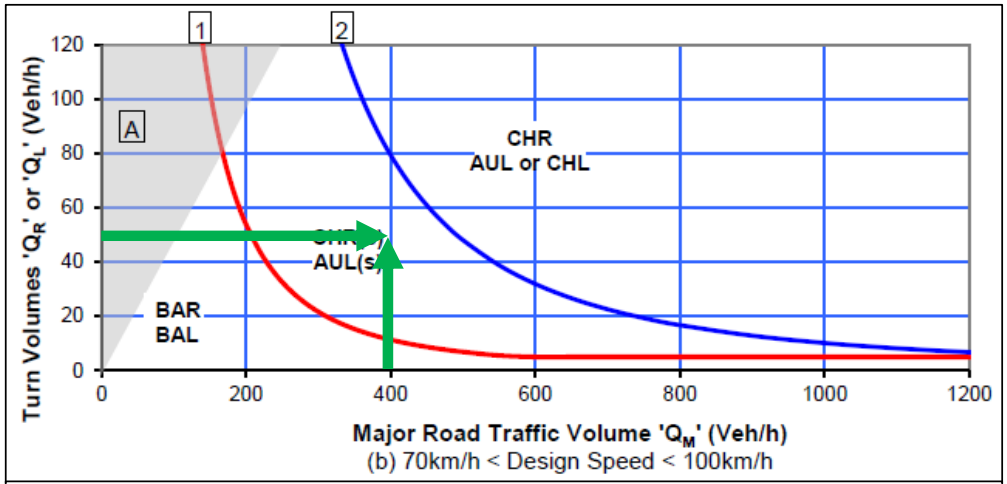


(b) 70km/h < Design Speed < 100km/h

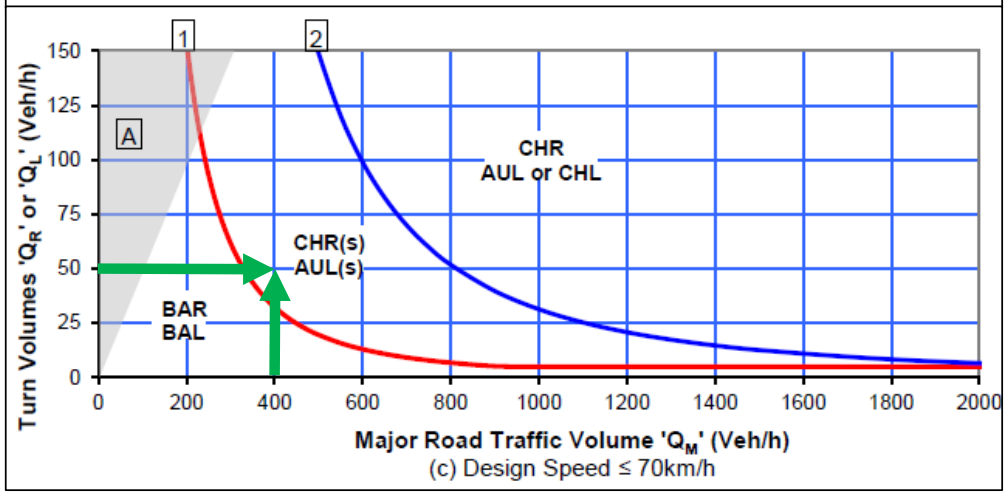


(c) Design Speed ≤ 70km/h

Cove Road and Road 1 Right Turn Lane

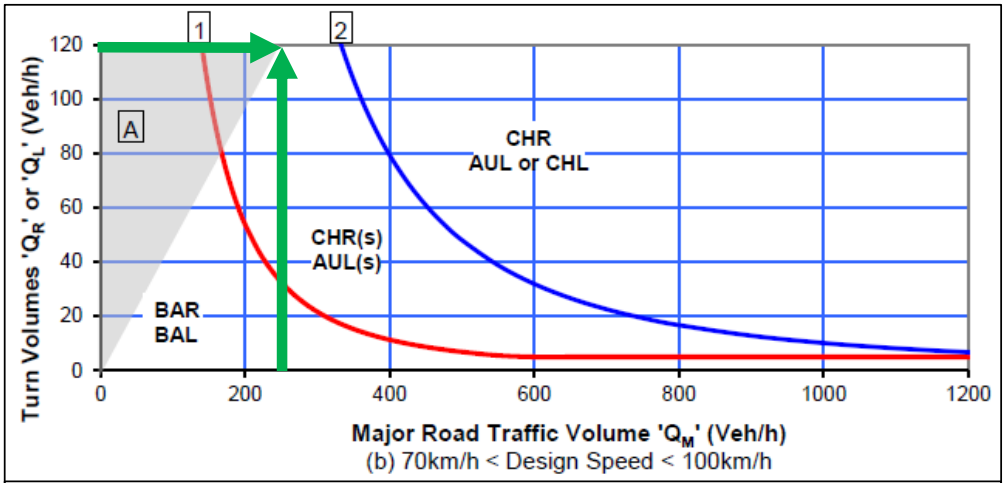


(b) 70km/h < Design Speed < 100km/h

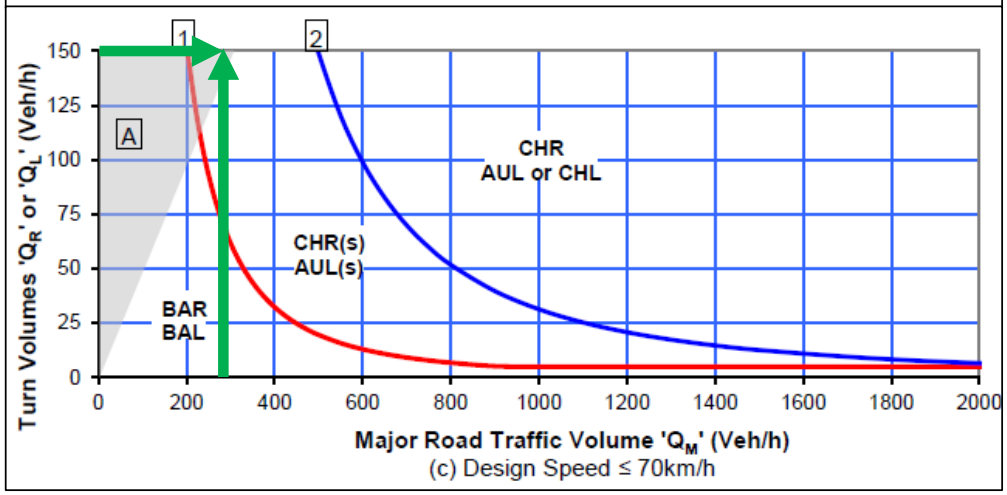


