WAKA KOTAHI
NZ TRANSPORT AGENCY

DRURY ACCESS RAMP PROJECT

Appendix M – Transport Impact Assessment

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More information

NZ Transport Agency
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Abbreviations

Abbreviation	Term
AEE	Assessment of Environmental Effects
AUP	Auckland Unitary Plan (Operative in Part 2016)
CEMP	Construction Environment Management Plan
CNVMP	Construction Noise and Vibration Management Plan

CTMP	Construction Traffic Management Plan
NIMT	North Island Main Trunk
NOR	Notice of Requirement
NUMP	Network Utilities Management Plan
NUO	Network Utility Operator
P2Ds	SH1 Upgrades Project between Papakura to Drury South
RMA	Resource Management Act 1991
RIA	Relevant Iwi Authorities
SH1	State Highway 1 Motorway, the Southern Motorway
SH22	State Highway 22, Great South Road
SMAF-1	Stormwater Management Areas – Flow 1
SUP	Shared Use Path
TEAP	Transport Emissions Action Plan 2021
the Project	Drury Access Ramp Project
Waka Kotahi	Waka Kotahi NZ Transport Agency

EXECUTIVE SUMMARY

This report provides an Assessment of Transport Effects to support the Proposed Access Ramp at Drury Interchange (the Project). This direct off ramp is proposed primarily to facilitate development within the Drury centre, and it is a proposal that is indicated within the provisions relating to the Drury Centre Precinct within the Auckland Unitary Plan (Precinct 450)[1], to allow development beyond what is referred to as Threshold C to be implemented.

Positive transport effects of the Project of the proposed direct ramp are:

- Traffic reassignment away from the local road network
- Improvements in the operation of the local road network, due to the above reassignment
- Reductions in the total kilometres travelled, due to the provision of the direct ramp (relative to the fairly indirect access for traffic heading to the future development area, for the scenario without the project).
- Minor benefits for walking and cycling
- Minor safety benefits
- Minor benefits for freight
- Negligible benefits for public transport

Potential adverse effects of the Project area:

- Minor Adverse traffic effects during the construction stage

These effects can be managed or mitigated by:

- The implementation of a Construction Traffic Management Plan.

[1] As defined in Table I450.6.2.1 in the AUP for the Drury Centre (Precinct 450), Threshold c relates to a maximum of:
(i) 1,800 dwellings; and/or
(ii) 32,000 m^2 retail GFA; and/or
(iii) 8,700 m^2 other commercial GFA; and/or
(iv) 1,000m^2 community GFA.

1 INTRODUCTION

1.1 Project Background Drury Interchange

This Report supports the application lodged by Waka Kotahi NZ Transport Agency (Waka Kotahi) for the construction of a new southbound access ramp at Drury Interchange (The Project).

The proposal is considered in the context of the Papakura to Bombay Project (P2B). P2B is a Waka Kotahi project set to improve the safety and functionality of State Highway 1 (SH1) and provide for long term growth in the south of Auckland. Waka Kotahi has structured P2B in to five stages. The most pertinent of these is Stage 1B1, which pertains to the approved upgrades of Drury Interchange. Stage 1B1 was approved under the COVID-19 Recovery (Fast Track Consenting) Act 2020 ("FTA").

In addition, the proposed site for the Project interfaces the following consented and future developments in the area:

- Future development areas in Drury which are detailed in section 2.1 below;
- Realigned SH1 corridor and SH22 / Great South Road as consented in Stage 1B1 of the Papakura to Drury ("P2D") project by Waka Kotahi;
- Future proofing works along North Island Main Trunk (NIMT) rail corridor by KiwiRail as part of Papakura to Pukekōhe (P2P) rail electrification works; and

1.2 Project Description Drury Centre Access Ramp

The proposal is for the construction of a new southbound access ramp from SH1 to provide direct connection to future development areas in Drury Town Centre. The approximate location of the proposed off-ramp in relation to the surrounding existing and planned environment is referred to in the AEE and shown in

Figure 1-1 Location plan of the proposed Drury Access Ramp

below.

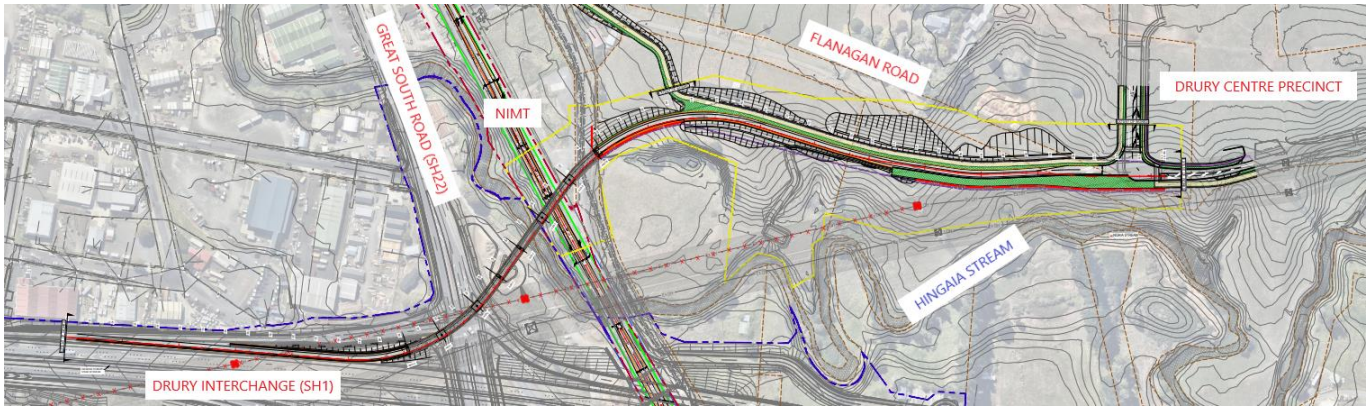


Figure 1-1 Location plan of the proposed Drury Access Ramp

In relation to transport, the following are proposed for the Project:

- Construction of a 245m long seven span structure bridge from southbound lane of SH1 to an area off Flanagan Road;
- Foundation piling works for bridge support; and
- Construction of a 500m long road on the southern end of the bridge, including associated earthworks, stormwater system and retaining walls to support the road.

Further details of the proposed off-ramp are shown on the plans attached as **Appendix B**.

The Project takes place within the existing Flanagan Road (considered as a local road in the AUP) and existing services and utilities, which include: 1200mm diameter underground Waikato watermain parallel to the NIMT corridor;

underground sewer and watermain pipes along Flanagan Road; and high voltage overhead lines located directly above the proposed ramp, which is planned to be removed.

1.3 Purpose of this Report

This report with respect to traffic impacts forms part of a suite of technical reports prepared the Project. Its purpose is to inform the AEE for:

- NoR for alteration to the existing Designation 6706 for which Waka Kotahi is the Requiring Authority under section 181 of the RMA; and
- Resource consent application for national environmental standard matters under NES-CS and NES-F; and
- Resource consent application for regional matters under the AUP.

The report will:

- Describe the existing transport environment and identify the relevant matters within the Project area.
- Assess the effects of the proposed works.
- Recommend mitigation and management measures to address potential adverse effects.

In assessing the effects related to transport, the main elements associated with the proposed works that are assessed in this report are:

- During the construction phase, the effects of:
  - Temporary traffic management
  - The temporary closure of the existing Drury southbound on ramp
- During the operation phase, the effects of:
  - The reassignment of some traffic from the existing road network to the new, direct ramp to Drury
  - Changes in performance of the local road network, due to the above reassignment of traffic
  - Reductions in total vehicle kilometres travelled
  - Effects on active mode trips
  - Effects on freight
  - Effects on public transport
  - Effects on safety.

2 EXISTING ENVRIONMENT

The following is an overview of the existing transport in the Project area.

2.1 Planning Environment

2.1.1 Designations

The primary designation which covers the majority of the Project corridor is Designation 6706, which is described in **Table 2-1** below. The corresponding planning environment maps are contained in **Appendix J**.

Table 2-1 The Designation in the Project area

Reference No.	Requiring Authority	Designation and Purpose	Location	Conditions
Designation 6706	Waka Kotahi	Motorway purposes between Auckland and Hamilton	SH1, north of Takaanini interchange to the south of Quarry Road, Drury	Condition set Designation 6706 (Operative)

There are a number of designations that overlap the Project corridor, which are described in **Table 2-2** below. The corresponding existing environment maps are contained in **Appendix J**.

Table 2-2 Overlapping designations in the Project area

Reference No.	Requiring Authority	Designation and Purpose	Location
Designation 6302	KiwiRail	NIMT Railway Line	South of the Drury Interchange.
Designation 6707	Waka Kotahi	To undertake maintenance, operation, use and improvement to the State Highway network	SH22, at Drury Interchange.

2.1.2 Drury Centre Precinct I450

Precinct 450 of the Auckland Unitary Plan allows 35.5 hectares of Business: Metropolitan Centre Zone, approximately 51.8 hectares of Business Mixed Use Zone surrounding the Metropolitan Centre and, 7.4 hectares of Open Space: Informal Recreation Zone at Drury Centre. The provisions for this Precinct identify the potential for a future southbound off ramp into Drury Centre.

The development and infrastructure thresholds that are relevant to this assessment are set out in Table I450.6.2.1 of the Precinct Provisions. These are summarised at Table 2-3 below (noting that there are also subsequent thresholds relating to later stages of development):

Table 2-3 Development and Transport Infrastructure Thresholds set out in AUP Precinct 450, Table I450.6.2.1

	Column 1: Activities, development or subdivision, enabled by Transport Infrastructure in Column 2	Column 2: Transport infrastructure required to enable activities, development or subdivision in column 1
(a)	Up to a maximum of 710 dwellings	Interim upgrade to Great South Road/Waihoehoe Road roundabout to signals in accordance with Appendix 1 and 1a, including pedestrian connections to adjacent existing footpaths; and Interim upgrade of Waihoehoe Road in accordance with Appendix 1 and 1a, including walking and cycling provisions on the Waihoehoe Road bridge.
(b)	Up to a maximum of: (i) 1,300 dwellings; and/or (ii) 24,000m2 retail GFA; and/or (iii) 6,000m2 other commercial GFA; and/or (iv) 800m2 community GFA.	Upgrades in (a) above and State Highway 1 widening – Stage 1, being six lanes between the Papakura interchange and Drury interchange.
(c)	Up to a maximum of: (i) 1,800 dwellings; and/or (ii) 32,000m2 retail GFA; and/or (iii) 8,700m2 other commercial GFA; and/or (iv) 1,000m2 community GFA.	Upgrades in (a) and (b) above and: Drury Central train station, including a pedestrian connection to Waihoehoe Road*; and Direct connection from State Highway 1 to the Drury Centre via a single lane slip lane from SH1 interchange to Creek Road. Creek Road is within the Drury Centre Precinct and is shown on Precinct Plan 2**.
(d)	Up to a maximum of: (i) 1,800 dwellings; and/or (ii) 32,000m2 retail GFA; and/or (iii) 8,700m2 other commercial GFA; and/or (iv) 1,000m2 community GFA.	Upgrades in (a)-(c) above and: Ultimate Waihoehoe Road upgrade between Fitzgerald Road and Great South Road in accordance with Appendix 1, including: i. Two general traffic lanes and two bus lanes, footpaths and cycleways on both sides, and a new six-lane bridge over the railway corridor; and ii. Signalisation and increased capacity at the Great South Road/ Waihoehoe Road intersection, including fully separated active mode facilities and 3-4 approach lanes in each direction

2.1.3 Papakura to Drury (P2DS)

The overall works for Stage 1B1 were approved under the FTA on 12th November 2021, which included planning approvals for various upgrades at Drury Interchange, such as the realignment and raising of the interchange towards the east, new bridges over State Highway 22 (SH22), a new off-road Shared Use Path (SUP), additional shoulders and associated stormwater infrastructure. For brevity, the relevant approvals can be summarised as follows:

- Regional and district resource consents granted to Waka Kotahi for the construction and operation of the project. Granted for Stage 1B1 on 12 November 2021 in accordance with the FTA:

  Land use consents LUC60391712;

  Groundwater consent WAT60391714;

  Stream works consent LUS60391713;

  Coastal works consent CST60391716 and

  Discharge consents DIS60391717 and DIS60391718.

- Decision on compliance for the State Highway 1 Papakura to Drury South State Highway 1 improvements (Listed Project LP15) – Transmission Line works under clause 3 of Schedule 6 of the FTA.

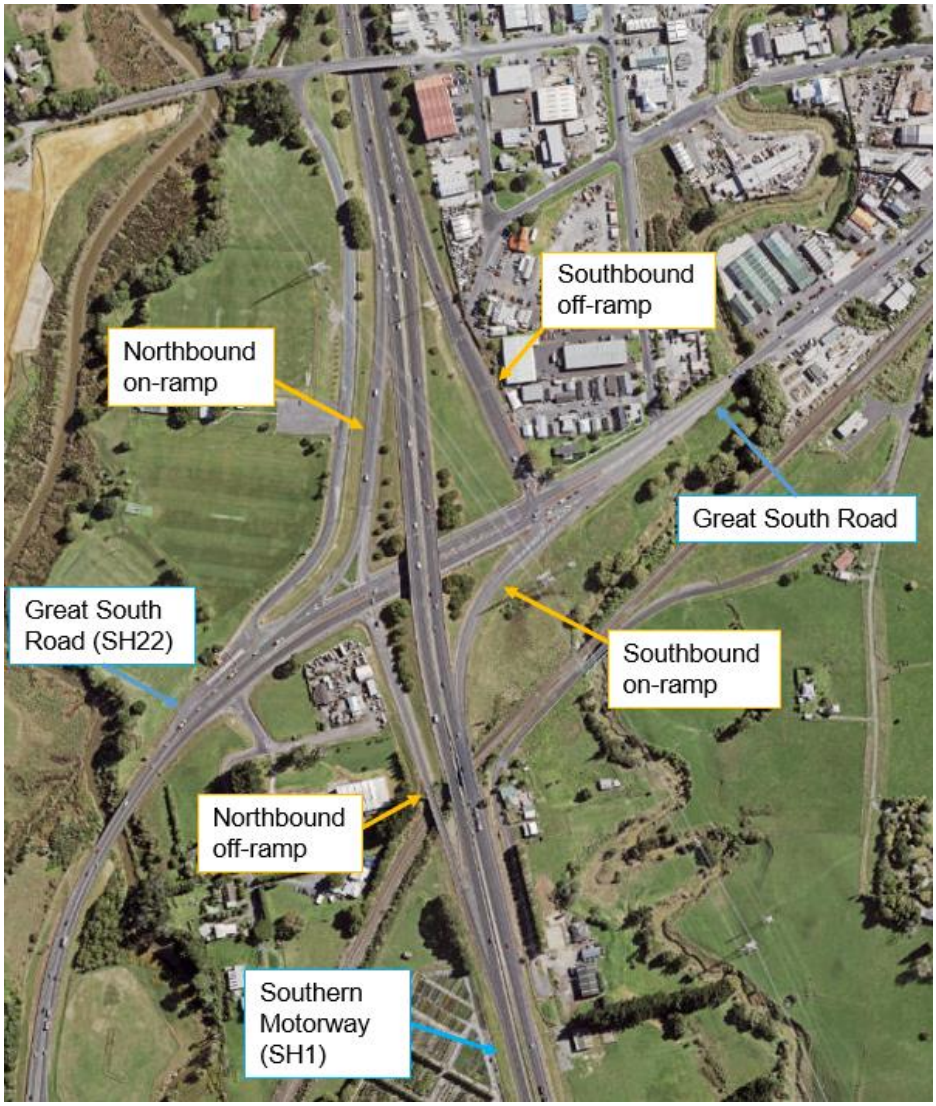
2.2 Transport environment

2.2.1 Drury Interchange

Error! Reference source not found. below shows the existing layout of the Drury Interchange. The interchange includes the following features:

- North and south-facing on-ramps and off-ramps are provided.
- Ramp metering is currently not provided on the on-ramps.
- Raised medians and two through lanes in each direction are provided on Great South Road and SH22 between the northbound and southbound on-ramps and off-ramps.
- Great South Road and SH22 have a posted speed limit of 70km/h near the interchange. The speed limit on Great South Road reduces to 50km/h 185m east of the southbound off-ramp.
- The northbound on-ramp and off-ramp form a signalised intersection with Great South Road:
  - The left turning movement exiting the off-ramp is a high angle slip lane with give-way control.
  - The on-ramp has two access points which merge into one before merging with SH1. Eastbound vehicles can access the on-ramp directly and bypass the signalised intersection with a slip lane entry. Westbound vehicles must turn right at the signals.
- The southbound on-ramp and off-ramp have similar characteristics to the northbound on/off-ramp intersection and also form a signalised intersection with Great South Road:
  - The left turning movement exiting the off-ramp is high angle slip lane with a give-way control.
  - The on-ramp has two access points which merge into one lane before merging with SH1. Westbound vehicles can access the on-ramp directly and bypass the signalised intersection with a slip lane entry. Eastbound vehicles must turn right at the signals.
- There are no lane gains or drops on SH1 for any on-ramps or off-ramps.
- Narrow footpaths are provided on the northern side of Great South Road.
- Painted cycle lanes are provided through the interchange, which are not physically separated from traffic lanes. The path of the lanes requires cyclists to cross the northbound and southbound on-ramps.

Figure 2-1 Existing layout at Drury interchange. *Source: Auckland Council GIS*



2.2.2 Current SH1 layout

The Southern Corridor Improvements Project on SH1 between Papakura and Manukau is now complete. As a result, the existing lane layout between north of the Papakura Interchange to south of the Drury Interchange is as follows:

- Southbound:
  - Three lanes from Takaanini to the Papakura Interchange.
  - A lane drop at the Papakura Interchange, resulting in two lanes from Papakura to the Drury Interchange.
- Northbound:
  - Two lanes from Drury to the Papakura Interchange.
  - A lane gain north of the Papakura Interchange, resulting in three lanes towards the Takaanini Interchange.

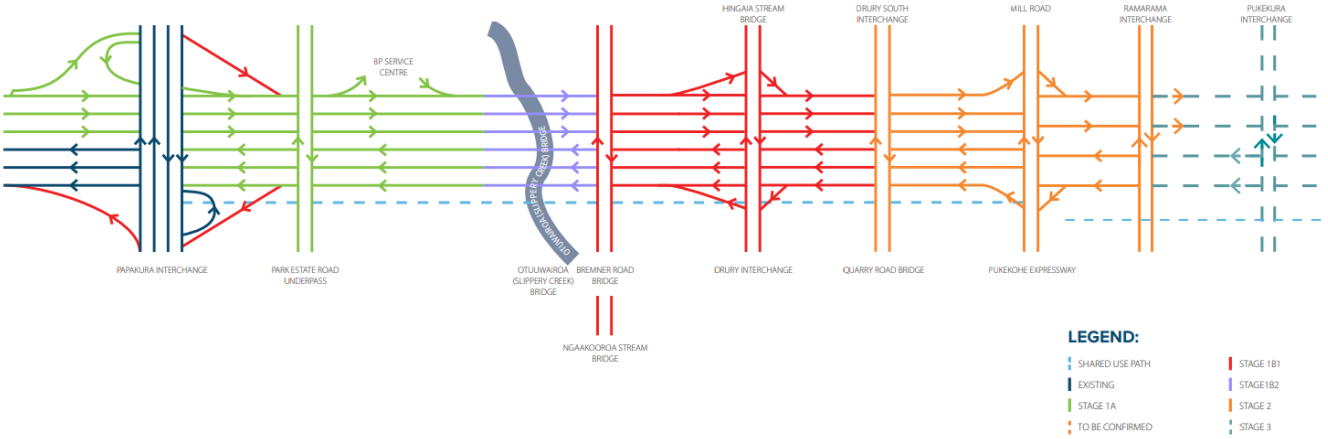
Stages 1A1, 1A2 and 1B1 works as part of the Papakura to Drury project are now consented and Stage 1A is now under construction These works will deliver an additional traffic lane along the motorway in each direction, between the Drury and Papakura Interchanges, up to a point south of the NIMT Bridges. This will result in three lanes in each direction between these interchanges. In a planning sense these consented works now form part of “the existing environment”, even though these lanes are currently under construction.

Stage 1B of the Papakura to Drury project also includes the following changes near the Drury Interchange:

- Extended right turn lanes through the interchange.
- An additional right turning lane on the southbound off-ramp.
- Upgrading the SH22 / Victoria Street / Mercer Street intersection from a staggered priority control intersection to a signalised intersection.