(c) Design Speed ≤ 70km/h

Cove Road and Mangawhai Heads Road Left Turn Lane

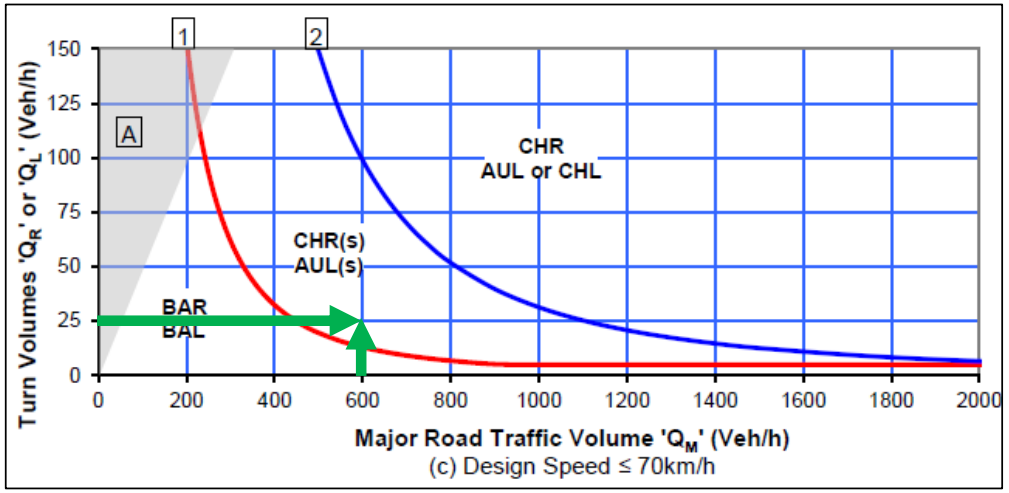


(b) 70km/h < Design Speed < 100km/h



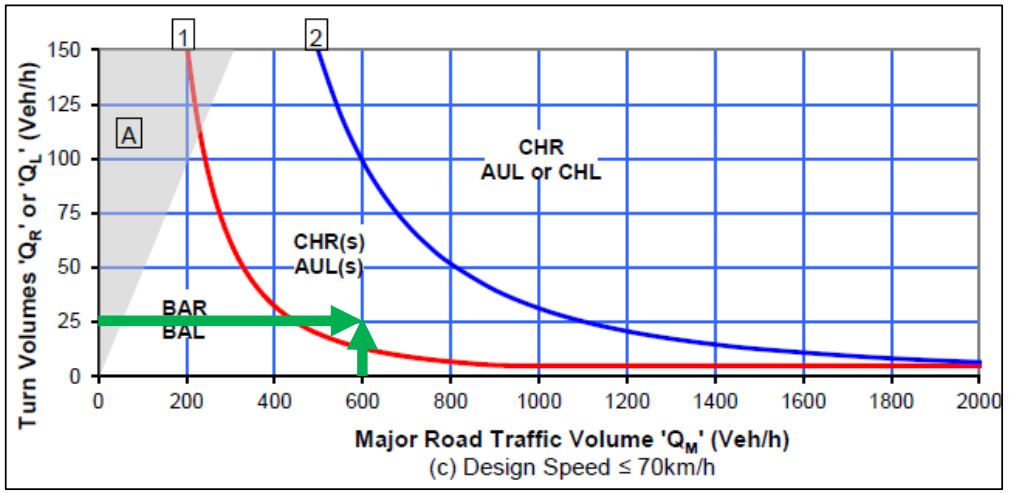
(c) Design Speed ≤ 70km/h

Mangawhai Heads Road and Road 2 Right Turn Lane



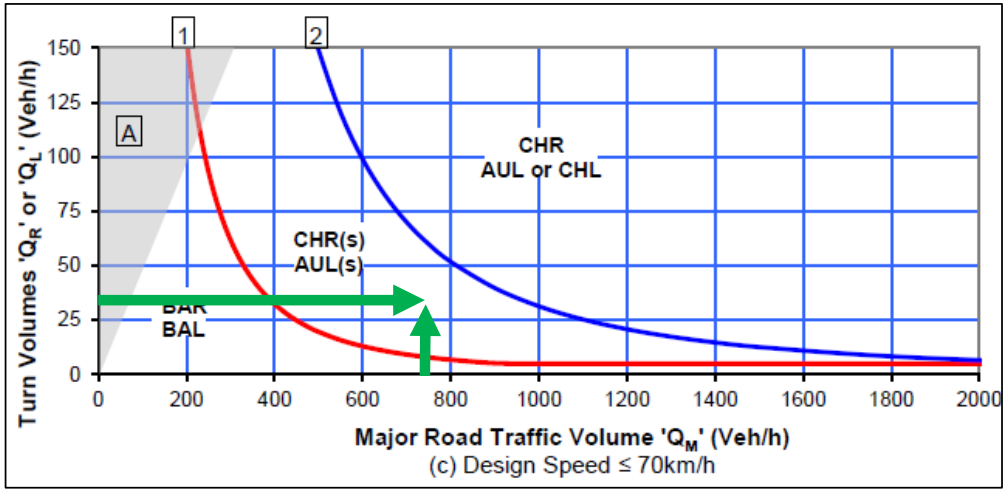