An overview of the separate stages of the Papakura to Drury project are shown in Figure 2-2 below.

Figure 2-2 Conceptual representation of Papakura to Drury project



2.2.3 Existing traffic volumes

The existing daily traffic volumes along SH1 (two-way) are summarised below (for the year 2018):

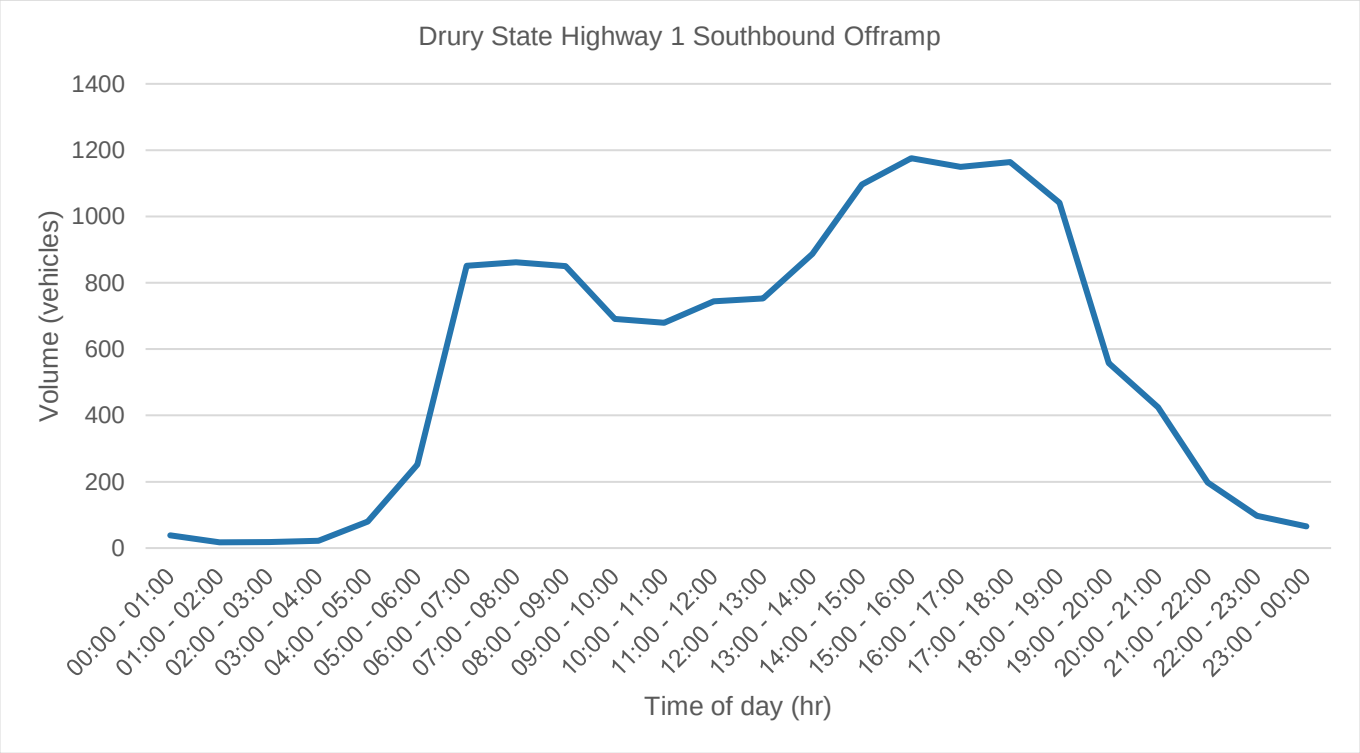
- 65,500 vpd between the Papakura and Drury Interchanges.
- 52,100 vpd between the Drury and Ramarama Interchanges.

The existing annual average daily total flows on the Drury southbound off ramp, according to data from the Waka Kotahi web site, was around 11,150 vehicles/day in 2015, increasing slightly to 11,400 in 2019. (Data for 2020 to 2022 is of limited relevance, given the effects of COVID on travel).

More recent data for weekdays (Tuesdays to Thursdays) in November 2022 indicates a daily flow of 13,700 vehicles/day. The profile of these trips is shown in

Figure 2-3. This figure indicates that the maximum hourly flow is just under 1,200 vehicles/hour, with this maximum flow occurring during the evening peak period.

Figure 2-3: Drury State Highway 1 southbound off ramp traffic profile



2.2.4 Crashes within the area of interest

We have undertaken a high-level crash assessment for the Project area between 2015 and 2019 (5-year period). This information is now a few years old, but clearly it is difficult if not impossible to draw meaningful conclusions from data that includes periods of time affected by COVID lockdowns.

Our crash search areas include the State Highway 1 southbound off ramp to Great South Road (

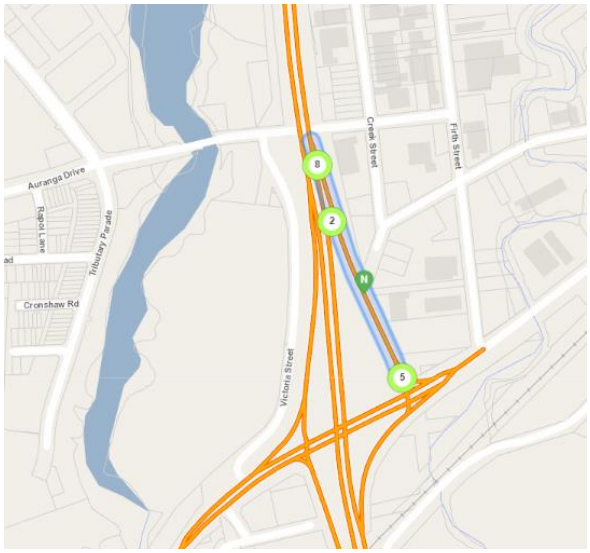
Figure 2-4 below) and the intersections of State Highway 1 and State Highway 22 (see Figure 2-5 below).

2.2.4.1 State Highway 1 southbound off ramp crash summary

The extent of the crash search is shown in

Figure 2-4 and key findings of the crash assessment for State Highway 1 off ramp are described below.

Figure 2-4: Crash search State Highway 1 off ramp



Crash numbers by severity:

- 0 injury crashes (fatal, serious and minor injury crashes)
- 16 (100%) non-injury crashes.

Crash numbers by crash types:

- 4 (25%) overtaking.
- 3 (19%) loss of control crashes.
- 9 (56%) rear-end / obstruction crashes.
- 0 crossing / turning crashes.
- 0 pedestrian / cyclist crashes.

The safe system approach acknowledges that people make mistakes and are vulnerable in a crash. While mistakes are inevitable, deaths and serious injuries from road crashes are not. Notably, there were no injury crashes and all crashes were non injury. There was a total of 16 non injury crashes.

Most crashes were rear-end/obstruction crashes. This is not unexpected on the Auckland Motorway network environment, due to heavy queuing during peak periods. The rest of the crashes is a mixture of loss of control crashes and overtaking crashes.

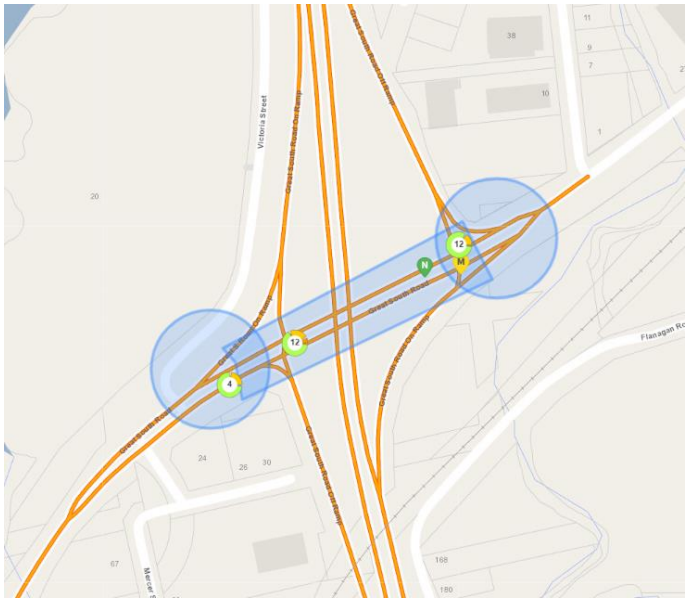
2.2.4.2 State Highway 1 / State Highway 22 interchange crash summary

The extent of the crash search is shown in

Figure 2-5

Figure 2-4 and key findings of the crash assessment for the intersections of State Highway 1 and Great South Road described below.

Figure 2-5: Crash search State Highway 1 and State Highway 22 intersections



Crash numbers by severity:

- 0 fatal and serious injury crashes.
- 7 (24%) minor injury crashes.
- 22 (76%) non-injury crashes.

Crash numbers by crash types:

- 6 (21%) overtaking.
- 1 (3%) Straight loss of control crashes.
- 6 (21%) Bend loss of control crashes
- 13 (45%) rear-end / obstruction crashes.
- 2 (7%) crossing / turning crashes.
- 1 (3%) miscellaneous crashes
- 0 pedestrian / cyclist crashes.

In the search area extraction, there was a limitation in the software to remove capture crashes on State Highway 1 northbound and southbound because it overlays on top of Great South Road. We identified a serious crash related to a motorcycle on State Highway 1 and removed this from our data set.

Notably, there were no fatal and serious crashes. There were 29 crashes with 7 injury crashes and 22 non injury crashes.

The highest proportion of crash type is rear end crashes, which can commonly occur at signalised intersections during peak periods. The next highest crash types are overtaking and loss of control crashes at the bend. This is likely due to the high-speed environment and the geometry of the road.

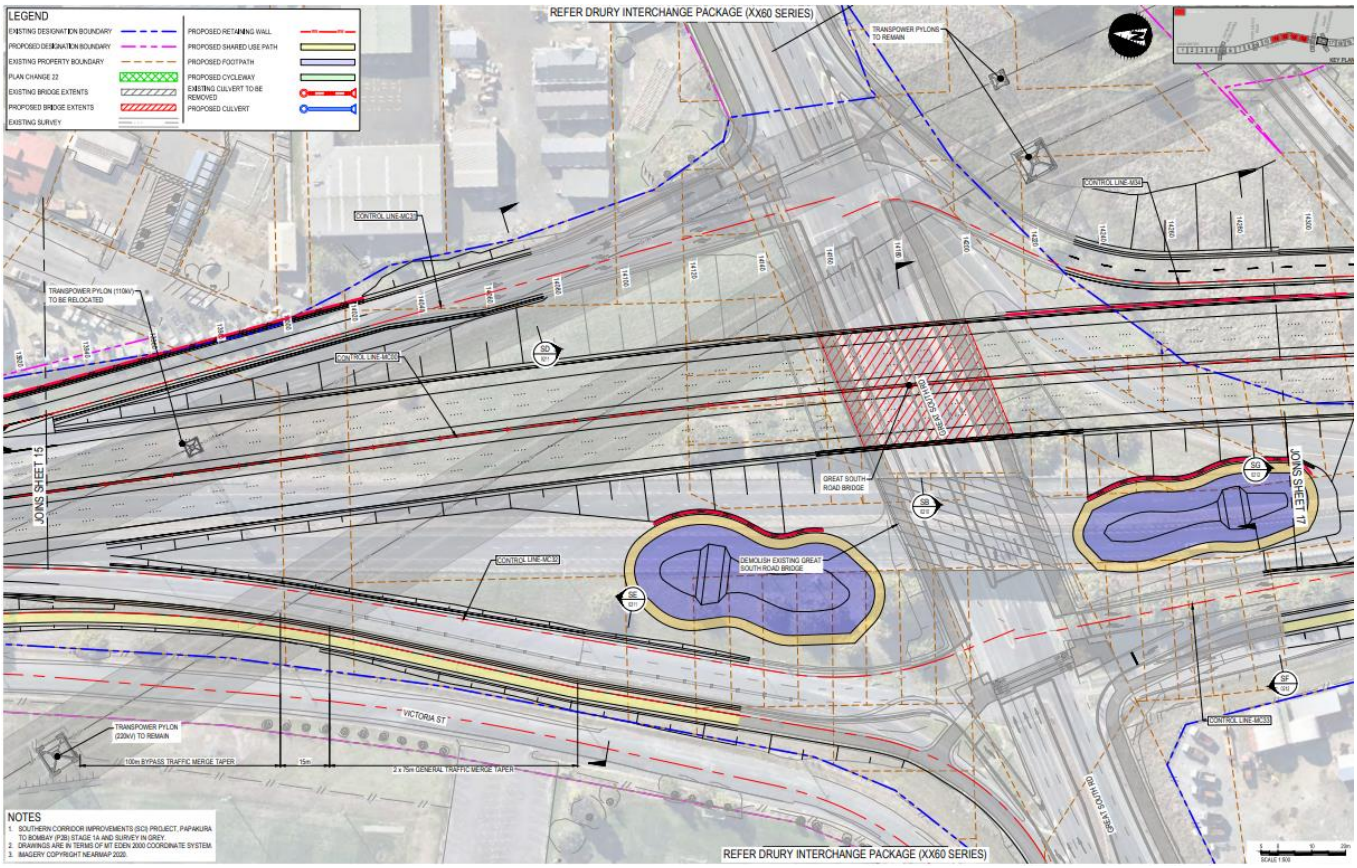
There were 14 crashes related to the intersection of State Highway 1 southbound off ramp and Great South Road, with 3 injury crashes and 11 non injury crashes. A total of 4 crashes were related to turning movements at this intersection and they were non injury crashes.

2.2.5 Pedestrian and cycle facilities

There are no pedestrians and cyclist facilities along the State Highway 1 corridor within the Project area. There are also limited facilities adjacent to the Drury interchange, as per Figure 2-6 (below).

As discussed in Section 2.2.2 above, Stages 1A1, 1A2 and 1B1 of the Papakura to Drury project are now consented and Stage 1A is now under construction. These stages include the provision of a Shared Use Path from Papakura Interchange to south of the BP service centre and Bremner Road Bridge to Drury South Interchange. Stage 1B2, which is currently pending planning approvals under the FTA will connect the SUP between stage 1A and 1B1, and stages 2 and 3 will extend the SUP to south of Papakura Interchange. New pedestrian crossing points will also connect to this SUP along the entire route.

Figure 2-6 General Arrangement Layout Plan – Drury Interchange (Stage 1B1 FTA, September 2021)



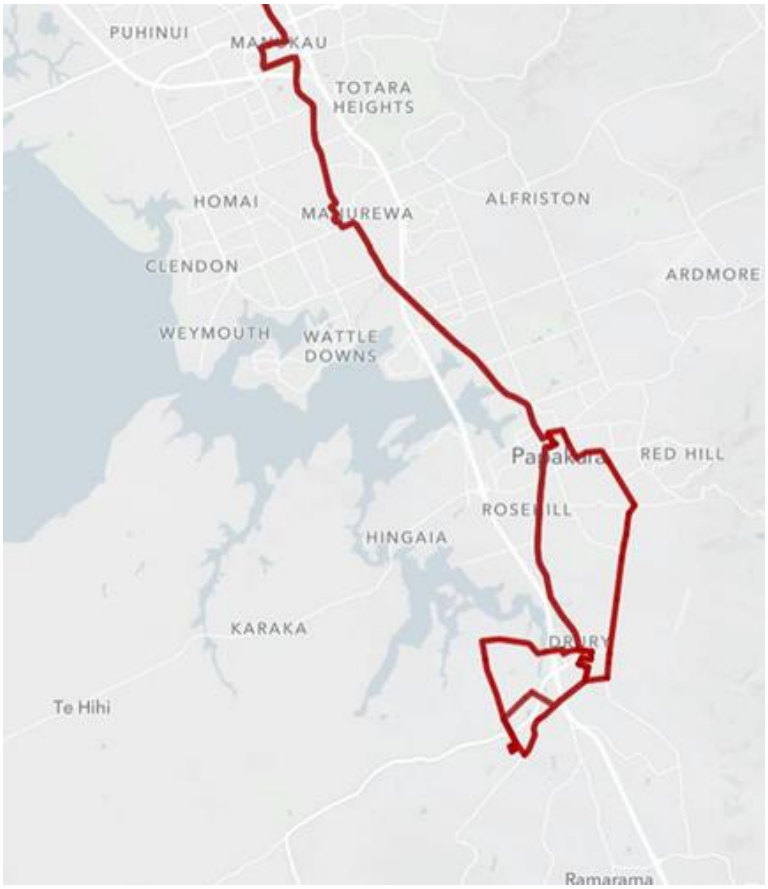
2.2.6 Public transport facilities

There are currently no public transport facilities along the motorway, within the Project area, and no scheduled bus services use the Drury southbound off ramp.

A Frequent Transit Network (FTN) is proposed as part of the Supporting Growth Programme Network for South Auckland. FTNs include public transport routes with minimum frequencies of 15 minutes in both directions between 7am and 7pm, seven days a week. Priority measures are usually implemented to reduce the effect of congestion on FTN routes.

Error! Reference source not found. below shows the current FTN plan, as previously provided by Auckland Transport for our Stage 1B assessment of the Papakura to Bombay Project. There are currently no public transport routes planned through the Drury Interchange. Routes in the local area include Bremner Road to the north, Great South Road to the east and other roads in Drury. None of these are expected to have direct impacts on the proposed Project.

Figure 2-7 Supporting Growth Programme, showing Frequent Transit Network



2.2.7 Freight

State Highway 1 is an important route for freight travelling between Auckland and the south, with approximately 9.4% of vehicles between Papakura and Drury during 2018 being heavy commercial vehicles (HCVs).

The southbound off ramp carries relatively few HCVs, these contributing only just over 2% of the daily flow.

3 ASSESSMENT OF EFFECTS

The following sections discuss the positive effects and the potential adverse impacts of the Project works on transport.

3.1 Assessment Methodology Overview

This section provides an overview of the modelling methodology used to assess the operational and construction traffic effects of the Project.

To assess the traffic effects of the Project, we have used the SATURN traffic models that have been used for numerous transport projects in south Auckland, including the Papakura to Drury project. These models were used most recently to assess the effects of the proposed development in Drury Centre

This assessment compares the following scenarios:

- Future Reference Case (Existing Case plus one additional traffic lane in each direction on State Highway 1, as consented under Stage 1A (and 1B) works, with 2028 predicted traffic demands).
- The Project (Future Reference Case plus the direct ramp at Drury)

The forecast 2028 traffic demands are generally based on outputs from Auckland Council's Macro Strategic Model (MSM), which in turn uses land use inputs from the Auckland Strategic Planning (ASP) model. The MSM broadly reflects the level of land use change anticipated in South Auckland (including Drury Centre and the surrounding development areas). However, three land use and transport scenarios for Drury have been assessed in SATURN, reflecting the development and Transport Infrastructure thresholds referred to in AUP Precinct 450, which were set out in Table 2-3 above:

- The construction traffic effects are based on Threshold b. This scenario reflects the greatest amount of development that can be in place prior to the provision of the direct off ramp to Drury
- The operational effects are based on Thresholds c and d, these reflecting scenarios that are possible following the provision of the direct off ramp.

Both the Future Reference Case and Project models assume investment in a range of other transport projects. At a regional level, the most notable projects include the completion of the initial phase of the Papakura to Drury project, and investment in rail, but several other projects, including those proposed by the Supporting Growth Alliance, are also taken into account. We have based the timing and staging of these projects on discussions with Waka Kotahi and the Supporting Growth Alliance.

3.2 Construction traffic effects

Delivery of the Project is expected to involve a range of temporary traffic management techniques that are commonly adopted throughout the wider Auckland motorway network.

We expect that these construction traffic management details will be developed through the project delivery phase and will be subject to further assessment, at the time of detailed construction planning. For our assessment we have considered three aspects of traffic effects during construction:

- Temporary works on the southbound off ramp and on Great South Road (which may include narrowing of lanes, or reduction in the number of lanes depending on construction methodology)
- Temporary closure of the existing Drury southbound on ramp.
- Construction related traffic.

3.2.1 Traffic effects of temporary works on the southbound off ramp

Temporary traffic management will be required on the existing southbound off ramp. The definitive methodology will be developed by the contractor once appointed at a later stage of design development, but we understand that the following measures are likely to be required:

- lane widths on the off ramp may be reduced
- there may be temporary closure of the road shoulder
- speed limit reductions on the off ramp are likely to be required.