(c) Design Speed ≤ 70km/h

Mangawhai Heads Road and Road 3 Right Turn Lane

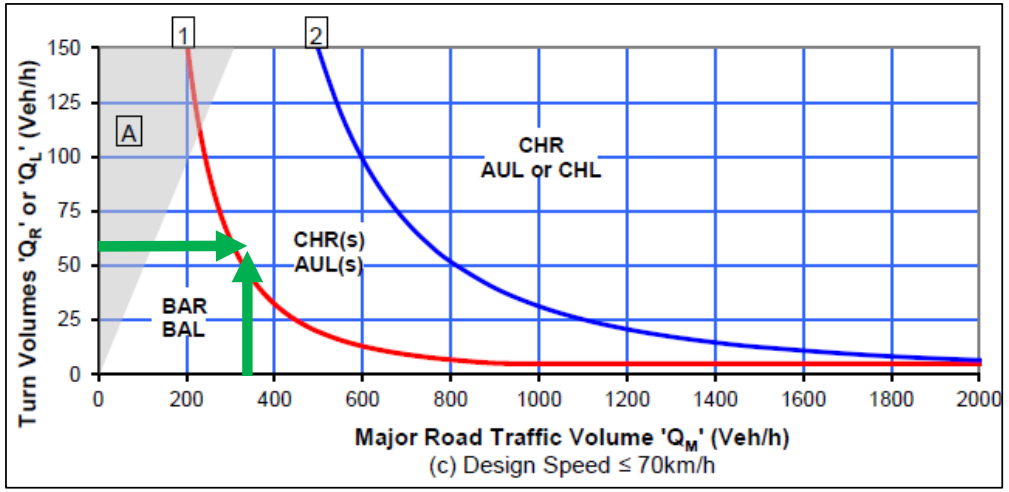


(c) Design Speed ≤ 70km/h

Mangawhai Heads Road and Jack Boyd Drive Right Turn Lane



Mangawhai Heads Road and Jack Boyd Drive Left Turn Lane



Mangawhai Heads Road and Road 4 Right Turn Lane