The traffic effects of these temporary measures are likely to be quite modest. As noted in Section 2.3 above, the maximum existing flow using the off ramp is currently 1,200 vehicles/hour, which is well within the capacity of a single lane.

3.2.2 Traffic effects of temporary works on Great South Road

Temporary traffic management will be required on Great South Road, in the vicinity of the interchange, and we understand that:

- lane widths may be reduced
- speed limit reductions are likely to be required

The traffic effects of these temporary measures are likely to be modest.

3.2.3 Traffic effects of temporary closure of southbound on ramp

We understand that temporary closure of the existing southbound on ramp may be necessary.

The effects of this temporary closure have been assessed using the SATURN models for 2028, with development Threshold b. The effects of this closure are shown in Figures 3-1 and 3-2 below, in terms of predicted changes in traffic flows in the weekday AM and PM peaks. In these plots decreases in flows are shown as blue bands, while increases are shown in green.

Figure 3-1: Threshold b - traffic flow changes in the AM peak

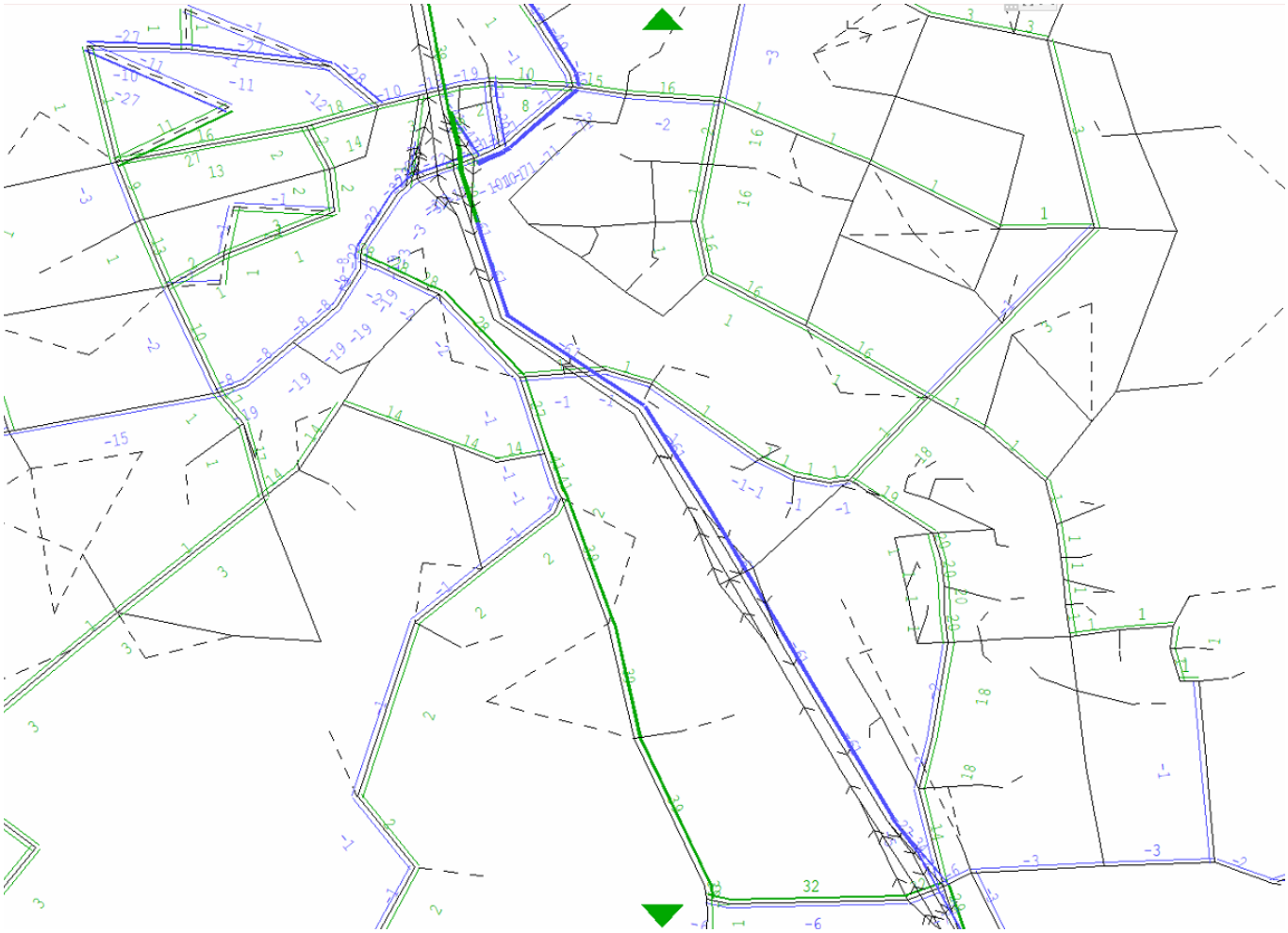
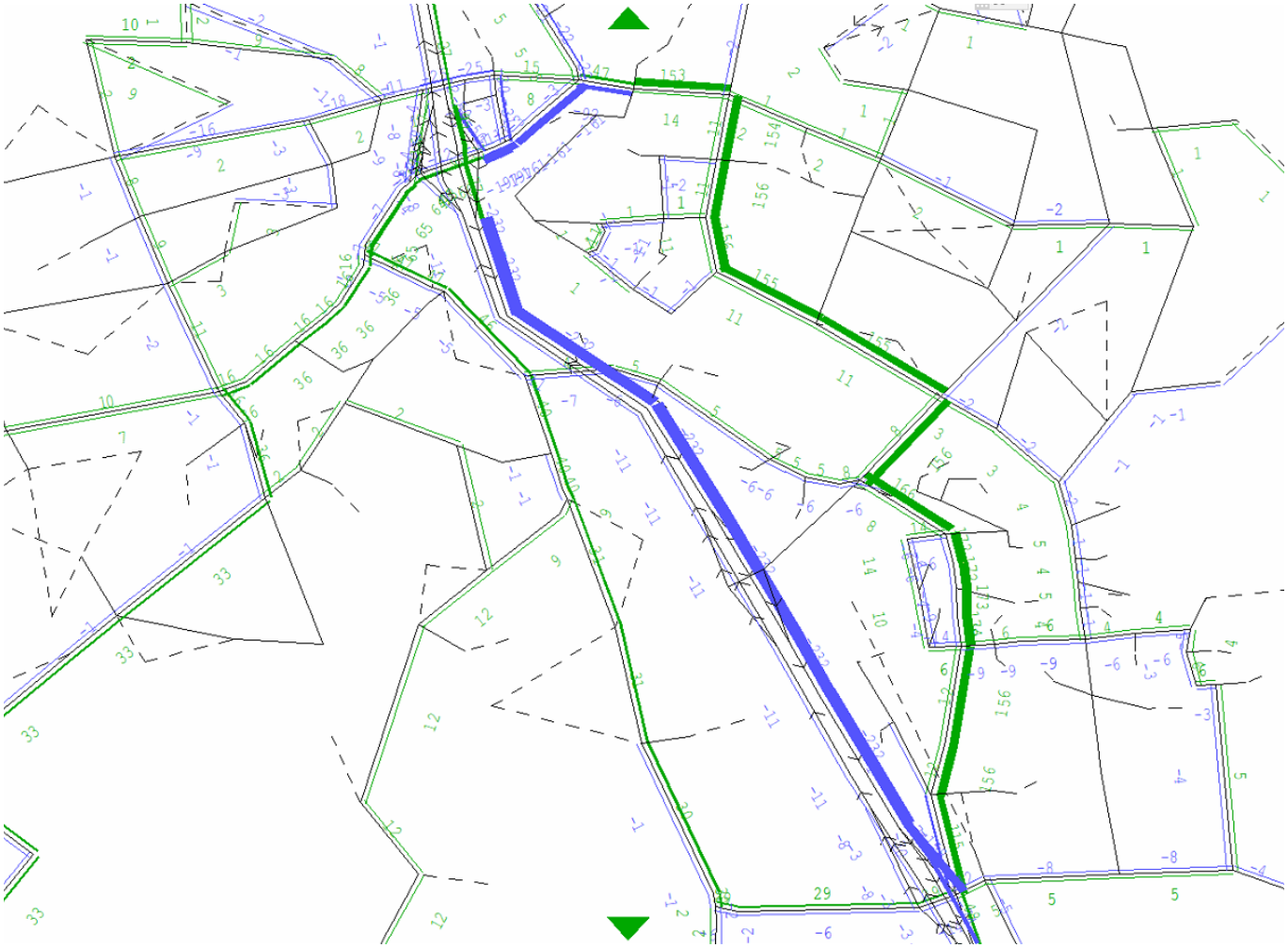


Figure 3-2: Threshold b - traffic flow changes in the PM peak



The traffic flows predicted to use the on ramp, according to the 2028 Threshold b models, are just under 150 vehicles/hour in the weekday AM peak, and 300 vehicles/hour in the PM peak hour.

The above plots indicate that traffic will reroute to join the motorway further south at the Ramarama interchange. Given the fairly low flows currently using the ramp, the effects of the proposed closure are expected to be minor.

3.2.4 Construction related traffic

Subject to final construction method confirmation, the following sites are envisaged to be potential construction support areas (CSAs) for the Project:

- Within designation adjacent to Flanagan Road; and
- Within designation adjacent to Great South Road.

The volumes of traffic heading to and from these two sites are not yet known, but it is unlikely that they will generate significant numbers of movements.

To ensure all construction traffic effects are adequately managed and mitigated, we recommend a Construction Traffic Management Plan (CTMP) be prepared prior to construction commencing, for implementation during construction. The CTMP should provide the following information:

- Be prepared in accordance the Council's requirements for CTMPs and the Waka Kotahi's most recent guidelines for temporary traffic management

- Contain specific details relating to avoiding, remedying or mitigating adverse effects on the environment from earthworks, construction and management of all works associated with the Project
- Be prepared in consultation with Auckland Transport
- Provide a general outline of the construction programme for each stage of development, and outline methods for maintaining the safe and efficient operation of local roads for all road users.

3.3 Operational effects

As stated above, the operational effects of the project have been assessed by using the 2028 SATURN models that reflect development thresholds c and d. The effects of this closure are shown in Figures 3-3 to 3-6 below, in terms of predicted changes in traffic flows in the weekday AM and PM peaks. In these plots decreases in flows are shown as blue bands, while increases are shown in green.

Figure 3-3: Threshold c - traffic flow changes in the AM peak

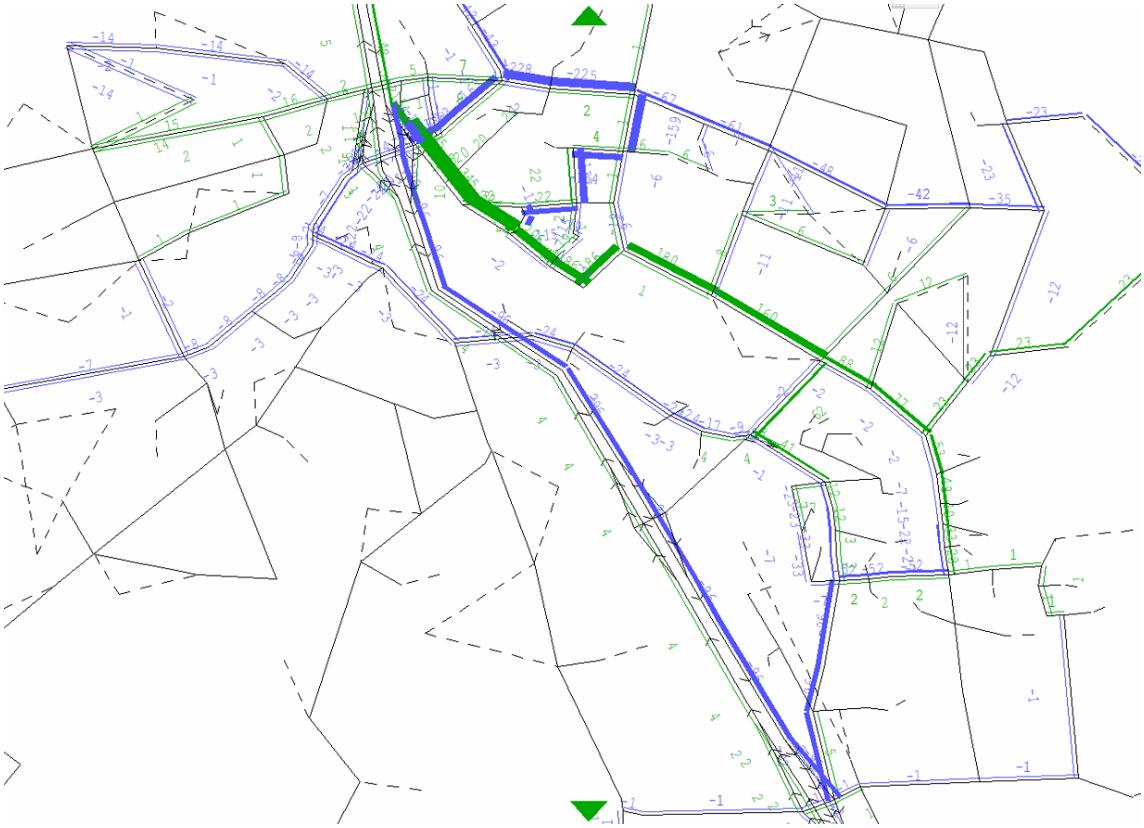


Figure 3-4: Threshold c - traffic flow changes in the PM peak

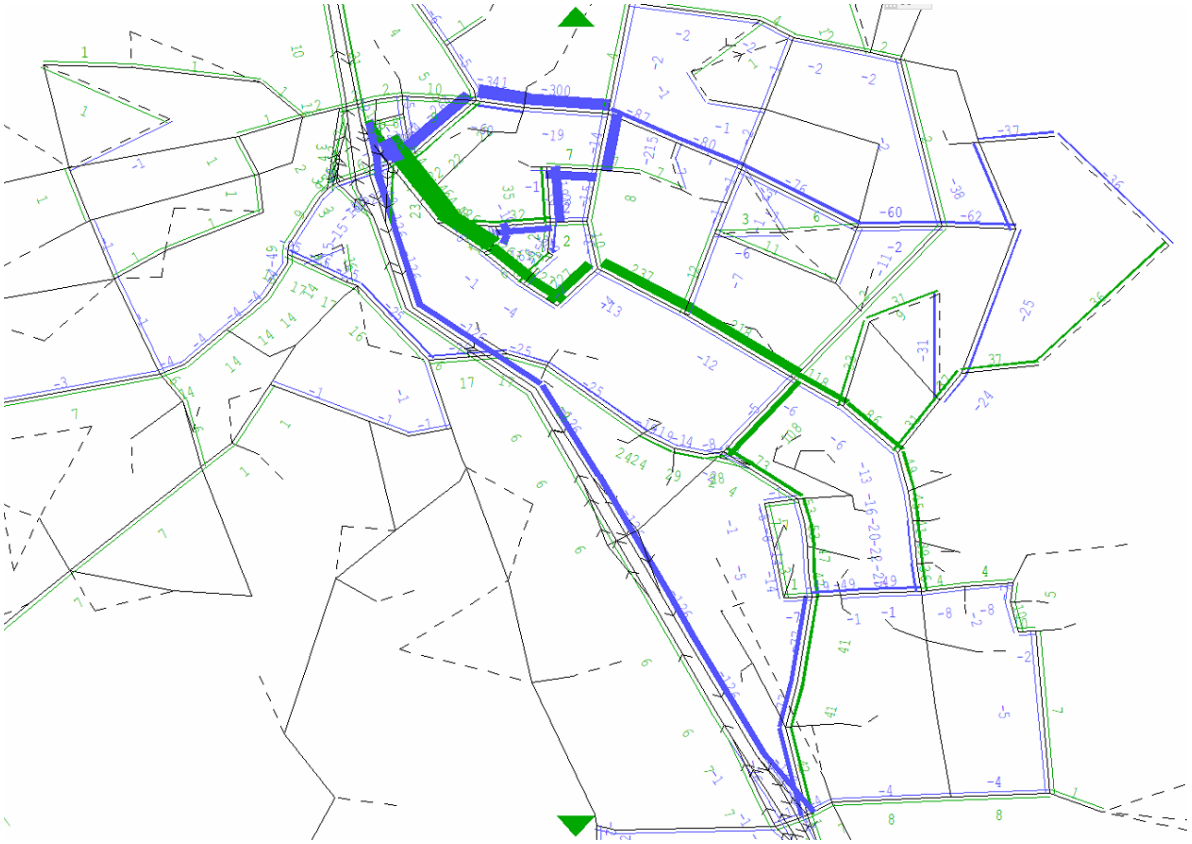


Figure 3-5: Threshold d - traffic flow changes in the AM peak

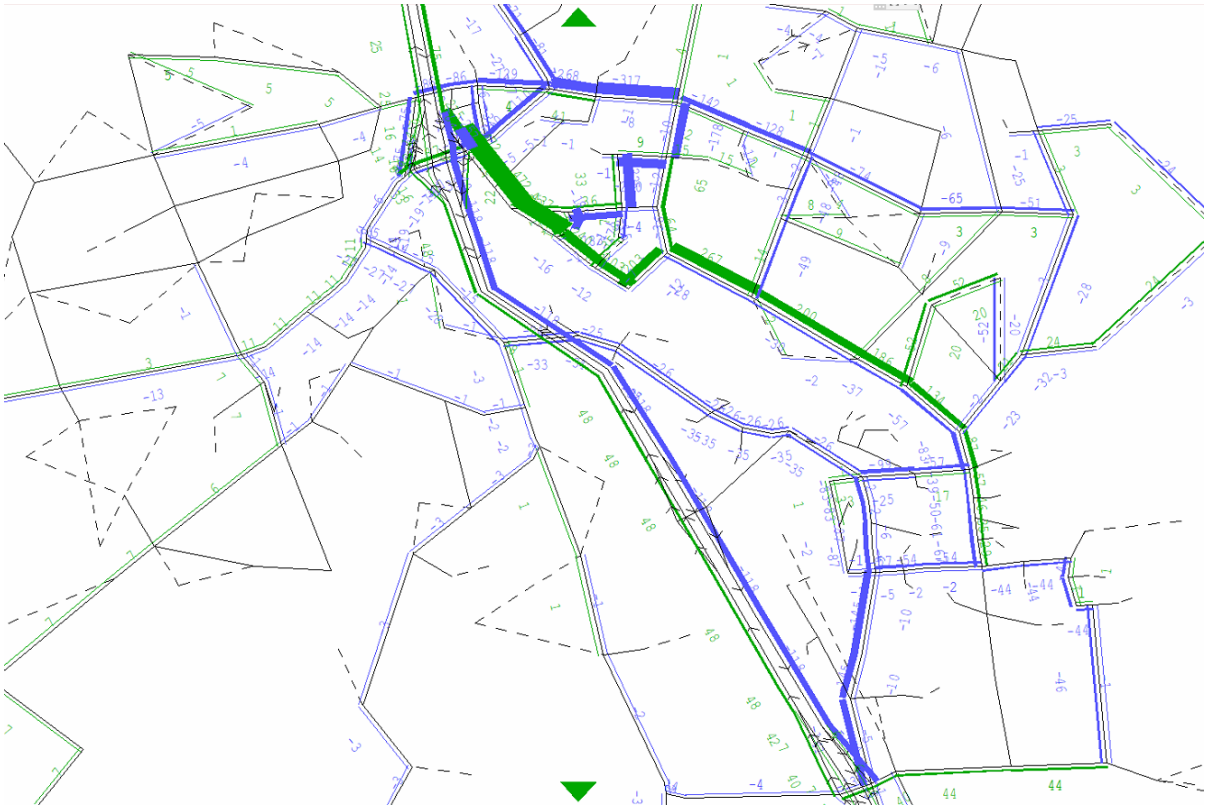
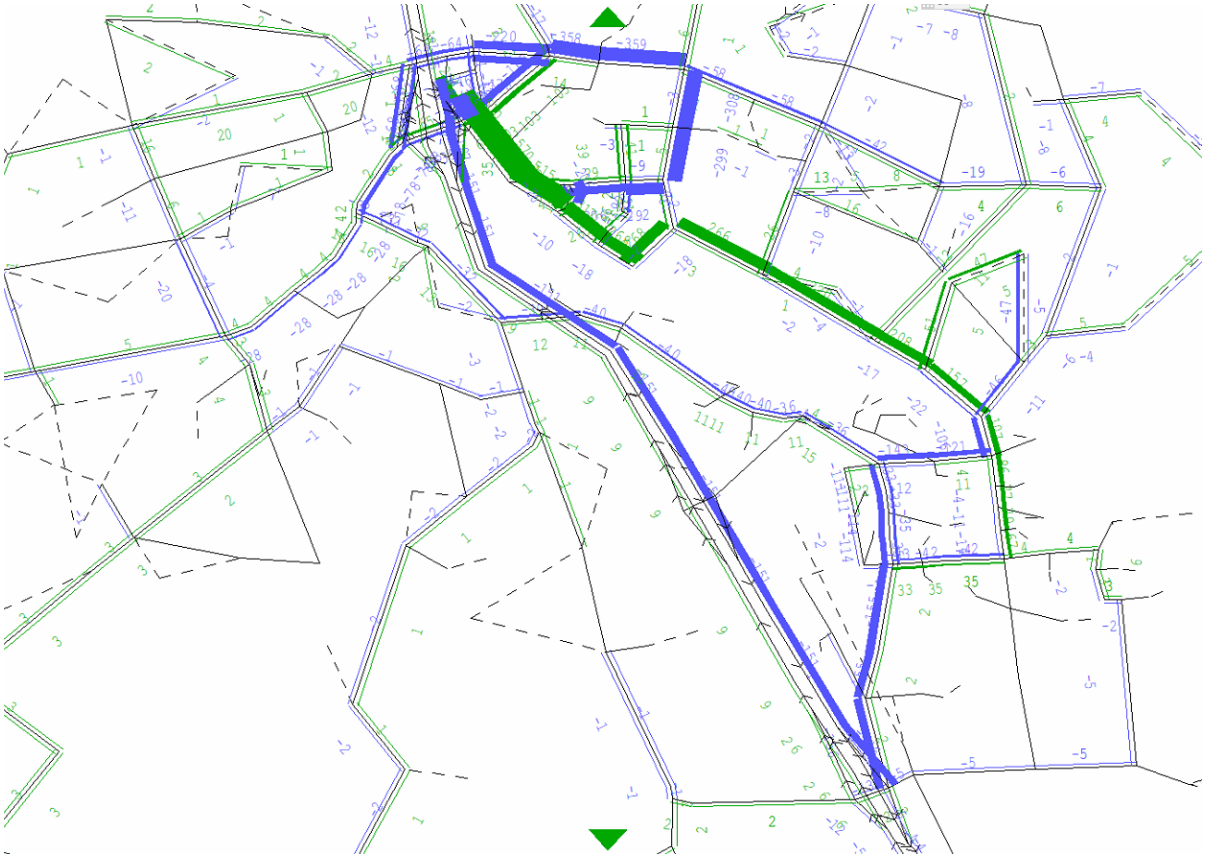


Figure 3-6: Threshold d - traffic flow changes in the PM peak



The above plots indicate that the direct southbound off ramp to Drury centre will attract about 350 and 460 vehicles/hour in the weekday morning and evening peaks, respectively, with Threshold c land uses. With Threshold d land uses these flows will increase to 470 and 570 vehicles/hour. These morning and evening peak forecasts lead to estimates of 5,250 and 6,775 vehicles/day, with Thresholds c and d[2].

3.4 Effects on Traffic

3.4.1 Reassignment of Traffic

The above plots indicate that the direct southbound off ramp to the Drury centre will attract about 5,250 or 6,775 vehicles/day, respectively, with Thresholds c and d.

The plots within Section 3.3 above indicate that the direct ramp will lead to reductions in traffic on Great South Road, primarily east of the motorway interchange, and also leading to reductions on Waihoehoe Road. The direct ramp will also lead to a minor reduction in traffic southbound on the motorway, as without the ramp some vehicles will approach Drury Centre/Drury South by using the Ramarama interchange.

3.4.2 Effects on Traffic Operations

As noted above, the direct southbound off ramp to the Drury centre will attract about 5,250 or 6,775 vehicles/day, respectively, with Thresholds c and d. This will lead to changes in traffic operations within the area of influence of the project.

[2] These daily estimates have been derived by 6.5 times the AM + PM peak flows. This is higher than the "rule of thumb" figure we often use (of 5 times AM + PM), but this higher figure is justified according to the existing flows on the southbound off ramp (see Figure 2-3 above)

The following plots show forecast differences in delays, due to the provision of the direct ramp, again for Thresholds c and d. Decreases in delays are shown as blue bands, while increases are shown in green. The main points to note include:

- Modest changes in delays are predicted at the Drury Interchange intersections
- More significant decreases in delays are predicted at the Great South Road/Waihoehoe Road intersection, particularly with Threshold d. At this threshold, this intersection is to change from a roundabout to a signalised layout, and the model indicates that this signalised layout will be operating at or over capacity if the direct off ramp to Drury is not provided.

Figure 3-7: Threshold c - delay changes in the AM peak

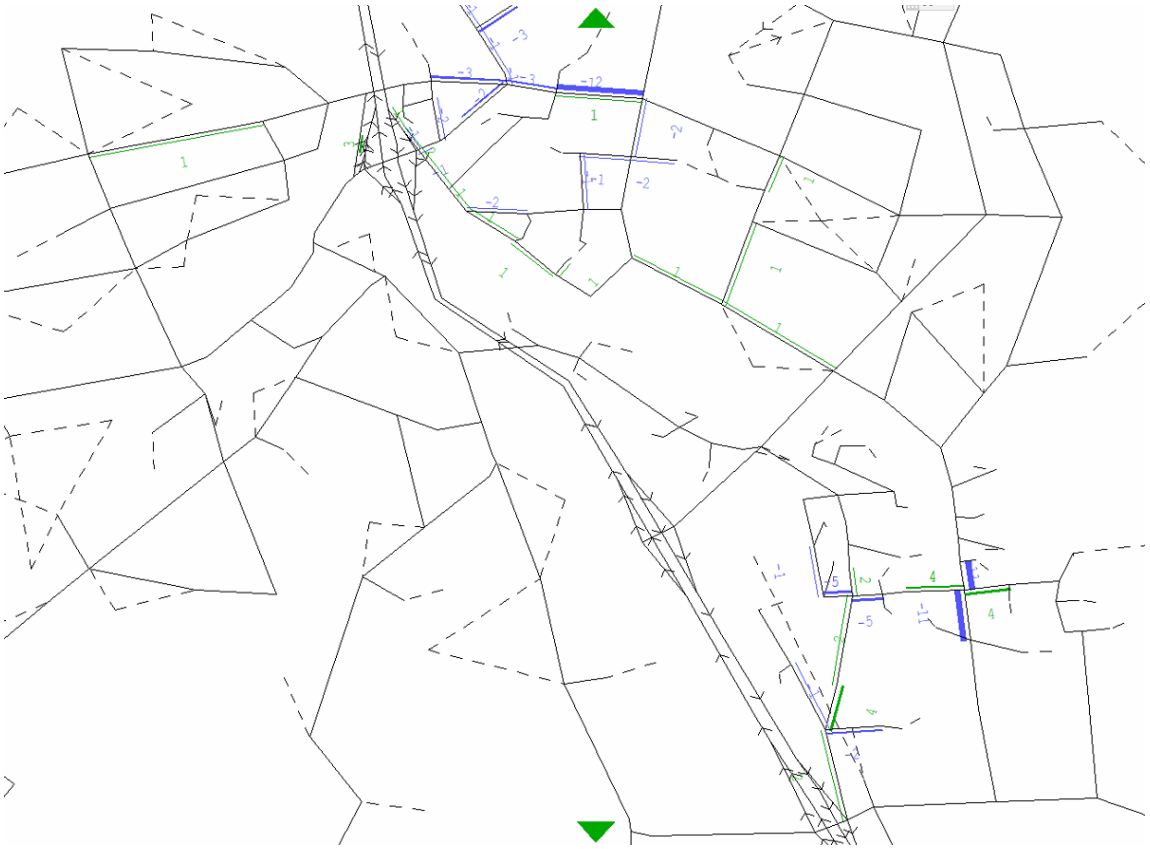


Figure 3-8: Threshold c - delay changes in the PM peak

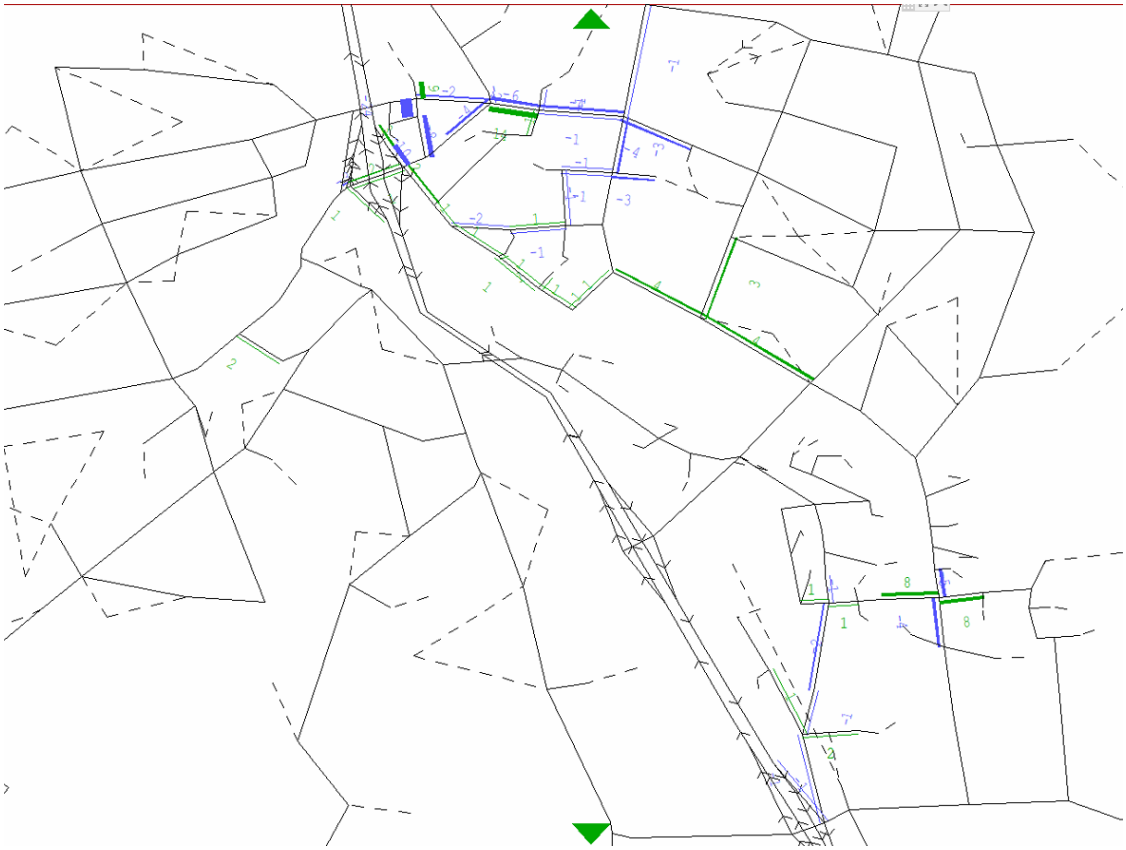


Figure 3-9: Threshold d - delay changes in the AM peak

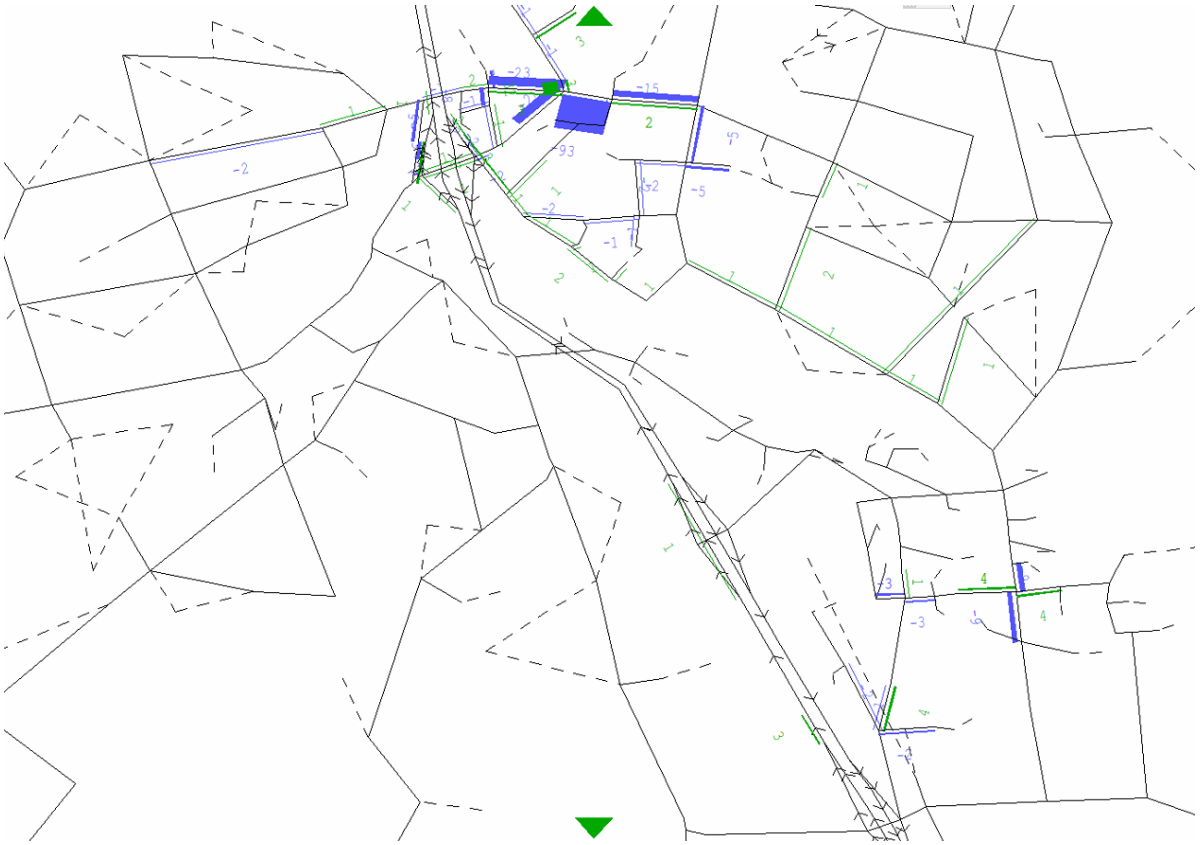
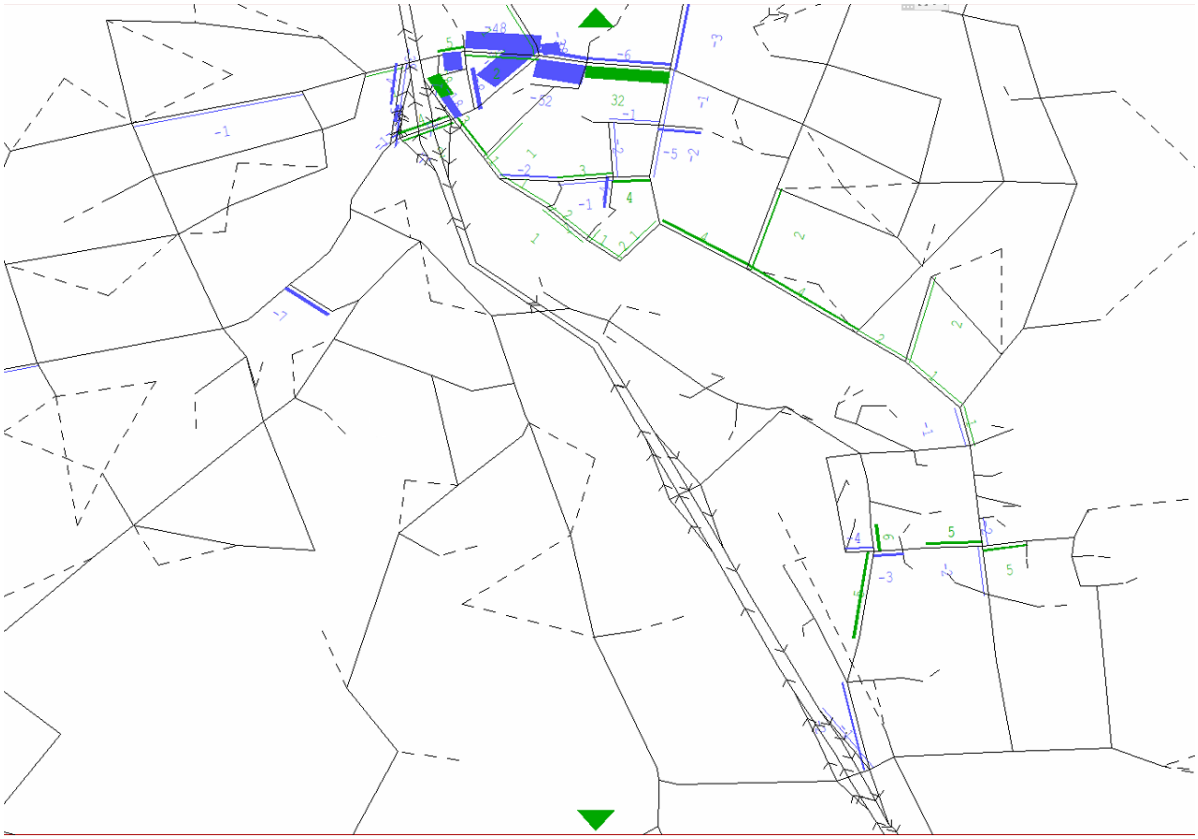


Figure 3-10: Threshold d - delay changes in the PM peak



3.5 Effects on Vehicle Kilometres Travelled

The route for traffic heading to the Drury centre will be somewhat indirect for the scenario without the Project. Therefore, the provision of the direct off ramp will assist with the objective of reducing overall kilometres travelled. The SATURN model indicates the following decreases comparing the situation without and with the direct off ramp with the quantum of development permitted with Thresholds c and d.

Table 3-1 Effects of providing the direct off ramp on Total Vehicle Kilometres Travelled)

	Morning Peak Hour	Evening Peak Hour
Threshold c	-385	-200
Threshold d	-765	-1,100

3.6 Effects on Public Transport

We do not expect significant effects on public transport due to the provision of the direct off ramp to Drury, as the direct ramp will not be used by buses. However, the model plots within Section 3.4 indicate that the direct off ramp will reduce delays at the Great South Road/Waihoehoe Road intersection, which will lead to benefits for buses using Waihoehoe Road.

3.7 Effects on Active Modes

We understand that the direct ramp will not be used by active mode users.

The direct off ramp will remove some traffic away from Great South Road and the motorway interchange, offering some (modest) benefit for active mode users, including those heading to/from the Shared Use Path. Also, the project will offer some benefit for active mode users along Waihoehoe Road.

3.8 Effects on Freight

As noted in Section 2.2.7 above, the existing southbound off ramp is currently used by relatively few HCVs, implying that the project will have minor positive effects on freight. However, the project will improve access to the new development area, which will include commercial/retail land uses, and it will reduce congestion at the motorway interchange, which will offer some benefit.

3.9 Safety Effects

The project will offer some safety benefits by reducing traffic at the Drury Interchange and at the Great South Road/Waihoehoe Road intersections.

The reduction in total kilometres travelled also implies some safety benefits.

4 CONCLUSIONS AND RECOMMENDATIONS

This report has considered the transport implications of providing an access ramp at the Drury Interchange which is proposed primarily to facilitate the development within the AUP that is anticipated for the Drury centre (Precinct 450).

Positive transport effects of the proposed direct ramp are:

- Traffic reassignment away from the local road network
- Improvements in the operation of the local road network, due to the above reassignment
- Reductions in the total kilometres travelled, due to the provision of the direct ramp (relative to the fairly indirect access for traffic heading to the future development area, for the scenario without the project).
- Minor benefits for walking and cycling
- Minor safety benefits
- Minor benefits for freight

Potential adverse effects of the Project area:

- Minor Adverse traffic effects during the construction stage

Based on the consideration of the statutory framework/requirements set out in the planning environment Section 2.1 of this report and the assessment of potential adverse effects on the environment, the following mitigation and management measures are recommended:

- To ensure all construction traffic effects are adequately managed and mitigated, we recommend a Construction Traffic Management Plan (CTMP) be prepared prior to construction commencing, for implementation during construction.

Drury Access Ramp Project Office

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